AMERICAN WOOD COUNCIL

April 2022

ERRATA

to the 2018 Edition of the *Design Values for Wood Construction*

(a supplement to the *National Design Specification® (NDS®) for Wood Construction*)

(All print and electronic versions)

Page **Revision**

41 Modify the following reference design values in Table 4B for Mixed Southern Pine as shown below (footnotes remain unchanged):

Table 4B (Cont.) **Reference Design Values for Visually Graded Southern Pine Dimension Lumber (2" - 4" thick)[1,2,3,4,5]**

(Tabulated design values are for normal load duration and dry service conditions, unless specified otherwise. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4B ADJUSTMENT FACTORS

Species and commercial grade	Size classification	Design values in pounds per square inch (psi)							Specific Gravity[6]	Grading Rules Agency
		Bending F_b	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}	G	
SOUTHERN PINE		(Surfaced Dry - Used in dry service condtions - 19% or less moisture content)								
Dense Structural 86	2" & wider	2,600	1,750	175	660	2,000	1,800,000	660,000	0.55	SPIB
Dense Structural 72		2,200	1,450	175	660	1,650	1,800,000	660,000		
Dense Structural 65		2,000	1,300	175	660	1,500	1,800,000	660,000		
SOUTHERN PINE		(Surfaced Green - Used in any service condtion)								
Dense Structural 86	2-1/2" & wider 2-1/2"-4" thick	2,100	1,400	165	440	1,300	1,600,000	580,000	0.55	SPIB
Dense Structural 72		1,750	1,200	165	440	1,100	1,600,000	580,000		
Dense Structural 65		1,600	1,050	165	440	1,000	1,600,000	580,000		
MIXED SOUTHERN PINE										
Select Structural	2" - 4" wide	2,050	1,200	175	565	1,800	1,600,000	580,000	0.51	SPIB
No.1		1,450	875	175	565	1,650	1,500,000	550,000		
No.2		1,100	675	175	565	1,450	1,400,000	510,000		
No.3 and Stud		650	400	175	565	850	1,200,000	440,000		
Construction	4" wide	~~850~~ 875	500	175	565	1,600	1,300,000	470,000	0.51	
Standard		475	275	175	565	1,300	1,200,000	440,000		
Utility		225	125	175	565	850	1,100,000	400,000		
Select Structural	5" - 6" wide	1,850	1,100	175	565	1,700	1,600,000	580,000	0.51	
No.1		1,300	750	175	565	1,550	1,500,000	550,000		
No.2		1,000	600	175	565	1,400	1,400,000	510,000		
No.3 and Stud		575	350	175	565	~~775~~ 800	1,200,000	440,000		
Select Structural	8" wide	1,750	1,000	175	565	1,600	1,600,000	580,000	0.51	
No.1		1,200	700	175	565	1,450	1,500,000	550,000		
No.2		925	550	175	565	1,350	1,400,000	510,000		
No.3 and Stud		525	325	175	565	~~800~~ 775	1,200,000	440,000		
Select Structural	10" wide	1,500	875	175	565	1,600	1,600,000	580,000	0.51	
No.1		1,050	600	175	565	1,450	1,500,000	550,000		
No.2		800	475	175	565	1,300	1,400,000	510,000		
No.3 and Stud		475	275	175	565	750	1,200,000	440,000		
Select Structural	12" wide	1,400	825	175	565	1,550	1,600,000	580,000	0.51	
No.1		975	575	175	565	1,400	1,500,000	550,000		
No.2		750	450	175	565	1,250	1,400,000	510,000		
No.3 and Stud		450	250	175	565	725	1,200,000	440,000		

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&
to the ADDENDUM (March 2019) to the *2018 NDS Supplement*

Modify the following design values for E_{min} as follows:

Table 4A Reference Design Values for Visually Graded Dimension Lumber (2" - 4" thick)[1,2,3]

(All species except Southern Pine – see table 4B) (Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4A ADJUSTMENT FACTORS

Species and commercial grade	Size classification	Design values in pounds per square inch (psi)								Specific Gravity[4]	Grading Rules Agency
		Bending	Tension parallel to grain	Shear parallel to grain	Compression perpendicular to grain	Compression parallel to grain	Modulus of Elasticity				
		F_b	F_t	F_v	$F_{c\perp}$	F_c	E	E_{min}		G	
NORWAY SPRUCE (NORTH)											
Select Structural	2" & wider	950	600	190	410	1,100	1,500,000	~~1,000,000~~	550,000	0.40	NLGA
No. 1/No.2		650	425	190	410	900	1,300,000	~~800,000~~	470,000		
No.3		375	250	190	410	525	1,200,000	~~700,000~~	440,000		
Stud	2" & wider	500	325	190	410	575	1,200,000	~~700,000~~	440,000		
Construction	2" - 4" wide	725	475	190	410	1,100	1,200,000	~~700,000~~	440,000		
Standard		400	275	190	410	925	1,100,000	~~700,000~~	400,000		
Utility		200	125	190	410	600	1,100,000	~~600,000~~	400,000		

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Design Values for Wood Construction

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Modify the following bending design values for No. 1 Norway Spruce from Finland, and No. 2 Norway Spruce from Romania and Ukraine as shown:

Table 4F Reference Design Values for Non-North American Visually Graded Dimension Lumber (2" - 4" thick)[1,3]

(Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4F ADJUSTMENT FACTORS

Species and commercial Grade	Size classification	Design values in pounds per square inch (psi)							Specific Gravity[5]	Grading Rules Agency
		Bending	Tension parallel to grain	Shear parallel to grain	Compression perpendicular to grain	Compression parallel to grain	Modulus of Elasticity			
		F_b	F_t	F_v	$F_{c\perp}$	F_c	E	E_{min}	G	
NORWAY SPRUCE - Finland										
Select Structural	2" & wider	1,350	600	125	220	1,200	1,500,000	550,000	0.42	WCLIB
No. 1		~~825~~ 850	375	125	220	1,000	1,400,000	510,000		
No. 2		625	275	125	220	875	1,200,000	440,000		
No. 3		375	175	125	220	500	1,100,000	400,000		
Stud	2" & wider	575	250	125	220	600	1,100,000	400,000		
Construction	2" - 4" wide	725	325	125	220	1,100	1,100,000	400,000		
Standard		400	175	125	220	900	1,000,000	370,000		
Utility		200	75	125	220	600	1,000,000	370,000		

Table 4F Reference Design Values for Non-North American Visually Graded Dimension Lumber (2" - 4" thick)[1,3]

(Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4F ADJUSTMENT FACTORS

Species and commercial Grade	Size classification	Design values in pounds per square inch (psi)							Specific Gravity[5]	Grading Rules Agency
		Bending	Tension parallel to grain	Shear parallel to grain	Compression perpendicular to grain	Compression parallel to grain	Modulus of Elasticity			
		F_b	F_t	F_v	$F_{c\perp}$	F_c	E	E_{min}	G	
NORWAY SPRUCE - Romania & Ukraine										
Select Structural	2" & wider	1,250	575	100	275	1,200	1,500,000	550,000	0.38	WCLIB
No. 1		850	375	100	275	1,050	1,400,000	510,000		
No. 2		~~725~~ 750	325	100	275	950	1,200,000	440,000		
No. 3		425	200	100	275	550	1,100,000	400,000		
Stud	2" & wider	575	250	100	275	600	1,100,000	400,000		
Construction	2" - 4" wide	850	375	100	275	1,200	1,100,000	400,000		
Standard		475	200	100	275	1,000	1,000,000	370,000		
Utility		225	100	100	275	650	1,000,000	370,000		

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ADDENDUM
to the 2018 Edition of the
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Page	Revision
62	Add new Table 4G, Reference Design Values for Multi-Species and Country Grademarked Visually Graded Dimension Lumber (2"- 4" thick) as shown on the following pages.

Repetitive Member Factor, C_r

Bending design values, F_b, for dimension lumber 2" to 4" thick shall be multiplied by the repetitive member factor, C_r = 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, C_M

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 from the following table:

Wet Service Factors, C_M

F_b	F_t	F_v	$F_{c\perp}$	F_c	E and E_{min}
0.85*	1.0	0.97	0.67	0.8**	0.9

* when $(F_b)(C_F) \le 1{,}150$ psi, $C_M = 1.0$

** when $(F_c)(C_F) \le 750$ psi, $C_M = 1.0$

Flat Use Factor, C_{fu}

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, F_b, shall also be permitted to be multiplied by the following flat use factors:

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

NOTE

To facilitate the use of Table 4G, shading has been employed to distinguish design values based on a 4" nominal width (Construction, Standard, and Utility grades) or a 6" nominal width (Stud grade) from design values based on a 12" nominal width (Select Structural, No.1 & Btr, No.1, No.2, and No.3 grades).

Size Factor, C_F

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:

Size Factors, C_F

		F_b		F_t	F_c
		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	1.3	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

Table 4G **Reference Design Values for Multi-Species and Country Grademarked Visually Graded Dimension Lumber (2" - 4" thick)[1,2,3]**

(Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4G ADJUSTMENT FACTORS

Multi-Species and Country Label	Commercial Grade	Size Classification	Design values in pounds per square inch (psi)							Specific Gravity[4]	Grade Stamping Agency
			Bending F_b	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}	G	
As-N Spr-Sc P (I) AUS ROM UKR		AUSTRIAN SPRUCE from AUSTRIA, NORWAY SPRUCE & SCOTS PINE from AUSTRIA, ROMANIA, & UKRAINE									PLIB
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: AUSTRIAN SPRUCE from AUSTRIA & THE CZECH REPUBLIC; NORWAY SPRUCE from ROMANIA & UKRAINE; SCOTS PINE from AUSTRIA & THE CZECH REPUBLIC, ROMANIA, & UKRAINE	Select Structural	2" & wider	1250	575	100	260	1200	1.5	0.55	0.38	
	No. 1		850	375	100	260	1050	1.4	0.51		
	No. 2		725	325	100	260	950	1.2	0.44		
	No. 3		425	200	100	260	550	1.1	0.40		
	Stud	2" & wider	575	250	100	260	600	1.1	0.40		
	Construction	2" - 4" wide	850	375	100	260	1200	1.1	0.40		
	Standard		475	200	100	260	1000	1	0.37		
	Utility		225	100	100	260	650	1	0.37		
AS-Sc P (I) AUS		AUSTRIAN SPRUCE & SCOTS PINE from AUSTRIA									PLIB
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: AUSTRIAN SPRUCE from AUSTRIA & THE CZECH REPUBLIC; SCOTS PINE from AUSTRIA & THE CZECH REPUBLIC, ROMANIA, & UKRAINE	Select Structural	2" & wider	1300	600	135	260	1200	1.7	0.62	0.43	
	No. 1		900	400	135	260	1050	1.6	0.58		
	No. 2		775	350	135	260	1000	1.4	0.51		
	No. 3		450	200	135	260	575	1.3	0.47		
	Stud	2" & wider	600	275	135	260	625	1.3	0.47		
	Construction	2" - 4" wide	875	400	135	260	1200	1.3	0.47		
	Standard		500	225	135	260	1000	1.2	0.44		
	Utility		225	100	135	260	675	1.1	0.40		
AS/NSPR/SCOTP(I)AUS/GER		AUSTRIAN SPRUCE from AUSTRIA, NORWAY SPRUCE & SCOTS PINE from AUSTRIA & GERMANY [5]									TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: AUSTRIAN SPRUCE from AUSTRIA & THE CZECH REPUBLIC; NORWAY SPRUCE from GERMANY, NE FRANCE, & SWITZERLAND; SCOTS PINE from AUSTRIA & THE CZECH REPUBLIC, ROMANIA, & UKRAINE; SCOTS PINE from GERMANY[5]	Select Structural	2" & wider	1200	550	135	260	1200	1.6	0.58	0.42	
	No. 1		800	375	135	260	1050	1.4	0.51		
	No. 2		700	325	135	260	950	1.1	0.40		
	No. 3		400	175	135	260	550	1	0.37		
	Stud	2" & wider	550	250	135	260	600	1	0.37		
	Construction	2" - 4" wide	800	375	135	260	1150	1.1	0.40		
	Standard		450	200	135	260	975	1	0.37		
	Utility		225	100	135	260	625	0.9	0.33		

Table 4G **Reference Design Values for Multi-Species and Country Grademarked Visually Graded Dimension Lumber (2" - 4" thick)[1,2,3]**

(Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4G ADJUSTMENT FACTORS

Multi-Species and Country Label	Commercial Grade	Size Classification	Design values in pounds per square inch (psi)							Specific Gravity[4]	Grade Stamping Agency
			Bending F_b	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}	G	
DF/DF-N			DOUGLAS FIR & DOUGLAS FIR (NORTH)								TP
DF-L/DF-L(N)			DOUGLAS FIR-LARCH & DOUGLAS FIR-LARCH (NORTH)								PLIB, WWPA
DF-L/DF(N)			DOUGLAS FIR-LARCH & DOUGLAS FIR (NORTH)								PLIB
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A: DOUGLAS FIR-LARCH & DOUGLAS FIR-LARCH (NORTH)	Select Structural	2" & wider	1350	825	180	625	1700	1.9	0.69	0.49	
	No. 1 & Btr		1150	750	180	625	1550	1.8	0.66		
	No. 1		850	500	180	625	1400	1.6	0.58		
	No. 2		850	500	180	625	1350	1.6	0.58		
	No. 3		475	300	180	625	775	1.4	0.51		
	Stud	2" & wider	650	400	180	625	850	1.4	0.51		
	Construction	2" - 4" wide	950	575	180	625	1650	1.5	0.55		
	Standard		525	325	180	625	1400	1.4	0.51		
	Utility		250	150	180	625	900	1.3	0.47		
D Fir-L-HF			DOUGLAS FIR-LARCH & HEM-FIR from U.S.								PLIB
DF-HF			DOUGLAS FIR & HEM-FIR from U.S.								
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A: DOUGLAS FIR-LARCH; HEM-FIR	Select Structural	2" & wider	1400	925	150	405	1500	1.6	0.58	0.43	
	No. 1&Btr		1100	725	150	405	1350	1.5	0.55		
	No. 1		975	625	150	405	1350	1.5	0.55		
	No. 2		850	525	150	405	1300	1.3	0.47		
	No. 3		500	300	150	405	725	1.2	0.44		
	Stud	2" & wider	675	400	150	405	800	1.2	0.44		
	Construction	2" - 4" wide	975	600	150	405	1550	1.3	0.47		
	Standard		550	325	150	405	1300	1.2	0.44		
	Utility		250	150	150	405	850	1.1	0.40		
DF-HF-SPF			DOUGLAS FIR, HEM-FIR & SPRUCE-PINE-FIR from NORTH AMERICA								PLIB
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A: DOUGLAS FIR-LARCH; HEM-FIR; SPRUCE-PINE-FIR	Select Structural	2" & wider	1250	700	135	405	1400	1.5	0.55	0.42	
	No. 1		875	450	135	405	1150	1.4	0.51		
	No. 2		850	450	135	405	1150	1.3	0.47		
	No. 3		500	250	135	405	650	1.2	0.44		
	Stud	2" & wider	675	350	135	405	725	1.2	0.44		
	Construction	2" - 4" wide	975	500	135	405	1400	1.3	0.47		
	Standard		550	275	135	405	1150	1.2	0.44		
	Utility		250	125	135	405	750	1.1	0.40		

Table 4G

Reference Design Values for Multi-Species and Country Grademarked Visually Graded Dimension Lumber (2" - 4" thick)[1,2,3]

(Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4G ADJUSTMENT FACTORS

Multi-Species and Country Label	Commercial Grade	Size Classification	Design values in pounds per square inch (psi)							Specific Gravity[4]	Grade Stamping Agency
			Bending	Tension parallel to grain	Shear parallel to grain	Compression perpendicular to grain	Compression parallel to grain	Modulus of Elasticity			
			F_b	F_t	F_v	$F_{c\perp}$	F_c	E	E_{min}	G	
DF-HF-SPF(S)			DOUGLAS FIR, HEM-FIR & SPRUCE-PINE-FIR (SOUTH) from U.S.								PLIB
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A: DOUGLAS FIR-LARCH; HEM-FIR; SPRUCE-PINE-FIR (SOUTH)	Select Structural	2" & wider	1300	575	135	335	1200	1.3	0.47	0.36	
	No. 1		875	400	135	335	1050	1.2	0.44		
	No. 2		775	350	135	335	1000	1.1	0.40		
	No. 3		450	200	135	335	575	1	0.37		
	Stud	2" & wider	600	275	135	335	625	1	0.37		
	Construction	2" - 4" wide	875	400	135	335	1200	1	0.37		
	Standard		500	225	135	335	1000	0.9	0.33		
	Utility		225	100	135	335	675	0.9	0.33		
D Fir-SPF			DOUGLAS FIR & SPRUCE-PINE-FIR from NORTH AMERICA								PLIB
DF-L-SPF			DOUGLAS FIR-LARCH & SPRUCE-PINE-FIR from NORTH AMERICA								
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A: DOUGLAS FIR-LARCH; SPRUCE-PINE-FIR	Select Structural	2" & wider	1250	700	135	425	1400	1.5	0.55	0.42	
	No. 1		875	450	135	425	1150	1.4	0.51		
	No. 2		875	450	135	425	1150	1.4	0.51		
	No. 3		500	250	135	425	650	1.2	0.44		
	Stud	2" & wider	675	350	135	425	725	1.2	0.44		
	Construction	2" - 4" wide	1000	500	135	425	1400	1.3	0.47		
	Standard		550	275	135	425	1150	1.2	0.44		
	Utility		275	125	135	425	750	1.1	0.40		
DF-N Spr (I) N FRA			DOUGLAS FIR & NORWAY SPRUCE from NORTHERN FRANCE								PLIB
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: DOUGLAS FIR from FRANCE & GERMANY; NORWAY SPRUCE from GERMANY, NE FRANCE, & SWITZERLAND	Select Structural	2" & wider	1200	550	170	355	1200	1.6	0.58	0.42	
	No. 1		825	375	170	355	1050	1.4	0.51		
	No. 2		725	325	170	355	950	1.2	0.44		
	No. 3		425	200	170	355	550	1.1	0.40		
	Stud	2" & wider	575	250	170	355	600	1.1	0.40		
	Construction	2" - 4" wide	825	375	170	355	1200	1.1	0.40		
	Standard		475	200	170	355	975	1	0.37		
	Utility		225	100	170	355	650	0.9	0.33		
DF/NSPR/SCOTP(I)GER/ROM/SW/UKR			DOUGLAS FIR from GERMANY, NORWAY SPRUCE & SCOTS PINE from GERMANY [5], ROMANIA, SWEDEN, or UKRAINE								TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: DOUGLAS FIR from FRANCE & GERMANY; NORWAY SPRUCE from GERMANY, NE FRANCE, & SWITZERLAND; NORWAY SPRUCE from ROMANIA & UKRAINE; NORWAY SPRUCE from SWEDEN; SCOTS PINE from AUSTRIA & THE CZECH REPUBLIC, ROMANIA, & UKRAINE; SCOTS PINE from GERMANY[5]; SCOTS PINE from SWEDEN	Select Structural	2" & wider	1200	550	100	270	1200	1.5	0.55	0.38	
	No. 1		800	375	100	270	1000	1.4	0.51		
	No. 2		575	250	100	270	825	1.1	0.40		
	No. 3		325	150	100	270	475	1	0.37		
	Stud	2" & wider	450	200	100	270	525	1	0.37		
	Construction	2" - 4" wide	650	300	100	270	1050	1.1	0.40		
	Standard		375	175	100	270	850	1	0.37		
	Utility		175	75	100	270	550	0.9	0.33		

Table 4G

Reference Design Values for Multi-Species and Country Grademarked Visually Graded Dimension Lumber (2" - 4" thick)[1,2,3]

(Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4G ADJUSTMENT FACTORS

Multi-Species and Country Label	Commercial Grade	Size Classification	Design values in pounds per square inch (psi)							Specific Gravity[4]	Grade Stamping Agency
			Bending F_b	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}	G	
DF/NSPR/SCOTP(I)GER			DOUGLAS FIR, NORWAY SPRUCE, & SCOTS PINE from GERMANY[5]								TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: DOUGLAS FIR from FRANCE & GERMANY; NORWAY SPRUCE from GERMANY, NE FRANCE, & SWITZERLAND; SCOTS PINE from GERMANY[5]	Select Structural	2" & wider	1200	550	160	355	1200	1.6	0.58	0.42	
	No. 1		800	375	160	355	1050	1.4	0.51		
	No. 2		700	325	160	355	950	1.1	0.40		
	No. 3		400	175	160	355	550	1	0.37		
	Stud	2" & wider	550	250	160	355	600	1	0.37		
	Construction	2" - 4" wide	800	375	160	355	1150	1.1	0.40		
	Standard		450	200	160	355	975	1	0.37		
	Utility		225	100	160	355	625	0.9	0.33		
ES-LP			ENGELMANN SPRUCE & LODGEPOLE PINE from NORTH AMERICA								PLIB, WWPA
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A: SPRUCE-PINE-FIR (SOUTH)	Select Structural	2" & wider	1300	575	135	335	1200	1.3	0.47	0.36	
	No. 1		875	400	135	335	1050	1.2	0.44		
	No. 2		775	350	135	335	1000	1.1	0.40		
	No. 3		450	200	135	335	575	1	0.37		
	Stud	2" & wider	600	275	135	335	625	1	0.37		
	Construction	2" - 4" wide	875	400	135	335	1200	1	0.37		
	Standard		500	225	135	335	1000	0.9	0.33		
	Utility		225	100	135	335	675	0.9	0.33		
ES-LP-AF			ENGELMANN SPRUCE, LODGEPOLE PINE & SUBALPINE FIR from U.S.								PLIB, WWPA
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A: SPRUCE-PINE-FIR (SOUTH); WESTERN WOODS	Select Structural	2" & wider	900	400	135	335	1050	1.2	0.44	0.36	
	No. 1		675	300	135	335	950	1.1	0.40		
	No. 2		675	300	135	335	900	1	0.37		
	No. 3		375	175	135	335	525	0.9	0.33		
	Stud	2" & wider	525	225	135	335	575	0.9	0.33		
	Construction	2" - 4" wide	775	350	135	335	1100	1	0.37		
	Standard		425	200	135	335	925	0.9	0.33		
	Utility		200	100	135	335	600	0.8	0.29		
HF/DF-N/SPF/SPF-S			HEM-FIR, DOUGLAS FIR (NORTH), SPRUCE-PINE-FIR & SPRUCE-PINE-FIR (SOUTH) from NORTH AMERICA								TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A: HEM-FIR; DOUGLAS FIR-LARCH (NORTH); SPRUCE-PINE-FIR; SPRUCE-PINE-FIR (SOUTH)	Select Structural	2" & wider	1250	575	135	335	1200	1.3	0.47	0.36	
	No. 1		850	400	135	335	1050	1.2	0.44		
	No. 2		775	350	135	335	1000	1.1	0.40		
	No. 3		450	200	135	335	575	1	0.37		
	Stud	2" & wider	600	275	135	335	625	1	0.37		
	Construction	2" - 4" wide	875	400	135	335	1200	1	0.37		
	Standard		500	225	135	335	1000	0.9	0.33		
	Utility		225	100	135	335	675	0.9	0.33		

Table 4G **Reference Design Values for Multi-Species and Country Grademarked Visually Graded Dimension Lumber (2" - 4" thick)[1,2,3]**

(Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4G ADJUSTMENT FACTORS

Multi-Species and Country Label	Commercial Grade	Size Classification	Design values in pounds per square inch (psi)							Specific Gravity[4]	Grade Stamping Agency
			Bending F_b	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}	G	
HF/HF(N)			HEM-FIR & HEM-FIR (NORTH) from NORTH AMERICA								PLIB, WWPA
HF/HF-N			HEM-FIR & HEM-FIR (NORTH) from NORTH AMERICA								TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A: HEM-FIR; HEM-FIR (NORTH)	Select Structural	2" & wider	1300	775	145	405	1500	1.6	0.58	0.43	
	No. 1 & Btr		1100	725	145	405	1350	1.5	0.55		
	No. 1		975	575	145	405	1350	1.5	0.55		
	No. 2		850	525	145	405	1300	1.3	0.47		
	No. 3		500	300	145	405	725	1.2	0.44		
	Stud	2" & wider	675	400	145	405	800	1.2	0.44		
	Construction	2" - 4" wide	975	600	145	405	1550	1.3	0.47		
	Standard		550	325	145	405	1300	1.2	0.44		
	Utility		250	150	145	405	850	1.1	0.40		
HF-SS			HEM-FIR & SITKA SPRUCE from U.S.								PLIB
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A: HEM-FIR; SITKA SPRUCE	Select Structural	2" & wider	1300	575	135	335	1200	1.3	0.47	0.36	
	No. 1		875	400	135	335	1050	1.2	0.44		
	No. 2		775	350	135	335	1000	1.1	0.40		
	No. 3		450	200	135	335	575	1	0.37		
	Stud	2" & wider	600	275	135	335	625	1	0.37		
	Construction	2" - 4" wide	875	400	135	335	1200	1	0.37		
	Standard		500	225	135	335	1000	0.9	0.33		
	Utility		225	100	135	335	675	0.9	0.33		
N Spr (I) EST FIN GER LTH NOR SW			NORWAY SPRUCE from ESTONIA, FINLAND, GERMANY, LITHUANIA, NORWAY, & SWEDEN								PLIB
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: NORWAY SPRUCE from ESTONIA, LATVIA, & LITHUANIA; NORWAY SPRUCE from FINLAND; NORWAY SPRUCE from GERMANY, NE FRANCE, & SWITZERLAND; NORWAY SPRUCE from NORWAY; NORWAY SPRUCE from SWEDEN	Select Structural	2" & wider	1200	550	115	220	1200	1.5	0.55	0.42	
	No. 1		825	375	115	220	1000	1.4	0.51		
	No. 2		625	275	115	220	875	1.2	0.44		
	No. 3		375	175	115	220	500	1.1	0.40		
	Stud	2" & wider	550	250	115	220	575	1.1	0.40		
	Construction	2" - 4" wide	725	325	115	220	1100	1.1	0.40		
	Standard		400	175	115	220	900	1	0.37		
	Utility		200	75	115	220	600	0.9	0.33		

Table 4G **Reference Design Values for Multi-Species and Country Grademarked Visually Graded Dimension Lumber (2" - 4" thick)[1,2,3]**

(Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4G ADJUSTMENT FACTORS

Multi-Species and Country Label	Commercial Grade	Size Classification	Design values in pounds per square inch (psi)							Specific Gravity[4]	Grade Stamping Agency
			Bending F_b	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}	G	
N Spr-Sc P(I) EST			NORWAY SPRUCE & SCOTS PINE from ESTONIA								PLIB
N Spr-Sc P(I) LAT			NORWAY SPRUCE & SCOTS PINE from LATVIA								PLIB
N Spr-Sc P(I) LTH			NORWAY SPRUCE & SCOTS PINE from LITHUANIA								PLIB
NSPR/SCOTP(I)LAT/LTH			NORWAY SPRUCE & SCOTS PINE from LATVIA & LITHUANIA								TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: NORWAY SPRUCE from ESTONIA, LATVIA, & LITHUANIA; SCOTS PINE from ESTONIA, LATVIA, & LITHUANIA	Select Structural	2" & wider	1150	525	130	430	1150	1.5	0.55	0.42	
	No. 1		800	350	130	430	1050	1.4	0.51		
	No. 2		750	325	130	430	975	1.2	0.44		
	No. 3		425	200	130	430	550	1.1	0.40		
	Stud	2" & wider	575	275	130	430	625	1.1	0.40		
	Construction	2" - 4" wide	850	375	130	430	1200	1.1	0.40		
	Standard		475	225	130	430	1000	1	0.37		
	Utility		225	100	130	430	650	1	0.37		
N Spr-Sc P(I) FIN			NORWAY SPRUCE & SCOTS PINE from FINLAND								PLIB
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: NORWAY SPRUCE from FINLAND; SCOTS PINE from FINLAND	Select Structural	2" & wider	1300	600	125	210	1200	1.5	0.55	0.42	
	No. 1		825	375	125	210	1000	1.4	0.51		
	No. 2		625	275	125	210	875	1.2	0.44		
	No. 3		375	175	125	210	500	1.1	0.40		
	Stud	2" & wider	575	250	125	210	600	1.1	0.40		
	Construction	2" - 4" wide	725	325	125	210	1100	1.1	0.40		
	Standard		400	175	125	210	900	1	0.37		
	Utility		200	75	125	210	600	1	0.37		
N Spr-Sc P(I) GER			NORWAY SPRUCE & SCOTS PINE from GERMANY[5]								PLIB
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: NORWAY SPRUCE from GERMANY, NE FRANCE, & SWITZERLAND; SCOTS PINE from GERMANY[5]	Select Structural	2" & wider	1200	550	160	355	1200	1.6	0.58	0.42	
	No. 1		800	375	160	355	1050	1.4	0.51		
	No. 2		700	325	160	355	950	1.1	0.40		
	No. 3		400	175	160	355	550	1	0.37		
	Stud	2" & wider	550	250	160	355	600	1	0.37		
	Construction	2" - 4" wide	800	375	160	355	1150	1.1	0.40		
	Standard		450	200	160	355	975	1	0.37		
	Utility		225	100	160	355	625	0.9	0.33		

Table 4G **Reference Design Values for Multi-Species and Country Grademarked Visually Graded Dimension Lumber (2" - 4" thick)[1,2,3]**

(Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4G ADJUSTMENT FACTORS

Multi-Species and Country Label	Commercial Grade	Size Classification	Design values in pounds per square inch (psi)							Specific Gravity[4]	Grade Stamping Agency
			Bending F_b	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}	G	
N Spr-Sc P(I) ROM			NORWAY SPRUCE & SCOTS PINE from ROMANIA								PLIB
N SPr-Sc P(I) ROM-UKR			NORWAY SPRUCE & SCOTS PINE from ROMANIA & UKRAINE								
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: NORWAY SPRUCE from ROMANIA & UKRAINE; SCOTS PINE from AUSTRIA & THE CZECH REPUBLIC, ROMANIA, & UKRAINE	Select Structural	2" & wider	1250	575	100	270	1200	1.5	0.55	0.38	
	No. 1		850	375	100	270	1050	1.4	0.51		
	No. 2		725	325	100	270	950	1.2	0.44		
	No. 3		425	200	100	270	550	1.1	0.40		
	Stud	2" & wider	575	250	100	270	600	1.1	0.40		
	Construction	2" - 4" wide	850	375	100	270	1200	1.1	0.40		
	Standard		475	200	100	270	1000	1	0.37		
	Utility		225	100	100	270	650	1	0.37		
N Spr-Sc P(I) SW			NORWAY SPRUCE & SCOTS PINE from SWEDEN								PLIB
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: NORWAY SPRUCE from SWEDEN; SCOTS PINE from SWEDEN	Select Structural	2" & wider	1250	550	120	285	1200	1.6	0.58	0.42	
	No. 1		825	375	120	285	1000	1.4	0.51		
	No. 2		575	250	120	285	825	1.2	0.44		
	No. 3		325	150	120	285	475	1.1	0.40		
	Stud	2" & wider	450	200	120	285	525	1.1	0.40		
	Construction	2" - 4" wide	650	300	120	285	1050	1.2	0.44		
	Standard		375	175	120	285	850	1.1	0.40		
	Utility		175	75	120	285	550	1	0.37		
N Spr-S Fir (I) GER			NORWAY SPRUCE & SILVER FIR from GERMANY								PLIB
N Spr-S Fir (I) N FRA			NORWAY SPRUCE & SILVER FIR from NORTHERN FRANCE								
N Spr-S Fir(I) GER N FRA			NORWAY SPRUCE & SILVER FIR from GERMANY & NORTHERN FRANCE								
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: NORWAY SPRUCE from GERMANY, NE FRANCE, & SWITZERLAND; SILVER FIR (*Abies alba*) from GERMANY, NE FRANCE, & SWITZERLAND	Select Structural	2" & wider	950	425	125	355	1100	1.5	0.55	0.42	
	No. 1		725	325	125	355	975	1.4	0.51		
	No. 2		725	325	125	355	950	1.2	0.44		
	No. 3		425	200	125	355	550	1.1	0.40		
	Stud	2" & wider	575	250	125	355	600	1.1	0.40		
	Construction	2" - 4" wide	825	375	125	355	1150	1.1	0.40		
	Standard		475	200	125	355	975	1	0.37		
	Utility		225	100	125	355	650	0.9	0.33		

Table 4G **Reference Design Values for Multi-Species and Country Grademarked Visually Graded Dimension Lumber (2" - 4" thick)[1,2,3]**

(Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4G ADJUSTMENT FACTORS

Multi-Species and Country Label	Commercial Grade	Size Classification	Design values in pounds per square inch (psi)							Specific Gravity[4]	Grade Stamping Agency
			Bending F_b	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}	G	
N Spr-Sc P-DF (I) GER		NORWAY SPRUCE, SCOTS PINE & DOUGLAS FIR from GERMANY[5]									PLIB
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: NORWAY SPRUCE from GERMANY, NE FRANCE, & SWITZERLAND; SCOTS PINE from GERMANY[5]; DOUGLAS FIR from FRANCE & GERMANY	Select Structural	2" & wider	1200	550	160	355	1200	1.6	0.58	0.42	
	No. 1		800	375	160	355	1050	1.4	0.51		
	No. 2		700	325	160	355	950	1.1	0.40		
	No. 3		400	175	160	355	550	1	0.37		
	Stud	2" & wider	550	250	160	355	600	1	0.37		
	Construction		800	375	160	355	1150	1.1	0.40		
	Standard	2" - 4" wide	450	200	160	355	975	1	0.37		
	Utility		225	100	160	355	625	0.9	0.33		
N Spr-Sc P-DF-L (I) GER		NORWAY SPRUCE, SCOTS PINE & DOUGLAS FIR from GERMANY[5], EUROPEAN LARCH from AUSTRIA, THE CZECH REPUBLIC & BAVARIA (2x4, 3x4 and 4x4 only)									PLIB
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: NORWAY SPRUCE from GERMANY, NE FRANCE, & SWITZERLAND; SCOTS PINE from GERMANY[5]; DOUGLAS FIR from FRANCE & GERMANY; EUROPEAN LARCH from AUSTRIA, THE CZECH REPUBLIC & BAVARIA (This grademark only available in 2x4, 3x4 and 4x4 sizes)	Select Structural	2" & wider	1200	550	160	355	1200	1.6	0.58	0.42	
	No. 1		800	375	160	355	1050	1.4	0.51		
	No. 2		700	325	160	355	950	1.1	0.40		
	No. 3		400	175	160	355	550	1	0.37		
	Stud	2" & wider	550	250	160	355	600	1	0.37		
	Construction		800	375	160	355	1150	1.1	0.40		
	Standard	2" - 4" wide	450	200	160	355	975	1	0.37		
	Utility		225	100	160	355	625	0.9	0.33		
N Spr-Sc P-DF-S Fir (I) GER		NORWAY SPRUCE, SCOTS PINE, DOUGLAS FIR & SILVER FIR from GERMANY[5]									PLIB
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: NORWAY SPRUCE from GERMANY, NE FRANCE, & SWITZERLAND; SCOTS PINE from GERMANY[5]; DOUGLAS FIR from FRANCE & GERMANY; SILVER FIR (*Abies alba*) from GERMANY, NE FRANCE, & SWITZERLAND	Select Structural	2" & wider	950	425	125	355	1100	1.5	0.55	0.42	
	No. 1		725	325	125	355	975	1.4	0.51		
	No. 2		700	325	125	355	950	1.1	0.40		
	No. 3		400	175	125	355	550	1	0.37		
	Stud	2" & wider	550	250	125	355	600	1	0.37		
	Construction		800	375	125	355	1150	1.1	0.40		
	Standard	2" - 4" wide	450	200	125	355	975	1	0.37		
	Utility		225	100	125	355	625	0.9	0.33		
NSPR/SCOTP(I)EST/FIN/GER/LIT/ROM/SW/UKR		NORWAY SPRUCE & SCOTS PINE from ESTONIA, FINLAND, GERMANY[5], LITHUANIA, ROMANIA, SWEDEN & UKRAINE									TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: NORWAY SPRUCE from ESTONIA, LATVIA, & LITHUANIA; NORWAY SPRUCE from FINLAND; NORWAY SPRUCE from GERMANY, NE FRANCE, & SWITZERLAND; NORWAY SPRUCE from SWEDEN; NORWAY SPRUCE from ROMANIA & UKRAINE; SCOTS PINE from ESTONIA, LATVIA, & LITHUANIA; SCOTS PINE from FINLAND; SCOTS PINE from GERMANY[5]; SCOTS PINE from SWEDEN; SCOTS PINE from AUSTRIA & THE CZECH REPUBLIC, ROMANIA, & UKRAINE	Select Structural	2" & wider	1150	525	100	210	1150	1.5	0.55	0.38	
	No. 1		800	350	100	210	1000	1.4	0.51		
	No. 2		575	250	100	210	825	1.1	0.40		
	No. 3		325	150	100	210	475	1	0.37		
	Stud	2" & wider	450	200	100	210	525	1	0.37		
	Construction		650	300	100	210	1050	1.1	0.40		
	Standard	2" - 4" wide	375	175	100	210	850	1	0.37		
	Utility		175	75	100	210	550	0.9	0.33		

Table 4G

Reference Design Values for Multi-Species and Country Grademarked Visually Graded Dimension Lumber (2" - 4" thick)[1,2,3]

(Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4G ADJUSTMENT FACTORS

Multi-Species and Country Label	Commercial Grade	Size Classification	Design values in pounds per square inch (psi)							Specific Gravity[4]	Grade Stamping Agency
			Bending F_b	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}	G	
NSPR/SCOTP(I)GER/ROM/SW/UKR		NORWAY SPRUCE & SCOTS PINE from GERMANY[5], ROMANIA, SWEDEN or UKRAINE									TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: NORWAY SPRUCE from GERMANY, NE FRANCE, & SWITZERLAND; NORWAY SPRUCE from SWEDEN; NORWAY SPRUCE from ROMANIA & UKRAINE; SCOTS PINE from GERMANY[5]; SCOTS PINE from SWEDEN, SCOTS PINE from AUSTRIA & THE CZECH REPUBLIC, ROMANIA, & UKRAINE	Select Structural	2" & wider	1200	550	100	270	1200	1.5	0.55	0.38	
	No. 1		800	375	100	270	1000	1.4	0.51		
	No. 2		575	250	100	270	825	1.1	0.40		
	No. 3		325	150	100	270	475	1	0.37		
	Stud	2" & wider	450	200	100	270	525	1	0.37		
	Construction	2" - 4" wide	650	300	100	270	1050	1.1	0.40		
	Standard		375	175	100	270	850	1	0.37		
	Utility		175	75	100	270	550	0.9	0.33		
NSPR/SCOTP(I)GER/SW		NORWAY SPRUCE & SCOTS PINE from GERMANY[5] or SWEDEN									TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: NORWAY SPRUCE from GERMANY, NE FRANCE, & SWITZERLAND; NORWAY SPRUCE from SWEDEN; SCOTS PINE from GERMANY[5]; SCOTS PINE from SWEDEN	Select Structural	2" & wider	1200	550	120	285	1200	1.6	0.58	0.42	
	No. 1		800	375	120	285	1000	1.4	0.51		
	No. 2		575	250	120	285	825	1.1	0.40		
	No. 3		325	150	120	285	475	1	0.37		
	Stud	2" & wider	450	200	120	285	525	1	0.37		
	Construction	2" - 4" wide	650	300	120	285	1050	1.1	0.40		
	Standard		375	175	120	285	850	1	0.37		
	Utility		175	75	120	285	550	0.9	0.33		
NSPR/SCOTP(I)SW		NORWAY SPRUCE & SCOTS PINE from SWEDEN									TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: NORWAY SPRUCE from SWEDEN; SCOTS PINE from SWEDEN	Select Structural	2" & wider	1250	550	120	285	1200	1.6	0.58	0.42	
	No. 1		825	375	120	285	1000	1.4	0.51		
	No. 2		575	250	120	285	825	1.2	0.44		
	No. 3		325	150	120	285	475	1.1	0.40		
	Stud	2" & wider	450	200	120	285	525	1.1	0.40		
	Construction	2" - 4" wide	650	300	120	285	1050	1.2	0.44		
	Standard		375	175	120	285	850	1.1	0.40		
	Utility		175	75	120	285	550	1	0.37		
NSPR/SCOTP/SFIR(I)GER		NORWAY SPRUCE, SCOTS PINE & SILVER FIR from GERMANY[5]									TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: NORWAY SPRUCE from GERMANY, NE FRANCE, & SWITZERLAND; SCOTS PINE from GERMANY[5]; SILVER FIR (*Abies alba*) from GERMANY, NE FRANCE, & SWITZERLAND	Select Structural	2" & wider	950	425	125	355	1100	1.5	0.55	0.42	
	No. 1		725	325	125	355	975	1.4	0.51		
	No. 2		700	325	125	355	950	1.1	0.40		
	No. 3		400	175	125	355	550	1	0.37		
	Stud	2" & wider	550	250	125	355	600	1	0.37		
	Construction	2" - 4" wide	800	375	125	355	1150	1.1	0.40		
	Standard		450	200	125	355	975	1	0.37		
	Utility		225	100	125	355	625	0.9	0.33		

Table 4G

Reference Design Values for Multi-Species and Country Grademarked Visually Graded Dimension Lumber (2" - 4" thick)[1,2,3]

(Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4G ADJUSTMENT FACTORS

Multi-Species and Country Label	Commercial Grade	Size Classification	Design values in pounds per square inch (psi)							Specific Gravity[4]	Grade Stamping Agency
			Bending F_b	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}	G	
PP-LP		PONDEROSA PINE & LODGEPOLE PINE from NORTH AMERICA									PLIB, WWPA
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A: SPRUCE-PINE-FIR (SOUTH); WESTERN WOODS	Select Structural	2" & wider	900	400	135	335	1050	1.2	0.44	0.36	
	No. 1		675	300	135	335	950	1.1	0.40		
	No. 2		675	300	135	335	900	1	0.37		
	No. 3		375	175	135	335	525	0.9	0.33		
	Stud	2" & wider	525	225	135	335	575	0.9	0.33		
	Construction	2" - 4" wide	775	350	135	335	1100	1	0.37		
	Standard		425	200	135	335	925	0.9	0.33		
	Utility		200	100	135	335	600	0.8	0.29		
R. PINE/NSPR(N)/SPF/SPF(S)		RED PINE, NORWAY SPRUCE (NORTH), SPRUCE-PINE-FIR, & SPRUCE-PINE-FIR(S) from NORTH AMERICA									TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A: NORTHERN SPECIES; NORWAY SPRUCE (NORTH); SPRUCE-PINE-FIR; SPRUCE-PINE-FIR(S)	Select Structural	2" & wider	950	425	110	335	1100	1.1	0.40	0.35	
	No. 1		625	275	110	335	850	1.1	0.40		
	No. 2		625	275	110	335	850	1.1	0.40		
	No. 3		350	150	110	335	500	1	0.37		
	Stud	2" & wider	475	225	110	335	550	1	0.37		
	Construction	2" - 4" wide	700	325	110	335	1050	1	0.37		
	Standard		400	175	110	335	875	0.9	0.33		
	Utility		175	75	110	335	575	0.9	0.33		
Sc P (I) EST FIN GER LTH SW		SCOTS PINE from ESTONIA, FINLAND, GERMANY, LITHUANIA, or SWEDEN									PLIB
Tabulated design values are the minimum values for the following species and commercial grades in Table 4F: SCOTS PINE from ESTONIA, LATVIA, & LITHUANIA; SCOTS PINE from FINLAND; SCOTS PINE from GERMANY; SCOTS PINE from SWEDEN	Select Structural	2" & wider	1150	525	120	210	1150	1.5	0.55	0.45	
	No. 1		800	350	120	210	1000	1.4	0.51		
	No. 2		575	250	120	210	825	1.1	0.40		
	No. 3		325	150	120	210	475	1	0.37		
	Stud	2" & wider	450	200	120	210	525	1	0.37		
	Construction	2" - 4" wide	650	300	120	210	1050	1.1	0.40		
	Standard		375	175	120	210	850	1	0.37		
	Utility		175	75	120	210	550	0.9	0.33		
Sitka Sp/HF		SITKA SPRUCE & HEM-FIR from U.S.									PLIB
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A: HEM-FIR; SITKA SPRUCE	Select Structural	2" & wider	1300	575	135	335	1200	1.3	0.47	0.36	
	No. 1		875	400	135	335	1050	1.2	0.44		
	No. 2		775	350	135	335	1000	1.1	0.40		
	No. 3		450	200	135	335	575	1	0.37		
	Stud	2" & wider	600	275	135	335	625	1	0.37		
	Construction	2" - 4" wide	875	400	135	335	1200	1	0.37		
	Standard		500	225	135	335	1000	0.9	0.33		
	Utility		225	100	135	335	675	0.9	0.33		

Table 4G **Reference Design Values for Multi-Species and Country Grademarked Visually Graded Dimension Lumber (2" - 4" thick)[1,2,3]**

(Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4G ADJUSTMENT FACTORS

Multi-Species and Country Label	Commercial Grade	Size Classification	Design values in pounds per square inch (psi)							Specific Gravity[4]	Grade Stamping Agency
			Bending F_b	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}	G	
SPF/SPF-S			SPRUCE-PINE-FIR & SPRUCE-PINE-FIR (SOUTH) from NORTH AMERICA								TP
SPF/SPF(S)			SPRUCE-PINE-FIR & SPRUCE-PINE-FIR (SOUTH) from NORTH AMERICA								PLIB
SPF[S]/SPF			SPRUCE-PINE-FIR & SPRUCE-PINE-FIR (SOUTH) from NORTH AMERICA								WWPA
SPF/SPF-s			SPRUCE-PINE-FIR & SPRUCE-PINE-FIR (SOUTH) from NORTH AMERICA								NLGA
S-P-F/SPFs			SPRUCE-PINE-FIR & SPRUCE-PINE-FIR (SOUTH) from NORTH AMERICA								NLGA
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A: SPRUCE-PINE-FIR; SPRUCE-PINE-FIR (SOUTH)	Select Structural	2" & wider	1250	575	135	335	1200	1.3	0.47	0.36	
	No. 1		875	400	135	335	1050	1.2	0.44		
	No. 2		775	350	135	335	1000	1.1	0.40		
	No. 3		450	200	135	335	575	1	0.37		
	Stud	2" & wider	600	275	135	335	625	1	0.37		
	Construction	2" - 4" wide	875	400	135	335	1200	1	0.37		
	Standard		500	225	135	335	1000	0.9	0.33		
	Utility		225	100	135	335	675	0.9	0.33		
SPF/SPF-S AS/NSPR/SCOTP/SFIR(I)AUS/EST/FIN/GER/LTH/SW			SPRUCE-PINE-FIR & SPRUCE-PINE-FIR (SOUTH) from NORTH AMERICA, AUSTRIAN SPRUCE from AUSTRIA, NORWAY SPRUCE from ESTONIA, FINLAND, GERMANY, LITHUANIA, or SWEDEN, SCOTS PINE from AUSTRIA, ESTONIA, FINLAND, GERMANY [5], LITHUANIA, or SWEDEN, & SILVER FIR from GERMANY								TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A & 4F: SPRUCE-PINE-FIR; SPRUCE-PINE-FIR (SOUTH); AUSTRIAN SPRUCE from AUSTRIA & THE CZECH REPUBLIC; NORWAY SPRUCE from ESTONIA, LATVIA, & LITHUANIA; NORWAY SPRUCE from FINLAND; NORWAY SPRUCE from GERMANY, NE FRANCE & SWITZERLAND; NORWAY SPRUCE from SWEDEN; SCOTS PINE from AUSTRIA & THE CZECH REPUBLIC, ROMANIA, & UKRAINE; SCOTS PINE from ESTONIA, LATVIA, & LITHUANIA; SCOTS PINE from FINLAND; SCOTS PINE from GERMANY; SCOTS PINE from SWEDEN; SILVER FIR (*Abies alba*) from GERMANY, NE FRANCE, & SWITZERLAND	Select Structural	2" & wider	950	425	120	210	1100	1.3	0.47	0.36	
	No. 1		725	325	120	210	975	1.2	0.44		
	No. 2		575	250	120	210	825	1.1	0.40		
	No. 3		325	150	120	210	475	1	0.37		
	Stud	2" & wider	450	200	120	210	525	1	0.37		
	Construction	2" - 4" wide	650	300	120	210	1050	1	0.37		
	Standard		375	175	120	210	850	0.9	0.33		
	Utility		175	75	120	210	550	0.9	0.33		

Table 4G **Reference Design Values for Multi-Species and Country Grademarked Visually Graded Dimension Lumber (2" - 4" thick)[1,2,3]**

(Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4G ADJUSTMENT FACTORS

Multi-Species and Country Label	Commercial Grade	Size Classification	Design values in pounds per square inch (psi)							Specific Gravity[4]	Grade Stamping Agency
			Bending F_b	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}	G	
SPF/SPF-S AS/NSPR/SCOTP/SFIR(I)AUS/FIN/GER/SW		SPRUCE-PINE-FIR & SPRUCE-PINE-FIR (SOUTH) from NORTH AMERICA, AUSTRIAN SPRUCE from AUSTRIA, NORWAY SPRUCE from FINLAND, GERMANY, LITHUANIA, or SWEDEN, SCOTS PINE from AUSTRIA, FINLAND, GERMANY [5], LITHUANIA, or SWEDEN, & SILVER FIR from GERMANY									TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A & 4F: SPRUCE-PINE-FIR; SPRUCE-PINE-FIR (SOUTH); AUSTRIAN SPRUCE from AUSTRIA & THE CZECH REPUBLIC; NORWAY SPRUCE from FINLAND; NORWAY SPRUCE from GERMANY, NE FRANCE & SWITZERLAND; NORWAY SPRUCE from SWEDEN; SCOTS PINE from AUSTRIA & THE CZECH REPUBLIC, ROMANIA, & UKRAINE; SCOTS PINE from FINLAND; SCOTS PINE from GERMANY[5]; SCOTS PINE from SWEDEN; SILVER FIR (*Abies alba*) from GERMANY, NE FRANCE, & SWITZERLAND	Select Structural	2" & wider	950	425	120	210	1100	1.3	0.47	0.36	
	No. 1		725	325	120	210	975	1.2	0.44		
	No. 2		575	250	120	210	825	1.1	0.40		
	No. 3		325	150	120	210	475	1	0.37		
	Stud	2" & wider	450	200	120	210	525	1	0.37		
	Construction	2" - 4" wide	650	300	120	210	1050	1	0.37		
	Standard		375	175	120	210	850	0.9	0.33		
	Utility		175	75	120	210	550	0.9	0.33		
SPF/SPF-S AS/NSPR/SCOTP/SFIR(I)AUS/GER/ROM/SW/UKR		SPRUCE-PINE-FIR & SPRUCE-PINE-FIR (SOUTH) from NORTH AMERICA, AUSTRIAN SPRUCE from AUSTRIA, NORWAY SPRUCE from GERMANY, ROMANIA, SWEDEN, or UKRAINE, SCOTS PINE from AUSTRIA, GERMANY [5], ROMANIA, SWEDEN, or UKRAINE, or SILVER FIR from GERMANY									TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A & 4F: SPRUCE-PINE-FIR; SPRUCE-PINE-FIR (SOUTH); AUSTRIAN SPRUCE from AUSTRIA & THE CZECH REPUBLIC; NORWAY SPRUCE from GERMANY, NE FRANCE & SWITZERLAND; NORWAY SPRUCE from ROMANIA & UKRAINE; NORWAY SPRUCE from SWEDEN; SCOTS PINE from AUSTRIA & THE CZECH REPUBLIC, ROMANIA, & UKRAINE; SCOTS PINE from GERMANY[5]; SCOTS PINE from SWEDEN; SILVER FIR (*Abies alba*) from GERMANY, NE FRANCE, & SWITZERLAND	Select Structural	2" & wider	950	425	100	260	1100	1.3	0.47	0.36	
	No. 1		725	325	100	260	975	1.2	0.44		
	No. 2		575	250	100	260	825	1.1	0.40		
	No. 3		325	150	100	260	475	1	0.37		
	Stud	2" & wider	450	200	100	260	525	1	0.37		
	Construction	2" - 4" wide	650	300	100	260	1050	1	0.37		
	Standard		375	175	100	260	850	0.9	0.33		
	Utility		175	75	100	260	550	0.9	0.33		

Table 4G **Reference Design Values for Multi-Species and Country Grademarked Visually Graded Dimension Lumber (2" - 4" thick)[1,2,3]**

(Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4G ADJUSTMENT FACTORS

Multi-Species and Country Label	Commercial Grade	Size Classification	Design values in pounds per square inch (psi)							Specific Gravity[4]	Grade Stamping Agency
			Bending F_b	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}	G	
SPF/SPF-S AS/NSPR/SCOTP/SFIR(I)AUS/EST/FIN/GER/LTH/ROM/SW/UKR		SPRUCE-PINE-FIR & SPRUCE-PINE-FIR (SOUTH) from NORTH AMERICA, AUSTRIAN SPRUCE from AUSTRIA, NORWAY SPRUCE from ESTONIA, FINLAND, GERMANY, LITHUANIA, or SWEDEN, SCOTS PINE from AUSTRIA, ESTONIA, FINLAND, GERMANY [5], LITHUANIA, or SWEDEN, & SILVER FIR from GERMANY									TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A & 4F: SPRUCE-PINE-FIR; SPRUCE-PINE-FIR (SOUTH); AUSTRIAN SPRUCE from AUSTRIA & THE CZECH REPUBLIC; NORWAY SPRUCE from ESTONIA, LATVIA, & LITHUANIA; NORWAY SPRUCE from FINLAND; NORWAY SPRUCE from GERMANY, NE FRANCE & SWITZERLAND; NORWAY SPRUCE from ROMANIA & UKRAINE; NORWAY SPRUCE from SWEDEN; SCOTS PINE from AUSTRIA & THE CZECH REPUBLIC, ROMANIA, & UKRAINE; SCOTS PINE from ESTONIA, LATVIA, & LITHUANIA; SCOTS PINE from FINLAND; SCOTS PINE from GERMANY[5]; SCOTS PINE from SWEDEN; SILVER FIR (*Abies alba*) from GERMANY, NE FRANCE, & SWITZERLAND	Select Structural	2" & wider	950	425	100	210	1100	1.3	0.47	0.36	
	No. 1		725	325	100	210	975	1.2	0.44		
	No. 2		575	250	100	210	825	1.1	0.40		
	No. 3		325	150	100	210	475	1	0.37		
	Stud	2" & wider	450	200	100	210	525	1	0.37		
	Construction	2" - 4" wide	650	300	100	210	1050	1	0.37		
	Standard		375	175	100	210	850	0.9	0.33		
	Utility		175	75	100	210	550	0.9	0.33		
S-P-F/ NSpr(N)		SPRUCE-PINE-FIR & NORWAY SPRUCE (NORTH) from CANADA									NLGA
SPF/NSpr(N)		SPRUCE-PINE-FIR & NORWAY SPRUCE (NORTH) from CANADA									
Tabulated design values are the minimum values for from the following species and commercial grades in Table 4A: SPRUCE-PINE-FIR; NORWAY SPRUCE (NORTH)	Select Structural	2" & wider	950	600	135	410	1100	1.5	0.55	0.40	
	No. 1		650	425	135	410	900	1.3	0.47		
	No. 2		650	425	135	410	900	1.3	0.47		
	No. 3		375	250	135	410	525	1.2	0.44		
	Stud	2" & wider	500	325	135	410	575	1.2	0.44		
	Construction	2" - 4" wide	725	475	135	410	1100	1.2	0.44		
	Standard		400	275	135	410	925	1.1	0.40		
	Utility		200	125	135	410	600	1.1	0.40		
S-P-F/ SPFs/NSpr(N)		SPRUCE-PINE-FIR & SPRUCE-PINE-FIR (S) From NORTH AMERICA, & NORWAY SPRUCE (NORTH) from NORTH AMERICA									NLGA
Tabulated desing values are the minimum values for the following species and commercial grades in Table 4A: SPRUCE-PINE-FIR; SPRUCE-PINE-FIR (S); NORWAY SPRUCE (NORTH)	Select Structural	2" & wider	950	575	135	335	1100	1.3	0.47	0.36	
	No. 1		650	400	135	335	900	1.2	0.44		
	No. 2		650	350	135	335	900	1.1	0.40		
	No. 3		375	200	135	335	525	1	0.37		
	Stud	2" & wider	500	275	135	335	575	1	0.37		
	Construction	2" - 4" wide	725	400	135	335	1100	1	0.37		
	Standard		400	225	135	335	925	0.9	0.33		
	Utility		200	100	135	335	600	0.9	0.33		

Table 4G **Reference Design Values for Multi-Species and Country Grademarked Visually Graded Dimension Lumber (2" - 4" thick)[1,2,3]**

(Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4G ADJUSTMENT FACTORS

Multi-Species and Country Label	Commercial Grade	Size Classification	Design values in pounds per square inch (psi)							Specific Gravity[4]	Grade Stamping Agency
			Bending F_b	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}	G	
SPF/SPF-S NSPR/SCOTP(I)GER		SPRUCE-PINE-FIR & SPRUCE-PINE-FIR (SOUTH) from NORTH AMERICA, NORWAY SPRUCE, & SCOTS PINE from GERMANY[5]									TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A & 4F: SPRUCE-PINE-FIR; SPRUCE-PINE-FIR (SOUTH); NORWAY SPRUCE from GERMANY, NE FRANCE, & SWITZERLAND; SCOTS PINE from GERMANY[5]	Select Structural	2" & wider	1200	550	135	335	1200	1.3	0.47	0.36	
	No. 1		800	375	135	335	1050	1.2	0.44		
	No. 2		700	325	135	335	950	1.1	0.40		
	No. 3		400	175	135	335	550	1	0.37		
	Stud	2" & wider	550	250	135	335	600	1	0.37		
	Construction	2" - 4" wide	800	375	135	335	1150	1	0.37		
	Standard		450	200	135	335	975	0.9	0.33		
	Utility		225	100	135	335	625	0.9	0.33		
SPF/SPF-S NSPR/SCOTP(I)GER/ROM/SW/UKR		SPRUCE-PINE-FIR & SPRUCE-PINE-FIR (SOUTH) from NORTH AMERICA, NORWAY SPRUCE, SCOTS PINE from GERMANY[5], ROMANIA, SWEDEN, & UKRAINE									TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A & 4F: SPRUCE-PINE-FIR; SPRUCE-PINE-FIR (SOUTH); NORWAY SPRUCE from GERMANY, NE FRANCE, & SWITZERLAND; NORWAY SPRUCE from ROMANIA & UKRAINE; NORWAY SPRUCE from SWEDEN; SCOTS PINE from AUSTRIA & THE CZECH REPUBLIC, ROMANIA, & UKRAINE; SCOTS PINE from GERMANY[5]; SCOTS PINE from SWEDEN	Select Structural	2" & wider	1200	550	100	270	1200	1.3	0.47	0.36	
	No. 1		800	375	100	270	1000	1.2	0.44		
	No. 2		575	250	100	270	825	1.1	0.40		
	No. 3		325	150	100	270	475	1	0.37		
	Stud	2" & wider	450	200	100	270	525	1	0.37		
	Construction	2" - 4" wide	650	300	100	270	1050	1	0.37		
	Standard		375	175	100	270	850	0.9	0.33		
	Utility		175	75	100	270	550	0.9	0.33		
SPF/SPF-S NSPR/SCOTP(I)GER/SW		SPRUCE-PINE-FIR, SPRUCE-PINE-FIR (SOUTH) from NORTH AMERICA, NORWAY SPRUCE, SCOTS PINE from GERMANY[5] & SWEDEN									TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A & 4F: SPRUCE-PINE-FIR; SPRUCE-PINE-FIR (SOUTH); NORWAY SPRUCE from GERMANY[5] & SWEDEN; SCOTS PINE from GERMANY[5] & SWEDEN	Select Structural	2" & wider	1200	550	120	285	1200	1.3	0.47	0.36	
	No. 1		800	375	120	285	1000	1.2	0.44		
	No. 2		575	250	120	285	825	1.1	0.40		
	No. 3		325	150	120	285	475	1	0.37		
	Stud	2" & wider	450	200	120	285	525	1	0.37		
	Construction	2" - 4" wide	650	300	120	285	1050	1	0.37		
	Standard		375	175	120	285	850	0.9	0.33		
	Utility		175	75	120	285	550	0.9	0.33		

Table 4G **Reference Design Values for Multi-Species and Country Grademarked Visually Graded Dimension Lumber (2" - 4" thick)[1,2,3]**

(Tabulated design values are for normal load duration and dry service conditions. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4G ADJUSTMENT FACTORS

Multi-Species and Country Label	Commercial Grade	Size Classification	Design values in pounds per square inch (psi)							Specific Gravity[4]	Grade Stamping Agency
			Bending	Tension parallel to grain	Shear parallel to grain	Compression perpendicular to grain	Compression parallel to grain	Modulus of Elasticity			
			F_b	F_t	F_v	$F_{c\perp}$	F_c	E	E_{min}	G	
SYP/WEST WOODS/NORTH SPECIES		SOUTHERN PINE, WESTERN WOODS, & NORTHERN SPECIES from NORTH AMERICA									TP
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A & 4B: SOUTHERN PINE; WESTERN WOODS; NORTHERN SPECIES	Select Structural	2" & wider	900	400	110	335	1050	1.1	0.40	0.35	
	No. 1		625	275	110	335	850	1.1	0.40		
	No. 2		625	275	110	335	850	1	0.37		
	No. 3		350	150	110	335	500	0.9	0.33		
	Stud	2" & wider	475	225	110	335	550	0.9	0.33		
	Construction	2" - 4" wide	700	325	110	335	1050	1	0.37		
	Standard		400	175	110	335	875	0.9	0.33		
	Utility		175	75	110	335	575	0.8	0.29		
WH-S Fir		WESTERN HEMLOCK & PACIFIC SILVER FIR from U.S.									PLIB
Tabulated design values are the minimum values for the following species and commercial grades in Table 4A: HEM-FIR	Select Structural	2" & wider	1400	925	150	405	1500	1.6	0.58	0.43	
	No. 1 & Btr		1100	725	150	405	1350	1.5	0.55		
	No. 1		975	625	150	405	1350	1.5	0.55		
	No. 2		850	525	150	405	1300	1.3	0.47		
	No. 3		500	300	150	405	725	1.2	0.44		
	Stud	2" & wider	675	400	150	405	800	1.2	0.44		
	Construction	2" - 4" wide	975	600	150	405	1550	1.3	0.47		
	Standard		550	325	150	405	1300	1.2	0.44		
	Utility		250	150	150	405	850	1.1	0.40		

Table 4G Footnotes

1. Reference 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 (see Table 1A) 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 the 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. The ALSC Board of Review permits the use of combination stamps in certain instances, provided that the associated Reference Design Value elements for such combination-stamped lumber be assigned based on the lowest value among the combined species/regions. For the Species and/or Countries combinations listed, each of the individual Reference Design Value (RDV) elements from Tables 4A, 4B, and 4F (i.e. - F_b, F_t, F_v, $F_{c\perp}$, F_c, E, E_{min}, and G) have been compared on its own merit for each species/regions listed on the stamp; the lowest value found and tabulated is the applicable value to be used for each Species and/or Countries, Region, and Agency category in the table. RDVs are only available for countries/regions that have completed ALSC Board of Review approved sampling and testing plans. Not all species group/grade/size combinations listed may be available at any given time.

3. The three entries on the black bar show in order: 1) The label stamped on the lumber; 2) The intended mix of species and countries; and 3) Agency stamping the lumber.

4. Specific gravity, G, based on weight and volume when oven-dry.

5. SCOTS PINE from GERMANY does not include states of Baden-Wurttemberg and Saarland.

AMERICAN WOOD COUNCIL

April 2019

Errata

to the 1991 to 2018 Editions of the *Design Values for Wood Construction*

(a supplement to the *National Design Specification® (NDS®) for Wood Construction*)

Modify the following design value in Table 4D for No. 1 Eastern Hemlock Posts & Timbers:

Table 4D Reference Design Values for Visually Graded Timbers (5" x 5" and larger)[1,3]

(Tabulated design values are for normal load duration and dry service conditions, unless specified otherwise. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4D ADJUSTMENT FACTORS

Species and commercial grade	Size classification	Design values in pounds per square inch (psi)							Specific Gravity[4]	Grading Rules Agency
		Bending	Tension parallel to grain	Shear parallel to grain	Compression perpendicular to grain	Compression parallel to grain	Modulus of Elasticity			
		F_b	F_t	F_v	$F_{c\perp}$	F_c	E	E_{min}	G	
EASTERN HEMLOCK										
Select Structural	Posts and Timbers	1,250	850	155	550	1,000	1,200,000	440,000	0.41	NELMA
No. 1		1,050	700	155	~~500~~ 550	875	1,200,000	440,000		
No.2		600	400	155	550	400	900,000	330,000		

AMERICAN WOOD COUNCIL

November 2013

ADDENDUM

to the 2012 *Design Values for Wood Construction*

(a supplement to the *National Design Specification® (NDS®) for Wood Construction*)

Table 4C Reference Design Values for Mechanically Graded Dimension Lumber (2"-4" thick)[1,2,3] (Tabulated design values are for normal load duration and dry service conditions, unless specified otherwise. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4C ADJUSTMENT FACTORS

Commercial grade	Size classification	Design values in pounds per square inch (psi)					Grading Rules Agency
		Bending	Tension parallel to grain	Compression parallel to grain	Modulus of Elasticity		
		F_b	F_t	F_c	E	E_{min}	
MACHINE STRESS RATED (MSR) LUMBER							
750f-1.4E	2" and less in thickness 2" and wider	750	425	925	1,400,000	710,000	SPIB
850f-1.4E		850	475	975	1,400,000	710,000	SPIB
900f-1.0E		900	350	1,050	1,000,000	510,000	WCLIB, WWPA, NELMA, NSLB
975f-1.6E		975	550	1,450	1,600,000	810,000	SPIB
1050f-1.2E		1,050	450	1,225	1,200,000	610,000	SPIB
1050f-1.6E		1,050	575	1,500	1,600,000	810,000	SPIB
1200f-1.2E		1,200	600	1,400	1,200,000	610,000	NLGA, WCLIB, WWPA, NELMA, NSLB
1200f-1.3E		1,200	600	1,400	1,300,000	660,000	SPIB
1200f-1.6E		1,200	650	1,550	1,600,000	810,000	SPIB
1250f-1.4E		1,250	800	1,475	1,400,000	710,000	WCLIB, ~~WWPA~~
1250f-1.6E		1,250	725	1,600	1,600,000	810,000	SPIB
1350f-1.3E		1,350	750	1,600	1,300,000	660,000	NLGA, WCLIB, WWPA, NELMA, NSLB
1350f-1.4E		1,350	750	1,600	1,400,000	710,000	SPIB
1400f-1.2E		1,400	800	1,600	1,200,000	610,000	NLGA, ~~WWPA~~
1450f-1.3E		1,450	800	1,625	1,300,000	660,000	NLGA, WCLIB, WWPA, NELMA, NSLB
1450f-1.3E		1,450	825	1,600	1,300,000	660,000	SPIB
1450f-1.5E		1,450	875	1,625	1,500,000	760,000	WCLIB, ~~WWPA~~
1500f-1.4E		1,500	900	1,650	1,400,000	710,000	NLGA, WCLIB, WWPA, NELMA, NSLB
1500f-1.5E		1,500	900	1,650	1,500,000	760,000	SPIB
1500f-1.6E		1,500	900	1,650	1,600,000	810,000	SPIB
1500f-1.7E		1,500	900	1,650	1,700,000	860,000	SPIB
1600f-1.4E		1,600	950	1,675	1,400,000	710,000	NLGA, ~~WWPA~~
1650f-1.3E		1,650	1,020	1,700	1,300,000	660,000	NLGA, ~~WWPA~~
1650f-1.5E		1,650	1,020	1,700	1,500,000	760,000	NLGA, SPIB, WCLIB, WWPA, NELMA, NSLB
~~1650f-1.6E-1075f~~		~~1,650~~	~~1,075~~	~~1,700~~	~~1,600,000~~	~~810,000~~	~~WCLIB, WWPA~~
1650f-1.6E		1,650	1,175	1,700	1,600,000	810,000	WCLIB, ~~WWPA~~
1650f-1.7E		1,650	1,020	1,750	1,700,000	860,000	SPIB
~~1650f-1.8E~~		~~1,650~~	~~1,020~~	~~1,750~~	~~1,800,000~~	~~910,000~~	~~WCLIB, WWPA~~
1700f-1.6E		1,700	1,175	1,725	1,600,000	810,000	WCLIB, ~~WWPA~~
~~1750f-2.0E~~		~~1,750~~	~~1,125~~	~~1,725~~	~~2,000,000~~	~~1,020,000~~	~~WCLIB, WWPA~~

(Continued on following page)

Table 4C (Cont.) **Reference Design Values for Mechanically Graded Dimension Lumber (2"-4" thick)[1,2,3]** (Tabulated design values are for normal load duration and dry service conditions, unless specified otherwise. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4C ADJUSTMENT FACTORS

Commercial grade	Size classification	Design values in pounds per square inch (psi)					Grading Rules Agency
		Bending	Tension parallel to grain	Compression parallel to grain	Modulus of Elasticity		
		F_b	F_t	F_c	E	E_{min}	
MACHINE STRESS RATED (MSR) LUMBER (Cont.)							
1800f-1.5E		1,800	1,300	1,750	1,500,000	760,000	NLGA~~, WWPA~~
1800f-1.6E		1,800	1,175	1,750	1,600,000	810,000	NLGA, SPIB, WCLIB, WWPA, NELMA, NSLB
1800f-1.8E		1,800	1,200	1,750	1,800,000	910,000	WCLIB~~, WWPA~~
~~1800f-2.0E~~		~~1,800~~	~~1,175~~	~~1,750~~	~~2,000,000~~	~~1,020,000~~	~~WCLIB~~
~~1850f-1.7E~~		~~1,850~~	~~1,175~~	~~1,850~~	~~1,700,000~~	~~860,000~~	~~SPIB~~
1950f-1.5E		1,950	1,375	1,800	1,500,000	760,000	SPIB~~, WWPA~~
1950f-1.7E		1,950	1,375	1,800	1,700,000	860,000	NLGA, SPIB, WCLIB, WWPA, NELMA, NSLB
2000f-1.6E		2,000	1,300	1,825	1,600,000	810,000	NLGA~~, WWPA~~
2100f-1.8E		2,100	1,575	1,875	1,800,000	910,000	NLGA, SPIB, WCLIB, WWPA, NELMA, NSLB
2250f-1.7E	2" and less	2,250	1,750	1,925	1,700,000	860,000	NLGA~~, WWPA~~
2250f-1.8E	in thickness	2,250	1,750	1,925	1,800,000	910,000	NLGA, WCLIB~~, WWPA~~
2250f-1.9E		2,250	1,750	1,925	1,900,000	970,000	NLGA, SPIB, WCLIB, WWPA, NELMA, NSLB
~~2250f-2.0E-1600f~~	2" and wider	~~2,250~~	~~1,600~~	~~1,925~~	~~2,000,000~~	~~1,020,000~~	~~WCLIB, WWPA~~
~~2250f-2.0E~~		~~2,250~~	~~1,750~~	~~1,925~~	~~2,000,000~~	~~1,020,000~~	~~WCLIB, WWPA~~
2400f-1.8E		2,400	1,925	1,975	1,800,000	910,000	NLGA~~, WWPA~~
2400f-2.0E		2,400	1,925	1,975	2,000,000	1,020,000	NLGA, SPIB, WCLIB, WWPA, NELMA, NSLB
2500f-2.2E		2,500	1,750	2,000	2,200,000	1,120,000	WCLIB~~, WWPA~~
~~2500f-2.2E-1925f~~		~~2,500~~	~~1,925~~	~~2,000~~	~~2,200,000~~	~~1,120,000~~	~~WCLIB, WWPA~~
~~2550f-1.8E~~		~~2,550~~	~~1,400~~	~~2,000~~	~~1,800,000~~	~~910,000~~	~~SPIB~~
2550f-2.1E		2,550	2,050	2,025	2,100,000	1,070,000	NLGA, SPIB, WCLIB, WWPA, NELMA, NSLB
2700f-2.0E		2,700	1,800	2,100	2,000,000	1,020,000	WCLIB~~, WWPA~~
2700f-2.2E		2,700	2,150	2,100	2,200,000	1,120,000	NLGA, SPIB, WCLIB, WWPA, NELMA, NSLB
~~2850f-1.8E~~		~~2,850~~	~~1,600~~	~~2,100~~	~~1,800,000~~	~~910,000~~	~~SPIB~~
2850f-2.3E		2,850	2,300	2,150	2,300,000	1,170,000	NLGA, SPIB, WCLIB, WWPA, NELMA, NSLB
3000f-2.4E		3,000	2,400	2,200	2,400,000	1,220,000	NLGA, SPIB

(Continued on following page)

Table 4C (Cont.) **Reference Design Values for Mechanically Graded Dimension Lumber (2"-4" thick)[1,2,3]** (Tabulated design values are for normal load duration and dry service conditions, unless specified otherwise. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4C ADJUSTMENT FACTORS

Commercial grade	Size classification	Design values in pounds per square inch (psi)					Grading Rules Agency
		Bending	Tension parallel to grain	Compression parallel to grain	Modulus of Elasticity		
		F_b	F_t	F_c	E	E_{min}	
MACHINE EVALUATED LUMBER (MEL)							
M-5		900	500	1,050	1,100,000	510,000	SPIB
M-6		1,100	600	1,300	1,000,000	470,000	SPIB
M-7		1,200	650	1,400	1,100,000	510,000	SPIB
M-8		1,300	700	1,500	1,300,000	610,000	SPIB
M-9		1,400	800	1,600	1,400,000	650,000	SPIB
M-10		1,400	800	1,600	1,200,000	560,000	NLGA, SPIB
M-11		1,550	850	1,675	1,500,000	700,000	NLGA, SPIB
M-12		1,600	850	1,675	1,600,000	750,000	NLGA, SPIB
M-13		1,600	950	1,675	1,400,000	650,000	NLGA, SPIB
M-14		1,800	1,000	1,750	1,700,000	790,000	NLGA, SPIB
M-15		1,800	1,100	1,750	1,500,000	700,000	NLGA, SPIB
M-16		1,800	1,300	1,750	1,500,000	700,000	SPIB
M-17[4]		1,950	1,300	2,050	1,700,000	790,000	SPIB
M-18		2,000	1,200	1,825	1,800,000	840,000	NLGA, SPIB
M-19		2,000	1,300	1,825	1,600,000	750,000	NLGA, SPIB
M-20[4]		2,000	1,600	2,100	1,900,000	890,000	SPIB
M-21	2" and less	2,300	1,400	1,950	1,900,000	890,000	NLGA, SPIB
M-22	in thickness	2,350	1,500	1,950	1,700,000	790,000	NLGA, SPIB
M-23		2,400	1,900	1,975	1,800,000	840,000	NLGA, SPIB
M-24	2" and wider	2,700	1,800	2,100	1,900,000	890,000	NLGA, SPIB
M-25		2,750	2,000	2,100	2,200,000	1,030,000	NLGA, SPIB
M-26		2,800	1,800	2,150	2,000,000	930,000	NLGA, SPIB
M-27[4]		3,000	2,000	2,400	2,100,000	980,000	SPIB
M-28		2,200	1,600	1,900	1,700,000	790,000	SPIB
M-29		1,550	850	1,650	1,700,000	790,000	SPIB
M-30		2,050	1,050	1,850	1,700,000	790,000	SPIB
M-31		2,850	1,600	2,150	1,900,000	890,000	SPIB
M-32		750	425	925	1,400,000	650,000	SPIB
M-33		850	475	975	1,400,000	650,000	SPIB
M-34		975	550	1,450	1,600,000	750,000	SPIB
M-35		1,050	575	1,500	1,600,000	750,000	SPIB
M-36		1,200	650	1,550	1,600,000	750,000	SPIB
M-37		1,250	725	1,600	1,600,000	750,000	SPIB
M-38		1,500	900	1,650	1,600,000	750,000	SPIB
M-39		1,650	1,020	1,750	1,700,000	790,000	SPIB
M-40		1,850	1,175	1,850	1,700,000	790,000	SPIB

Table 4C Footnotes

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 (see Table 1A) 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. **SPECIFIC GRAVITY, G, SHEAR PARALLEL TO GRAIN, F_v, AND COMPRESSION PERPENDICULAR TO GRAIN, $F_{c\perp}$.** Values for specific gravity, G, shear parallel to grain, F_v, and compression perpendicular to grain, $F_{c\perp}$, are provided below for MSR and MEL lumber. For species or species groups not shown below, the G, F_v and $F_{c\perp}$ values for visually graded lumber may be used. Higher G values may be claimed when (a) specifically assigned by the rules writing agency or (b) when qualified by test, quality controlled for G and provided for on the grade stamp. When a different G value is provided on the grade stamp, higher F_v and $F_{c\perp}$ design values may be calculated in accordance with the grading rule requirements.

Species	Modulus of Elasticity E (x10^6) psi	Specific Gravity G	Design values in pounds per square inch (psi)		Grading Rules Agency
			Shear parallel to grain F_v	Compression perpendicular to grain $F_{c\perp}$	
Douglas Fir-Larch	1.0 and higher	0.50	180	625	~~WCLIB,~~ WWPA
	2.0	0.51	180	670	~~WCLIB,~~ WWPA
	2.1	0.52	180	690	
	2.2	0.53	180	715	
	2.3	0.54	185	735	
	2.4	0.55	185	760	
Douglas Fir-Larch	1.0 and higher	0.50	170	625	WCLIB
	2.0	0.51	170	670	WCLIB
	2.1	0.52	170	690	
	2.2	0.53	170	715	
	2.3	0.54	170	735	
	2.4	0.55	170	760	
Douglas Fir-Larch (N)	1.2 to 1.9	0.49	180	625	NLGA
	2.0 to 2.2	0.53	180	715	
	2.3 & higher	0.57	~~180~~ 190	715	NLGA
Douglas Fir-South	1.0 and higher	0.46	180	520	WWPA
Englemann Spruce-Lodgepole Pine	1.0 and higher	0.38	135	335	WWPA
	1.5 and higher	0.46	160	555	WWPA
Hem-Fir	1.0 and higher	0.43	140	405	WCLIB
	1.0 and higher	0.43	150	405	~~WCLIB,~~ WWPA
	1.6	0.44	155	510	WCLIB, WWPA
	1.7	0.45	160	535	
	1.8	0.46	160	555	
	1.9	0.47	165	580	
	2.0	0.48	170	600	
	2.1	0.49	170	625	
	2.2	0.50	175	645	
	2.3	0.51	~~190~~ 175	670	
	2.4	0.52	~~190~~ 180	690	
Hem-Fir (N)	1.0 and higher	0.46	145	405	NLGA
Southern Pine	1.0 and higher	0.55	175	565	SPIB
	1.8*	0.57*	190*	805*	SPIB
	~~1.8~~ 1.9 and higher	0.57	190	805	SPIB
Spruce-Pine-Fir	1.2 and higher	0.42	135	425	NLGA
	1.8 to 1.9	0.46	160	525	NLGA
	2.0 and higher	0.50	170	615	NLGA
Spruce-Pine-Fir (S)	1.0 and higher	0.36	135	335	NELMA, NSLB, WCLIB, WWPA
	1.2 to 1.9	0.42	150	465	NELMA, NSLB
	1.2 to 1.7	0.42	150	465	WWPA
	1.8 to 1.9	0.46	160	555	
	2.0 and higher	0.50	175	645	NELMA, NSLB, WWPA
Western Cedars	1.0 and higher	0.36	155	425	WCLIB, WWPA
Western Woods	1.0 and higher	0.36	135	335	WCLIB, WWPA

* 1.8E southern pine marked with a specific gravity of 0.55 on the grade stamp has a shear parallel to grain, F_v, of 175 psi and compression perpendicular to grain, $F_{c\perp}$, of 565 psi.

3. **MODULUS OF ELASTICITY, E, AND TENSION PARALLEL TO GRAIN, F_t.** For any given bending design value, F_b, the modulus of elasticity, E, and tension parallel to grain, F_t, design value may vary depending upon species, timber source or other variables. The "E" and "F_t" values included in the "F_b-E" grade designations in Table 4C are those usually associated with each "F_b" level. Grade stamps may show higher or lower values if machine rating indicates the assignment is appropriate. Where the "E" or "F_t" values shown on a grade stamp differ from Table 4C values associated with the "F_b" on the grade stamp, the values on the stamp shall be used in design, and the "F_c" value associated with the "F_b" value in Table 4C shall be used.

4. **COMPRESSION PARALLEL TO GRAIN, F_c.** This grade requires "F_c" qualification and quality control.

AMERICAN WOOD COUNCIL

September 2013

ERRATA
to the 2012 Edition of
the National Design Specification® (NDS®) Supplement: Design Values for Wood Construction
(web versions dated 11-11 and 10-12, print version 10-12)

Pages Revision

14-15 Replace the "Post and Timber" and "Beams & Stringers" portions of Table 1B with the following table (portions of Table 1B pertaining to "Boards" and "Dimension Lumber and Decking remain unchanged):

Table 1B Section Properties of Standard Dressed (S4S) Sawn Lumber[1]

Nominal Size b x d	Standard Dressed Size (S4S) b x d in. x in.	Area of Section A in.^{2}	X-X AXIS Section Modulus S_{xx} in.^{3}	X-X AXIS Moment of Inertia I_{xx} in.^{4}	Y-Y AXIS Section Modulus S_{yy} in.^{3}	Y-Y AXIS Moment of Inertia I_{yy} in.^{4}	Approximate weight in pounds per linear foot (lbs/ft) of piece when density of wood equals: 25 lbs/ft^3	30 lbs/ft^3	35 lbs/ft^3	40 lbs/ft^3	45 lbs/ft^3	50 lbs/ft^3
Timbers (5" x 5" and larger)[2]												
Post and Timber (see NDS 4.1.3.4 and NDS 4.1.5.3)												
5 x 5	4-1/2 x 4-1/2	20.25	15.19	34.17	15.19	34.17	3.516	4.219	4.922	5.625	6.328	7.031
6 x 6	5-1/2 x 5-1/2	30.25	27.73	76.26	27.73	76.26	5.252	6.302	7.352	8.403	9.453	10.50
6 x 8	5-1/2 x 7-1/2	41.25	51.56	193.4	37.81	104.0	7.161	8.594	10.03	11.46	12.89	14.32
8 x 8	7-1/2 x 7-1/2	56.25	70.31	263.7	70.31	263.7	9.766	11.72	13.67	15.63	17.58	19.53
8 x 10	7-1/2 x 9-1/2	71.25	112.8	535.9	89.06	334.0	12.37	14.84	17.32	19.79	22.27	24.74
10 x 10	9-1/2 x 9-1/2	90.25	142.9	678.8	142.9	678.8	15.67	18.80	21.94	25.07	28.20	31.34
10 x 12	9-1/2 x 11-1/2	109.3	209.4	1204	173.0	821.7	18.97	22.76	26.55	30.35	34.14	37.93
12 x 12	11-1/2 x 11-1/2	132.3	253.5	1458	253.5	1458	22.96	27.55	32.14	36.74	41.33	45.92
12 x 14	11-1/2 x 13-1/2	155.3	349.3	2358	297.6	1711	26.95	32.34	37.73	43.13	48.52	53.91
14 x 14	13-1/2 x 13-1/2	182.3	410.1	2768	410.1	2768	31.64	37.97	44.30	50.63	56.95	63.28
14 x 16	13-1/2 x 15-1/2	209.3	540.6	4189	470.8	3178	36.33	43.59	50.86	58.13	65.39	72.66
16 x 16	15-1/2 x 15-1/2	240.3	620.6	4810	620.6	4810	41.71	50.05	58.39	66.74	75.08	83.42
16 x 18	15-1/2 x 17-1/2	271.3	791.1	6923	700.7	5431	47.09	56.51	65.93	75.35	84.77	94.18
18 x 18	17-1/2 x 17-1/2	306.3	893.2	7816	893.2	7816	53.17	63.80	74.44	85.07	95.70	106.3
18 x 20	17-1/2 x 19-1/2	341.3	1109	10813	995.3	8709	59.24	71.09	82.94	94.79	106.6	118.5
20 x 20	19-1/2 x 19-1/2	380.3	1236	12049	1236	12049	66.02	79.22	92.4	105.6	118.8	132.0
20 x 22	19-1/2 x 21-1/2	419.3	1502	16150	1363	13285	72.79	87.34	101.9	116.5	131.0	145.6
22 x 22	21-1/2 x 21-1/2	462.3	1656	17806	1656	17806	80.25	96.30	112.4	128.4	144.5	160.5
22 x 24	21-1/2 x 23-1/2	505.3	1979	23252	1810	19463	87.72	105.3	122.8	140.3	157.9	175.4
24 x 24	23-1/2 x 23-1/2	552.3	2163	25415	2163	25415	95.88	115.1	134.2	153.4	172.6	191.8

Beams & Stringers (see NDS 4.1.3.3 and NDS 4.1.5.3)												
6 x 10	5-1/2 x 9-1/2	52.25	82.73	393.0	47.90	131.7	9.071	10.89	12.70	14.51	16.33	18.14
6 x 12	5-1/2 x 11-1/2	63.25	121.2	697.1	57.98	159.4	10.98	13.18	15.37	17.57	19.77	21.96
6 x 14	5-1/2 x 13-1/2	74.25	167.1	1128	68.06	187.2	12.89	15.47	18.05	20.63	23.20	25.78
6 x 16	5-1/2 x 15-1/2	85.25	220.2	1707	78.15	214.9	14.80	17.76	20.72	23.68	26.64	29.60
6 x 18	5-1/2 x 17-1/2	96.25	280.7	2456	88.23	242.6	16.71	20.05	23.39	26.74	30.08	33.42
6 x 20	5-1/2 x 19-1/2	107.3	348.6	3398	98.31	270.4	18.62	22.34	26.07	29.79	33.52	37.24
6 x 22	5-1/2 x 21-1/2	118.3	423.7	4555	108.4	298.1	20.53	24.64	28.74	32.85	36.95	41.06
6 x 24	5-1/2 x 23-1/2	129.3	506.2	5948	118.5	325.8	22.44	26.93	31.41	35.90	40.39	44.88
8 x 12	7-1/2 x 11-1/2	86.25	165.3	950.5	107.8	404.3	14.97	17.97	20.96	23.96	26.95	29.95
8 x 14	7-1/2 x 13-1/2	101.3	227.8	1538	126.6	474.6	17.58	21.09	24.61	28.13	31.64	35.16
8 x 16	7-1/2 x 15-1/2	116.3	300.3	2327	145.3	544.9	20.18	24.22	28.26	32.29	36.33	40.36
8 x 18	7-1/2 x 17-1/2	131.3	382.8	3350	164.1	615.2	22.79	27.34	31.90	36.46	41.02	45.57
8 x 20	7-1/2 x 19-1/2	146.3	475.3	4634	182.8	685.5	25.39	30.47	35.55	40.63	45.70	50.78
8 x 22	7-1/2 x 21-1/2	161.3	577.8	6211	201.6	755.9	27.99	33.59	39.19	44.79	50.39	55.99
8 x 24	7-1/2 x 23-1/2	176.3	690.3	8111	220.3	826.2	30.60	36.72	42.84	48.96	55.08	61.20
10 x 14	9-1/2 x 13-1/2	128.3	288.6	1948	203.1	964.5	22.27	26.72	31.17	35.63	40.08	44.53
10 x 16	9-1/2 x 15-1/2	147.3	380.4	2948	233.1	1107	25.56	30.68	35.79	40.90	46.02	51.13
10 x 18	9-1/2 x 17-1/2	166.3	484.9	4243	263.2	1250	28.86	34.64	40.41	46.18	51.95	57.73
10 x 20	9-1/2 x 19-1/2	185.3	602.1	5870	293.3	1393	32.16	38.59	45.03	51.46	57.89	64.32
10 x 22	9-1/2 x 21-1/2	204.3	731.9	7868	323.4	1536	35.46	42.55	49.64	56.74	63.83	70.92
10 x 24	9-1/2 x 23-1/2	223.3	874.4	10274	353.5	1679	38.76	46.51	54.26	62.01	69.77	77.52
12 x 16	11-1/2 x 15-1/2	178.3	460.5	3569	341.6	1964	30.95	37.14	43.32	49.51	55.70	61.89
12 x 18	11-1/2 x 17-1/2	201.3	587.0	5136	385.7	2218	34.94	41.93	48.91	55.90	62.89	69.88
12 x 20	11-1/2 x 19-1/2	224.3	728.8	7106	429.8	2471	38.93	46.72	54.51	62.29	70.08	77.86
12 x 22	11-1/2 x 21-1/2	247.3	886.0	9524	473.9	2725	42.93	51.51	60.10	68.68	77.27	85.85
12 x 24	11-1/2 x 23-1/2	270.3	1058	12437	518.0	2978	46.92	56.30	65.69	75.07	84.45	93.84
14 x 18	13-1/2 x 17-1/2	236.3	689.1	6029	531.6	3588	41.02	49.22	57.42	65.63	73.83	82.03
14 x 20	13-1/2 x 19-1/2	263.3	855.6	8342	592.3	3998	45.70	54.84	63.98	73.13	82.27	91.41
14 x 22	13-1/2 x 21-1/2	290.3	1040	11181	653.1	4408	50.39	60.47	70.55	80.63	90.70	100.8
14 x 24	13-1/2 x 23-1/2	317.3	1243	14600	713.8	4818	55.08	66.09	77.11	88.13	99.14	110.2
16 x 20	15-1/2 x 19-1/2	302.3	982.3	9578	780.8	6051	52.47	62.97	73.46	83.96	94.45	104.9
16 x 22	15-1/2 x 21-1/2	333.3	1194	12837	860.9	6672	57.86	69.43	81.00	92.57	104.1	115.7
16 x 24	15-1/2 x 23-1/2	364.3	1427	16763	941.0	7293	63.24	75.89	88.53	101.2	113.8	126.5
18 x 22	17-1/2 x 21-1/2	376.3	1348	14493	1097	9602	65.32	78.39	91.45	104.5	117.6	130.6
18 x 24	17-1/2 x 23-1/2	411.3	1611	18926	1199	10495	71.40	85.68	99.96	114.2	128.5	142.8
20 x 24	19-1/2 x 23-1/2	458.3	1795	21089	1489	14521	79.56	95.47	111.4	127.3	143.2	159.1

Footnotes 1 and 2 remain unchanged.

Page **Revision**

40 Revise the sentences for Table 4C Adjustment Factors under Flat Use Factor as follows:

"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 values, F_b, shall ~~also~~ be multiplied by the following flat use factors:"

AMERICAN WOOD COUNCIL

August 2013

ADDENDUM

to the 2012 and previous versions of the
Design Values for Wood Construction
(a supplement to the *National Design Specification® (NDS®) for Wood Construction*)

Table 1C Section Properties of *Western Species* Structural Glued Laminated Timber

Depth	Area	X-X Axis			Y-Y Axis	
d (in.)	A (in.^{2})	I_x (in.^{4})	S_x (in.^{3})	r_x (in.)	I_y (in.^{4})	S_y (in.^{3})
3-1/2 in. Width					**(r_y = 1.010 in.)**	
6	21.00	63.00	21.00	1.732	21.44	12.25
7-1/2	26.25	123.0	32.81	2.165	26.80	15.31
9	31.50	212.6	47.25	2.598	32.16	18.38
9-1/4	32.38	230.8	49.91	2.670	33.05	18.89
9-1/2	33.25	250.1	52.65	2.742	33.94	19.40
10-1/2	36.75	337.6	64.31	3.031	37.52	21.44
11-1/4	39.38	415.3	73.83	3.248	40.20	22.97
11-7/8	41.56	488.4	82.26	3.428	42.43	24.24
12	42.00	504.0	84.00	3.464	42.88	24.50
13-1/2	47.25	717.6	106.3	3.897	48.23	27.56
14	49.00	800.3	114.3	4.041	50.02	28.58
15	52.50	984.4	131.3	4.330	53.59	30.63
16	56.00	1195	149.3	4.619	57.17	32.67
16-1/2	57.75	1310	158.8	4.763	58.95	33.69
18	63.00	1701	189.0	5.196	64.31	36.75
19-1/2	68.25	2163	221.8	5.629	69.67	39.81
20	70.00	2333	233.3	5.774	71.46	40.83
21	73.50	2701	257.3	6.062	75.03	42.88
22	77.00	3106	282.3	6.351	78.60	44.92
22-1/2	78.75	3322	295.3	6.495	80.39	45.94
24	84.00	4032	336.0	6.928	85.75	49.00

(Continued on following page)

Table 1C Section Properties of *Western Species* Structural Glued Laminated Timber (Cont.)

Depth	Area	X-X Axis			Y-Y Axis	
d (in.)	A (in.^{2})	I_x (in.^{4})	S_x (in.^{3})	r_x (in.)	I_y (in.^{4})	S_y (in.^{3})
5-1/2 in. Width					**(r_y = 1.588 in.)**	
6	33.00	99.00	33.00	1.732	83.19	30.25
7-1/2	41.25	193.4	51.56	2.165	104.0	37.81
9	49.50	334.1	74.25	2.598	124.8	45.38
9-1/4	50.88	362.7	78.43	2.670	128.2	46.64
9-1/2	52.25	393.0	82.73	2.742	131.7	47.90
10-1/2	57.75	530.6	101.1	3.031	145.6	52.94
11-1/4	61.88	652.6	116.0	3.248	156.0	56.72
11-7/8	65.31	767.5	129.3	3.428	164.6	59.87
12	66.00	792.0	132.0	3.464	166.4	60.50
13-1/2	74.25	1128	167.1	3.897	187.2	68.06
14	77.00	1258	179.7	4.041	194.1	70.58
15	82.50	1547	206.3	4.330	208.0	75.63
16	88.00	1877	234.7	4.619	221.8	80.67
16-1/2	90.75	2059	249.6	4.763	228.8	83.19
18	99.00	2673	297.0	5.196	249.6	90.75
19-1/2	107.3	3398	348.6	5.629	270.4	98.31
20	110.0	3667	366.7	5.774	277.3	100.8
21	115.5	4245	404.3	6.062	291.2	105.9
22	121.0	4880	443.7	6.351	305.0	110.9
22-1/2	123.8	5221	464.1	6.495	312.0	113.4
24	132.0	6336	528.0	6.928	332.8	121.0
25-1/2	140.3	7600	596.1	7.361	353.5	128.6
27	148.5	9021	668.3	7.794	374.3	136.1
28-1/2	156.8	10610	744.6	8.227	395.1	143.7
30	165.0	12380	825.0	8.660	415.9	151.3
31-1/2	173.3	14330	909.6	9.093	436.7	158.8
33	181.5	16470	998.3	9.526	457.5	166.4
34-1/2	189.8	18820	1091	9.959	478.3	173.9
36	198.0	21380	1188	10.39	499.1	181.5

(Portions of Table 1C not shown remain unchanged)

Table 1D Section Properties of *Southern Pine* Structural Glued Laminated Timber

Depth	Area	X-X Axis			Y-Y Axis	
d (in.)	A (in.^{2})	I_x (in.^{4})	S_x (in.^{3})	r_x (in.)	I_y (in.^{4})	S_y (in.^{3})
3-1/2 in. Width					**(r_y = 1.010 in.)**	
5-1/2	19.25	48.53	17.65	1.588	19.65	11.23
6-7/8	24.06	94.78	27.57	1.985	24.56	14.04
8-1/4	28.88	163.8	39.70	2.382	29.48	16.84
9-1/4	32.38	230.8	49.91	2.670	33.05	18.89
9-1/2	33.25	250.1	52.65	2.742	33.94	19.40
9-5/8	33.69	260.1	54.04	2.778	34.39	19.65
11	38.50	388.2	70.58	3.175	39.30	22.46
11-1/4	39.38	415.3	73.83	3.248	40.20	22.97
11-7/8	41.56	488.4	82.26	3.428	42.43	24.24
12-3/8	43.31	552.7	89.33	3.572	44.21	25.27
13-3/4	48.13	758.2	110.3	3.969	49.13	28.07
14	49.00	800.3	114.3	4.041	50.02	28.58
15-1/8	52.94	1009	133.4	4.366	54.04	30.88
16	56.00	1195	149.3	4.619	57.17	32.67
16-1/2	57.75	1310	158.8	4.763	58.95	33.69
17-7/8	62.56	1666	186.4	5.160	63.87	36.49
18	63.00	1701	189.0	5.196	64.31	36.75
19-1/4	67.38	2081	216.2	5.557	68.78	39.30
20	70.00	2333	233.3	5.774	71.46	40.83
20-5/8	72.19	2559	248.1	5.954	73.69	42.11
22	77.00	3106	282.3	6.351	78.60	44.92
23-3/8	81.81	3725	318.7	6.748	83.52	47.72
24	84.00	4032	336.0	6.928	85.75	49.00

(Continued on following page)

Table 1D Section Properties of *Southern Pine* Structural Glued Laminated Timber (Cont.)

Depth	Area	X-X Axis			Y-Y Axis	
d (in.)	A (in.^{2})	I_x (in.^{4})	S_x (in.^{3})	r_x (in.)	I_y (in.^{4})	S_y (in.^{3})
		5-1/2 in. Width			**(r_y = 1.588 in.)**	
6-7/8	37.81	148.9	43.33	1.985	95.32	34.66
8-1/4	45.38	257.4	62.39	2.382	114.4	41.59
9-1/4	50.88	362.7	78.43	2.670	128.2	46.64
9-1/2	52.25	393.0	82.73	2.742	131.7	47.90
9-5/8	52.94	408.7	84.92	2.778	133.4	48.53
11	60.50	610.0	110.9	3.175	152.5	55.46
11-1/4	61.88	652.6	116.0	3.248	156.0	56.72
11-7/8	65.31	767.5	129.3	3.428	164.6	59.87
12-3/8	68.06	868.6	140.4	3.572	171.6	62.39
13-3/4	75.63	1191	173.3	3.969	190.6	69.32
14	77.00	1258	179.7	4.041	194.1	70.58
15-1/8	83.19	1586	209.7	4.366	209.7	76.26
16	88.00	1877	234.7	4.619	221.8	80.67
16-1/2	90.75	2059	249.6	4.763	228.8	83.19
17-7/8	98.31	2618	292.9	5.160	247.8	90.12
18	99.00	2673	297.0	5.196	249.6	90.75
19-1/4	105.9	3269	339.7	5.557	266.9	97.05
20	110.0	3667	366.7	5.774	277.3	100.8
20-5/8	113.4	4021	389.9	5.954	286.0	104.0
22	121.0	4880	443.7	6.351	305.0	110.9
23-3/8	128.6	5854	500.9	6.748	324.1	117.8
24	132.0	6336	528.0	6.928	332.8	121.0
24-3/4	136.1	6949	561.5	7.145	343.1	124.8
26-1/8	143.7	8172	625.6	7.542	362.2	131.7
27-1/2	151.3	9532	693.2	7.939	381.3	138.6
28-7/8	158.8	11030	764.3	8.335	400.3	145.6
30-1/4	166.4	12690	838.8	8.732	419.4	152.5
31-5/8	173.9	14500	916.8	9.129	438.5	159.4
33	181.5	16470	998.3	9.526	457.5	166.4
34-3/8	189.1	18620	1083	9.923	476.6	173.3
35-3/4	196.6	20940	1172	10.32	495.7	180.2

(Portions of Table 1D not shown remain unchanged)

AMERICAN WOOD COUNCIL

March 2013

ADDENDUM

to the 2012 and previous versions of the *Design Values for Wood Construction*

(a supplement to the *National Design Specification® (NDS®) for Wood Construction*)

Effective June 1, 2013, design values for all grades of visually-graded Southern Pine and Mixed Southern Pine lumber, 2"- 4" thick will change. The design values to use with the *2012 NDS*, *2005 NDS*, and the *2001 NDS* are shown below (values that will change on June 1, 2013 are shown as underlined). These values supersede values published in the AWC March 2012 Addendum.

Table 4B Reference Design Values for Visually Graded Southern Pine Dimension Lumber (2" - 4" thick)[1,2,3,4,5] (Tabulated design values are for normal load duration and dry service conditions, unless specified otherwise. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4B ADJUSTMENT FACTORS

Species and commercial grade	Size classification	Design values in pounds per square inch (psi)							Specific Gravity[6]	Grading Rules Agency
		Bending	Tension parallel to grain	Shear parallel to grain	Compression perpendicular to grain	Compression parallel to grain	Modulus of Elasticity			
		F_b	F_t	F_v	$F_{c\perp}$	F_c	E	E_{min}	G	
SOUTHERN PINE										
Dense Select Structural	2" - 4" wide	2,700	1,900	175	660	2,050	1,900,000	690,000	0.55	SPIB
Select Structural		2,350	1,650	175	565	1,900	1,800,000	660,000		
Non-Dense Select Structural		2,050	1,450	175	480	1,800	1,600,000	580,000		
No.1 Dense		1,650	1,100	175	660	1,750	1,800,000	660,000		
No.1		1,500	1,000	175	565	1,650	1,600,000	580,000		
No.1 Non-Dense		1,300	875	175	480	1,550	1,400,000	510,000		
No.2 Dense		1,200	750	175	660	1,500	1,600,000	580,000		
No.2		1,100	675	175	565	1,450	1,400,000	510,000		
No.2 Non-Dense		1,050	600	175	480	1,450	1,300,000	470,000		
No.3 and Stud		650	400	175	565	850	1,300,000	470,000		
Construction	4" wide	875	500	175	565	1,600	1,400,000	510,000	0.55	
Standard		475	275	175	565	1,300	1,200,000	440,000		
Utility		225	125	175	565	850	1,200,000	440,000		
Dense Select Structural	5" - 6" wide	2,400	1,650	175	660	1,900	1,900,000	690,000	0.55	SPIB
Select Structural		2,100	1,450	175	565	1,800	1,800,000	660,000		
Non-Dense Select Structural		1,850	1,300	175	480	1,700	1,600,000	580,000		
No.1 Dense		1,500	1,000	175	660	1,650	1,800,000	660,000		
No.1		1,350	875	175	565	1,550	1,600,000	580,000		
No.1 Non-Dense		1,200	775	175	480	1,450	1,400,000	510,000		
No.2 Dense		1,050	650	175	660	1,450	1,600,000	580,000		
No.2		1,000	600	175	565	1,400	1,400,000	510,000		
No.2 Non-Dense		950	525	175	480	1,350	1,300,000	470,000		
No.3 and Stud		575	350	175	565	800	1,300,000	470,000		
Dense Select Structural	8" wide	2,200	1,550	175	660	1,850	1,900,000	690,000	0.55	SPIB
Select Structural		1,950	1,350	175	565	1,700	1,800,000	660,000		
Non-Dense Select Structural		1,700	1,200	175	480	1,650	1,600,000	580,000		
No.1 Dense		1,350	900	175	660	1,600	1,800,000	660,000		
No.1		1,250	800	175	565	1,500	1,600,000	580,000		
No.1 Non-Dense		1,100	700	175	480	1,400	1,400,000	510,000		
No.2 Dense		975	600	175	660	1,400	1,600,000	580,000		
No.2		925	550	175	565	1,350	1,400,000	510,000		
No.2 Non-Dense		875	500	175	480	1,300	1,300,000	470,000		
No.3 and Stud		525	325	175	565	775	1,300,000	470,000		

Species and commercial grade	Size classification	Design values in pounds per square inch (psi)							Specific Gravity[6]	Grading Rules Agency
		Bending	Tension parallel to grain	Shear parallel to grain	Compression perpendicular to grain	Compression parallel to grain	Modulus of Elasticity			
		F_b	F_t	F_v	$F_{c\perp}$	F_c	E	E_{min}	G	
SOUTHERN PINE (continued)										
Dense Select Structural	10" wide	1,950	1,300	175	660	1,800	1,900,000	690,000	0.55	SPIB
Select Structural		1,700	1,150	175	565	1,650	1,800,000	660,000		
Non-Dense Select Structural		1,500	1,050	175	480	1,600	1,600,000	580,000		
No.1 Dense		1,200	800	175	660	1,550	1,800,000	660,000		
No.1		1,050	700	175	565	1,450	1,600,000	580,000		
No.1 Non-Dense		950	625	175	480	1,400	1,400,000	510,000		
No.2 Dense		850	525	175	660	1,350	1,600,000	580,000		
No.2		800	475	175	565	1,300	1,400,000	510,000		
No.2 Non-Dense		750	425	175	480	1,250	1,300,000	470,000		
No.3 and Stud		475	275	175	565	750	1,300,000	470,000		
Dense Select Structural	12" wide	1,800	1,250	175	660	1,750	1,900,000	690,000	0.55	SPIB
Select Structural		1,600	1,100	175	565	1,650	1,800,000	660,000		
Non-Dense Select Structural		1,400	975	175	480	1,550	1,600,000	580,000		
No.1 Dense		1,100	750	175	660	1,500	1,800,000	660,000		
No.1		1,000	650	175	565	1,400	1,600,000	580,000		
No.1 Non-Dense		900	575	175	480	1,350	1,400,000	510,000		
No.2 Dense		800	500	175	660	1,300	1,600,000	580,000		
No.2		750	450	175	565	1,250	1,400,000	510,000		
No.2 Non-Dense		700	400	175	480	1,250	1,300,000	470,000		
No.3 and Stud		450	250	175	565	725	1,300,000	470,000		
MIXED SOUTHERN PINE										
Select Structural	2" - 4" wide	2,050	1,200	175	565	1,800	1,600,000	580,000	0.51	SPIB
No.1		1,450	875	175	565	1,650	1,500,000	550,000		
No.2		1,100	675	175	565	1,450	1,400,000	510,000		
No.3 and Stud		650	400	175	565	850	1,200,000	440,000		
Construction	4" wide	850	500	175	565	1,600	1,300,000	470,000	0.51	
Standard		475	275	175	565	1,300	1,200,000	440,000		
Utility		225	125	175	565	850	1,100,000	400,000		
Select Structural	5" - 6" wide	1,850	1,100	175	565	1,700	1,600,000	580,000	0.51	
No.1		1,300	750	175	565	1,550	1,500,000	550,000		
No.2		1,000	600	175	565	1,400	1,400,000	510,000		
No.3 and Stud		575	350	175	565	775	1,200,000	440,000		
Select Structural	8" wide	1,750	1,000	175	565	1,600	1,600,000	580,000	0.51	
No.1		1,200	700	175	565	1,450	1,500,000	550,000		
No.2		925	550	175	565	1,350	1,400,000	510,000		
No.3 and Stud		525	325	175	565	800	1,200,000	440,000		
Select Structural	10" wide	1,500	875	175	565	1,600	1,600,000	580,000	0.51	
No.1		1,050	600	175	565	1,450	1,500,000	550,000		
No.2		800	475	175	565	1,300	1,400,000	510,000		
No.3 and Stud		475	275	175	565	750	1,200,000	440,000		
Select Structural	12" wide	1,400	825	175	565	1,550	1,600,000	580,000	0.51	
No.1		975	575	175	565	1,400	1,500,000	550,000		
No.2		750	450	175	565	1,250	1,400,000	510,000		
No.3 and Stud		450	250	175	565	725	1,200,000	440,000		

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 (see Table 1A) 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. **STRESS-RATED BOARDS.** Information for various grades of Southern Pine stress-rated boards of nominal 1", 1¼", and 1½" thickness, 2" and wider is available from the Southern Pine Inspection Bureau (SPIB) in the *Standard Grading Rules for Southern Pine Lumber*.

3. **SPRUCE PINE.** To obtain recommended design values for Spruce Pine graded to SPIB rules, multiply the appropriate design values for Mixed Southern Pine by the corresponding conversion factor shown below and round to the nearest 100,000 psi for E; to the nearest 10,000 psi for E_{min}; to the next lower multiple of 5 psi for F_v and $F_{c\perp}$; to the next lower multiple of 50 psi for F_b, F_t, and F_c if 1,000 psi or greater, 25 psi otherwise.

CONVERSION FACTORS FOR DETERMINING DESIGN VALUES FOR SPRUCE PINE

	Bending	Tension parallel to grain	Shear parallel to grain	Compression perpendicular to grain	Compression parallel to grain	Modulus of Elasticity
	F_b	F_t	F_v	$F_{c\perp}$	F_c	E and E_{min}
Conversion Factor	0.78	0.78	0.98	0.73	0.78	0.82

4. **SIZE FACTOR.** For sizes wider than 12", use size factors for F_b, F_t, and F_c specified for the 12" width. Use 100% of the F_v, $F_{c\perp}$, E, and E_{min} specified for the 12" width.

5. 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.

6. Specific gravity, G, based on weight and volume when oven-dry.

AMERICAN WOOD COUNCIL

March 2012

ADDENDUM

to the 2012 and previous versions of the *Design Values for Wood Construction*

(a supplement to the *National Design Specification® (NDS®) for Wood Construction*)

Effective June 1, 2012, design values for No. 2 Dense and lower grades of visually-graded Southern Pine and No. 2 and lower grades of visually-graded Mixed Southern Pine lumber, 2"- 4" thick, 2"- 4" wide, will change. The design values to use with the *2012 NDS*, *2005 NDS*, and the *2001 NDS* are shown below (values that will change on June 1, 2012 are shown as underlined):

Table 4B Reference Design Values for Visually Graded Southern Pine Dimension Lumber (2" - 4" thick)[1,2,3,4,5] (Tabulated design values are for normal load duration and dry service conditions, unless specified otherwise. See NDS 4.3 for a comprehensive description of design value adjustment factors.)

USE WITH TABLE 4B ADJUSTMENT FACTORS

Species and commercial grade	Size classification	Design values in pounds per square inch (psi)							Specific Gravity[6]	Grading Rules Agency
		Bending	Tension parallel to grain	Shear parallel to grain	Compression perpendicular to grain	Compression parallel to grain	Modulus of Elasticity			
		F_b	F_t	F_v	$F_{c\perp}$	F_c	E	E_{min}	G	
SOUTHERN PINE										
No.2 Dense	2" - 4" wide	1,150	750	175	660	1,250	1,500,000	550,000	0.55	SPIB
No.2		1,050	650	175	565	1,100	1,400,000	510,000		
No.2 Non-Dense		975	575	175	480	1,050	1,200,000	440,000		
No.3 and Stud		600	375	175	565	625	1,200,000	440,000		
Construction	4" wide	800	500	175	565	1,150	1,300,000	470,000	0.55	
Standard		450	275	175	565	950	1,200,000	440,000		
Utility		200	125	175	565	625	1,100,000	400,000		
MIXED SOUTHERN PINE										
No.2	2" - 4" wide	1,050	650	175	565	1,100	1,400,000	510,000	0.51	SPIB
No.3 and Stud		600	375	175	565	625	1,200,000	440,000		
Construction	4" wide	800	500	175	565	1,150	1,300,000	470,000	0.51	
Standard		450	275	175	565	950	1,200,000	440,000		
Utility		200	125	175	565	625	1,100,000	400,000		

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 (see Table 1A) 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. **STRESS-RATED BOARDS.** Information for various grades of Southern Pine stress-rated boards of nominal 1", 1¼", and 1½" thickness, 2" and wider is available from the Southern Pine Inspection Bureau (SPIB) in the *Standard Grading Rules for Southern Pine Lumber*.
3. **SPRUCE PINE.** To obtain recommended design values for Spruce Pine graded to SPIB rules, multiply the appropriate design values for Mixed Southern Pine by the corresponding conversion factor shown below and round to the nearest 100,000 psi for E; to the nearest 10,000 psi for E_{min}; to the next lower multiple of 5 psi for F_v and $F_{c\perp}$; to the next lower multiple of 50 psi for F_b, F_t, and F_c if 1,000 psi or greater, 25 psi otherwise.

CONVERSION FACTORS FOR DETERMINING DESIGN VALUES FOR SPRUCE PINE

	Bending	Tension parallel to grain	Shear parallel to grain	Compression perpendicular to grain	Compression parallel to grain	Modulus of Elasticity
	F_b	F_t	F_v	$F_{c\perp}$	F_c	E and E_{min}
Conversion Factor	0.78	0.78	0.98	0.73	0.78	0.82

4. **SIZE FACTOR.** For sizes wider than 12", use size factors for F_b, F_t, and F_c specified for the 12" width. Use 100% of the F_v, $F_{c\perp}$, E, and E_{min} specified for the 12" width.
5. 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.
6. Specific gravity, G, based on weight and volume when oven-dry.