

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)							Grading Rules Agency
		Bending F _b	Tension parallel to grain F _t	Shear parallel to grain F _v	Compression perpendicular to grain F _{c⊥}	Compression parallel to grain F _c	Modulus of Elasticity		
							E	E _{min}	
BEECH-BIRCH-HICKORY									
Select Structural	2" & wider	1,450	850	195	715	1,200	1,700,000	620,000	NELMA
No.1		1,050	600	195	715	950	1,600,000	580,000	
No.2		1,000	600	195	715	750	1,500,000	550,000	
No.3		575	350	195	715	425	1,300,000	470,000	
Stud	2" & wider	775	450	195	715	475	1,300,000	470,000	
Construction	2" - 4" wide	1,150	675	195	715	1,000	1,400,000	510,000	
Standard		650	375	195	715	775	1,300,000	470,000	
Utility		300	175	195	715	500	1,200,000	440,000	
COTTONWOOD									
Select Structural	2" & wider	875	525	125	320	775	1,200,000	440,000	NSLB
No.1		625	375	125	320	625	1,200,000	440,000	
No.2		625	350	125	320	475	1,100,000	400,000	
No.3		350	200	125	320	275	1,000,000	370,000	
Stud	2" & wider	475	275	125	320	300	1,000,000	370,000	
Construction	2" - 4" wide	700	400	125	320	650	1,000,000	370,000	
Standard		400	225	125	320	500	900,000	330,000	
Utility		175	100	125	320	325	900,000	330,000	
DOUGLAS FIR-LARCH									
Select Structural	2" & wider	1,500	1,000	180	625	1,700	1,900,000	690,000	WCLIB WWPA
No.1 & Btr		1,200	800	180	625	1,550	1,800,000	660,000	
No.1		1,000	675	180	625	1,500	1,700,000	620,000	
No.2		900	575	180	625	1,350	1,600,000	580,000	
No.3	525	325	180	625	775	1,400,000	510,000		
Stud	2" & wider	700	450	180	625	850	1,400,000	510,000	
Construction	2" - 4" wide	1,000	650	180	625	1,650	1,500,000	550,000	
Standard		575	375	180	625	1,400	1,400,000	510,000	
Utility		275	175	180	625	900	1,300,000	470,000	
DOUGLAS FIR-LARCH (NORTH)									
Select Structural	2" & wider	1,350	825	180	625	1,900	1,900,000	690,000	NLGA
No.1 & Btr		1,150	750	180	625	1,800	1,800,000	660,000	
No.1/No.2		850	500	180	625	1,400	1,600,000	580,000	
No.3		475	300	180	625	825	1,400,000	510,000	
Stud	2" & wider	650	400	180	625	900	1,400,000	510,000	
Construction	2" - 4" wide	950	575	180	625	1,800	1,500,000	550,000	
Standard		525	325	180	625	1,450	1,400,000	510,000	
Utility		250	150	180	625	950	1,300,000	470,000	
DOUGLAS FIR-SOUTH									
Select Structural	2" & wider	1,350	900	180	520	1,600	1,400,000	510,000	WWPA
No.1		925	600	180	520	1,450	1,300,000	470,000	
No.2		850	525	180	520	1,350	1,200,000	440,000	
No.3		500	300	180	520	775	1,100,000	400,000	
Stud	2" & wider	675	425	180	520	850	1,100,000	400,000	
Construction	2" - 4" wide	975	600	180	520	1,650	1,200,000	440,000	
Standard		550	350	180	520	1,400	1,100,000	400,000	
Utility		250	150	180	520	900	1,000,000	370,000	
EASTERN HEMLOCK-BALSAM FIR									
Select Structural	2" & wider	1,250	575	140	335	1,200	1,200,000	440,000	NELMA NSLB
No.1		775	350	140	335	1,000	1,100,000	400,000	
No.2		575	275	140	335	825	1,100,000	400,000	
No.3		350	150	140	335	475	900,000	330,000	
Stud	2" & wider	450	200	140	335	525	900,000	330,000	
Construction	2" - 4" wide	675	300	140	335	1,050	1,000,000	370,000	
Standard		375	175	140	335	850	900,000	330,000	
Utility		175	75	140	335	550	800,000	290,000	

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USE WITH TABLE 4A ADJUSTMENT FACTORS

Species and commercial grade	Size classification	Design values in pounds per square inch (psi)							Grading Rules Agency
		Bending F _b	Tension parallel to grain F _t	Shear parallel to grain F _v	Compression perpendicular to grain F _{c⊥}	Compression parallel to grain F _c	Modulus of Elasticity		
							E	E _{min}	
EASTERN HEMLOCK-TAMARACK									
Select Structural	2" & wider	1,250	575	170	555	1,200	1,200,000	440,000	NELMA NSLB
No.1		775	350	170	555	1,000	1,100,000	400,000	
No.2		575	275	170	555	825	1,100,000	400,000	
No.3		350	150	170	555	475	900,000	330,000	
Stud	2" & wider	450	200	170	555	525	900,000	330,000	
Construction	2" - 4" wide	675	300	170	555	1,050	1,000,000	370,000	
Standard		375	175	170	555	850	900,000	330,000	
Utility		175	75	170	555	550	800,000	290,000	
EASTERN SOFTWOODS									
Select Structural	2" & wider	1,250	575	140	335	1,200	1,200,000	440,000	NELMA NSLB
No.1		775	350	140	335	1,000	1,100,000	400,000	
No.2		575	275	140	335	825	1,100,000	400,000	
No.3		350	150	140	335	475	900,000	330,000	
Stud	2" & wider	450	200	140	335	525	900,000	330,000	
Construction	2" - 4" wide	675	300	140	335	1,050	1,000,000	370,000	
Standard		375	175	140	335	850	900,000	330,000	
Utility		175	75	140	335	550	800,000	290,000	
EASTERN WHITE PINE									
Select Structural	2" & wider	1,250	575	135	350	1,200	1,200,000	440,000	NELMA NSLB
No.1		775	350	135	350	1,000	1,100,000	400,000	
No.2		575	275	135	350	825	1,100,000	400,000	
No.3		350	150	135	350	475	900,000	330,000	
Stud	2" & wider	450	200	135	350	525	900,000	330,000	
Construction	2" - 4" wide	675	300	135	350	1,050	1,000,000	370,000	
Standard		375	175	135	350	850	900,000	330,000	
Utility		175	75	135	350	550	800,000	290,000	
HEM-FIR									
Select Structural	2" & wider	1,400	925	150	405	1,500	1,600,000	580,000	WCLIB WWPA
No.1 & Btr		1,100	725	150	405	1,350	1,500,000	550,000	
No.1		975	625	150	405	1,350	1,500,000	550,000	
No.2		850	525	150	405	1,300	1,300,000	470,000	
No.3	2" & wider	500	300	150	405	725	1,200,000	440,000	
Stud		675	400	150	405	800	1,200,000	440,000	
Construction	2" - 4" wide	975	600	150	405	1,550	1,300,000	470,000	
Standard		550	325	150	405	1,300	1,200,000	440,000	
Utility		250	150	150	405	850	1,100,000	400,000	
HEM-FIR (NORTH)									
Select Structural	2" & wider	1,300	775	145	405	1,700	1,700,000	620,000	NLGA
No.1 & Btr		1,200	725	145	405	1,550	1,700,000	620,000	
No.1/No.2		1,000	575	145	405	1,450	1,600,000	580,000	
No.3		575	325	145	405	850	1,400,000	510,000	
Stud	2" & wider	775	450	145	405	925	1,400,000	510,000	
Construction	2" - 4" wide	1,150	650	145	405	1,750	1,500,000	550,000	
Standard		650	350	145	405	1,500	1,400,000	510,000	
Utility		300	175	145	405	975	1,300,000	470,000	
MIXED MAPLE									
Select Structural	2" & wider	1,000	600	195	620	875	1,300,000	470,000	NELMA
No.1		725	425	195	620	700	1,200,000	440,000	
No.2		700	425	195	620	550	1,100,000	400,000	
No.3		400	250	195	620	325	1,000,000	370,000	
Stud	2" & wider	550	325	195	620	350	1,000,000	370,000	
Construction	2" - 4" wide	800	475	195	620	725	1,100,000	400,000	
Standard		450	275	195	620	575	1,000,000	370,000	
Utility		225	125	195	620	375	900,000	330,000	