Based on SPIB Grading Rules and AWC National Design Specification®
Values in pounds per square inch (psi)

Table 3 Timbers – 5˝ x 5˝ and larger

Based on Normal Load Duration and Dry or Wet Service — See Tables A-1 and A-3 for Adjustment Factors

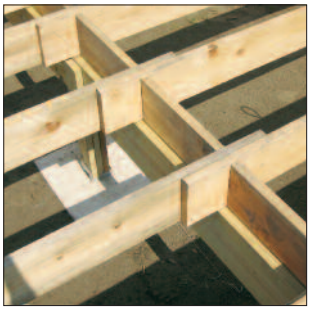
Size	Grade	Bending F_b[1]	Tension Parallel to Grain F_t	Shear Parallel to Grain F_v	Compression Perpendicular to Grain $F_{c\perp}$	Compression Parallel to Grain F_c	Modulus of Elasticity E	Modulus of Elasticity E_{min}
5˝ x 5˝ and larger	Dense Select Structural	1750	1200	165	440	1100	1,600,000	580,000
	Select Structural	1500	1000	165	375	950	1,500,000	550,000
	No.1 Dense	1550	1050	165	440	975	1,600,000	580,000
	No.1	1350	900	165	375	825	1,500,000	550,000
	No.2 Dense	975	650	165	440	625	1,300,000	470,000
	No.2	850	550	165	375	525	1,200,000	440,000

(1) When the depth, d, of a timber exceeds 12˝, the tabulated bending design value, F_b, shall be multiplied by the following size factor:
$C_F = \left(\frac{12}{d}\right)^{1/9}$ where d is the actual depth of the member.

Table 4 Scaffold Plank[1] – 2˝ and 3˝ thick, 8˝ and wider

Size	Grade	Bending F_b Flatwise Use Only	Modulus of Elasticity E
2˝ thick, 8˝ and wider MC≤19%[2]	Dense Industrial 72 Scaffold Plank	2400	1,800,000
	Dense Industrial 65 Scaffold Plank	2200	1,800,000
3˝ thick, 8˝ and wider MC>19%	Dense Industrial 72 Scaffold Plank	1800	1,600,000
	Dense Industrial 65 Scaffold Plank	1650	1,600,000

(1) Scaffold plank design values are for flatwise use only. They were calculated using ASTM D245 and D2555 standards and modified using procedures shown in "Calculating Apparent Reliability of Wood Scaffold Planks," as published by the Journal on Structural Safety, 2 (1984) 47-57, and updated in 1993.
(2) For exposed conditions of use (where the moisture content in service may exceed 19%) the values shall be multiplied by: 0.85 for F_b and 0.90 for E.



Reference design values are for normal load duration under the moisture service conditions specified. Because the strength of wood varies with conditions under which it is used, reference design values should only be applied in conjunction with appropriate design and service recommendations from the *National Design Specification® (NDS®) for Wood Construction* published by the American Wood Council. The latest connection design information is also provided in the *NDS*.

Reference design values **(F_b F_t F_v $F_{c\perp}$ F_c E E_{min})** in Tables 1 thru 3 shall be multiplied by all applicable adjustment factors to determine adjusted design values **(F_b' F_t' F_v' $F_{c\perp}'$ F_c' E' E_{min}')**.

Table A-1 is excerpted from the *NDS* and summarizes the applicability of adjustment factors for solid-sawn lumber.

Table A-1 Applicability of Adjustment Factors for Sawn Lumber

		ASD only	ASD and LRFD											LRFD only		
Adjusted Design Value	Reference Design Value	Load Duration Factor	Wet Service Factor	Temperature Factor	Beam Stability Factor	Size Factor	Flat Use Factor	Incising Factor	Repetitive Member Factor	Column Stability Factor	Buckling Stiffness Factor	Bearing Area Factor	Format Conversion Factor	Resistance Factor	Time Effect Factor
													K_F	ϕ	
F_b' =	F_b *	C_D *	C_M *	C_t *	C_L *	C_F *	C_{fu} *	C_i *	C_r *				2.54 *	0.85 *	λ
F_t' =	F_t *	C_D *	C_M *	C_t *		C_F *		C_i *					2.70 *	0.80 *	λ
F_v' =	F_v *	C_D *	C_M *	C_t *				C_i *					2.88 *	0.75 *	λ
F_c' =	F_c *	C_D *	C_M *	C_t *		C_F *		C_i *		C_P *			2.40 *	0.90 *	λ
$F_{c\perp}'$ =	$F_{c\perp}$ *		C_M *	C_t *				C_i *				C_b *	1.67 *	0.90	
E' =	E *		C_M *	C_t *				C_i							
E_{min}' =	E_{min} *		C_M *	C_t *				C_i *			C_T *		1.76 *	0.85	

ASD – Allowable Stress Design; **LRFD** – Load and Resistance Factor Design

Tables A-2 thru A-4 highlight the most common adjustment factors as they apply to Southern Pine. In addition, Table 1 and 3 footnotes provide information about the Size Factor, C_F. For complete information on adjustment factors, see the *NDS*.

Table A-2 Wet Service Factor, C_M

For lumber 2″ to 4″ thick

Applies to all values

When dimension lumber is used under conditions where the moisture content of the wood in service will exceed 19% for an extended time period, reference design values shall be multiplied by the appropriate wet service factors to the right.

F_b	F_t	F_v	$F_{c\perp}$	F_c	E	E_{min}
0.85 [1]	1.0	0.97	0.67	0.8 [2]	0.9	0.9

(1) When $F_b \le 1150$ psi, $C_M = 1.0$

(2) When $F_c \le 750$ psi, $C_M = 1.0$

Table A-3 Load Duration Factor, C_D

For all solid wood products – Allowable Stress Design Only

Applies to F_b, F_t, F_v, and F_c values
Does not apply to $F_{c\perp}$, E, and E_{min} values

Wood has the property of carrying substantially greater maximum loads for short durations than for long durations of loading. Reference design values apply to normal load duration, meaning a load that fully stresses a member to its allowable design value by the application of the full design load for a cumulative duration of approximately ten years. When the cumulative duration of the full maximum load does not exceed the specified time period, all reference design values (except $F_{c\perp}$, E, and E_{min}) shall be multiplied by the appropriate load duration factor. Frequently used load duration factors are provided to the right.

Load Duration *(Typical Design Loads)*	C_D
Permanent *(dead load)*	0.9
Ten years *(occupancy live load)*	1.0
Two months *(snow load)*	1.15
Seven days *(construction load)*	1.25
Ten minutes *(wind/earthquake load)*	1.6
Impact [1] *(impact load)*	2.0

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

Table A-4 Flat Use Factor, C_{fu}

For lumber 2″ to 4″ thick

Applies to F_b values only

Reference bending design values, F_b, are based on edgewise use (load applied to narrow face). When dimension lumber is used flatwise (load applied to wide face), F_b shall also be multiplied by the flat use factors to the right.

Flat Use Factors, C_{fu}

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