



County of San Diego, Department of Planning and Land Use
SPAN TABLES
 BUILDING DIVISION

ALLOWABLE SPANS FOR JOISTS AND RAFTERS ^{1, 7}

| Lumber Grade | | FLOOR JOISTS | | CEILING JOISTS ⁵ | | RAFTER-CEILING JOIST COMBINATION | | RAFTER-CEILING JOIST COMBINATION | | RAFTERS ⁶ | |
|----------------------------------|-----------------------|----------------------------|------------------------------|-----------------------------|----------------------------|---|---|--|--|----------------------------------|---------------------------|
| DOUGLAS FIR-LARCH NO.2 OR BETTER | | Drywall Below ² | No Finish Below ² | Plaster Below ² | Drywall Below ³ | Lightweight Roofing; Plaster Below ² | Lightweight Roofing; Drywall Below ³ | Tile Roofing; Plaster Below ² | Tile Roofing; Drywall Below ³ | Lightweight Roofing ⁴ | Tile Roofing ⁴ |
| Nominal Size (inches) | O.C. Spacing (inches) | DL = 15 psf | DL = 10 psf | DL = 10 psf | DL = 5 psf | DL = 20 psf | DL = 15 psf | DL = 30 psf | DL = 25 psf | DL = 10 psf | DL = 20 psf |
| | | LL = 40 psf | LL = 40 psf | LL = 10 psf | LL = 10 psf | LL = 20 psf | LL = 20 psf | LL = 20 psf | LL = 20 psf | LL = 20 psf | LL = 20 psf |
| 2 x 4 | 12 | 6' - 9" | 6' - 9" | 9' - 9" | 12' - 5" | 8' - 5" | 9' - 6" | 7' - 11" | 8' - 2" | 10' - 10" | 9' - 10" |
| | 16 | 6' - 2" | 6' - 2" | 8' - 11" | 11' - 3" | 7' - 7" | 8' - 8" | 7' - 3" | 7' - 5" | 9' - 10" | 8' - 6" |
| | 24 | 5' - 3" | 5' - 4" | 7' - 9" | 9' - 10" | 6' - 7" | 7' - 4" | 6' - 1" | 6' - 5" | 8' - 0" | 6' - 11" |
| 2 x 6 | 12 | 10' - 8" | 10' - 8" | 15' - 5" | 19' - 6" | 13' - 4" | 15' - 1" | 12' - 7" | 12' - 11" | 16' - 7" | 14' - 4" |
| | 16 | 9' - 9" | 9' - 8" | 14' - 0" | 17' - 8" | 12' - 1" | 13' - 3" | 11' - 1" | 11' - 8" | 14' - 4" | 12' - 5" |
| | 24 | 7' - 8" | 8' - 1" | 12' - 2" | 14' - 10" | 10' - 1" | 10' - 10" | 9' - 0" | 9' - 6" | 11' - 9" | 10' - 2" |
| 2 x 8 | 12 | 13' - 10" | 14' - 1" | 20' - 3" | 25' - 8" | 17' - 7" | 19' - 6" | 16' - 3" | 17' - 2" | 21' - 0" | 18' - 2" |
| | 16 | 12' - 0" | 12' - 7" | 18' - 5" | 23' - 0" | 15' - 9" | 16' - 10" | 14' - 1" | 14' - 10" | 18' - 2" | 15' - 9" |
| | 24 | 9' - 9" | 10' - 3" | 16' - 1" | 18' - 9" | 12' - 10" | 13' - 9" | 11' - 5" | 12' - 1" | 14' - 10" | 12' - 10" |
| 2 x 10 | 12 | 16' - 11" | 17' - 9" | 25' - 11" | * | 22' - 4" | 23' - 10" | 19' - 11" | 21' - 0" | 25' - 8" | 22' - 3" |
| | 16 | 14' - 9" | 15' - 4" | 23' - 6" | * | 19' - 4" | 20' - 8" | 17' - 3" | 18' - 2" | 22' - 3" | 19' - 3" |
| | 24 | 11' - 11" | 12' - 6" | 19' - 10" | 22' - 11" | 15' - 9" | 16' - 10" | 14' - 0" | 14' - 10" | 18' - 2" | 15' - 8" |
| 2 x 12 | 12 | 19' - 7" | 20' - 7" | * | * | 25' - 11" | * | 23' - 2" | 24' - 5" | * | 25' - 9" |
| | 16 | 17' - 0" | 17' - 10" | * | * | 22' - 5" | 24' - 0" | 20' - 0" | 21' - 1" | 25' - 9" | 22' - 4" |
| | 24 | 13' - 10" | 14' - 6" | 23' - 0" | * | 18' - 3" | 19' - 6" | 16' - 4" | 17' - 2" | 21' - 0" | 18' - 3" |
| 2 x 14 | 12 | 21' - 11" | 23' - 0" | * | * | * | * | 25' - 11" | * | * | * |
| | 16 | 19' - 0" | 19' - 11" | * | * | 25' - 1" | * | 22' - 5" | 23' - 7" | * | 25' - 1" |
| | 24 | 15' - 6" | 16' - 3" | * | * | 20' - 5" | 21' - 10" | 18' - 3" | 19' - 3" | 23' - 7" | 20' - 5" |

*Span exceeds 26 feet in length. Check sources for availability of lumber in lengths greater than 20 feet.

ALLOWABLE SPANS FOR OPEN BEAM CEILINGS ^{1, 2, 7}

| Lumber Grade | | Lightweight Roofing | Tile Roofing |
|----------------------------------|-----------------------|---------------------|--------------|
| DOUGLAS FIR-LARCH NO.2 OR BETTER | | | |
| Nominal Size (inches) | O.C. Spacing (inches) | DL = 15 psf | DL = 25 psf |
| | | LL = 20 psf | LL = 20 psf |
| 4 x 4 | 24 | 10' - 1" | 9' - 6" |
| | 32 | 9' - 1" | 8' - 0" |
| | 48 | 7' - 4" | 6' - 6" |
| | 24 | 15' - 11" | 14' - 7" |
| 4 x 6 | 32 | 13' - 4" | 11' - 9" |
| | 48 | 10' - 11" | 9' - 7" |
| | 24 | 21' - 0" | 19' - 4" |
| 4 x 8 | 32 | 17' - 8" | 15' - 7" |
| | 48 | 14' - 5" | 12' - 8" |
| | 24 | * | 23' - 9" |
| 4 x 10 | 32 | 21' - 9" | 19' - 2" |
| | 48 | 17' - 8" | 15' - 7" |

*Span exceeds 26 feet in length. Check sources for availability of lumber in lengths greater than 20 feet.

RAFTER TIE CONNECTIONS

| Rafter Slope | Tie Spacing (inches) | Roof Span (feet) | | | |
|--|----------------------|------------------|----|----|----|
| | | 12 | 20 | 28 | 36 |
| Required number of 16d common nails per connection ^{8, 9} | | | | | |
| 3:12 | 12 | 4 | 6 | 8 | 10 |
| | 16 | 5 | 7 | 10 | 13 |
| | 24 | 7 | 11 | 15 | 19 |
| | 32 | 10 | 14 | 19 | 25 |
| | 48 | 14 | 21 | 29 | 37 |
| 4:12 | 12 | 3 | 4 | 5 | 6 |
| | 16 | 3 | 5 | 7 | 8 |
| | 24 | 4 | 7 | 10 | 12 |
| | 32 | 6 | 9 | 13 | 16 |
| | 48 | 8 | 14 | 19 | 24 |
| 5:12 | 12 | 3 | 3 | 4 | 5 |
| | 16 | 3 | 4 | 5 | 7 |
| | 24 | 4 | 6 | 8 | 10 |
| | 32 | 5 | 8 | 10 | 13 |
| | 48 | 7 | 11 | 15 | 20 |

Notes:

- Used under dry conditions with lumber moisture content less than 16 percent at time of installation.
- Deflection based on L/360 (LL) and L/240 (LL + DL).
- Deflection based on L/240 (LL) and L/180 (LL + DL).
- Deflection based on L/180 (LL) and L/120 (LL + DL).
- Unfinished attic above with no storage.
- Unfinished attic below.
- See DPLU #081 for fastening schedule.
- Equivalent nailing required for ceiling joist to ceiling joist lap splices.
- Connected members shall be of sufficient size to prevent splitting due to nailing.

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ALLOWABLE PLYWOOD SPANS ¹

| Panel Identification Index ⁶ | Plywood Thickness (inches) | Edges | Maximum Spans (inches) | |
|---|----------------------------|-----------|------------------------|---------------------|
| | | | Roof | Floor |
| 12/0 | 5/16 | Blocked | 12 | 0 |
| | | Unblocked | 12 | 0 |
| 16/0 | 5/16, 3/8 | Blocked | 16 | 0 |
| | | Unblocked | 16 | 0 |
| 20/0 | 5/16, 3/8 | Blocked | 20 | 0 |
| | | Unblocked | 20 | 0 |
| 24/0 | 3/8, 7/16, 1/2 | Blocked | 24 | 0 |
| | | Unblocked | 20 ⁴ | 0 |
| 24/16 | 7/16, 1/2 | Blocked | 24 | 16 ² |
| | | Unblocked | 24 | 0 |
| 32/16 | 15/32, 1/2, 5/8 | Blocked | 32 | 16 ^{2,3} |
| | | Unblocked | 28 | 0 |
| 40/20 | 19/32, 5/8, 3/4, 7/8 | Blocked | 40 | 20 ^{2,3,5} |
| | | Unblocked | 32 | 0 |
| 48/24 | 23/32, 3/4, 7/8 | Blocked | 48 | 24 ² |
| | | Unblocked | 36 | 0 |

Notes:

- Plywood shall be Structural I, Structural II, Standard Sheathing, or CC Exterior grades only. Plywood shall be continuous over two or more spans with face grain perpendicular to supports.
- Blocking may be omitted if plywood edges have approved tongue and groove joints, if 1/4" minimum thickness plywood underlayment is installed, or if finish floor is 3/4" wood strip, or 1 1/2" of approved cellular or lightweight concrete is placed over subfloor.
- May be 24" if 3/4" wood strip flooring is installed at rights angles to joists.
- For 1/2" panel, maximum span shall be 24".
- May be 24" o.c. for floors where 1 1/2" of cellular or lightweight concrete is applied over panels
- Identification index appears on all panel in the construction grades listed in footnote #1.

ALLOWABLE LUMBER SHEATHING SPANS

| Sheathing ¹ | | Maximum Spans | |
|---|-----------------------|----------------------|----------------|
| | | Roof | Floor |
| 1" Thick Nominal | Solid | 32" | 16" |
| | Spaced ^{2,4} | 24" | Not Applicable |
| 2" Thick Nominal (Douglas Fir-Larch No. 2 or better) | Supported Ceiling | 6' - 6" ³ | 4' - 6" |
| | No Ceiling | 8' - 0" ³ | 4' - 6" |

Notes:

- Spans of sheathing boards placed diagonally across rafters or joists shall be measured along the longitudinal axis of the plank. Utility grade not permitted.
- Shall be continuous over three or more supports.
- Douglas Fir-Larch No. 3 also permitted.
- Merchantable, No.4 Common and No. 3 not permitted.