



AMERICAN WOOD COUNCIL

DESIGN VALUES FOR JOISTS AND RAFTERS

2024 EDITION

**SUPPLEMENT TO
SPAN TABLES FOR JOISTS AND RAFTERS**

Updates and Errata

While every precaution has been taken to ensure the accuracy of this document, errors may have occurred during development. Updates or Errata are posted to the American Wood Council website at www.awc.org. Technical inquiries may be addressed to info@awc.org.

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While every effort has been made to insure the accuracy of the information presented, and special effort has been made to assure that the information reflects the state-of-the-art, neither the American Wood Council nor its members assume any responsibility for any particular design prepared from this publication. Those using this document assume all liability from its use.

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Species or Species Combination	Species that may be included in the Combination	Page
Alaska Cedar		1
Alaska Hemlock		1
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Alaska Yellow Cedar		2
Aspen	Big Tooth Aspen, Quaking Aspen	3
Baldcypress		3
Beech-Birch-Hickory	American Beech, Bitternut Hickory, Mockernut Hickory, Nutmeg Hickory, Pecan Hickory, Pignut Hickory, Shagbark Hickory, Shellbark Hickory, Sweet Birch, Water Hickory, Yellow Birch	4
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Cottonwood		5
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Douglas Fir-Larch (North)	Douglas Fir, Western Larch	6
Douglas Fir-South		6
Eastern Hemlock-Balsam Fir	Balsam Fir, Eastern Hemlock, Tamarack	7
Eastern Hemlock-Tamarack	Eastern Hemlock, Tamarack	7
Eastern Softwoods	Balsam Fir, Black Spruce, Eastern Hemlock, Eastern White Pine, Jack Pine, Norway (Red) Pine, Pitch Pine, Red Spruce, Tamarack, White Spruce	8
Eastern White Pine		8
Hem-Fir	California Red Fir, Grand Fir, Noble Fir, Pacific Silver Fir, Western Hemlock, White Fir	9
Hem-Fir (North)	Amabilis Fir, Western Hemlock	9
Mixed Maple	Black Maple, Red Maple, Silver Maple, Sugar Maple	10
Mixed Oak	All Oak Species graded under NELMA rules	10
Mixed Southern Pine	Any species in the Southern Pine species combination, plus either or both of the following: Pond Pine, Virginia Pine	11
Northern Red Oak	Black Oak, Northern Red Oak, Pin Oak, Scarlet Oak	11
Northern Species	Any species graded under NLGA rules except Red Alder and White Birch	12
Northern White Cedar		12
Norway Spruce (North)		13
Red Maple		14
Red Oak	Black Oak, Cherrybark Oak, Laurel Oak, Northern Red Oak, Pin Oak, Scarlet Oak, Southern Red Oak, Water Oak, Willow Oak	14
Redwood		15
Southern Pine	Loblolly Pine, Longleaf Pine, Shortleaf Pine, Slash Pine	16
Spruce-Pine-Fir	Alpine Fir, Balsam Fir, Black Spruce, Engelmann Spruce, Jack Pine, Lodgepole Pine, Red Spruce, White Spruce	17
Spruce-Pine-Fir (South)	Balsam Fir, Black Spruce, Engelmann Spruce, Jack Pine, Lodgepole Pine, Norway (Red) Pine, Red Spruce, Sitka Spruce, White Spruce	17
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Western Woods	Any species in the Douglas Fir-Larch, Douglas Fir-South, Hem-Fir, and Spruce-Pine-Fir (South) species combinations, plus any or all of the following: Alpine Fir, Idaho White Pine, Mountain Hemlock, Ponderosa Pine, and Sugar Pine	18
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TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
ALASKA CEDAR							
Select Structural	2x4	1,985	2,280	2,480	525	1,400,000	PLIB
No. 1		1,680	1,935	2,100	525	1,300,000	
No. 2		1,380	1,585	1,725	525	1,200,000	
No. 3		775	895	970	525	1,100,000	
Stud		790	910	990	525	1,100,000	
Construction		1,035	1,190	1,295	525	1,200,000	
Standard		575	660	720	525	1,100,000	
Utility		290	330	360	525	1,000,000	
Select Structural	2x6	1,720	1,975	2,150	525	1,400,000	
No. 1		1,460	1,675	1,820	525	1,300,000	
No. 2		1,195	1,375	1,495	525	1,200,000	
No. 3		675	775	840	525	1,100,000	
Stud		720	825	900	525	1,100,000	
Select Structural	2x8	1,585	1,825	1,985	525	1,400,000	
No. 1		1,345	1,545	1,680	525	1,300,000	
No. 2		1,105	1,270	1,380	525	1,200,000	
No. 3		620	715	775	525	1,100,000	
Select Structural	2x10	1,455	1,675	1,820	525	1,400,000	
No. 1		1,235	1,420	1,540	525	1,300,000	
No. 2		1,010	1,165	1,265	525	1,200,000	
No. 3		570	655	710	525	1,100,000	
Select Structural	2x12	1,325	1,520	1,655	525	1,400,000	
No. 1		1,120	1,290	1,400	525	1,300,000	
No. 2		920	1,060	1,150	525	1,200,000	
No. 3		520	595	645	525	1,100,000	
ALASKA HEMLOCK							
Select Structural	2x4	2,245	2,580	2,805	440	1,700,000	WWPA
No. 1		1,555	1,785	1,940	440	1,600,000	
No. 2		1,425	1,635	1,780	440	1,500,000	
No. 3		820	940	1,025	440	1,400,000	
Stud		820	945	1,030	440	1,400,000	
Construction		1,095	1,255	1,365	440	1,400,000	
Standard		605	695	755	440	1,300,000	
Utility		290	330	360	440	1,200,000	
Select Structural	2x6	1,945	2,235	2,430	440	1,700,000	
No. 1		1,345	1,545	1,680	440	1,600,000	
No. 2		1,235	1,420	1,540	440	1,500,000	
No. 3		710	815	890	440	1,400,000	
Stud		750	860	935	440	1,400,000	
Select Structural	2x8	1,795	2,065	2,245	440	1,700,000	
No. 1		1,240	1,430	1,555	440	1,600,000	
No. 2		1,140	1,310	1,425	440	1,500,000	
No. 3		655	755	820	440	1,400,000	
Select Structural	2x10	1,645	1,890	2,055	440	1,700,000	
No. 1		1,140	1,310	1,425	440	1,600,000	
No. 2		1,045	1,200	1,305	440	1,500,000	
No. 3		600	690	750	440	1,400,000	
Select Structural	2x12	1,495	1,720	1,870	440	1,700,000	
No. 1		1,035	1,190	1,295	440	1,600,000	
No. 2		950	1,090	1,185	440	1,500,000	
No. 3		545	630	685	440	1,400,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
ALASKA SPRUCE							
Select Structural	2x4	2,415	2,775	3,020	330	1,600,000	WWPA
No. 1		1,640	1,885	2,050	330	1,500,000	
No. 2		1,510	1,735	1,885	330	1,400,000	
No. 3		865	990	1,080	330	1,300,000	
Stud		855	980	1,065	330	1,300,000	
Construction Standard		1,150	1,325	1,440	330	1,300,000	
Standard		635	725	790	330	1,200,000	
Utility		315	365	395	330	1,100,000	
Select Structural	2x6	2,095	2,405	2,615	330	1,600,000	
No. 1		1,420	1,635	1,775	330	1,500,000	
No. 2		1,310	1,505	1,635	330	1,400,000	
No. 3		750	860	935	330	1,300,000	
Stud		775	895	970	330	1,300,000	
Select Structural	2x8	1,930	2,220	2,415	330	1,600,000	
No. 1		1,310	1,510	1,640	330	1,500,000	
No. 2		1,210	1,390	1,510	330	1,400,000	
No. 3		690	795	865	330	1,300,000	
Select Structural	2x10	1,770	2,035	2,215	330	1,600,000	
No. 1		1,200	1,380	1,500	330	1,500,000	
No. 2		1,105	1,275	1,385	330	1,400,000	
No. 3		635	725	790	330	1,300,000	
Select Structural	2x12	1,610	1,850	2,015	330	1,600,000	
No. 1		1,095	1,255	1,365	330	1,500,000	
No. 2		1,005	1,155	1,260	330	1,400,000	
No. 3		575	660	720	330	1,300,000	
ALASKA YELLOW CEDAR							
Select Structural	2x4	2,330	2,680	2,910	510	1,500,000	PLIB WWPA
No. 1		1,555	1,785	1,940	510	1,400,000	
No. 2		1,380	1,585	1,725	510	1,300,000	
No. 3		820	940	1,025	510	1,200,000	
Stud		790	910	990	510	1,200,000	
Construction Standard		1,065	1,225	1,330	510	1,300,000	
Standard		575	660	720	510	1,100,000	
Utility		290	330	360	510	1,100,000	
Select Structural	2x6	2,020	2,320	2,525	510	1,500,000	
No. 1		1,345	1,545	1,680	510	1,400,000	
No. 2		1,195	1,375	1,495	510	1,300,000	
No. 3		710	815	890	510	1,200,000	
Stud		720	825	900	510	1,200,000	
Select Structural	2x8	1,865	2,140	2,330	510	1,500,000	
No. 1		1,240	1,430	1,555	510	1,400,000	
No. 2		1,105	1,270	1,380	510	1,300,000	
No. 3		655	755	820	510	1,200,000	
Select Structural	2x10	1,710	1,965	2,135	510	1,500,000	
No. 1		1,140	1,310	1,425	510	1,400,000	
No. 2		1,010	1,165	1,265	510	1,300,000	
No. 3		600	690	750	510	1,200,000	
Select Structural	2x12	1,555	1,785	1,940	510	1,500,000	
No. 1		1,035	1,190	1,295	510	1,400,000	
No. 2		920	1,060	1,150	510	1,300,000	
No. 3		545	630	685	510	1,200,000	

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Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, F_{cL}	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
ASPEN							
Select Structural	2x4	1,510	1,735	1,885	265	1,100,000	NELMA WWPA
No. 1		1,080	1,240	1,350	265	1,100,000	
No. 2		1,035	1,190	1,295	265	1,000,000	
No. 3		605	695	755	265	900,000	
Stud		600	690	750	265	900,000	
Construction Standard		805	925	1,005	265	900,000	
Standard		430	495	540	265	900,000	
Utility		200	230	250	265	800,000	
Select Structural	2x6	1,310	1,505	1,635	265	1,100,000	
No. 1		935	1,075	1,170	265	1,100,000	
No. 2		895	1,030	1,120	265	1,000,000	
No. 3		525	600	655	265	900,000	
Stud	545	630	685	265	900,000		
Select Structural	2x8	1,210	1,390	1,510	265	1,100,000	
No. 1		865	990	1,080	265	1,100,000	
No. 2		830	950	1,035	265	1,000,000	
No. 3		485	555	605	265	900,000	
Select Structural	2x10	1,105	1,275	1,385	265	1,100,000	
No. 1		790	910	990	265	1,100,000	
No. 2		760	875	950	265	1,000,000	
No. 3		445	510	555	265	900,000	
Select Structural	2x12	1,005	1,155	1,260	265	1,100,000	
No. 1		720	825	900	265	1,100,000	
No. 2		690	795	865	265	1,000,000	
No. 3		405	465	505	265	900,000	
BALDCYPRESS							
Select Structural	2x4	2,070	2,380	2,590	615	1,400,000	SPIB
No. 1		1,725	1,985	2,155	615	1,400,000	
No. 2		1,425	1,635	1,780	615	1,300,000	
No. 3		820	940	1,025	615	1,200,000	
Stud		820	945	1,030	615	1,200,000	
Construction Standard		1,065	1,225	1,330	615	1,200,000	
Standard		605	695	755	615	1,100,000	
Utility		290	330	360	615	1,000,000	
Select Structural	2x6	1,795	2,065	2,245	615	1,400,000	
No. 1		1,495	1,720	1,870	615	1,400,000	
No. 2		1,235	1,420	1,540	615	1,300,000	
No. 3		710	815	890	615	1,200,000	
Stud	750	860	935	615	1,200,000		
Select Structural	2x8	1,655	1,905	2,070	615	1,400,000	
No. 1		1,380	1,585	1,725	615	1,400,000	
No. 2		1,140	1,310	1,425	615	1,300,000	
No. 3		655	755	820	615	1,200,000	
Select Structural	2x10	1,520	1,745	1,900	615	1,400,000	
No. 1		1,265	1,455	1,580	615	1,400,000	
No. 2		1,045	1,200	1,305	615	1,300,000	
No. 3		600	690	750	615	1,200,000	
Select Structural	2x12	1,380	1,585	1,725	615	1,400,000	
No. 1		1,150	1,325	1,440	615	1,400,000	
No. 2		950	1,090	1,185	615	1,300,000	
No. 3		545	630	685	615	1,200,000	

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Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
BEECH-BIRCH-HICKORY							
Select Structural	2x4	2,500	2,875	3,125	715	1,700,000	NELMA
No. 1		1,810	2,085	2,265	715	1,600,000	
No. 2		1,725	1,985	2,155	715	1,500,000	
No. 3		990	1,140	1,240	715	1,300,000	
Stud		980	1,125	1,225	715	1,300,000	
Construction Standard		1,325	1,520	1,655	715	1,400,000	
Standard		750	860	935	715	1,300,000	
Utility		345	395	430	715	1,200,000	
Select Structural	2x6	2,170	2,495	2,710	715	1,700,000	
No. 1		1,570	1,805	1,960	715	1,600,000	
No. 2		1,495	1,720	1,870	715	1,500,000	
No. 3		860	990	1,075	715	1,300,000	
Stud	890	1,025	1,115	715	1,300,000		
Select Structural	2x8	2,000	2,300	2,500	715	1,700,000	
No. 1		1,450	1,665	1,810	715	1,600,000	
No. 2		1,380	1,585	1,725	715	1,500,000	
No. 3		795	915	990	715	1,300,000	
Select Structural	2x10	1,835	2,110	2,295	715	1,700,000	
No. 1		1,330	1,525	1,660	715	1,600,000	
No. 2		1,265	1,455	1,580	715	1,500,000	
No. 3		725	835	910	715	1,300,000	
Select Structural	2x12	1,670	1,920	2,085	715	1,700,000	
No. 1		1,210	1,390	1,510	715	1,600,000	
No. 2		1,150	1,325	1,440	715	1,500,000	
No. 3		660	760	825	715	1,300,000	
COAST SITKA SPRUCE							
Select Structural	2x4	2,245	2,580	2,805	455	1,700,000	NLGA
No. 1/No. 2		1,595	1,835	1,995	455	1,500,000	
No. 3		905	1,040	1,130	455	1,400,000	
Stud		915	1,055	1,145	455	1,400,000	
Construction Standard		1,210	1,390	1,510	455	1,400,000	
Standard		690	795	865	455	1,300,000	
Utility		315	365	395	455	1,200,000	
Select Structural	2x6	1,945	2,235	2,430	455	1,700,000	
No. 1/No. 2		1,385	1,590	1,730	455	1,500,000	
No. 3		785	905	980	455	1,400,000	
Stud		835	960	1,040	455	1,400,000	
Select Structural	2x8	1,795	2,065	2,245	455	1,700,000	
No. 1/No. 2		1,275	1,470	1,595	455	1,500,000	
No. 3		725	835	905	455	1,400,000	
Select Structural	2x10	1,645	1,890	2,055	455	1,700,000	
No. 1/No. 2		1,170	1,345	1,465	455	1,500,000	
No. 3		665	765	830	455	1,400,000	
Select Structural	2x12	1,495	1,720	1,870	455	1,700,000	
No. 1/No. 2		1,065	1,225	1,330	455	1,500,000	
No. 3		605	695	755	455	1,400,000	

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Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
COTTONWOOD							
Select Structural	2x4	1,510	1,735	1,885	320	1,200,000	NELMA
No. 1		1,080	1,240	1,350	320	1,200,000	
No. 2		1,080	1,240	1,350	320	1,100,000	
No. 3		605	695	755	320	1,000,000	
Stud		600	690	750	320	1,000,000	
Construction Standard		805	925	1,005	320	1,000,000	
Standard		460	530	575	320	900,000	
Utility		200	230	250	320	900,000	
Select Structural	2x6	1,310	1,505	1,635	320	1,200,000	
No. 1		935	1,075	1,170	320	1,200,000	
No. 2		935	1,075	1,170	320	1,100,000	
No. 3		525	600	655	320	1,000,000	
Stud	545	630	685	320	1,000,000		
Select Structural	2x8	1,210	1,390	1,510	320	1,200,000	
No. 1		865	990	1,080	320	1,200,000	
No. 2		865	990	1,080	320	1,100,000	
No. 3		485	555	605	320	1,000,000	
Select Structural	2x10	1,105	1,275	1,385	320	1,200,000	
No. 1		790	910	990	320	1,200,000	
No. 2		790	910	990	320	1,100,000	
No. 3		445	510	555	320	1,000,000	
Select Structural	2x12	1,005	1,155	1,260	320	1,200,000	
No. 1		720	825	900	320	1,200,000	
No. 2		720	825	900	320	1,100,000	
No. 3		405	465	505	320	1,000,000	
DOUGLAS FIR-LARCH, DOUGLAS FIR, WESTERN LARCH							
Select Structural	2x4	2,590	2,975	3,235	625	1,900,000	PLIB WWPA
No. 1 & Btr		2,070	2,380	2,590	625	1,800,000	
No. 1		1,725	1,985	2,155	625	1,700,000	
No. 2		1,555	1,785	1,940	625	1,600,000	
No. 3		905	1,040	1,130	625	1,400,000	
Stud		885	1,020	1,105	625	1,400,000	
Construction Standard		1,150	1,325	1,440	625	1,500,000	
Standard		660	760	825	625	1,400,000	
Utility	315	365	395	625	1,300,000		
Select Structural	2x6	2,245	2,580	2,805	625	1,900,000	
No. 1 & Btr		1,795	2,065	2,245	625	1,800,000	
No. 1		1,495	1,720	1,870	625	1,700,000	
No. 2		1,345	1,545	1,680	625	1,600,000	
No. 3		785	905	980	625	1,400,000	
Stud		805	925	1,005	625	1,400,000	
Select Structural	2x8	2,070	2,380	2,590	625	1,900,000	
No. 1 & Btr		1,655	1,905	2,070	625	1,800,000	
No. 1		1,380	1,585	1,725	625	1,700,000	
No. 2		1,240	1,430	1,555	625	1,600,000	
No. 3	725	835	905	625	1,400,000		
Select Structural	2x10	1,900	2,180	2,370	625	1,900,000	
No. 1 & Btr		1,520	1,745	1,900	625	1,800,000	
No. 1		1,265	1,455	1,580	625	1,700,000	
No. 2		1,140	1,310	1,425	625	1,600,000	
No. 3	665	765	830	625	1,400,000		
Select Structural	2x12	1,725	1,985	2,155	625	1,900,000	
No. 1 & Btr		1,380	1,585	1,725	625	1,800,000	
No. 1		1,150	1,325	1,440	625	1,700,000	
No. 2		1,035	1,190	1,295	625	1,600,000	
No. 3	605	695	755	625	1,400,000		

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%.
Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
DOUGLAS FIR-LARCH (NORTH), DOUGLAS FIR (NORTH), WESTERN LARCH (NORTH)							
Select Structural	2x4	2,330	2,680	2,910	625	1,900,000	NLGA
No. 1 & Btr		1,985	2,280	2,480	625	1,800,000	
No. 1/ No. 2		1,465	1,685	1,835	625	1,600,000	
No. 3		820	940	1,025	625	1,400,000	
Stud		820	945	1,030	625	1,400,000	
Construction		1,095	1,255	1,365	625	1,500,000	
Standard		605	695	755	625	1,400,000	
Utility		290	330	360	625	1,300,000	
Select Structural	2x6	2,020	2,320	2,525	625	1,900,000	
No. 1 & Btr		1,720	1,975	2,150	625	1,800,000	
No. 1/ No. 2		1,270	1,460	1,590	625	1,600,000	
No. 3		710	815	890	625	1,400,000	
Stud	750	860	935	625	1,400,000		
Select Structural	2x8	1,865	2,140	2,330	625	1,900,000	
No. 1 & Btr		1,585	1,825	1,985	625	1,800,000	
No. 1/ No. 2		1,175	1,350	1,465	625	1,600,000	
No. 3		655	755	820	625	1,400,000	
Select Structural	2x10	1,710	1,965	2,135	625	1,900,000	
No. 1 & Btr		1,455	1,675	1,820	625	1,800,000	
No. 1/ No. 2		1,075	1,235	1,345	625	1,600,000	
No. 3		600	690	750	625	1,400,000	
Select Structural	2x12	1,555	1,785	1,940	625	1,900,000	
No. 1 & Btr		1,325	1,520	1,655	625	1,800,000	
No. 1/ No. 2		980	1,125	1,220	625	1,600,000	
No. 3		545	630	685	625	1,400,000	
DOUGLAS FIR-SOUTH							
Select Structural	2x4	2,330	2,680	2,910	520	1,400,000	WWPA
No. 1		1,595	1,835	1,995	520	1,300,000	
No. 2		1,465	1,685	1,835	520	1,200,000	
No. 3		865	990	1,080	520	1,100,000	
Stud		855	980	1,065	520	1,100,000	
Construction		1,120	1,290	1,400	520	1,200,000	
Standard		635	725	790	520	1,100,000	
Utility		290	330	360	520	1,000,000	
Select Structural	2x6	2,020	2,320	2,525	520	1,400,000	
No. 1		1,385	1,590	1,730	520	1,300,000	
No. 2		1,270	1,460	1,590	520	1,200,000	
No. 3		750	860	935	520	1,100,000	
Stud		775	895	970	520	1,100,000	
Select Structural	2x8	1,865	2,140	2,330	520	1,400,000	
No. 1		1,275	1,470	1,595	520	1,300,000	
No. 2		1,175	1,350	1,465	520	1,200,000	
No. 3		690	795	865	520	1,100,000	
Select Structural	2x10	1,710	1,965	2,135	520	1,400,000	
No. 1		1,170	1,345	1,465	520	1,300,000	
No. 2		1,075	1,235	1,345	520	1,200,000	
No. 3		635	725	790	520	1,100,000	
Select Structural	2x12	1,555	1,785	1,940	520	1,400,000	
No. 1		1,065	1,225	1,330	520	1,300,000	
No. 2		980	1,125	1,220	520	1,200,000	
No. 3		575	660	720	520	1,100,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
EASTERN HEMLOCK-BALSAM FIR							
Select Structural	2x4	2,155	2,480	2,695	335	1,200,000	NELMA
No. 1		1,335	1,535	1,670	335	1,100,000	
No. 2		990	1,140	1,240	335	1,100,000	
No. 3		605	695	755	335	900,000	
Stud		570	655	710	335	900,000	
Construction Standard		775	895	970	335	1,000,000	
Standard		430	495	540	335	900,000	
Utility		200	230	250	335	800,000	
Select Structural	2x6	1,870	2,150	2,335	335	1,200,000	
No. 1		1,160	1,330	1,450	335	1,100,000	
No. 2		860	990	1,075	335	1,100,000	
No. 3		525	600	655	335	900,000	
Stud	520	595	645	335	900,000		
Select Structural	2x8	1,725	1,985	2,155	335	1,200,000	
No. 1		1,070	1,230	1,335	335	1,100,000	
No. 2		795	915	990	335	1,100,000	
No. 3		485	555	605	335	900,000	
Select Structural	2x10	1,580	1,820	1,975	335	1,200,000	
No. 1		980	1,125	1,225	335	1,100,000	
No. 2		725	835	910	335	1,100,000	
No. 3		445	510	555	335	900,000	
Select Structural	2x12	1,440	1,655	1,795	335	1,200,000	
No. 1		890	1,025	1,115	335	1,100,000	
No. 2		660	760	825	335	1,100,000	
No. 3		405	465	505	335	900,000	
EASTERN HEMLOCK-TAMARACK							
Select Structural	2x4	2,155	2,480	2,695	555	1,200,000	NELMA
No. 1		1,335	1,535	1,670	555	1,100,000	
No. 2		990	1,140	1,240	555	1,100,000	
No. 3		605	695	755	555	900,000	
Stud		570	655	710	555	900,000	
Construction Standard		775	895	970	555	1,000,000	
Standard		430	495	540	555	900,000	
Utility		200	230	250	555	800,000	
Select Structural	2x6	1,870	2,150	2,335	555	1,200,000	
No. 1		1,160	1,330	1,450	555	1,100,000	
No. 2		860	990	1,075	555	1,100,000	
No. 3		525	600	655	555	900,000	
Stud	520	595	645	555	900,000		
Select Structural	2x8	1,725	1,985	2,155	555	1,200,000	
No. 1		1,070	1,230	1,335	555	1,100,000	
No. 2		795	915	990	555	1,100,000	
No. 3		485	555	605	555	900,000	
Select Structural	2x10	1,580	1,820	1,975	555	1,200,000	
No. 1		980	1,125	1,225	555	1,100,000	
No. 2		725	835	910	555	1,100,000	
No. 3		445	510	555	555	900,000	
Select Structural	2x12	1,440	1,655	1,795	555	1,200,000	
No. 1		890	1,025	1,115	555	1,100,000	
No. 2		660	760	825	555	1,100,000	
No. 3		405	465	505	555	900,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%.
Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
EASTERN SOFTWOODS							
Select Structural	2x4	2,155	2,480	2,695	335	1,200,000	NELMA
No. 1		1,335	1,535	1,670	335	1,100,000	
No. 2		990	1,140	1,240	335	1,100,000	
No. 3		605	695	755	335	900,000	
Stud		570	655	710	335	900,000	
Construction Standard		775	895	970	335	1,000,000	
Standard		430	495	540	335	900,000	
Utility		200	230	250	335	800,000	
Select Structural	2x6	1,870	2,150	2,335	335	1,200,000	
No. 1		1,160	1,330	1,450	335	1,100,000	
No. 2		860	990	1,075	335	1,100,000	
No. 3		525	600	655	335	900,000	
Stud	520	595	645	335	900,000		
Select Structural	2x8	1,725	1,985	2,155	335	1,200,000	
No. 1		1,070	1,230	1,335	335	1,100,000	
No. 2		795	915	990	335	1,100,000	
No. 3		485	555	605	335	900,000	
Select Structural	2x10	1,580	1,820	1,975	335	1,200,000	
No. 1		980	1,125	1,225	335	1,100,000	
No. 2		725	835	910	335	1,100,000	
No. 3		445	510	555	335	900,000	
Select Structural	2x12	1,440	1,655	1,795	335	1,200,000	
No. 1		890	1,025	1,115	335	1,100,000	
No. 2		660	760	825	335	1,100,000	
No. 3		405	465	505	335	900,000	
EASTERN WHITE PINE							
Select Structural	2x4	2,155	2,480	2,695	350	1,200,000	NELMA
No. 1		1,335	1,535	1,670	350	1,100,000	
No. 2		990	1,140	1,240	350	1,100,000	
No. 3		605	695	755	350	900,000	
Stud		570	655	710	350	900,000	
Construction Standard		775	895	970	350	1,000,000	
Standard		430	495	540	350	900,000	
Utility		200	230	250	350	800,000	
Select Structural	2x6	1,870	2,150	2,335	350	1,200,000	
No. 1		1,160	1,330	1,450	350	1,100,000	
No. 2		860	990	1,075	350	1,100,000	
No. 3		525	600	655	350	900,000	
Stud	520	595	645	350	900,000		
Select Structural	2x8	1,725	1,985	2,155	350	1,200,000	
No. 1		1,070	1,230	1,335	350	1,100,000	
No. 2		795	915	990	350	1,100,000	
No. 3		485	555	605	350	900,000	
Select Structural	2x10	1,580	1,820	1,975	350	1,200,000	
No. 1		980	1,125	1,225	350	1,100,000	
No. 2		725	835	910	350	1,100,000	
No. 3		445	510	555	350	900,000	
Select Structural	2x12	1,440	1,655	1,795	350	1,200,000	
No. 1		890	1,025	1,115	350	1,100,000	
No. 2		660	760	825	350	1,100,000	
No. 3		405	465	505	350	900,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
HEM-FIR							
Select Structural	2x4	2,415	2,775	3,020	405	1,600,000	PLIB WWPA
No. 1 & Btr		1,900	2,180	2,370	405	1,500,000	
No. 1		1,680	1,935	2,100	405	1,500,000	
No. 2		1,465	1,685	1,835	405	1,300,000	
No. 3		865	990	1,080	405	1,200,000	
Stud		855	980	1,065	405	1,200,000	
Construction		1,120	1,290	1,400	405	1,300,000	
Standard		635	725	790	405	1,200,000	
Utility		290	330	360	405	1,100,000	
Select Structural	2x6	2,095	2,405	2,615	405	1,600,000	
No. 1 & Btr		1,645	1,890	2,055	405	1,500,000	
No. 1		1,460	1,675	1,820	405	1,500,000	
No. 2		1,270	1,460	1,590	405	1,200,000	
No. 3		750	860	935	405	1,200,000	
Stud		775	895	970	405	1,300,000	
Select Structural	2x8	1,930	2,220	2,415	405	1,600,000	
No. 1 & Btr		1,520	1,745	1,900	405	1,500,000	
No. 1		1,345	1,545	1,680	405	1,500,000	
No. 2		1,175	1,350	1,465	405	1,200,000	
No. 3		690	795	865	405	1,200,000	
Select Structural	2x10	1,770	2,035	2,215	405	1,600,000	
No. 1 & Btr		1,390	1,600	1,740	405	1,500,000	
No. 1		1,235	1,420	1,540	405	1,500,000	
No. 2		1,075	1,235	1,345	405	1,300,000	
No. 3		635	725	790	405	1,200,000	
Select Structural	2x12	1,610	1,850	2,015	405	1,600,000	
No. 1 & Btr		1,265	1,455	1,580	405	1,500,000	
No. 1		1,120	1,290	1,400	405	1,500,000	
No. 2		980	1,125	1,220	405	1,300,000	
No. 3		575	660	720	405	1,200,000	
HEM-FIR (NORTH)							
Select Structural	2x4	2,245	2,580	2,805	405	1,700,000	NLGA
No. 1 & Btr		2,070	2,380	2,590	405	1,700,000	
No. 1/No. 2		1,725	1,985	2,155	405	1,600,000	
No. 3		990	1,140	1,240	405	1,400,000	
Stud		980	1,125	1,225	405	1,400,000	
Construction		1,325	1,520	1,655	405	1,500,000	
Standard		750	860	935	405	1,400,000	
Utility		345	395	430	405	1,300,000	
Select Structural		2x6	1,945	2,235	2,430	405	
No. 1 & Btr	1,795		2,065	2,245	405	1,700,000	
No. 1/No. 2	1,495		1,720	1,870	405	1,600,000	
No. 3	860		990	1,075	405	1,400,000	
Stud	890		1,025	1,115	405	1,400,000	
Select Structural	2x8	1,795	2,065	2,245	405	1,700,000	
No. 1 & Btr		1,655	1,905	2,070	405	1,700,000	
No. 1/No. 2		1,380	1,585	1,725	405	1,600,000	
No. 3		795	915	990	405	1,400,000	
Select Structural	2x10	1,645	1,890	2,055	405	1,700,000	
No. 1 & Btr		1,520	1,745	1,900	405	1,700,000	
No. 1/No. 2		1,265	1,455	1,580	405	1,600,000	
No. 3		725	835	910	405	1,400,000	
Select Structural	2x12	1,495	1,720	1,870	405	1,700,000	
No. 1 & Btr		1,380	1,585	1,725	405	1,700,000	
No. 1/No. 2		1,150	1,325	1,440	405	1,600,000	
No. 3		660	760	825	405	1,400,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
MIXED MAPLE							
Select Structural	2x4	1,725	1,985	2,155	620	1,300,000	NELMA
No. 1		1,250	1,440	1,565	620	1,200,000	
No. 2		1,210	1,390	1,510	620	1,100,000	
No. 3		690	795	865	620	1,000,000	
Stud		695	800	870	620	1,000,000	
Construction		920	1,060	1,150	620	1,100,000	
Standard		520	595	645	620	1,000,000	
Utility		260	300	325	620	900,000	
Select Structural	2x6	1,495	1,720	1,870	620	1,300,000	
No. 1		1,085	1,245	1,355	620	1,200,000	
No. 2		1,045	1,205	1,310	620	1,100,000	
No. 3		600	690	750	620	1,000,000	
Stud	635	725	790	620	1,000,000		
Select Structural	2x8	1,380	1,585	1,725	620	1,300,000	
No. 1		1,000	1,150	1,250	620	1,200,000	
No. 2		965	1,110	1,210	620	1,100,000	
No. 3		550	635	690	620	1,000,000	
Select Structural	2x10	1,265	1,455	1,580	620	1,300,000	
No. 1		915	1,055	1,145	620	1,200,000	
No. 2		885	1,020	1,105	620	1,100,000	
No. 3		505	580	635	620	1,000,000	
Select Structural	2x12	1,150	1,325	1,440	620	1,300,000	
No. 1		835	960	1,040	620	1,200,000	
No. 2		805	925	1,005	620	1,100,000	
No. 3		460	530	575	620	1,000,000	
MIXED OAK							
Select Structural	2x4	1,985	2,280	2,480	800	1,100,000	
No. 1		1,425	1,635	1,780	800	1,000,000	
No. 2		1,380	1,585	1,725	800	900,000	
No. 3		820	940	1,025	800	800,000	
Stud		790	910	990	800	800,000	
Construction		1,065	1,225	1,330	800	900,000	
Standard		605	695	755	800	800,000	
Utility		290	330	360	800	800,000	
Select Structural	2x6	1,720	1,975	2,150	800	1,100,000	
No. 1		1,235	1,420	1,540	800	1,000,000	
No. 2		1,195	1,375	1,495	800	900,000	
No. 3		710	815	890	800	800,000	
Stud		720	825	900	800	800,000	
Select Structural	2x8	1,585	1,825	1,985	800	1,100,000	
No. 1		1,140	1,310	1,425	800	1,000,000	
No. 2		1,105	1,270	1,380	800	900,000	
No. 3		655	755	820	800	800,000	
Select Structural	2x10	1,455	1,675	1,820	800	1,100,000	
No. 1		1,045	1,200	1,305	800	1,000,000	
No. 2		1,010	1,165	1,265	800	900,000	
No. 3		600	690	750	800	800,000	
Select Structural	2x12	1,325	1,520	1,655	800	1,100,000	
No. 1		950	1,090	1,185	800	1,000,000	
No. 2		920	1,060	1,150	800	900,000	
No. 3		545	630	685	800	800,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, F_{cL}	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
MIXED SOUTHERN PINE							
Select Structural	2x4	2,360	2,710	2,945	565	1,600,000	SPIB
No.1		1,670	1,920	2,085	565	1,500,000	
No.2		1,265	1,455	1,580	565	1,400,000	
No.3 and Stud		750	860	935	565	1,200,000	
Construction		980	1,125	1,220	565	1,300,000	
Standard		545	630	685	565	1,200,000	
Utility		260	300	325	565	1,100,000	
Select Structural	2x6	2,130	2,445	2,660	565	1,600,000	
No.1		1,495	1,720	1,870	565	1,500,000	
No.2		1,150	1,325	1,440	565	1,400,000	
No.3 and Stud		660	760	825	565	1,200,000	
Select Structural	2x8	2,015	2,315	2,515	565	1,600,000	
No.1		1,380	1,585	1,725	565	1,500,000	
No.2		1,065	1,225	1,330	565	1,400,000	
No.3 and Stud		605	695	755	565	1,200,000	
Select Structural	2x10	1,725	1,985	2,155	565	1,600,000	
No.1		1,210	1,390	1,510	565	1,500,000	
No.2		920	1,060	1,150	565	1,400,000	
No.3 and Stud		545	630	685	565	1,200,000	
Select Structural	2x12	1,610	1,850	2,015	565	1,600,000	
No.1		1,120	1,290	1,400	565	1,500,000	
No.2		865	990	1,080	565	1,400,000	
No.3 and Stud		520	595	645	565	1,200,000	
NORTHERN RED OAK							
Select Structural	2x4	2,415	2,775	3,020	885	1,400,000	NELMA
No. 1		1,725	1,985	2,155	885	1,400,000	
No. 2		1,680	1,935	2,100	885	1,300,000	
No. 3		950	1,090	1,185	885	1,200,000	
Stud		950	1,090	1,185	885	1,200,000	
Construction		1,265	1,455	1,580	885	1,200,000	
Standard		720	825	900	885	1,100,000	
Utility		345	395	430	885	1,000,000	
Select Structural	2x6	2,095	2,405	2,615	885	1,400,000	
No. 1		1,495	1,720	1,870	885	1,400,000	
No. 2		1,460	1,675	1,820	885	1,300,000	
No. 3		820	945	1,030	885	1,200,000	
Stud		865	990	1,080	885	1,200,000	
Select Structural	2x8	1,930	2,220	2,415	885	1,400,000	
No. 1		1,380	1,585	1,725	885	1,400,000	
No. 2		1,345	1,545	1,680	885	1,300,000	
No. 3		760	875	950	885	1,200,000	
Select Structural	2x10	1,770	2,035	2,215	885	1,400,000	
No. 1		1,265	1,455	1,580	885	1,400,000	
No. 2		1,235	1,420	1,540	885	1,300,000	
No. 3		695	800	870	885	1,200,000	
Select Structural	2x12	1,610	1,850	2,015	885	1,400,000	
No. 1		1,150	1,325	1,440	885	1,400,000	
No. 2		1,120	1,290	1,400	885	1,300,000	
No. 3		635	725	790	885	1,200,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
NORTHERN SPECIES							
Select Structural	2x4	1,680	1,935	2,100	350	1,100,000	NLGA
No. 1/No. 2		1,080	1,240	1,350	350	1,100,000	
No. 3		605	695	755	350	1,000,000	
Stud		600	690	750	350	1,000,000	
Construction		805	925	1,005	350	1,000,000	
Standard		460	530	575	350	900,000	
Utility		200	230	250	350	900,000	
Select Structural	2x6	1,460	1,675	1,820	350	1,100,000	
No. 1/No. 2		935	1,075	1,170	350	1,100,000	
No. 3		525	600	655	350	1,000,000	
Stud		545	630	685	350	1,000,000	
Select Structural	2x8	1,345	1,545	1,680	350	1,100,000	
No. 1/No. 2		865	990	1,080	350	1,100,000	
No. 3		485	555	605	350	1,000,000	
Select Structural	2x10	1,235	1,420	1,540	350	1,100,000	
No. 1/No. 2		790	910	990	350	1,100,000	
No. 3		445	510	555	350	1,000,000	
Select Structural	2x12	1,120	1,290	1,400	350	1,100,000	
No. 1/No. 2		720	825	900	350	1,100,000	
No. 3		405	465	505	350	1,000,000	
NORTHERN WHITE CEDAR							
Select Structural	2x4	1,335	1,535	1,670	370	800,000	NELMA
No. 1		990	1,140	1,240	370	700,000	
No. 2		950	1,090	1,185	370	700,000	
No. 3		560	645	700	370	600,000	
Stud		540	620	670	370	600,000	
Construction		720	825	900	370	700,000	
Standard		405	465	505	370	600,000	
Utility		200	230	250	370	600,000	
Select Structural	2x6	1,160	1,330	1,450	370	800,000	
No. 1		860	990	1,075	370	700,000	
No. 2		820	945	1,030	370	700,000	
No. 3		485	560	605	370	600,000	
Stud		490	560	610	370	600,000	
Select Structural	2x8	1,070	1,230	1,335	370	800,000	
No. 1		795	915	990	370	700,000	
No. 2		760	875	950	370	700,000	
No. 3		450	515	560	370	600,000	
Select Structural	2x10	980	1,125	1,225	370	800,000	
No. 1		725	835	910	370	700,000	
No. 2		695	800	870	370	700,000	
No. 3		410	475	515	370	600,000	
Select Structural	2x12	890	1,025	1,115	370	800,000	
No. 1		660	760	825	370	700,000	
No. 2		635	725	790	370	700,000	
No. 3		375	430	465	370	600,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - VISUALLY GRADED LUMBER^{1,2}

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Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
NORWAY SPRUCE (NORTH)							
Select Structural	2x4	1,640	1,885	2,050	410	1,500,000	NLGA
No. 1/No. 2		1,120	1,290	1,400	410	1,300,000	
No. 3		645	745	810	410	1,200,000	
Stud		635	725	790	410	1,200,000	
Construction		835	960	1,040	410	1,200,000	
Standard		460	530	575	410	1,100,000	
Utility		230	265	290	410	1,100,000	
Select Structural	2x6	1,420	1,635	1,775	410	1,500,000	
No. 1/No. 2		970	1,120	1,215	410	1,300,000	
No. 3		560	645	700	410	1,200,000	
Stud		575	660	720	410	1,200,000	
Select Structural	2x8	1,310	1,510	1,640	410	1,500,000	
No. 1/No. 2		895	1,030	1,120	410	1,300,000	
No. 3		520	595	645	410	1,200,000	
Select Structural	2x10	1,200	1,380	1,500	410	1,500,000	
No. 1/No. 2		820	945	1,030	410	1,300,000	
No. 3		475	545	595	410	1,200,000	
Select Structural	2x12	1,095	1,255	1,365	410	1,500,000	
No. 1/No. 2		750	860	935	410	1,300,000	
No. 3		430	495	540	410	1,200,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%.
Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
RED MAPLE							
Select Structural	2x4	2,245	2,580	2,805	615	1,700,000	NELMA
No. 1		1,595	1,835	1,995	615	1,600,000	
No. 2		1,555	1,785	1,940	615	1,500,000	
No. 3		905	1,040	1,130	615	1,300,000	
Stud		885	1,020	1,105	615	1,300,000	
Construction Standard		1,210	1,390	1,510	615	1,400,000	
Standard		660	760	825	615	1,300,000	
Utility		315	365	395	615	1,200,000	
Select Structural	2x6	1,945	2,235	2,430	615	1,700,000	
No. 1		1,385	1,590	1,730	615	1,600,000	
No. 2		1,345	1,545	1,680	615	1,500,000	
No. 3		785	905	980	615	1,300,000	
Stud	805	925	1,005	615	1,300,000		
Select Structural	2x8	1,795	2,065	2,245	615	1,700,000	
No. 1		1,275	1,470	1,595	615	1,600,000	
No. 2		1,240	1,430	1,555	615	1,500,000	
No. 3		725	835	905	615	1,300,000	
Select Structural	2x10	1,645	1,890	2,055	615	1,700,000	
No. 1		1,170	1,345	1,465	615	1,600,000	
No. 2		1,140	1,310	1,425	615	1,500,000	
No. 3		665	765	830	615	1,300,000	
Select Structural	2x12	1,495	1,720	1,870	615	1,700,000	
No. 1		1,065	1,225	1,330	615	1,600,000	
No. 2		1,035	1,190	1,295	615	1,500,000	
No. 3		605	695	755	615	1,300,000	
RED OAK							
Select Structural	2x4	1,985	2,280	2,480	820	1,400,000	NELMA
No. 1		1,425	1,635	1,780	820	1,300,000	
No. 2		1,380	1,585	1,725	820	1,200,000	
No. 3		820	940	1,025	820	1,100,000	
Stud		790	910	990	820	1,100,000	
Construction Standard		1,065	1,225	1,330	820	1,200,000	
Standard		605	695	755	820	1,100,000	
Utility		290	330	360	820	1,000,000	
Select Structural	2x6	1,720	1,975	2,150	820	1,400,000	
No. 1		1,235	1,420	1,540	820	1,300,000	
No. 2		1,195	1,375	1,495	820	1,200,000	
No. 3		710	815	890	820	1,100,000	
Stud	720	825	900	820	1,100,000		
Select Structural	2x8	1,585	1,825	1,985	820	1,400,000	
No. 1		1,140	1,310	1,425	820	1,300,000	
No. 2		1,105	1,270	1,380	820	1,200,000	
No. 3		655	755	820	820	1,100,000	
Select Structural	2x10	1,455	1,675	1,820	820	1,400,000	
No. 1		1,045	1,200	1,305	820	1,300,000	
No. 2		1,010	1,165	1,265	820	1,200,000	
No. 3		600	690	750	820	1,100,000	
Select Structural	2x12	1,325	1,520	1,655	820	1,400,000	
No. 1		950	1,090	1,185	820	1,300,000	
No. 2		920	1,060	1,150	820	1,200,000	
No. 3		545	630	685	820	1,100,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
REDWOOD							
Clear Structural	2x4	3,020	3,470	3,775	650	1,400,000	RIS
Select Structural		2,330	2,680	2,910	650	1,400,000	
Select Structural, open grain		1,900	2,180	2,370	425	1,100,000	
No. 1		1,680	1,935	2,100	650	1,300,000	
No. 1, open grain		1,335	1,535	1,670	425	1,100,000	
No. 2		1,595	1,835	1,995	650	1,200,000	
No. 2, open grain		1,250	1,440	1,565	425	1,000,000	
No. 3		905	1,040	1,130	650	1,100,000	
No. 3, open grain		735	845	915	425	900,000	
Stud		725	835	910	425	900,000	
Construction		950	1,090	1,185	425	900,000	
Standard		520	595	645	425	900,000	
Utility		260	300	325	425	800,000	
Clear Structural	2x6	2,615	3,010	3,270	650	1,400,000	
Select Structural		2,020	2,320	2,525	650	1,400,000	
Select Structural, open grain		1,645	1,890	2,055	425	1,100,000	
No. 1		1,460	1,675	1,820	650	1,300,000	
No. 1, open grain		1,160	1,330	1,450	425	1,100,000	
No. 2		1,385	1,590	1,730	650	1,200,000	
No. 2, open grain		1,085	1,245	1,355	425	1,000,000	
No. 3		785	905	980	650	1,100,000	
No. 3, open grain	635	730	795	425	900,000		
Stud	660	760	825	425	900,000		
Clear Structural	2x8	2,415	2,775	3,020	650	1,400,000	
Select Structural		1,865	2,140	2,330	650	1,400,000	
Select Structural, open grain		1,520	1,745	1,900	425	1,100,000	
No. 1		1,345	1,545	1,680	650	1,300,000	
No. 1, open grain		1,070	1,230	1,335	425	1,100,000	
No. 2		1,275	1,470	1,595	650	1,200,000	
No. 2, open grain		1,000	1,150	1,250	425	1,000,000	
No. 3		725	835	905	650	1,100,000	
No. 3, open grain	585	675	735	425	900,000		
Clear Structural	2x10	2,215	2,545	2,765	650	1,400,000	
Select Structural		1,710	1,965	2,135	650	1,400,000	
Select Structural, open grain		1,390	1,600	1,740	425	1,100,000	
No. 1		1,235	1,420	1,540	650	1,300,000	
No. 1, open grain		980	1,125	1,225	425	1,100,000	
No. 2		1,170	1,345	1,465	650	1,200,000	
No. 2, open grain		915	1,055	1,145	425	1,000,000	
No. 3		665	765	830	650	1,100,000	
No. 3, open grain	540	620	670	425	900,000		
Clear Structural	2x12	2,015	2,315	2,515	650	1,400,000	
Select Structural		1,555	1,785	1,940	650	1,400,000	
Select Structural, open grain		1,265	1,455	1,580	425	1,100,000	
No. 1		1,120	1,290	1,400	650	1,300,000	
No. 1, open grain		890	1,025	1,115	425	1,100,000	
No. 2		1,065	1,225	1,330	650	1,200,000	
No. 2, open grain		835	960	1,040	425	1,000,000	
No. 3		605	695	755	650	1,100,000	
No. 3, open grain	490	560	610	425	900,000		

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - VISUALLY GRADED LUMBER^{1,2}

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Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
SOUTHERN PINE							
Dense Select Structural	2x4	3,105	3,570	3,880	660	1,900,000	
Select Structural		2,705	3,110	3,380	565	1,800,000	
Non-Dense Select Structural		2,360	2,710	2,945	480	1,600,000	
No.1 Dense		1,900	2,180	2,370	660	1,800,000	
No.1		1,725	1,985	2,155	565	1,600,000	
No.1 Non-Dense		1,495	1,720	1,870	480	1,400,000	
No.2 Dense		1,380	1,585	1,725	660	1,600,000	
No.2		1,265	1,455	1,580	565	1,400,000	
No.2 Non-Dense		1,210	1,390	1,510	480	1,300,000	
No.3 and Stud		750	860	935	565	1,300,000	
Construction		1,005	1,155	1,260	565	1,400,000	
Standard		545	630	685	565	1,200,000	
Utility		260	300	325	565	1,200,000	
Dense Select Structural	2x6	2,760	3,175	3,450	660	1,900,000	
Select Structural		2,415	2,775	3,020	565	1,800,000	
Non-Dense Select Structural		2,130	2,445	2,660	480	1,600,000	
No.1 Dense		1,725	1,985	2,155	660	1,800,000	
No.1		1,555	1,785	1,940	565	1,600,000	
No.1 Non-Dense		1,380	1,585	1,725	480	1,400,000	
No.2 Dense		1,210	1,390	1,510	660	1,600,000	
No.2		1,150	1,325	1,440	565	1,400,000	
No.2 Non-Dense		1,095	1,255	1,365	480	1,300,000	
No.3 and Stud		660	760	825	565	1,300,000	
Dense Select Structural	2x8	2,530	2,910	3,165	660	1,900,000	SPIB
Select Structural		2,245	2,580	2,805	565	1,800,000	
Non-Dense Select Structural		1,955	2,250	2,445	480	1,600,000	
No.1 Dense		1,555	1,785	1,940	660	1,800,000	
No.1		1,440	1,655	1,795	565	1,600,000	
No.1 Non-Dense		1,265	1,455	1,580	480	1,400,000	
No.2 Dense		1,120	1,290	1,400	660	1,600,000	
No.2		1,065	1,225	1,330	565	1,400,000	
No.2 Non-Dense		1,005	1,155	1,260	480	1,300,000	
No.3 and Stud		605	695	755	565	1,300,000	
Dense Select Structural	2x10	2,245	2,580	2,805	660	1,900,000	
Select Structural		1,955	2,250	2,445	565	1,800,000	
Non-Dense Select Structural		1,725	1,985	2,155	480	1,600,000	
No.1 Dense		1,380	1,585	1,725	660	1,800,000	
No.1		1,210	1,390	1,510	565	1,600,000	
No.1 Non-Dense		1,095	1,255	1,365	480	1,400,000	
No.2 Dense		980	1,125	1,220	660	1,600,000	
No.2		920	1,060	1,150	565	1,400,000	
No.2 Non-Dense		865	990	1,080	480	1,300,000	
No.3 and Stud		545	630	685	565	1,300,000	
Dense Select Structural	2x12	2,070	2,380	2,590	660	1,900,000	
Select Structural		1,840	2,115	2,300	565	1,800,000	
Non-Dense Select Structural		1,610	1,850	2,015	480	1,600,000	
No.1 Dense		1,265	1,455	1,580	660	1,800,000	
No.1		1,150	1,325	1,440	565	1,600,000	
No.1 Non-Dense		1,035	1,190	1,295	480	1,400,000	
No.2 Dense		920	1,060	1,150	660	1,600,000	
No.2		865	990	1,080	565	1,400,000	
No.2 Non-Dense		805	925	1,005	480	1,300,000	
No.3 and Stud		520	595	645	565	1,300,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
SPRUCE-PINE-FIR							
Select Structural	2x4	2,155	2,480	2,695	425	1,500,000	NLGA
No. 1/ No. 2		1,510	1,735	1,885	425	1,400,000	
No. 3		865	990	1,080	425	1,200,000	
Stud		855	980	1,065	425	1,200,000	
Construction Standard		1,150	1,325	1,440	425	1,300,000	
Standard		635	725	790	425	1,200,000	
Utility		315	365	395	425	1,100,000	
Select Structural	2x6	1,870	2,150	2,335	425	1,500,000	
No. 1/ No. 2		1,310	1,505	1,635	425	1,400,000	
No. 3		750	860	935	425	1,200,000	
Stud		775	895	970	425	1,200,000	
Select Structural	2x8	1,725	1,985	2,155	425	1,500,000	
No. 1/ No. 2		1,210	1,390	1,510	425	1,400,000	
No. 3		690	795	865	425	1,200,000	
Select Structural	2x10	1,580	1,820	1,975	425	1,500,000	
No. 1/ No. 2		1,105	1,275	1,385	425	1,400,000	
No. 3		635	725	790	425	1,200,000	
Select Structural	2x12	1,440	1,655	1,795	425	1,500,000	
No. 1/ No. 2		1,005	1,155	1,260	425	1,400,000	
No. 3		575	660	720	425	1,200,000	
SPRUCE-PINE-FIR (SOUTH)							
Select Structural	2x4	2,245	2,580	2,805	335	1,300,000	NELMA PLIB WWPA
No. 1		1,510	1,735	1,885	335	1,200,000	
No. 2		1,335	1,535	1,670	335	1,100,000	
No. 3		775	895	970	335	1,000,000	
Stud		760	875	950	335	1,000,000	
Construction Standard		1,005	1,155	1,260	335	1,000,000	
Standard		575	660	720	335	900,000	
Utility		260	300	325	335	900,000	
Select Structural	2x6	1,945	2,235	2,430	335	1,300,000	
No. 1		1,310	1,505	1,635	335	1,200,000	
No. 2		1,160	1,330	1,450	335	1,100,000	
No. 3		675	775	840	335	1,000,000	
Stud		690	795	865	335	1,000,000	
Select Structural	2x8	1,795	2,065	2,245	335	1,300,000	
No. 1		1,210	1,390	1,510	335	1,200,000	
No. 2		1,070	1,230	1,335	335	1,100,000	
No. 3		620	715	775	335	1,000,000	
Select Structural	2x10	1,645	1,890	2,055	335	1,300,000	
No. 1		1,105	1,275	1,385	335	1,200,000	
No. 2		980	1,125	1,225	335	1,100,000	
No. 3		570	655	710	335	1,000,000	
Select Structural	2x12	1,495	1,720	1,870	335	1,300,000	
No. 1		1,005	1,155	1,260	335	1,200,000	
No. 2		890	1,025	1,115	335	1,100,000	
No. 3		520	595	645	335	1,000,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
WESTERN CEDARS							
Select Structural	2x4	1,725	1,985	2,155	425	1,100,000	PLIB WWPA
No. 1		1,250	1,440	1,565	425	1,000,000	
No. 2		1,210	1,390	1,510	425	1,000,000	
No. 3		690	795	865	425	900,000	
Stud		695	800	870	425	900,000	
Construction Standard		920	1,060	1,150	425	900,000	
Standard		520	595	645	425	800,000	
Utility		260	300	325	425	800,000	
Select Structural	2x6	1,495	1,720	1,870	425	1,100,000	
No. 1		1,085	1,245	1,355	425	1,000,000	
No. 2		1,045	1,205	1,310	425	1,000,000	
No. 3		600	690	750	425	900,000	
Stud	635	725	790	425	900,000		
Select Structural	2x8	1,380	1,585	1,725	425	1,100,000	
No. 1		1,000	1,150	1,250	425	1,000,000	
No. 2		965	1,110	1,210	425	1,000,000	
No. 3		550	635	690	425	900,000	
Select Structural	2x10	1,265	1,455	1,580	425	1,100,000	
No. 1		915	1,055	1,145	425	1,000,000	
No. 2		885	1,020	1,105	425	1,000,000	
No. 3		505	580	635	425	900,000	
Select Structural	2x12	1,150	1,325	1,440	425	1,100,000	
No. 1		835	960	1,040	425	1,000,000	
No. 2		805	925	1,005	425	1,000,000	
No. 3		460	530	575	425	900,000	
WESTERN WOODS							
Select Structural	2x4	1,555	1,785	1,940	335	1,200,000	
No. 1		1,165	1,340	1,455	335	1,100,000	
No. 2		1,165	1,340	1,455	335	1,000,000	
No. 3		645	745	810	335	900,000	
Stud		665	765	830	335	900,000	
Construction Standard		890	1,025	1,115	335	1,000,000	
Standard		490	560	610	335	900,000	
Utility		230	265	290	335	800,000	
Select Structural	2x6	1,345	1,545	1,680	335	1,200,000	
No. 1		1,010	1,160	1,260	335	1,100,000	
No. 2		1,010	1,160	1,260	335	1,000,000	
No. 3		560	645	700	335	900,000	
Stud	605	695	755	335	900,000		
Select Structural	2x8	1,240	1,430	1,555	335	1,200,000	
No. 1		930	1,070	1,165	335	1,100,000	
No. 2		930	1,070	1,165	335	1,000,000	
No. 3		520	595	645	335	900,000	
Select Structural	2x10	1,140	1,310	1,425	335	1,200,000	
No. 1		855	980	1,065	335	1,100,000	
No. 2		855	980	1,065	335	1,000,000	
No. 3		475	545	595	335	900,000	
Select Structural	2x12	1,035	1,190	1,295	335	1,200,000	
No. 1		775	895	970	335	1,100,000	
No. 2		775	895	970	335	1,000,000	
No. 3		430	495	540	335	900,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
WHITE OAK							
Select Structural	2x4	2,070	2,380	2,590	800	1,100,000	NELMA
No. 1		1,510	1,735	1,885	800	1,000,000	
No. 2		1,465	1,685	1,835	800	900,000	
No. 3		820	940	1,025	800	800,000	
Stud		820	945	1,030	800	800,000	
Construction Standard		1,095	1,255	1,365	800	900,000	
Standard		605	695	755	800	800,000	
Utility		290	330	360	800	800,000	
Select Structural	2x6	1,795	2,065	2,245	800	1,100,000	
No. 1		1,310	1,505	1,635	800	1,000,000	
No. 2		1,270	1,460	1,590	800	900,000	
No. 3		710	815	890	800	800,000	
Stud		750	860	935	800	800,000	
Select Structural	2x8	1,655	1,905	2,070	800	1,100,000	
No. 1		1,210	1,390	1,510	800	1,000,000	
No. 2		1,175	1,350	1,465	800	900,000	
No. 3		655	755	820	800	800,000	
Select Structural	2x10	1,520	1,745	1,900	800	1,100,000	
No. 1		1,105	1,275	1,385	800	1,000,000	
No. 2		1,075	1,235	1,345	800	900,000	
No. 3		600	690	750	800	800,000	
Select Structural	2x12	1,380	1,585	1,725	800	1,100,000	
No. 1		1,005	1,155	1,260	800	1,000,000	
No. 2		980	1,125	1,220	800	900,000	
No. 3		545	630	685	800	800,000	
YELLOW CEDAR							
Select Structural	2x4	2,070	2,380	2,590	540	1,600,000	NLGA
No. 1/ No. 2		1,380	1,585	1,725	540	1,400,000	
No. 3		820	940	1,025	540	1,200,000	
Stud		790	910	990	540	1,200,000	
Construction Standard		1,065	1,225	1,330	540	1,300,000	
Standard		605	695	755	540	1,200,000	
Utility		290	330	360	540	1,100,000	
Select Structural		2x6	1,795	2,065	2,245	540	
No. 1/ No. 2	1,195		1,375	1,495	540	1,400,000	
No. 3	710		815	890	540	1,200,000	
Stud	720		825	900	540	1,200,000	
Select Structural	2x8	1,655	1,905	2,070	540	1,600,000	
No. 1/ No. 2		1,105	1,270	1,380	540	1,400,000	
No. 3		655	755	820	540	1,200,000	
Select Structural	2x10	1,520	1,745	1,900	540	1,600,000	
No. 1/ No. 2		1,010	1,165	1,265	540	1,400,000	
No. 3		600	690	750	540	1,200,000	
Select Structural	2x12	1,380	1,585	1,725	540	1,600,000	
No. 1/ No. 2		920	1,060	1,150	540	1,400,000	
No. 3		545	630	685	540	1,200,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%.
 Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
YELLOW POPLAR							
Select Structural	2x4	1,725	1,985	2,155	420	1,500,000	NELMA
No. 1		1,250	1,440	1,565	420	1,400,000	
No. 2		1,210	1,390	1,510	420	1,300,000	
No. 3		690	795	865	420	1,200,000	
Stud		695	800	870	420	1,200,000	
Construction		920	1,060	1,150	420	1,300,000	
Standard		520	595	645	420	1,100,000	
Utility		230	265	290	420	1,100,000	
Select Structural	2x6	1,495	1,720	1,870	420	1,500,000	
No. 1		1,085	1,245	1,355	420	1,400,000	
No. 2		1,045	1,205	1,310	420	1,300,000	
No. 3		600	690	750	420	1,200,000	
Stud		635	725	790	420	1,200,000	
Select Structural	2x8	1,380	1,585	1,725	420	1,500,000	
No. 1		1,000	1,150	1,250	420	1,400,000	
No. 2		965	1,110	1,210	420	1,300,000	
No. 3		550	635	690	420	1,200,000	
Select Structural	2x10	1,265	1,455	1,580	420	1,500,000	
No. 1		915	1,055	1,145	420	1,400,000	
No. 2		885	1,020	1,105	420	1,300,000	
No. 3		505	580	635	420	1,200,000	
Select Structural	2x12	1,150	1,325	1,440	420	1,500,000	
No. 1		835	960	1,040	420	1,400,000	
No. 2		805	925	1,005	420	1,300,000	
No. 3		460	530	575	420	1,200,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - NON-NORTH AMERICAN VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
AUSTRIAN SPRUCE - Austria & The Czech Republic							
Select Structural	2x4	2,590	2,975	3,235	260	1,700,000	PLIB
No. 1		1,725	1,985	2,155	260	1,600,000	
No. 2		1,595	1,835	1,995	260	1,500,000	
No. 3		905	1,040	1,130	260	1,300,000	
Stud		915	1,055	1,145	260	1,300,000	
Construction		1,210	1,390	1,510	260	1,400,000	
Standard		660	760	825	260	1,300,000	
Utility		315	365	395	260	1,200,000	
Select Structural	2x6	2,245	2,580	2,805	260	1,700,000	
No. 1		1,495	1,720	1,870	260	1,600,000	
No. 2		1,385	1,590	1,730	260	1,500,000	
No. 3		785	905	980	260	1,300,000	
Stud	835	960	1,040	260	1,300,000		
Select Structural	2x8	2,070	2,380	2,590	260	1,700,000	
No. 1		1,380	1,585	1,725	260	1,600,000	
No. 2		1,275	1,470	1,595	260	1,500,000	
No. 3		725	835	905	260	1,300,000	
Select Structural	2x10	1,900	2,180	2,370	260	1,700,000	
No. 1		1,265	1,455	1,580	260	1,600,000	
No. 2		1,170	1,345	1,465	260	1,500,000	
No. 3		665	765	830	260	1,300,000	
Select Structural	2x12	1,725	1,985	2,155	260	1,700,000	
No. 1		1,150	1,325	1,440	260	1,600,000	
No. 2		1,065	1,225	1,330	260	1,500,000	
No. 3		605	695	755	260	1,300,000	
DOUGLAS FIR - France & Germany							
Select Structural	2x4	2,590	2,975	3,235	540	1,900,000	
No. 1		1,680	1,935	2,100	540	1,700,000	
No. 2		1,425	1,635	1,780	540	1,500,000	
No. 3		820	940	1,025	540	1,300,000	
Stud		820	945	1,030	540	1,300,000	
Construction		1,065	1,225	1,330	540	1,400,000	
Standard		605	695	755	540	1,300,000	
Utility		290	330	360	540	1,200,000	
Select Structural	2x6	2,245	2,580	2,805	540	1,900,000	
No. 1		1,460	1,675	1,820	540	1,700,000	
No. 2		1,235	1,420	1,540	540	1,500,000	
No. 3		710	815	890	540	1,300,000	
Stud	750	860	935	540	1,300,000		
Select Structural	2x8	2,070	2,380	2,590	540	1,900,000	
No. 1		1,345	1,545	1,680	540	1,700,000	
No. 2		1,140	1,310	1,425	540	1,500,000	
No. 3		655	755	820	540	1,300,000	
Select Structural	2x10	1,900	2,180	2,370	540	1,900,000	
No. 1		1,235	1,420	1,540	540	1,700,000	
No. 2		1,045	1,200	1,305	540	1,500,000	
No. 3		600	690	750	540	1,300,000	
Select Structural	2x12	1,725	1,985	2,155	540	1,900,000	
No. 1		1,120	1,290	1,400	540	1,700,000	
No. 2		950	1,090	1,185	540	1,500,000	
No. 3		545	630	685	540	1,300,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - NON-NORTH AMERICAN VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
DOUGLAS FIR/EUROPEAN LARCH - Austria, The Czech Republic, & Bavaria³							
Select Structural	2x4	2,185	2,515	2,730	440	1,800,000	PLIB
No. 1		1,610	1,850	2,015	440	1,700,000	
No. 2		1,555	1,785	1,940	440	1,600,000	
No. 3		890	1,025	1,115	440	1,400,000	
Stud		920	1,060	1,150	440	1,400,000	
Construction		1,150	1,325	1,440	440	1,500,000	
Standard		660	760	825	440	1,300,000	
Utility		315	365	395	440	1,300,000	
MONTANE PINE - South Africa							
Select Structural	2x4	1,680	1,935	2,100	325	1,300,000	PLIB
No. 1		1,120	1,290	1,400	325	1,100,000	
No. 2		1,035	1,190	1,295	325	1,000,000	
No. 3		605	695	755	325	900,000	
Stud		600	690	750	325	900,000	
Construction		775	895	970	325	900,000	
Standard		430	495	540	325	800,000	
Utility		200	230	250	325	800,000	
Select Structural	2x6	1,460	1,675	1,820	325	1,300,000	PLIB
No. 1		970	1,120	1,215	325	1,100,000	
No. 2		895	1,030	1,120	325	1,000,000	
No. 3		525	600	655	325	900,000	
Stud	545	630	685	325	900,000		
Select Structural	2x8	1,345	1,545	1,680	325	1,300,000	
No. 1		895	1,030	1,120	325	1,100,000	
No. 2		830	950	1,035	325	1,000,000	
No. 3		485	555	605	325	900,000	
Select Structural	2x10	1,235	1,420	1,540	325	1,300,000	
No. 1		820	945	1,030	325	1,100,000	
No. 2		760	875	950	325	1,000,000	
No. 3		445	510	555	325	900,000	
Select Structural	2x12	1,120	1,290	1,400	325	1,300,000	
No. 1		750	860	935	325	1,100,000	
No. 2		690	795	865	325	1,000,000	
No. 3		405	465	505	325	900,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - NON-NORTH AMERICAN VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
NORWAY SPRUCE - Estonia, Latvia, & Lithuania							
Select Structural	2x4	2,070	2,380	2,590	430	1,600,000	PLIB
No. 1		1,465	1,685	1,835	430	1,400,000	
No. 2		1,380	1,585	1,725	430	1,300,000	
No. 3		775	895	970	430	1,100,000	
Stud		790	910	990	430	1,100,000	
Construction Standard		1,035	1,190	1,295	430	1,200,000	
Utility		575	660	720	430	1,100,000	
Utility		290	330	360	430	1,000,000	
Select Structural	2x6	1,795	2,065	2,245	430	1,600,000	
No. 1		1,270	1,460	1,590	430	1,400,000	
No. 2		1,195	1,375	1,495	430	1,300,000	
No. 3		675	775	840	430	1,100,000	
Stud		720	825	900	430	1,100,000	
Select Structural	2x8	1,655	1,905	2,070	430	1,600,000	
No. 1		1,175	1,350	1,465	430	1,400,000	
No. 2		1,105	1,270	1,380	430	1,300,000	
No. 3		620	715	775	430	1,100,000	
Select Structural	2x10	1,520	1,745	1,900	430	1,600,000	
No. 1		1,075	1,235	1,345	430	1,400,000	
No. 2		1,010	1,165	1,265	430	1,300,000	
No. 3		570	655	710	430	1,100,000	
Select Structural	2x12	1,380	1,585	1,725	430	1,600,000	
No. 1		980	1,125	1,220	430	1,400,000	
No. 2		920	1,060	1,150	430	1,300,000	
No. 3		520	595	645	430	1,100,000	
NORWAY SPRUCE - Finland							
Select Structural	2x4	2,330	2,680	2,910	220	1,500,000	PLIB
No. 1		1,425	1,635	1,780	220	1,400,000	
No. 2		1,080	1,240	1,350	220	1,200,000	
No. 3		645	745	810	220	1,100,000	
Stud		725	835	910	220	1,100,000	
Construction Standard		835	960	1,040	220	1,100,000	
Utility		460	530	575	220	1,000,000	
Utility		230	265	290	220	1,000,000	
Select Structural	2x6	2,020	2,320	2,525	220	1,500,000	
No. 1		1,235	1,420	1,540	220	1,400,000	
No. 2		935	1,075	1,170	220	1,200,000	
No. 3		560	645	700	220	1,100,000	
Stud		660	760	825	220	1,100,000	
Select Structural	2x8	1,865	2,140	2,330	220	1,500,000	
No. 1		1,140	1,310	1,425	220	1,400,000	
No. 2		865	990	1,080	220	1,200,000	
No. 3		520	595	645	220	1,100,000	
Select Structural	2x10	1,710	1,965	2,135	220	1,500,000	
No. 1		1,045	1,200	1,305	220	1,400,000	
No. 2		790	910	990	220	1,200,000	
No. 3		475	545	595	220	1,100,000	
Select Structural	2x12	1,555	1,785	1,940	220	1,500,000	
No. 1		950	1,090	1,185	220	1,400,000	
No. 2		720	825	900	220	1,200,000	
No. 3		430	495	540	220	1,100,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - NON-NORTH AMERICAN VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
NORWAY SPRUCE - Germany, NE France, & Switzerland							
Select Structural	2x4	2,070	2,380	2,590	355	1,600,000	PLIB
No. 1		1,425	1,635	1,780	355	1,400,000	
No. 2		1,250	1,440	1,565	355	1,200,000	
No. 3		735	845	915	355	1,100,000	
Stud		725	835	910	355	1,100,000	
Construction		950	1,090	1,185	355	1,100,000	
Standard		545	630	685	355	1,000,000	
Utility		260	300	325	355	900,000	
Select Structural	2x6	1,795	2,065	2,245	355	1,600,000	
No. 1		1,235	1,420	1,540	355	1,400,000	
No. 2		1,085	1,245	1,355	355	1,200,000	
No. 3		635	730	795	355	1,100,000	
Stud	660	760	825	355	1,100,000		
Select Structural	2x8	1,655	1,905	2,070	355	1,600,000	
No. 1		1,140	1,310	1,425	355	1,400,000	
No. 2		1,000	1,150	1,250	355	1,200,000	
No. 3		585	675	735	355	1,100,000	
Select Structural	2x10	1,520	1,745	1,900	355	1,600,000	
No. 1		1,045	1,200	1,305	355	1,400,000	
No. 2		915	1,055	1,145	355	1,200,000	
No. 3		540	620	670	355	1,100,000	
Select Structural	2x12	1,380	1,585	1,725	355	1,600,000	
No. 1		950	1,090	1,185	355	1,400,000	
No. 2		835	960	1,040	355	1,200,000	
No. 3		490	560	610	355	1,100,000	
NORWAY SPRUCE - Norway							
Select Structural	2x4	2,675	3,075	3,340	360	1,800,000	PLIB
No. 1		1,725	1,985	2,155	360	1,500,000	
No. 2		1,380	1,585	1,725	360	1,300,000	
No. 3		820	940	1,025	360	1,200,000	
Stud		790	910	990	360	1,200,000	
Construction		1,065	1,225	1,330	360	1,200,000	
Standard		605	695	755	360	1,100,000	
Utility		290	330	360	360	1,000,000	
Select Structural	2x6	2,315	2,665	2,895	360	1,800,000	
No. 1		1,495	1,720	1,870	360	1,500,000	
No. 2		1,195	1,375	1,495	360	1,300,000	
No. 3		710	815	890	360	1,200,000	
Stud	720	825	900	360	1,200,000		
Select Structural	2x8	2,140	2,460	2,675	360	1,800,000	
No. 1		1,380	1,585	1,725	360	1,500,000	
No. 2		1,105	1,270	1,380	360	1,300,000	
No. 3		655	755	820	360	1,200,000	
Select Structural	2x10	1,960	2,255	2,450	360	1,800,000	
No. 1		1,265	1,455	1,580	360	1,500,000	
No. 2		1,010	1,165	1,265	360	1,300,000	
No. 3		600	690	750	360	1,200,000	
Select Structural	2x12	1,785	2,050	2,230	360	1,800,000	
No. 1		1,150	1,325	1,440	360	1,500,000	
No. 2		920	1,060	1,150	360	1,300,000	
No. 3		545	630	685	360	1,200,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - NON-NORTH AMERICAN VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
NORWAY SPRUCE - Romania & Ukraine							
Select Structural	2x4	2,155	2,480	2,695	275	1,500,000	PLIB
No. 1		1,465	1,685	1,835	275	1,400,000	
No. 2		1,250	1,440	1,565	275	1,200,000	
No. 3		735	845	915	275	1,100,000	
Stud		725	835	910	275	1,100,000	
Construction		980	1,125	1,220	275	1,100,000	
Standard		545	630	685	275	1,000,000	
Utility		260	300	325	275	1,000,000	
Select Structural	2x6	1,870	2,150	2,335	275	1,500,000	
No. 1		1,270	1,460	1,590	275	1,400,000	
No. 2		1,085	1,245	1,355	275	1,200,000	
No. 3		635	730	795	275	1,100,000	
Stud	660	760	825	275	1,100,000		
Select Structural	2x8	1,725	1,985	2,155	275	1,500,000	
No. 1		1,175	1,350	1,465	275	1,400,000	
No. 2		1,000	1,150	1,250	275	1,200,000	
No. 3		585	675	735	275	1,100,000	
Select Structural	2x10	1,580	1,820	1,975	275	1,500,000	
No. 1		1,075	1,235	1,345	275	1,400,000	
No. 2		915	1,055	1,145	275	1,200,000	
No. 3		540	620	670	275	1,100,000	
Select Structural	2x12	1,440	1,655	1,795	275	1,500,000	
No. 1		980	1,125	1,220	275	1,400,000	
No. 2		835	960	1,040	275	1,200,000	
No. 3		490	560	610	275	1,100,000	
NORWAY SPRUCE - Sweden							
Select Structural	2x4	2,155	2,480	2,695	285	1,600,000	
No. 1		1,425	1,635	1,780	285	1,400,000	
No. 2		1,165	1,340	1,455	285	1,200,000	
No. 3		690	795	865	285	1,100,000	
Stud		695	800	870	285	1,100,000	
Construction		890	1,025	1,115	285	1,200,000	
Standard		490	560	610	285	1,100,000	
Utility		230	265	290	285	1,000,000	
Select Structural	2x6	1,870	2,150	2,335	285	1,600,000	
No. 1		1,235	1,420	1,540	285	1,400,000	
No. 2		1,010	1,160	1,260	285	1,200,000	
No. 3		600	690	750	285	1,100,000	
Stud	635	725	790	285	1,100,000		
Select Structural	2x8	1,725	1,985	2,155	285	1,600,000	
No. 1		1,140	1,310	1,425	285	1,400,000	
No. 2		930	1,070	1,165	285	1,200,000	
No. 3		550	635	690	285	1,100,000	
Select Structural	2x10	1,580	1,820	1,975	285	1,600,000	
No. 1		1,045	1,200	1,305	285	1,400,000	
No. 2		855	980	1,065	285	1,200,000	
No. 3		505	580	635	285	1,100,000	
Select Structural	2x12	1,440	1,655	1,795	285	1,600,000	
No. 1		950	1,090	1,185	285	1,400,000	
No. 2		775	895	970	285	1,200,000	
No. 3		460	530	575	285	1,100,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - NON-NORTH AMERICAN VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
SCOTS PINE - Austria & The Czech Republic, Romania, & Ukraine							
Select Structural	2x4	2,245	2,580	2,805	270	1,700,000	PLIB
No. 1		1,555	1,785	1,940	270	1,600,000	
No. 2		1,335	1,535	1,670	270	1,400,000	
No. 3		775	895	970	270	1,300,000	
Stud		760	875	950	270	1,300,000	
Construction Standard		1,005	1,155	1,260	270	1,300,000	
Utility		575	660	720	270	1,200,000	
Utility		260	300	325	270	1,100,000	
Select Structural	2x6	1,945	2,235	2,430	270	1,700,000	
No. 1		1,345	1,545	1,680	270	1,600,000	
No. 2		1,160	1,330	1,450	270	1,400,000	
No. 3		675	775	840	270	1,300,000	
Stud	690	795	865	270	1,300,000		
Select Structural	2x8	1,795	2,065	2,245	270	1,700,000	
No. 1		1,240	1,430	1,555	270	1,600,000	
No. 2		1,070	1,230	1,335	270	1,400,000	
No. 3		620	715	775	270	1,300,000	
Select Structural	2x10	1,645	1,890	2,055	270	1,700,000	
No. 1		1,140	1,310	1,425	270	1,600,000	
No. 2		980	1,125	1,225	270	1,400,000	
No. 3		570	655	710	270	1,300,000	
Select Structural	2x12	1,495	1,720	1,870	270	1,700,000	
No. 1		1,035	1,190	1,295	270	1,600,000	
No. 2		890	1,025	1,115	270	1,400,000	
No. 3		520	595	645	270	1,300,000	
SCOTS PINE - Estonia, Latvia, & Lithuania							
Select Structural	2x4	1,985	2,280	2,480	430	1,500,000	PLIB
No. 1		1,380	1,585	1,725	430	1,400,000	
No. 2		1,295	1,490	1,615	430	1,200,000	
No. 3		735	845	915	430	1,100,000	
Stud		725	835	910	430	1,100,000	
Construction Standard		980	1,125	1,220	430	1,100,000	
Utility		545	630	685	430	1,000,000	
Utility		260	300	325	430	1,000,000	
Select Structural	2x6	1,720	1,975	2,150	430	1,500,000	
No. 1		1,195	1,375	1,495	430	1,400,000	
No. 2		1,120	1,290	1,400	430	1,200,000	
No. 3		635	730	795	430	1,100,000	
Stud	660	760	825	430	1,100,000		
Select Structural	2x8	1,585	1,825	1,985	430	1,500,000	
No. 1		1,105	1,270	1,380	430	1,400,000	
No. 2		1,035	1,190	1,295	430	1,200,000	
No. 3		585	675	735	430	1,100,000	
Select Structural	2x10	1,455	1,675	1,820	430	1,500,000	
No. 1		1,010	1,165	1,265	430	1,400,000	
No. 2		950	1,090	1,185	430	1,200,000	
No. 3		540	620	670	430	1,100,000	
Select Structural	2x12	1,325	1,520	1,655	430	1,500,000	
No. 1		920	1,060	1,150	430	1,400,000	
No. 2		865	990	1,080	430	1,200,000	
No. 3		490	560	610	430	1,100,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - NON-NORTH AMERICAN VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
SCOTS PINE - Finland							
Select Structural	2x4	2,245	2,580	2,805	210	1,500,000	PLIB
No. 1		1,640	1,885	2,050	210	1,400,000	
No. 2		1,595	1,835	1,995	210	1,300,000	
No. 3		905	1,040	1,130	210	1,200,000	
Stud		915	1,055	1,145	210	1,200,000	
Construction		1,210	1,390	1,510	210	1,200,000	
Standard		690	795	865	210	1,100,000	
Utility		315	365	395	210	1,000,000	
Select Structural		2x6	1,945	2,235	2,430	210	
No. 1	1,420		1,635	1,775	210	1,400,000	
No. 2	1,385		1,590	1,730	210	1,300,000	
No. 3	785		905	980	210	1,200,000	
Stud	835	960	1,040	210	1,200,000		
Select Structural	2x8	1,795	2,065	2,245	210	1,500,000	
No. 1		1,310	1,510	1,640	210	1,400,000	
No. 2		1,275	1,470	1,595	210	1,300,000	
No. 3	725	835	905	210	1,200,000		
Select Structural	2x10	1,645	1,890	2,055	210	1,500,000	
No. 1		1,200	1,380	1,500	210	1,400,000	
No. 2		1,170	1,345	1,465	210	1,300,000	
No. 3	665	765	830	210	1,200,000		
Select Structural	2x12	1,495	1,720	1,870	210	1,500,000	
No. 1		1,095	1,255	1,365	210	1,400,000	
No. 2		1,065	1,225	1,330	210	1,300,000	
No. 3	605	695	755	210	1,200,000		
SCOTS PINE - Germany⁴							
Select Structural	2x4	2,070	2,380	2,590	395	1,600,000	PLIB
No. 1		1,380	1,585	1,725	395	1,400,000	
No. 2		1,210	1,390	1,510	395	1,100,000	
No. 3		690	795	865	395	1,000,000	
Stud		695	800	870	395	1,000,000	
Construction		920	1,060	1,150	395	1,100,000	
Standard		520	595	645	395	1,000,000	
Utility		260	300	325	395	900,000	
Select Structural		2x6	1,795	2,065	2,245	395	
No. 1	1,195		1,375	1,495	395	1,400,000	
No. 2	1,045		1,205	1,310	395	1,100,000	
No. 3	600		690	750	395	1,000,000	
Stud	635	725	790	395	1,000,000		
Select Structural	2x8	1,655	1,905	2,070	395	1,600,000	
No. 1		1,105	1,270	1,380	395	1,400,000	
No. 2		965	1,110	1,210	395	1,100,000	
No. 3	550	635	690	395	1,000,000		
Select Structural	2x10	1,520	1,745	1,900	395	1,600,000	
No. 1		1,010	1,165	1,265	395	1,400,000	
No. 2		885	1,020	1,105	395	1,100,000	
No. 3	505	580	635	395	1,000,000		
Select Structural	2x12	1,380	1,585	1,725	395	1,600,000	
No. 1		920	1,060	1,150	395	1,400,000	
No. 2		805	925	1,005	395	1,100,000	
No. 3	460	530	575	395	1,000,000		

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - NON-NORTH AMERICAN VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
SCOTS PINE - Sweden							
Select Structural	2x4	2,330	2,680	2,910	410	1,700,000	PLIB
No. 1		1,465	1,685	1,835	410	1,500,000	
No. 2		1,080	1,240	1,350	410	1,300,000	
No. 3		645	745	810	410	1,200,000	
Stud		635	725	790	410	1,200,000	
Construction		835	960	1,040	410	1,200,000	
Standard		460	530	575	410	1,100,000	
Utility		230	265	290	410	1,000,000	
Select Structural	2x6	2,020	2,320	2,525	410	1,700,000	
No. 1		1,270	1,460	1,590	410	1,500,000	
No. 2		935	1,075	1,170	410	1,300,000	
No. 3		560	645	700	410	1,200,000	
Stud	575	660	720	410	1,200,000		
Select Structural	2x8	1,865	2,140	2,330	410	1,700,000	
No. 1		1,175	1,350	1,465	410	1,500,000	
No. 2		865	990	1,080	410	1,300,000	
No. 3		520	595	645	410	1,200,000	
Select Structural	2x10	1,710	1,965	2,135	410	1,700,000	
No. 1		1,075	1,235	1,345	410	1,500,000	
No. 2		790	910	990	410	1,300,000	
No. 3		475	545	595	410	1,200,000	
Select Structural	2x12	1,555	1,785	1,940	410	1,700,000	
No. 1		980	1,125	1,220	410	1,500,000	
No. 2		720	825	900	410	1,300,000	
No. 3		430	495	540	410	1,200,000	
SILVER FIR (<i>Abies alba</i>) - Germany, NE France, & Switzerland							
Select Structural	2x4	1,640	1,885	2,050	400	1,500,000	PLIB
No. 1		1,250	1,440	1,565	400	1,400,000	
No. 2		1,250	1,440	1,565	400	1,300,000	
No. 3		735	845	915	400	1,100,000	
Stud		725	835	910	400	1,100,000	
Construction		950	1,090	1,185	400	1,200,000	
Standard		545	630	685	400	1,100,000	
Utility		260	300	325	400	1,000,000	
Select Structural	2x6	1,420	1,635	1,775	400	1,500,000	
No. 1		1,085	1,245	1,355	400	1,400,000	
No. 2		1,085	1,245	1,355	400	1,300,000	
No. 3		635	730	795	400	1,100,000	
Stud	660	760	825	400	1,100,000		
Select Structural	2x8	1,310	1,510	1,640	400	1,500,000	
No. 1		1,000	1,150	1,250	400	1,400,000	
No. 2		1,000	1,150	1,250	400	1,300,000	
No. 3		585	675	735	400	1,100,000	
Select Structural	2x10	1,200	1,380	1,500	400	1,500,000	
No. 1		915	1,055	1,145	400	1,400,000	
No. 2		915	1,055	1,145	400	1,300,000	
No. 3		540	620	670	400	1,100,000	
Select Structural	2x12	1,095	1,255	1,365	400	1,500,000	
No. 1		835	960	1,040	400	1,400,000	
No. 2		835	960	1,040	400	1,300,000	
No. 3		490	560	610	400	1,100,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - NON-NORTH AMERICAN VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Species and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
SOUTHERN PINE - Misiones Argentina							
Select Structural	2x4	1,900	2,180	2,370	440	1,200,000	SPIB
No. 1		1,335	1,535	1,670	440	1,100,000	
No. 2		1,250	1,440	1,565	440	1,100,000	
No. 3		735	845	915	440	900,000	
Stud		725	835	910	440	900,000	
Construction Standard		950	1,090	1,185	440	1,000,000	
Standard		545	630	685	440	900,000	
Utility		260	300	325	440	800,000	
Select Structural	2x6	1,645	1,890	2,055	440	1,200,000	
No. 1		1,160	1,330	1,450	440	1,100,000	
No. 2		1,085	1,245	1,355	440	1,100,000	
No. 3		635	730	795	440	900,000	
Stud	660	760	825	440	900,000		
Select Structural	2x8	1,520	1,745	1,900	440	1,200,000	
No. 1		1,070	1,230	1,335	440	1,100,000	
No. 2		1,000	1,150	1,250	440	1,100,000	
No. 3		585	675	735	440	900,000	
Select Structural	2x10	1,390	1,600	1,740	440	1,200,000	
No. 1		980	1,125	1,225	440	1,100,000	
No. 2		915	1,055	1,145	440	1,100,000	
No. 3		540	620	670	440	900,000	
Select Structural	2x12	1,265	1,455	1,580	440	1,200,000	
No. 1		890	1,025	1,115	440	1,100,000	
No. 2		835	960	1,040	440	1,100,000	
No. 3		490	560	610	440	900,000	
SOUTHERN PINE - Misiones Argentina, Free of Heart Center and Medium Grain Density							
Select Structural	2x4	2,935	3,370	3,665	710	1,500,000	SPIB
No. 1		1,985	2,280	2,480	710	1,500,000	
No. 2		1,725	1,985	2,155	710	1,500,000	
No. 3		990	1,140	1,240	710	1,400,000	
Stud		1,010	1,165	1,265	710	1,400,000	
Construction Standard		1,325	1,520	1,655	710	1,400,000	
Standard		750	860	935	710	1,300,000	
Utility		345	395	430	710	1,200,000	
Select Structural	2x6	2,540	2,925	3,175	710	1,500,000	
No. 1		1,720	1,975	2,150	710	1,500,000	
No. 2		1,495	1,720	1,870	710	1,500,000	
No. 3		860	990	1,075	710	1,400,000	
Stud	920	1,060	1,150	710	1,400,000		
Select Structural	2x8	2,345	2,700	2,935	710	1,500,000	
No. 1		1,585	1,825	1,985	710	1,500,000	
No. 2		1,380	1,585	1,725	710	1,500,000	
No. 3		795	915	990	710	1,400,000	
Select Structural	2x10	2,150	2,475	2,690	710	1,500,000	
No. 1		1,455	1,675	1,820	710	1,500,000	
No. 2		1,265	1,455	1,580	710	1,500,000	
No. 3		725	835	910	710	1,400,000	
Select Structural	2x12	1,955	2,250	2,445	710	1,500,000	
No. 1		1,325	1,520	1,655	710	1,500,000	
No. 2		1,150	1,325	1,440	710	1,500,000	
No. 3		660	760	825	710	1,400,000	

^{1,2} See Table W1 FOOTNOTES

³ Design values are applicable only for 2x4 dimensional lumber.

⁴ Does not include states of Baden-Württemberg and Saarland.

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
As-N Spr-Sc P (I) AUS ROM UKR							
Select Structural	2x4	2,155	2,480	2,695	260	1,500,000	PLIB
No. 1		1,465	1,685	1,835	260	1,400,000	
No. 2		1,250	1,440	1,565	260	1,200,000	
No. 3		735	845	915	260	1,100,000	
Stud		725	835	910	260	1,100,000	
Construction		980	1,125	1,220	260	1,100,000	
Standard		545	630	685	260	1,000,000	
Utility		260	300	325	260	1,000,000	
Select Structural	2x6	1,870	2,150	2,335	260	1,500,000	
No. 1		1,270	1,460	1,590	260	1,400,000	
No. 2		1,085	1,245	1,355	260	1,200,000	
No. 3		635	730	795	260	1,100,000	
Stud	660	760	825	260	1,100,000		
Select Structural	2x8	1,725	1,985	2,155	260	1,500,000	
No. 1		1,175	1,350	1,465	260	1,400,000	
No. 2		1,000	1,150	1,250	260	1,200,000	
No. 3		585	675	735	260	1,100,000	
Select Structural	2x10	1,580	1,820	1,975	260	1,500,000	
No. 1		1,075	1,235	1,345	260	1,400,000	
No. 2		915	1,055	1,145	260	1,200,000	
No. 3		540	620	670	260	1,100,000	
Select Structural	2x12	1,440	1,655	1,795	260	1,500,000	
No. 1		980	1,125	1,220	260	1,400,000	
No. 2		835	960	1,040	260	1,200,000	
No. 3		490	560	610	260	1,100,000	
AS-Sc P (I) AUS							
Select Structural	2x4	2,245	2,580	2,805	260	1,700,000	PLIB
No. 1		1,555	1,785	1,940	260	1,600,000	
No. 2		1,335	1,535	1,670	260	1,400,000	
No. 3		775	895	970	260	1,300,000	
Stud		760	875	950	260	1,300,000	
Construction		1,005	1,155	1,260	260	1,300,000	
Standard		575	660	720	260	1,200,000	
Utility		260	300	325	260	1,100,000	
Select Structural	2x6	1,945	2,235	2,430	260	1,700,000	
No. 1		1,345	1,545	1,680	260	1,600,000	
No. 2		1,160	1,330	1,450	260	1,400,000	
No. 3		675	775	840	260	1,300,000	
Stud	690	795	865	260	1,300,000		
Select Structural	2x8	1,795	2,065	2,245	260	1,700,000	
No. 1		1,240	1,430	1,555	260	1,600,000	
No. 2		1,070	1,230	1,335	260	1,400,000	
No. 3		620	715	775	260	1,300,000	
Select Structural	2x10	1,645	1,890	2,055	260	1,700,000	
No. 1		1,140	1,310	1,425	260	1,600,000	
No. 2		980	1,125	1,225	260	1,400,000	
No. 3		570	655	710	260	1,300,000	
Select Structural	2x12	1,495	1,720	1,870	260	1,700,000	
No. 1		1,035	1,190	1,295	260	1,600,000	
No. 2		890	1,025	1,115	260	1,400,000	
No. 3		520	595	645	260	1,300,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
AS/NSPR/SCOTP(I)AUS/GER							
Select Structural	2x4	2,070	2,380	2,590	260	1,600,000	TP
No. 1		1,380	1,585	1,725	260	1,400,000	
No. 2		1,210	1,390	1,510	260	1,100,000	
No. 3		690	795	865	260	1,000,000	
Stud		695	800	870	260	1,000,000	
Construction		920	1,060	1,150	260	1,100,000	
Standard		520	595	645	260	1,000,000	
Utility		260	300	325	260	900,000	
Select Structural	2x6	1,795	2,065	2,245	260	1,600,000	
No. 1		1,195	1,375	1,495	260	1,400,000	
No. 2		1,045	1,205	1,310	260	1,100,000	
No. 3		600	690	750	260	1,000,000	
Stud	635	725	790	260	1,000,000		
Select Structural	2x8	1,655	1,905	2,070	260	1,600,000	
No. 1		1,105	1,270	1,380	260	1,400,000	
No. 2		965	1,110	1,210	260	1,100,000	
No. 3		550	635	690	260	1,000,000	
Select Structural	2x10	1,520	1,745	1,900	260	1,600,000	
No. 1		1,010	1,165	1,265	260	1,400,000	
No. 2		885	1,020	1,105	260	1,100,000	
No. 3		505	580	635	260	1,000,000	
Select Structural	2x12	1,380	1,585	1,725	260	1,600,000	
No. 1		920	1,060	1,150	260	1,400,000	
No. 2		805	925	1,005	260	1,100,000	
No. 3		460	530	575	260	1,000,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
DF/DF-N							
DF-L/DF-L(N)							
DF-L/DF(N)							
Select Structural	2x4	2,330	2,680	2,910	625	1,900,000	PLIB, TP, WWPA
No. 1 & Btr		1,985	2,280	2,480	625	1,800,000	
No. 1		1,465	1,685	1,835	625	1,600,000	
No. 2		1,465	1,685	1,835	625	1,600,000	
No. 3		820	940	1,025	625	1,400,000	
Stud		820	945	1,030	625	1,400,000	
Construction		1,095	1,255	1,365	625	1,500,000	
Standard		605	695	755	625	1,400,000	
Utility		290	330	360	625	1,300,000	
Select Structural		2x6	2,020	2,320	2,525	625	
No. 1 & Btr	1,720		1,975	2,150	625	1,800,000	
No. 1	1,270		1,460	1,590	625	1,600,000	
No. 2	1,270		1,460	1,590	625	1,600,000	
No. 3	710		815	890	625	1,400,000	
Stud	750		860	935	625	1,400,000	
Select Structural	2x8	1,865	2,140	2,330	625	1,900,000	
No. 1 & Btr		1,585	1,825	1,985	625	1,800,000	
No. 1		1,175	1,350	1,465	625	1,600,000	
No. 2		1,175	1,350	1,465	625	1,600,000	
No. 3	655	755	820	625	1,400,000		
Select Structural	2x10	1,710	1,965	2,135	625	1,900,000	
No. 1 & Btr		1,455	1,675	1,820	625	1,800,000	
No. 1		1,075	1,235	1,345	625	1,600,000	
No. 2		1,075	1,235	1,345	625	1,600,000	
No. 3		600	690	750	625	1,400,000	
Select Structural	2x12	1,555	1,785	1,940	625	1,900,000	
No. 1 & Btr		1,325	1,520	1,655	625	1,800,000	
No. 1		980	1,125	1,220	625	1,600,000	
No. 2		980	1,125	1,220	625	1,600,000	
No. 3		545	630	685	625	1,400,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
D Fir-L-HF							
DF-HF							
Select Structural	2x4	2,415	2,775	3,020	405	1,600,000	PLIB
No. 1 & Btr		1,900	2,180	2,370	405	1,500,000	
No. 1		1,680	1,935	2,100	405	1,500,000	
No. 2		1,465	1,685	1,835	405	1,300,000	
No. 3		865	990	1,080	405	1,200,000	
Stud		855	980	1,065	405	1,200,000	
Construction		1,120	1,290	1,400	405	1,300,000	
Standard		635	725	790	405	1,200,000	
Utility		290	330	360	405	1,100,000	
Select Structural	2x6	2,095	2,405	2,615	405	1,600,000	
No. 1 & Btr		1,645	1,890	2,055	405	1,500,000	
No. 1		1,460	1,675	1,820	405	1,500,000	
No. 2		1,270	1,460	1,590	405	1,300,000	
No. 3		750	860	935	405	1,200,000	
Stud	775	895	970	405	1,200,000		
Select Structural	2x8	1,930	2,220	2,415	405	1,600,000	
No. 1 & Btr		1,520	1,745	1,900	405	1,500,000	
No. 1		1,345	1,545	1,680	405	1,500,000	
No. 2		1,175	1,350	1,465	405	1,300,000	
No. 3	690	795	865	405	1,200,000		
Select Structural	2x10	1,770	2,035	2,215	405	1,600,000	
No. 1 & Btr		1,390	1,600	1,740	405	1,500,000	
No. 1		1,235	1,420	1,540	405	1,500,000	
No. 2		1,075	1,235	1,345	405	1,300,000	
No. 3		635	725	790	405	1,200,000	
Select Structural	2x12	1,610	1,850	2,015	405	1,600,000	
No. 1 & Btr		1,265	1,455	1,580	405	1,500,000	
No. 1		1,120	1,290	1,400	405	1,500,000	
No. 2		980	1,125	1,220	405	1,300,000	
No. 3		575	660	720	405	1,200,000	

**TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND
COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}**

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
DF-HF-SPF							
Select Structural	2x4	2,155	2,480	2,695	405	1,500,000	PLIB
No. 1		1,510	1,735	1,885	405	1,400,000	
No. 2		1,465	1,685	1,835	405	1,300,000	
No. 3		865	990	1,080	405	1,200,000	
Stud		855	980	1,065	405	1,200,000	
Construction		1,120	1,290	1,400	405	1,300,000	
Standard		635	725	790	405	1,200,000	
Utility		290	330	360	405	1,100,000	
Select Structural	2x6	1,870	2,150	2,335	405	1,500,000	
No. 1		1,310	1,505	1,635	405	1,400,000	
No. 2		1,270	1,460	1,590	405	1,300,000	
No. 3		750	860	935	405	1,200,000	
Stud	775	895	970	405	1,200,000		
Select Structural	2x8	1,725	1,985	2,155	405	1,500,000	
No. 1		1,210	1,390	1,510	405	1,400,000	
No. 2		1,175	1,350	1,465	405	1,300,000	
No. 3		690	795	865	405	1,200,000	
Select Structural	2x10	1,580	1,820	1,975	405	1,500,000	
No. 1		1,105	1,275	1,385	405	1,400,000	
No. 2		1,075	1,235	1,345	405	1,300,000	
No. 3		635	725	790	405	1,200,000	
Select Structural	2x12	1,440	1,655	1,795	405	1,500,000	
No. 1		1,005	1,155	1,260	405	1,400,000	
No. 2		980	1,125	1,220	405	1,300,000	
No. 3		575	660	720	405	1,200,000	
DF-HF-SPF(S)							
Select Structural	2x4	2,245	2,580	2,805	335	1,300,000	PLIB
No. 1		1,510	1,735	1,885	335	1,200,000	
No. 2		1,335	1,535	1,670	335	1,100,000	
No. 3		775	895	970	335	1,000,000	
Stud		760	875	950	335	1,000,000	
Construction		1,005	1,155	1,260	335	1,000,000	
Standard		575	660	720	335	900,000	
Utility		260	300	325	335	900,000	
Select Structural	2x6	1,945	2,235	2,430	335	1,300,000	
No. 1		1,310	1,505	1,635	335	1,200,000	
No. 2		1,160	1,330	1,450	335	1,100,000	
No. 3		675	775	840	335	1,000,000	
Stud	690	795	865	335	1,000,000		
Select Structural	2x8	1,795	2,065	2,245	335	1,300,000	
No. 1		1,210	1,390	1,510	335	1,200,000	
No. 2		1,070	1,230	1,335	335	1,100,000	
No. 3		620	715	775	335	1,000,000	
Select Structural	2x10	1,645	1,890	2,055	335	1,300,000	
No. 1		1,105	1,275	1,385	335	1,200,000	
No. 2		980	1,125	1,225	335	1,100,000	
No. 3		570	655	710	335	1,000,000	
Select Structural	2x12	1,495	1,720	1,870	335	1,300,000	
No. 1		1,005	1,155	1,260	335	1,200,000	
No. 2		890	1,025	1,115	335	1,100,000	
No. 3		520	595	645	335	1,000,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
D Fir-SPF							
DF-L-SPF							
Select Structural	2x4	2,155	2,480	2,695	425	1,500,000	PLIB
No. 1		1,510	1,735	1,885	425	1,400,000	
No. 2		1,510	1,735	1,885	425	1,400,000	
No. 3		865	990	1,080	425	1,200,000	
Stud		855	980	1,065	425	1,200,000	
Construction Standard		1,150	1,325	1,440	425	1,300,000	
Standard		635	725	790	425	1,200,000	
Utility		315	365	395	425	1,100,000	
Select Structural	2x6	1,870	2,150	2,335	425	1,500,000	
No. 1		1,310	1,505	1,635	425	1,400,000	
No. 2		1,310	1,505	1,635	425	1,400,000	
No. 3		750	860	935	425	1,200,000	
Stud	775	895	970	425	1,200,000		
Select Structural	2x8	1,725	1,985	2,155	425	1,500,000	
No. 1		1,210	1,390	1,510	425	1,400,000	
No. 2		1,210	1,390	1,510	425	1,400,000	
No. 3		690	795	865	425	1,200,000	
Select Structural	2x10	1,580	1,820	1,975	425	1,500,000	
No. 1		1,105	1,275	1,385	425	1,400,000	
No. 2		1,105	1,275	1,385	425	1,400,000	
No. 3		635	725	790	425	1,200,000	
Select Structural	2x12	1,440	1,655	1,795	425	1,500,000	
No. 1		1,005	1,155	1,260	425	1,400,000	
No. 2		1,005	1,155	1,260	425	1,400,000	
No. 3		575	660	720	425	1,200,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
DF-N Spr (I) N FRA							
Select Structural	2x4	2,070	2,380	2,590	355	1,600,000	PLIB
No. 1		1,425	1,635	1,780	355	1,400,000	
No. 2		1,250	1,440	1,565	355	1,200,000	
No. 3		735	845	915	355	1,100,000	
Stud		725	835	910	355	1,100,000	
Construction		950	1,090	1,185	355	1,100,000	
Standard		545	630	685	355	1,000,000	
Utility		260	300	325	355	900,000	
Select Structural	2x6	1,795	2,065	2,245	355	1,600,000	
No. 1		1,235	1,420	1,540	355	1,400,000	
No. 2		1,085	1,245	1,355	355	1,200,000	
No. 3		635	730	795	355	1,100,000	
Stud	660	760	825	355	1,100,000		
Select Structural	2x8	1,655	1,905	2,070	355	1,600,000	
No. 1		1,140	1,310	1,425	355	1,400,000	
No. 2		1,000	1,150	1,250	355	1,200,000	
No. 3		585	675	735	355	1,100,000	
Select Structural	2x10	1,520	1,745	1,900	355	1,600,000	
No. 1		1,045	1,200	1,305	355	1,400,000	
No. 2		915	1,055	1,145	355	1,200,000	
No. 3		540	620	670	355	1,100,000	
Select Structural	2x12	1,380	1,585	1,725	355	1,600,000	
No. 1		950	1,090	1,185	355	1,400,000	
No. 2		835	960	1,040	355	1,200,000	
No. 3		490	560	610	355	1,100,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
DF/NSPR/SCOTP(I)GER/ROM/SW/UKR							
Select Structural	2x4	2,070	2,380	2,590	270	1,500,000	TP
No. 1		1,380	1,585	1,725	270	1,400,000	
No. 2		1,080	1,240	1,350	270	1,100,000	
No. 3		645	745	810	270	1,000,000	
Stud		635	725	790	270	1,000,000	
Construction		835	960	1,040	270	1,100,000	
Standard		460	530	575	270	1,000,000	
Utility		230	265	290	270	900,000	
Select Structural	2x6	1,795	2,065	2,245	270	1,500,000	
No. 1		1,195	1,375	1,495	270	1,400,000	
No. 2		935	1,075	1,170	270	1,100,000	
No. 3		560	645	700	270	1,000,000	
Stud	575	660	720	270	1,000,000		
Select Structural	2x8	1,655	1,905	2,070	270	1,500,000	
No. 1		1,105	1,270	1,380	270	1,400,000	
No. 2		865	990	1,080	270	1,100,000	
No. 3		520	595	645	270	1,000,000	
Select Structural	2x10	1,520	1,745	1,900	270	1,500,000	
No. 1		1,010	1,165	1,265	270	1,400,000	
No. 2		790	910	990	270	1,100,000	
No. 3		475	545	595	270	1,000,000	
Select Structural	2x12	1,380	1,585	1,725	270	1,500,000	
No. 1		920	1,060	1,150	270	1,400,000	
No. 2		720	825	900	270	1,100,000	
No. 3		430	495	540	270	1,000,000	
DF/NSPR/SCOTP(I)GER							
Select Structural	2x4	2,070	2,380	2,590	355	1,600,000	
No. 1		1,380	1,585	1,725	355	1,400,000	
No. 2		1,210	1,390	1,510	355	1,100,000	
No. 3		690	795	865	355	1,000,000	
Stud		695	800	870	355	1,000,000	
Construction		920	1,060	1,150	355	1,100,000	
Standard		520	595	645	355	1,000,000	
Utility		260	300	325	355	900,000	
Select Structural	2x6	1,795	2,065	2,245	355	1,600,000	
No. 1		1,195	1,375	1,495	355	1,400,000	
No. 2		1,045	1,205	1,310	355	1,100,000	
No. 3		600	690	750	355	1,000,000	
Stud	635	725	790	355	1,000,000		
Select Structural	2x8	1,655	1,905	2,070	355	1,600,000	
No. 1		1,105	1,270	1,380	355	1,400,000	
No. 2		965	1,110	1,210	355	1,100,000	
No. 3		550	635	690	355	1,000,000	
Select Structural	2x10	1,520	1,745	1,900	355	1,600,000	
No. 1		1,010	1,165	1,265	355	1,400,000	
No. 2		885	1,020	1,105	355	1,100,000	
No. 3		505	580	635	355	1,000,000	
Select Structural	2x12	1,380	1,585	1,725	355	1,600,000	
No. 1		920	1,060	1,150	355	1,400,000	
No. 2		805	925	1,005	355	1,100,000	
No. 3		460	530	575	355	1,000,000	

**TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND
COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}**

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
ES-LP							
Select Structural	2x4	2,245	2,580	2,805	335	1,300,000	PLIB, WWPA
No. 1		1,510	1,735	1,885	335	1,200,000	
No. 2		1,335	1,535	1,670	335	1,100,000	
No. 3		775	895	970	335	1,000,000	
Stud		760	875	950	335	1,000,000	
Construction		1,005	1,155	1,260	335	1,000,000	
Standard		575	660	720	335	900,000	
Utility		260	300	325	335	900,000	
Select Structural	2x6	1,945	2,235	2,430	335	1,300,000	
No. 1		1,310	1,505	1,635	335	1,200,000	
No. 2		1,160	1,330	1,450	335	1,100,000	
No. 3		675	775	840	335	1,000,000	
Stud	690	795	865	335	1,000,000		
Select Structural	2x8	1,795	2,065	2,245	335	1,300,000	
No. 1		1,210	1,390	1,510	335	1,200,000	
No. 2		1,070	1,230	1,335	335	1,100,000	
No. 3		620	715	775	335	1,000,000	
Select Structural	2x10	1,645	1,890	2,055	335	1,300,000	
No. 1		1,105	1,275	1,385	335	1,200,000	
No. 2		980	1,125	1,225	335	1,100,000	
No. 3		570	655	710	335	1,000,000	
Select Structural	2x12	1,495	1,720	1,870	335	1,300,000	
No. 1		1,005	1,155	1,260	335	1,200,000	
No. 2		890	1,025	1,115	335	1,100,000	
No. 3		520	595	645	335	1,000,000	
ES-LP-AF							
Select Structural	2x4	1,555	1,785	1,940	335	1,200,000	PLIB, WWPA
No. 1		1,165	1,340	1,455	335	1,100,000	
No. 2		1,165	1,340	1,455	335	1,000,000	
No. 3		645	745	810	335	900,000	
Stud		665	765	830	335	900,000	
Construction		890	1,025	1,115	335	1,000,000	
Standard		490	560	610	335	900,000	
Utility		230	265	290	335	800,000	
Select Structural	2x6	1,345	1,545	1,680	335	1,200,000	
No. 1		1,010	1,160	1,260	335	1,100,000	
No. 2		1,010	1,160	1,260	335	1,000,000	
No. 3		560	645	700	335	900,000	
Stud	605	695	755	335	900,000		
Select Structural	2x8	1,240	1,430	1,555	335	1,200,000	
No. 1		930	1,070	1,165	335	1,100,000	
No. 2		930	1,070	1,165	335	1,000,000	
No. 3		520	595	645	335	900,000	
Select Structural	2x10	1,140	1,310	1,425	335	1,200,000	
No. 1		855	980	1,065	335	1,100,000	
No. 2		855	980	1,065	335	1,000,000	
No. 3		475	545	595	335	900,000	
Select Structural	2x12	1,035	1,190	1,295	335	1,200,000	
No. 1		775	895	970	335	1,100,000	
No. 2		775	895	970	335	1,000,000	
No. 3		430	495	540	335	900,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
HF/DF-N/SPF/SPF-S							
Select Structural	2x4	2,155	2,480	2,695	335	1,300,000	TP
No. 1		1,465	1,685	1,835	335	1,200,000	
No. 2		1,335	1,535	1,670	335	1,100,000	
No. 3		775	895	970	335	1,000,000	
Stud		760	875	950	335	1,000,000	
Construction		1,005	1,155	1,260	335	1,000,000	
Standard		575	660	720	335	900,000	
Utility		260	300	325	335	900,000	
Select Structural	2x6	1,870	2,150	2,335	335	1,300,000	
No. 1		1,270	1,460	1,590	335	1,200,000	
No. 2		1,160	1,330	1,450	335	1,100,000	
No. 3		675	775	840	335	1,000,000	
Stud	690	795	865	335	1,000,000		
Select Structural	2x8	1,725	1,985	2,155	335	1,300,000	
No. 1		1,175	1,350	1,465	335	1,200,000	
No. 2		1,070	1,230	1,335	335	1,100,000	
No. 3		620	715	775	335	1,000,000	
Select Structural	2x10	1,580	1,820	1,975	335	1,300,000	
No. 1		1,075	1,235	1,345	335	1,200,000	
No. 2		980	1,125	1,225	335	1,100,000	
No. 3		570	655	710	335	1,000,000	
Select Structural	2x12	1,440	1,655	1,795	335	1,300,000	
No. 1		980	1,125	1,220	335	1,200,000	
No. 2		890	1,025	1,115	335	1,100,000	
No. 3		520	595	645	335	1,000,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
HF/HF(N)							
HF/HF-N							
Select Structural	2x4	2,245	2,580	2,805	405	1,600,000	PLIB, TP, WWPA
No. 1 & Btr		1,900	2,180	2,370	405	1,500,000	
No. 1		1,680	1,935	2,100	405	1,500,000	
No. 2		1,465	1,685	1,835	405	1,300,000	
No. 3		865	990	1,080	405	1,200,000	
Stud		855	980	1,065	405	1,200,000	
Construction		1,120	1,290	1,400	405	1,300,000	
Standard		635	725	790	405	1,200,000	
Utility		290	330	360	405	1,100,000	
Select Structural	2x6	1,945	2,235	2,430	405	1,600,000	
No. 1 & Btr		1,645	1,890	2,055	405	1,500,000	
No. 1		1,460	1,675	1,820	405	1,500,000	
No. 2		1,270	1,460	1,590	405	1,300,000	
No. 3		750	860	935	405	1,200,000	
Stud	775	895	970	405	1,200,000		
Select Structural	2x8	1,795	2,065	2,245	405	1,600,000	
No. 1 & Btr		1,520	1,745	1,900	405	1,500,000	
No. 1		1,345	1,545	1,680	405	1,500,000	
No. 2		1,175	1,350	1,465	405	1,300,000	
No. 3	690	795	865	405	1,200,000		
Select Structural	2x10	1,645	1,890	2,055	405	1,600,000	
No. 1 & Btr		1,390	1,600	1,740	405	1,500,000	
No. 1		1,235	1,420	1,540	405	1,500,000	
No. 2		1,075	1,235	1,345	405	1,300,000	
No. 3		635	725	790	405	1,200,000	
Select Structural	2x12	1,495	1,720	1,870	405	1,600,000	
No. 1 & Btr		1,265	1,455	1,580	405	1,500,000	
No. 1		1,120	1,290	1,400	405	1,500,000	
No. 2		980	1,125	1,220	405	1,300,000	
No. 3		575	660	720	405	1,200,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
HF-SS							
Select Structural	2x4	2,245	2,580	2,805	335	1,300,000	PLIB
No. 1		1,510	1,735	1,885	335	1,200,000	
No. 2		1,335	1,535	1,670	335	1,100,000	
No. 3		775	895	970	335	1,000,000	
Stud		760	875	950	335	1,000,000	
Construction		1,005	1,155	1,260	335	1,000,000	
Standard		575	660	720	335	900,000	
Utility		260	300	325	335	900,000	
Select Structural	2x6	1,945	2,235	2,430	335	1,300,000	
No. 1		1,310	1,505	1,635	335	1,200,000	
No. 2		1,160	1,330	1,450	335	1,100,000	
No. 3		675	775	840	335	1,000,000	
Stud	690	795	865	335	1,000,000		
Select Structural	2x8	1,795	2,065	2,245	335	1,300,000	
No. 1		1,210	1,390	1,510	335	1,200,000	
No. 2		1,070	1,230	1,335	335	1,100,000	
No. 3		620	715	775	335	1,000,000	
Select Structural	2x10	1,645	1,890	2,055	335	1,300,000	
No. 1		1,105	1,275	1,385	335	1,200,000	
No. 2		980	1,125	1,225	335	1,100,000	
No. 3		570	655	710	335	1,000,000	
Select Structural	2x12	1,495	1,720	1,870	335	1,300,000	
No. 1		1,005	1,155	1,260	335	1,200,000	
No. 2		890	1,025	1,115	335	1,100,000	
No. 3		520	595	645	335	1,000,000	
N Spr (I) EST FIN GER LTH NOR SW							
Select Structural	2x4	2,070	2,380	2,590	220	1,500,000	PLIB
No. 1		1,425	1,635	1,780	220	1,400,000	
No. 2		1,080	1,240	1,350	220	1,200,000	
No. 3		645	745	810	220	1,100,000	
Stud		695	800	870	220	1,100,000	
Construction		835	960	1,040	220	1,100,000	
Standard		460	530	575	220	1,000,000	
Utility		230	265	290	220	900,000	
Select Structural	2x6	1,795	2,065	2,245	220	1,500,000	
No. 1		1,235	1,420	1,540	220	1,400,000	
No. 2		935	1,075	1,170	220	1,200,000	
No. 3		560	645	700	220	1,100,000	
Stud	635	725	790	220	1,100,000		
Select Structural	2x8	1,655	1,905	2,070	220	1,500,000	
No. 1		1,140	1,310	1,425	220	1,400,000	
No. 2		865	990	1,080	220	1,200,000	
No. 3		520	595	645	220	1,100,000	
Select Structural	2x10	1,520	1,745	1,900	220	1,500,000	
No. 1		1,045	1,200	1,305	220	1,400,000	
No. 2		790	910	990	220	1,200,000	
No. 3		475	545	595	220	1,100,000	
Select Structural	2x12	1,380	1,585	1,725	220	1,500,000	
No. 1		950	1,090	1,185	220	1,400,000	
No. 2		720	825	900	220	1,200,000	
No. 3		430	495	540	220	1,100,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
N Spr-Sc P(I) EST							
N Spr-Sc P(I) LAT							
N Spr-Sc P(I) LTH							
NSPR/SCOTP(I)LAT/LTH							
Select Structural	2x4	1,985	2,280	2,480	430	1,500,000	PLIB, TP
No. 1		1,380	1,585	1,725	430	1,400,000	
No. 2		1,295	1,490	1,615	430	1,200,000	
No. 3		735	845	915	430	1,100,000	
Stud		725	835	910	430	1,100,000	
Construction		980	1,125	1,220	430	1,100,000	
Standard		545	630	685	430	1,000,000	
Utility		260	300	325	430	1,000,000	
Select Structural	2x6	1,720	1,975	2,150	430	1,500,000	
No. 1		1,195	1,375	1,495	430	1,400,000	
No. 2		1,120	1,290	1,400	430	1,200,000	
No. 3		635	730	795	430	1,100,000	
Stud		660	760	825	430	1,100,000	
Select Structural	2x8	1,585	1,825	1,985	430	1,500,000	
No. 1		1,105	1,270	1,380	430	1,400,000	
No. 2		1,035	1,190	1,295	430	1,200,000	
No. 3		585	675	735	430	1,100,000	
Select Structural	2x10	1,455	1,675	1,820	430	1,500,000	
No. 1		1,010	1,165	1,265	430	1,400,000	
No. 2		950	1,090	1,185	430	1,200,000	
No. 3		540	620	670	430	1,100,000	
Select Structural	2x12	1,325	1,520	1,655	430	1,500,000	
No. 1		920	1,060	1,150	430	1,400,000	
No. 2		865	990	1,080	430	1,200,000	
No. 3		490	560	610	430	1,100,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
N Spr-Sc P(I) FIN							
Select Structural	2x4	2,245	2,580	2,805	210	1,500,000	PLIB
No. 1		1,425	1,635	1,780	210	1,400,000	
No. 2		1,080	1,240	1,350	210	1,200,000	
No. 3		645	745	810	210	1,100,000	
Stud		725	835	910	210	1,100,000	
Construction		835	960	1,040	210	1,100,000	
Standard		460	530	575	210	1,000,000	
Utility		230	265	290	210	1,000,000	
Select Structural	2x6	1,945	2,235	2,430	210	1,500,000	
No. 1		1,235	1,420	1,540	210	1,400,000	
No. 2		935	1,075	1,170	210	1,200,000	
No. 3		560	645	700	210	1,100,000	
Stud	660	760	825	210	1,100,000		
Select Structural	2x8	1,795	2,065	2,245	210	1,500,000	
No. 1		1,140	1,310	1,425	210	1,400,000	
No. 2		865	990	1,080	210	1,200,000	
No. 3		520	595	645	210	1,100,000	
Select Structural	2x10	1,645	1,890	2,055	210	1,500,000	
No. 1		1,045	1,200	1,305	210	1,400,000	
No. 2		790	910	990	210	1,200,000	
No. 3		475	545	595	210	1,100,000	
Select Structural	2x12	1,495	1,720	1,870	210	1,500,000	
No. 1		950	1,090	1,185	210	1,400,000	
No. 2		720	825	900	210	1,200,000	
No. 3		430	495	540	210	1,100,000	
N Spr-Sc P(I) GER							
Select Structural	2x4	2,070	2,380	2,590	355	1,600,000	PLIB
No. 1		1,380	1,585	1,725	355	1,400,000	
No. 2		1,210	1,390	1,510	355	1,100,000	
No. 3		690	795	865	355	1,000,000	
Stud		695	800	870	355	1,000,000	
Construction		920	1,060	1,150	355	1,100,000	
Standard		520	595	645	355	1,000,000	
Utility		260	300	325	355	900,000	
Select Structural	2x6	1,795	2,065	2,245	355	1,600,000	
No. 1		1,195	1,375	1,495	355	1,400,000	
No. 2		1,045	1,205	1,310	355	1,100,000	
No. 3		600	690	750	355	1,000,000	
Stud	635	725	790	355	1,000,000		
Select Structural	2x8	1,655	1,905	2,070	355	1,600,000	
No. 1		1,105	1,270	1,380	355	1,400,000	
No. 2		965	1,110	1,210	355	1,100,000	
No. 3		550	635	690	355	1,000,000	
Select Structural	2x10	1,520	1,745	1,900	355	1,600,000	
No. 1		1,010	1,165	1,265	355	1,400,000	
No. 2		885	1,020	1,105	355	1,100,000	
No. 3		505	580	635	355	1,000,000	
Select Structural	2x12	1,380	1,585	1,725	355	1,600,000	
No. 1		920	1,060	1,150	355	1,400,000	
No. 2		805	925	1,005	355	1,100,000	
No. 3		460	530	575	355	1,000,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
N Spr-Sc P(I) ROM							
N SPr-Sc P(I) ROM-UKR							
Select Structural	2x4	2,155	2,480	2,695	270	1,500,000	PLIB
No. 1		1,465	1,685	1,835	270	1,400,000	
No. 2		1,250	1,440	1,565	270	1,200,000	
No. 3		735	845	915	270	1,100,000	
Stud		725	835	910	270	1,100,000	
Construction		980	1,125	1,220	270	1,100,000	
Standard		545	630	685	270	1,000,000	
Utility		260	300	325	270	1,000,000	
Select Structural		2x6	1,870	2,150	2,335	270	
No. 1	1,270		1,460	1,590	270	1,400,000	
No. 2	1,085		1,245	1,355	270	1,200,000	
No. 3	635		730	795	270	1,100,000	
Stud	660		760	825	270	1,100,000	
Select Structural	2x8	1,725	1,985	2,155	270	1,500,000	
No. 1		1,175	1,350	1,465	270	1,400,000	
No. 2		1,000	1,150	1,250	270	1,200,000	
No. 3		585	675	735	270	1,100,000	
Select Structural		2x10	1,580	1,820	1,975	270	
No. 1	1,075		1,235	1,345	270	1,400,000	
No. 2	915		1,055	1,145	270	1,200,000	
No. 3	540		620	670	270	1,100,000	
Select Structural	2x12		1,440	1,655	1,795	270	
No. 1		980	1,125	1,220	270	1,400,000	
No. 2		835	960	1,040	270	1,200,000	
No. 3		490	560	610	270	1,100,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
N Spr-Sc P(I) SW							
Select Structural	2x4	2,155	2,480	2,695	285	1,600,000	PLIB
No. 1		1,465	1,685	1,835	285	1,400,000	
No. 2		1,080	1,240	1,350	285	1,200,000	
No. 3		645	745	810	285	1,100,000	
Stud		635	725	790	285	1,100,000	
Construction		835	960	1,040	285	1,200,000	
Standard		460	530	575	285	1,100,000	
Utility		230	265	290	285	1,000,000	
Select Structural	2x6	1,870	2,150	2,335	285	1,600,000	
No. 1		1,270	1,460	1,590	285	1,400,000	
No. 2		935	1,075	1,170	285	1,200,000	
No. 3		560	645	700	285	1,100,000	
Stud	575	660	720	285	1,100,000		
Select Structural	2x8	1,725	1,985	2,155	285	1,600,000	
No. 1		1,175	1,350	1,465	285	1,400,000	
No. 2		865	990	1,080	285	1,200,000	
No. 3		520	595	645	285	1,100,000	
Select Structural	2x10	1,580	1,820	1,975	285	1,600,000	
No. 1		1,075	1,235	1,345	285	1,400,000	
No. 2		790	910	990	285	1,200,000	
No. 3		475	545	595	285	1,100,000	
Select Structural	2x12	1,440	1,655	1,795	285	1,600,000	
No. 1		980	1,125	1,220	285	1,400,000	
No. 2		720	825	900	285	1,200,000	
No. 3		430	495	540	285	1,100,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency					
		Normal Duration	Snow Loading	7-Day Loading								
N Spr-S Fir (I) GER	2x4						PLIB					
N Spr-S Fir (I) N FRA												
N Spr-S Fir(I) GER N FRA												
Select Structural								1,640	1,885	2,050	355	1,500,000
No. 1								1,250	1,440	1,565	355	1,400,000
No. 2								1,250	1,440	1,565	355	1,200,000
No. 3								735	845	915	355	1,100,000
Stud								725	835	910	355	1,100,000
Construction								950	1,090	1,185	355	1,100,000
Standard								545	630	685	355	1,000,000
Utility	260	300	325	355	900,000							
Select Structural	2x6						PLIB					
No. 1								1,420	1,635	1,775	355	1,500,000
No. 2								1,085	1,245	1,355	355	1,400,000
No. 3								1,085	1,245	1,355	355	1,200,000
Stud								635	730	795	355	1,100,000
Select Structural	2x8						PLIB					
No. 1								1,310	1,510	1,640	355	1,500,000
No. 2								1,000	1,150	1,250	355	1,400,000
No. 3								1,000	1,150	1,250	355	1,200,000
Select Structural	2x10						PLIB					
No. 1								585	675	735	355	1,100,000
No. 2								1,200	1,380	1,500	355	1,500,000
No. 3								915	1,055	1,145	355	1,400,000
Select Structural	2x12						PLIB					
No. 1								915	1,055	1,145	355	1,200,000
No. 2								540	620	670	355	1,100,000
No. 3								1,095	1,255	1,365	355	1,500,000
Select Structural	2x12						PLIB					
No. 1								835	960	1,040	355	1,400,000
No. 2								835	960	1,040	355	1,200,000
No. 3								490	560	610	355	1,100,000

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
N Spr-Sc P-DF (I) GER							
Select Structural	2x4	2,070	2,380	2,590	355	1,600,000	PLIB
No. 1		1,380	1,585	1,725	355	1,400,000	
No. 2		1,210	1,390	1,510	355	1,100,000	
No. 3		690	795	865	355	1,000,000	
Stud		695	800	870	355	1,000,000	
Construction		920	1,060	1,150	355	1,100,000	
Standard		520	595	645	355	1,000,000	
Utility		260	300	325	355	900,000	
Select Structural		2x6	1,795	2,065	2,245	355	
No. 1	1,195		1,375	1,495	355	1,400,000	
No. 2	1,045		1,205	1,310	355	1,100,000	
No. 3	600		690	750	355	1,000,000	
Stud	635		725	790	355	1,000,000	
Select Structural	2x8	1,655	1,905	2,070	355	1,600,000	
No. 1		1,105	1,270	1,380	355	1,400,000	
No. 2		965	1,110	1,210	355	1,100,000	
No. 3		550	635	690	355	1,000,000	
Select Structural	2x10	1,520	1,745	1,900	355	1,600,000	
No. 1		1,010	1,165	1,265	355	1,400,000	
No. 2		885	1,020	1,105	355	1,100,000	
No. 3		505	580	635	355	1,000,000	
Select Structural	2x12	1,380	1,585	1,725	355	1,600,000	
No. 1		920	1,060	1,150	355	1,400,000	
No. 2		805	925	1,005	355	1,100,000	
No. 3		460	530	575	355	1,000,000	
N Spr-Sc P-DF-L (I) GER							
Select Structural	2x4	2,070	2,380	2,590	355	1,600,000	
No. 1		1,380	1,585	1,725	355	1,400,000	
No. 2		1,210	1,390	1,510	355	1,100,000	
No. 3		690	795	865	355	1,000,000	
Stud		695	800	870	355	1,000,000	
Construction		920	1,060	1,150	355	1,100,000	
Standard		520	595	645	355	1,000,000	
Utility		260	300	325	355	900,000	
Select Structural		2x6	1,795	2,065	2,245	355	1,600,000
No. 1	1,195		1,375	1,495	355	1,400,000	
No. 2	1,045		1,205	1,310	355	1,100,000	
No. 3	600		690	750	355	1,000,000	
Stud	635		725	790	355	1,000,000	
Select Structural	2x8	1,655	1,905	2,070	355	1,600,000	
No. 1		1,105	1,270	1,380	355	1,400,000	
No. 2		965	1,110	1,210	355	1,100,000	
No. 3		550	635	690	355	1,000,000	
Select Structural	2x10	1,520	1,745	1,900	355	1,600,000	
No. 1		1,010	1,165	1,265	355	1,400,000	
No. 2		885	1,020	1,105	355	1,100,000	
No. 3		505	580	635	355	1,000,000	
Select Structural	2x12	1,380	1,585	1,725	355	1,600,000	
No. 1		920	1,060	1,150	355	1,400,000	
No. 2		805	925	1,005	355	1,100,000	
No. 3		460	530	575	355	1,000,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
N Spr-Sc P-DF-S Fir (I) GER							
Select Structural	2x4	1,640	1,885	2,050	355	1,500,000	PLIB
No. 1		1,250	1,440	1,565	355	1,400,000	
No. 2		1,210	1,390	1,510	355	1,100,000	
No. 3		690	795	865	355	1,000,000	
Stud		695	800	870	355	1,000,000	
Construction		920	1,060	1,150	355	1,100,000	
Standard		520	595	645	355	1,000,000	
Utility		260	300	325	355	900,000	
Select Structural	2x6	1,420	1,635	1,775	355	1,500,000	
No. 1		1,085	1,245	1,355	355	1,400,000	
No. 2		1,045	1,205	1,310	355	1,100,000	
No. 3		600	690	750	355	1,000,000	
Stud	635	725	790	355	1,000,000		
Select Structural	2x8	1,310	1,510	1,640	355	1,500,000	
No. 1		1,000	1,150	1,250	355	1,400,000	
No. 2		965	1,110	1,210	355	1,100,000	
No. 3		550	635	690	355	1,000,000	
Select Structural	2x10	1,200	1,380	1,500	355	1,500,000	
No. 1		915	1,055	1,145	355	1,400,000	
No. 2		885	1,020	1,105	355	1,100,000	
No. 3		505	580	635	355	1,000,000	
Select Structural	2x12	1,095	1,255	1,365	355	1,500,000	
No. 1		835	960	1,040	355	1,400,000	
No. 2		805	925	1,005	355	1,100,000	
No. 3		460	530	575	355	1,000,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
NSPR/SCOTP(D)EST/FIN/GER/LIT/ROM /SW/UKR							
Select Structural	2x4	1,985	2,280	2,480	210	1,500,000	TP
No. 1		1,380	1,585	1,725	210	1,400,000	
No. 2		1,080	1,240	1,350	210	1,100,000	
No. 3		645	745	810	210	1,000,000	
Stud		635	725	790	210	1,000,000	
Construction Standard		835	960	1,040	210	1,100,000	
Standard		460	530	575	210	1,000,000	
Utility		230	265	290	210	900,000	
Select Structural	2x6	1,720	1,975	2,150	210	1,500,000	
No. 1		1,195	1,375	1,495	210	1,400,000	
No. 2		935	1,075	1,170	210	1,100,000	
No. 3		560	645	700	210	1,000,000	
Stud	575	660	720	210	1,000,000		
Select Structural	2x8	1,585	1,825	1,985	210	1,500,000	
No. 1		1,105	1,270	1,380	210	1,400,000	
No. 2		865	990	1,080	210	1,100,000	
No. 3		520	595	645	210	1,000,000	
Select Structural	2x10	1,455	1,675	1,820	210	1,500,000	
No. 1		1,010	1,165	1,265	210	1,400,000	
No. 2		790	910	990	210	1,100,000	
No. 3		475	545	595	210	1,000,000	
Select Structural	2x12	1,325	1,520	1,655	210	1,500,000	
No. 1		920	1,060	1,150	210	1,400,000	
No. 2		720	825	900	210	1,100,000	
No. 3		430	495	540	210	1,000,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
NSPR/SCOTP(D)GER/ROM/SW/UKR							
Select Structural	2x4	2,070	2,380	2,590	270	1,500,000	TP
No. 1		1,380	1,585	1,725	270	1,400,000	
No. 2		1,080	1,240	1,350	270	1,100,000	
No. 3		645	745	810	270	1,000,000	
Stud		635	725	790	270	1,000,000	
Construction Standard		835	960	1,040	270	1,100,000	
Standard		460	530	575	270	1,000,000	
Utility		230	265	290	270	900,000	
Select Structural	2x6	1,795	2,065	2,245	270	1,500,000	
No. 1		1,195	1,375	1,495	270	1,400,000	
No. 2		935	1,075	1,170	270	1,100,000	
No. 3		560	645	700	270	1,000,000	
Stud	575	660	720	270	1,000,000		
Select Structural	2x8	1,655	1,905	2,070	270	1,500,000	
No. 1		1,105	1,270	1,380	270	1,400,000	
No. 2		865	990	1,080	270	1,100,000	
No. 3		520	595	645	270	1,000,000	
Select Structural	2x10	1,520	1,745	1,900	270	1,500,000	
No. 1		1,010	1,165	1,265	270	1,400,000	
No. 2		790	910	990	270	1,100,000	
No. 3		475	545	595	270	1,000,000	
Select Structural	2x12	1,380	1,585	1,725	270	1,500,000	
No. 1		920	1,060	1,150	270	1,400,000	
No. 2		720	825	900	270	1,100,000	
No. 3		430	495	540	270	1,000,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
NSPR/SCOTP(D)GER/SW							
Select Structural	2x4	2,070	2,380	2,590	285	1,600,000	TP
No. 1		1,380	1,585	1,725	285	1,400,000	
No. 2		1,080	1,240	1,350	285	1,100,000	
No. 3		645	745	810	285	1,000,000	
Stud		635	725	790	285	1,000,000	
Construction		835	960	1,040	285	1,100,000	
Standard		460	530	575	285	1,000,000	
Utility		230	265	290	285	900,000	
Select Structural	2x6	1,795	2,065	2,245	285	1,600,000	
No. 1		1,195	1,375	1,495	285	1,400,000	
No. 2		935	1,075	1,170	285	1,100,000	
No. 3		560	645	700	285	1,000,000	
Stud	575	660	720	285	1,000,000		
Select Structural	2x8	1,655	1,905	2,070	285	1,600,000	
No. 1		1,105	1,270	1,380	285	1,400,000	
No. 2		865	990	1,080	285	1,100,000	
No. 3		520	595	645	285	1,000,000	
Select Structural	2x10	1,520	1,745	1,900	285	1,600,000	
No. 1		1,010	1,165	1,265	285	1,400,000	
No. 2		790	910	990	285	1,100,000	
No. 3		475	545	595	285	1,000,000	
Select Structural	2x12	1,380	1,585	1,725	285	1,600,000	
No. 1		920	1,060	1,150	285	1,400,000	
No. 2		720	825	900	285	1,100,000	
No. 3		430	495	540	285	1,000,000	
NSPR/SCOTP(I)SW							
Select Structural	2x4	2,155	2,480	2,695	285	1,600,000	
No. 1		1,425	1,635	1,780	285	1,400,000	
No. 2		1,080	1,240	1,350	285	1,200,000	
No. 3		645	745	810	285	1,100,000	
Stud		635	725	790	285	1,100,000	
Construction		835	960	1,040	285	1,200,000	
Standard		460	530	575	285	1,100,000	
Utility		230	265	290	285	1,000,000	
Select Structural	2x6	1,870	2,150	2,335	285	1,600,000	
No. 1		1,235	1,420	1,540	285	1,400,000	
No. 2		935	1,075	1,170	285	1,200,000	
No. 3		560	645	700	285	1,100,000	
Stud	575	660	720	285	1,100,000		
Select Structural	2x8	1,725	1,985	2,155	285	1,600,000	
No. 1		1,140	1,310	1,425	285	1,400,000	
No. 2		865	990	1,080	285	1,200,000	
No. 3		520	595	645	285	1,100,000	
Select Structural	2x10	1,580	1,820	1,975	285	1,600,000	
No. 1		1,045	1,200	1,305	285	1,400,000	
No. 2		790	910	990	285	1,200,000	
No. 3		475	545	595	285	1,100,000	
Select Structural	2x12	1,440	1,655	1,795	285	1,600,000	
No. 1		950	1,090	1,185	285	1,400,000	
No. 2		720	825	900	285	1,200,000	
No. 3		430	495	540	285	1,100,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

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Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
NSPR/SCOTP/SFIR(I)GER							
Select Structural	2x4	1,640	1,885	2,050	355	1,500,000	TP
No. 1		1,250	1,440	1,565	355	1,400,000	
No. 2		1,210	1,390	1,510	355	1,100,000	
No. 3		690	795	865	355	1,000,000	
Stud		695	800	870	355	1,000,000	
Construction		920	1,060	1,150	355	1,100,000	
Standard		520	595	645	355	1,000,000	
Utility		260	300	325	355	900,000	
Select Structural	2x6	1,420	1,635	1,775	355	1,500,000	
No. 1		1,085	1,245	1,355	355	1,400,000	
No. 2		1,045	1,205	1,310	355	1,100,000	
No. 3		600	690	750	355	1,000,000	
Stud	635	725	790	355	1,000,000		
Select Structural	2x8	1,310	1,510	1,640	355	1,500,000	
No. 1		1,000	1,150	1,250	355	1,400,000	
No. 2		965	1,110	1,210	355	1,100,000	
No. 3		550	635	690	355	1,000,000	
Select Structural	2x10	1,200	1,380	1,500	355	1,500,000	
No. 1		915	1,055	1,145	355	1,400,000	
No. 2		885	1,020	1,105	355	1,100,000	
No. 3		505	580	635	355	1,000,000	
Select Structural	2x12	1,095	1,255	1,365	355	1,500,000	
No. 1		835	960	1,040	355	1,400,000	
No. 2		805	925	1,005	355	1,100,000	
No. 3		460	530	575	355	1,000,000	
PP-LP							
Select Structural	2x4	1,555	1,785	1,940	335	1,200,000	PLIB, WWPA
No. 1		1,165	1,340	1,455	335	1,100,000	
No. 2		1,165	1,340	1,455	335	1,000,000	
No. 3		645	745	810	335	900,000	
Stud		665	765	830	335	900,000	
Construction		890	1,025	1,115	335	1,000,000	
Standard		490	560	610	335	900,000	
Utility		230	265	290	335	800,000	
Select Structural	2x6	1,345	1,545	1,680	335	1,200,000	
No. 1		1,010	1,160	1,260	335	1,100,000	
No. 2		1,010	1,160	1,260	335	1,000,000	
No. 3		560	645	700	335	900,000	
Stud	605	695	755	335	900,000		
Select Structural	2x8	1,240	1,430	1,555	335	1,200,000	
No. 1		930	1,070	1,165	335	1,100,000	
No. 2		930	1,070	1,165	335	1,000,000	
No. 3		520	595	645	335	900,000	
Select Structural	2x10	1,140	1,310	1,425	335	1,200,000	
No. 1		855	980	1,065	335	1,100,000	
No. 2		855	980	1,065	335	1,000,000	
No. 3		475	545	595	335	900,000	
Select Structural	2x12	1,035	1,190	1,295	335	1,200,000	
No. 1		775	895	970	335	1,100,000	
No. 2		775	895	970	335	1,000,000	
No. 3		430	495	540	335	900,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
R. PINE/NSPR(N)/SPF/SPF(S)							
Select Structural	2x4	1,640	1,885	2,050	335	1,100,000	TP
No. 1		1,080	1,240	1,350	335	1,100,000	
No. 2		1,080	1,240	1,350	335	1,100,000	
No. 3		605	695	755	335	1,000,000	
Stud		600	690	750	335	1,000,000	
Construction		805	925	1,005	335	1,000,000	
Standard		460	530	575	335	900,000	
Utility		200	230	250	335	900,000	
Select Structural	2x6	1,420	1,635	1,775	335	1,100,000	
No. 1		935	1,075	1,170	335	1,100,000	
No. 2		935	1,075	1,170	335	1,100,000	
No. 3		525	600	655	335	1,000,000	
Stud	545	630	685	335	1,000,000		
Select Structural	2x8	1,310	1,510	1,640	335	1,100,000	
No. 1		865	990	1,080	335	1,100,000	
No. 2		865	990	1,080	335	1,100,000	
No. 3		485	555	605	335	1,000,000	
Select Structural	2x10	1,200	1,380	1,500	335	1,100,000	
No. 1		790	910	990	335	1,100,000	
No. 2		790	910	990	335	1,100,000	
No. 3		445	510	555	335	1,000,000	
Select Structural	2x12	1,095	1,255	1,365	335	1,100,000	
No. 1		720	825	900	335	1,100,000	
No. 2		720	825	900	335	1,100,000	
No. 3		405	465	505	335	1,000,000	
Sc P (I) EST FIN GER LTH SW							
Select Structural	2x4	1,985	2,280	2,480	210	1,500,000	PLIB
No. 1		1,380	1,585	1,725	210	1,400,000	
No. 2		1,080	1,240	1,350	210	1,100,000	
No. 3		645	745	810	210	1,000,000	
Stud		635	725	790	210	1,000,000	
Construction		835	960	1,040	210	1,100,000	
Standard		460	530	575	210	1,000,000	
Utility		230	265	290	210	900,000	
Select Structural	2x6	1,720	1,975	2,150	210	1,500,000	
No. 1		1,195	1,375	1,495	210	1,400,000	
No. 2		935	1,075	1,170	210	1,100,000	
No. 3		560	645	700	210	1,000,000	
Stud	575	660	720	210	1,000,000		
Select Structural	2x8	1,585	1,825	1,985	210	1,500,000	
No. 1		1,105	1,270	1,380	210	1,400,000	
No. 2		865	990	1,080	210	1,100,000	
No. 3		520	595	645	210	1,000,000	
Select Structural	2x10	1,455	1,675	1,820	210	1,500,000	
No. 1		1,010	1,165	1,265	210	1,400,000	
No. 2		790	910	990	210	1,100,000	
No. 3		475	545	595	210	1,000,000	
Select Structural	2x12	1,325	1,520	1,655	210	1,500,000	
No. 1		920	1,060	1,150	210	1,400,000	
No. 2		720	825	900	210	1,100,000	
No. 3		430	495	540	210	1,000,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
Sitka Sp/HF							
Select Structural	2x4	2,245	2,580	2,805	335	1,300,000	PLIB
No. 1		1,510	1,735	1,885	335	1,200,000	
No. 2		1,335	1,535	1,670	335	1,100,000	
No. 3		775	895	970	335	1,000,000	
Stud		760	875	950	335	1,000,000	
Construction		1,005	1,155	1,260	335	1,000,000	
Standard		575	660	720	335	900,000	
Utility		260	300	325	335	900,000	
Select Structural	2x6	1,945	2,235	2,430	335	1,300,000	
No. 1		1,310	1,505	1,635	335	1,200,000	
No. 2		1,160	1,330	1,450	335	1,100,000	
No. 3		675	775	840	335	1,000,000	
Stud	690	795	865	335	1,000,000		
Select Structural	2x8	1,795	2,065	2,245	335	1,300,000	
No. 1		1,210	1,390	1,510	335	1,200,000	
No. 2		1,070	1,230	1,335	335	1,100,000	
No. 3		620	715	775	335	1,000,000	
Select Structural	2x10	1,645	1,890	2,055	335	1,300,000	
No. 1		1,105	1,275	1,385	335	1,200,000	
No. 2		980	1,125	1,225	335	1,100,000	
No. 3		570	655	710	335	1,000,000	
Select Structural	2x12	1,495	1,720	1,870	335	1,300,000	
No. 1		1,005	1,155	1,260	335	1,200,000	
No. 2		890	1,025	1,115	335	1,100,000	
No. 3		520	595	645	335	1,000,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

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Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
SPF/SPF-S							
SPF/SPF(S)							
SPF^s/SPF							
SPF/SPF-s							
S-P-F/SPFs							
Select Structural	2x4	2,155	2,480	2,695	335	1,300,000	NLGA, PLIB, TP, WWPA
No. 1		1,510	1,735	1,885	335	1,200,000	
No. 2		1,335	1,535	1,670	335	1,100,000	
No. 3		775	895	970	335	1,000,000	
Stud		760	875	950	335	1,000,000	
Construction		1,005	1,155	1,260	335	1,000,000	
Standard		575	660	720	335	900,000	
Utility		260	300	325	335	900,000	
Select Structural		2x6	1,870	2,150	2,335	335	
No. 1	1,310		1,505	1,635	335	1,200,000	
No. 2	1,160		1,330	1,450	335	1,100,000	
No. 3	675		775	840	335	1,000,000	
Stud	690	795	865	335	1,000,000		
Select Structural	2x8	1,725	1,985	2,155	335	1,300,000	
No. 1		1,210	1,390	1,510	335	1,200,000	
No. 2		1,070	1,230	1,335	335	1,100,000	
No. 3		620	715	775	335	1,000,000	
Select Structural	2x10	1,580	1,820	1,975	335	1,300,000	
No. 1		1,105	1,275	1,385	335	1,200,000	
No. 2		980	1,125	1,225	335	1,100,000	
No. 3		570	655	710	335	1,000,000	
Select Structural	2x12	1,440	1,655	1,795	335	1,300,000	
No. 1		1,005	1,155	1,260	335	1,200,000	
No. 2		890	1,025	1,115	335	1,100,000	
No. 3		520	595	645	335	1,000,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

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Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
SPF/SPF-S AS/NSPR/SCOTP/SFIR(I)AUS /EST/FIN/GER/LTH/SW							
Select Structural	2x4	1,640	1,885	2,050	210	1,300,000	TP
No. 1		1,250	1,440	1,565	210	1,200,000	
No. 2		1,080	1,240	1,350	210	1,100,000	
No. 3		645	745	810	210	1,000,000	
Stud		635	725	790	210	1,000,000	
Construction		835	960	1,040	210	1,000,000	
Standard		460	530	575	210	900,000	
Utility		230	265	290	210	900,000	
Select Structural	2x6	1,420	1,635	1,775	210	1,300,000	
No. 1		1,085	1,245	1,355	210	1,200,000	
No. 2		935	1,075	1,170	210	1,100,000	
No. 3		560	645	700	210	1,000,000	
Stud	575	660	720	210	1,000,000		
Select Structural	2x8	1,310	1,510	1,640	210	1,300,000	
No. 1		1,000	1,150	1,250	210	1,200,000	
No. 2		865	990	1,080	210	1,100,000	
No. 3		520	595	645	210	1,000,000	
Select Structural	2x10	1,200	1,380	1,500	210	1,300,000	
No. 1		915	1,055	1,145	210	1,200,000	
No. 2		790	910	990	210	1,100,000	
No. 3		475	545	595	210	1,000,000	
Select Structural	2x12	1,095	1,255	1,365	210	1,300,000	
No. 1		835	960	1,040	210	1,200,000	
No. 2		720	825	900	210	1,100,000	
No. 3		430	495	540	210	1,000,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
SPF/SPF-S AS/NSPR/SCOTP/SFIR(I)AUS /FIN/GER/SW							
Select Structural	2x4	1,640	1,885	2,050	210	1,300,000	TP
No. 1		1,250	1,440	1,565	210	1,200,000	
No. 2		1,080	1,240	1,350	210	1,100,000	
No. 3		645	745	810	210	1,000,000	
Stud		635	725	790	210	1,000,000	
Construction Standard		835	960	1,040	210	1,000,000	
Standard		460	530	575	210	900,000	
Utility		230	265	290	210	900,000	
Select Structural	2x6	1,420	1,635	1,775	210	1,300,000	
No. 1		1,085	1,245	1,355	210	1,200,000	
No. 2		935	1,075	1,170	210	1,100,000	
No. 3		560	645	700	210	1,000,000	
Stud	575	660	720	210	1,000,000		
Select Structural	2x8	1,310	1,510	1,640	210	1,300,000	
No. 1		1,000	1,150	1,250	210	1,200,000	
No. 2		865	990	1,080	210	1,100,000	
No. 3		520	595	645	210	1,000,000	
Select Structural	2x10	1,200	1,380	1,500	210	1,300,000	
No. 1		915	1,055	1,145	210	1,200,000	
No. 2		790	910	990	210	1,100,000	
No. 3		475	545	595	210	1,000,000	
Select Structural	2x12	1,095	1,255	1,365	210	1,300,000	
No. 1		835	960	1,040	210	1,200,000	
No. 2		720	825	900	210	1,100,000	
No. 3		430	495	540	210	1,000,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

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Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
SPF/SPF-S AS/NSPR/SCOTP/SFIR(I)AUS /GER/ROM/SW/UKR							
Select Structural	2x4	1,640	1,885	2,050	260	1,300,000	TP
No. 1		1,250	1,440	1,565	260	1,200,000	
No. 2		1,080	1,240	1,350	260	1,100,000	
No. 3		645	745	810	260	1,000,000	
Stud		635	725	790	260	1,000,000	
Construction		835	960	1,040	260	1,000,000	
Standard		460	530	575	260	900,000	
Utility		230	265	290	260	900,000	
Select Structural	2x6	1,420	1,635	1,775	260	1,300,000	
No. 1		1,085	1,245	1,355	260	1,200,000	
No. 2		935	1,075	1,170	260	1,100,000	
No. 3		560	645	700	260	1,000,000	
Stud	575	660	720	260	1,000,000		
Select Structural	2x8	1,310	1,510	1,640	260	1,300,000	
No. 1		1,000	1,150	1,250	260	1,200,000	
No. 2		865	990	1,080	260	1,100,000	
No. 3		520	595	645	260	1,000,000	
Select Structural	2x10	1,200	1,380	1,500	260	1,300,000	
No. 1		915	1,055	1,145	260	1,200,000	
No. 2		790	910	990	260	1,100,000	
No. 3		475	545	595	260	1,000,000	
Select Structural	2x12	1,095	1,255	1,365	260	1,300,000	
No. 1		835	960	1,040	260	1,200,000	
No. 2		720	825	900	260	1,100,000	
No. 3		430	495	540	260	1,000,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

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Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
SPF/SPF-S AS/NSPR/SCOTP/SFIR(I)AUS /EST/FIN/GER/LTH/ROM/ SW/UKR							
Select Structural	2x4	1,640	1,885	2,050	210	1,300,000	TP
No. 1		1,250	1,440	1,565	210	1,200,000	
No. 2		1,080	1,240	1,350	210	1,100,000	
No. 3		645	745	810	210	1,000,000	
Stud		635	725	790	210	1,000,000	
Construction		835	960	1,040	210	1,000,000	
Standard		460	530	575	210	900,000	
Utility		230	265	290	210	900,000	
Select Structural	2x6	1,420	1,635	1,775	210	1,300,000	
No. 1		1,085	1,245	1,355	210	1,200,000	
No. 2		935	1,075	1,170	210	1,100,000	
No. 3		560	645	700	210	1,000,000	
Stud	575	660	720	210	1,000,000		
Select Structural	2x8	1,310	1,510	1,640	210	1,300,000	
No. 1		1,000	1,150	1,250	210	1,200,000	
No. 2		865	990	1,080	210	1,100,000	
No. 3		520	595	645	210	1,000,000	
Select Structural	2x10	1,200	1,380	1,500	210	1,300,000	
No. 1		915	1,055	1,145	210	1,200,000	
No. 2		790	910	990	210	1,100,000	
No. 3		475	545	595	210	1,000,000	
Select Structural	2x12	1,095	1,255	1,365	210	1,300,000	
No. 1		835	960	1,040	210	1,200,000	
No. 2		720	825	900	210	1,100,000	
No. 3		430	495	540	210	1,000,000	

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Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
S-P-F/ NSpr(N)							
SPF/NSpr(N)							
Select Structural	2x4	1,640	1,885	2,050	410	1,500,000	NLGA
No. 1		1,120	1,290	1,400	410	1,300,000	
No. 2		1,120	1,290	1,400	410	1,300,000	
No. 3		645	745	810	410	1,200,000	
Stud		635	725	790	410	1,200,000	
Construction		805	925	1,005	410	1,200,000	
Standard		460	530	575	410	1,100,000	
Utility		200	230	250	410	1,100,000	
Select Structural		2x6	1,420	1,635	1,775	410	
No. 1	970		1,120	1,215	410	1,300,000	
No. 2	970		1,120	1,215	410	1,300,000	
No. 3	560		645	700	410	1,200,000	
Stud	575	660	720	410	1,200,000		
Select Structural	2x8	1,310	1,510	1,640	410	1,500,000	
No. 1		895	1,030	1,120	410	1,300,000	
No. 2		895	1,030	1,120	410	1,300,000	
No. 3		520	595	645	410	1,200,000	
Select Structural	2x10	1,200	1,380	1,500	410	1,500,000	
No. 1		820	945	1,030	410	1,300,000	
No. 2		820	945	1,030	410	1,300,000	
No. 3		475	545	595	410	1,200,000	
Select Structural	2x12	1,095	1,255	1,365	410	1,500,000	
No. 1		750	860	935	410	1,300,000	
No. 2		750	860	935	410	1,300,000	
No. 3		430	495	540	410	1,200,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

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Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
S-P-F/ SPFs/NSpr(N)							
Select Structural	2x4	1,640	1,885	2,050	335	1,300,000	NLGA
No. 1		1,120	1,290	1,400	335	1,200,000	
No. 2		1,120	1,290	1,400	335	1,100,000	
No. 3		645	745	810	335	1,000,000	
Stud		635	725	790	335	1,000,000	
Construction		805	925	1,005	335	1,000,000	
Standard		460	530	575	335	900,000	
Utility		200	230	250	335	900,000	
Select Structural	2x6	1,420	1,635	1,775	335	1,300,000	
No. 1		970	1,120	1,215	335	1,200,000	
No. 2		970	1,120	1,215	335	1,100,000	
No. 3		560	645	700	335	1,000,000	
Stud	575	660	720	335	1,000,000		
Select Structural	2x8	1,310	1,510	1,640	335	1,300,000	
No. 1		895	1,030	1,120	335	1,200,000	
No. 2		895	1,030	1,120	335	1,100,000	
No. 3		520	595	645	335	1,000,000	
Select Structural	2x10	1,200	1,380	1,500	335	1,300,000	
No. 1		820	945	1,030	335	1,200,000	
No. 2		820	945	1,030	335	1,100,000	
No. 3		475	545	595	335	1,000,000	
Select Structural	2x12	1,095	1,255	1,365	335	1,300,000	
No. 1		750	860	935	335	1,200,000	
No. 2		750	860	935	335	1,100,000	
No. 3		430	495	540	335	1,000,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
SPF/SPF-S NSPR/SCOTP(D)GER							
Select Structural	2x4	2,070	2,380	2,590	335	1,300,000	TP
No. 1		1,380	1,585	1,725	335	1,200,000	
No. 2		1,210	1,390	1,510	335	1,100,000	
No. 3		690	795	865	335	1,000,000	
Stud		695	800	870	335	1,000,000	
Construction Standard		920	1,060	1,150	335	1,000,000	
Standard		520	595	645	335	900,000	
Utility		260	300	325	335	900,000	
Select Structural	2x6	1,795	2,065	2,245	335	1,300,000	
No. 1		1,195	1,375	1,495	335	1,200,000	
No. 2		1,045	1,205	1,310	335	1,100,000	
No. 3		600	690	750	335	1,000,000	
Stud	635	725	790	335	1,000,000		
Select Structural	2x8	1,655	1,905	2,070	335	1,300,000	
No. 1		1,105	1,270	1,380	335	1,200,000	
No. 2		965	1,110	1,210	335	1,100,000	
No. 3		550	635	690	335	1,000,000	
Select Structural	2x10	1,520	1,745	1,900	335	1,300,000	
No. 1		1,010	1,165	1,265	335	1,200,000	
No. 2		885	1,020	1,105	335	1,100,000	
No. 3		505	580	635	335	1,000,000	
Select Structural	2x12	1,380	1,585	1,725	335	1,300,000	
No. 1		920	1,060	1,150	335	1,200,000	
No. 2		805	925	1,005	335	1,100,000	
No. 3		460	530	575	335	1,000,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
SPF/SPF-S NSPR/SCOTP(I)GER/ROM /SW/UKR							
Select Structural	2x4	2,070	2,380	2,590	270	1,300,000	TP
No. 1		1,380	1,585	1,725	270	1,200,000	
No. 2		1,080	1,240	1,350	270	1,100,000	
No. 3		645	745	810	270	1,000,000	
Stud		635	725	790	270	1,000,000	
Construction Standard		835	960	1,040	270	1,000,000	
Standard		460	530	575	270	900,000	
Utility		230	265	290	270	900,000	
Select Structural	2x6	1,795	2,065	2,245	270	1,300,000	
No. 1		1,195	1,375	1,495	270	1,200,000	
No. 2		935	1,075	1,170	270	1,100,000	
No. 3		560	645	700	270	1,000,000	
Stud	575	660	720	270	1,000,000		
Select Structural	2x8	1,655	1,905	2,070	270	1,300,000	
No. 1		1,105	1,270	1,380	270	1,200,000	
No. 2		865	990	1,080	270	1,100,000	
No. 3		520	595	645	270	1,000,000	
Select Structural	2x10	1,520	1,745	1,900	270	1,300,000	
No. 1		1,010	1,165	1,265	270	1,200,000	
No. 2		790	910	990	270	1,100,000	
No. 3		475	545	595	270	1,000,000	
Select Structural	2x12	1,380	1,585	1,725	270	1,300,000	
No. 1		920	1,060	1,150	270	1,200,000	
No. 2		720	825	900	270	1,100,000	
No. 3		430	495	540	270	1,000,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
SPF/SPF-S NSPR/SCOTP(D)GER/SW							
Select Structural	2x4	2,070	2,380	2,590	285	1,300,000	TP
No. 1		1,380	1,585	1,725	285	1,200,000	
No. 2		1,080	1,240	1,350	285	1,100,000	
No. 3		645	745	810	285	1,000,000	
Stud		635	725	790	285	1,000,000	
Construction		835	960	1,040	285	1,000,000	
Standard		460	530	575	285	900,000	
Utility		230	265	290	285	900,000	
Select Structural	2x6	1,795	2,065	2,245	285	1,300,000	
No. 1		1,195	1,375	1,495	285	1,200,000	
No. 2		935	1,075	1,170	285	1,100,000	
No. 3		560	645	700	285	1,000,000	
Stud	575	660	720	285	1,000,000		
Select Structural	2x8	1,655	1,905	2,070	285	1,300,000	
No. 1		1,105	1,270	1,380	285	1,200,000	
No. 2		865	990	1,080	285	1,100,000	
No. 3		520	595	645	285	1,000,000	
Select Structural	2x10	1,520	1,745	1,900	285	1,300,000	
No. 1		1,010	1,165	1,265	285	1,200,000	
No. 2		790	910	990	285	1,100,000	
No. 3		475	545	595	285	1,000,000	
Select Structural	2x12	1,380	1,585	1,725	285	1,300,000	
No. 1		920	1,060	1,150	285	1,200,000	
No. 2		720	825	900	285	1,100,000	
No. 3		430	495	540	285	1,000,000	
SYP/WEST WOODS/NORTH SPECIES							
Select Structural	2x4	1,555	1,785	1,940	335	1,100,000	
No. 1		1,080	1,240	1,350	335	1,100,000	
No. 2		1,080	1,240	1,350	335	1,000,000	
No. 3		605	695	755	335	900,000	
Stud		600	690	750	335	900,000	
Construction		805	925	1,005	335	1,000,000	
Standard		460	530	575	335	900,000	
Utility		200	230	250	335	800,000	
Select Structural	2x6	1,345	1,545	1,680	335	1,100,000	
No. 1		935	1,075	1,170	335	1,100,000	
No. 2		935	1,075	1,170	335	1,000,000	
No. 3		525	600	655	335	900,000	
Stud		545	630	685	335	900,000	
Select Structural	2x8	1,240	1,430	1,555	335	1,100,000	
No. 1		865	990	1,080	335	1,100,000	
No. 2		865	990	1,080	335	1,000,000	
No. 3		485	555	605	335	900,000	
Select Structural	2x10	1,140	1,310	1,425	335	1,100,000	
No. 1		790	910	990	335	1,100,000	
No. 2		790	910	990	335	1,000,000	
No. 3		445	510	555	335	900,000	
Select Structural	2x12	1,035	1,190	1,295	335	1,100,000	
No. 1		720	825	900	335	1,100,000	
No. 2		720	825	900	335	1,000,000	
No. 3		405	465	505	335	900,000	

TABLE W-1 DESIGN VALUES FOR JOISTS AND RAFTERS - MULTI-SPECIES AND COUNTRY GRADEMARKED VISUALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, the F_b values shall be reduced 13%. Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Multi-Species Country Grademark and Grade	Size	Design Value in Bending, F_b			Compression perpendicular to grain, $F_{c\perp}$	Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading			
WH-S Fir							
Select Structural	2x4	2,415	2,775	3,020	405	1,600,000	PLIB
No. 1 & Btr		1,900	2,180	2,370	405	1,500,000	
No. 1		1,680	1,935	2,100	405	1,500,000	
No. 2		1,465	1,685	1,835	405	1,300,000	
No. 3		865	990	1,080	405	1,200,000	
Stud		855	980	1,065	405	1,200,000	
Construction		1,120	1,290	1,400	405	1,300,000	
Standard		635	725	790	405	1,200,000	
Utility		290	330	360	405	1,100,000	
Select Structural	2x6	2,095	2,405	2,615	405	1,600,000	
No. 1 & Btr		1,645	1,890	2,055	405	1,500,000	
No. 1		1,460	1,675	1,820	405	1,500,000	
No. 2		1,270	1,460	1,590	405	1,300,000	
No. 3		750	860	935	405	1,200,000	
Stud	775	895	970	405	1,200,000		
Select Structural	2x8	1,930	2,220	2,415	405	1,600,000	
No. 1 & Btr		1,520	1,745	1,900	405	1,500,000	
No. 1		1,345	1,545	1,680	405	1,500,000	
No. 2		1,175	1,350	1,465	405	1,300,000	
No. 3	690	795	865	405	1,200,000		
Select Structural	2x10	1,770	2,035	2,215	405	1,600,000	
No. 1 & Btr		1,390	1,600	1,740	405	1,500,000	
No. 1		1,235	1,420	1,540	405	1,500,000	
No. 2		1,075	1,235	1,345	405	1,300,000	
No. 3		635	725	790	405	1,200,000	
Select Structural	2x12	1,610	1,850	2,015	405	1,600,000	
No. 1 & Btr		1,265	1,455	1,580	405	1,500,000	
No. 1		1,120	1,290	1,400	405	1,500,000	
No. 2		980	1,125	1,220	405	1,300,000	
No. 3		575	660	720	405	1,200,000	

TABLE W-1 FOOTNOTES - VISUALLY GRADED LUMBER

1. When dimension lumber is used where moisture content will exceed 19% for an extended time period, F_b shall be multiplied by 0.85 if F_b exceeds 1150 psi, and E shall be multiplied by 0.9.

2. Following is a list of agencies certified by the American Lumber Standard Committee Board of Review for inspection and grading of untreated lumber under the rules indicated. For the most up-to-date list of certified agencies contact:

American Lumber Standard Committee
7470 New Technology Way, Suite F
Frederick, MD 21703
www.alsc.org

**Rules for which grading
is authorized****Rules Writing Agencies**

Northeastern Lumber Manufacturers Association (NELMA)	NELMA, NLGA, PLIB, SPIB, WWPA
272 Tuttle Road, P.O. Box 87A, Cumberland Center, Maine 04021	
Pacific Lumber Inspection Bureau (PLIB)	NLGA, PLIB, RIS, SPIB, WWPA
1010 S 336th Street, Suite 210, Federal Way, Washington 98003	
Redwood Inspection Service (RIS).....	PLIB, RIS, WWPA
1500 SW First Avenue, Suite 870, Portland, Oregon 97201	
Southern Pine Inspection Bureau (SPIB).....	NELMA, NLGA, PLIB, SPIB, WWPA
4555 Spanish Trail, Pensacola, Florida 32504	
Western Wood Products Association (WWPA).....	NELMA, NLGA, PLIB, RIS, SPIB, WWPA
1500 SW First Avenue, Suite 870, Portland, Oregon 97201	
National Lumber Grades Authority (NLGA)	
420-99 Bank Street, Ottawa, ON, Canada K1P 6B9	

Non-Rules Writing Agencies

Continental Inspection Agency, LLC.....	NLGA, PLIB, RIS, WWPA
Renewable Resource Associates, Inc.	NELMA, NLGA, PLIB, SPIB, WWPA
Stafford Inspection and Consulting, LLC	NELMA, NLGA, PLIB, SPIB, WWPA
Timber Products Inspection	NELMA, NLGA, PLIB, RIS, SPIB, WWPA
Alberta Forest Products Association	NLGA
Canadian Mill Services Association	NLGA, WWPA
Canadian Softwood Inspection Agency, Inc.	NLGA, PLIB, WWPA
Central Forest Products Association	NELMA, NLGA
Council of Forest Industries	NLGA, WWPA
Macdonald Inspection	NLGA, PLIB, WWPA
Maritime Lumber Bureau	NELMA, NLGA
Newfoundland and Labrador Lumber Producers Association	NLGA
Ontario Forest Industries Association – Home of CLA Grading and Inspection	NELMA, NLGA
Ontario Lumber Manufacturers Agency	NELMA, NLGA
Quebec Forest Industry Council	NELMA, NLGA

TABLE W-2 DESIGN VALUES FOR JOISTS AND RAFTERS - MECHANICALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, F_b values shall be reduced 13%.

Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Grade Designation	Size	Design Value in Bending, F_b			Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading		
MACHINE STRESS RATED (MSR) LUMBER						
900F-1.0E	2x4 and wider	1,035	1,190	1,295	1,000,000	NELMA, PLIB, SPIB, WWPA
900F-1.4E		1,035	1,190	1,295	1,400,000	PLIB
1000F-1.4E		1,150	1,325	1,440	1,400,000	PLIB
1050F-1.2E		1,210	1,390	1,510	1,200,000	SPIB
1100F-1.4E		1,265	1,455	1,580	1,400,000	PLIB
1200F-1.2E		1,380	1,585	1,725	1,200,000	NELMA, NLGA, PLIB, WWPA
1200F-1.3E		1,380	1,585	1,725	1,300,000	SPIB
1200F-1.4E		1,380	1,585	1,725	1,400,000	PLIB
1200F-1.5E		1,380	1,585	1,725	1,500,000	PLIB
1250F-1.4E		1,440	1,655	1,795	1,400,000	PLIB
1350F-1.3E		1,555	1,785	1,940	1,300,000	NELMA, NLGA, PLIB, WWPA
1350F-1.4E		1,555	1,785	1,940	1,400,000	PLIB, SPIB
1400F-1.2E		1,610	1,850	2,015	1,200,000	NLGA
1450F-1.3E		1,670	1,920	2,085	1,300,000	NELMA, NLGA, PLIB, WWPA
1450F-1.3E		1,670	1,920	2,085	1,300,000	SPIB
1450F-1.5E		1,670	1,920	2,085	1,500,000	PLIB
1500F-1.4E		1,725	1,985	2,155	1,400,000	NELMA, NLGA, PLIB, WWPA
1500F-1.5E		1,725	1,985	2,155	1,500,000	SPIB
1500F-1.6E		1,725	1,985	2,155	1,600,000	SPIB
1500F-1.7E		1,725	1,985	2,155	1,700,000	SPIB
1600F-1.4E		1,840	2,115	2,300	1,400,000	NLGA
1650F-1.3E		1,900	2,180	2,370	1,300,000	NLGA
1650F-1.5E		1,900	2,180	2,370	1,500,000	NELMA, NLGA, PLIB, SPIB, WWPA
1650F-1.6E		1,900	2,180	2,370	1,600,000	SPIB
1650F-1.6E		1,900	2,180	2,370	1,600,000	PLIB
1650F-1.7E		1,900	2,180	2,370	1,700,000	SPIB
1700F-1.6E		1,955	2,250	2,445	1,600,000	PLIB
1800F-1.5E		2,070	2,380	2,590	1,500,000	NLGA
1800F-1.6E		2,070	2,380	2,590	1,600,000	NELMA, NLGA, PLIB, SPIB, WWPA
1800F-1.8E		2,070	2,380	2,590	1,800,000	PLIB
1800F-2.0E		2,070	2,380	2,590	2,000,000	PLIB
1850F-1.7E		2,130	2,445	2,660	1,700,000	SPIB
1950F-1.7E		2,245	2,580	2,805	1,700,000	NELMA, NLGA, PLIB, SPIB, WWPA
1950F-1.9E		2,245	2,580	2,805	1,900,000	PLIB
1950F-1.9E		2,245	2,580	2,805	1,900,000	PLIB
2000F-1.6E		2,300	2,645	2,875	1,600,000	NLGA
2100F-1.8E		2,415	2,775	3,020	1,800,000	NELMA, NLGA, PLIB, SPIB, WWPA
2250F-1.7E		2,590	2,975	3,235	1,700,000	NLGA
2250F-1.8E	2,590	2,975	3,235	1,800,000	NLGA, PLIB	
2250F-1.9E	2,590	2,975	3,235	1,900,000	NELMA, NLGA, PLIB, SPIB, WWPA	
2250F-2.0E	2,590	2,975	3,235	2,000,000	PLIB	
2250F-2.0E	2,590	2,975	3,235	2,000,000	PLIB	
2400F-1.8E	2,760	3,175	3,450	1,800,000	NLGA	
2400F-2.0E	2,760	3,175	3,450	2,000,000	NELMA, NLGA, PLIB, SPIB, WWPA	
2500F-2.2E	2,875	3,305	3,595	2,200,000	PLIB	
2500F-2.2E	2,875	3,305	3,595	2,200,000	PLIB	
2550F-2.1E	2,935	3,370	3,665	2,100,000	NELMA, NLGA, PLIB, SPIB, WWPA	
2700F-2.0E	3,105	3,570	3,880	2,000,000	PLIB	
2700F-2.2E	3,105	3,570	3,880	2,200,000	NELMA, NLGA, PLIB, SPIB, WWPA	
2850F-1.8E	3,280	3,770	4,095	1,800,000	SPIB	
2850F-2.3E	3,280	3,770	4,095	2,300,000	NELMA, NLGA, PLIB, SPIB, WWPA	
3000F-2.4E	3,450	3,970	4,315	2,400,000	NLGA, SPIB	

1. COMPRESSION PERPENDICULAR TO GRAIN, $F_{c\perp}$. Design values for compression perpendicular to grain, $F_{c\perp}$, are identical to the design values given in Table W1 for No. 2 visually graded lumber of the appropriate species. When the $F_{c\perp}$ values shown on the grade stamp differ from the values shown in Table W1, the values shown on the grade stamp shall be used for design.

2. MODULUS OF ELASTICITY, E. For any given bending design value, F_b , the average modulus of elasticity, E, design value may vary depending upon species, timber source or other variables. The E values included in the F_b -E grade designations in Table W2 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. When the E values shown on a grade stamp differ from the values in Table W2, the values shown on the grade stamp shall be used for design.

TABLE W-2 DESIGN VALUES FOR JOISTS AND RAFTERS - MECHANICALLY GRADED LUMBER^{1,2}

These F_b values are for use where repetitive members are spaced not more than 24 inches. For wider spacing, F_b values shall be reduced 13%.

Values for surfaced dry or surfaced green lumber apply at 19% maximum moisture content in use.

Grade Designation	Size	Design Value in Bending, F_b			Modulus of Elasticity, E	Grading Rules Agency
		Normal Duration	Snow Loading	7-Day Loading		
MACHINE EVALUATED LUMBER (MEL)						
M-5	2x4 and wider	1,035	1,190	1,295	1,100,000	SPIB
M-6		1,265	1,455	1,580	1,000,000	SPIB
M-7		1,380	1,585	1,725	1,100,000	SPIB
M-8		1,495	1,720	1,870	1,300,000	SPIB
M-9		1,610	1,850	2,015	1,400,000	SPIB
M-10		1,610	1,850	2,015	1,200,000	NLGA
M-11		1,785	2,050	2,230	1,500,000	NLGA, SPIB
M-12		1,840	2,115	2,300	1,600,000	NLGA, SPIB
M-13		1,840	2,115	2,300	1,400,000	NLGA
M-14		2,070	2,380	2,590	1,700,000	NLGA, SPIB
M-15		2,070	2,380	2,590	1,500,000	NLGA, SPIB
M-18		2,300	2,645	2,875	1,800,000	NLGA, SPIB
M-19		2,300	2,645	2,875	1,600,000	NLGA, SPIB
M-21		2,645	3,040	3,305	1,900,000	NLGA, SPIB
M-22		2,705	3,110	3,380	1,700,000	NLGA, SPIB
M-23		2,760	3,175	3,450	1,800,000	NLGA, SPIB
M-24		3,105	3,570	3,880	1,900,000	NLGA, SPIB
M-25		3,165	3,635	3,955	2,200,000	NLGA, SPIB
M-26		3,220	3,705	4,025	2,000,000	NLGA, SPIB
M-28		2,530	2,910	3,165	1,700,000	SPIB
M-29		1,785	2,050	2,230	1,700,000	SPIB
M-30		2,360	2,710	2,945	1,700,000	SPIB
M-31		3,280	3,770	4,095	1,900,000	SPIB

1. COMPRESSION PERPENDICULAR TO GRAIN, $F_{c\perp}$. Design values for compression perpendicular to grain, $F_{c\perp}$, are identical to the design values given in Table W1 for No. 2 visually graded lumber of the appropriate species. When the $F_{c\perp}$ values shown on the grade stamp differ from the values shown in Table W1, the values shown on the grade stamp shall be used for design.

2. MODULUS OF ELASTICITY, E. For any given bending design value, F_b , the average modulus of elasticity, E, design value may vary depending upon species, timber source or other variables. The E values included in the F_b -E grade designations in Table W2 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. When the E values shown on a grade stamp differ from the values in Table W2, the values shown on the grade stamp shall be used for design.

American Wood Council

AWC Mission Statement

To increase the use of wood by assuring the broad regulatory acceptance of wood products, developing design tools and guidelines for wood construction, and influencing the development of public policies affecting the use and manufacture of wood products.

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