Example 2

Species and Grade	Size	Design Value in Bending, "Fb"		Modulus of Elasticity "E"	Grading Rules Agency
		Normal Duration	Snow Loading		
Cottonwood					
Select Structural	2x4	1510	1735	1,200,000	NSLB
No.1		1080	1240	1,200,000	
No.2		1080	1240	1,100,000	
No.3		605	695	1,000,000	
Stud		600	690	1,000,000	
Construction		805	925	1,000,000	
Standard		460	530	900,000	
Utility		200	230	900,000	
Select Structural	2x6	1310	1505	1,200,000	
No.1		935	1075	1,200,000	
No.2		935	1075	1,100,000	
No.3		525	600	1,000,000	
Stud		545	630	1,000,000	
Select Structural	2x8	1210	1390	1,200,000	
No.1		865	990	1,200,000	
No.2		865	990	1,100,000	
No.3		485	555	1,000,000	
Select Structural	2xl0	1105	1275	1,200,000	
No.1		790	910	1,200,000	
No.2		790	910	1,100,000	
No.3		445	510	1,000,000	
Select Structural	2xl2	1005	1155	1,200,000	
No.1		720	825	1,200,000	
No.2		720	825	1,100,000	
No.3		405	465	1,000,000	
Douglas Fir-Larch					
Select Structural	2x4	2500	2875	1,900,000	WCLIB WWPA
No.1 & Btr		1985	2280	1,800,000	
No.1		1725	1985	1,700,000	
No.2		1510	1735	1,600,000	
No.3		865	990	1,400,000	
Stud		855	980	1,400,000	
Construction		1150	1325	1,500,000	
Standard		635	725	1,400,000	
Utility		315	365	1,300,000	
Select Structural	2x6	2170	2495	1,900,000	
No.1 & Btr		1720	1975	1,800,000	
No.1		1495	1720	1,700,000	
No.2		1310	1505	1,600,000	
No.3		750	860	1,400,000	
Stud		775	895	1,400,000	
Select Structural	2x8	2000	2300	1,900,000	
No.1 & Str		1585	1825	1,800,000	
No.1		1380	1585	1,700,000	
No.2		1210	1390	1,600,000	
No.3		690	795	1,400,000	
Select Structural	2xl0	1835	2110	1,900,000	
No.1 & Btr		1455	1675	1,800,000	
No.1		1265	1455	1,700,000	
No.2		1105	1275	1,600,000	
No.3		635	725	1,400,000	
Select Structural	2xl2	1670	1920	1,900,000	
No.1 & Btr		1325	1520	1,800,000	
No.1		1150	1325	1,700,000	
No.2		1005	1155	1,600,000	
No.3		575	660	1,400,000	

TABLE F- 2
FLOOR JOISTS WITH L/360 DEFLECTION LIMITS

DESIGN CRITERIA:
Deflection - For 40 psf live load.
Limited to span in inches divided by 360.
Strength - Live load of 40 psf plus dead load
of 10 psf determines the required bending design value.

Joist Size (in)	**Spacing (in)**	**Modulus of Elasticity, E, in 1,000,000 psi**																
		0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4
	12.0	8- 6	8-10	9- 2	9- 6	9- 9	10- 0	10- 3	10- 6	10- 9	10-11	11- 2	11- 4	11- 7	11- 9	11-11	12- 1	12- 3
	16.0	7- 9	8- 0	8- 4	8- 7	8-10	9- 1	9- 4	9- 6	9- 9	9-11	10- 2	10- 4	10- 6	10- 8	10-10	11- 0	11- 2
2x 6	19.2	7- 3	7- 7	7-10	8- 1	8- 4	8- 7	8- 9	9- 0	9- 2	9- 4	9- 6	9- 8	9-10	10- 0	10- 2	10- 4	10- 6
	24.0	6- 9	7- 0	7- 3	7- 6	7- 9	7-11	8- 2	8- 4	8- 6	8- 8	8-10	9- 0	9- 2	9- 4	9- 6	9- 7	9- 9
	12.0	11- 3	11- 8	12- 1	12- 6	12-10	13- 2	13- 6	13-10	14- 2	14- 5	14- 8	15- 0	15- 3	15- 6	15- 9	15-11	16- 2
	16.0	10- 2	10- 7	11- 0	11- 4	11- 8	12- 0	12- 3	12- 7	12-10	13- 1	13- 4	13- 7	13-10	14- 1	14- 3	14- 6	14- 8
2x 8	19.2	9- 7	10- 0	10- 4	10- 8	11- 0	11- 3	11- 7	11-10	12- 1	12- 4	12- 7	12-10	13- 0	13- 3	13- 5	13- 8	13-10
	24.0	8-11	9- 3	9- 7	9-11	10- 2	10- 6	10- 9	11- 0	11- 3	11- 5	11- 8	11-11	12- 1	12- 3	12- 6	12- 8	12-10
	12.0	14- 4	14-11	15- 5	15-11	16- 5	16-10	17- 3	17- 8	18- 0	18- 5	18- 9	19- 1	19- 5	19- 9	20- 1	20- 4	20- 8
	16.0	13- 0	13- 6	14- 0	14- 6	14-11	15- 3	15- 8	16- 0	16- 5	16- 9	17- 0	17- 4	17- 8	17-11	18- 3	18- 6	18- 9
2x10	19.2	12- 3	12- 9	13- 2	13- 7	14- 0	14- 5	14- 9	15- 1	15- 5	15- 9	16- 0	16- 4	16- 7	16-11	17- 2	17- 5	17- 8
	24.0	11- 4	11-10	12- 3	12- 8	13- 0	13- 4	13- 8	14- 0	14- 4	14- 7	14-11	15- 2	15- 5	15- 8	15-11	16- 2	16- 5
	12.0	17- 5	18- 1	18- 9	19- 4	19-11	20- 6	21- 0	21- 6	21-11	22- 5	22-10	23- 3	23- 7	24- 0	24- 5	24- 9	25- 1
	16.0	15-10	16- 5	17- 0	17- 7	18- 1	18- 7	19- 1	19- 6	19-11	20- 4	20- 9	21- 1	21- 6	21-10	22- 2	22- 6	22-10
2x12	19.2	14-11	15- 6	16- 0	16- 7	17- 0	17- 6	17-11	18- 4	18- 9	19- 2	19- 6	19-10	20- 2	20- 6	20-10	21- 2	21- 6
	24.0	13-10	14- 4	14-11	15- 4	15-10	16- 3	16- 8	17- 0	17- 5	17- 9	18- 1	18- 5	18- 9	19- 1	19- 4	19- 8	19-11
F_b	12.0	718	777	833	888	941	993	1043	1092	1140	1187	1233	1278	1323	1367	1410	1452	1494
F_b	16.0	790	855	917	977	1036	1093	1148	1202	1255	1306	1357	1407	1456	1504	1551	1598	1644
F_b	19.2	840	909	975	1039	1101	1161	1220	1277	1333	1388	1442	1495	1547	1598	1649	1698	1747
F_b	24.0	905	979	1050	1119	1186	1251	1314	1376	1436	1496	1554	1611	1667	1722	1776	1829	1882

Note: The required bending design value, F_b, in pounds per square inch is shown at the bottom of each table and is applicable to all lumber sizes shown. Spans are shown in feet-inches and are limited to 26' and less. Check sources of supply for availability of lumber in lengths greater than 20'.

TABLE C-1
CEILING JOISTS WITH L/240 DEFLECTION LIMITS

DESIGN CRITERIA:
Deflection - For 10 psf live load.
Limited to span in inches divided by 240.
Strength - Live Load of 10 psf plus
dead load of 5 psf determines the required fiber stress value.

Joist Size (in)	**Spacing (in)**	**Modulus of Elasticity, E, in 1,000,000 psi**																
		0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4
	12.0	9-10	10- 3	10- 7	10-11	11- 3	11- 7	11-10	12- 2	12- 5	12- 8	12-11	13- 2	13- 4	13- 7	13- 9	14- 0	14- 2
	16.0	8-11	9- 4	9- 8	9-11	10- 3	10- 6	10- 9	11- 0	11- 3	11- 6	11- 9	11-11	12- 2	12- 4	12- 6	12- 9	12-11
2x 4	19.2	8- 5	8- 9	9- 1	9- 4	9- 8	9-11	10- 2	10- 4	10- 7	10-10	11- 0	11- 3	11- 5	11- 7	11- 9	12- 0	12- 2
	24.0	7-10	8- 1	8- 5	8- 8	8-11	9- 2	9- 5	9- 8	9-10	10- 0	10- 3	10- 5	10- 7	10- 9	10-11	11- 1	11- 3
	12.0	15- 6	16- 1	16- 8	17- 2	17- 8	18- 2	18- 8	19- 1	19- 6	19-11	20- 3	20- 8	21- 0	21- 4	21- 8	22- 0	22- 4
	16.0	14- 1	14- 7	15- 2	15- 7	16- 1	16- 6	16-11	17- 4	17- 8	18- 1	18- 5	18- 9	19- 1	19- 5	19- 8	20- 0	20- 3
2x 6	19.2	13- 3	13- 9	14- 3	14- 8	15- 2	15- 7	15-11	16- 4	16- 8	17- 0	17- 4	17- 8	17-11	18- 3	18- 6	18-10	19- 1
	24.0	12- 3	12- 9	13- 3	13- 8	14- 1	14- 5	14- 9	15- 2	15- 6	15- 9	16- 1	16- 4	16- 8	16-11	17- 2	17- 5	17- 8
	12.0	20- 5	21- 2	21-11	22- 8	23- 4	24- 0	24- 7	25- 2	25- 8								
	16.0	18- 6	19- 3	19-11	20- 7	21- 2	21- 9	22- 4	22-10	23- 4	23-10	24- 3	24- 8	25- 2	25- 7	25-11		
2x 8	19.2	17- 5	18- 1	18- 9	19- 5	19-11	20- 6	21- 0	21- 6	21-11	22- 5	22-10	23- 3	23- 8	24- 0	24- 5	24- 9	25- 2
	24.0	16- 2	16-10	17- 5	18- 0	18- 6	19- 0	19- 6	19-11	20- 5	20-10	21- 2	21- 7	21-11	22- 4	22- 8	23- 0	23- 4
	12.0	26- 0																
	16.0	23- 8	24- 7	25- 5														
2x10	19.2	22- 3	23- 1	23-11	24- 9	25- 5												
	24.0	20- 8	21- 6	22- 3	22-11	23- 8	24- 3	24-10	25- 5	26- 0								
F_b	12.0	711	769	825	880	932	983	1033	1082	1129	1176	1221	1266	1310	1354	1396	1438	1480
F_b	16.0	783	847	909	968	1026	1082	1137	1191	1243	1294	1344	1394	1442	1490	1537	1583	1629
F_b	19.2	832	900	965	1029	1090	1150	1208	1265	1321	1375	1429	1481	1533	1583	1633	1682	1731
F_b	24.0	896	969	1040	1108	1174	1239	1302	1363	1423	1481	1539	1595	1651	1706	1759	1812	1864

Note: The required bending design value, F_b, in pounds per square inch is shown at the bottom of each table and is applicable to all lumber sizes shown. Spans are shown in feet-inches and are limited to 26' and less. Check sources of supply for availability of lumber in lengths greater than 20'.

TABLE C-2
CEILING JOISTS WITH L/240 DEFLECTION LIMITS

DESIGN CRITERIA:
Deflection - For 20 psf live load.
Limited to span in inches divided by 240.
Strength - Live Load of 20 psf plus
dead load of 10 psf determines the required bending design value.

Size (in)	Spacing (in)	Joist Modulus of Elasticity, E, in 1,000,000 psi																
		0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4
	12.0	7-10	8- 1	8- 5	8- 8	8-11	9- 2	9- 5	9- 8	9-10	10- 0	10- 3	10- 5	10- 7	10- 9	10-11	11- 1	11- 3
	16.0	7- 1	7- 5	7- 8	7-11	8- 1	8- 4	8- 7	8- 9	8-11	9- 1	9- 4	9- 6	9- 8	9- 9	9-11	10- 1	10- 3
2x 4	19.2	6- 8	6-11	7- 2	7- 5	7- 8	7-10	8- 1	8- 3	8- 5	8- 7	8- 9	8-11	9- 1	9- 3	9- 4	9- 6	9- 8
	24.0	6- 2	6- 5	6- 8	6-11	7- 1	7- 3	7- 6	7- 8	7-10	8- 0	8- 1	8- 3	8- 5	8- 7	8- 8	8-10	8-11
	12.0	12- 3	12- 9	13- 3	13- 8	14- 1	14- 5	14- 9	15- 2	15- 6	15- 9	16- 1	16- 4	16- 8	16-11	17- 2	17- 5	17- 8
	16.0	11- 2	11- 7	12- 0	12- 5	12- 9	13- 1	13- 5	13- 9	14- 1	14- 4	14- 7	14-11	15- 2	15- 5	15- 7	15-10	16- 1
2x 6	19.2	10- 6	10-11	11- 4	11- 8	12- 0	12- 4	12- 8	12-11	13- 3	13- 6	13- 9	14- 0	14- 3	14- 6	14- 8	14-11	15- 2
	24.0	9- 9	10- 2	10- 6	10-10	11- 2	11- 5	11- 9	12- 0	12- 3	12- 6	12- 9	13- 0	13- 3	13- 5	13- 8	13-10	14- 1
	12.0	16- 2	16-10	17- 5	18- 0	18- 6	19- 0	19- 6	19-11	20- 5	20-10	21- 2	21- 7	21-11	22- 4	22- 8	23- 0	23- 4
	16.0	14- 8	15- 3	15-10	16- 4	16-10	17- 3	17- 9	18- 1	18- 6	18-11	19- 3	19- 7	19-11	20- 3	20- 7	20-11	21- 2
2x 8	19.2	13-10	14- 5	14-11	15- 5	15-10	16- 3	16- 8	17- 1	17- 5	17- 9	18- 1	18- 5	18- 9	19- 1	19- 5	19- 8	19-11
	24.0	12-10	13- 4	13-10	14- 3	14- 8	15- 1	15- 6	15-10	16- 2	16- 6	16-10	17- 2	17- 5	17- 9	18- 0	18- 3	18- 6
	12.0	20- 8	21- 6	22- 3	22-11	23- 8	24- 3	24-10	25- 5	26- 0								
	16.0	18- 9	19- 6	20- 2	20-10	21- 6	22- 1	22- 7	23- 1	23- 8	24- 1	24- 7	25- 0	25- 5	25-10			
2x10	19.2	17- 8	18- 4	19- 0	19- 7	20- 2	20- 9	21- 3	21- 9	22- 3	22- 8	23- 1	23- 7	23-11	24- 4	24- 9	25- 1	25- 5
	24.0	16- 5	17- 0	17- 8	18- 3	18- 9	19- 3	19- 9	20- 2	20- 8	21- 1	21- 6	21-10	22- 3	22- 7	22-11	23- 4	23- 8
F_b	12.0	896	969	1040	1108	1174	1239	1302	1363	1423	1481	1539	1595	1651	1706	1759	1812	1864
F_b	16.0	986	1067	1145	1220	1293	1364	1433	1500	1566	1631	1694	1756	1817	1877	1936	1995	2052
F_b	19.2	1048	1134	1216	1296	1374	1449	1522	1594	1664	1733	1800	1866	1931	1995	2058	2120	2181
F_b	24.0	1129	1221	1310	1396	1480	1561	1640	1717	1793	1866	1939	2010	2080	2149	2217	2283	2349

Note: The required bending design value, F_b, in pounds per square inch is shown at the bottom of each table and is applicable to all lumber sizes shown. Spans are shown in feet-inches and are limited to 26' and less.Check sources of supply for availability of lumber in lengths greater than 20'.

TABLE R-2
RAFTERS WITH L/240 DEFLECTION LIMITATION

DESIGN CRITERIA:
Strength - Live Load of 30 psf plus
Dead Load of 10 psf determines the required bending design value.
Deflection - For 30 psf live load.
Limited to span in inches divided by 240.

		Rafter Bending Design Value, F_b, (psi)																				
Size (in)	**Spacing (in)**	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
	12.0	6- 2	7- 1	7-11	8- 8	9- 5	10- 0	10- 8	11- 3	11- 9	12- 4	12-10	13- 3	13- 9	14- 2	14- 8	15- 1	15- 6	15-11				
	16.0	5- 4	6- 2	6-10	7- 6	8- 2	8- 8	9- 3	9- 9	10- 2	10- 8	11- 1	11- 6	11-11	12- 4	12- 8	13- 1	13- 5	13- 9	14- 1	14- 5		
2x 6	19.2	4-10	5- 7	6- 3	6-10	7- 5	7-11	8- 5	8-11	9- 4	9- 9	10- 1	10- 6	10-10	11- 3	11- 7	11-11	12- 3	12- 7	12-10	13- 2	13- 6	
	24.0	4- 4	5- 0	5- 7	6- 2	6- 8	7- 1	7- 6	7-11	8- 4	8- 8	9- 1	9- 5	9- 9	10- 0	10- 4	10- 8	10-11	11- 3	11- 6	11- 9	12- 0	12- 4
	12.0	8- 1	9- 4	10- 6	11- 6	12- 5	13- 3	14- 0	14-10	15- 6	16- 3	16-10	17- 6	18- 1	18- 9	19- 4	19-10	20- 5	20-11				
	16.0	7- 0	8- 1	9- 1	9-11	10- 9	11- 6	12- 2	12-10	13- 5	14- 0	14- 7	15- 2	15- 8	16- 3	16- 9	17- 2	17- 8	18- 1	18- 7	19- 0		
2x 8	19.2	6- 5	7- 5	8- 3	9- 1	9- 9	10- 6	11- 1	11- 8	12- 3	12-10	13- 4	13-10	14- 4	14-10	15- 3	15- 8	16- 2	16- 7	16-11	17- 4	17- 9	
	24.0	5- 9	6- 7	7- 5	8- 1	8- 9	9- 4	9-11	10- 6	11- 0	11- 6	11-11	12- 5	12-10	13- 3	13- 8	14- 0	14- 5	14-10	15- 2	15- 6	15-10	16- 3
	12.0	10- 4	11-11	13- 4	14- 8	15-10	16-11	17-11	18-11	19-10	20- 8	21- 6	22- 4	23- 1	23-11	24- 7	25- 4	26- 0					
	16.0	8-11	10- 4	11- 7	12- 8	13- 8	14- 8	15- 6	16- 4	17- 2	17-11	18- 8	19- 4	20- 0	20- 8	21- 4	21-11	22- 6	23- 1	23- 8	24- 3		
2x10	19.2	8- 2	9- 5	10- 7	11- 7	12- 6	13- 4	14- 2	14-11	15- 8	16- 4	17- 0	17- 8	18- 3	18-11	19- 6	20- 0	20- 7	21- 1	21- 8	22- 2	22- 8	
	24.0	7- 4	8- 5	9- 5	10- 4	11- 2	11-11	12- 8	13- 4	14- 0	14- 8	15- 3	15-10	16- 4	16-11	17- 5	17-11	18- 5	18-11	19- 4	19-10	20- 3	20- 8
	12.0	12- 7	14- 6	16- 3	17- 9	19- 3	20- 6	21- 9	23- 0	24- 1	25- 2												
	16.0	10-11	12- 7	14- 1	15- 5	16- 8	17- 9	18-10	19-11	20-10	21- 9	22- 8	23- 6	24- 4	25- 2	25-11							
2x12	19.2	9-11	11- 6	12-10	14- 1	15- 2	16- 3	17- 3	18- 2	19- 0	19-11	20- 8	21- 6	22- 3	23- 0	23- 8	24- 4	25- 0	25- 8				
	24.0	8-11	10- 3	11- 6	12- 7	13- 7	14- 6	15- 5	16- 3	17- 0	17- 9	18- 6	19- 3	19-11	20- 6	21- 2	21- 9	22- 5	23- 0	23- 6	24- 1	24- 8	25- 2
E	12.0	0.15	0.23	0.32	0.43	0.54	0.66	0.78	0.92	1.06	1.21	1.36	1.52	1.69	1.86	2.04	2.22	2.41	2.60				
E	16.0	0.13	0.20	0.28	0.37	0.47	0.57	0.68	0.80	0.92	1.05	1.18	1.32	1.46	1.61	1.76	1.92	2.08	2.25	2.42	2.60		
E	19.2	0.12	0.18	0.26	0.34	0.43	0.52	0.62	0.73	0.84	0.95	1.08	1.20	1.33	1.47	1.61	1.75	1.90	2.05	2.21	2.37	2.53	
E	24.0	0.11	0.16	0.23	0.30	0.38	0.46	0.55	0.65	0.75	0.85	0.96	1.08	1.19	1.31	1.44	1.57	1.70	1.84	1.98	2.12	2.27	2.41

Note: The required modulus of elasticity, E, in 1,000,000 pounds per square inch is shown at the bottom of each table, is limited to 2.6 million psi and less, and is applicable to all lumber sizes shown. Spans are shown in feet-inches and are limited to 26' and less. Check sources of supply for availability of lumber in lengths greater than 20'.

TABLE R-3
RAFTERS WITH L/240 DEFLECTION LIMITATION

DESIGN CRITERIA:
Strength - Live Load of 40 psf plus
Dead Load of 10 psf determines the required bending design value.
Deflection - For 40 psf live load.
Limited to span in inches divided by 240.

		Rafter Bending Design Value, F_b, (psi)																					
Size (in)	**Spacing (in)**	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400
	12.0	5- 6	6- 4	7- 1	7- 9	8- 5	9- 0	9- 6	10- 0	10- 6	11- 0	11- 5	11-11	12- 4	12- 8	13- 1	13- 6	13-10	14- 2				
	16.0	4- 9	5- 6	6- 2	6- 9	7- 3	7- 9	8- 3	8- 8	9- 1	9- 6	9-11	10- 3	10- 8	11- 0	11- 4	11- 8	12- 0	12- 4	12- 7	12-11		
2x 6	19.2	4- 4	5- 0	5- 7	6- 2	6- 8	7- 1	7- 6	7-11	8- 4	8- 8	9- 1	9- 5	9- 9	10- 0	10- 4	10- 8	10-11	11- 3	11- 6	11- 9	12- 0	12- 4
	24.0	3-11	4- 6	5- 0	5- 6	5-11	6- 4	6- 9	7- 1	7- 5	7- 9	8- 1	8- 5	8- 8	9- 0	9- 3	9- 6	9- 9	10- 0	10- 3	10- 6	10- 9	11- 0
	12.0	7- 3	8- 4	9- 4	10- 3	11- 1	11-10	12- 7	13- 3	13-11	14- 6	15- 1	15- 8	16- 3	16- 9	17- 3	17- 9	18- 3	18- 9				
	16.0	6- 3	7- 3	8- 1	8-11	9- 7	10- 3	10-10	11- 6	12- 0	12- 7	13- 1	13- 7	14- 0	14- 6	14-11	15- 5	15-10	16- 3	16- 7	17- 0		
2x 8	19.2	5- 9	6- 7	7- 5	8- 1	8- 9	9- 4	9-11	10- 6	11- 0	11- 6	11-11	12- 5	12-10	13- 3	13- 8	14- 0	14- 5	14-10	15- 2	15- 6	15-10	16- 3
	24.0	5- 2	5-11	6- 7	7- 3	7-10	8- 4	8-11	9- 4	9-10	10- 3	10- 8	11- 1	11- 6	11-10	12- 2	12- 7	12-11	13- 3	13- 7	13-11	14- 2	14- 6
	12.0	9- 3	10- 8	11-11	13- 1	14- 2	15- 1	16- 0	16-11	17- 9	18- 6	19- 3	20- 0	20- 8	21- 4	22- 0	22- 8	23- 3	23-11				
	16.0	8- 0	9- 3	10- 4	11- 4	12- 3	13- 1	13-10	14- 8	15- 4	16- 0	16- 8	17- 4	17-11	18- 6	19- 1	19- 7	20- 2	20- 8	21- 2	21- 8		
2x10	19.2	7- 4	8- 5	9- 5	10- 4	11- 2	11-11	12- 8	13- 4	14- 0	14- 8	15- 3	15-10	16- 4	16-11	17- 5	17-11	18- 5	18-11	19- 4	19-10	20- 3	20- 8
	24.0	6- 6	7- 7	8- 5	9- 3	10- 0	10- 8	11- 4	11-11	12- 6	13- 1	13- 7	14- 2	14- 8	15- 1	15- 7	16- 0	16- 6	16-11	17- 4	17- 9	18- 1	18- 6
	12.0	11- 3	13- 0	14- 6	15-11	17- 2	18- 4	19- 6	20- 6	21- 7	22- 6	23- 5	24- 4	25- 2	26- 0								
	16.0	9- 9	11- 3	12- 7	13- 9	14-11	15-11	16-10	17- 9	18- 8	19- 6	20- 3	21- 1	21- 9	22- 6	23- 2	23-10	24- 6	25- 2	25- 9			
2x12	19.2	8-11	10- 3	11- 6	12- 7	13- 7	14- 6	15- 5	16- 3	17- 0	17- 9	18- 6	19- 3	19-11	20- 6	21- 2	21- 9	22- 5	23- 0	23- 6	24- 1	24- 8	25- 2
	24.0	7-11	9- 2	10- 3	11- 3	12- 2	13- 0	13- 9	14- 6	15- 3	15-11	16- 7	17- 2	17- 9	18- 4	18-11	19- 6	20- 0	20- 6	21- 1	21- 7	22- 0	22- 6
E	12.0	0.14	0.22	0.31	0.41	0.51	0.63	0.75	0.88	1.01	1.15	1.30	1.45	1.61	1.77	1.94	2.12	2.30	2.48				
E	16.0	0.12	0.19	0.27	0.35	0.44	0.54	0.65	0.76	0.88	1.00	1.12	1.26	1.39	1.54	1.68	1.83	1.99	2.15	2.31	2.48		
E	19.2	0.11	0.18	0.24	0.32	0.41	0.50	0.59	0.69	0.80	0.91	1.03	1.15	1.27	1.40	1.54	1.67	1.81	1.96	2.11	2.26	2.42	2.58
E	24.0	0.10	0.16	0.22	0.29	0.36	0.44	0.53	0.62	0.71	0.81	0.92	1.03	1.14	1.25	1.37	1.50	1.62	1.75	1.89	2.02	2.16	2.30

Note: The required modulus of elasticity, E, in 1,000,000 pounds per square inch is shown at the bottom of each table, is limited to 2.6 million psi and less, and is applicable to all lumber sizes shown. Spans are shown in feet-inches and are limited to 26' and less. Check sources of supply for availability of lumber in lengths greater than 20'.

TABLE R-10
RAFTERS WITH L/240 DEFLECTION LIMITATION

DESIGN CRITERIA:
Strength - Live Load of 30 psf plus
Dead Load of 20 psf determines the required bending design value.
Deflection - For 30 psf live load.
Limited to span in inches divided by 240.

Rafter Bending Design Value, F_b, (psi)

Size (in)	Spacing (in)	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700
	12.0	5- 6	6- 4	7- 1	7- 9	8- 5	9- 0	9- 6	10- 0	10- 6	11- 0	11- 5	11-11	12- 4	12- 8	13- 1	13- 6	13-10	14- 2	14- 7	14-11	15- 3	15- 7	15-11		
	16.0	4- 9	5- 6	6- 2	6- 9	7- 3	7- 9	8- 3	8- 8	9- 1	9- 6	9-11	10- 3	10- 8	11- 0	11- 4	11- 8	12- 0	12- 4	12- 7	12-11	13- 2	13- 6	13- 9	14- 0	14- 3
2x 6	19.2	4- 4	5- 0	5- 7	6- 2	6- 8	7- 1	7- 6	7-11	8- 4	8- 8	9- 1	9- 5	9- 9	10- 0	10- 4	10- 8	10-11	11- 3	11- 6	11- 9	12- 0	12- 4	12- 7	12-10	13- 1
	24.0	3-11	4- 6	5- 0	5- 6	5-11	6- 4	6- 9	7- 1	7- 5	7- 9	8- 1	8- 5	8- 8	9- 0	9- 3	9- 6	9- 9	10- 0	10- 3	10- 6	10- 9	11- 0	11- 3	11- 5	11- 8
	12.0	7- 3	8- 4	9- 4	10- 3	11- 1	11-10	12- 7	13- 3	13-11	14- 6	15- 1	15- 8	16- 3	16- 9	17- 3	17- 9	18- 3	18- 9	19- 2	19- 8	20- 1	20- 6	20-11		
	16.0	6- 3	7- 3	8- 1	8-11	9- 7	10- 3	10-10	11- 6	12- 0	12- 7	13- 1	13- 7	14- 0	14- 6	14-11	15- 5	15-10	16- 3	16- 7	17- 0	17- 5	17- 9	18- 1	18- 6	18-10
2x 8	19.2	5- 9	6- 7	7- 5	8- 1	8- 9	9- 4	9-11	10- 6	11- 0	11- 6	11-11	12- 5	12-10	13- 3	13- 8	14- 0	14- 5	14-10	15- 2	15- 6	15-10	16- 3	16- 7	16-10	17- 2
	24.0	5- 2	5-11	6- 7	7- 3	7-10	8- 4	8-11	9- 4	9-10	10- 3	10- 8	11- 1	11- 6	11-10	12- 2	12- 7	12-11	13- 3	13- 7	13-11	14- 2	14- 6	14-10	15- 1	15- 5
	12.0	9- 3	10- 8	11-11	13- 1	14- 2	15- 1	16- 0	16-11	17- 9	18- 6	19- 3	20- 0	20- 8	21- 4	22- 0	22- 8	23- 3	23-11	24- 6	25- 1	25- 7				
	16.0	8- 0	9- 3	10- 4	11- 4	12- 3	13- 1	13-10	14- 8	15- 4	16- 0	16- 8	17- 4	17-11	18- 6	19- 1	19- 7	20- 2	20- 8	21- 2	21- 8	22- 2	22- 8	23- 1	23- 7	24- 0
2x10	19.2	7- 4	8- 5	9- 5	10- 4	11- 2	11-11	12- 8	13- 4	14- 0	14- 8	15- 3	15-10	16- 4	16-11	17- 5	17-11	18- 5	18-11	19- 4	19-10	20- 3	20- 8	21- 1	21- 6	21-11
	24.0	6- 6	7- 7	8- 5	9- 3	10- 0	10- 8	11- 4	11-11	12- 6	13- 1	13- 7	14- 2	14- 8	15- 1	15- 7	16- 0	16- 6	16-11	17- 4	17- 9	18- 1	18- 6	18-11	19- 3	19- 7
	12.0	11- 3	13- 0	14- 6	15-11	17- 2	18- 4	19- 6	20- 6	21- 7	22- 6	23- 5	24- 4	25- 2	26- 0											
	16.0	9- 9	11- 3	12- 7	13- 9	14-11	15-11	16-10	17- 9	18- 8	19- 6	20- 3	21- 1	21- 9	22- 6	23- 2	23-10	24- 6	25- 2	25- 9						
2x12	19.2	8-11	10- 3	11- 6	12- 7	13- 7	14- 6	15- 5	16- 3	17- 0	17- 9	18- 6	19- 3	19-11	20- 6	21- 2	21- 9	22- 5	23- 0	23- 6	24- 1	24- 8	25- 2	25- 8		
	24.0	7-11	9- 2	10- 3	11- 3	12- 2	13- 0	13- 9	14- 6	15- 3	15-11	16- 7	17- 2	17- 9	18- 4	18-11	19- 6	20- 0	20- 6	21- 1	21- 7	22- 0	22- 6	23- 0	23- 5	23-10
E	12.0	0.11	0.17	0.23	0.31	0.38	0.47	0.56	0.66	0.76	0.86	0.97	1.09	1.21	1.33	1.46	1.59	1.72	1.86	2.00	2.14	2.29	2.44	2.60		
E	16.0	0.09	0.14	0.20	0.26	0.33	0.41	0.49	0.57	0.66	0.75	0.84	0.94	1.05	1.15	1.26	1.37	1.49	1.61	1.73	1.86	1.99	2.12	2.25	2.39	2.53
E	19.2	0.09	0.13	0.18	0.24	0.30	0.37	0.44	0.52	0.60	0.68	0.77	0.86	0.95	1.05	1.15	1.25	1.36	1.47	1.58	1.70	1.81	1.93	2.05	2.18	2.31
E	24.0	0.08	0.12	0.16	0.22	0.27	0.33	0.40	0.46	0.54	0.61	0.69	0.77	0.85	0.94	1.03	1.12	1.22	1.31	1.41	1.52	1.62	1.73	1.84	1.95	2.06

Note: The required modulus of elasticity, E, in 1,000,000 pounds per square inch is shown at the bottom of each table, is limited to 2.6 million psi and less, and is applicable to all lumber sizes shown. Spans are shown in feet-inches and are limited to 26' and less. Check sources of supply for availability of lumber in lengths greater than 20'.

TABLE R-11
RAFTERS WITH L/240 DEFLECTION LIMITATION

DESIGN CRITERIA:
Strength - Live Load of 40 psf plus
Dead Load of 20 psf determines the required bending design value.
Deflection - For 40 psf live load.
Limited to span in inches divided by 240.

Rafter Bending Design Value, F_b, (psi)

Size (in)	Spacing (in)	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700
	12.0	5- 0	5-10	6- 6	7- 1	7- 8	8- 2	8- 8	9- 2	9- 7	10- 0	10- 5	10-10	11- 3	11- 7	11-11	12- 4	12- 8	13- 0	13- 3	13- 7	13-11	14- 2			
	16.0	4- 4	5- 0	5- 7	6- 2	6- 8	7- 1	7- 6	7-11	8- 4	8- 8	9- 1	9- 5	9- 9	10- 0	10- 4	10- 8	10-11	11- 3	11- 6	11- 9	12- 0	12- 4	12- 7	12-10	13- 1
2x 6	19.2	4- 0	4- 7	5- 1	5- 7	6- 1	6- 6	6-10	7- 3	7- 7	7-11	8- 3	8- 7	8-11	9- 2	9- 5	9- 9	10- 0	10- 3	10- 6	10- 9	11- 0	11- 3	11- 5	11- 8	11-11
	24.0	3- 7	4- 1	4- 7	5- 0	5- 5	5-10	6- 2	6- 6	6-10	7- 1	7- 5	7- 8	7-11	8- 2	8- 5	8- 8	8-11	9- 2	9- 5	9- 7	9-10	10- 0	10- 3	10- 5	10- 8
	12.0	6- 7	7- 8	8- 7	9- 4	10- 1	10-10	11- 6	12- 1	12- 8	13- 3	13- 9	14- 4	14-10	15- 3	15- 9	16- 3	16- 8	17- 1	17- 6	17-11	18- 4	18- 9			
	16.0	5- 9	6- 7	7- 5	8- 1	8- 9	9- 4	9-11	10- 6	11- 0	11- 6	11-11	12- 5	12-10	13- 3	13- 8	14- 0	14- 5	14-10	15- 2	15- 6	15-10	16- 3	16- 7	16-10	17- 2
2x 8	19.2	5- 3	6- 0	6- 9	7- 5	8- 0	8- 7	9- 1	9- 7	10- 0	10- 6	10-11	11- 4	11- 8	12- 1	12- 5	12-10	13- 2	13- 6	13-10	14- 2	14- 6	14-10	15- 1	15- 5	15- 8
	24.0	4- 8	5- 5	6- 0	6- 7	7- 2	7- 8	8- 1	8- 7	9- 0	9- 4	9- 9	10- 1	10- 6	10-10	11- 2	11- 6	11- 9	12- 1	12- 5	12- 8	12-11	13- 3	13- 6	13- 9	14- 0
	12.0	8- 5	9- 9	10-11	11-11	12-11	13- 9	14- 8	15- 5	16- 2	16-11	17- 7	18- 3	18-11	19- 6	20- 1	20- 8	21- 3	21-10	22- 4	22-10	23- 5	23-11			
	16.0	7- 4	8- 5	9- 5	10- 4	11- 2	11-11	12- 8	13- 4	14- 0	14- 8	15- 3	15-10	16- 4	16-11	17- 5	17-11	18- 5	18-11	19- 4	19-10	20- 3	20- 8	21- 1	21- 6	21-11
2x10	19.2	6- 8	7- 8	8- 7	9- 5	10- 2	10-11	11- 7	12- 2	12- 9	13- 4	13-11	14- 5	14-11	15- 5	15-11	16- 4	16-10	17- 3	17- 8	18- 1	18- 6	18-11	19- 3	19- 8	20- 0
	24.0	6- 0	6-11	7- 8	8- 5	9- 1	9- 9	10- 4	10-11	11- 5	11-11	12- 5	12-11	13- 4	13- 9	14- 3	14- 8	15- 0	15- 5	15-10	16- 2	16- 6	16-11	17- 3	17- 7	17-11
	12.0	10- 3	11-10	13- 3	14- 6	15- 8	16- 9	17- 9	18- 9	19- 8	20- 6	21- 5	22- 2	23- 0	23- 9	24- 5	25- 2	25-10								
	16.0	8-11	10- 3	11- 6	12- 7	13- 7	14- 6	15- 5	16- 3	17- 0	17- 9	18- 6	19- 3	19-11	20- 6	21- 2	21- 9	22- 5	23- 0	23- 6	24- 1	24- 8	25- 2	25- 8		
2x12	19.2	8- 1	9- 4	10- 6	11- 6	12- 5	13- 3	14- 1	14-10	15- 7	16- 3	16-11	17- 6	18- 2	18- 9	19- 4	19-11	20- 5	21- 0	21- 6	22- 0	22- 6	23- 0	23- 5	23-11	24- 4
	24.0	7- 3	8- 5	9- 4	10- 3	11- 1	11-10	12- 7	13- 3	13-11	14- 6	15- 1	15- 8	16- 3	16- 9	17- 3	17- 9	18- 3	18- 9	19- 3	19- 8	20- 1	20- 6	21- 0	21- 5	21- 9
E	12.0	0.11	0.17	0.24	0.31	0.39	0.48	0.57	0.67	0.77	0.88	0.99	1.10	1.22	1.35	1.48	1.61	1.75	1.89	2.03	2.18	2.33	2.48			
E	16.0	0.09	0.15	0.20	0.27	0.34	0.41	0.49	0.58	0.67	0.76	0.86	0.96	1.06	1.17	1.28	1.39	1.51	1.63	1.76	1.88	2.01	2.15	2.28	2.42	2.56
E	19.2	0.09	0.13	0.19	0.24	0.31	0.38	0.45	0.53	0.61	0.69	0.78	0.87	0.97	1.07	1.17	1.27	1.38	1.49	1.60	1.72	1.84	1.96	2.08	2.21	2.34
E	24.0	0.08	0.12	0.17	0.22	0.28	0.34	0.40	0.47	0.54	0.62	0.70	0.78	0.87	0.95	1.04	1.14	1.23	1.33	1.43	1.54	1.64	1.75	1.86	1.98	2.09

Note: The required modulus of elasticity, E, in 1,000,000 pounds per square inch is shown at the bottom of each table, is limited to 2.6 million psi and less, and is applicable to all lumber sizes shown. Spans are shown in feet-inches and are limited to 26' and less. Check sources of supply for availability of lumber in lengths greater than 20'.

TABLE R-14
RAFTERS WITH L/180 DEFLECTION LIMITATION

DESIGN CRITERIA:
Strength - Live Load of 30 psf plus
Dead Load of 10 psf determines the required bending design value.
Deflection - For 30 psf live load.
Limited to span in inches divided by 180.

Rafter Bending Design Value, F_b, (psi)

Size (in)	Spacing (in)	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000
	12.0	3- 2	3-11	4- 6	5- 1	5- 6	6- 0	6- 5	6- 9	7- 2	7- 6	7-10	8- 2	8- 5	8- 9	9- 0	9- 4	9- 7	9-10	10- 1	10- 4	10- 7	10-10	11- 1						
	16.0	2- 9	3- 5	3-11	4- 4	4-10	5- 2	5- 6	5-10	6- 2	6- 6	6- 9	7- 1	7- 4	7- 7	7-10	8- 1	8- 4	8- 6	8- 9	9- 0	9- 2	9- 5	9- 7	9- 9	10- 0				
2x 4	19.2	2- 6	3- 1	3- 7	4- 0	4- 4	4- 9	5- 1	5- 4	5- 8	5-11	6- 2	6- 5	6- 8	6-11	7- 2	7- 4	7- 7	7- 9	8- 0	8- 2	8- 5	8- 7	8- 9	8-11	9- 1	9- 3	9- 5		
	24.0	2- 3	2- 9	3- 2	3- 7	3-11	4- 3	4- 6	4-10	5- 1	5- 4	5- 6	5- 9	6- 0	6- 2	6- 5	6- 7	6- 9	7- 0	7- 2	7- 4	7- 6	7- 8	7-10	8- 0	8- 2	8- 4	8- 5	8- 7	8- 9
	12.0	5- 0	6- 2	7- 1	7-11	8- 8	9- 5	10- 0	10- 8	11- 3	11- 9	12- 4	12-10	13- 3	13- 9	14- 2	14- 8	15- 1	15- 6	15-11	16- 3	16- 8	17- 0	17- 5						
	16.0	4- 4	5- 4	6- 2	6-10	7- 6	8- 2	8- 8	9- 3	9- 9	10- 2	10- 8	11- 1	11- 6	11-11	12- 4	12- 8	13- 1	13- 5	13- 9	14- 1	14- 5	14- 9	15- 1	15- 4	15- 8				
2x 6	19.2	4- 0	4-10	5- 7	6- 3	6-10	7- 5	7-11	8- 5	8-11	9- 4	9- 9	10- 1	10- 6	10-10	11- 3	11- 7	11-11	12- 3	12- 7	12-10	13- 2	13- 6	13- 9	14- 0	14- 4	14- 7	14-10		
	24.0	3- 7	4- 4	5- 0	5- 7	6- 2	6- 8	7- 1	7- 6	7-11	8- 4	8- 8	9- 1	9- 5	9- 9	10- 0	10- 4	10- 8	10-11	11- 3	11- 6	11- 9	12- 0	12- 4	12- 7	12-10	13- 1	13- 3	13- 6	13- 9
	12.0	6- 7	8- 1	9- 4	10- 6	11- 6	12- 5	13- 3	14- 0	14-10	15- 6	16- 3	16-10	17- 6	18- 1	18- 9	19- 4	19-10	20- 5	20-11	21- 5	21-11	22- 5	22-11						
	16.0	5- 9	7- 0	8- 1	9- 1	9-11	10- 9	11- 6	12- 2	12-10	13- 5	14- 0	14- 7	15- 2	15- 8	16- 3	16- 9	17- 2	17- 8	18- 1	18- 7	19- 0	19- 5	19-10	20- 3	20- 8				
2x 8	19.2	5- 3	6- 5	7- 5	8- 3	9- 1	9- 9	10- 6	11- 1	11- 8	12- 3	12-10	13- 4	13-10	14- 4	14-10	15- 3	15- 8	16- 2	16- 7	16-11	17- 4	17- 9	18- 1	18- 6	18-10	19- 3	19- 7		
	24.0	4- 8	5- 9	6- 7	7- 5	8- 1	8- 9	9- 4	9-11	10- 6	11- 0	11- 6	11-11	12- 5	12-10	13- 3	13- 8	14- 0	14- 5	14-10	15- 2	15- 6	15-10	16- 3	16- 7	16-10	17- 2	17- 6	17-10	18- 1
	12.0	8- 5	10- 4	11-11	13- 4	14- 8	15-10	16-11	17-11	18-11	19-10	20- 8	21- 6	22- 4	23- 1	23-11	24- 7	25- 4	26- 0											
	16.0	7- 4	8-11	10- 4	11- 7	12- 8	13- 8	14- 8	15- 6	16- 4	17- 2	17-11	18- 8	19- 4	20- 0	20- 8	21- 4	21-11	22- 6	23- 1	23- 8	24- 3	24-10	25- 4	25-10					
2x10	19.2	6- 8	8- 2	9- 5	10- 7	11- 7	12- 6	13- 4	14- 2	14-11	15- 8	16- 4	17- 0	17- 8	18- 3	18-11	19- 6	20- 0	20- 7	21- 1	21- 8	22- 2	22- 8	23- 1	23- 7	24- 1	24- 6	25- 0		
	24.0	6- 0	7- 4	8- 5	9- 5	10- 4	11- 2	11-11	12- 8	13- 4	14- 0	14- 8	15- 3	15-10	16- 4	16-11	17- 5	17-11	18- 5	18-11	19- 4	19-10	20- 3	20- 8	21- 1	21- 6	21-11	22- 4	22- 9	23- 1
E	12.0	0.06	0.11	0.17	0.24	0.32	0.40	0.49	0.59	0.69	0.79	0.91	1.02	1.14	1.27	1.39	1.53	1.66	1.80	1.95	2.10	2.25	2.40	2.56						
E	16.0	0.05	0.10	0.15	0.21	0.28	0.35	0.43	0.51	0.60	0.69	0.78	0.88	0.99	1.10	1.21	1.32	1.44	1.56	1.69	1.82	1.95	2.08	2.22	2.36	2.50				
E	19.2	0.05	0.09	0.14	0.19	0.25	0.32	0.39	0.47	0.54	0.63	0.72	0.81	0.90	1.00	1.10	1.21	1.32	1.43	1.54	1.66	1.78	1.90	2.03	2.15	2.28	2.42	2.55		
E	24.0	0.04	0.08	0.12	0.17	0.23	0.29	0.35	0.42	0.49	0.56	0.64	0.72	0.81	0.89	0.99	1.08	1.18	1.28	1.38	1.48	1.59	1.70	1.81	1.93	2.04	2.16	2.28	2.41	2.53

Note: The required modulus of elasticity, E, in 1,000,000 pounds per square inch is shown at the bottom of each table, is limited to 2.6 million psi and less, and is applicable to all lumber sizes shown. Spans are shown in feet-inches and are limited to 26' and less. Check sources of supply for availability of lumber in lengths greater than 20'.

TABLE R-15
RAFTERS WITH L/180 DEFLECTION LIMITATION

DESIGN CRITERIA:
Strength - Live Load of 40 psf plus
Dead Load of 10 psf determines the required bending design value.
Deflection - For 40 psf live load.
Limited to span in inches divided by 180.

Rafter Bending Design Value, F_b, (psi)

Size (in)	Spacing (in)	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000
	12.0	2-10	3- 6	4- 0	4- 6	4-11	5- 4	5- 9	6- 1	6- 5	6- 8	7- 0	7- 3	7- 7	7-10	8- 1	8- 4	8- 7	8-10	9- 0	9- 3	9- 6	9- 8	9-11	10- 1					
	16.0	2- 6	3- 0	3- 6	3-11	4- 3	4- 8	4-11	5- 3	5- 6	5-10	6- 1	6- 4	6- 7	6- 9	7- 0	7- 3	7- 5	7- 8	7-10	8- 0	8- 2	8- 5	8- 7	8- 9	8-11	9- 1			
2x 4	19.2	2- 3	2- 9	3- 2	3- 7	3-11	4- 3	4- 6	4-10	5- 1	5- 4	5- 6	5- 9	6- 0	6- 2	6- 5	6- 7	6- 9	7- 0	7- 2	7- 4	7- 6	7- 8	7-10	8- 0	8- 2	8- 4	8- 5	8- 7	
	24.0	2- 0	2- 6	2-10	3- 2	3- 6	3- 9	4- 0	4- 3	4- 6	4- 9	4-11	5- 2	5- 4	5- 6	5- 9	5-11	6- 1	6- 3	6- 5	6- 7	6- 8	6-10	7- 0	7- 2	7- 3	7- 5	7- 7	7- 8	7-10
	12.0	4- 6	5- 6	6- 4	7- 1	7- 9	8- 5	9- 0	9- 6	10- 0	10- 6	11- 0	11- 5	11-11	12- 4	12- 8	13- 1	13- 6	13-10	14- 2	14- 7	14-11	15- 3	15- 7	15-11					
	16.0	3-11	4- 9	5- 6	6- 2	6- 9	7- 3	7- 9	8- 3	8- 8	9- 1	9- 6	9-11	10- 3	10- 8	11- 0	11- 4	11- 8	12- 0	12- 4	12- 7	12-11	13- 2	13- 6	13- 9	14- 0	14- 3			
2x 6	19.2	3- 7	4- 4	5- 0	5- 7	6- 2	6- 8	7- 1	7- 6	7-11	8- 4	8- 8	9- 1	9- 5	9- 9	10- 0	10- 4	10- 8	10-11	11- 3	11- 6	11- 9	12- 0	12- 4	12- 7	12-10	13- 1	13- 3	13- 6	
	24.0	3- 2	3-11	4- 6	5- 0	5- 6	5-11	6- 4	6- 9	7- 1	7- 5	7- 9	8- 1	8- 5	8- 8	9- 0	9- 3	9- 6	9- 9	10- 0	10- 3	10- 6	10- 9	11- 0	11- 3	11- 5	11- 8	11-11	12- 1	12- 4
	12.0	5-11	7- 3	8- 4	9- 4	10- 3	11- 1	11-10	12- 7	13- 3	13-11	14- 6	15- 1	15- 8	16- 3	16- 9	17- 3	17- 9	18- 3	18- 9	19- 2	19- 8	20- 1	20- 6	20-11					
	16.0	5- 2	6- 3	7- 3	8- 1	8-11	9- 7	10- 3	10-10	11- 6	12- 0	12- 7	13- 1	13- 7	14- 0	14- 6	14-11	15- 5	15-10	16- 3	16- 7	17- 0	17- 5	17- 9	18- 1	18- 6	18-10			
2x 8	19.2	4- 8	5- 9	6- 7	7- 5	8- 1	8- 9	9- 4	9-11	10- 6	11- 0	11- 6	11-11	12- 5	12-10	13- 3	13- 8	14- 0	14- 5	14-10	15- 2	15- 6	15-10	16- 3	16- 7	16-10	17- 2	17- 6	17-10	
	24.0	4- 2	5- 2	5-11	6- 7	7- 3	7-10	8- 4	8-11	9- 4	9-10	10- 3	10- 8	11- 1	11- 6	11-10	12- 2	12- 7	12-11	13- 3	13- 7	13-11	14- 2	14- 6	14-10	15- 1	15- 5	15- 8	15-11	16- 3
	12.0	7- 7	9- 3	10- 8	11-11	13- 1	14- 2	15- 1	16- 0	16-11	17- 9	18- 6	19- 3	20- 0	20- 8	21- 4	22- 0	22- 8	23- 3	23-11	24- 6	25- 1	25- 7							
	16.0	6- 6	8- 0	9- 3	10- 4	11- 4	12- 3	13- 1	13-10	14- 8	15- 4	16- 0	16- 8	17- 4	17-11	18- 6	19- 1	19- 7	20- 2	20- 8	21- 2	21- 8	22- 2	22- 8	23- 1	23- 7	24- 0			
2x10	19.2	6- 0	7- 4	8- 5	9- 5	10- 4	11- 2	11-11	12- 8	13- 4	14- 0	14- 8	15- 3	15-10	16- 4	16-11	17- 5	17-11	18- 5	18-11	19- 4	19-10	20- 3	20- 8	21- 1	21- 6	21-11	22- 4	22- 9	
	24.0	5- 4	6- 6	7- 7	8- 5	9- 3	10- 0	10- 8	11- 4	11-11	12- 6	13- 1	13- 7	14- 2	14- 8	15- 1	15- 7	16- 0	16- 6	16-11	17- 4	17- 9	18- 1	18- 6	18-11	19- 3	19- 7	20- 0	20- 4	20- 8
E	12.0	0.06	0.11	0.17	0.23	0.31	0.38	0.47	0.56	0.66	0.76	0.86	0.97	1.09	1.21	1.33	1.46	1.59	1.72	1.86	2.00	2.14	2.29	2.44	2.60					
E	16.0	0.05	0.09	0.14	0.20	0.26	0.33	0.41	0.49	0.57	0.66	0.75	0.84	0.94	1.05	1.15	1.26	1.37	1.49	1.61	1.73	1.86	1.99	2.12	2.25	2.39	2.53			
E	19.2	0.05	0.09	0.13	0.18	0.24	0.30	0.37	0.44	0.52	0.60	0.68	0.77	0.86	0.95	1.05	1.15	1.25	1.36	1.47	1.58	1.70	1.81	1.93	2.05	2.18	2.31	2.43	2.57	
E	24.0	0.04	0.08	0.12	0.16	0.22	0.27	0.33	0.40	0.46	0.54	0.61	0.69	0.77	0.85	0.94	1.03	1.12	1.22	1.31	1.41	1.52	1.62	1.73	1.84	1.95	2.06	2.18	2.30	2.41

Note: The required modulus of elasticity, E, in 1,000,000 pounds per square inch is shown at the bottom of each table, is limited to 2.6 million psi and less, and is applicable to all lumber sizes shown. Spans are shown in feet-inches and are limited to 26' and less. Check sources of supply for availability of lumber in lengths greater than 20'.

TABLE R-22
RAFTERS WITH L/180 DEFLECTION LIMITATION

DESIGN CRITERIA:
Strength - Live Load of 30 psf plus
Dead Load of 20 psf determines the required bending design value.
Deflection - For 30 psf live load.
Limited to span in inches divided by 180.

Rafter Bending Design Value, F_b, (psi)

Size (in)	Spacing (in)	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000
	12.0	2-10	3- 6	4- 0	4- 6	4-11	5- 4	5- 9	6- 1	6- 5	6- 8	7- 0	7- 3	7- 7	7-10	8- 1	8- 4	8- 7	8-10	9- 0	9- 3	9- 6	9- 8	9-11	10- 1	10- 4	10- 6	10- 8	10-11	11- 1
	16.0	2- 6	3- 0	3- 6	3-11	4- 3	4- 8	4-11	5- 3	5- 6	5-10	6- 1	6- 4	6- 7	6- 9	7- 0	7- 3	7- 5	7- 8	7-10	8- 0	8- 2	8- 5	8- 7	8- 9	8-11	9- 1	9- 3	9- 5	9- 7
2x 4	19.2	2- 3	2- 9	3- 2	3- 7	3-11	4- 3	4- 6	4-10	5- 1	5- 4	5- 6	5- 9	6- 0	6- 2	6- 5	6- 7	6- 9	7- 0	7- 2	7- 4	7- 6	7- 8	7-10	8- 0	8- 2	8- 4	8- 5	8- 7	8- 9
	24.0	2- 0	2- 6	2-10	3- 2	3- 6	3- 9	4- 0	4- 3	4- 6	4- 9	4-11	5- 2	5- 4	5- 6	5- 9	5-11	6- 1	6- 3	6- 5	6- 7	6- 8	6-10	7- 0	7- 2	7- 3	7- 5	7- 7	7- 8	7-10
	12.0	4- 6	5- 6	6- 4	7- 1	7- 9	8- 5	9- 0	9- 6	10- 0	10- 6	11- 0	11- 5	11-11	12- 4	12- 8	13- 1	13- 6	13-10	14- 2	14- 7	14-11	15- 3	15- 7	15-11	16- 2	16- 6	16-10	17- 1	17- 5
	16.0	3-11	4- 9	5- 6	6- 2	6- 9	7- 3	7- 9	8- 3	8- 8	9- 1	9- 6	9-11	10- 3	10- 8	11- 0	11- 4	11- 8	12- 0	12- 4	12- 7	12-11	13- 2	13- 6	13- 9	14- 0	14- 3	14- 7	14-10	15- 1
2x 6	19.2	3- 7	4- 4	5- 0	5- 7	6- 2	6- 8	7- 1	7- 6	7-11	8- 4	8- 8	9- 1	9- 5	9- 9	10- 0	10- 4	10- 8	10-11	11- 3	11- 6	11- 9	12- 0	12- 4	12- 7	12-10	13- 1	13- 3	13- 6	13- 9
	24.0	3- 2	3-11	4- 6	5- 0	5- 6	5-11	6- 4	6- 9	7- 1	7- 5	7- 9	8- 1	8- 5	8- 8	9- 0	9- 3	9- 6	9- 9	10- 0	10- 3	10- 6	10- 9	11- 0	11- 3	11- 5	11- 8	11-11	12- 1	12- 4
	12.0	5-11	7- 3	8- 4	9- 4	10- 3	11- 1	11-10	12- 7	13- 3	13-11	14- 6	15- 1	15- 8	16- 3	16- 9	17- 3	17- 9	18- 3	18- 9	19- 2	19- 8	20- 1	20- 6	20-11	21- 4	21- 9	22- 2	22- 6	22-11
	16.0	5- 2	6- 3	7- 3	8- 1	8-11	9- 7	10- 3	10-10	11- 6	12- 0	12- 7	13- 1	13- 7	14- 0	14- 6	14-11	15- 5	15-10	16- 3	16- 7	17- 0	17- 5	17- 9	18- 1	18- 6	18-10	19- 2	19- 6	19-10
2x 8	19.2	4- 8	5- 9	6- 7	7- 5	8- 1	8- 9	9- 4	9-11	10- 6	11- 0	11- 6	11-11	12- 5	12-10	13- 3	13- 8	14- 0	14- 5	14-10	15- 2	15- 6	15-10	16- 3	16- 7	16-10	17- 2	17- 6	17-10	18- 1
	24.0	4- 2	5- 2	5-11	6- 7	7- 3	7-10	8- 4	8-11	9- 4	9-10	10- 3	10- 8	11- 1	11- 6	11-10	12- 2	12- 7	12-11	13- 3	13- 7	13-11	14- 2	14- 6	14-10	15- 1	15- 5	15- 8	15-11	16- 3
	12.0	7- 7	9- 3	10- 8	11-11	13- 1	14- 2	15- 1	16- 0	16-11	17- 9	18- 6	19- 3	20- 0	20- 8	21- 4	22- 0	22- 8	23- 3	23-11	24- 6	25- 1	25- 7							
	16.0	6- 6	8- 0	9- 3	10- 4	11- 4	12- 3	13- 1	13-10	14- 8	15- 4	16- 0	16- 8	17- 4	17-11	18- 6	19- 1	19- 7	20- 2	20- 8	21- 2	21- 8	22- 2	22- 8	23- 1	23- 7	24- 0	24- 6	24-11	25- 4
2x10	19.2	6- 0	7- 4	8- 5	9- 5	10- 4	11- 2	11-11	12- 8	13- 4	14- 0	14- 8	15- 3	15-10	16- 4	16-11	17- 5	17-11	18- 5	18-11	19- 4	19-10	20- 3	20- 8	21- 1	21- 6	21-11	22- 4	22- 9	23- 1
	24.0	5- 4	6- 6	7- 7	8- 5	9- 3	10- 0	10- 8	11- 4	11-11	12- 6	13- 1	13- 7	14- 2	14- 8	15- 1	15- 7	16- 0	16- 6	16-11	17- 4	17- 9	18- 1	18- 6	18-11	19- 3	19- 7	20- 0	20- 4	20- 8
E	12.0	0.04	0.08	0.12	0.17	0.23	0.29	0.35	0.42	0.49	0.57	0.65	0.73	0.82	0.91	1.00	1.09	1.19	1.29	1.39	1.50	1.61	1.72	1.83	1.95	2.07	2.19	2.31	2.43	2.56
E	16.0	0.04	0.07	0.11	0.15	0.20	0.25	0.31	0.36	0.43	0.49	0.56	0.63	0.71	0.78	0.86	0.95	1.03	1.12	1.21	1.30	1.39	1.49	1.59	1.69	1.79	1.89	2.00	2.11	2.22
E	19.2	0.03	0.06	0.10	0.14	0.18	0.23	0.28	0.33	0.39	0.45	0.51	0.58	0.65	0.72	0.79	0.86	0.94	1.02	1.10	1.19	1.27	1.36	1.45	1.54	1.63	1.73	1.83	1.92	2.03
E	24.0	0.03	0.06	0.09	0.12	0.16	0.20	0.25	0.30	0.35	0.40	0.46	0.52	0.58	0.64	0.71	0.77	0.84	0.91	0.99	1.06	1.14	1.22	1.30	1.38	1.46	1.55	1.63	1.72	1.81

Note: The required modulus of elasticity, E, in 1,000,000 pounds per square inch is shown at the bottom of each table, is limited to 2.6 million psi and less, and is applicable to all lumber sizes shown. Spans are shown in feet-inches and are limited to 26' and less. Check sources of supply for availability of lumber in lengths greater than 20'.

TABLE R-23
RAFTERS WITH L/180 DEFLECTION LIMITATION

DESIGN CRITERIA:
Strength - Live Load of 40 psf plus
Dead Load of 20 psf determines the required bending design value.
Deflection - For 40 psf live load.
Limited to span in inches divided by 180.

Rafter Bending Design Value, F_b, (psi)

Size (in)	Spacing (in)	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700	2800	2900	3000
	12.0	2- 7	3- 2	3- 8	4- 1	4- 6	4-11	5- 3	5- 6	5-10	6- 1	6- 5	6- 8	6-11	7- 2	7- 5	7- 7	7-10	8- 0	8- 3	8- 5	8- 8	8-10	9- 0	9- 3	9- 5	9- 7	9- 9	9-11	10- 1
	16.0	2- 3	2- 9	3- 2	3- 7	3-11	4- 3	4- 6	4-10	5- 1	5- 4	5- 6	5- 9	6- 0	6- 2	6- 5	6- 7	6- 9	7- 0	7- 2	7- 4	7- 6	7- 8	7-10	8- 0	8- 2	8- 4	8- 5	8- 7	8- 9
2x 4	19.2	2- 1	2- 6	2-11	3- 3	3- 7	3-10	4- 1	4- 4	4- 7	4-10	5- 1	5- 3	5- 5	5- 8	5-10	6- 0	6- 2	6- 4	6- 6	6- 8	6-10	7- 0	7- 2	7- 3	7- 5	7- 7	7- 9	7-10	8- 0
	24.0	1-10	2- 3	2- 7	2-11	3- 2	3- 5	3- 8	3-11	4- 1	4- 4	4- 6	4- 8	4-11	5- 1	5- 3	5- 5	5- 6	5- 8	5-10	6- 0	6- 1	6- 3	6- 5	6- 6	6- 8	6- 9	6-11	7- 0	7- 2
	12.0	4- 1	5- 0	5-10	6- 6	7- 1	7- 8	8- 2	8- 8	9- 2	9- 7	10- 0	10- 5	10-10	11- 3	11- 7	11-11	12- 4	12- 8	13- 0	13- 3	13- 7	13-11	14- 2	14- 6	14- 9	15- 1	15- 4	15- 7	15-11
	16.0	3- 7	4- 4	5- 0	5- 7	6- 2	6- 8	7- 1	7- 6	7-11	8- 4	8- 8	9- 1	9- 5	9- 9	10- 0	10- 4	10- 8	10-11	11- 3	11- 6	11- 9	12- 0	12- 4	12- 7	12-10	13- 1	13- 3	13- 6	13- 9
2x 6	19.2	3- 3	4- 0	4- 7	5- 1	5- 7	6- 1	6- 6	6-10	7- 3	7- 7	7-11	8- 3	8- 7	8-11	9- 2	9- 5	9- 9	10- 0	10- 3	10- 6	10- 9	11- 0	11- 3	11- 5	11- 8	11-11	12- 2	12- 4	12- 7
	24.0	2-11	3- 7	4- 1	4- 7	5- 0	5- 5	5-10	6- 2	6- 6	6-10	7- 1	7- 5	7- 8	7-11	8- 2	8- 5	8- 8	8-11	9- 2	9- 5	9- 7	9-10	10- 0	10- 3	10- 5	10- 8	10-10	11- 0	11- 3
	12.0	5- 5	6- 7	7- 8	8- 7	9- 4	10- 1	10-10	11- 6	12- 1	12- 8	13- 3	13- 9	14- 4	14-10	15- 3	15- 9	16- 3	16- 8	17- 1	17- 6	17-11	18- 4	18- 9	19- 1	19- 6	19-10	20- 3	20- 7	20-11
	16.0	4- 8	5- 9	6- 7	7- 5	8- 1	8- 9	9- 4	9-11	10- 6	11- 0	11- 6	11-11	12- 5	12-10	13- 3	13- 8	14- 0	14- 5	14-10	15- 2	15- 6	15-10	16- 3	16- 7	16-10	17- 2	17- 6	17-10	18- 1
2x 8	19.2	4- 3	5- 3	6- 0	6- 9	7- 5	8- 0	8- 7	9- 1	9- 7	10- 0	10- 6	10-11	11- 4	11- 8	12- 1	12- 5	12-10	13- 2	13- 6	13-10	14- 2	14- 6	14-10	15- 1	15- 5	15- 8	16- 0	16- 3	16- 7
	24.0	3-10	4- 8	5- 5	6- 0	6- 7	7- 2	7- 8	8- 1	8- 7	9- 0	9- 4	9- 9	10- 1	10- 6	10-10	11- 2	11- 6	11- 9	12- 1	12- 5	12- 8	12-11	13- 3	13- 6	13- 9	14- 0	14- 4	14- 7	14-10
	12.0	6-11	8- 5	9- 9	10-11	11-11	12-11	13- 9	14- 8	15- 5	16- 2	16-11	17- 7	18- 3	18-11	19- 6	20- 1	20- 8	21- 3	21-10	22- 4	22-10	23- 5	23-11	24- 5	24-10	25- 4	25-10		
	16.0	6- 0	7- 4	8- 5	9- 5	10- 4	11- 2	11-11	12- 8	13- 4	14- 0	14- 8	15- 3	15-10	16- 4	16-11	17- 5	17-11	18- 5	18-11	19- 4	19-10	20- 3	20- 8	21- 1	21- 6	21-11	22- 4	22- 9	23- 1
2x10	19.2	5- 5	6- 8	7- 8	8- 7	9- 5	10- 2	10-11	11- 7	12- 2	12- 9	13- 4	13-11	14- 5	14-11	15- 5	15-11	16- 4	16-10	17- 3	17- 8	18- 1	18- 6	18-11	19- 3	19- 8	20- 0	20- 5	20- 9	21- 1
	24.0	4-11	6- 0	6-11	7- 8	8- 5	9- 1	9- 9	10- 4	10-11	11- 5	11-11	12- 5	12-11	13- 4	13- 9	14- 3	14- 8	15- 0	15- 5	15-10	16- 2	16- 6	16-11	17- 3	17- 7	17-11	18- 3	18- 7	18-11
E	12.0	0.04	0.08	0.13	0.18	0.23	0.29	0.36	0.43	0.50	0.58	0.66	0.74	0.83	0.92	1.01	1.11	1.21	1.31	1.41	1.52	1.63	1.74	1.86	1.98	2.10	2.22	2.34	2.47	2.60
E	16.0	0.04	0.07	0.11	0.15	0.20	0.25	0.31	0.37	0.43	0.50	0.57	0.64	0.72	0.80	0.88	0.96	1.05	1.13	1.22	1.32	1.41	1.51	1.61	1.71	1.82	1.92	2.03	2.14	2.25
E	19.2	0.04	0.06	0.10	0.14	0.18	0.23	0.28	0.34	0.40	0.46	0.52	0.59	0.65	0.73	0.80	0.88	0.95	1.04	1.12	1.20	1.29	1.38	1.47	1.56	1.66	1.75	1.85	1.95	2.05
E	24.0	0.03	0.06	0.09	0.13	0.16	0.21	0.25	0.30	0.35	0.41	0.46	0.52	0.59	0.65	0.72	0.78	0.85	0.93	1.00	1.08	1.15	1.23	1.31	1.40	1.48	1.57	1.66	1.75	1.84

Note: The required modulus of elasticity, E, in 1,000,000 pounds per square inch is shown at the bottom of each table, is limited to 2.6 million psi and less, and is applicable to all lumber sizes shown. Spans are shown in feet-inches and are limited to 26' and less. Check sources of supply for availability of lumber in lengths greater than 20'.

Design Values for Joists and Rafters

These "Fb" values are for use where repetitive members are spaced not more than 24 inches. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, "Fb"		Modulus of Elasticity "E"	Grading Rules Agency
		Normal Duration	Snow Loading		
Cottonwood					
Select Structural	2x4	1510	1735	1,200,000	NSLB
No.1		1080	1240	1,200,000	
No.2		1080	1240	1,100,000	
No.3		605	695	1,000,000	
Stud		600	690	1,000,000	
Construction		805	925	1,000,000	
Standard		460	530	900,000	
Utility		200	230	900,000	
Select Structural	2x6	1310	1505	1,200,000	
No.1		935	1075	1,200,000	
No.2		935	1075	1,100,000	
No.3		525	600	1,000,000	
Stud		545	630	1,000,000	
Select Structural	2x8	1210	1390	1,200,000	
No.1		865	990	1,200,000	
No.2		865	990	1,100,000	
No.3		485	555	1,000,000	
Select Structural	2xl0	1105	1275	1,200,000	
No.1		790	910	1,200,000	
No.2		790	910	1,100,000	
No.3		445	510	1,000,000	
Select Structural	2xl2	1005	1155	1,200,000	
No.1		720	825	1,200,000	
No.2		720	825	1,100,000	
No.3		405	465	1,000,000	
Douglas Fir-Larch					
Select Structural	2x4	2500	2875	1,900,000	WCLIB WWPA
No.1 & Btr		1985	2280	1,800,000	
No.1		1725	1985	1,700,000	
No.2		1510	1735	1,600,000	
No.3		865	990	1,400,000	
Stud		855	980	1,400,000	
Construction		1150	1325	1,500,000	
Standard		635	725	1,400,000	
Utility		315	365	1,300,000	
Select Structural	2x6	2170	2495	1,900,000	
No.1 & Btr		1720	1975	1,800,000	
No.1		1495	1720	1,700,000	
No.2		1310	1505	1,600,000	
No.3		750	860	1,400,000	
Stud		775	895	1,400,000	
Select Structural	2x8	2000	2300	1,900,000	
No.1 & Str		1585	1825	1,800,000	
No.1		1380	1585	1,700,000	
No.2		1210	1390	1,600,000	
No.3		690	795	1,400,000	
Select Structural	2xl0	1835	2110	1,900,000	
No.1 & Btr		1455	1675	1,800,000	
No.1		1265	1455	1,700,000	
No.2		1105	1275	1,600,000	
No.3		635	725	1,400,000	
Select Structural	2xl2	1670	1920	1,900,000	
No.1 & Btr		1325	1520	1,800,000	
No.1		1150	1325	1,700,000	
No.2		1005	1155	1,600,000	
No.3		575	660	1,400,000	

Species and Grade	Size	Design Value in Bending, "Fb"		Modulus of Elasticity "E"	Grading Rules Agency
		Normal Duration	Snow Loading		
Douglas Fir-Larch (North)					
Select Structural	2x4	2245	2580	1,900,000	NLGA
No.1 /No.2		1425	1635	1,600,000	
No.3		820	940	1,400,000	
Stud		820	945	1,400,000	
Construction		1095	1255	1,500,000	
Standard		605	695	1,400,000	
Utility		290	330	1,300,000	
Select Structural	2x6	1945	2235	1,900,000	
No.1 /No.2		1235	1420	1,600,000	
No.3		710	815	1,400,000	
Stud		750	860	1,400,000	
Select Structural	2x8	1795	2065	1,900,000	
No.1 /No.2		1140	1310	1,600,000	
No.3		655	755	1,400,000	
Select Structural	2x10	1645	1890	1,900,000	
No.1 /No-2		1045	1200	1,600,000	
No.3		600	690	1,400,000	
Select Structural	2xl2	1495	1720	1,900,000	
No.1 /No.2		950	1090	1,600,000	
No.3		545	630	1,400,000	
Douglas Fir-South					
Select Structural	2x4	2245	2580	1,400,000	WWPA
No.1		1555	1785	1,300,000	
No.2		1425	1635	1,200,000	
No.3		820	940	1,100,000	
Stud		820	945	1,100,000	
Construction		1065	1225	1,200,000	
Standard		605	695	1,100,000	
Utility		290	330	1,000,000	
Select Structural	2x6	1945	2235	1,400,000	
No.1		1345	1545	1,300,000	
No.2		1235	1420	1,200,000	
No.3		710	815	1,100,000	
Stud		750	860	1,100,000	
Select Structural	2x8	1795	2065	1,400,000	
No.1		1240	1430	1,300,000	
No.2		1140	1310	1,200,000	
No.3		655	755	1,100,000	
Select Structural	2x10	1645	1890	1,400,000	
No.1		1140	1310	1,300,000	
No.2		1045	1200	1,200,000	
No.3		600	690	1,100,000	
Select Structural	2xl2	1495	1720	1,400,000	
No.1		1035	1190	1,300,000	
No.2		950	1090	1,200,000	
No.3		545	630	1,100,000	

Species and Grade	Size	Design Value in Bending, "Fb"		Modulus of Elasticity "E"	Grading Rules Agency
		Normal Duration	Snow Loading		
Eastern Hemlock-Tamarack					
Select Structural	2x4	2155	2480	1,200,000	NELMA NSLB
No.1		1335	1535	1,100,000	
No.2		990	1140	1,100,000	
No.3		605	695	900,000	
Stud		570	655	900,000	
Construction		775	895	1,000,000	
Standard		430	495	900,000	
Utility		200	230	800,000	
Select Structural	2x6	1870	2150	1,200,000	
No.1		1160	1330	1,100,000	
No.2		860	990	1,100,000	
No.3		525	600	900,000	
Stud		520	595	900,000	
Select Structural	2x8	1725	1985	1,200,000	
No.1		1070	1230	1,100,000	
No.2		795	915	1,100,000	
No.3		485	555	900,000	
Select Structural	2xl0	1580	1820	1,200,000	
No.1		980	1125	1,100,000	
No.2		725	835	1,100,000	
No.3		445	510	900,000	
Select Structural	2xl2	1440	1655	1,200,000	
No.1		890	1025	1,100,000	
No.2		660	760	1,100,000	
No.3		405	465	900,000	
Eastern Softwoods					
Select Structural	2x4	2155	2480	1,200,000	NELMA NSLB
No.1		1335	1535	1,100,000	
No.2		990	1140	1,100,000	
No.3		605	695	900,000	
Stud		570	655	900,000	
Construction		775	895	1,000,000	
Standard		430	495	900,000	
Utility		200	230	800,000	
Select Structural	2x6	1870	2150	1,200,000	
No.1		1160	1330	1,100,000	
No.2		860	990	1,100,000	
No.3		525	600	900,000	
Stud		520	595	900,000	
Select Structural	2x8	1725	1985	1,200,000	
No.1		1070	1230	1,100,000	
No.2		795	915	1,100,000	
No.3		485	555	900,000	
Select Structural	2xl0	1580	1820	1,200,000	
No.1		980	1125	1,100,000	
No.2		725	835	1,100,000	
No.3		445	510	900,000	
Select Structural	2xl2	1440	1655	1,200,000	
No.1		890	1025	1,100,000	
No.2		660	760	1,100,000	
No.3		405	465	900,000	

Species and Grade	Size	Design Value in Bending, "Fb"		Modulus of Elasticity "E"	Grading Rules Agency
		Normal Duration	Snow Loading		
Eastern White Pine					
Select Structural	2x4	2155	2480	1,200,000	NELMA NSLB
No.1		1335	1535	1,100,000	
No.2		990	1140	1,100,000	
No.3		605	695	900,000	
Stud		570	655	900,000	
Construction		775	895	1,000,000	
Standard		430	495	900,000	
Utility		200	230	800,000	
Select Structural	2x6	1870	2150	1,200,000	
No.1		1160	1330	1,100,000	
No.2		860	990	1,100,000	
No.3		525	600	900,000	
Stud		520	595	900,000	
Select Structural	2x8	1725	1985	1,200,000	
No.1		1070	1230	1,100,000	
No.2		795	915	1,100,000	
No.3		485	555	900,000	
Select Structural	2xl0	1580	1820	1,200,000	
No.1		980	1125	1,100,000	
No.2		725	835	1,100,000	
No.3		445	510	900,000	
Select Structural	2xl2	1440	1655	1,200,000	
No.1		890	1025	1,100,000	
No.2		660	760	1,100,000	
No.3		405	465	900,000	
Hem Fir					
Select Structural	2x4	2415	2775	1,600,000	WCLIB WWPA
No.1 & Btr		1810	2085	1,500,000	
No.1		1640	1885	1,500,000	
No.2		1465	1685	1,300,000	
No.3		865	990	1,200,000	
Stud		855	980	1,200,000	
Construction		1120	1290	1,300,000	
Standard		635	725	1,200,000	
Utility		290	330	1,100,000	
Select Structural	2x6	2095	2405	1,600,000	
No.1 & Btr		1570	1805	1,500,000	
No.1		1420	1635	1,500,000	
No.2		1270	1460	1,300,000	
No.3		750	860	1,200,000	
Stud		775	895	1,200,000	
Select Structural	2x8	1930	2220	1,600,000	
No.1 & Btr		1450	1665	1,500,000	
No.1		1310	1510	1,500,000	
No.2		1175	1350	1,300,000	
No.3		690	795	1,200,000	
Select Structural	2xl0	1770	2035	1,600,000	
No.1 & Btr		1330	1525	1,500,000	
No.1		1200	1380	1,500,000	
No.2		1075	1235	1,300,000	
No.3		635	725	1,200,000	
Select Structural	2xl2	1610	1850	1,600,000	
No.1 & Btr		1210	1390	1,500,000	
No.1		1095	1255	1,500,000	
No.2		980	1125	1,300,000	
No.3		575	660	1,200,000	

Species and Grade	Size	Design Value in Bending, "Fb"		Modulus of Elasticity "E"	Grading Rules Agency
		Normal Duration	Snow Loading		
Hem-Fir (North)					
Select Structural	2x4	2245	2580	1,700,000	NLGA
No.1 /No.2		1725	1985	1,600,000	
No.3		990	1140	1,400,000	
Stud		980	1125	1,400,000	
Construction		1325	1520	1,500,000	
Standard		720	825	1,400,000	
Utility		345	395	1,300,000	
Select Structural	2x6	1945	2235	1,700,000	
No.1 /No.2		1495	1720	1,600,000	
No.3		860	990	1,400,000	
Stud		890	1025	1,400,000	
Select Structural	2x8	1795	2065	1,700,000	
No.1 /No.2		1380	1585	1,600,000	
No.3		795	915	1,400,000	
Select Structural	2xl0	1645	1890	1,700,000	
No.1 /No.2		1265	1455	1,600,000	
No.3		725	835	1,400,000	
Select Structural	2xl2	1495	1720	1,700,000	
No.1 /No.2		1150	1325	1,600,000	
No.3		660	760	1,400,000	
Mixed Maple					
Select Structural	2x4	1725	1985	1,300,000	NELMA
No.1		1250	1440	1,200,000	
No.2		1210	1390	1,100,000	
No.3		690	795	1,000.000	
Stud		695	Boo	1,000,000	
Construction		920	1060	1,100,000	
Standard		520	595	1,000,000	
Utility		260	300	900,000	
Select Structural	2x6	1495	1720	1,300,000	
No.1		1085	1245	1,200,000	
No.2		1045	1205	1,100,000	
No.3		600	690	1,000,000	
Stud		635	725	1,000,000	
Select Structural	2x8	1380	1585	1,300,000	
No.1		1000	1150	1,200,000	
No.2		965	1110	1,100,000	
No.3		550	635	1,000,000	
Select Structural	2xl0	1265	1455	1,300,000	
No.1		915	1055	1,200,000	
No.2		885	1020	1,100,000	
No.3		505	580	1,000,000	
Select Structural	2xl2	1150	1325	1,300,000	
No.1		835	960	1,200,000	
No.2		805	925	1,100,000	
No.3		460	530	1,000,000	

Species and Grade	Size	Design Value in Bending, "Fb"		Modulus of Elasticity "E"	Grading Rules Agency
		Normal Duration	Snow Loading		
Mixed Oak					
Select Structural	2x4	1985	2280	1,100,000	NELMA
No.1		1425	1635	1,000,000	
No.2		1380	1585	900,000	
No.3		820	940	800,000	
Stud		790	910	800,000	
Construction		1065	1225	900,000	
Standard		605	695	800,000	
Utility		290	330	800,000	
Select Structural	2x6	1720	1975	1,100,000	
No.1		1235	1420	1,000,000	
No.2		1195	1375	900,000	
No.3		710	815	800,000	
Stud		720	825	800,000	
Select Structural	2x8	1585	1825	1,100,000	
No.1		1140	1310	1,000,000	
No.2		1105	1270	900,000	
No.3		655	755	800,000	
Select Structural	2xl0	1455	1675	1,100,000	
No.1		1045	1200	1,000,000	
No.2		1010	1165	900,000	
No.3		600	690	800,000	
Select Structural	2xl2	1325	1520	1,100,000	
No.1		950	1090	1,000,000	
No.2		920	1060	900,000	
No.3		545	630	800,000	
Mixed Southern Pine					
Select Structural	2x4	2360	2710	1,600,000	SPIB
No.1		1670	1920	1,500,000	
No.2		1500	1720	1,400,000	
No.3		865	990	1,200,000	
Stud		890	1020	1,200,000	
Construction		1150	1320	1,300,000	
Standard		635	725	1,200,000	
Utility		315	365	1,100,000	
Select Structural	2x6	2130	2450	1,600,000	
No.1		1490	1720	1,500,000	
No.2		1320	1520	1,400,000	
No.3		775	895	1,200,000	
Stud		775	895	1,200,000	
Select Structural	2x8	2010	2310	1,600,000	
No.1		1380	1590	1,500,000	
No.2		1210	1390	1,400,000	
No.3		720	825	1,200,000	
Select Structural	2xl0	1730	1980	1,600,000	
No.1		1210	1390	1,500,000	
No.2		1060	1220	1,400,000	
No.3		605	695	1,200,000	
Select Structural	2xl2	1610	1850	1,600,000	
No.1		1120	1290	1,500,000	
No.2		1010	1160	1,400,000	
No.3		575	660	1,200,000	

Species and Grade	Size	Design Value in Bending, "Fb"		Modulus of Elasticity "E"	Grading Rules Agency
		Normal Duration	Snow Loading		
Northern Red Oak					
Select Structural	2x4	2415	2775	1,400,000	NELMA
No.1		1725	1985	1,400,000	
No.2		1680	1935	1,300,000	
No.3		950	1090	1,200,000	
Stud		950	1090	1,200,000	
Construction		1265	1455	1,200,000	
Standard		720	825	1,100,000	
Utility		345	395	1,000,000	
Select Structural	2x6	2095	2405	1,400,000	
No.1		1495	1720	1,400,000	
No.2		1460	1675	1,300,000	
No.3		820	945	1,200,000	
Stud		865	990	1,200,000	
Select Structural	2x8	1930	2220	1,400,000	
No.1		1380	1585	1,400,000	
No.2		1345	1545	1,300,000	
No.3		760	875	1,200,000	
Select Structural	2xl0	1770	2035	1,400,000	
No.1		1265	1455	1,400,000	
No.2		1235	1420	1,300,000	
No.3		695	800	1,200,000	
Select Structural	2xl2	1610	1850	1,400,000	
No.1		1150	1325	1,400,000	
No.2		1120	1290	1,300,000	
No.3		635	725	1,200,000	
Northern Species					
Select Structural	2x4	1640	1885	1,100,000	NLGA
No.1 /No.2		990	1140	1,100,000	
No.3		605	695	1,000,000	
Stud		570	655	1,000,000	
Construction		775	895	1,000,000	
Standard		430	495	900,000	
Utility		200	230	900,000	
Select Structural	2x6	1420	1635	1,100,000	
No. 1 / No.2		860	990	1,100,000	
No.3		525	600	1,000,000	
Stud		520	595	1,000,000	
Select Structural	2x8	1310	1510	1,100,000	
No.l/No.2		795	915	1,100,000	
No.3		485	555	1,000,000	
Select Structural	2xl0	1200	1380	1,100,000	
No.1 /No.2		725	835	1,100,000	
No.3		445	510	1,000,000	
Select Structural	2xl2	1095	1255	1,100,000	
No.1 /No.2		660	760	1,100,000	
No.3		405	465	1,000,000	

Species and Grade	Size	Design Value in Bending, "Fb"		Modulus of Elasticity "E"	Grading Rules Agency
		Normal Duration	Snow Loading		
Northern White Cedar					
Select Structural	2x4	1335	1535	800,000	NELMA
No.1		990	1140	700,000	
No.2		950	1090	700,000	
No.3		560	645	600,000	
Stud		540	620	600,000	
Construction		720	825	700,000	
Standard		405	465	600,000	
Utility		200	230	600,000	
Select Structural	2x6	1160	1330	800,000	
No.1		860	990	700,000	
No.2		820	945	700,000	
No.3		485	560	600,000	
Stud		490	560	600,000	
Select Structural	2x8	1070	1230	800,000	
No.1		795	915	700,000	
No.2		760	875	700,000	
No.3		450	515	600,000	
Select Structural	2xl0	980	1125	800,000	
No.1		725	835	700,000	
No.2		695	800	700,000	
No.3		410	475	600,000	
Select Structural	2xl2	890	1025	800,000	
No.1		660	760	700,000	
No.2		635	725	700,000	
No.3		375	430	600,000	
Red Maple					
Select Structural	2x4	2245	2580	1,700,000	NELMA
No.1		1595	1835	1,600,000	
No.2		1555	1785	1,500,000	
No.3		905	1040	1,300,000	
Stud		885	1020	1,300,000	
Construction		1210	1390	1,400,000	
Standard		660	760	1,300,000	
Utility		315	365	1,200,000	
Select Structural	2x6	1945	2235	1,700,000	
No.1		1385	1590	1,600,000	
No.2		1345	1545	1,500,000	
No.3		785	905	1,300,000	
Stud		805	925	1,300,000	
Select Structural	2x8	1795	2065	1,700,000	
No.1		1275	1470	1,600,000	
No.2		1240	1430	1,500,000	
No.3		725	835	1,300,000	
Select Structural	2xl0	1645	1890	1,700,000	
No.1		1170	1345	1,600,000	
No.2		1140	1310	1,500,000	
No.3		665	765	1,300,000	
Select Structural	2xl2	1495	1720	1,700,000	
No.1		1065	1225	1,600,000	
No.2		1035	1190	1,500,000	
No.3		605	695	1,300,000	