| Design Values for Non-North American Visually Graded Dimension Lumber (2”-4” thick) * ** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Species and commercial grade | Size classification | Bending Fb | Tension parallel to grain Ft | Shear parallel to grain Fv | Compression perpendicular to grain Fc1 | Compression parallel to grain Fc | Modulus of Elasticity E | Minimum Modulus of Elasticity Emin |
| **Austrian Spruce – Austria & The Czech Republic** | | | | | | | | |
| Select Structural | | 1500 | 675 | 175 | 260 | 1250 | 1700000 | 620000 |
| No. 1 | | 1000 | 450 | 175 | 260 | 1100 | 1600000 | 580000 |
| No. 2 | 2” & wider | 925 | 400 | 175 | 260 | 1050 | 1500000 | 550000 |
| No. 3 | | 525 | 225 | 175 | 260 | 625 | 1300000 | 470000 |
| Stud | 2” & wider | 725 | 325 | 175 | 260 | 675 | 1300000 | 470000 |
| Construction | | 1050 | 475 | 175 | 260 | 1300 | 1400000 | 510000 |
| Standard | 2”- 4” wide | 575 | 250 | 175 | 260 | 1100 | 1300000 | 470000 |
| Utility | | 275 | 125 | 175 | 260 | 725 | 1200000 | 440000 |
| **Douglas Fir/European Larch – Austria, The Czech Republic, & Bavaria** (Design values are applicable only for 2x4 dimensional lumber and shall not be multiplied by the size factor adjustment.) | | | | | | | | |
| Select Structural | | 1900 | 850 | 195 | 440 | 1400 | 1800000 | 660000 |
| No. 1 | | 1400 | 625 | 195 | 440 | 1250 | 1700000 | 620000 |
| No. 2 | 2” & wider | 1350 | 600 | 195 | 440 | 1250 | 1600000 | 580000 |
| No. 3 | | 775 | 350 | 195 | 440 | 700 | 1400000 | 510000 |
| Stud | 2” & wider | 800 | 350 | 195 | 440 | 700 | 1400000 | 510000 |
| Construction | | 1000 | 450 | 195 | 440 | 1250 | 1500000 | 550000 |
| Standard | 2”- 4” wide | 575 | 250 | 195 | 440 | 1100 | 1300000 | 470000 |
| Utility | | 275 | 125 | 195 | 440 | 700 | 1300000 | 470000 |
| **Montane Pine – South Africa** | | | | | | | | |
| Select Structural | | 975 | 425 | 135 | 325 | 1100 | 1300000 | 470000 |
| No. 1 | | 650 | 300 | 135 | 325 | 950 | 1100000 | 400000 |
| No. 2 | 2” & wider | 600 | 275 | 135 | 325 | 850 | 1000000 | 370000 |
| No. 3 | | 350 | 150 | 135 | 325 | 475 | 900000 | 330000 |
| Stud | 2” & wider | 475 | 200 | 135 | 325 | 525 | 900000 | 330000 |
| Construction | | 675 | 300 | 135 | 325 | 1050 | 900000 | 330000 |
| Standard | 2”- 4” wide | 375 | 175 | 135 | 325 | 875 | 800000 | 290000 |
| Utility | | 175 | 75 | 135 | 325 | 575 | 800000 | 290000 |
| **Norway Spruce – Estonia & Lithuania** | | | | | | | | |
| Select Structural | | 1200 | 550 | 150 | 430 | 1200 | 1500000 | 550000 |
| No. 1 | | 800 | 375 | 150 | 430 | 1050 | 1400000 | 510000 |
| No. 2 | 2” & wider | 700 | 300 | 150 | 430 | 925 | 1200000 | 440000 |
| No. 3 | | 400 | 175 | 150 | 430 | 525 | 1100000 | 400000 |
| Stud | 2” & wider | 550 | 250 | 150 | 430 | 575 | 1100000 | 400000 |
| Construction | | 800 | 350 | 150 | 430 | 1150 | 1100000 | 400000 |
| Standard | 2”- 4” wide | 450 | 200 | 150 | 430 | 950 | 1000000 | 370000 |
| Utility | | 200 | 100 | 150 | 430 | 625 | 1000000 | 370000 |
| **Norway Spruce - Finland** | | | | | | | | |
| Select Structural | | 1350 | 600 | 125 | 220 | 1200 | 1500000 | 550000 |
| No. 1 | | 825 | 375 | 125 | 220 | 1000 | 1400000 | 510000 |
| No. 2 | 2” & wider | 625 | 275 | 125 | 220 | 875 | 1200000 | 440000 |
| No. 3 | | 375 | 175 | 125 | 220 | 500 | 1100000 | 400000 |
| Stud | 2” & wider | 575 | 250 | 125 | 220 | 600 | 1100000 | 400000 |
| Construction | | 725 | 325 | 125 | 220 | 1100 | 1100000 | 400000 |
| Standard | 2”- 4” wide | 400 | 175 | 125 | 220 | 900 | 1000000 | 370000 |
| Utility | | 200 | 75 | 125 | 220 | 600 | 1000000 | 370000 |
| **Norway Spruce – Germany, NE France, & Switzerland** | | | | | | | | |
| Select Structural | | 1200 | 550 | 170 | 355 | 1200 | 1600000 | 580000 |
| No. 1 | | 825 | 375 | 170 | 355 | 1050 | 1400000 | 510000 |
| No. 2 | 2” & wider | 725 | 325 | 170 | 355 | 950 | 1200000 | 440000 |
| No. 3 | | 425 | 200 | 170 | 355 | 550 | 1100000 | 400000 |
| Stud | 2” & wider | 575 | 250 | 170 | 355 | 600 | 1100000 | 400000 |
| Construction | | 825 | 375 | 170 | 355 | 1200 | 1100000 | 400000 |
| Standard | 2”- 4” wide | 475 | 200 | 170 | 355 | 975 | 1000000 | 370000 |
| Utility | | 225 | 100 | 170 | 355 | 650 | 900000 | 330000 |

| Design Values for Non-North American Visually Graded Dimension Lumber (2”-4” thick) * ** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Species and commercial grade | Size classification | Bending Fb | Tension parallel to grain Ft | Shear parallel to grain Fv | Compression perpendicular to grain Fc1 | Compression parallel to grain Fc | Modulus of Elasticity E | Minimum Modulus of Elasticity Emin |
| **Norway Spruce – Romania & the Ukraine** | | | | | | | | |
| Select Structural | | 1250 | 575 | 100 | 275 | 1200 | 1500000 | 550000 |
| No. 1 | | 850 | 375 | 100 | 275 | 1050 | 1400000 | 510000 |
| No. 2 | 2” & wider | 725 | 325 | 100 | 275 | 950 | 1200000 | 440000 |
| No. 3 | | 425 | 200 | 100 | 275 | 550 | 1100000 | 400000 |
| Stud | 2” & wider | 575 | 250 | 100 | 275 | 600 | 1100000 | 400000 |
| Construction | | 850 | 375 | 100 | 275 | 1200 | 1100000 | 400000 |
| Standard | 2”- 4” wide | 475 | 200 | 100 | 275 | 1000 | 1000000 | 370000 |
| Utility | | 225 | 100 | 100 | 275 | 650 | 1000000 | 370000 |
| **Norway Spruce - Sweden** | | | | | | | | |
| Select Structural | | 1250 | 550 | 170 | 285 | 1200 | 1600000 | 580000 |
| No. 1 | | 825 | 375 | 170 | 285 | 1050 | 1400000 | 510000 |
| No. 2 | 2” & wider | 675 | 300 | 170 | 285 | 925 | 1200000 | 440000 |
| No. 3 | | 400 | 175 | 170 | 285 | 525 | 1100000 | 400000 |
| Stud | 2” & wider | 550 | 250 | 170 | 285 | 575 | 1100000 | 400000 |
| Construction | | 775 | 350 | 170 | 285 | 1050 | 1200000 | 440000 |
| Standard | 2”- 4” wide | 425 | 200 | 170 | 285 | 950 | 1100000 | 400000 |
| Utility | | 200 | 100 | 170 | 285 | 625 | 1000000 | 370000 |
| **Scots Pine – Austria, The Czech Republic, Romania & the Ukraine** | | | | | | | | |
| Select Structural | | 1300 | 600 | 135 | 270 | 1200 | 1700000 | 620000 |
| No. 1 | | 900 | 400 | 135 | 270 | 1050 | 1600000 | 580000 |
| No. 2 | 2” & wider | 775 | 350 | 135 | 270 | 1000 | 1400000 | 510000 |
| No. 3 | | 450 | 200 | 135 | 270 | 575 | 1300000 | 470000 |
| Stud | 2” & wider | 600 | 275 | 135 | 270 | 625 | 1300000 | 470000 |
| Construction | | 875 | 400 | 135 | 270 | 1200 | 1300000 | 470000 |
| Standard | 2”- 4” wide | 500 | 225 | 135 | 270 | 1000 | 1200000 | 440000 |
| Utility | | 225 | 100 | 135 | 270 | 675 | 1100000 | 400000 |
| **Scots Pine – Estonia & Lithuania** | | | | | | | | |
| Select Structural | | 1100 | 500 | 130 | 430 | 1150 | 1500000 | 550000 |
| No. 1 | | 750 | 350 | 130 | 430 | 1000 | 1300000 | 470000 |
| No. 2 | 2” & wider | 650 | 300 | 130 | 430 | 900 | 1100000 | 400000 |
| No. 3 | | 375 | 175 | 130 | 430 | 525 | 1000000 | 370000 |
| Stud | 2” & wider | 525 | 225 | 130 | 430 | 575 | 1000000 | 370000 |
| Construction | | 750 | 325 | 130 | 430 | 1100 | 1100000 | 400000 |
| Standard | 2”- 4” wide | 425 | 200 | 130 | 430 | 925 | 1000000 | 370000 |
| Utility | | 200 | 100 | 130 | 430 | 600 | 900000 | 330000 |
| **Scots Pine - Finland** | | | | | | | | |
| Select Structural | | 1300 | 600 | 150 | 210 | 1200 | 1500000 | 550000 |
| No. 1 | | 950 | 425 | 150 | 210 | 1100 | 1400000 | 510000 |
| No. 2 | 2” & wider | 925 | 425 | 150 | 210 | 1100 | 1300000 | 470000 |
| No. 3 | | 525 | 250 | 150 | 210 | 625 | 1200000 | 440000 |
| Stud | 2” & wider | 725 | 325 | 150 | 210 | 675 | 1200000 | 440000 |
| Construction | | 1050 | 475 | 150 | 210 | 1300 | 1200000 | 440000 |
| Standard | 2”- 4” wide | 600 | 275 | 150 | 210 | 1100 | 1100000 | 400000 |
| Utility | | 275 | 125 | 150 | 210 | 725 | 1000000 | 370000 |
| **Scots Pine – Germany** (Does not include states of Baden-Wurttemburg and Saarland.) | | | | | | | | |
| Select Structural | | 1200 | 550 | 160 | 395 | 1200 | 1600000 | 580000 |
| No. 1 | | 800 | 375 | 160 | 395 | 1050 | 1400000 | 510000 |
| No. 2 | 2” & wider | 700 | 325 | 160 | 395 | 950 | 1100000 | 400000 |
| No. 3 | | 400 | 175 | 160 | 395 | 550 | 1000000 | 370000 |
| Stud | 2” & wider | 550 | 250 | 160 | 395 | 600 | 1000000 | 370000 |
| Construction | | 800 | 375 | 160 | 395 | 1150 | 1100000 | 400000 |
| Standard | 2”- 4” wide | 450 | 200 | 160 | 395 | 975 | 1000000 | 370000 |
| Utility | | 225 | 100 | 160 | 395 | 625 | 900000 | 330000 |

| Design Values for Non-North American Visually Graded Dimension Lumber (2”-4” thick) * ** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Species and commercial grade | Size classification | Bending Fb | Tension parallel to grain Ft | Shear parallel to grain Fv | Compression perpendicular to grain Fc1 | Compression parallel to grain Fc | Modulus of Elasticity E | Minimum Modulus of Elasticity Emin |
| **Scots Pine - Sweden** | | | | | | | | |
| Select Structural | | 1350 | 600 | 120 | 410 | 1200 | 1700000 | 620000 |
| No. 1 | | 825 | 375 | 120 | 410 | 1000 | 1500000 | 550000 |
| No. 2 | 2” & wider | 575 | 250 | 120 | 410 | 825 | 1200000 | 440000 |
| No. 3 | | 325 | 150 | 120 | 410 | 475 | 1100000 | 400000 |
| Stud | 2” & wider | 450 | 200 | 120 | 410 | 525 | 1100000 | 400000 |
| Construction | | 650 | 300 | 120 | 410 | 1050 | 1200000 | 440000 |
| Standard | 2”- 4” wide | 375 | 175 | 120 | 410 | 850 | 1100000 | 400000 |
| Utility | | 175 | 75 | 120 | 410 | 550 | 1000000 | 370000 |
| **Silver Fir (Ables alba) – Germany, NE France, & Switzerland** | | | | | | | | |
| Select Structural | | 950 | 425 | 125 | 400 | 1100 | 1500000 | 550000 |
| No. 1 | | 725 | 325 | 125 | 400 | 975 | 1400000 | 510000 |
| No. 2 | 2” & wider | 725 | 325 | 125 | 400 | 950 | 1300000 | 470000 |
| No. 3 | | 425 | 200 | 125 | 400 | 550 | 1100000 | 400000 |
| Stud | 2” & wider | 575 | 250 | 125 | 400 | 600 | 1100000 | 400000 |
| Construction | | 825 | 375 | 125 | 400 | 1150 | 1200000 | 440000 |
| Standard | 2”- 4” wide | 475 | 200 | 125 | 400 | 975 | 1100000 | 400000 |
| Utility | | 225 | 100 | 125 | 400 | 650 | 1000000 | 370000 |
| **Southern Pine – Misiones Argentina** | | | | | | | | |
| Select Structural | | 1100 | 500 | 150 | 440 | 1150 | 1200000 | 440000 |
| No. 1 | | 775 | 350 | 150 | 440 | 1000 | 1100000 | 400000 |
| No. 2 | 2” & wider | 725 | 325 | 150 | 440 | 950 | 1100000 | 400000 |
| No. 3 | | 425 | 200 | 150 | 440 | 550 | 900000 | 330000 |
| Stud | 2” & wider | 575 | 250 | 150 | 440 | 600 | 900000 | 330000 |
| Construction | | 825 | 375 | 150 | 440 | 1150 | 1000000 | 370000 |
| Standard | 2”- 4” wide | 475 | 200 | 150 | 440 | 975 | 900000 | 330000 |
| Utility | | 225 | 100 | 150 | 440 | 650 | 800000 | 290000 |
| **Southern Pine – Misiones Argentina, Free of Heart Center and Medium Grain Density** | | | | | | | | |
| Select Structural | | 1700 | 775 | 210 | 710 | 1250 | 1500000 | 550000 |
| No.1 | | 1150 | 525 | 210 | 710 | 1150 | 1500000 | 550000 |
| No.2 | 2” & wider | 1000 | 450 | 210 | 710 | 1100 | 1500000 | 550000 |
| No.3 | | 575 | 250 | 210 | 710 | 650 | 1400000 | 510000 |
| Stud | 2” & wider | 800 | 350 | 210 | 710 | 700 | 1400000 | 510000 |
| Construction | | 1150 | 525 | 210 | 710 | 1350 | 1400000 | 510000 |
| Standard | 2”- 4” wide | 650 | 300 | 210 | 710 | 1150 | 1300000 | 470000 |
| Utility | | 300 | 125 | 210 | 710 | 750 | 1200000 | 440000 |

## *Reference Design Values Notes

1. **Lumber Dimensions.** Tabulated design values are applicable to lumber that will be used under dry conditions such as in most covered structures. For 2” to 4” thick lumber the DRY dressed sizes shall be used regardless of the moisture content at the time of manufacture or use. In calculating design values the natural gain in strength and stiffness that occurs as lumber dries has been taken into consideration as well as the reduction in size that occurs when unseasoned lumber shrinks. The gain in load carrying capacity due to increased strength and stiffness resulting from drying more than offsets the design effect of size reductions due to shrinkage.
2. When individual species or species groups are combined, the design values to be used for the combination shall be the lowest design values for each individual species or species group for each design property.

## **Adjustment Factors

**Repetitive Member Factor, Cr.** Bending design values, Fb, for dimension lumber 2" to 4" thick shall be multiplied by the repetitive member factor, Cr = 1.15, when such members are used as joists, truss chords, rafters, studs, planks, decking, or similar members which are in contact or spaced not more than 24" on center, are not less than 3 in number and are joined by floor, roof, or other load distributing elements adequate to support the design load.

**Wet Service Factor, Cm.** When dimension lumber is used where moisture content will exceed 19% for an extended time period, design values shall be multiplied by the appropriate wet service factors below:

| Fb | Ft | Fv | Fc1 | Fc | E and Emin |
|---|---|---|---|---|---|
| 0.85* | 1.0 | 0.97 | 0.67 | 0.8** | 0.9 |

*when (Fb)(Cf) <= 1150 psi, Cm = 1.0, **when (Fc)(Cf) <= 750 psi, Cm = 1.0

**Size Factor, Cf.** Tabulated bending, tension, and compression parallel to grain design values for dimension lumber 2" to 4" thick shall be multiplied by the following size factors:

| | | Fb | | Ft | Fc |
|---|---|---|---|---|---|
| | | Thickness (breadth) | | | |
| Grades | Width (depth) | 2" & 3" | 4" | | |
| Select Structural No.1 & Btr, No.1, No.2, No.3 | 2", 3" & 4" | 1.5 | 1.5 | 1.5 | 1.15 |
| | 5" | 1.4 | 1.4 | 1.4 | 1.1 |
| | 6" | 1.3 | 1.3 | 1.3 | 1.1 |
| | 8" | 1.2 | 1.2 | 1.2 | 1.05 |
| | 10" | 1.1 | 1.2 | 1.1 | 1.0 |
| | 12" | 1.0 | 1.1 | 1.0 | 1.0 |
| | 14" & wider | 0.9 | 1.0 | 0.9 | 0.9 |
| Stud | 2", 3", & 4" | 1.1 | 1.1 | 1.1 | 1.05 |
| | 5" & 6" | 1.0 | 1.0 | 1.0 | 1.0 |
| | 8" & wider | Use No.3 Grade tabulated design values and size factors | | | |
| Construction, Standard | 2", 3", & 4" | 1.0 | 1.0 | 1.0 | 1.0 |
| Utility | 4" | 1.0 | 1.0 | 1.0 | 1.0 |
| | 2" & 3" | 0.4 | ---- | 0.4 | 0.6 |

**Flat Use Factor, Cfu.** Bending design values adjusted by size factors are based on edgewise use (load applied to narrow face). When dimension lumber is used flatwise (load applied to wide face), the bending design value, Fb, shall also be multiplied by the following flat use factors:

| Width (depth) | Thickness (breadth) | |
|---|---|---|
| | 2" & 3" | 4" |
| 2" & 3" | 1.0 | ---- |
| 4" | 1.1 | 1.0 |
| 5" | 1.1 | 1.05 |
| 6" | 1.15 | 1.05 |
| 8" | 1.15 | 1.05 |
| 10" & wider | 1.2 | 1.1 |

**Temperature Factor, Ct.** When structural members will experience sustained exposure to elevated temperatures up to 150 deg. F, Reference design values shall be multiplied by the following:

| Reference Design Values | In-Service Moisture Conditions | Ct | | |
|---|---|---|---|---|
| | | T <= 100 degF | 100 degF<T<=125 degF | 125 degF<T<=150 degF |
| Ft, E, Emin | Wet or Dry | 1.0 | 0.9 | 0.9 |
| Fb, Fv, Fc, and Fc1 | Dry | 1.0 | 0.8 | 0.7 |
| | Wet | 1.0 | 0.7 | 0.5 |

**Load Duration Factor, Cd.** When structural members will sustain loads for a design period which does not exceed the normal

duration for the design load, typically a cumulative duration of approximately 10 years, all reference design values except modulus of elasticity, E, modulus of elasticity for beam and column stability, Emin, and compression perpendicular to grain, Fc1, based on deformation limit shall be multiplied by the appropriate load duration factor from the table below. The duration factor, Cd for the shortest duration load in a combination of loads shall apply for that load combination.

| **Load Duration** | **Cd** | **Typical Design Loads** |
|---|---|---|
| Permanent | 0.9 | Dead Load |
| Ten years | 1.0 | Occupancy Live Load |
| Two months | 1.15 | Snow Load |
| Seven days | 1.25 | Construction Load |
| Ten minutes | 1.6 | Wind/Earthquake Load |
| Impact* | 2.0 | Impact Load |

*Load duration factors greater than 1.6 shall not apply to structural members pressure-treated with water-borne preservatives, or fire retardant chemicals. The impact load duration factor shall not apply to connections.

**Beam Stability Factor, CL.** When the depth of a bending member does not exceed its breadth, d<=b, no lateral support is required and CL = 1.0. When the compression edge of a bending member is supported throughout its length to prevent lateral displacement, and the ends at points of bearing have lateral support to prevent rotation, CL = 1.0. When rectangular sawn lumber bending members are laterally supported as shown below, CL = 1.0.

(a) d/b<=2; no lateral support shall be required.
(b) 2<d/b<=4; the ends shall be held in position, as by full depth solid blocking, bridging, hangers, nailing, or bolting to other framing members, or other acceptable means.
(c) 4<d/b<=5; the compression edge of the member shall be held in line for its entire length to prevent lateral displacement, as by adequate sheathing or subflooring, and ends at point of bearing shall be held in position to prevent rotation and/or lateral displacement.
(d) 5<d/b<=6; bridging, full depth solid blocking or diagonal cross bracing shall be installed at intervals not exceeding 8 feet, the compression edge of the member shall be held in line as by adequate sheathing or subflooring, and the nds at points of bearing shall be held in position to prevent rotation and/or lateral displacement.
(e) 6<d/b<=7; both edges of the member shall be held in line for their entire length and ends at points of bearing shall be held in position to prevent rotation and/or lateral displacement.
(f) If bending member is subjected to flexure and axial compression then d/b<=5, and one edge must be firmly held in line.
(g) If under all combinations of load, the un-braced edge of the member is in tension then d/b<=6.

**Bearing Area Factor, Cb.** Compression design values perpendicular to grain, Fc1, apply to bearings of any length at the ends of a member, and to all bearings 6” or more in length at any other location. For bearing less than 6” in length and not nearer than 3” to the end shall be multiplied by the following bearing area factor, Cb = (lb + 0.375)/lb; where lb = the bearing length measured parallel to the grain in inches. For round bearing areas such as washer, the bearing length, lb, shall be equal to the diameter. The equation gives the following bearing area factors for the indicated bearing length on such small areas as plates and washers:

| lb | 0.5” | 1” | 1.5” | 2” | 3” | 4” | 6” or more |
|---|---|---|---|---|---|---|---|
| Cb | 1.75 | 1.38 | 1.25 | 1.19 | 1.13 | 1.10 | 1.00 |

**Buckling Length Coefficient Ke**

| **End no. 1 (bottom)** | **End no. 2 (top)** | **Design Ke** |
|---|---|---|
| Built-in: rotation fixed, translation fixed | Built-in: rotation fixed, translation fixed | 0.65 |
| Built-in: rotation fixed, translation fixed | Pinned: rotation free, translation fixed | 0.80 |
| Built-in: rotation fixed, translation fixed | Rotation fixed, translation free | 1.20 |
| Built-in: rotation fixed, translation fixed | Free: rotation free, translation free | 2.10 |
| Pinned: rotation free, translation fixed | Pinned: rotation free, translation fixed | 1.0 |

| | | |
|---|---|---|
| Pinned: rotation free, translation fixed | Rotation fixed, translation free | 2.4 |

**Buckling Stiffness Factor, CT.** Increased chord stiffness relative to axial loads when a 2"x4" or smaller sawn lumber truss compression chord is subjected to combined flexure and axial compression under dry service condition and has 3/8" or thicker plywood sheathing nailed to the narrow face of the chord in accordance with code required roof sheathing fastener schedules, shall be permitted to be accounted for by multiplying the reference modulus of elasticity design value for beam and column stability, Emin, by the buckling stiffness factor, CT, as calculated below:

When le < 96", CT = 1+(KMle)/(KTE); Where
le = effective column length of truss compression chord
KM = 2300 for wood seasoned to 19% moisture content or less at the time of plywood attachment.
KM=1200 for unseasoned or partially seasoned wood at the time of plywood attachment.
KT = 1.1645 (COVE)
KT = 0.59 for visually graded lumber
KT=0.75 for machine evaluated lumber (MEL)
KT = 0.82 for products with COVE<=0.11
When le>96", CT shall be calculated based on le=96".

**Column Stability Factor, Cp.** When a compression member is supported throughout its length to prevent lateral displacement in all directions, Cp = 1.0. For all other conditions Cp shall be calculated as follows:
Cp = (1+(FcE/Fc*))/2c – ((((1+(FcE/Fc*))/2c)^2 –(FcE/Fc*)/c)^0.5); where:
Fc* = reference compression design value parallel to grain multiplied by all applicable adjustment factors except Cp
Fce = (0.822Emin)/(le/d)^2
c = 0.8 for sawn lumber
c = 0.85 for round timber poles and piles
c = 0.9 for structural glued laminated timber or structural composite lumber

**Incising Factor, Ci.** Reference design values shall be multiplied by the following incising factor, Ci, when dimension lumber is incised parallel to grain a maximum depth of 0.4", a maximum length of 3/8", and density of incisions up to 1100/ft^2. Incising factors shall be determined by test or by calculation using reduced section properties for incising patterns exceeding these limits.

| **Design Value** | **Ci** |
|---|---|
| E, Emin | 0.95 |
| Fb, Ft, Fc, Fv | 0.80 |
| Fc1 | 1.00 |