# Southern Pine Allowable Load Tables

## Requirements for Use of Allowable Load Tables

1. These tables are for gravity loads only. Consult a registered design professional for wind and seismic load analysis and design.
2. All tables are based on uniformly distributed loads only. Other loads, such as concentrated or unbalanced snow loads, have not been considered and must be analyzed separately.
3. These tables are only applicable to members used under dry-service conditions where the moisture content in use is a maximum of 19% for lumber and less than 16% for glued laminated timber.
4. The compression edge of the header or beam must be laterally supported at intervals of 24" or less. In addition, lateral support must be provided at bearing points.
5. Allowable total and live plf (pounds per lineal foot) loads used to select a header or beam must be equal to or greater than the actual plf loads applied.
6. Multiple-member headers and beams must be properly connected together. See page 5 for connection guidelines.
7. These tables assume unbalanced glued laminated timber combinations used in simple-span applications. Balanced beam combinations with equal or greater design values may be substituted and used in either simple-span or continuous-span applications.
8. These tables are only applicable to members used under ordinary ranges of temperature and occasionally heated in use up to 150° F.

## Key – for each clear opening there are three rows of values:

TL: Maximum total load in pounds per lineal foot (plf) with deflection limited to $\ell/180$

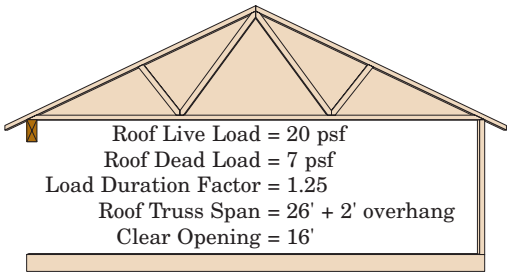
LL: Maximum live load in pounds per lineal foot (plf) with deflection limited to $\ell/240$

BL: Required bearing length in inches

## Steps in Sizing Headers or Beams:

1. Determine the required total load (live load + dead load) in plf.
2. Determine the required live load in plf.
3. Select a clear opening and find columns where the plf value in the TL row equals or exceeds the required total load, *and* the plf value in the LL row equals or exceeds the required live load.
4. Check required bearing lengths in the BL row.
5. Find product size options at the top of the columns meeting the total load, live load and bearing length requirements.

## Example: Allowable Roof Loads




Total Load = (26'/2 + 2') x (20 + 7) psf = 405 plf
Live Load = (26'/2 + 2') x 20 psf = 300 plf

Select the 16' clear opening in Tables 33-38. Read across the TL row in each table to find columns with total loads equal to or greater than the required 405 plf. Then check the LL row in those columns to make sure the corresponding live loads are equal to or greater than the required 300 plf. Solutions include: from Table 33 for No.1 SP lumber, select (4) 2x12s requiring a 1.5" bearing length; from Table 36 for 24F-1.7E (V4) SP glulam, select a 3-1/2x11-1/4" beam requiring a 3.0" bearing length. From Table 38 for 24F-1.8E (V3) SP glulam, select a 3-1/8x11" beam requiring a 3.0" bearing length.

## Table 33 – No. 1 Southern Pine Lumber

| Clear Opening | | 1-ply | | | | 2-ply | | | | 3-ply | | | | 4-ply | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2 x 6 | 2 x 8 | 2 x 10 | 2 x 12 | 2 x 6 | 2 x 8 | 2 x 10 | 2 x 12 | 2 x 6 | 2 x 8 | 2 x 10 | 2 x 12 | 2 x 6 | 2 x 8 | 2 x 10 | 2 x 12 |
| 4' | TL | 502 | 783 | 1036 | 1389 | 1005 | 1565 | 2072 | 2778 | 1720 | 2666 | 3512 | 4671 | 2293 | 3554 | 4682 | 6228 |
| | LL | 502 | 783 | 1036 | 1389 | 1005 | 1565 | 2072 | 2778 | 1720 | 2666 | 3512 | 4671 | 2293 | 3554 | 4682 | 6228 |
| | BL | 1.5 | 3.0 | 3.0 | 4.5 | 1.5 | 3.0 | 3.0 | 4.5 | 1.5 | 3.0 | 3.0 | 4.5 | 1.5 | 3.0 | 3.0 | 4.5 |
| 6' | TL | 229 | 364 | 490 | 677 | 458 | 727 | 981 | 1353 | 788 | 1248 | 1680 | 2310 | 1050 | 1664 | 2240 | 3080 |
| | LL | 229 | 364 | 490 | 677 | 458 | 727 | 981 | 1353 | 788 | 1248 | 1680 | 2310 | 1050 | 1664 | 2240 | 3080 |
| | BL | 1.5 | 1.5 | 3.0 | 3.0 | 1.5 | 1.5 | 3.0 | 3.0 | 1.5 | 3.0 | 3.0 | 3.0 | 1.5 | 3.0 | 3.0 | 3.0 |
| 8' | TL | 129 | 207 | 281 | 391 | 258 | 414 | 562 | 783 | 446 | 712 | 966 | 1344 | 594 | 950 | 1288 | 1792 |
| | LL | 129 | 207 | 281 | 391 | 258 | 414 | 562 | 783 | 424 | 712 | 966 | 1344 | 565 | 950 | 1288 | 1792 |
| | BL | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 3.0 | 3.0 | 1.5 | 1.5 | 3.0 | 3.0 |
| 10' | TL | 82 | 132 | 180 | 253 | 165 | 265 | 361 | 506 | 285 | 457 | 622 | 871 | 380 | 610 | 830 | 1161 |
| | LL | 73 | 132 | 180 | 253 | 146 | 265 | 361 | 506 | 219 | 457 | 622 | 871 | 292 | 610 | 830 | 1161 |
| | BL | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 1.5 | 3.0 |
| 12' | TL | 55 | 92 | 125 | 176 | 109 | 183 | 250 | 352 | 164 | 317 | 432 | 607 | 218 | 422 | 576 | 809 |
| | LL | 42 | 92 | 125 | 176 | 85 | 183 | 250 | 352 | 127 | 289 | 432 | 607 | 170 | 386 | 576 | 809 |
| | BL | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| 14' | TL | 34 | 67 | 91 | 129 | 68 | 134 | 183 | 257 | 101 | 231 | 316 | 445 | 135 | 308 | 421 | 593 |
| | LL | 27 | 61 | 91 | 129 | 54 | 122 | 183 | 257 | 80 | 183 | 316 | 445 | 107 | 244 | 421 | 593 |
| | BL | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| 16' | TL | 22 | 51 | 69 | 98 | 44 | 101 | 139 | 196 | 66 | 156 | 240 | 339 | 88 | 208 | 320 | 452 |
| | LL | 18 | 41 | 69 | 98 | 36 | 82 | 139 | 196 | 54 | 123 | 240 | 339 | 72 | 164 | 320 | 452 |
| | BL | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| 18' | TL | 15 | 36 | 54 | 77 | 30 | 72 | 108 | 153 | 45 | 108 | 188 | 266 | 60 | 144 | 251 | 355 |
| | LL | 13 | 29 | 54 | 77 | 25 | 58 | 108 | 153 | 38 | 87 | 179 | 266 | 51 | 116 | 239 | 355 |
| | BL | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |

(See *Requirements for Use* on page 23, and *Key*, *Example* and *Notes* on this page)

## Notes for Tables 33 - 38: Allowable Roof Loads (plf) - 1.25 Load Duration Factor

- Tabulated total loads (TL) and live loads (LL) represent the allowable uniformly distributed loads that a beam can support in addition to its own weight. Deflection is limited to $\ell/180$ for total load and $\ell/240$ for live load. To determine an allowable live load for a deflection limit other than $\ell/240$, multiply the LL value by the ratio of 240 divided by the desired deflection constant. The result must not exceed the corresponding TL value for the same clear opening and product.
- Tabulated bearing lengths (BL) reflect the number of 2x trimmers required at each end of the header or beam based on the corresponding plf loads (e.g., 1.5" = one trimmer, 3.0" = two trimmers, etc.). Additional checks may be required for bearing length and trimmers.
- See *Assumptions for Table Development* beginning on page 2 for details on design assumptions made to generate these tables.
- Interpolation between clear openings is permitted.
- The design span is assumed to be the clear opening plus 1/2 the required bearing length at each end.

## Table 33A – 2400F-2.0E Southern Pine Lumber

| Clear Opening | | 1-ply | | | | 2-ply | | | | 3-ply | | | | 4-ply | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2 x 6 | 2 x 8 | 2 x 10 | 2 x 12 | 2 x 6 | 2 x 8 | 2 x 10 | 2 x 12 | 2 x 6 | 2 x 8 | 2 x 10 | 2 x 12 | 2 x 6 | 2 x 8 | 2 x 10 | 2 x 12 |
| 4' | TL | 845 | 1231 | 1784 | 2511 | 1691 | 2462 | 3568 | 5021 | 2536 | 3693 | 5352 | 7532 | 3381 | 4924 | 7135 | 10042 |
| | LL | 845 | 1231 | 1784 | 2511 | 1691 | 2462 | 3568 | 5021 | 2536 | 3693 | 5352 | 7532 | 3381 | 4924 | 7135 | 10042 |
| | BL | 1.5 | 3.0 | 4.5 | 6.0 | 1.5 | 3.0 | 4.5 | 6.0 | 1.5 | 3.0 | 4.5 | 6.0 | 1.5 | 3.0 | 4.5 | 6.0 |
| 6' | TL | 406 | 692 | 982 | 1291 | 812 | 1383 | 1964 | 2583 | 1395 | 2148 | 2946 | 3874 | 1861 | 2864 | 3928 | 5165 |
| | LL | 406 | 692 | 982 | 1291 | 812 | 1383 | 1964 | 2583 | 1221 | 2148 | 2946 | 3874 | 1628 | 2864 | 3928 | 5165 |
| | BL | 1.5 | 3.0 | 3.0 | 4.5 | 1.5 | 3.0 | 3.0 | 4.5 | 1.5 | 3.0 | 3.0 | 4.5 | 1.5 | 3.0 | 3.0 | 4.5 |
| 8' | TL | 230 | 396 | 635 | 868 | 461 | 793 | 1269 | 1737 | 698 | 1363 | 2031 | 2605 | 931 | 1817 | 2708 | 3473 |
| | LL | 176 | 396 | 635 | 868 | 352 | 792 | 1269 | 1737 | 528 | 1181 | 2031 | 2605 | 704 | 1574 | 2708 | 3473 |
| | BL | 1.5 | 1.5 | 3.0 | 3.0 | 1.5 | 1.5 | 3.0 | 3.0 | 1.5 | 3.0 | 3.0 | 3.0 | 1.5 | 3.0 | 3.0 | 3.0 |
| 10' | TL | 120 | 255 | 412 | 601 | 239 | 511 | 824 | 1203 | 359 | 814 | 1416 | 1961 | 479 | 1086 | 1888 | 2614 |
| | LL | 91 | 206 | 412 | 601 | 183 | 412 | 824 | 1203 | 274 | 617 | 1253 | 1961 | 365 | 822 | 1671 | 2614 |
| | BL | 1.5 | 1.5 | 3.0 | 3.0 | 1.5 | 1.5 | 3.0 | 3.0 | 1.5 | 1.5 | 3.0 | 3.0 | 1.5 | 1.5 | 3.0 | 3.0 |
| 12' | TL | 69 | 158 | 288 | 422 | 138 | 316 | 575 | 844 | 206 | 474 | 972 | 1451 | 275 | 632 | 1296 | 1935 |
| | LL | 53 | 120 | 247 | 422 | 106 | 241 | 493 | 844 | 159 | 361 | 737 | 1303 | 212 | 482 | 982 | 1737 |
| | BL | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 3.0 | 3.0 | 1.5 | 1.5 | 3.0 | 3.0 |
| 14' | TL | 43 | 99 | 206 | 312 | 85 | 198 | 411 | 623 | 128 | 297 | 617 | 1073 | 171 | 396 | 822 | 1431 |
| | LL | 34 | 76 | 157 | 279 | 67 | 153 | 313 | 557 | 101 | 229 | 470 | 832 | 134 | 305 | 627 | 1109 |
| | BL | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 1.5 | 3.0 |
| 16' | TL | 28 | 66 | 138 | 239 | 56 | 131 | 275 | 478 | 84 | 197 | 413 | 740 | 112 | 263 | 550 | 986 |
| | LL | 22 | 51 | 106 | 188 | 45 | 103 | 212 | 376 | 67 | 154 | 317 | 564 | 90 | 205 | 423 | 752 |
| | BL | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 1.5 | 3.0 |
| 18' | TL | 19 | 45 | 96 | 173 | 38 | 91 | 192 | 347 | 57 | 136 | 288 | 520 | 76 | 182 | 384 | 693 |
| | LL | 16 | 36 | 75 | 133 | 32 | 72 | 149 | 266 | 47 | 108 | 224 | 399 | 63 | 144 | 298 | 532 |
| | BL | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |

## Table 33B – M-23 Southern Pine Lumber

| Clear Opening | | 1-ply | | | | 2-ply | | | | 3-ply | | | | 4-ply | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2 x 6 | 2 x 8 | 2 x 10 | 2 x 12 | 2 x 6 | 2 x 8 | 2 x 10 | 2 x 12 | 2 x 6 | 2 x 8 | 2 x 10 | 2 x 12 | 2 x 6 | 2 x 8 | 2 x 10 | 2 x 12 |
| 4' | TL | 845 | 1231 | 1784 | 2511 | 1691 | 2462 | 3568 | 5021 | 2536 | 3693 | 5352 | 7532 | 3381 | 4924 | 7135 | 10042 |
| | LL | 845 | 1231 | 1784 | 2511 | 1691 | 2462 | 3568 | 5021 | 2536 | 3693 | 5352 | 7532 | 3381 | 4924 | 7135 | 10042 |
| | BL | 1.5 | 3.0 | 4.5 | 6.0 | 1.5 | 3.0 | 4.5 | 6.0 | 1.5 | 3.0 | 4.5 | 6.0 | 1.5 | 3.0 | 4.5 | 6.0 |
| 6' | TL | 406 | 692 | 982 | 1291 | 812 | 1383 | 1964 | 2583 | 1395 | 2148 | 2946 | 3874 | 1861 | 2864 | 3928 | 5165 |
| | LL | 369 | 692 | 982 | 1291 | 737 | 1383 | 1964 | 2583 | 1099 | 2148 | 2946 | 3874 | 1465 | 2864 | 3928 | 5165 |
| | BL | 1.5 | 3.0 | 3.0 | 4.5 | 1.5 | 3.0 | 3.0 | 4.5 | 1.5 | 3.0 | 3.0 | 4.5 | 1.5 | 3.0 | 3.0 | 4.5 |
| 8' | TL | 210 | 396 | 635 | 868 | 420 | 793 | 1269 | 1737 | 629 | 1363 | 2031 | 2605 | 839 | 1817 | 2708 | 3473 |
| | LL | 159 | 357 | 635 | 868 | 318 | 713 | 1269 | 1737 | 477 | 1080 | 2031 | 2605 | 635 | 1417 | 2708 | 3473 |
| | BL | 1.5 | 1.5 | 3.0 | 3.0 | 1.5 | 1.5 | 3.0 | 3.0 | 1.5 | 3.0 | 3.0 | 3.0 | 1.5 | 3.0 | 3.0 | 3.0 |
| 10' | TL | 108 | 245 | 412 | 601 | 215 | 489 | 824 | 1203 | 323 | 745 | 1416 | 1961 | 430 | 979 | 1888 | 2614 |
| | LL | 82 | 186 | 378 | 601 | 164 | 371 | 757 | 1203 | 247 | 565 | 1128 | 1961 | 329 | 742 | 1504 | 2614 |
| | BL | 1.5 | 1.5 | 3.0 | 3.0 | 1.5 | 1.5 | 3.0 | 3.0 | 1.5 | 1.5 | 3.0 | 3.0 | 1.5 | 1.5 | 3.0 | 3.0 |
| 12' | TL | 62 | 142 | 288 | 422 | 123 | 284 | 575 | 844 | 185 | 434 | 877 | 1451 | 247 | 568 | 1169 | 1935 |
| | LL | 48 | 109 | 222 | 394 | 96 | 217 | 444 | 787 | 143 | 330 | 666 | 1172 | 191 | 434 | 887 | 1563 |
| | BL | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 1.5 | 3.0 |
| 14' | TL | 38 | 89 | 185 | 312 | 76 | 178 | 370 | 623 | 115 | 270 | 555 | 989 | 153 | 356 | 740 | 1318 |
| | LL | 30 | 69 | 141 | 251 | 60 | 138 | 283 | 502 | 91 | 210 | 424 | 751 | 121 | 275 | 565 | 1001 |
| | BL | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 1.5 | 3.0 | 1.5 | 1.5 | 1.5 | 3.0 |
| 16' | TL | 25 | 59 | 124 | 222 | 50 | 118 | 247 | 444 | 75 | 180 | 371 | 666 | 100 | 236 | 495 | 888 |
| | LL | 20 | 46 | 95 | 170 | 41 | 92 | 191 | 339 | 61 | 140 | 286 | 509 | 81 | 185 | 381 | 679 |
| | BL | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| 18' | TL | 17 | 41 | 86 | 156 | 34 | 81 | 172 | 312 | 51 | 123 | 259 | 468 | 68 | 163 | 345 | 623 |
| | LL | 14 | 33 | 67 | 120 | 28 | 65 | 134 | 240 | 43 | 99 | 202 | 360 | 57 | 130 | 269 | 480 |
| | BL | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |

(See *Requirements for Use* on page 23, *Key*, *Example* and *Notes* on page 34)