# 780 CMR 3608

## ROOF-CEILING CONSTRUCTION

### 3608.1 GENERAL

**3608.1.1 Application**: The provisions of 780 CMR 3608.1 shall control the design and construction of the roof-ceiling system for all buildings. The use of materials or methods of construction not specified in 780 CMR 3608.1 accomplishing the purposes intended with 780 CMR 36 and approved by the building official in accordance with 780 CMR 36 and approved by the building official in accordance with ***780 CMR 109*** shall be accepted as complying with 780 CMR 36.

**3608.1.2 Requirements**: Roof-ceiling construction shall be capable of ***supporting*** all loads imposed according to ***780 CMR 3603.1*** and shall transmit the resulting loads to supporting structural elements.

**3608.1.3 Roof drainage**: In areas where expansive or collapsible soils are known to exist ***or where required by city or town ordinance or by-law***, all dwellings shall have a controlled method of water disposal from roofs that will collect and discharge all roof drainage to the ground surface at least five feet (1524 mm) from foundation walls or to an approved drainage system.

### 780 CMR 3608.2 ROOF FRAMING

**3608.2.1 Identification and grade**: Load-bearing dimension lumber for rafters, trusses and ceiling joists shall conform to DOC PS 20 and to other applicable standards or grading rules, ***as listed in Appendix A***, and be identified by a grade mark or certificate of inspection issued by an approved agency. The grade mark or certificate shall provide adequate information to determine $F_b$, the allowable stress in bending, and E, the modulus of elasticity. Approved end jointed lumber may be used interchangeably with solid-sawn members of the same species and grade. Blocking shall be a minimum of utility grade lumber.

treatment and redrying process. The fire-retardant treated lumber shall be graded by an approved agency.

**3608.2.2 Design and construction**: Roof-ceilings of wood construction shall be designed and constructed in accordance with the provisions of 780 CMR 3608.2 or with the AFPA NDS-1991 "National Design Specification for Wood Construction," the CWC-1987 "Canadian Dimension Lumber Data Book," the WWPA- 1992 "Western Lumber Span Tables for Floor and Ceiling Joists and Roof Rafters," or the "Southern Pine Maximum Spans for Joists and Rafters," ***each as listed in Appendix A***. Roof-ceilings shall be constructed in accordance with Figures ***3606.4.10a***, ***3606.4.10b***, ***3606.4.10c*** and ***3608.2.4.1*** and nailed in accordance with Table ***3606.2.3a***.

**3608.2.2.1 Cathedral ceilings**: When ceiling joists and rafter ties are omitted and the rafters are used to create a cathedral ceiling, rafter ends shall be supported on bearing walls, headers or ridge beams. Rafters shall be attached to supporting members in accordance with Table ***3606.2.3a***. Ridge beams shall be capable of carrying the imposed roof loads and shall be supported by structural elements which transmit the loads to the foundation.

**3608.2.3 Framing details**: Rafters shall be nailed to ceiling joists to form a continuous tie between exterior walls where joists are parallel to the rafters. Where not parallel, rafters shall be tied with a rafter tie, located as near the plate as practical. Rafter ties shall be spaced not more than four feet (1219 mm) on center. Rafters shall be framed to ridge board or to each other with gusset plate as a tie. Ridge board shall be at least one-inch (25 mm) nominal thickness and not less in depth than the cut end of the rafter. At all valleys and hips there shall be a valley or hip rafter not less than two-inch (51 mm) nominal thickness

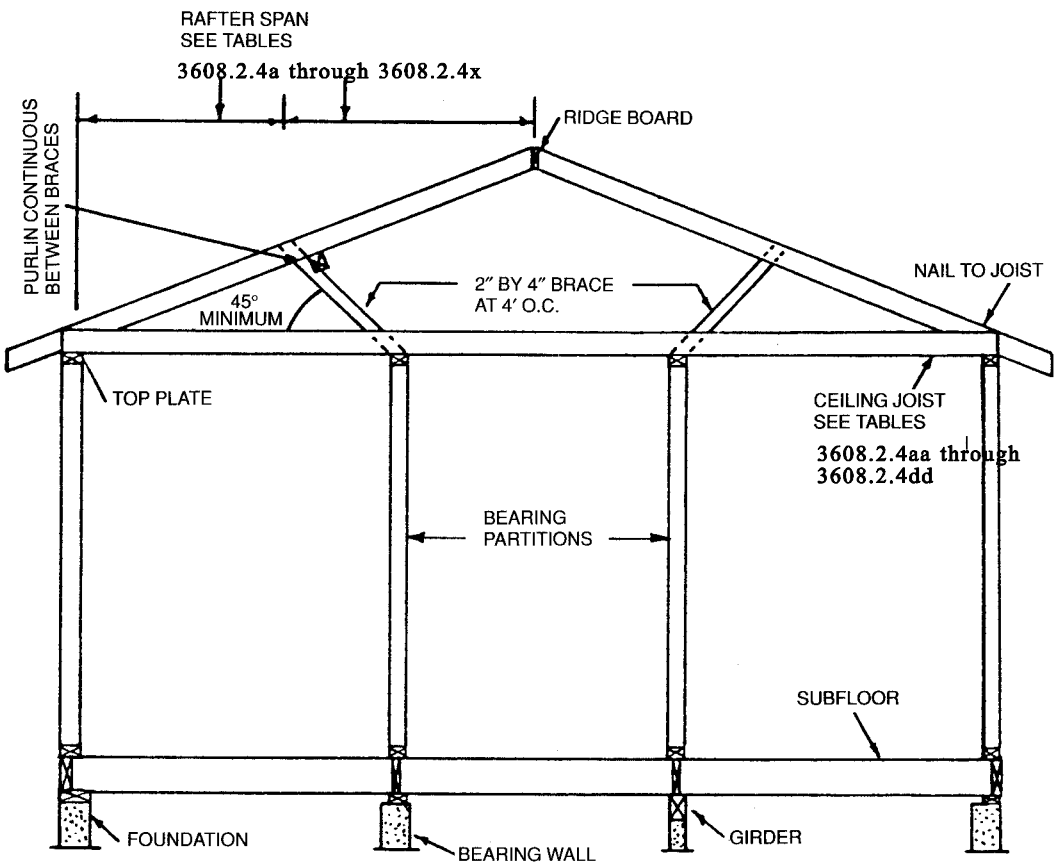
and butted joists shall be tied together in a manner to resist such thrust.

**3608.2.3.2 Collar ties:** Pairs of rafters on opposing sides of a ridge board in roof pitches over three units vertical in 12 units horizontal shall be connected by collar ties. Collar ties shall be located at a maximum spacing of 48 inches on center, measured parallel to the ridge, or at every third pair of rafters, whichever is smaller. Collar ties shall be located in the upper third of the height of the roof, measured from the sill plate to the ridge, and shall be a minimum of one inch by six inch dimension lumber. Collar ties shall be connected to rafters in accordance with the requirements for rafter ties in Table 3606.2.3a.

**3608.2.4 Allowable spans**: The unsupported spans for ceiling joists shall not exceed the values set forth in Tables ***3608.2.4aa*** through ***3608.2.4dd*** The unsupported spans for rafters shall not exceed the values set forth in Tables ***3608.2.4a through 3608.2.4x***. When the roof pitch is less than three units vertical in 12 units horizontal (25% slope), members supporting rafters and ceiling joists, such as ridge beams, hips and valleys, shall be designed as beams. Selection of rafters shall be based on lumber properties, snow load zone and deflection due to live load based on ceiling finish (see table 3603.1.6

**3608.2.4.1 Purlins**: Purlins may be installed to reduce the span of rafters as shown in Figure ***3608.2.4.1***. Purlins shall be sized no less than the required size of the rafters that they support. Purlins shall be continuous and shall be supported by two by four (51 by 102) struts installed to bearing walls at a slope not less than 45 degrees from the horizontal. The struts shall be spaced not more than four feet (1219 mm) on center, and the unbraced length of struts shall not exceed eight feet (2438 mm).

**FIGURE 3608.2.4.1**
**BRACED RAFTER CONSTRUCTION**




For SI: one inch = 25.4 mm, one foot = 304.8 mm.
NOTE: Where ceiling joists run perpendicular to the rafters, rafter ties shall be nailed to the rafters near the plate line and spaced not more than four feet on center.

**3608.2.5 Bearing**: The ends of each rafter or ceiling joist shall have not less than 1½ inches (38 mm) of bearing on wood or metal and not less than three inches (76 mm) on masonry.

**3608.2.6 Cutting and notching**: It shall be unlawful to notch, cut or pierce wood beams, joists or rafters in excess of the limitations herein specified, unless proven safe by structural analysis or suitably reinforced to transmit all calculated *loads*. Notches in the top or bottom of rafter shall not exceed $^{1}/_{16}$ of the depth of the rafter, ***shall not be longer than*** ? ***the depth of the member*** and shall not be located in the middle third of the span. ***Notch depth at the ends of the member*** shall not exceed ¼ the rafter depth.

**3608.2.7 Holes**: Holes drilled, bored ***or cut*** into rafters shall ***not be closer than*** two inches (51 mm) to the top or bottom of the rafters, ***or to any other hole located in the rafter. Where the rafter is notched, the hole shall not be closer than two***

NON-TEXT PAGE

***inches to the notch. The*** diameter ***of the hole*** shall not exceed ? the depth of the rafter.

**3608.2.8 Lateral support**: Rafters and ceiling joists having a depth-to-thickness ratio exceeding five to one based on nominal dimensions shall be provided with lateral support at points of bearing to prevent rotation.

**3608.2.8.1 Bridging**: Rafters and ceiling joists having a depth-to-thickness ratio exceeding six to one based on nominal dimensions shall be supported laterally by solid blocking, diagonal bridging (wood or metal) or a continuous one-inch-by-three-inch (25 mm by 76 mm) wood strip nailed across the rafters or ceiling joists at intervals not exceeding ten feet (3048 mm).

**3608.2.9 Framing of openings**: Openings in roof and ceiling framing shall be framed with headers between ceiling joists or rafters. When the header span does not exceed four feet (1219 mm), the header may be a single member the same size as the ceiling joist or rafter. When the header span exceeds four feet (1219 mm), the header and the joists or rafters that support the header shall be doubled, and approved hangers shall be used to connect the header to the joists or rafters.

**3608.2.1<u>0</u> Trusses**: Wood trusses shall be designed in accordance with approved engineering practice. Truss components may be joined by nails, glue, timber connectors or other approved fastening devices. The design of metal plate connected wood trusses shall comply with TPI QST, TPI PCT and TPI-1985 "Design Specification for Metal Plate Connected Wood Trusses", ***each as listed in Appendix A***. Trusses shall be braced according to their appropriate engineered design. In the absence of specific bracing requirements, trusses shall be braced in accordance with TPI BWT, ***as listed in Appendix A***. Truss members shall not be cut or altered unless so designed.

**3608.2.1<u>1</u> Roof tie-down**: Roof assemblies subject to wind uplift pressures of 20 pounds per square foot (0.958 kN/m$^2$) or greater, shall have rafter or truss ties provided in accordance with Table ***3608.2.12***. The resulting uplift forces from the rafter or truss ties

***3608.3.1***. Spaced lumber sheathing for wood shingle and shake roofing shall conform to the requirements of ***780 CMR 3609.8 and 3609.9***.

**3608.3.2 Plywood sheathing**:

**3608.3.2.1 Identification and grade**: Plywood and wood structural panels shall conform to DOC PS 1 or DOC PS 2 ***as listed in Appendix A***, and shall be identified by grade mark or certificate of inspection issued by an approved agency. Plywood and wood structural panels shall comply with the grades specified in Table ***3605.3.2.1.1a***.

**3608.3.2.1.1 Type**: All plywood, when designed to be exposed in outdoor applications, shall be of an exterior type. Plywood or wood structural panel roof sheathing exposed to the underside may be of interior type bonded with exterior glue, identified as Exposure 1.

**3608.3.2.1.2 Fire-retardant-treated plywood**: The allowable unit stresses for fire-retardant-treated plywood, including fastener values, shall be developed from an approved method of investigation which considers the effects of anticipated temperature and humidity to which the fire-retardant plywood will be subjected, the type of treatment and redrying process. The fire-retardant-treated plywood shall be graded by an approved agency.

**3608.3.2.1.3 Wood structural panels**: Wood structural-use panels conforming to DOC PS 2, ***as listed in Appendix A***, includes performance-rated plywood, oriented strandboard and composite panels. Oriented strandboard structural-use panels manufactured in Canada shall conform to CSA 0437 ***as listed in Appendix A***.

**3608.3.2.2 Allowable spans**: The maximum allowable spans for plywood and wood structural panel roof sheathing shall not exceed the values set forth in Table ***3605.3.2.1.1a***.

**3608.3.2.3 Installation**: Plywood and wood structural panel roof sheathing shall be installed with joints staggered or nonstaggered in

**TABLE 3608.2.12**
**WIND UPLIFT FORCES ON ROOF TRUSSES AND RAFTERS[1, 2, 3, 4]**
**(Pounds Per Tie-Down Connection)**

| WIND UPLIFT PRESSURE ON ROOF (psf)[5] | TOTAL BUILDING WIDTH ROOF INCLUDING OVERHANG (feet) | | | | |
|---|---|---|---|---|---|
| | 24 | 28 | 32 | 36 | 40 |
| 20 | 192 | 224 | 256 | 288 | 320 |
| 30 | 432 | 504 | 576 | 648 | 720 |
| 40 | 672 | 784 | 895 | 1,008 | 1,120 |
| 50 | 912 | 1,064 | 1,216 | 1,368 | 1,520 |
| 60 | 1,152 | 1,344 | 1,536 | 1,728 | 1,920 |
| 70 | 1,392 | 1,624 | 1,856 | 2,088 | 2,320 |
| 80 | 1,632 | 1,904 | 2,176 | 2,448 | 2,720 |
| 90 | 1,872 | 2,184 | 2,496 | 2,808 | 3,120 |

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, psf = 0.0479 $kNm^2$

1. A continuous load path capable of resisting the tributary forces shall be provided from tie-down connections to the foundation.
2. Wind uplift forces are based on 24-inch spacing of roof trusses or rafters. For spacing other than 24 inches, forces shall be adjusted accordingly.
3. Interpolation is permitted for intermediate values of wind uplift pressures and building widths.
4. The rated capacity of approved tie-down devices is permitted to include a ? increase for wind effects.
5. Tie-down connections shall be provided at bearing walls for roof trusses or rafters to resist wind uplift forces.

**3608.3.3 Particleboard sheathing**:

**3608.3.3.1 Identification and grade**: Particleboard roof sheathing shall conform to Type 2-M-W as set forth in ANSI A208.1 ***as listed in Appendix A*** and shall be so identified by a grade mark or certificate of inspection issued by an approved agency.

**3608.3.3.2 Allowable spans**: The allowable loads and spans for particleboard roof sheathing shall not exceed the values set forth in Table **3608.3.3.2**.

**3608.3.3.3 Installation**: Particleboard roof sheathing shall be installed in accordance with Tables ***3606.2.3a*** and ***3608.3.3.2***. Where walls are

| | |
|---|---|
| 24 | ? |
| 48[1] | 1½ T & G |
| 60[2] | |
| 72[3] | |

For SI: 1 inch = 25.4 mm, 1 psi= 6.895 kPa.

1. Minimum 270 $F_b$, 340,000 $E$.
2. Minimum 420 $F_b$, 660,000 $E$.
3. Minimum 600 $F_b$, 1,150,000 $E$.

**TABLE 3803.3.2**
**ALLOWABLE LOADS FOR PARTICLEBOARD ROOF SHEATHING[1, 2, 3]**

| GRADE |
|---|
| 2-M-W |

For SI: 1 inch = 25.4 mm, 1 psi = 6895 kPa.

1. Panels are continuous over two or more spans.
2. Uniform load deflection limitations: $^1/_{180}$ of the span under live load plus dead load and $^1/_{240}$ of the span under live load only.
3. The panels may be applied parallel or perpendicular to the span of the rafters or joists and shall be continuous over two or more spans. If the panels are applied perpendicular to roof supports, the end joints of the panels shall be offset so that four panel corners will not meet. Cutouts for items such as plumbing and electrical shall be oversized to avoid a forced fit. A ½-inch gap must be provided between the panel and concrete masonry walls. Leave a $^1/_{16}$-inch gap between panels and nail no closer than ? inch from panel edge.
4. Edges shall be tongue and groove or supported with blocking or edge clips.

## 780 CMR 3608.4 METAL

**3608.4.1 General**: Elements shall be straight and

***3608.4.2 Steel Elements: Steel structural elements in roof-ceiling construction may be either hot-rolled structural steel shapes or members cold formed to shape from steel strip or plate or a fabricated combination thereof. Steel structural members in roof-ceiling construction shall be designed in accordance with the AISC "Specification for the Design", "Fabrication and Erection of Structural Steel for Buildings" as listed in Appendix A.***

***3608.4.3 Aluminum Elements: Aluminum structural elements in roof-ceiling systems shall, be constructed of materials and designed in accordance with AA SAS 30 as listed in Appendix A.***

## 780 CMR 3608.5 CEILING FINISHES

**3608.5.1 Ceiling installation**: Ceilings shall be installed in accordance with the requirements for interior wall finishes, as provided in ***780 CMR 3607.2***.

## 780 CMR 3608.6 ROOF VENTILATION

**3608.6.1 Ventilation required**: Enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain or snow. Ventilating openings shall be provided with corrosion-resistant wire mesh, with the least dimension being ? inch (3.2 mm).

**3608.6.2 Minimum area**: The total net free ventilating area shall not be less than one to 150 of the area of the space ventilated except that the total area is permitted to be reduced to one to 300, provided at least 50% and not more than 80% of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated at least three feet (914 mm) above eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents. As an alternative, the net free cross-ventilation area may be reduced to one to 300 when a vapor barrier having a transmission rate not exceeding one perm (57.4 ng/s?m$^2$?Pa) is installed on the warm side of the ceiling.

**3608.6.3 Vent clearance**: Where eave or cornice vents are installed, insulation shall not block the free flow of air. A minimum of one-inch (25 mm) space shall be provided between the insulation and the roof sheathing at the location of the vent.

## 780 CMR 3608.7 ATTIC ACCESS

**3608.7.1 Accessible attic access**: A readily accessible attic access framed opening not less than 22 inches by 30 inches (559 mm by 762 mm) shall be provided to any attic area having a clear height of over 30 inches (762 mm).

## TABLE 3608.2.4aa
## ALLOWABLE SPANS FOR CEILING JOISTS
## 20 Lbs. per Sq. Ft. Live Load
**(Limited attic storage where development of future rooms is not possible)**
**(Veneer Plaster Ceiling)**

**DESIGN CRITERIA:** Deflection–For 20 lbs. per sq. ft. live load. Limited to span in inches divided by 360**.** Strength–Live load of 20 lbs. per sq. ft. plus dead load of 10 lbs. per sq. ft. determines fiber stress value shown.

**HOW TO USE TABLES:** Enter table with span of joists (upper figure in each square). Determine size and spacing (first column) based stress grade (lower figure in each square) and modulus of elasticity (top row) of lumber to be used.

| JOIST SIZE AND SPACING | | MODULUS OF ELASTICITY, "*E*," IN 1,000,000 PSi | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **(inches)** | **(inches)** | **0.4** | **0.5** | **0.6** | **0.7** | **0.8** | **0.9** | **1.0** | **1.1** | **1.2** | **1.3** |
| | 12.0 | 5-5<br>430 | 5-10<br>500 | 6-2<br>560 | 6-6<br>630 | 6-10<br>680 | 7-1<br>740 | 7-4<br>790 | 7-7<br>850 | 7-10<br>900 | 8-0<br>950 |
| | 16.0 | 4-11<br>470 | 5-4<br>550 | 5-8<br>620 | 5-11<br>690 | 6-2<br>750 | 6-5<br>810 | 6-0<br>870 | 6-11<br>930 | 7-1<br>990 | 7-3<br>1,040 |
| 2 x 4 | 24.0 | 4-4<br>540 | 4-8<br>630 | 4-11<br>710 | 5-2<br>790 | 5-5<br>860 | 5-8<br>930 | 5-10<br>1,000 | 6-0<br>1,070 | 6-2<br>1,130 | 6-4<br>1,190 |
| | 12 0 | 8-6<br>430 | 9-2<br>500 | 9 9<br>560 | 10-3<br>630 | 10-9<br>680 | 11-2<br>740 | 11-7<br>790 | 11-11<br>850 | 12-3<br>900 | 12-7<br>950 |
| | 16.0 | 7-9<br>470 | 8-4<br>550 | 8-10<br>620 | 9-4<br>690 | 9 9<br>750 | 10-2<br>810 | 10-6<br>870 | 10-10<br>930 | 11-2<br>990 | 11-5<br>1,040 |
| 2 x 6 | 24 0 | 6-9<br>540 | 7-3<br>630 | 7-9<br>710 | 8-2<br>790 | 8-6<br>860 | 8-10<br>930 | 9-2<br>1,000 | 9-6<br>1,070 | 9-9<br>1,130 | 10-0<br>1.190 |
| | 12 0 | 11-3<br>430 | 12-1<br>500 | 12-10<br>560 | 13-6<br>630 | 14-2<br>680 | 14-8<br>740 | 15-3<br>790 | 15-9<br>850 | 16-2<br>900 | 16-7<br>950 |
| | 16.0 | 10-2<br>470 | 11-0<br>550 | 11-8<br>620 | 12-3<br>690 | 12-10<br>750 | 13-4<br>810 | 13-10<br>870 | 14-3<br>930 | 14-8<br>990 | 15-1<br>1,040 |
| 2 x 8 | 24.0 | 8-11<br>540 | 9-7<br>630 | 10-2<br>710 | 10-9<br>790 | 11-3<br>860 | 11-8<br>930 | 12-1<br>1,000 | 12-6<br>1,070 | 12-10<br>1,130 | 13-2<br>1,190 |
| | 12.0 | 14-4<br>430 | 15-5<br>500 | 16-5<br>560 | 17-3<br>630 | 18-0<br>680 | 18-9<br>740 | 19-5<br>790 | 20- 1<br>850 | 20-8<br>900 | 21 -2<br>950 |
| | 16.0 | 13-0<br>470 | 14-0<br>550 | 14-11<br>620 | 15-8<br>690 | 16-5<br>750 | 17-0<br>810 | 17-8<br>870 | 18-3<br>930 | 18-9<br>990 | 19-3<br>1,040 |
| 2x 10 | 24.0 | 11-4<br>540 | 12-3<br>630 | 13-0<br>710 | 13-8<br>790 | 14-4<br>860 | 14-11<br>930 | 15-5<br>1,000 | 15-11<br>1,070 | 16-5<br>1,130 | 16-10<br>1,190 |
| **(inches)** | **(inches)** | **1.4** | **1.5** | **1.6** | **1.7** | **1.8** | **1.9** | **2.0** | **2.2** | **2.4** | |
| | 12.0 | 8-3<br>990 | 8-5<br>1,040 | 8-7<br>1,090 | 8-9<br>1,130 | 8-11<br>1,170 | 9-1<br>1,220 | 9-3<br>1,260 | 9-7<br>1,340 | 9-10<br>1,420 | |
| | 16.0 | 7-6<br>1,090 | 7-8<br>1,140 | 7-10<br>1,200 | 8-0<br>1,240 | 8-1<br>1,290 | 8-3<br>1,340 | 8-5<br>1,390 | 8-8<br>1,480 | 8-11<br>1,570 | |
| 2 x 4 | 24.0 | 6-6<br>1,250 | 6-8<br>1,310 | 6-10<br>1,370 | 7-0<br>1,420 | 7-1<br>1,480 | 7-3<br>1,530 | 7-4<br>1,590 | 7-7<br>1 690 | 7-10<br>1,790 | |
| | 12.0 | 12-11<br>990 | 13-3<br>1,040 | 13-6<br>1,090 | 13-9<br>1,130 | 14-1<br>1,170 | 14-4<br>1,220 | 14-7<br>1,260 | 15 0<br>1 340 | 15-6<br>1,420 | |
| | 16.0 | 11-9<br>1,090 | 12-0<br>1,140 | 12-3<br>1,200 | 12-6<br>1,240 | 12-9<br>1,290 | 13-0<br>1,340 | 13-3<br>1,390 | 13-8<br>1,480 | 14-1<br>1,570 | |
| 2 x 6 | 24 0 | 10-3<br>1,250 | 10-6<br>1,310 | 10-9<br>1,370 | 10-11<br>1,420 | 11-2<br>1,480 | 11-4<br>1,530 | 11-7<br>1,590 | 11.11<br>1,690 | 12-3<br>1,790 | |

For SI: I inch = 25.4 mm, 1 pound per square inch = 6.895 kPa,1I pound per square foot = 0.0479 kN/m2.
NOTE: The extreme fiber stress in bending, *"Fb,"* in pounds per square inch is shown below each span.

## TABLE 3608.2.4bb
## ALLOWABLE SPANS FOR CEILING JOISTS
## 20 Lbs. per Sq. Ft. Live Load
**(Limited attic storage where development of future rooms is not possible)**
**(Gypsum Ceiling)**

**DESIGN CRITERIA:** Deflection–For 20 lbs. per sq. ft. live load. Limited to span in inches divided by 240. Strength–Live load of 20 lbs. per sq. ft. plus dead load of 10 lbs. per sq. ft. determines fiber stress value.
**HOW TO USE TABLES:** Enter table with span of joists (upper figure in each square). Determine size and spacing (first column) based stress grade (lower figure in each square) and modulus of elasticity (top row) of lumber to be used.

| JOIST SIZE AND SPACING | | MODULUS OF ELASTICITY, "*E*," IN 1,000,000 PSI | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **(inches)** | **(inches)** | **0.4** | **0.5** | **0.6** | **0.7** | **0.8** | **0.9** | **1.0** | **1.1** | **1.2** | **1 .3** |
| | 12.0 | 6-2<br>560 | 6-8<br>660 | 7-1<br>740 | 7-6<br>820 | 7-10<br>900 | 8-1<br>970 | 8-5<br>1,040 | 8-8<br>1,110 | 8-11<br>1,170 | 9-2<br>1,240 |
| | 16.0 | 5-8<br>620 | 6-1<br>720 | 6-5<br>810 | 6-9<br>900 | 7-1<br>990 | 7-5<br>1,070 | 7-8<br>1,140 | 7-11<br>1,220 | 8-1<br>1,290 | 8-4<br>1,360 |
| 2 x 4 | 24.0 | 4-11<br>710 | 5-4<br>830 | 5-8<br>930 | 5-11<br>1,030 | 6-2<br>1,130 | 6-5<br>1,220 | 6-8<br>1,310 | 6-11<br>1,400 | 7-1<br>1,480 | 7-3<br>1,560 |
| | 12.0 | 9-9<br>560 | 10-6<br>660 | 11-2<br>740 | 11-9<br>820 | 12-3<br>900 | 12-9<br>970 | 13-3<br>1,040 | 13-8<br>1,110 | 14-1<br>1,170 | 14-5<br>1,240 |
| | 16.0 | 8-10<br>620 | 9-6<br>720 | 10-2<br>810 | 10-8<br>900 | 11-2<br>990 | 11-7<br>1,070 | 12-0<br>1,140 | 12-5<br>1,220 | 12-9<br>1,290 | 13-1<br>1,360 |
| 2 x 6 | 24.0 | 7-9<br>710 | 8-4<br>830 | 8-10<br>930 | 9-4<br>1,030 | 9-9<br>1,130 | 10-2<br>1,220 | 10-6<br>1,310 | 10-10<br>1,400 | 11-2<br>1,480 | 11 -5<br>1,560 |
| | 12.0 | 12-10<br>560 | 13-10<br>660 | 14-8<br>740 | 15-6<br>820 | 16-2<br>900 | 16-10<br>970 | 17-5<br>1,040 | 18-0<br>1,110 | 18-6<br>1,170 | 19-0<br>1,240 |
| | 16.0 | 11 -8<br>620 | 12-7<br>720 | 13-4<br>810 | 14-1<br>900 | 14-8<br>990 | 15-3<br>1,070 | 15-10<br>1,140 | 164<br>1,220 | 16-10<br>1,290 | 17-3<br>1,360 |
| 2 x 8 | 24.0 | 10-2<br>710 | 11-0<br>830 | 11-8<br>930 | 12-3<br>1,030 | 12-10<br>1,130 | 13-4<br>1,220 | 13-10<br>1,310 | 14-3<br>1,400 | 14-8<br>1,480 | 15-1<br>1,560 |
| | 12.0 | 16-5<br>560 | 17-8<br>660 | 18-9<br>740 | 19-9<br>820 | 20-8<br>900 | 21 -6<br>970 | 22-3<br>1,040 | 22-11<br>1,110 | 23-8<br>1,170 | 24-3<br>1,240 |
| | 16.0 | 14-11<br>620 | 16-0<br>720 | 17-0<br>810 | 17-11<br>900 | 18-9<br>990 | 19-6<br>1,070 | 20-2<br>1,140 | 20-10<br>1,220 | 21-6<br>1,290 | 22-1<br>1,360 |
| 2 x 10 | 24.0 | 13-0<br>710 | 14-0<br>830 | 14-11<br>930 | 15-8<br>1,030 | 16-5<br>1,130 | 17-0<br>1,220 | 17-8<br>1,310 | 18-3<br>1,400 | 18 9<br>1,480 | 19-3<br>1,560 |
| **(inches)** | **(inches)** | **1.4** | **1.5** | **1.6** | **1.7** | **1.8** | **1.9** | **2.0** | **2.2** | **2.4** | |
| | 12.0 | 9-5<br>1,300 | 9-8<br>1,360 | 9-10<br>1,420 | 10-0<br>1,480 | 10-3<br>1,540 | 10-5<br>1,600 | 10-7<br>1,650 | 10-11<br>1,760 | 11-3<br>1,860 | |
| | 16.0 | 8-7<br>1,430 | 8-9<br>1,500 | 8- 11<br>1,570 | 9- 1<br>1,630 | 9-4<br>1,690 | 9-6<br>1,760 | 9-8<br>1,820 | 9- 11<br>1,940 | 10-3<br>2,050 | |
| 2 x 4 | 24.0 | 7-6<br>1,640 | 7-8<br>1,720 | 7-10<br>1,790 | 8-0<br>1,870 | 8-1<br>1,940 | 8-3<br>2,010 | 8-5<br>2,080 | 8-8<br>2,220 | 8-11<br>2,350 | |
| | 12.0 | 14-9<br>1,300 | 15-2<br>1,360 | 15-6<br>1,420 | 15-9<br>1,480 | 16-1<br>1,540 | 16-4<br>1,600 | 16-8<br>1,650 | 17-2<br>1,760 | 17-8<br>1,860 | |
| | 16.0 | 13-5<br>1,430 | 13-9<br>1,500 | 14-1<br>1,570 | 14-4<br>1,630 | 14-7<br>1,690 | 14-11<br>1,760 | 15-2<br>1,820 | 15-7<br>1,940 | 16-1<br>2,050 | |
| 2 x 6 | 24.0 | 11-9<br>1,640 | 12-0<br>1,720 | 12-3<br>1,790 | 12-6<br>1,870 | 12-9<br>1,940 | 13-0<br>2,010 | 13-3<br>2,080 | 13-8<br>2,220 | 14-1<br>2,350 | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1,640 | 1,720 | 1,790 | 1,870 | 1,940 | 2,010 | 2,080 | 2,220 | 2,350 | |

For Sl: I inch = 25.4 mm, I pound per square inch = 6.895 kPa, I pound per square foot = 0.0479 kN/m2.
NOTE: The extreme fiber stress in bending, *"Fb,"*in pounds per square inch is shown below each span.

## TABLE 3608.2.4cc
## ALLOWABLE SPANS FOR CEILING JOISTS
### 10 Lbs. per Sq. Ft. Live Load
### (No attic storage and roof slope not steeper than 3 in 1 2)
### (Veneer Plaster Ceiling)

**DESIGN CRITERIA:** Deflection-For 10 Ibs. per sq. Ft. live load. Limited to span in inches divided by 360. Strength-Live load of 10 lbs. per sq. Ft. plus dead load of 5 lbs. per sq. ft. determines fiber stress value.

**HOW TO USE TABLES:** Enter table with span of joists (upper figure in each square). Determine size and spacing (first column) based stress grade (lower figure in each square) and modulus of elasticity (top row) of lumber to be used.

| JOIST SIZE AND SPAC1NG | | MODULUS OF ELASTICITY, "E" IN 1,000,000 PSI | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (inches} | (inches) | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 |
| | 12.0 | 6-10<br>340 | 7-4<br>400 | 7-10<br>450 | 8-3<br>500 | 8-7<br>540 | 8-11<br>590 | 9-3<br>630 | 9-7<br>670 | 9-10<br>710 | 10-1<br>750 |
| | 16.0 | 6-2<br>380 | 6-8<br>440 | 7-1<br>490 | 7-6<br>550 | 7-10<br>600 | 8-1<br>650 | 8-5<br>690 | 8-8<br>740 | 8-11<br>780 | 9-2<br>830 |
| 2 x 4 | 24.0 | 5-5<br>430 | 5-10<br>500 | 6-2<br>560 | 6-6<br>630 | 6-10<br>680 | 7-1<br>740 | 7-4<br>790 | 7-7<br>850 | 7-10<br>900 | 8-0<br>950 |
| | 12.0 | 10-9<br>340 | 11-7<br>400 | 12-3<br>450 | 12-11<br>500 | 13-6<br>540 | 14-1<br>590 | 14-7<br>630 | 15-0<br>670 | 15-6<br>710 | 15-11<br>750 |
| | 16.0 | 9-9<br>380 | 10-6<br>440 | 11-2<br>490 | l1-9<br>550 | 12-3<br>600 | 12-9<br>650 | 13-3<br>690 | 13-8<br>740 | 14.1<br>780 | 14-5<br>830 |
| 2 x 6 | 24.0 | 8-6<br>430 | 9-2<br>500 | 9-9<br>560 | 10-3<br>630 | 10-9<br>680 | 11-2<br>740 | 11-7<br>790 | 11-11<br>850 | 12-3<br>900 | 12-7<br>950 |
| | 12.0 | 14-2<br>340 | 15-3<br>400 | 16-2<br>450 | 17-0<br>500 | 17-10<br>540 | 18-6<br>590 | 19-2<br>630 | 19-10<br>670 | 20-5<br>710 | 20-11<br>750 |
| | 16.0 | 12-10<br>380 | 13-10<br>440 | 14-8<br>490 | 15-6<br>550 | 16-2<br>600 | 16-10<br>650 | 17-5<br>690 | 18-0<br>740 | 18-6<br>780 | 19-0<br>830 |
| 2 x 8 | 24.0 | 11-3<br>430 | 12-1<br>500 | 12-10<br>560 | 13-6<br>630 | 14-2<br>680 | 14-8<br>740 | 15-3<br>790 | 15-9<br>850 | 16-2<br>900 | 16-7<br>950 |
| | 12.0 | 18-0<br>340 | 19-5<br>400 | 20-8<br>450 | 21-9<br>500 | 22-9<br>540 | 23-8<br>590 | 24-6<br>630 | 25-3<br>670 | 26-0<br>710 | 26-9<br>750 |
| | 16.0 | 16-5<br>380 | 17-8<br>440 | 18-9<br>490 | 19-9<br>550 | 20-8<br>600 | 21 -6<br>650 | 22-3<br>690 | 22- 11<br>740 | 23-8<br>780 | 24-3<br>830 |
| 2 x 10 | 24.0 | 14-4<br>430 | 15-5<br>500 | 16-5<br>560 | 17-3<br>630 | 18-0<br>680 | 18-9<br>740 | 19-5<br>790 | 20-1<br>850 | 20-8<br>900 | 21-2<br>950 |
| (inches) | (inches) | 1.4 | 1.5 | 1.6 | 1.7 | 1.8 | 1.9 | 2.0 | 2.2 | 2.4 | |
| | 12.0 | 10-4<br>790 | 10-7<br>830 | 10-10<br>860 | 11-1<br>900 | 11-3<br>930 | 11-6<br>970 | 11-8<br>1,000 | 12-1<br>1,070 | 12-5<br>1,130 | |
| | 16.0 | 9-5<br>870 | 9-8<br>910 | 9-10<br>950 | 10-0<br>990 | 10-3<br>1,030 | 10-5<br>1,060 | 10-7<br>1,100 | 10 11<br>1,170 | 11-3<br>1,240 | |
| 2 x 4 | 24.0 | 8-3<br>990 | 8-5<br>I ,040 | 8-7<br>I ,090 | 8-9<br>1,130 | 8-11<br>1,170 | 9-1<br>1,220 | 9-3<br>1,260 | 9-7<br>1,340 | 9-10<br>1,420 | |
| | 12.0 | 16-3<br>790 | 16-8<br>830 | 17-0<br>860 | 17-4<br>900 | 17-8<br>930 | 18-0<br>970 | 18-4<br>1,000 | 18-11<br>1,070 | 19-6<br>1,130 | |
| | 16.0 | 14-9<br>870 | 15-2<br>910 | 15-6<br>950 | 15-9<br>990 | 16-1<br>1,030 | 16-4<br>1,060 | 16-8<br>1,100 | 17-2<br>1,170 | 17-8<br>1,240 | |
| | | 12-11 | 13-3 | 13-6 | 13-9 | 14-1 | 14-4 | 14-7 | 15-0 | 15-6 | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 990 | 1,040 | I ,090 | 1,130 | 1,170 | 1,220 | 1,260 | 1,340 | 1,420 | |

For Sl: 1 inch = 25.4 mm, 1 pound per square inch = 6.895 kPa, 1 pound per square foot = 0.0479 kN/m2.
NOTE: The extreme fiber stress in bending, *"Fb,"* in pounds per square inch is shown below each span.

## TABLE 3608.2.4dd
## ALLOWABLE SPANS FOR CEILING JOISTS
### 10 Lbs per Sq. Ft. Live Load
### (No attic storage and roof slope not steeper than 3 in 12)
### (Gypsum Ceiling)

**DESIGN CRITERIA:** Deflection–For 10 lbs. per sq. ft. live load. Limited to span in inches divided by 240. Strength–Live load of 10 lbs. per *sq. Ft.* plus dead load of 5 lbs. per sq. ft. determines fiber stress value.

**HOW TO USE TABLES:** Enter table with span of joists (upper figure in each square). Determine size and spacing (first column) based stress grade (lower figure in each square) and modulus of elasticity (top row) of lumber to be used.

| JOIST SIZE AND SPACING | | MODULUS OF ELASTICITY, "*E*," IN 1,000,000 PSI | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **(inches)** | **(inches)** | **0.4** | **0.5** | **0.6** | **0.7** | **0.8** | **0.9** | **1.0** | **1.1** | **1.2** | **1.3** |
| | 12.0 | 7-10<br>450 | 8-5<br>520 | 8-11<br>590 | 9-5<br>650 | 9-10<br>710 | 10-3<br>770 | 10-7<br>830 | 10-11<br>880 | l l-3<br>930 | l l -7<br>980 |
| | 16.0 | 7-1<br>490 | 7-8<br>570 | 8-1<br>650 | 8-7<br>720 | 8-11<br>780 | 9-4<br>850 | 9-8<br>910 | 9-11<br>970 | 10-3<br>1,030 | 10-6<br>1,080 |
| 2 x 4 | 24.0 | 6-2<br>560 | 6-8<br>660 | 7-1<br>740 | 7-6<br>820 | 7-10<br>900 | 8-1<br>970 | 8-5<br>I ,040 | 8-8<br>1,110 | 8-11<br>1,170 | 9-2<br>1,240 |
| | 12.0 | 12-3<br>450 | 13-3<br>520 | 14-1<br>590 | 14-9<br>650 | 15-6<br>710 | 16-1<br>770 | 16-8<br>830 | 17-2<br>880 | 17-8<br>930 | 18-2<br>980 |
| | 16.0 | 11-2<br>490 | 12-0<br>570 | 12-9<br>650 | 13-5<br>720 | 14-1<br>780 | 14-7<br>850 | 15-2<br>910 | 15-7<br>970 | 16-1<br>1,030 | 16-6<br>1,080 |
| 2 x 6 | 24.0 | 9-9<br>560 | 10-6<br>660 | 11-2<br>740 | 11-9<br>820 | 12-3<br>900 | 12-9<br>970 | 13-3<br>I ,040 | 13-8<br>1,110 | 14-1<br>1,170 | 14-5<br>1,240 |
| | 12.0 | 16-2<br>450 | 17-5<br>520 | 18-6<br>590 | 19-6<br>650 | 20-5<br>710 | 21-2<br>770 | 21-11<br>830 | 22-8<br>880 | 23-4<br>930 | 24-0<br>980 |
| | 16.0 | 14-8<br>490 | 15-10<br>570 | 16-10<br>650 | 17-9<br>720 | 18-6<br>780 | 19-3<br>850 | 19-11<br>910 | 20-7<br>970 | 21-2<br>1,030 | 21-9<br>1,080 |
| 2x8 | 24.0 | 12-10<br>560 | 13-10<br>660 | 14-8<br>740 | 15-6<br>820 | 16-2<br>900 | 16-10<br>970 | 17-5<br>1,040 | 18-0<br>1,110 | 18-6<br>1,170 | 19-0<br>1,240 |
| | 12.0 | 20-8<br>450 | 22-3<br>520 | 23-8<br>590 | 24- 10<br>650 | 26-0<br>710 | 27- 1<br>770 | 28-0<br>830 | 28- 11<br>880 | 29-9<br>930 | 30-7<br>980 |
| | 16.0 | 18-9<br>490 | 20-2<br>570 | 21 -6<br>650 | 22-7<br>720 | 23-8<br>780 | 24-7<br>850 | 25 -5<br>910 | 26-3<br>970 | 27- 1<br>1,030 | 27-9<br>1,080 |
| 2x 10 | 24.0 | 16-5<br>560 | 17-8<br>660 | 18-9<br>740 | 19-9<br>820 | 20-8<br>900 | 21-6<br>970 | 22-3<br>1,040 | 22-11<br>1,110 | 23-8<br>1,170 | 24-3<br>1,240 |
| **(inches)** | **(inches)** | **1.4** | **1.5** | **1.6** | **1.7** | **1.8** | **1.9** | **2.0** | **2.2** | **2.4** | |
| | 12.0 | 11-10<br>1,030 | 12-2<br>1,080 | 12-5<br>1,130 | 12-8<br>1,180 | 12-11<br>1,220 | 13-2<br>1,270 | 13-4<br>1,310 | 13-9<br>I ,400 | 14-2<br>1,480 | |
| | 16.0 | 10-9<br>1,140 | 11-0<br>1,190 | 11 -3<br>1,240 | 11 -6<br>1,290 | 11-9<br>1,340 | 11-11<br>1,390 | 12-2<br>1,440 | 12-6<br>1,540 | 12- 11<br>1,630 | |
| 2 x 4 | 24.0 | 9-5<br>I ,300 | 9-8<br>1,360 | 9-10<br>1,420 | 10-0<br>1,480 | 10-3<br>1,540 | 10-5<br>1,600 | 10-7<br>1,650 | 10-11<br>1,760 | l l-3<br>1,860 | |
| | 12.0 | 18-8<br>1,030 | 19-1<br>1,080 | 19-6<br>1,130 | 19-11<br>1,180 | 20-3<br>1,220 | 20-8<br>1,270 | 21-0<br>1,310 | 21-8<br>1,400 | 22-4<br>1,480 | |
| | 16.0 | 16-11<br>1,140 | 17-4<br>1,190 | 17-8<br>1,240 | 18-1<br>1,290 | 18-5<br>1,340 | 18-9<br>1,390 | 19-1<br>1,440 | 19-8<br>1,540 | 20-3<br>1,630 | |
| 2 x 6 | 24.0 | 14-9<br>1,300 | 15-2<br>1,360 | 15-6<br>1,420 | 15-9<br>1,480 | 16-1<br>1,540 | 16-4<br>1,600 | 16-8<br>1,650 | 17-2<br>1,760 | 17-8<br>1,860 | |
| | | 24-7 | 25-2 | 25-8 | 26-2 | 26-9 | 27-2 | 27-8 | 28-7 | 29-5 | |

## TABLE 3608.2.4a
## ALLOWABLE SPANS FOR LOW OR HIGH SLOPE RAFTERS

**25 Lbs. per Sq. Ft. Live Load**
**For Use in Snow Load Zone 1**

**DESIGN CRITERIA:** Strength 25 Ibs. per sq. ft. live load plus 10 Ibs. per sq. ft. dead load determines fiber stress. Deflection—For 25 Ibs. per sq. ft. Iive load. Limited to span in inches divided by 180.

**RAFTERS:** Spans are measured along the horizontal projection and loads are considered as applied on the horizontal projection.

**HOW TO USE TABLES:** Enter table with span of rafters (upper figure in each square). Determine size and spacing (first column) based on stress grade (top row) and modulus of elasticity (lower figure in each square) of lumber to be used.

| RAFTER SIZE AND SPACING | | ALLOWABLE EXTREME FIBER STRESS IN BENDING, "*Fb*," (psi) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **(inches)** | **(inches)** | **300** | **400** | **500** | **600** | **700** | **800** | **900** | **1000** | **1100** | **1200** |
| 2 x 6 | 12.0 | 6-7<br>.12 | 7-7<br>.18 | 8-6<br>.25 | 9-4<br>.33 | 10-0<br>.41 | 10-9<br>.50 | 11-5<br>.60 | 12-0<br>.70 | 12-7<br>.81 | 13-2<br>.92 |
| | 16.0 | 5-8<br>.10 | 6-7<br>.15 | 7-4<br>.21 | 8-1<br>.28 | 8-8<br>.36 | 9-4<br>.43 | 9-10<br>.52 | 10-5<br>.61 | 10-11<br>.70 | 11-5<br>.80 |
| | 24.0 | 4-8<br>.08 | 5-4<br>.13 | 6-0<br>.18 | 6-7<br>.23 | 7-1<br>.29 | 7-7<br>.35 | 8-1<br>.42 | 8-6<br>.50 | 8-11<br>.57 | 9-4<br>.65 |
| 2 x 8 | 12.0 | 8-8<br>.12 | 10-0<br>.18 | 11-2<br>.25 | 12-3<br>.33 | 13-3<br>.41 | 14-2<br>.50 | 15-0<br>.60 | 15-10<br>.70 | 16-7<br>.81 | 17-4<br>.92 |
| | 16.0 | 7-6<br>.10 | 8-8<br>.15 | 9-8<br>.21 | 10-7<br>.28 | 11-6<br>.36 | 12-3<br>.43 | 13-0<br>.52 | 13-8<br>.61 | 14-4<br>.70 | 15-0<br>.80 |
| | 24. 0 | 6-2<br>.08 | 7-1<br>.13 | 7-11<br>.18 | 8-8<br>.23 | 9-4<br>.29 | 10-0<br>.35 | 10-7<br>.42 | 11-2<br>.50 | 11-9<br>.57 | 12-3<br>.65 |
| 2 x 10 | 12.0 | 11-1<br>.12 | 12-9<br>.18 | 14-3<br>.25 | 15.8<br>.33 | 16-11<br>.41 | 18-1<br>.50 | 19-2<br>.60 | 20-2<br>.70 | 21-2<br>.81 | 22-1<br>.92 |
| | 16.0 | 9-7<br>.10 | 11-1<br>.15 | 12-4<br>.21 | 13-6<br>.28 | 14-8<br>.36 | 15-8<br>.43 | 16-7<br>.52 | 17-6<br>.61 | 18-4<br>.70 | 19-2<br>.80 |
| | 24.0 | 7-10<br>.08 | 9-0<br>.13 | 10-1<br>.18 | 11-1<br>.23 | 11-11<br>.29 | 12-9<br>.35 | 13-6<br>.42 | 14-3<br>.50 | 15-0<br>.57 | 15-8<br>.65 |
| 2x 12 | 12.0 | 13-6<br>0.12 | 15-6<br>0.18 | 17-4<br>0.25 | 19-0<br>0.33 | 20-7<br>0.41 | 22-0<br>0.50 | 23-4<br>0.60 | 24-7<br>0.70 | 25-9<br>0.81 | 26-11<br>0.92 |
| | 16.0 | 11-8<br>0.10 | 13-5<br>0.15 | 15-0<br>0.21 | 16-6<br>0.28 | 17-9<br>0.36 | 19-0<br>0.43 | 20-2<br>0.52 | 21-3<br>0.61 | 22-3<br>0.70 | 23-3<br>0.92 |
| | 24.0 | 9-6<br>0.08 | 11-0<br>0.13 | 12-3<br>0.18 | 13-5<br>0.23 | 14-6<br>0.29 | 15-6<br>0.35 | 16-6<br>0.42 | 17-4<br>0.50 | 18-3<br>0.57 | 19-0<br>0.65 |
| **(inches)** | **(inches)** | **1300** | **1400** | **1500** | **1600** | **1700** | **1800** | **1900** | **2000** | **2100** | **2200** |
| 2 x 6 | 12. 0 | 13-8<br>1.04 | 14-2<br>1.16 | 14-8<br>1.29 | 15-2<br>1.42 | 15-8<br>1.55 | 16-1<br>1.69 | 16-7<br>1.84 | 17-0<br>1.98 | 17-5<br>2.13 | 17-10<br>2.29 |
| | 16.0 | 11-10<br>.90 | 12-4<br>1.01 | 12-9<br>1.12 | 13-2<br>1.23 | 13-7<br>1.35 | 13-11<br>1.47 | 14-4<br>1.59 | 14-8<br>1.72 | 15-1<br>1.85 | 15-5<br>1.98 |
| | 24.0 | 9-8<br>.74 | 10-0<br>.82 | 10-5<br>.91 | 10-9<br>1.00 | 11-1<br>1.10 | 11-5<br>1.20 | 11-8<br>1.30 | 12-0<br>1.40 | 12-4<br>1.51 | 12-7<br>1.62 |
| 2 x 8 | 12.0 | 18-0<br>1.04 | 18-9<br>1.16 | 19-5<br>1.29 | 20-0<br>1.42 | 20-8<br>1.55 | 21-3<br>1.69 | 21-10<br>1.84 | 22-4<br>1.98 | 22-11<br>2.13 | 23-6<br>2.29 |
| | 16.0 | 15-7<br>.90 | 16-3<br>1.01 | 16-9<br>1.12 | 17-4<br>1.23 | 17-10<br>1.35 | 18-5<br>1.47 | 18-11<br>1.59 | 19-5<br>1.72 | 19-10<br>1.85 | 20-4<br>1.98 |
| | 24.0 | 12-9<br>.74 | 13-3<br>.82 | 13-8<br>.91 | 14-2<br>1.00 | 14-7<br>1.10 | 15-0<br>1.20 | 15-5<br>1.30 | 15-10<br>1.40 | 16-3<br>1.51 | 16-7<br>1.62 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | 1.51 | 1.62 |

For Sl: 1 inch = 25,4 mm, 1 pound per square inch = 6.895 kPa, 1 pound per square foot = 0.0479 kN/m2.
NOTE: The modulus of elasticity, "E," in 1,000,000 pounds per square inch is shown below each span.

## TABLE 3608.2.4b
## ALLOWABLE SPANS FOR LOW OR HIGH SLOPE RAFTERS

**25 Lbs. per Sq. Ft. Live Load (Supporting Gypsum Wallboard Ceiling)**

**For Use in Snow Load Zone 1**

**DESIGN CRITERIA:** Strength—25 Ibs. per sq.ft. live load plus 10 Ibs. per sq. ft. dead load determines fiber stress. Deflection—For 25 Ibs. per sq. ft. Iive load. Limited to span in inches divided by 240.

**RAFTERS:** Spans are measured along the horizontal projection and loads are considered as applied on the horizontal projection.

**HOW TO USE TABLES:** Enter table with span of rafters (upper figure in each square). Determine size and spacing (first column) based on stress grade (top row) and modulus of elasticity (lower figure in each square) of lumber to be used.

| RAFTER SIZE AND SPACING | | ALLOWABLE EXTREME FIBER STRESS IN BENDING, "*Fb*," (psi) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **(inches)** | **(inches)** | **300** | **400** | **500** | **600** | **700** | **800** | **900** | **1000** | **1100** | **1200** |
| 2 x 6 | 12.0 | 6-7<br>.15 | 7-7<br>.24 | 8-6<br>.33 | 9-4<br>.43 | 10-0<br>.55 | 10-9<br>.67 | 11-5<br>.80 | 12-0<br>.94 | 12-7<br>1.03 | 13-2<br>1.23 |
| | 16.0 | 5-8<br>.13 | 6-7<br>.20 | 7-4<br>.29 | 8-1<br>.38 | 8-8<br>.47 | 9-4<br>.58 | 9-10<br>.69 | 10-5<br>.81 | 10-11<br>.93 | 11-5<br>1.06 |
| | 24.0 | 4-8<br>.11 | 5-4<br>.17 | 6-0<br>.23 | 6-7<br>.31 | 7-1<br>.39 | 7-7<br>.47 | 8-1<br>.56 | 8-6<br>.66 | 8-11<br>.76 | 9-4<br>.87 |
| 2 x 8 | 12.0 | 8-8<br>.15 | 10-0<br>.24 | 11-2<br>.33 | 12-3<br>.43 | 13-3<br>.55 | 14-2<br>.67 | 15-0<br>.80 | 15-10<br>.94 | 16-7<br>1.08 | 17-4<br>1.23 |
| | 16.0 | 7-6<br>.13 | 8-8<br>.20 | 9-8<br>.29 | 10-7<br>.38 | 11-6<br>.47 | 12-3<br>.58 | 13-0<br>.69 | 13-8<br>.81 | 14-4<br>.93 | 15-0<br>1.06 |
| | 24. 0 | 6-2<br>.11 | 7-1<br>.17 | 7-11<br>.23 | 8-8<br>.31 | 9-4<br>.39 | 10-0<br>.47 | 10-7<br>.56 | 11-2<br>.66 | 11-9<br>.76 | 12-3<br>.87 |
| 2 x 10 | 12.0 | 11-1<br>.15 | 12-9<br>.24 | 14-3<br>.33 | 15-8<br>.43 | 16-11<br>.55 | 18-1<br>.67 | 19-2<br>.80 | 20-2<br>.94 | 21-2<br>1.08 | 22-1<br>1.23 |
| | 16.0 | 9-7<br>.13 | 11-1<br>.20 | 12-4<br>.29 | 13-6<br>.38 | 14-8<br>.47 | 15-8<br>.58 | 16-7<br>.69 | 17-6<br>.81 | 18-4<br>.93 | 19-2<br>1.06 |
| | 24.0 | 7-10<br>.11 | 9-0<br>.17 | 10-1<br>.23 | 11-1<br>.31 | 11-11<br>.39 | 12-9<br>.47 | 13-6<br>.56 | 14-3<br>.66 | 15-0<br>.76 | 15-8<br>.87 |
| 2x 12 | 12.0 | 13-5<br>.15 | 15-6<br>.24 | 17-4<br>.33 | 19-0<br>.43 | 20-6<br>.55 | 21-11<br>.67 | 23-3<br>.80 | 24-7<br>.94 | 25-9<br>1.08 | 26-11<br>1.23 |
| | 16.0 | 11-8<br>.13 | 13-5<br>.20 | 15-0<br>.29 | 16-6<br>.38 | 17-9<br>.47 | 19-0<br>.58 | 20-2<br>.69 | 21-3<br>.81 | 22-4<br>.93 | 23-3<br>1.06 |
| | 24.0 | 9-6<br>.11 | 11-0<br>.17 | 12-3<br>.23 | 13-5<br>.31 | 14-6<br>.39 | 15-6<br>.47 | 16-6<br>.56 | 17-4<br>.66 | 18-2<br>.76 | 19-0<br>.87 |
| **(inches)** | **(inches)** | **1300** | **1400** | **1500** | **1600** | **1700** | **1800** | **1900** | **2000** | **2100** | **2200** |
| 2 x 6 | 12. 0 | 13-8<br>1.39 | 14-2<br>1.55 | 14-8<br>1.72 | 15-2<br>1.89 | 15-8<br>2.07 | 16-1<br>2.26 | 16-7<br>2.45 | 17-0<br>2.65 | 17-5<br>2.85 | 17-10<br>3.06 |
| | 16.0 | 11-10<br>1.20 | 12-4<br>1.34 | 12-9<br>1.49 | 13-2<br>1.64 | 13-7<br>1.80 | 13-11<br>1.96 | 14-4<br>2.12 | 14-8<br>2.29 | 15-1<br>2.46 | 15-5<br>2.64 |
| | 24.0 | 9-8<br>.98 | 10-0<br>1.10 | 10-5<br>1.21 | 10-9<br>1.34 | 11-1<br>1.47 | 11-5<br>1.60 | 11-8<br>1.73 | 12-0<br>1.87 | 12-4<br>2.01 | 12-7<br>2.16 |
| 2 x 8 | 12.0 | 18-0<br>1.39 | 18-9<br>1.55 | 19-5<br>1.72 | 20-0<br>1.89 | 20-8<br>2.07 | 21-3<br>2.26 | 21-10<br>2.45 | 22-5<br>2.65 | 22-11<br>2.85 | 23-6<br>3.06 |
| | 16.0 | 15-7<br>1.20 | 16-3<br>1.34 | 16-9<br>1.49 | 17-4<br>1.64 | 17-10<br>1.80 | 18-5<br>1.96 | 18-11<br>2.12 | 19-5<br>2.29 | 19-10<br>2.46 | 20-4<br>2.64 |
| | 24.0 | 12-9<br>.98 | 13-3<br>1.10 | 13-8<br>1.21 | 14-2<br>1.34 | 14-7<br>1.47 | 15-0<br>1.60 | 15-5<br>1.73 | 15-10<br>1.87 | 16-3<br>2.01 | 16-7<br>2.16 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | .98 | 1.10 | 1.21 | 1.34 | 1.47 | 1.60 | 1.73 | 1.87 | 2.01 | 2.16 |

For Sl: 1 inch = 25,4 mm, 1 pound per square inch = 6.895 kPa, 1 pound per square foot = 0.0479 kN/m2.

NOTE: The modulus of elasticity, "E," in 1,000,000 pounds per square inch is shown below each span.

## TABLE 3608.2.4c
## ALLOWABLE SPANS FOR LOW OR HIGH SLOPE RAFTERS

**25 Lbs. per Sq. Ft. Live Load (Supporting Veneer Plaster Ceiling)**

**For Use in Snow Load Zone 1**

**DESIGN CRITERIA:** Strength-25 Ibs. per sq.ft. live load plus 10 Ibs. per sq. ft. dead load determines fiber stress. Deflection—For 25 Ibs. per sq. ft. Iive load. Limited to span in inches divided by 360.

**RAFTERS:** Spans are measured along the horizontal projection and loads are considered as applied on the horizontal projection.

**HOW TO USE TABLES:** Enter table with span of rafters (upper figure in each square). Determine size and spacing (first column) based on stress grade (top row) and modulus of elasticity (lower figure in each square) of lumber to be used.

| RAFTER SIZE AND SPACING | | ALLOWABLE EXTREME FIBER STRESS IN BENDING, "*Fb*," (psi) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **(inches)** | **(inches)** | **300** | **400** | **500** | **600** | **700** | **800** | **900** | **1000** | **1100** | **1200** |
| 2 x 6 | 12.0 | 6-7<br>.23 | 7-7<br>.35 | 8-6<br>.50 | 9-4<br>.65 | 10-0<br>.82 | 10-9<br>1.00 | 11-5<br>1.20 | 12-0<br>1.40 | 12-7<br>1.62 | 13-2<br>1.84 |
| | 16.0 | 5-8<br>.20 | 6-7<br>.31 | 7-4<br>.43 | 8-1<br>.56 | 8-8<br>.71 | 9-4<br>.87 | 9-10<br>1.04 | 10-5<br>1.21 | 10-11<br>1.40 | 11-5<br>1.60 |
| | 24.0 | 4-8<br>.16 | 5-4<br>.25 | 6-0<br>.35 | 6-7<br>.46 | 7-1<br>.58 | 7-7<br>.71 | 8-1<br>.85 | 8-6<br>.99 | 8-11<br>1.14 | 9-4<br>1.30 |
| 2 x 8 | 12.0 | 8-8<br>.23 | 10-0<br>.35 | 11-2<br>.50 | 12-3<br>.65 | 13-3<br>.82 | 14-2<br>1.00 | 15-0<br>1.20 | 15-10<br>1.40 | 16-7<br>1.62 | 17-4<br>1.84 |
| | 16.0 | 7-6<br>.20 | 8-8<br>.31 | 9-8<br>.43 | 10-7<br>.56 | 11-6<br>.71 | 12-3<br>.87 | 13-0<br>1.04 | 13-8<br>1.21 | 14-4<br>1.40 | 15-0<br>1.60 |
| | 24. 0 | 6-2<br>.16 | 7-1<br>.25 | 7-11<br>.35 | 8-8<br>.46 | 9-4<br>.58 | 10-0<br>.71 | 10-7<br>.85 | 11-2<br>.99 | 11-9<br>1.14 | 12-3<br>1.30 |
| 2 x 10 | 12.0 | 11-1<br>.23 | 12-9<br>.35 | 14-3<br>.50 | 15.8<br>.65 | 16-11<br>.82 | 18-1<br>1.00 | 19-2<br>1.20 | 20-2<br>1.40 | 21-2<br>1.62 | 22-1<br>1.84 |
| | 16.0 | 9-7<br>.20 | 11-1<br>.31 | 12-4<br>.43 | 13-6<br>.56 | 14-8<br>.71 | 15-8<br>.87 | 16-7<br>1.04 | 17-6<br>1.21 | 18-4<br>1.40 | 19-2<br>1.60 |
| | 24.0 | 7-10<br>.16 | 9-0<br>.25 | 10-1<br>.35 | 11-1<br>.46 | 11-11<br>.58 | 12-9<br>.71 | 13-6<br>.85 | 14-3<br>.99 | 15-0<br>1.14 | 15-8<br>1.30 |
| 2x 12 | 12.0 | 13-5<br>.23 | 15-6<br>.35 | 17-4<br>.50 | 19-0<br>.65 | 20-6<br>.82 | 21-11<br>1.00 | 23-3<br>1.20 | 24-7<br>1.40 | 25-9<br>1.62 | 26-11<br>1.84 |
| | 16.0 | 11-8<br>.20 | 13-5<br>.31 | 15-0<br>.43 | 16-6<br>.56 | 17-9<br>.71 | 19-0<br>.87 | 20-2<br>1.04 | 21-3<br>1.21 | 22-4<br>1.40 | 23-3<br>1.60 |
| | 24.0 | 9-6<br>.16 | 11-0<br>.25 | 12-3<br>.35 | 13-5<br>.46 | 14-6<br>.58 | 15-6<br>.71 | 16-6<br>.85 | 17-4<br>.99 | 18-2<br>1.14 | 19-0<br>1.30 |
| **(inches)** | **(inches)** | **1300** | **1400** | **1500** | **1600** | **1700** | **1800** | **1900** | **2000** | **2100** | **2200** |
| 2 x 6 | 12. 0 | 13-8<br>2.08 | 14-2<br>2.32 | 14-8<br>2.58 | 15-2<br>2.84 | 15-8<br>3.11 | 16-1<br>3.39 | 16-6<br>3.68 | 17-0<br>3.97 | 17-5<br>4.28 | 17-10<br>4.58 |
| | 16.0 | 11-10<br>1.80 | 12-4<br>2.01 | 12-9<br>2.23 | 13-2<br>2.46 | 13-7<br>2.69 | 13-11<br>2.93 | 14-4<br>3.18 | 14-8<br>3.44 | 15-1<br>3.70 | 15-5<br>3.96 |
| | 24.0 | 9-8<br>1.47 | 10-0<br>1.64 | 10-5<br>1.82 | 10-9<br>2.01 | 11-1<br>2.20 | 11-5<br>2.40 | 11-8<br>2.60 | 12-0<br>2.81 | 12-4<br>3.02 | 12-7<br>3.24 |
| 2 x 8 | 12.0 | 18-0<br>2.08 | 18-9<br>2.32 | 19-5<br>2.58 | 20-0<br>2.84 | 20-8<br>3.11 | 21-3<br>3.39 | 21-10<br>3.68 | 22-5<br>3.97 | 22-11<br>4.28 | 23-6<br>4.59 |
| | 16.0 | 15-7<br>1.80 | 16-3<br>2.01 | 16-9<br>2.23 | 17-4<br>2.46 | 17-10<br>2.69 | 18-4<br>2.93 | 18-10<br>3.18 | 19-4<br>3.44 | 19-10<br>3.70 | 20-4<br>3.97 |
| | 24.0 | 12-9<br>1.47 | 13-3<br>1.64 | 13-8<br>1.82 | 14-2<br>2.01 | 14-7<br>2.20 | 15-0<br>2.40 | 15-5<br>2.60 | 15-10<br>2.81 | 16-3<br>3.02 | 16-7<br>3.24 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1.47 | 1.64 | 1.82 | 2.01 | 2.20 | 2.40 | 2.60 | 2.81 | 3.02 | 3.24 |

For Sl: 1 inch = 25,4 mm, 1 pound per square inch = 6.895 kPa, 1 pound per square foot = 0.0479 kN/m2.
NOTE: The modulus of elasticity, "E," in 1,000,000 pounds per square inch is shown below each span.

## TABLE 3608.2.4d
## ALLOWABLE SPANS FOR LOW OR HIGH SLOPE RAFTERS

**25 Lbs. per Sq. Ft. Live Load**
**For Use in Snow Load Zone 1**

**DESIGN CRITERIA:** Strength—25 Ibs. per sq. ft.live load plus 15 Ibs. per sq.ft. dead load determines fiber stress. Deflection—For 25 Ibs. per sq. ft. Iive load. Limited to span in inches divided by 180.

**RAFTERS:** Spans are measured along the horizontal projection and loads are considered as applied on the horizontal projection.

**HOW TO USE TABLES:** Enter table with span of rafters (upper figure in each square). Determine size and spacing (first column) based on stress grade (top row) and modulus of elasticity (lower figure in each square) of lumber to be used.

| RAFTER SIZE AND SPACING | | ALLOWABLE EXTREME FIBER STRESS IN BENDING, "*Fb*," (psi) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **(inches)** | **(inches)** | **300** | **400** | **500** | **600** | **700** | **800** | **900** | **1000** | **1100** | **1200** |
| 2 x 6 | 12.0 | 6-2<br>0.09 | 7-1<br>0.15 | 7-11<br>0.20 | 8-8<br>0.27 | 9-5<br>0.34 | 10-0<br>0.41 | 10-8<br>0.49 | 11-3<br>0.57 | 11-9<br>0.66 | 12-4<br>0 .75 |
| | 16.0 | 5-4<br>.08 | 6-2<br>.13 | 6-10<br>.18 | 7-6<br>.23 | 8-2<br>.29 | 8-8<br>.36 | 9-3<br>.42 | 9-9<br>.50 | 10-2<br>.57 | 10-8<br>.65 |
| | 24.0 | 4-4<br>.07 | 5-0<br>.10 | 5-7<br>.14 | 6-2<br>.19 | 6-8<br>.24 | 7-1<br>.29 | 7-6<br>.35 | 7-11<br>.41 | 8-4<br>.47 | 8-8<br>.53 |
| 2 x 8 | 12.0 | 8-1<br>.09 | 9-4<br>.15 | 10-6<br>.20 | 11-6<br>.27 | 12-5<br>.34 | 13-3<br>.41 | 14-0<br>.49 | 14-10<br>.57 | 15-6<br>.66 | 16-3<br>.75 |
| | 16.0 | 7-0<br>.08 | 8-1<br>.13 | 9-1<br>.18 | 9-11<br>.23 | 10-9<br>.29 | 11-6<br>.36 | 12-2<br>.42 | 12-10<br>.50 | 13-5<br>.57 | 14-0<br>.65 |
| | 24. 0 | 5-9<br>.07 | 6-7<br>.10 | 7-5<br>.14 | 8-1<br>.19 | 8-9<br>.24 | 9-4<br>.29 | 9-11<br>.35 | 10-6<br>.41 | 11-0<br>.47 | 11-6<br>.53 |
| 2 x 10 | 12.0 | 10-4<br>.09 | 11-11<br>.15 | 13-4<br>.20 | 14-8<br>.27 | 15-10<br>.34 | 16-11<br>.41 | 17-11<br>.49 | 18-11<br>.57 | 19-10<br>.66 | 20-8<br>.75 |
| | 16.0 | 8-11<br>.08 | 10-4<br>.13 | 11-7<br>.18 | 12-8<br>.23 | 13-8<br>.29 | 14-8<br>.36 | 15-6<br>.42 | 16-4<br>.50 | 17-2<br>.57 | 17-11<br>.65 |
| | 24.0 | 7-4<br>.07 | 8-5<br>.10 | 9-5<br>.14 | 10-4<br>.19 | 11-2<br>.24 | 11-11<br>.29 | 12-8<br>.35 | 13-4<br>.41 | 14-0<br>.47 | 14-8<br>.53 |
| 2x 12 | 12.0 | 12-7<br>.09 | 14-6<br>.15 | 16-3<br>.20 | 17-9<br>.27 | 19-3<br>.34 | 20-6<br>.41 | 21-9<br>.49 | 23-0<br>.57 | 24-1<br>.66 | 25-2<br>.75 |
| | 16.0 | 10-11<br>.08 | 12-7<br>.13 | 14-1<br>.18 | 15-5<br>.23 | 16-8<br>.29 | 17-9<br>.36 | 18-10<br>.42 | 19-11<br>.50 | 20-10<br>.57 | 21-9<br>.65 |
| | 24.0 | 8-11<br>.07 | 10-3<br>.10 | 11-6<br>.14 | 12-7<br>.19 | 13-7<br>.24 | 14-6<br>.29 | 15-5<br>.35 | 16-3<br>.41 | 17-0<br>.47 | 17-9<br>.53 |
| **(inches)** | **(inches)** | **1300** | **1400** | **1500** | **1600** | **1700** | **1800** | **1900** | **2000** | **2100** | **2200** |
| 2 x 6 | 12. 0 | 12-10<br>.85 | 13-3<br>.95 | 13-9<br>1.05 | 14-2<br>1.16 | 14-8<br>1.27 | 15-1<br>1.39 | 15-6<br>1.50 | 15-11<br>1.62 | 16-3<br>1.75 | 16-8<br>1.87 |
| | 16.0 | 11-1<br>.74 | 11-6<br>.82 | 11-11<br>.91 | 12-4<br>1.01 | 12-8<br>1.10 | 13-1<br>1.20 | 13-5<br>1.30 | 13-9<br>1.41 | 14-1<br>1.51 | 14-5<br>1.63 |
| | 24.0 | 9-1<br>.60 | 9-5<br>.67 | 9-9<br>.75 | 10-0<br>.82 | 10-4<br>.90 | 10-8<br>.98 | 10-11<br>1.06 | 11-3<br>1.15 | 11-6<br>1.24 | 11-9<br>1.32 |
| 2 x 8 | 12.0 | 16-10<br>.85 | 17-6<br>.95 | 18-1<br>1.05 | 18-9<br>1.16 | 19-4<br>1.27 | 19-10<br>1.39 | 20-5<br>1.50 | 20-11<br>1.62 | 21-11<br>1.75 | 21-11<br>1.87 |
| | 16.0 | 14-7<br>.74 | 15-2<br>.82 | 15-8<br>.91 | 16-3<br>1.01 | 16-9<br>1.10 | 17-2<br>1.20 | 17-8<br>1.30 | 18-1<br>1.41 | 18-7<br>1.51 | 19-0<br>1.63 |
| | 24.0 | 11-11<br>.60 | 12-5<br>.67 | 12-10<br>.75 | 13-3<br>.82 | 13-8<br>.90 | 14-0<br>.98 | 14-5<br>1.06 | 14-10<br>1.15 | 15-2<br>1.24 | 15-6<br>1.32 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.60 | 0.67 | 0.75 | 0.82 | 0.90 | 0.98 | 1.06 | 1.15 | 1.24 | 1.32 |

For Sl: 1 inch = 25,4 mm, 1 pound per square inch = 6.895 kPa, 1 pound per square foot = 0.0479 kN/m2.
NOTE: The modulus of elasticity, "E," in 1,000,000 pounds per square inch is shown below each span.

## TABLE 3608.2.4e
## ALLOWABLE SPANS FOR LOW OR HIGH SLOPE RAFTERS

**25 Lbs. per Sq. Ft. Live Load (Supporting Gypsum Wallboard Ceiling)**

**For Use in Snow Load Zone 1**

**DESIGN CRITERIA:** Strength-25 Ibs. per sq. ft. live load plus 15 Ibs. per sq.ft. dead load determines fiber stress. Deflection—For 25 Ibs. per sq. ft. Iive load. Limited to span in inches divided by 240.

**RAFTERS:** Spans are measured along the horizontal projection and loads are considered as applied on the horizontal projection.

**HOW TO USE TABLES:** Enter table with span of rafters (upper figure in each square). Determine size and spacing (first column) based on stress grade (top row) and modulus of elasticity (lower figure in each square) of lumber to be used.

| RAFTER SIZE AND SPACING | | ALLOWABLE EXTREME FIBER STRESS IN BENDING, "*Fb*," (psi) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **(inches)** | **(inches)** | **300** | **400** | **500** | **600** | **700** | **800** | **900** | **1000** | **1100** | **1200** |
| 2 x 6 | 12.0 | 6-2<br>.13 | 7-1<br>.19 | 7-11<br>.27 | 8-8<br>.36 | 9-5<br>.45 | 10-0<br>.55 | 10-8<br>.65 | 11-3<br>.77 | 11-9<br>.88 | 12-4<br>1.01 |
| | 16.0 | 5-4<br>.11 | 6-2<br>.17 | 6-10<br>.23 | 7-6<br>.31 | 8-2<br>.39 | 8-8<br>.47 | 9-3<br>.57 | 9-9<br>.66 | 10-2<br>.76 | 10-8<br>.87 |
| | 24.0 | 4-4<br>.09 | 5-0<br>.14 | 5-7<br>.19 | 6-2<br>.25 | 6-8<br>.32 | 7-1<br>.39 | 7-6<br>.46 | 7-11<br>.54 | 8-4<br>.62 | 8-8<br>.71 |
| 2 x 8 | 12.0 | 8-1<br>.13 | 9-4<br>.19 | 10-6<br>.27 | 11-6<br>.36 | 12-5<br>.45 | 13-3<br>.55 | 14-0<br>.65 | 14-10<br>.77 | 15-6<br>.88 | 16-3<br>1.01 |
| | 16.0 | 7-0<br>.11 | 8-1<br>.17 | 9-1<br>.23 | 9-11<br>.31 | 10-9<br>.39 | 11-6<br>.47 | 12-2<br>.57 | 12-10<br>.66 | 13-5<br>.76 | 14-0<br>.87 |
| | 24. 0 | 5-9<br>.09 | 6-7<br>.14 | 7-5<br>.19 | 8-1<br>.25 | 8-9<br>.32 | 9-4<br>.39 | 9-11<br>.46 | 10-6<br>.54 | 11-0<br>.62 | 11-6<br>.71 |
| 2 x 10 | 12.0 | 10-4<br>.13 | 11-11<br>.19 | 13-4<br>.27 | 14-8<br>.36 | 15-10<br>.45 | 16-11<br>.55 | 17-11<br>.65 | 18-11<br>.77 | 19-10<br>.88 | 20-8<br>1.01 |
| | 16.0 | 8-11<br>.11 | 10-4<br>.17 | 11-7<br>.23 | 12-8<br>.31 | 13-8<br>.39 | 14-8<br>.47 | 15-6<br>.57 | 16-4<br>.66 | 17-2<br>.76 | 17-11<br>.87 |
| | 24.0 | 7-4<br>.09 | 8-5<br>.14 | 9-5<br>.19 | 10-4<br>.25 | 11-2<br>.32 | 11-11<br>.39 | 12-8<br>.46 | 13-4<br>.54 | 14-0<br>.62 | 14-8<br>.71 |
| 2x 12 | 12.0 | 12-7<br>.13 | 14-6<br>.19 | 16-3<br>.23 | 17-9<br>.36 | 19-3<br>.45 | 20-6<br>.55 | 21-9<br>.65 | 23-0<br>.77 | 24-1<br>.88 | 25-2<br>1.01 |
| | 16.0 | 10-11<br>.11 | 12-7<br>.17 | 14-1<br>.23 | 15-5<br>.31 | 16-8<br>.39 | 17-9<br>.47 | 18-10<br>.57 | 19-11<br>.66 | 20-10<br>.76 | 21-9<br>.87 |
| | 24.0 | 8-11<br>.09 | 10-3<br>.14 | 11-6<br>.19 | 12-7<br>.25 | 13-7<br>.32 | 14-6<br>.39 | 15-5<br>.46 | 16-3<br>.54 | 17-0<br>.62 | 17-9<br>.71 |
| **(inches)** | **(inches)** | **1300** | **1400** | **1500** | **1600** | **1700** | **1800** | **1900** | **2000** | **2100** | **2200** |
| 2 x 6 | 12. 0 | 12-10<br>1.13 | 13-3<br>1.27 | 13-9<br>1.41 | 14-2<br>1.55 | 14-8<br>1.70 | 15-1<br>1.85 | 15-6<br>2.00 | 15-11<br>2.17 | 16-3<br>2.33 | 16-8<br>2.5 |
| | 16.0 | 11-1<br>0.98 | 11-6<br>1.10 | 11-11<br>1.22 | 12-4<br>1.34 | 12-8<br>1.47 | 13-1<br>1.60 | 13-5<br>1.74 | 13-9<br>1.88 | 14-1<br>2.02 | 14-5<br>2.17 |
| | 24.0 | 9-1<br>0.80 | 9-5<br>0.90 | 9-9<br>0.99 | 10-0<br>1.10 | 10-4<br>1.20 | 10-8<br>1.31 | 10-11<br>1.42 | 11-3<br>1.53 | 11-6<br>1.65 | 11-9<br>1.77 |
| 2 x 8 | 12.0 | 16-10<br>1.13 | 17-6<br>1.27 | 18-1<br>1.41 | 18-9<br>1.55 | 19-4<br>1.70 | 19-10<br>1.85 | 20-5<br>2.00 | 20-11<br>2.17 | 21-6<br>2.33 | 21-11<br>2.50 |
| | 16.0 | 14-7<br>0.98 | 15-2<br>1.10 | 15-8<br>1.22 | 16-3<br>1.34 | 16-9<br>1.47 | 17-2<br>1.60 | 17-8<br>1.74 | 18-1<br>1.88 | 18-7<br>2.02 | 19-0<br>2.17 |
| | 24.0 | 11-11<br>0.80 | 12-5<br>0.90 | 12-10<br>0.99 | 13-3<br>1.10 | 13-8<br>1.20 | 14-0<br>1.31 | 14-5<br>1.42 | 14-10<br>1.53 | 15-2<br>1.65 | 15-5<br>1.77 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.80 | .90 | .99 | 1.10 | 1.20 | 1.31 | 1.42 | 1.53 | 1.65 | 1.77 |

For Sl: 1 inch = 25,4 mm, 1 pound per square inch = 6.895 kPa, 1 pound per square foot = 0.0479 kN/m2.
NOTE: The modulus of elasticity, "E," in 1,000,000 pounds per square inch is shown below each span.

## TABLE 3608.2.4f
## ALLOWABLE SPANS FOR LOW OR HIGH SLOPE RAFTERS

**25 Lbs. per Sq. Ft. Live Load (Supporting Veneer Plaster Ceiling)**

**For Use in Snow Load Zone 1**

**DESIGN CRITERIA:** Strength-25 Ibs. per sq. ft. live load plus 15 Ibs. per sq.ft. dead load determines fiber stress. Deflection—For 25 Ibs. per sq. ft. Iive load. Limited to span in inches divided by 360.

**RAFTERS:** Spans are measured along the horizontal projection and loads are considered as applied on the horizontal projection.

**HOW TO USE TABLES:** Enter table with span of rafters (upper figure in each square). Determine size and spacing (first column) based on stress grade (top row) and modulus of elasticity (lower figure in each square) of lumber to be used.

| RAFTER SIZE AND SPACING | | ALLOWABLE EXTREME FIBER STRESS IN BENDING, "*Fb*," (psi) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **(inches)** | **(inches)** | **300** | **400** | **500** | **600** | **700** | **800** | **900** | **1000** | **1100** | **1200** |
| 2 x 6 | 12.0 | 6-2<br>.19 | 7-1<br>.29 | 7-11<br>.41 | 8-8<br>.53 | 9-5<br>.67 | 10-0<br>.82 | 10-8<br>.98 | 11-3<br>1.15 | 11-9<br>1.32 | 12-4<br>1.51 |
| | 16.0 | 5-4<br>.16 | 6-2<br>.25 | 6-10<br>.35 | 7-6<br>.46 | 8-2<br>.58 | 8-8<br>.71 | 9-3<br>.85 | 9-9<br>.99 | 10-2<br>1.15 | 10-8<br>1.31 |
| | 24.0 | 4-4<br>.13 | 5-0<br>.21 | 5-7<br>.29 | 6-2<br>.38 | 6-8<br>.48 | 7-1<br>.58 | 7-6<br>.69 | 7-11<br>.81 | 8-4<br>.94 | 8-8<br>1.07 |
| 2 x 8 | 12.0 | 8-1<br>.19 | 9-4<br>.29 | 10-6<br>.41 | 11-6<br>.53 | 12-5<br>.67 | 13-3<br>.82 | 14-0<br>.98 | 14-10<br>1.15 | 15-6<br>1.32 | 16-3<br>1.51 |
| | 16.0 | 7-0<br>.16 | 8-1<br>.25 | 9-1<br>.35 | 9-11<br>.46 | 10-9<br>.58 | 11-6<br>.71 | 12-2<br>.85 | 12-10<br>.99 | 13-5<br>1.15 | 14-0<br>1.31 |
| | 24. 0 | 5-9<br>.13 | 6-7<br>.21 | 7-5<br>.29 | 8-1<br>.38 | 8-9<br>.48 | 9-4<br>.58 | 9-11<br>.69 | 10-6<br>.81 | 11-0<br>.94 | 11-6<br>1.07 |
| 2 x 10 | 12.0 | 10-4<br>.19 | 11-11<br>.29 | 13-4<br>.41 | 14-8<br>.53 | 15-10<br>.67 | 16-11<br>.82 | 17-11<br>.98 | 18-11<br>1.15 | 19-10<br>1.32 | 20-8<br>1.51 |
| | 16.0 | 8-11<br>.16 | 10-4<br>.25 | 11-7<br>.35 | 12-8<br>.46 | 13-8<br>.58 | 14-8<br>.71 | 15-6<br>.85 | 16-4<br>.99 | 17-2<br>1.15 | 17-11<br>1.31 |
| | 24.0 | 7-4<br>.13 | 8-5<br>.21 | 9-5<br>.29 | 10-4<br>.38 | 11-2<br>.48 | 11-11<br>.58 | 12-8<br>.69 | 13-4<br>.81 | 14-0<br>.94 | 14-8<br>1.07 |
| 2x 12 | 12.0 | 12-7<br>.19 | 14-6<br>.29 | 16-3<br>.41 | 17-9<br>.53 | 19-3<br>.67 | 20-6<br>.82 | 21-9<br>.98 | 23-0<br>1.15 | 24-1<br>1.32 | 25-2<br>1.51 |
| | 16.0 | 10-11<br>.16 | 12-7<br>.25 | 14-1<br>.35 | 15-5<br>.46 | 16-8<br>.58 | 17-9<br>.71 | 18-10<br>.85 | 19-11<br>.99 | 20-10<br>1.15 | 21-9<br>1.31 |
| | 24.0 | 8-11<br>.13 | 10-3<br>.21 | 11-6<br>.29 | 12-7<br>.38 | 13-7<br>.48 | 14-6<br>.58 | 15-5<br>.69 | 16-3<br>.81 | 17-0<br>.94 | 17-9<br>1.07 |
| **(inches)** | **(inches)** | **1300** | **1400** | **1500** | **1600** | **1700** | **1800** | **1900** | **2000** | **2100** | **2200** |
| 2 x 6 | 12. 0 | 12-10<br>1.70 | 13-3<br>1.90 | 13-9<br>2.11 | 14-2<br>2.32 | 14-8<br>2.55 | 15-1<br>2.77 | 15-6<br>3.01 | 15-10<br>3.25 | 16-3<br>3.49 | 16-8<br>3.75 |
| | 16.0 | 11-1<br>1.47 | .46<br>1.65 | 11-11<br>1.83 | 12-4<br>2.01 | 12-8<br>2.20 | 13-1<br>2.40 | 13-5<br>2.61 | 13-9<br>2.82 | 14-1<br>3.03 | 14-5<br>3.25 |
| | 24.0 | 9-1<br>1.20 | 9-5<br>1.34 | 9-9<br>1.49 | 10-0<br>1.64 | 10-4<br>1.80 | 10-8<br>1.96 | 10-11<br>2.13 | 11-3<br>2.30 | 11-6<br>2.47 | 11-9<br>2.65 |
| 2 x 8 | 12.0 | 16-10<br>1.70 | 17-6<br>1.90 | 18-1<br>2.11 | 18-9<br>2.32 | 19-4<br>2.55 | 19-10<br>2.77 | 20-5<br>3.01 | 20-11<br>3.25 | 21-5<br>3.49 | 21-11<br>3.75 |
| | 16.0 | 14-7<br>1.47 | 15-2<br>1.65 | 15-8<br>183 | 16-3<br>2.01 | 16-9<br>2.20 | 17-2<br>2.40 | 17-8<br>2.61 | 18-2<br>2.82 | 18-7<br>3.03 | 19-0<br>3.25 |
| | 24.0 | 11-11<br>1.20 | 12-5<br>1.34 | 12-10<br>1.49 | 13-3<br>1.64 | 13-8<br>1.80 | 14-0<br>1.96 | 14-5<br>2.13 | 14-10<br>2.30 | 15-2<br>2.47 | 15-6<br>2.65 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1.20 | 1.34 | 1.49 | 1.64 | 1.80 | 1.96 | 2.13 | 2.30 | 2.47 | 2.65 |

For Sl: 1 inch = 25,4 mm, 1 pound per square inch = 6.895 kPa, 1 pound per square foot = 0.0479 kN/m2.
NOTE: The modulus of elasticity, "E," in 1,000,000 pounds per square inch is shown below each span.

## TABLE 3608.2.4g
## ALLOWABLE SPANS FOR LOW OR HIGH SLOPE RAFTERS
**30 Lbs. per Sq. Ft. Live Load**
**For Use in Snow Load Zone 2**

**DESIGN CRITERIA:** Strength—10 Ibs. per sq. fl. dead load plus 30 Ibs. per sq. ft. Iive load determines fiber stress. Deflection—For 30 Ibs. per sq. ft. Iive load. Limited to span in inches divided by 180.

**RAFTERS:** Spans are measured along the horizontal projection and loads are considered as applied on the horizontal projection.

**HOW TO USE TABLES:** Enter table with span of rafters (upper figure in each square). Determine size and spacing (last column) based on stress grade (top row) and modulus of elasticity (lower figure in each square) of lumber to be used.

| RAFTER SIZE AND SPACING | | ALLOWABLE EXTREME FIBER STRESS IN BENDING, "*Fb*," (psi) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **(inches)** | **(inches)** | **300** | **400** | **500** | **600** | **700** | **800** | **900** | **1000** | **1100** | **1200** | **1300** |
| | 12.0 | 6-2<br>0.11 | 7-1<br>0.17 | 7-11<br>0.24 | 8-8<br>0.32 | 9-4<br>0.40 | 10-0<br>0.49 | 10-8<br>0.59 | 11-3<br>0.69 | 11-9<br>0.80 | 12-4<br>0.91 | 12-9<br>1.02 |
| | 16.0 | 5-4<br>0.10 | 6-2<br>0.15 | 6-10<br>0.21 | 7-6<br>0.28 | 8-2<br>0.35 | 8-8<br>0.43 | 9-3<br>0.51 | 9-9<br>0.60 | 10-2<br>0.69 | 10-8<br>0.78 | 11-1<br>0.88 |
| 2 x 6 | 24. 0 | 4-4<br>0.08 | 5-0<br>0.12 | 5-8<br>0.17 | 6-2<br>0.23 | 6-8<br>0.29 | 7-1<br>0.35 | 7-6<br>0.42 | 7-11<br>0.49 | 8-4<br>0.56 | 8.8<br>0.64 | 9-1<br>0.72 |
| | 12.0 | 8-1<br>0.11 | 9-4<br>0.17 | 10-6<br>0.24 | 11-6<br>0.32 | 12-4<br>0.40 | 13-3<br>0.49 | 14-1<br>0.59 | 14-10<br>0.69 | 15-6<br>0.80 | 16-3<br>0.91 | 16-10<br>1.02 |
| | 16.0 | 7-0<br>0.10 | 8-1<br>0.15 | 9-1<br>0.21 | 9-11<br>0.28 | 10-9<br>0.35 | 11-6<br>0.43 | 12-2<br>0.51 | 12-10<br>0.60 | 13-6<br>0.69 | 14-1<br>0.78 | 14-8<br>0.88 |
| 2 x 8 | 24.0 | 5-9<br>0.08 | 6-8<br>0.12 | 7-5<br>0.17 | 8-1<br>0.23 | 8-9<br>0.29 | 9-4<br>0.35 | 9-11<br>0.42 | 10-6<br>0.49 | 11-0<br>0.56 | 11-6<br>0.64 | 11-11<br>0.72 |
| | 12.0 | 10-4<br>0.11 | 11-11<br>0.17 | 13-4<br>0.24 | 14-8<br>0.32 | 15-10<br>0.40 | 16-11<br>0.49 | 17-11<br>0.59 | 18-11<br>0.69 | 19-11<br>0.80 | 20-8<br>0.91 | 21-6<br>1.02 |
| | 16.0 | 8-11<br>0.10 | 10-4<br>0.15 | 11-7<br>0.21 | 12-8<br>0.28 | 13-8<br>0.35 | 14-8<br>0.43 | 15-6<br>0.51 | 16-4<br>0.60 | 17-2<br>0.69 | 17-11<br>0.78 | 18-8<br>0.88 |
| 2x 10 | 24.0 | 7-4<br>0.08 | 8.5<br>0.12 | 9-5<br>0.17 | 10-4<br>0.23 | 11-2<br>0.29 | 11-11<br>0.35 | 12-8<br>0.42 | 13-4<br>0.49 | 14-0<br>0.56 | 14-8<br>0.64 | 15-3<br>0.72 |
| | 12. 0 | 12-7<br>0.11 | 14-6<br>0.17 | 16-3<br>0.24 | 17-9<br>0.32 | 19-3<br>0.40 | 20-6<br>0.49 | 21-10<br>0.59 | 22-11<br>0.69 | 24-1<br>0.80 | 25-2<br>0.91 | 26-2<br>1.02 |
| | 16. 0 | 10-11<br>0.10 | 12-7<br>0.15 | 14-1<br>0.21 | 15-5<br>0.28 | 16-8<br>0.35 | 17-10<br>0.43 | 18-10<br>0.51 | 19-11<br>0.60 | 20-10<br>0.69 | 21-10<br>0.78 | 22-8<br>0.88 |
| 2 x 12 | 24. 0 | 8-10<br>0.08 | 10-3<br>0.12 | 11-6<br>0.17 | 12-7<br>0.23 | 13-7<br>0.29 | 14-6<br>0.35 | 15-5<br>0.42 | 16-3<br>0.49 | 17-0<br>0.56 | 17-9<br>0.64 | 18-6<br>0.72 |
| **(inches)** | **(inches)** | **1400** | **1500** | **1600** | **1700** | **1800** | **1900** | **2000** | **2100** | **2200** | **2300** | **2400** |
| | 12.0 | 13-3<br>1.14 | 13-9<br>1.27 | 14-3<br>1.40 | 14-8<br>1.53 | 15-1<br>1.67 | 15-6<br>1.81 | 15-10<br>1.95 | 16-3<br>2.10 | 16-8<br>2.25 | 17-0<br>2.41 | 17-5<br>2.57 |
| | 16.0 | 11-6<br>0.99 | 11-11<br>1.10 | 12-4<br>1.21 | 12-8<br>1.32 | 13-1<br>1.44 | 13-5<br>1.56 | 13-9<br>1.69 | 14-1<br>1.82 | 14-6<br>1.95 | 14-9<br>2.08 | 15-1<br>2.22 |
| 2 x 6 | 24.0 | 9-5<br>0.81 | 9-9<br>0.89 | 10-0<br>0.99 | 10-4<br>1.08 | 10-8<br>1.18 | 10-11<br>1.27 | 11-3<br>1.38 | 11-6<br>1.48 | 11.9<br>1.59 | 12-0<br>1.70 | 12-3<br>1.81 |
| | 12.0 | 17-6<br>1.14 | 18-2<br>1.27 | 18-9<br>1.40 | 19-4<br>1.53 | 19-10<br>1.67 | 20-5<br>1.81 | 20-11<br>1.95 | 21-6<br>2.10 | 21-11<br>2.25 | 22-6<br>2.41 | 22-11<br>2.57 |
| | 16.0 | 15-2<br>0.99 | 15-7<br>1.10 | 16-3<br>1.21 | 16-9<br>1.32 | 17-2<br>1.44 | 17-8<br>1.56 | 18-2<br>1.69 | 18-7<br>1.82 | 19-0<br>1.95 | 19-5<br>2.08 | 19-10<br>2.22 |
| 2 x 8 | 24.0 | 12-4<br>0.81 | 12-10<br>0.89 | 13-3<br>0.99 | 13-8<br>1.08 | 14-0<br>1.18 | 14-5<br>1.27 | 14-9<br>1.38 | 15-2<br>1.48 | 15-6<br>1.59 | 15-10<br>1.70 | 16-3<br>1.81 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.81 | 0.89 | 0.99 | 1.08 | 1.18 | 1.27 | 1.38 | 1.48 | 1.59 | 1.70 | 1.81 |

For Sl: 1 inch = 25.4 mm, 1 pound per square inch = 6.895 kPa, 1 pound per square foot = 0.0479 kN/mZ.

NOTE: The modulus of elasticity, "E," in 1,000,000 pounds per square inch is shown below each span.

## TABLE 3608.2.4h
## ALLOWABLE SPANS FOR LOW OR HIGH SLOPE RAFTERS

**30 Lbs. per Sq. Ft. Live Load (Supporting Gypsum Ceiling)**

**For Use in Snow Load Zone 2**

**DESIGN CRITERIA:** Strength—10 Ibs. per sq. ft. dead load plus 30 Ibs. per sq. ft. Iive load determines fiber stress. Deflection—For 30 Ibs. per sq. ft. live load. Limited to span in inches divided by 240.

**RAFTERS:** Spans are measured along the horizontal projection and loads are considered as applied on the horizontal projection.

**HOW TO USE TABLES:** Enter table with span of rafters (upper figure in each square). Determine size and spacing (last column) based on stress grade (top row) and modulus of elasticity (lower figure in each square) of lumber to be used.

| RAFTER SIZE AND SPACING | | ALLOWABLE EXTREME FIBER STRESS IN BENDING, "*Fb*," (psi) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **(inches)** | **(inches)** | **300** | **400** | **500** | **600** | **700** | **800** | **900** | **1000** | **1100** | **1200** | **1300** |
| 2 x 6 | 12.0 | 6-2<br>0.15 | 7-1<br>0.23 | 7-11<br>0 32 | 8-8<br>0.43 | 9-5<br>0.54 | 10-0<br>0.66 | 10-8<br>0.78 | 11-3<br>0.92 | 11-9<br>1.06 | 124<br>1.21 | 12-10<br>1.36 |
| | 16.0 | 5-4<br>0.13 | 6-2<br>0.20 | 6-11<br>0.28 | 7-6<br>0.37 | 8-2<br>0.47 | 8-8<br>0.57 | 9-3<br>0.68 | 9- 9<br>0.80 | 10-2<br>0.92 | 10-8<br>1.05 | 11-1<br>1.18 |
| | 24. 0 | 4-4<br>0.11 | 5-0<br>0.16 | 5-7<br>0.23 | 6-2<br>0.30 | 6-8<br>0.38 | 7-1<br>0.46 | 7-6<br>0.55 | 7-11<br>0.65 | 8-4<br>0.75 | 8-8<br>0.85 | 9-1<br>0.96 |
| 2 x 8 | 12.0 | 8-1<br>0.15 | 9-4<br>0.23 | 10-6<br>0.32 | 11-6<br>0.43 | 12-5<br>0.54 | 13-3<br>0.66 | 14-0<br>0.78 | 14-10<br>0.92 | 15-6<br>1.06 | 16-3<br>1.21 | 16-10<br>1.36 |
| | 16.0 | 7-0<br>0.13 | 8-1<br>0.20 | 9-1<br>0.28 | 9-11<br>0.37 | 10-9<br>0.47 | 11-6<br>0.57 | 12-2<br>0.68 | 12-10<br>0.80 | 13-5<br>0.92 | 14-0<br>1.05 | 14-7<br>1.18 |
| | 24.0 | 5-9<br>0.11 | 6-7<br>0.16 | 7-5<br>0.23 | 8-1<br>0.30 | 8-9<br>0.38 | 9-4<br>0.46 | 9-11<br>0.55 | 10-6<br>0.65 | 11-0<br>0.75 | 11-6<br>0.85 | 11-11<br>0.96 |
| 2x 10 | 12.0 | 10-4<br>0.15 | 11-11<br>0.23 | 13-4<br>0.32 | 14-8<br>0.43 | 15-10<br>0.54 | 16-11<br>0.66 | 17-11<br>0.78 | 18-11<br>0.92 | 19-10<br>1.06 | 20-8<br>1.21 | 21-6<br>1.36 |
| | 16.0 | 8-11<br>0.13 | 10-4<br>0.20 | 11-7<br>0.28 | 12-8<br>0.37 | 13-8<br>0.47 | 14-8<br>0.57 | 15-6<br>0.68 | 16-4<br>0.80 | 17-2<br>0.92 | 17-11<br>1.05 | 18-8<br>1.18 |
| | 24.0 | 7-4<br>0.11 | 8-5<br>0.16 | 9-5<br>0.23 | 10-4<br>0.30 | 11-2<br>0.38 | 11-11<br>0.46 | 12-8<br>0.55 | 134<br>0.65 | 14-0<br>0.75 | 14-8<br>0.85 | 15-3<br>0.96 |
| 2 x 12 | 12. 0 | 12-7<br>0.15 | 14-6<br>0.23 | 16-3<br>0.32 | 17-9<br>0.43 | 19-3<br>0.54 | 20-6<br>0.66 | 21-9<br>0.78 | 23-0<br>0.92 | 24-1<br>1.06 | 25-2<br>1.21 | 26-2<br>1.36 |
| | 16. 0 | 10-11<br>0.13 | 12-7<br>0.20 | 14-1<br>0.28 | 15-5<br>0.37 | 16-8<br>0.47 | 17-9<br>0.57 | 18-10<br>0.68 | 19-11<br>0.80 | 20-10<br>0.92 | 21-9<br>1.05 | 22-8<br>1.18 |
| | 24. 0 | 8-11<br>0.11 | 10-3<br>0.16 | 11-6<br>0.23 | 12-7<br>0.30 | 13-7<br>0.38 | 14-6<br>0.46 | 15-5<br>0.55 | 16-3<br>0.65 | 17-0<br>0.75 | 17-9<br>0.85 | 18-6<br>0.96 |
| **(inches)** | **(inches)** | **1400** | **1500** | **1600** | **1700** | **1800** | **1900** | **2000** | **2100** | **2200** | **2400** | |
| 2 x 6 | 12.0 | 13-3<br>1.52 | 13-9<br>1.69 | 14-2<br>1.86 | 14-8<br>2.04 | 15-1<br>2.22 | 15-6<br>2.41 | 15-11<br>2.60 | 16-3<br>2.80 | 16-8<br>3.00 | 17-5<br>3.42 | |
| | 16.0 | 11-6<br>1.32 | 11-11<br>1.46 | 12-4<br>1.61 | 12-8<br>1.76 | 13-1<br>1.92 | 13-5<br>2.08 | 13-9<br>2.25 | 14-1<br>2.42 | 14-5<br>2.60 | 15-1<br>2.96 | |
| | 24.0 | 9-5<br>1.08 | 9 9<br>1.19 | 10-0<br>1.31 | 10-4<br>1.44 | 10-8<br>1.57 | 10-11<br>1.70 | 11-3<br>1.84 | 11-6<br>1.98 | 11-9<br>2.12 | 12-4<br>2.41 | |
| 2 x 8 | 12.0 | 17-6<br>1.52 | 18 2<br>1.69 | 18-9<br>1.86 | 19-4<br>2.04 | 19-10<br>2.22 | 20-5<br>2.41 | 20-11<br>2.60 | 21-5<br>2.80 | 21-11<br>3.00 | 22-11<br>3.42 | |
| | 16.0 | 15-2<br>1.32 | 15-8<br>1.46 | 16-3<br>1.61 | 16-9<br>1.76 | 17-2<br>1.92 | 17-8<br>2.08 | 18-2<br>2.25 | 18-7<br>2.42 | 19-0<br>2.60 | 19-10<br>2.96 | |
| | 24.0 | 12-5<br>1.08 | 12-10<br>1.19 | 13-3<br>1.31 | 13-8<br>1.44 | 14-0<br>1.57 | 14-5<br>1.70 | 14-10<br>1.84 | 15-2<br>1.98 | 15-6<br>2.12 | 16-3<br>2.41 | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1.08 | 1.19 | 1.31 | 1.44 | 1.57 | 1.70 | 1.84 | 1.98 | 2.12 | 2.41 | |

For Sl: 1 inch = 25.4 mm, 1 pound per square inch = 6.895 kPa, 1 pound per square foot = 0.0479 kN/mZ.

NOTE: The modulus of elasticity, "E," in 1,000,000 pounds per square inch is shown below each span.

## TABLE 3608.2.4i
## ALLOWABLE SPANS FOR LOW OR HIGH SLOPE RAFTERS
**30 Lbs. per Sq. Ft. Live Load (Supporting Veneer Plaster Ceiling)**
## For Use in Snow Load Zone 2

**DESIGN CRITERIA:** Strength—10 lbs. per sq. ft. dead load plus 30 lbs. per sq. ft. live load determines fiber stress. Deflection—For 30 Ibs. per sq. ft. Iive load. Limited to span in inches divided by 360.
**RAFTERS:** Spans are measured along the horizontal projection and loads are considered as applied on the horizontal projection.
**HOW TO USE TABLES:** Enter table with span of rafters (upper figure in each square). Determine size and spacing (last column) based on stress grade (top row) and modulus of elasticity (lower figure in each square) of lumber to be used.

| RAFTER SIZE AND SPACING | | ALLOWABLE EXTREME FIBER STRESS IN BENDING, "*Fb*," (psi) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (inches) | (inches) | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 | 1300 |
| 2 x 6 | 12.0 | 6-2<br>0.23 | 7-1<br>0.35 | 7-11<br>0.49 | 8-8<br>0.64 | 9-5<br>0.81 | 10-0<br>0.99 | 10-8<br>1.18 | 11-3<br>1.38 | 11-9<br>1.59 | 12-3<br>1.81 | 12-10<br>2.04 |
| | 16.0 | 5-4<br>0.20 | 6-2<br>0.30 | 6-10<br>0.42 | 7-6<br>0.55 | 8-2<br>0.70 | 8-8<br>0.85 | 9-3<br>1.02 | 9-9<br>1.19 | 10-2<br>1.38 | 10-8<br>1.57 | 11-1<br>1.77 |
| | 24. 0 | 4-4<br>0.16 | 5-0<br>0.25 | 5-7<br>0.34 | 6-2<br>0.45 | 6-8<br>0.57 | 7-1<br>0.70 | 7-6<br>0.83 | 7-11<br>0.97 | 8-4<br>1.12 | 8-8<br>1.28 | 9-1<br>1.44 |
| 2 x 8 | 12.0 | 8-1<br>0.23 | 9-4<br>0.35 | 10-6<br>0.49 | 11-5<br>0.64 | 12-4<br>0.81 | 13-3<br>0.99 | 14-1<br>1.18 | 14-10<br>1.38 | 15-6<br>1.59 | 16-3<br>1.81 | 16-10<br>2.04 |
| | 16.0 | 7-0<br>0.20 | 8-1<br>0.30 | 9-1<br>0.42 | 9-11<br>0.55 | 10-9<br>0.70 | 11-6<br>0.85 | 12-2<br>1.02 | 12-10<br>1.19 | 13-5<br>1.38 | 14-0<br>1.57 | 14-8<br>1.77 |
| | 24.0 | 5-9<br>0.16 | 6-7<br>0.25 | 7-5<br>0.34 | 8-1<br>0.45 | 8-9<br>0.57 | 9-4<br>0.70 | 9-11<br>0.83 | 10-6<br>0.97 | 11-0<br>1.12 | 11-6<br>1.28 | 11-11<br>1.44 |
| 2x 10 | 12.0 | 10-4<br>0.23 | 11-11<br>0.35 | 13-4<br>0.49 | 14-8<br>0.64 | 15-10<br>0.81 | 16-11<br>0.99 | 17-11<br>1.18 | 18-11<br>1.38 | 19-11<br>1.59 | 20-8<br>1.81 | 21-6<br>2.04 |
| | 16.0 | 8-11<br>0.20 | 10-4<br>0.30 | 11-7<br>0.42 | 12-8<br>0.55 | 13-8<br>0.70 | 14-7<br>0.85 | 15-6<br>1.02 | 16-4<br>1.19 | 17-2<br>1.38 | 17-11<br>1.57 | 18-8<br>1.77 |
| | 24.0 | 7-4<br>0.16 | 8-5<br>0.25 | 9-5<br>0.34 | 10-4<br>0.45 | 11-2<br>0.57 | 11-11<br>0.70 | 12-8<br>0.83 | 13-4<br>0.97 | 14-0<br>1.12 | 14-8<br>1.28 | 15-3<br>1.44 |
| 2 x 12 | 12. 0 | 12-7<br>0.23 | 14-6<br>0.35 | 16-3<br>0.49 | 17-10<br>0.64 | 19-3<br>0.81 | 20-6<br>0.99 | 21-9<br>1.18 | 23-0<br>1.38 | 24-1<br>1.59 | 25-2<br>1.81 | 26-2<br>2.04 |
| | 16. 0 | 10-11<br>0.20 | 12-7<br>0.30 | 14-1<br>0.42 | 15-5<br>0.55 | 16-8<br>0.70 | 17-9<br>0.85 | 18-10<br>1.02 | 19-11<br>1.19 | 20-10<br>1.38 | 21-9<br>1.57 | 22-8<br>1.77 |
| | 24. 0 | 8-11<br>0.16 | 10-3<br>0.25 | 11-6<br>0.34 | 12-7<br>0.45 | 13-7<br>0.57 | 14-6<br>0.70 | 15-5<br>0.83 | 16-3<br>0.97 | 17-0<br>1.12 | 17-9<br>1.28 | 18-6<br>1.44 |
| (inches) | (inches) | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 | 2300 | 2400 |
| 2 x 6 | 12.0 | 13-3<br>2.29 | 13-9<br>2.53 | 14-3<br>2.79 | 14-8<br>3.06 | 15-1<br>3.33 | 15-6<br>3.61 | 15-10<br>3.90 | 16-3<br>4.20 | 16-8<br>4.50 | 17-0<br>4.81 | 17-5<br>5.13 |
| | 16.0 | 11-6<br>1.98 | 11-11<br>2.19 | 12-4<br>2.42 | 12-8<br>2.65 | 13-0<br>2.88 | 13-5<br>3.13 | 13-9<br>3.38 | 14-1<br>3.63 | 14-5<br>3.89 | 14-9<br>4.16 | 15-1<br>4.44 |
| | 24.0 | 9-4<br>1.61 | 9-9<br>1.79 | 10-0<br>1.97 | 10-4<br>2.16 | 10-8<br>2.35 | 10-11<br>2.55 | 11-3<br>2.75 | 11-6<br>2.96 | 11-9<br>3.18 | 12-0<br>3.39 | 12-3<br>3.62 |
| 2 x 8 | 12.0 | 17-6<br>2.29 | 18-1<br>2.53 | 18-9<br>2.79 | 19-3<br>3.06 | 19-10<br>3.33 | 20-5<br>3.61 | 20-11<br>3.90 | 21-5<br>4.20 | 21-11<br>4.50 | 22-5<br>4.81 | 22-11<br>5.13 |
| | 16.0 | 15-2<br>1.98 | 15-8<br>2.19 | 16-3<br>2.42 | 16-9<br>2.65 | 17-3<br>2.88 | 17-8<br>3.13 | 18-1<br>3.38 | 18-7<br>3.63 | 19-0<br>3.89 | 19-5<br>4.16 | 19-10<br>4.44 |
| | 24.0 | 12-4<br>1.61 | 12-10<br>1.79 | 13-3<br>1.97 | 13-8<br>2.16 | 14-0<br>2.35 | 14-5<br>2.55 | 14-9<br>2.75 | 15-2<br>2.96 | 15-6<br>3.18 | 15-10<br>3.39 | 16-3<br>3.62 |

For Sl: 1 inch = 25.4 mm, 1 pound per square inch = 6.895 kPa, 1 pound per square foot = 0.0479 kN/mZ.
NOTE: The modulus of elasticity, "E," in 1,000,000 pounds per square inch is shown below each span.

## TABLE 3608.2.4j
## ALLOWABLE SPANS FOR LOW OR HIGH SLOPE RAFTERS
## 30 Lbs. per Sq. Ft. Live Load
### For Use in Snow Load Zone 2

**DESIGN CRITERIA**: Strength—15 lbs. per sq. ft. dead load plus 30 Ibs. per sq. ft. live load determines fiber stress. Deflection—For 30 Ibs. per sq. ft. live load. Limited to span in inches divided by 180.

**RAFTERS:** Spans are measured along the horizontal projection and loads are considered as applied on the horizontal projection.

**HOW TO USE TABLES:** Enter table with span of rafters (upper figure in each square). Determine size and spacing (last column) based on stress grade (top row) and modulus of elasticity (lower figure in each square) of lumber to be used.

| RAFTER SPACING AND SIZE | | ALLOWABLE EXTREME FIBER STRESS IN BENDING, "*Fb*," (psi) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **(inches)** | **(inches)** | **200** | **300** | **400** | **500** | **600** | **700** | **800** | **900** | **1000** | **1100** | **1200** | **1300** |
| | 12 .0 | 3-0<br>0.05 | 3-8<br>0.09 | 4-3<br>0.15 | 4-9<br>0.20 | 5-3<br>0.27 | 5-8<br>0.34 | 6-0<br>0.41 | 6-5<br>0.49 | 6-9<br>0.58 | 7-1<br>0.67 | 7-5<br>0.76 | 7-8<br>0.86 |
| | 16.0 | 2-7<br>0.04 | 3-2<br>0.08 | 3-8<br>0.13 | 4-1<br>0.18 | 4-6<br>0.23 | 4-11<br>0.29 | 5-3<br>0.36 | 5-6<br>0.43 | 5-10<br>0.50 | 6-1<br>0.58 | 6-5<br>0.66 | 6-8<br>0.74 |
| 2 x 4 | 24.0 | 2-2<br>0.04 | 2-7<br>0.07 | 3-0<br>0.10 | 3-4<br>0.14 | 3-8<br>0.19 | 4-0<br>0.24 | 4-3<br>0.29 | 4-6<br>0.35 | 4-9<br>0.41 | 5-0<br>0.47 | 5-3<br>0.54 | 5-5<br>0.61 |
| | 12.0 | 4-9<br>0.05 | 5-10<br>0.09 | 6-8<br>0.15 | 7-6<br>0.20 | 8-2<br>0.27 | 8-10<br>0.34 | 9-6<br>0.41 | 10-0<br>0.49 | 10-7<br>0.58 | 11-1<br>0.67 | 11-7<br>0.76 | 12-1<br>0.86 |
| | 16.0 | 4-1<br>0.04 | 5-0<br>0.08 | 5-10<br>0.13 | 6-6<br>0.18 | 7-1<br>0.23 | 7-8<br>0.29 | 8-2<br>0.36 | 8-8<br>0.43 | 9-2<br>0.50 | 9-7<br>0.58 | 10-0<br>0.66 | 10-5<br>0.74 |
| 2x6 | 24.0 | 3-4<br>0.04 | 4-1<br>0.07 | 4-9<br>0.10 | 5-4<br>0.14 | 5-10<br>0.19 | 6-3<br>0.24 | 6-8<br>0.29 | 7-1<br>0.35 | 7-6<br>0.41 | 7-10<br>0.47 | 8-2<br>0.54 | 8-6<br>0.61 |
| | 12.0 | 6-3<br>0.05 | 7-8<br>0.09 | 8-10<br>0.15 | 9-10<br>0.20 | 10-10<br>0.27 | 11-8<br>0.34 | 12-6<br>0.41 | 13-3<br>0.49 | 13-11<br>0.58 | 14-8<br>0.67 | 15-3<br>0.76 | 15-11<br>0.86 |
| | 16.0 | 5-5<br>0.04 | 6-7<br>0.08 | 7-8<br>0.13 | 8-7<br>0.18 | 9-4<br>0.23 | 10-1<br>0.29 | 10-10<br>0.36 | 11-6<br>0.43 | 12-1<br>0.50 | 12-8<br>0.58 | 13-3<br>0.66 | 13-9<br>0.74 |
| 2 x 8 | 24.0 | 4-5<br>0.04 | 5-5<br>0.07 | 6-3<br>0.10 | 7-0<br>0.14 | 7-8<br>0.19 | 8-3<br>0.24 | 8-10<br>0.29 | 9-4<br>0.35 | 9-10<br>0.41 | 10-4<br>0.47 | 10-10<br>0.54 | 11-3<br>0.61 |
| | 12.0 | 8-0<br>0.05 | 9-9<br>0.09 | 11-3<br>0.15 | 12-7<br>0.20 | 13-9<br>0.27 | 14-11<br>0.34 | 15-11<br>0.41 | 16-11<br>0.49 | 17-10<br>0.58 | 18-8<br>0.67 | 19-6<br>0.76 | 20-4<br>0.86 |
| | 16.0 | 6-11<br>0.04 | 8-5<br>0.08 | 9-9<br>0.13 | 10-11<br>0.18 | 11-11<br>0.23 | 12-11<br>0.29 | 13-9<br>0.36 | 14-8<br>0.43 | 15-5<br>0.50 | 16-2<br>0.58 | 16-11<br>0.66 | 17-7<br>0.74 |
| 2x 10 | 24.0 | 5-8<br>0.04 | 6-11<br>0.07 | 8-0<br>0.10 | 8-11<br>0.14 | 9-9<br>0.19 | 10-6<br>0.24 | 11-3<br>0.29 | 11-11<br>0.35 | 12-7<br>0.41 | 13-2<br>0.47 | 13-9<br>0.54 | 14-4<br>0 61 |
| **(inches)** | **(inches)** | **1400** | **1500** | **1600** | **1700** | **1800** | **1900** | **2000** | **2 1 00** | **2200** | **2400** | **2700** | **3000** |
| | 12.0 | 8-0<br>0.96 | 8-3<br>1.06 | 8-6<br>1.17 | 8-9<br>1.28 | 9-0<br>1.39 | 9-3<br>1.51 | 9-6<br>1.63 | 9- 9<br>1.76 | 10-0<br>1.88 | 10-5<br>2.15 | 11-1<br>2.56 | |
| | 16.0 | 6- 11<br>0.83 | 7-2<br>0.92 | 7-5<br>1.01 | 7-7<br>1.11 | 7- 10<br>1.21 | 8-0<br>1.31 | 8-3<br>1.41 | 8-5<br>1.52 | 8-8<br>1.63 | 9-0<br>1.86 | 9-7<br>2.22 | 10- 1<br>2.60 |
| 2 x4 | 24.0 | 5-8<br>0.68 | 5-10<br>0.75 | 6-0<br>0.83 | 6-3<br>0.90 | 6-5<br>0.99 | 6-7<br>1.07 | 6-9<br>1.15 | 6-11<br>1.24 | 7-1<br>1.33 | 7-5<br>1.52 | 7-10<br>1.81 | 8-3<br>2.12 |
| | 12.0 | 12-6<br>0.96 | 13-0<br>1.06 | 13-5<br>1.17 | 13-10<br>1.28 | 14-2<br>1.39 | 14-7<br>1.51 | 15-0<br>1.63 | 15-4<br>1.76 | 15-8<br>1.88 | 16-5<br>2.15 | 17-5<br>2.56 | |
| | 16.0 | 10-10<br>0.83 | 11-3<br>0.92 | 11-7<br>1.01 | 11-11<br>1.11 | 12-4<br>1.21 | 12-8<br>1.31 | 13-0<br>1.41 | 13-3<br>1.52 | 13-7<br>1.63 | 14-2<br>1.86 | 15-1<br>2.22 | 15-11<br>2.60 |
| 2 x 6 | 24.0 | 8-10<br>0.68 | 9-2<br>0.75 | 9-6<br>0.83 | 9-9<br>0.90 | 10-0<br>0.99 | 10-4<br>1.07 | 10-7<br>1.15 | 10-10<br>1.24 | 11-1<br>1.33 | 11-7<br>1.52 | 12-4<br>1.81 | 13-0<br>2.12 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.68 | 0.75 | 0.83 | 0.90 | 0.99 | 1.07 | 1.15 | 1.24 | 1.33 | 1.52 | 1.81 | 2.12 |

For Sl: 1 inch = 25.4 mm, 1 pound per square inch = 6.895 kPa, 1 pound per square foot = 0.0479 kN/m2.

NOTE: The modulus of elasticity, "*E*," in 1,000,000 pounds per square inch is shown below each span.

## TABLE 3608.2.4k
## ALLOWABLE SPANS FOR LOW OR HIGH SLOPE RAFTERS
## 30 Lbs. per Sq. Ft. Live Load (Supporting Gypsum Ceiling)
**For Use in Snow Load Zone 2**

**DESIGN CRITERIA:** Strength—15 Ibs. per sq. ft. dead load plus 30 Ibs. per sq. ft. live load determines fiber stress. Deflection—For 30 Ibs. per sq. ft. live load. Limited to span in inches divided by 240.

**RAFTERS:** Spans are measured along the horizontal projection and loads are considered as applied on the horizontal projection.

**HOW TO USE TABLES:** Enter table with span of rafters (upper figure in each square). Determine size and spacing (last column) based on stress grade (top row) and modulus of elasticity (lower figure in each square) of lumber to be used.

| RAFTER SIZE AND SPACING | | ALLOWABLE EXTREME FIBER STRESS IN BENDING, *"Fb,"* (psi) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **( i nches)** | **(i nches)** | **300** | **400** | **500** | **600** | **700** | **800** | **900** | **1000** | **1100** | **1200** | **1300** |
| | | 5-10 | 6-8 | 7-6 | 8-2 | 8-10 | 9-6 | 10-0 | 10-7 | 11-1 | 11-7 | 12-1 |
| | 12.0 | 0.13 | 0.19 | 0.27 | 0.36 | 0.45 | 0.55 | 0.66 | 0.77 | 0.89 | 1.01 | 1.14 |
| | | 5-0 | 5-10 | 6-6 | 7-1 | 7-8 | 8-2 | 8-8 | 9-2 | 9-7 | 10-0 | 10-5 |
| | 16.0 | 0.11 | 0.17 | 0.24 | 0.31 | 0.39 | 0.48 | 0.57 | 0.67 | 0.77 | 0.88 | 0.99 |
| | | 4-1 | 4-9 | 5-4 | 5-10 | 6-3 | 6-8 | 7-1 | 7-6 | 7-10 | 8-2 | 8-6 |
| 2 x 6 | 24.0 | 0.09 | 0.14 | 0.19 | 0.25 | 0.32 | 0.39 | 0.46 | 0.54 | 0.63 | 0.72 | 0.81 |
| | | 7-8 | 8-10 | 9-10 | 10-10 | 11-8 | 12-6 | 13-3 | 13-11 | 14-8 | 15-3 | 15-11 |
| | 12.0 | 0.13 | 0.19 | 0.27 | 0.36 | 0.45 | 0.55 | 0.66 | 0.77 | 0.89 | 1.01 | 1.14 |
| | | 6-7 | 7-8 | 8-7 | 9-4 | 10-1 | 10-10 | 11-6 | 12-1 | 12-8 | 13-3 | 13-9 |
| | 16.0 | 0.11 | 0.17 | 0.24 | 0.31 | 0.39 | 0.48 | 0.57 | 0.67 | 0.77 | 0.88 | 0.99 |
| | | 5-5 | 6-3 | 7-0 | 7-8 | 8-3 | 8-10 | 9-4 | 9-10 | 10-4 | 10-10 | 11-3 |
| 2 x 8 | 24.0 | 0.09 | 0.14 | 0.19 | 0.25 | 0.32 | 0.39 | 0.46 | 0.54 | 0.63 | 0.72 | 0.81 |
| | | 9 -9 | 11-3 | 12-7 | 13-9 | 14-11 | 15-11 | 16-11 | 17-10 | 18-8 | 19-6 | 20-4 |
| | 12.0 | 0.13 | 0.19 | 0.27 | 0.36 | 0.45 | 0.55 | 0.66 | 0.77 | 0.89 | 1.01 | 1.14 |
| | | 8-5 | 9-9 | 10-11 | 11-11 | 12-11 | 13-9 | 14-8 | 15-5 | 16-2 | 16-11 | 17-7 |
| | 16.0 | 0.11 | 0.17 | 0.24 | 0.31 | 0.39 | 0.48 | 0.57 | 0.67 | 0.77 | 0.88 | 0.99 |
| | | 6-11 | 8-0 | 8-11 | 9-9 | 10-6 | 11-3 | 11-11 | 12-7 | 13-2 | 13-9 | 14-4 |
| 2x 10 | 24.0 | 0.09 | 0.14 | 0.19 | 0.25 | 0.32 | 0.39 | 0.46 | 0.54 | 0.63 | 0.72 | 0.81 |
| | | 11-10 | 13-8 | 15-4 | 16-9 | 18-1 | 19-4 | 20-6 | 21-8 | 22-8 | 23-9 | 24-8 |
| | 12.0 | 0.13 | 0.19 | 0.27 | 0.36 | 0.45 | 0.55 | 0.66 | 0.77 | 0.89 | 1.01 | 1.14 |
| | | 10-3 | 11-10 | 13-3 | 14-6 | 15-8 | 16-9 | 17-9 | 18-9 | 19-8 | 20-6 | 21-5 |
| | 16.0 | 0.11 | 0.17 | 0.24 | 0.31 | 0.39 | 0.48 | 0.57 | 0.67 | 0.77 | 0.88 | 0.99 |
| | | 8-5 | 9-8 | 10-10 | 11-10 | 12-10 | 13-8 | 14-6 | 15-4 | 16-1 | 16-9 | 17-5 |
| 2 x 12 | 24.0 | 0.09 | 0.14 | 0.19 | 0.25 | 0.32 | 0.39 | 0.46 | 0.54 | 0.63 | 0.72 | 0.81 |
| **(inches)** | **(inches)** | **1 400** | **1500** | **1600** | **1700** | **1800** | **1900** | **2000** | **2100** | **2200** | **2400** | |
| | | 12-6 | 13-0 | 13-5 | 13-10 | 14-2 | 14-7 | 15-0 | 15-4 | 15-8 | 16-5 | |
| | 12.0 | 1.28 | 1.41 | 1.56 | 1.71 | 1.86 | 2.02 | 2.18 | 2.34 | 2.51 | 2.86 | |
| | | 10-10 | 11-3 | 11-7 | 11-11 | 12-4 | 12-8 | 13-0 | 13-3 | 13-7 | 14-2 | |
| | 16.0 | 1.10 | 1.22 | 1.35 | 1.48 | 1.61 | 1.75 | 1.89 | 2.03 | 2.18 | 2.48 | |
| | | 8-10 | 9-2 | 9-6 | 9-9 | 10-0 | 10-4 | 10-7 | 10-10 | 11-1 | 11-7 | 12-4 |
| 2 x 6 | 24.0 | 0.90 | 1.00 | 1.10 | 1.21 | 1.31 | 1.43 | 1.54 | 1.66 | 1.78 | 2.02 | 2.41 |
| | | 16-6 | 17-1 | 17-8 | 18-2 | 18-9 | 19-3 | 19-9 | 20-3 | 20-8 | 21-7 | |
| | 12 0 | 1.28 | 1.41 | 1.56 | 1.71 | 1.86 | 2.02 | 2.18 | 2.34 | 2.51 | 2.86 | |
| | | 14-4 | 14-10 | 15-3 | 15-9 | 16-3 | 16-8 | 17-1 | 17-6 | 17-11 | 18-9 | |
| | 16.0 | 1.10 | 1.22 | 1.35 | 1.48 | 1.61 | 1.75 | 1.89 | 2.03 | 2.18 | 2.48 | |
| | | 11-8 | 12-1 | 12-6 | 12-10 | 13-3 | 13-7 | 13-11 | 14-4 | 14-8 | 15-3 | 16-3 |
| 2 x 8 | 24.0 | 0.90 | 1.00 | 1.10 | 1.21 | 1.31 | 1.43 | 1.54 | 1.66 | 1.78 | 2.02 | 2.41 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 0.90 | 1.00 | 1.10 | 1.21 | 1.31 | 1.43 | 1.54 | 1.66 | 1.78 | 2.02 | 2.41 |

For SI: 1 inch = 25.4 mm, 1 pound per square inch = 6.895 kPa, 1 pound per square foot = 0.0479 kN/m2.
NOTE: The modulus of elasticity, "E," in 1,000,000 pounds per square inch is shown oelow each span.

## TABLE 3608.2.4l
## ALLOWABLE SPANS FOR LOW OR HIGH SLOPE RAFTERS
## 30 Lbs. per Sq. Ft. Live Load (Supporting Plaster Ceiling)
## For Use in Snow Load Zone 2

**DESIGN CRITERIA:** Strength—15 lbs. per sq ft. dead load plus 30 Ibs. per sq.ft. live load determines fiber stress.
Deflection—For 30 Ibs. per sq. ft. live load. Limited to span in inches divided by 360.
**RAFTERS:** Spans are measured along the horizontal projection and loads are considered as applied on the horizontal projection.
**HOW TO USE TABLES:** Enter table with span of rafters (upper figure in each square). Determine size and spacing (first column) based on stress grade (top row) and modulus of elasticity (lower figure in each square) of lumber to be used.

| RAFTER SIZE AND SPACING | | ALLOWABLE EXTREME FIBER STRESS IN BENDING, "*Fb*," (psi) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **(inches)** | **(inches)** | **300** | **400** | **500** | **600** | **700** | **800** | **900** | **1000** | **1100** | **1200** |
| 2 x 6 | 12.0 | 5-10<br>0.19 | 6-8<br>0.29 | 7-6<br>0.41 | 8-2<br>0.54 | 8-10<br>0.68 | 9-6<br>0.83 | 10-0<br>0.99 | 10-7<br>1.15 | 11-1<br>1.33 | 11-7<br>1.52 |
| | 16.0 | 5-0<br>0.16 | 5-10<br>0.25 | 6-6<br>0.35 | 7-1<br>0.46 | 7-8<br>0.59 | 8-2<br>0.72 | 8-8<br>0.85 | 9-2<br>1.00 | 9-7<br>1.15 | 10-0<br>1.31 |
| | 24.0 | 4-1<br>0.13 | 4-9<br>0.21 | 5-4<br>0.29 | 5-10<br>0.38 | 6-3<br>0.48 | 6-8<br>0.58 | 7-1<br>0.70 | 7-6<br>0.82 | 7-10<br>0.94 | 8-2<br>1.07 |
| 2 x 8 | 12.0 | 7-8<br>0.19 | 8-10<br>0.29 | 9-10<br>0.41 | 10-10<br>0.54 | 11-8<br>0.68 | 12-6<br>0.83 | 13-3<br>0.99 | 13-11<br>1.15 | 14-8<br>1.33 | 15-3<br>1.52 |
| | 16.0 | 6-7<br>0.16 | 7-8<br>0.25 | 8-7<br>0.35 | 9-4<br>0.46 | 10-1<br>0.59 | 10-10<br>0.72 | 11-6<br>0.85 | 12-1<br>1.00 | 12-8<br>1.15 | 13-3<br>1.31 |
| | 24. 0 | 5-5<br>0.13 | 6-3<br>0.21 | 7-0<br>0.29 | 7-8<br>0.38 | 8-3<br>0.48 | 8-10<br>0.58 | 9-4<br>0.70 | 9-10<br>0.82 | 10-4<br>0.94 | 10-10<br>1.07 |
| 2 x 10 | 12.0 | 9-9<br>0.19 | 11-3<br>0.29 | 12-7<br>0.41 | 13-9<br>0.54 | 14-11<br>0.68 | 15-11<br>0.83 | 16-11<br>0.99 | 17-10<br>1.15 | 18-8<br>1.33 | 19-6<br>1.52 |
| | 16.0 | 8-5<br>0.16 | 9-9<br>0.25 | 10-11<br>0.35 | 11-11<br>0.46 | 12-11<br>0.59 | 13-9<br>0.72 | 14-8<br>0.85 | 15-5<br>1.00 | 16-2<br>1.15 | 16-11<br>1.31 |
| | 24.0 | 6-11<br>0.13 | 8-0<br>0.21 | 8-11<br>0.29 | 9 9<br>0.38 | 10-6<br>0.48 | 11-3<br>0.58 | 11-11<br>0.70 | 12-7<br>0.82 | 13-2<br>0.94 | 13-9<br>1.07 |
| 2x 12 | 12.0 | 11-10<br>0.19 | 13-8<br>0.29 | 15-4<br>0.41 | 16-9<br>0.54 | 18-1<br>0.68 | 19-4<br>0.83 | 20-6<br>0.99 | 21-8<br>1.15 | 22-8<br>1.33 | 23-9<br>1.52 |
| | 16.0 | 10-3<br>0.16 | 11-10<br>0.25 | 13-3<br>0.35 | 14-6<br>0.46 | 15-8<br>0.59 | 16-9<br>0.72 | 17-9<br>0.85 | 18-9<br>1.00 | 19-8<br>1.15 | 20-6<br>1.31 |
| | 24.0 | 8-5<br>0.13 | 9-8<br>0.21 | 10-10<br>0.29 | 11-10<br>0.38 | 12-10<br>0.48 | 13-8<br>0.58 | 14-6<br>0.70 | 15-4<br>0.82 | 16-1<br>0.94 | 16-9<br>1.07 |
| **(inches)** | **(inches)** | **1300** | **1400** | **1500** | **1600** | **1700** | **1800** | **1900** | **2000** | **2100** | **2200** |
| 2 x 6 | 12. 0 | 12-1<br>1.71 | 12-6<br>1.91 | 13-0<br>2.12 | 13-5<br>2.34 | 13-10<br>2.56 | 14-1<br>2.79 | 14-6<br>3.02 | 15-0<br>3.27 | 15-4<br>3.51 | 15-8<br>3.77 |
| | 16.0 | 10-5<br>1.48 | 10-10<br>1.66 | 11-3<br>1.84 | 11-7<br>2.02 | 11-11<br>2.22 | 12-4<br>2.41 | 12-8<br>2.62 | 12-11<br>2.82 | 13-3<br>3.04 | 13-11<br>3.26 |
| | 24.0 | 8-6<br>1.21 | 8-10<br>1.35 | 9-2<br>1.50 | 9-6<br>1.65 | 9-9<br>1.81 | 10-0<br>1.97 | 10-4<br>2.14 | 10-7<br>2.31 | 10-10<br>2.48 | 11-1<br>2.66 |
| 2 x 8 | 12.0 | 15-11<br>1.71 | 16-6<br>1.91 | 17-1<br>2.12 | 17-8<br>2 34 | 18-2<br>2.56 | 18-8<br>2.79 | 19-3<br>3.02 | 19-9<br>3.27 | 20-3<br>3.51 | 20-8<br>3.77 |
| | 16.0 | 13-9<br>1.48 | 14-4<br>1.66 | 14-10<br>1.84 | 15-3<br>2.02 | 15-9<br>2.22 | 16-3<br>2.41 | 16-8<br>2.62 | 17-1<br>2.83 | 17-6<br>3.04 | 17-11<br>3.26 |
| | 24.0 | 11-3<br>1.21 | 11-8<br>1.35 | 12-1<br>1.50 | 12-6<br>1.65 | 12-10<br>1.81 | 13-3<br>1.97 | 13-7<br>2.14 | 13-11<br>2.31 | 14-4<br>2.48 | 14-7<br>2.66 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1.21 | 1.35 | 1.50 | 1.65 | 1.81 | 1.97 | 2.14 | 2.31 | 2.48 | 2.66 |

For Sl: 1 inch = 25,4 mm, 1 pound per square inch = 6.895 kPa, 1 pound per square foot = 0.0479 kN/m2.

NOTE: The modulus of elasticity, "E," in 1,000,000 pounds per square inch is shown below each span.

## TABLE 3608.2.4m
## ALLOWABLE SPANS FOR LOW OR HIGH SLOPE RAFTERS

**35 Lbs. per Sq. Ft. Live Load**
**For Use in Snow Load Zone 3**

**DESIGN CRITERIA:** Strength-35 lbs. per sq. ft. live load plus 10 Ibs. per sq. ft. dead load determines fiber stress. Deflection—For 35 Ibs. per sq. ft. live load. Limited to span in inches divided by 180.

**RAFTERS:** Spans are measured along the horizontal projection and loads are considered as applied on the horizontal projection.

**HOW TO USE TABLES:** Enter table with span of rafters (upper figure in each square). Determine size and spacing (first column) based on stress grade (top row) and modulus of elasticity (lower figure in each square) of lumber to be used.

| RAFTER SIZE AND SPACING | | ALLOWABLE EXTREME FIBER STRESS IN BENDING, "*Fb*," (psi) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| (inches) | (inches) | 300 | 400 | 500 | 600 | 700 | 800 | 900 | 1000 | 1100 | 1200 |
| 2 x 6 | 12.0 | 5-10<br>.11 | 6-8<br>.17 | 7-6<br>.24 | 8-2<br>.31 | 8-10<br>.39 | 9-6<br>.48 | 10-0<br>.58 | 10-7<br>.67 | 11-1<br>.78 | 11-7<br>.89 |
| | 16.0 | 5-0<br>.10 | 5-10<br>.15 | 6-6<br>.21 | 7-1<br>.27 | 7-8<br>.34 | 8-2<br>.42 | 8-8<br>.50 | 9-2<br>.58 | 9-7<br>.67 | 10-0<br>.77 |
| | 24.0 | 4-1<br>.08 | 4-9<br>.12 | 5-4<br>.17 | 5-10<br>.22 | 6-3<br>.28 | 6-8<br>.34 | 7-1<br>.41 | 7-6<br>.48 | 7-10<br>.55 | 8-2<br>.63 |
| 2 x 8 | 12.0 | 7-8<br>.11 | 8-10<br>.17 | 9-10<br>.24 | 10-10<br>.31 | 11-8<br>.39 | 12-6<br>.48 | 13-3<br>.58 | 13-11<br>.67 | 14-8<br>.78 | 15-3<br>.89 |
| | 16.0 | 6-7<br>.10 | 7-8<br>.15 | 8-7<br>.21 | 9-4<br>.27 | 10-1<br>.34 | 10-10<br>.42 | 11-6<br>.50 | 12-1<br>.58 | 12-8<br>.67 | 13-3<br>.77 |
| | 24. 0 | 5-5<br>.08 | 6-3<br>.12 | 7-0<br>.17 | 7-8<br>.22 | 8-3<br>.28 | 8-10<br>.34 | 9-4<br>.41 | 9-10<br>.48 | 10-4<br>.55 | 10-10<br>.63 |
| 2 x 10 | 12.0 | 9-9<br>.11 | 11-3<br>.17 | 12-7<br>.24 | 13-9<br>.31 | 14-11<br>.39 | 15-11<br>.48 | 16-11<br>.58 | 17-10<br>.67 | 18-8<br>.78 | 19-6<br>.89 |
| | 16.0 | 8-5<br>.10 | 9-9<br>.15 | 10-11<br>.21 | 11-11<br>.27 | 12-11<br>.34 | 13-9<br>.42 | 14-8<br>.50 | 15-5<br>.58 | 16-2<br>.67 | 16-11<br>.77 |
| | 24.0 | 6-11<br>.08 | 8-0<br>.12 | 8-11<br>.17 | 9-9<br>.22 | 10-6<br>.28 | 11-3<br>.34 | 11-11<br>.41 | 12-7<br>.48 | 13-2<br>.55 | 13-9<br>.63 |
| 2x 12 | 12.0 | 11-10<br>0.11 | 13-8<br>0.17 | 15-4<br>0.24 | 16-9<br>0.31 | 18-1<br>0.39 | 19-4<br>0.48 | 20-6<br>0.58 | 21-8<br>0.67 | 22-9<br>0.78 | 23-9<br>0.89 |
| | 16.0 | 10-3<br>0.10 | 11-10<br>0.15 | 13-3<br>0.21 | 14-6<br>0.27 | 15-8<br>0.34 | 16-9<br>0.42 | 17-8<br>0.58 | 18-9<br>0.58 | 19-8<br>0.67 | 20-6<br>0.77 |
| | 24.0 | 8-4<br>0.08 | 9-8<br>0.12 | 10-10<br>0.17 | 11.10<br>0.22 | 12-10<br>0.28 | 13-8<br>0.34 | 14-6<br>0.41 | 15-4<br>0.48 | 16-1<br>0.55 | 16-9<br>0.63 |
| (inches) | (inches) | 1300 | 1400 | 1500 | 1600 | 1700 | 1800 | 1900 | 2000 | 2100 | 2200 |
| 2 x 6 | 12. 0 | 12-1<br>1.00 | 12-6<br>1.12 | 13-0<br>1.24 | 13-5<br>1.36 | 13-10<br>1.49 | 14-2<br>1.63 | 14-7<br>1.76 | 15-0<br>1.91 | 15-4<br>2.05 | 15-9<br>2.2 |
| | 16.0 | 10-5<br>.86 | 10-10<br>.97 | 11-3<br>1.07 | 11-7<br>1.18 | 11-11<br>1.29 | 12-4<br>1.41 | 12-8<br>1.53 | 13-0<br>1.65 | 13-3<br>1.78 | 13-7<br>1.90 |
| | 24.0 | 8-6<br>.71 | 8-10<br>.79 | 9-2<br>.88 | 9-6<br>.96 | 9-9<br>1.06 | 10-0<br>1.15 | 10-4<br>1.25 | 10-7<br>1.35 | 10-10<br>1.45 | 11-1<br>1.55 |
| 2 x 8 | 12.0 | 15-11<br>1.00 | 16-6<br>1.12 | 17-1<br>1.24 | 17-8<br>1.36 | 18-2<br>1.49 | 18-9<br>1.63 | 19-3<br>1.76 | 19-9<br>1.91 | 20-3<br>2.05 | 20-8<br>2.20 |
| | 16.0 | 13-9<br>.86 | 14-4<br>.97 | 14-10<br>1.07 | 15-3<br>1.18 | 15-9<br>1.29 | 16-3<br>1.41 | 16-8<br>1.53 | 17-1<br>1.65 | 17-6<br>1.78 | 17-11<br>1.90 |
| | 24.0 | 11-3<br>.71 | 11-8<br>.79 | 12-1<br>.88 | 12-6<br>.96 | 12-10<br>1.06 | 13-3<br>1.15 | 13-7<br>1.25 | 13-11<br>1.35 | 14-4<br>1.45 | 14-8<br>1.55 |
| | | 20-4 | 21-1 | 21-10 | 22-6 | 23-3 | 23-11 | 24-6 | 25-2 | 25-10 | 26-5 |

For SI: 1 inch = 25,4 mm, 1 pound per square inch = 6.895 kPa, 1 pound per square foot = 0.0479 kN/m2.
NOTE: The modulus of elasticity, "E," in 1,000,000 pounds per square inch is shown below each span.