



Allowable Property Values

for softwood species
listed in Standard
Grading Rules No. 17

Revised Aug. 1

2002



The Quality Stamp

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ALLOWABLE PROPERTY VALUES

FOR

SOFTWOOD SPECIES LISTED IN STANDARD GRADING RULES NO. 17

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INTRODUCTION

Allowable unit working stresses for softwood Dimension lumber based on In-grade testing of full size lumber were first approved for use in the United States by the American Lumber Standard Board of Review in June 1991. The Allowable Property Values, also referred to as Design Values, are listed for several domestic and imported softwood species in Standard Grading Rules No. 17 published by the West Coast Lumber Inspection Bureau. The In-grade based design values initially became effective September 1, 1991. Revisions to the allowable properties were made in 1996 and 1999 due to changes in ASTM Standard D1990, Standard Practice for Establishing Allowable Properties for Visually-Graded Dimension Lumber from In-Grade Tests of Full-Size Specimens, and D245 Standard Practice for Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber. Several changes to this newly revised publication have also resulted from additions of new species and species groups, and additions and revisions to MSR grades.

Allowable Property Format for Dimension Lumber

Unit working stresses for visual grades of dimension lumber are presented in a "Base Value" format. The Base Value is defined as the allowable unit working stresses and modulus of elasticity values for a reference size of lumber. The reference size is set at a nominal 2 inch by 12 inch for grades of Structural Light Framing, and Structural Joists and Planks, at a nominal 2 inch by 4 inch for Light Framing grades, and a nominal 2 inch by 6 inch for Stud grade. Stud grade lumber wider than 6 inches in nominal width uses the same Base Values and width adjustment factors as No. 3 Structural Joists and Planks. The Base Values for the several domestic and imported softwood species listed here are also published in Standard Grading Rules No. 17.

Size Adjusted Values for Dimension Lumber

To determine the allowable property value for a grade at a specific width and thickness other than the reference size used for the Base Value, the published Base Value (see Section 2) must be multiplied by the appropriate size adjustment factor (see Section 1). Values adjusted to specific widths and thicknesses are listed in the tables in Section 3.

Size Adjustment Formula:

Base Value * Width Adjustment Factor = Size Adj. Allowable Property

Other Lumber Sizes and Grades:

Note that the Base Value format is not used for the published allowable properties of MSR, Beams & Stringers, or Posts & Timbers.

Machine Stress Rated (MSR) Lumber:

The table of design values for MSR lumber is applicable for all widths. No adjustment for width is necessary for MSR design values.

Beams & Stringers and Posts & Timbers:

Listed design values for Beams & Stringers and Posts & Timbers are appropriate for beam depths of 12" and less. ASTM D245 provides a method to adjust bending stress values for width in beams, stringers, posts, and timbers. Also see width adjustment procedures discussion, page 3.

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SECTION 1. WIDTH ADJUSTMENT FACTORS

DIMENSION LUMBER

TABLE 1
WIDTH ADJUSTMENT FACTORS
DIMENSION LUMBER BASE VALUES
 (2" to 4" Nominal Thickness, 2" and greater Nominal Width)

GRADES	WIDTH	Fb		Ft	Fc	Other Properties
		Less Than 4" Thick	4" Thick			
Select Structural, No. 1 & Better, No. 1, No. 2, and No. 3	4" & Less	1.5	1.5	1.5	1.15	1.0
	5"	1.4	1.4	1.4	1.10	1.0
	6"	1.3	1.3	1.3	1.10	1.0
	8"	1.2	1.3	1.2	1.05	1.0
	10"	1.1	1.2	1.1	1.00	1.0
	12"	1.0	1.1	1.0	1.00	1.0
	14" & Wider.	0.9	1.0	0.9	0.90	1.0
Construction, and Standard	2" & 3"	1.0	--	1.0	1.0	1.0
	4"	1.0	1.0	1.0	1.0	1.0
Utility	2" & 3"	0.4	--	0.4	0.6	1.0
	4"	1.0	1.0	1.0	1.0	1.0
Stud	4" & Less	1.1	1.1	1.1	1.05	1.0
	5" & 6"	1.0	1.0	1.0	1.0	1.0
	Wider than 6"	Use No. 3	Use No. 3	Use No. 3	Use No. 3	Use No. 3

MACHINE STRESS RATED LUMBER

Tabulated allowable properties listed in Section 4 for Machine Stress Rated (MSR) lumber are applicable to lumber 2" to 4" in Nominal thickness, 2" and wider.

TABLE 2
WIDTH ADJUSTMENT FACTORS
MACHINE STRESS RATED LUMBER ALLOWABLE PROPERTIES
 (2" to 4" Nominal Thickness, 2" and greater Nominal Width)

GRADES	WIDTH	Fb	Ft	Fc	Other Properties
All Grades	All Widths	1.0	1.0	1.0	1.0

BEAMS & STRINGERS, POSTS & TIMBERS

ASTM D245, Standard Practice for Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber, provides a method to adjust bending stress values for width in beams, stringers, posts, and timbers. The adjustment equation when used to adjust Fb for Beams & Stringers, or Posts & Timbers is as provided below:

$$Fb' = Fb * (12/d)^{1/9}$$

FLATWISE USE

Adjustment factors for flatwise use are provided on page 28.

SECTION 2. DIMENSION LUMBER BASE VALUES¹ - DOMESTIC SPECIES

GRADE	Extreme fiber in bending Fb	Tension parallel to grain Ft	Compression parallel to grain Fc	Compression perpendicular to grain Fc	Horizontal shear Fv	Modulus of Elasticity E
SPECIES: DOUGLAS FIR						
Select Structural	1,500	1,000	1,700	625	180	1,900,000
No. 1 & Btr.	1,200	800	1,550	625	180	1,800,000
No. 1	1,000	675	1,500	625	180	1,700,000
No. 2	900	575	1,350	625	180	1,600,000
No. 3	525	325	775	625	180	1,400,000
Construction	1,000	650	1,650	625	180	1,500,000
Standard	575	375	1,400	625	180	1,400,000
Utility	275	175	900	625	180	1,300,000
Stud	700	450	850	625	180	1,400,000
SPECIES: HEM-FIR						
Select Structural	1,400	925	1,500	405	150	1,600,000
No. 1 & Btr.	1,100	725	1,350	405	150	1,500,000
No. 1	975	625	1,350	405	150	1,500,000
No. 2	850	525	1,300	405	150	1,300,000
No. 3	500	300	725	405	150	1,200,000
Construction	975	600	1,500	405	150	1,300,000
Standard	550	325	1,300	405	150	1,200,000
Utility	250	150	850	405	150	1,100,000
Stud	675	400	800	405	150	1,200,000
SPECIES: SPRUCE-PINE-FIR - South						
Select Structural	1,300	575	1,200	335	135	1,300,000
No. 1	875	400	1,050	335	135	1,200,000
No. 2	775	350	1,000	335	135	1,100,000
No. 3	450	200	575	335	135	1,000,000
Construction	875	400	1,200	335	135	1,000,000
Standard	500	225	1,000	335	135	900,000
Utility	225	100	675	335	135	900,000
Stud	600	275	625	335	135	1,000,000
SPECIES: WESTERN WOODS						
Select Structural	900	400	1,050	335	135	1,200,000
No. 1	675	300	950	335	135	1,100,000
No. 2	675	300	900	335	135	1,000,000
No. 3	375	175	525	335	135	900,000
Construction	775	350	1,100	335	135	1,000,000
Standard	425	200	925	335	135	900,000
Utility	200	100	600	335	135	800,000
Stud	525	225	575	335	135	900,000
SPECIES: WESTERN CEDARS						
Select Structural	1,000	600	1,000	425	155	1,100,000
No. 1	725	425	825	425	155	1,000,000
No. 2	700	425	650	425	155	1,000,000
No. 3	400	250	375	425	155	900,000
Construction	800	475	850	425	155	900,000
Standard	450	275	650	425	155	800,000
Utility	225	125	425	425	155	800,000
Stud	550	325	400	425	155	900,000
SPECIES: PORT ORFORD CEDAR						
Select Structural	1,250	700	1,150	470	165	1,600,000
No. 1	1,050	575	1,050	470	165	1,500,000
No. 2	875	475	875	470	165	1,400,000
No. 3	500	275	500	470	165	1,300,000
Construction	975	550	1,100	470	165	1,300,000
Standard	550	300	900	470	165	1,200,000
Utility	250	150	600	470	165	1,100,000
Stud	675	375	550	470	165	1,300,000

See footnotes page 7

SECTION 2 (cont.)

DIMENSION LUMBER BASE VALUES¹ - IMPORTED SPECIES

GRADE	Extreme fiber in bending F _b	Tension parallel to grain F _t	Compression parallel to grain F _c	Compression perpendicular to grain F _c	Horizontal shear F _v	Modulus of Elasticity E
SPECIES: AUSTRIAN SPRUCE - AUSTRIA & THE CZECH REPUBLIC						
Select Structural	1,450	650	1,250	260	175	1,600,000
No. 1	950	425	1,100	260	175	1,500,000
No. 2	825	375	1,000	260	175	1,300,000
No. 3	475	225	575	260	175	1,200,000
Construction	925	425	1,250	260	175	1,200,000
Standard	525	225	1,050	260	175	1,100,000
Utility	250	100	675	260	175	1,000,000
Stud	650	300	650	260	175	1,200,000
SPECIES: NORWAY SPRUCE - BALTIC COUNTRIES - ESTONIA, LATVIA, LITHUANIA						
Select Structural	1,200	550	1,200	430	150	1,600,000
No. 1	825	375	1,050	430	150	1,400,000
No. 2	725	325	950	430	150	1,200,000
No. 3	425	200	550	430	150	1,100,000
Construction	825	375	1,150	430	150	1,100,000
Standard	450	200	975	430	150	1,000,000
Utility	225	100	650	430	150	1,000,000
Stud	575	250	600	430	150	1,100,000
SPECIES: NORWAY SPRUCE - FINLAND						
Select Structural	1,350	600	1,200	220	125	1,500,000
No. 1	850	375	1,000	220	125	1,400,000
No. 2	625	275	875	220	125	1,200,000
No. 3	375	175	500	220	125	1,100,000
Construction	725	325	1,100	220	125	1,100,000
Standard	400	175	900	220	125	1,000,000
Utility	200	75	600	220	125	1,000,000
Stud	500	225	550	220	125	1,100,000
SPECIES: NORWAY SPRUCE - GERMANY						
Select Structural	1,250	550	1,200	355	170	1,600,000
No. 1	800	350	1,000	355	170	1,400,000
No. 2	650	300	900	355	170	1,100,000
No. 3	375	175	525	355	170	1,000,000
Construction	750	325	1,100	355	170	1,000,000
Standard	400	175	925	355	170	1,000,000
Utility	200	100	600	355	170	900,000
Stud	500	225	575	355	170	1,000,000
SPECIES: NORWAY SPRUCE - SWEDEN						
Select Structural	1,250	550	1,200	285	170	1,600,000
No. 1	825	375	1,050	285	170	1,400,000
No. 2	675	300	925	285	170	1,200,000
No. 3	400	175	525	285	170	1,100,000
Construction	775	350	1,150	285	170	1,200,000
Standard	425	200	950	285	170	1,100,000
Utility	200	100	625	285	170	1,000,000
Stud	550	250	575	285	170	1,100,000

See footnotes page 7

SECTION 2 (cont.)

DIMENSION LUMBER BASE VALUES¹ - IMPORTED SPECIES (cont.)

GRADE	Extreme fiber in bending F _b	Tension parallel to grain F _t	Compression parallel to grain F _c	Compression perpendicular to grain F _c	Horizontal shear F _v	Modulus of Elasticity E
SPECIES: SCOTS PINE - AUSTRIA & THE CZECH REPUBLIC						
Select Structural	1,300	600	1,200	270	135	1,700,000
No. 1	850	375	1,050	270	135	1,500,000
No. 2	700	300	925	270	135	1,300,000
No. 3	400	175	525	270	135	1,200,000
Construction	775	350	1,150	270	135	1,200,000
Standard	450	200	950	270	135	1,100,000
Utility	200	100	625	270	135	1,000,000
Stud	550	250	575	270	135	1,200,000
SPECIES: SCOTS PINE - BALTIC COUNTRIES - ESTONIA, & LITHUANIA						
Select Structural	1,100	500	1,150	430	130	1,500,000
No. 1	750	350	1,000	430	130	1,300,000
No. 2	650	300	900	430	130	1,100,000
No. 3	375	175	525	430	130	1,000,000
Construction	750	325	1,100	430	130	1,100,000
Standard	425	200	925	430	130	1,000,000
Utility	200	100	600	430	130	900,000
Stud	525	225	575	430	130	1,000,000
SPECIES: SCOTS PINE - FINLAND						
Select Structural	1,300	600	1,200	210	150	1,500,000
No. 1	950	425	1,100	210	150	1,400,000
No. 2	925	425	1,100	210	150	1,300,000
No. 3	525	250	625	210	150	1,200,000
Construction	1,050	475	1,300	210	150	1,200,000
Standard	600	275	1,100	210	150	1,100,000
Utility	275	125	725	210	150	1,000,000
Stud	725	325	675	210	150	1,200,000
SPECIES: SCOTS PINE - GERMANY						
Select Structural	1,200	550	1,200	395	160	1,600,000
No. 1	800	375	1,050	395	160	1,400,000
No. 2	700	325	950	395	160	1,100,000
No. 3	400	175	550	395	160	1,000,000
Construction	800	375	1,150	395	160	1,100,000
Standard	450	200	975	395	160	1,000,000
Utility	225	100	625	395	160	900,000
Stud	550	250	600	395	160	1,000,000
SPECIES: SCOTS PINE - SWEDEN						
Select Structural	1,350	600	1,200	410	120	1,700,000
No. 1	825	375	1,000	410	120	1,500,000
No. 2	575	250	825	410	120	1,200,000
No. 3	325	150	475	410	120	1,100,000
Construction	650	300	1,050	410	120	1,200,000
Standard	375	175	850	410	120	1,100,000
Utility	175	75	550	410	120	1,000,000
Stud	450	200	525	410	120	1,100,000
SPECIES: DOUGLAS-FIR/EUROPEAN LARCH - AUSTRIA, THE CZECH REPUBLIC AND BAVARIA						
Douglas-fir/European larch values are for 2X4 only.						
Size specific values for 2X4 are shown with other species on pages 8-11 of this booklet.						

See footnotes page 7

SECTION 2 (cont.)

DIMENSION LUMBER BASE VALUES - OTHER SPECIES COMBINATIONS

GRADE	Extreme fiber in bending Fb	Tension parallel to grain Ft	Compression parallel to grain Fc	Compression perpendicular to grain Fc	Horizontal shear Fv	Modulus of Elasticity E
SPECIES MIX: DOUGLAS FIR/DOUGLAS FIR - North						
Select Structural	1,350	825	1,700	625	180	1,900,000
No. 1	850	500	1,400	625	180	1,600,000
No. 2	850	500	1,350	625	180	1,600,000
No. 3	475	300	775	625	180	1,400,000
Construction Standard	950	575	1,650	625	180	1,500,000
Utility	525	325	1,400	625	180	1,400,000
Stud	250	150	900	625	180	1,300,000
	650	400	850	625	180	1,400,000
SPECIES MIX: HEM FIR/HEM FIR - North						
Select Structural	1,300	775	1,500	370	145	1,600,000
No. 1	975	575	1,350	370	145	1,500,000
No. 2	850	525	1,300	370	145	1,300,000
No. 3	500	300	725	370	145	1,200,000
Construction Standard	975	600	1,550	370	145	1,300,000
Utility	550	325	1,300	370	145	1,200,000
Stud	250	150	850	370	145	1,100,000
	675	400	800	370	145	1,200,000
SPECIES MIX: SPRUCE-PINE-FIR/SPRUCE-PINE-FIR - South						
Select Structural	1,250	575	1,200	335	135	1,300,000
No. 1	875	400	1,050	335	135	1,200,000
No. 2	775	350	1,000	335	135	1,100,000
No. 3	450	200	575	335	135	1,000,000
Construction Standard	875	400	1,200	335	135	1,000,000
Utility	500	225	1,000	335	135	900,000
Stud	225	100	675	335	135	900,000
	600	275	625	335	135	1,000,000
SPECIES MIX: AUSTRIAN SPRUCE / SCOTS PINE - from Austria and Czech Republic						
Select Structural	1,300	600	1,200	260	135	1,600,000
No. 1	850	375	1,050	260	135	1,500,000
No. 2	700	300	925	260	135	1,300,000
No. 3	400	175	525	260	135	1,200,000
Construction Standard	775	350	1,150	260	135	1,200,000
Utility	450	200	950	260	135	1,100,000
Stud	200	100	625	260	135	1,000,000
	550	250	575	260	135	1,200,000
SPECIES MIX: NORWAY SPRUCE / SCOTS PINE - from Estonia and Lithuania						
Select Structural	1,100	500	1,150	430	130	1,500,000
No. 1	750	350	1,000	430	130	1,300,000
No. 2	650	300	900	430	130	1,100,000
No. 3	375	175	525	430	130	1,000,000
Construction Standard	750	325	1,100	430	130	1,100,000
Utility	425	200	925	430	130	1,000,000
Stud	200	100	600	430	130	900,000
	525	225	575	430	130	1,000,000

Notes:

1. All values in psi. Dimension lumber Base Values must be multiplied by the appropriate width adjustment factor.
2. Allowable property values are for Normal Loading. Values apply to lumber used at 19% maximum moisture content as in most covered structures.

**ALLOWABLE PROPERTY VALUES
FOR
VISUAL STRESS GRADES OF SOFTWOOD SPECIES
LISTED IN
STANDARD GRADING RULES NO. 17
(PRODUCT OF BASE VALUE AND WIDTH ADJUSTMENT FACTOR)**

SECTION 3.

4" Nominal (page 1 of 4)	VALUES BY SIZE							
DOMESTIC SPECIES	GRADE	Fb	Ft	Fc	Fc	Fv	E	
DOUGLAS FIR	Select Structural	2,250	1,500	1,955	625	180	1,900,000	
	No. 1 & Btr.	1,800	1,200	1,785	625	180	1,800,000	
	No. 1	1,500	1,015	1,725	625	180	1,700,000	
	No. 2	1,350	865	1,555	625	180	1,600,000	
	No. 3	790	490	890	625	180	1,400,000	
	Construction	1,000	650	1,650	625	180	1,500,000	
	Standard	575	375	1,400	625	180	1,400,000	
	Utility	275	175	900	625	180	1,300,000	
	Stud	770	495	895	625	180	1,400,000	
	HEM-FIR	Select Structural	2,100	1,390	1,725	405	150	1,600,000
No. 1 & Btr.		1,650	1,090	1,555	405	150	1,500,000	
No. 1		1,465	940	1,555	405	150	1,500,000	
No. 2		1,275	790	1,495	405	150	1,300,000	
No. 3		750	450	835	405	150	1,200,000	
Construction		975	600	1,500	405	150	1,300,000	
Standard		550	325	1,300	405	150	1,200,000	
Utility		250	150	850	405	150	1,100,000	
Stud		745	440	840	405	150	1,200,000	
SPRUCE-PINE-FIR - SOUTH		Select Structural	1,950	865	1,380	335	135	1,300,000
	No. 1	1,315	600	1,210	335	135	1,200,000	
	No. 2	1,165	525	1,150	335	135	1,100,000	
	No. 3	675	300	660	335	135	1,000,000	
	Construction	875	400	1,200	335	135	1,000,000	
	Standard	500	225	1,000	335	135	900,000	
	Utility	225	100	675	335	135	900,000	
	Stud	660	305	655	335	135	1,000,000	
	WESTERN WOODS	Select Structural	1,350	600	1,210	335	135	1,200,000
		No. 1	1,015	450	1,095	335	135	1,100,000
No. 2		1,015	450	1,035	335	135	1,000,000	
No. 3		565	265	605	335	135	900,000	
Construction		775	350	1,100	335	135	1,000,000	
Standard		425	200	925	335	135	900,000	
Utility		200	100	600	335	135	800,000	
Stud		580	250	605	335	135	900,000	
WESTERN CEDARS		Select Structural	1,500	900	1,150	425	155	1,100,000
		No. 1	1,090	640	950	425	155	1,000,000
	No. 2	1,050	640	750	425	155	1,000,000	
	No. 3	600	375	430	425	155	900,000	
	Construction	800	475	850	425	155	900,000	
	Standard	450	275	650	425	155	800,000	
	Utility	225	125	425	425	155	800,000	
	Stud	605	360	420	425	155	900,000	
	PORT ORFORD CEDAR	Select Structural	1,875	1,050	1,325	470	165	1,600,000
		No. 1	1,575	865	1,210	470	165	1,500,000
No. 2		1,315	715	1,005	470	165	1,400,000	
No. 3		750	415	575	470	165	1,300,000	
Construction		975	550	1,100	470	165	1,300,000	
Standard		550	300	900	470	165	1,200,000	
Utility		250	150	600	470	165	1,100,000	
Stud		745	415	580	470	165	1,300,000	

See footnotes, page 21

SECTION 3. (cont.)

4" Nominal (page 2 of 4)	VALUES BY SIZE						
IMPORTED SPECIES	GRADE	Fb	Ft	Fc	Fc	Fv	E
DOUGLAS-FIR/ EUROPEAN LARCH - GERMANY	Select Structural	1,900	850	1,400	440	195	1,800,000
	No. 1	1,400	625	1,250	440	195	1,700,000
	No. 2	1,350	600	1,250	440	195	1,600,000
	No. 3	775	350	700	440	195	1,400,000
	Construction	1,000	450	1,250	440	195	1,500,000
	Standard	575	250	1,100	440	195	1,300,000
	Utility	275	125	700	440	195	1,300,000
	Stud	800	350	700	440	195	1,400,000
AUSTRIAN SPRUCE - AUSTRIA/CZECH REP.	Select Structural	2,175	975	1,440	260	175	1,600,000
	No. 1	1,425	640	1,265	260	175	1,500,000
	No. 2	1,240	565	1,150	260	175	1,300,000
	No. 3	715	340	660	260	175	1,200,000
	Construction	925	425	1,250	260	175	1,200,000
	Standard	525	225	1,050	260	175	1,100,000
	Utility	250	100	675	260	175	1,000,000
	Stud	715	330	685	260	175	1,200,000
NORWAY SPRUCE - BALTIC COUNTRIES ESTONIA, LATVIA, LITHUANIA	Select Structural	1,800	825	1,380	430	150	1,600,000
	No. 1	1,240	565	1,210	430	150	1,400,000
	No. 2	1,090	490	1,095	430	150	1,200,000
	No. 3	640	300	635	430	150	1,100,000
	Construction	825	375	1,150	430	150	1,100,000
	Standard	450	200	975	430	150	1,000,000
	Utility	225	100	650	430	150	1,000,000
	Stud	635	275	630	430	150	1,100,000
NORWAY SPRUCE - FINLAND	Select Structural	2,025	900	1,380	220	125	1,500,000
	No. 1	1,275	565	1,150	220	125	1,400,000
	No. 2	940	415	1,005	220	125	1,200,000
	No. 3	565	265	575	220	125	1,100,000
	Construction	725	325	1,100	220	125	1,100,000
	Standard	400	175	900	220	125	1,000,000
	Utility	200	75	600	220	125	1,000,000
	Stud	550	250	580	220	125	1,100,000
NORWAY SPRUCE - GERMANY	Select Structural	1,875	825	1,380	335	170	1,600,000
	No. 1	1,200	525	1,150	335	170	1,400,000
	No. 2	975	450	1,035	335	170	1,100,000
	No. 3	565	265	605	335	170	1,000,000
	Construction	750	325	1,100	335	170	1,000,000
	Standard	400	175	925	335	170	1,000,000
	Utility	200	100	600	335	170	900,000
	Stud	550	250	605	335	170	1,000,000
NORWAY SPRUCE - SWEDEN	Select Structural	1,875	825	1,380	285	170	1,600,000
	No. 1	1,240	565	1,210	285	170	1,400,000
	No. 2	1,015	450	1,065	285	170	1,200,000
	No. 3	600	265	605	285	170	1,100,000
	Construction	775	350	1,150	285	170	1,200,000
	Standard	425	200	950	285	170	1,100,000
	Utility	200	100	625	285	170	1,000,000
	Stud	605	275	605	285	170	1,100,000

See footnotes, page 21

SECTION 3. (cont.)

4" Nominal (page 3 of 4)	VALUES BY SIZE							
	GRADE	Fb	Ft	Fc	Fc	Fv	E	
IMPORTED SPECIES (cont.)	SCOTS PINE - AUSTRIA/CZECH REP.	Select Structural	1,950	900	1,380	270	135	1,700,000
		No. 1	1,275	565	1,210	270	135	1,500,000
		No. 2	1,050	450	1,065	270	135	1,300,000
		No. 3	600	265	605	270	135	1,200,000
	Construction	Standard	775	350	1,150	270	135	1,200,000
		Utility	450	200	950	270	135	1,100,000
		Stud	200	100	625	270	135	1,000,000
	SCOTS PINE - BALTIC COUNTRIES ESTONIA, LITHUANIA	Select Structural	1,650	750	1,325	430	130	1,500,000
No. 1		1,125	525	1,150	430	130	1,300,000	
No. 2		975	450	1,035	430	130	1,100,000	
No. 3		565	265	605	430	130	1,000,000	
Construction		Standard	750	325	1,100	430	130	1,100,000
		Utility	425	200	925	430	130	1,000,000
		Stud	200	100	600	430	130	900,000
SCOTS PINE - FINLAND		Select Structural	1,950	900	1,380	210	150	1,500,000
	No. 1	1,425	640	1,265	210	150	1,400,000	
	No. 2	1,390	640	1,265	210	150	1,300,000	
	No. 3	790	375	720	210	150	1,200,000	
	Construction	Standard	1,050	475	1,300	210	150	1,200,000
		Utility	600	275	1,100	210	150	1,100,000
		Stud	275	125	725	210	150	1,000,000
	SCOTS PINE - GERMANY	Select Structural	1,800	825	1,380	395	160	1,600,000
No. 1		1,200	565	1,210	395	160	1,400,000	
No. 2		1,050	490	1,095	395	160	1,100,000	
No. 3		600	265	635	395	160	1,000,000	
Construction		Standard	800	375	1,150	395	160	1,100,000
		Utility	450	200	975	395	160	1,000,000
		Stud	225	100	625	395	160	900,000
SCOTS PINE - SWEDEN		Select Structural	2,025	900	1,380	410	120	1,700,000
	No. 1	1,240	565	1,150	410	120	1,500,000	
	No. 2	865	375	950	410	120	1,200,000	
	No. 3	490	225	545	410	120	1,100,000	
	Construction	Standard	650	300	1,050	410	120	1,200,000
		Utility	375	175	850	410	120	1,100,000
		Stud	175	75	550	410	120	1,000,000
	SCOTS PINE - SWEDEN	Select Structural	2,025	900	1,380	410	120	1,700,000
No. 1		1,240	565	1,150	410	120	1,500,000	
No. 2		865	375	950	410	120	1,200,000	
No. 3		490	225	545	410	120	1,100,000	
Construction		Standard	650	300	1,050	410	120	1,200,000
		Utility	375	175	850	410	120	1,100,000
		Stud	175	75	550	410	120	1,000,000
SCOTS PINE - SWEDEN		Select Structural	2,025	900	1,380	410	120	1,700,000
	No. 1	1,240	565	1,150	410	120	1,500,000	
	No. 2	865	375	950	410	120	1,200,000	
	No. 3	490	225	545	410	120	1,100,000	
	Construction	Standard	650	300	1,050	410	120	1,200,000
		Utility	375	175	850	410	120	1,100,000
		Stud	175	75	550	410	120	1,000,000

See footnotes, page 21

SECTION 3. (cont.)

4" Nominal (page 3 of 4)		VALUES BY SIZE					
OTHER SPECIES COMBINATIONS	GRADE	Fb	Ft	Fc	Fc	Fv	E
U.S. / Canadian Species Combinations							
DOUGLAS FIR/ DOUGLAS FIR - North	Select Structural	2,025	1,240	1,955	625	180	1,900,000
	No. 1	1,275	750	1,610	625	180	1,600,000
	No. 2	1,275	750	1,555	625	180	1,600,000
	No. 3	715	450	890	625	180	1,400,000
	Construction	950	575	1,650	625	180	1,500,000
	Standard	525	325	1,400	625	180	1,400,000
	Utility	250	150	900	625	180	1,300,000
Stud	715	440	895	625	180	1,400,000	
HEM FIR/ HEM FIR - North	Select Structural	1,950	1,165	1,725	370	145	1,600,000
	No. 1	1,465	865	1,555	370	145	1,500,000
	No. 2	1,275	790	1,495	370	145	1,300,000
	No. 3	750	450	835	370	145	1,200,000
	Construction	975	600	1,550	370	145	1,300,000
	Standard	550	325	1,300	370	145	1,200,000
	Utility	250	150	850	370	145	1,100,000
Stud	745	440	840	370	145	1,200,000	
SPRUCE-PINE-FIR/ SPRUCE-PINE-FIR-South	Select Structural	1,875	865	1,380	335	135	1,300,000
	No. 1	1,315	600	1,210	335	135	1,200,000
	No. 2	1,165	525	1,150	335	135	1,100,000
	No. 3	675	300	660	335	135	1,000,000
	Construction	875	400	1,200	335	135	1,000,000
	Standard	500	225	1,000	335	135	900,000
	Utility	225	100	675	335	135	900,000
Stud	660	305	655	335	135	1,000,000	
European Species Combinations							
AUSTRIAN SPRUCE / SCOTS PINE from Austria & Czech Republic	Select Structural	1,950	900	1,380	260	135	1,600,000
	No. 1	1,275	565	1,210	260	135	1,500,000
	No. 2	1,050	450	1,065	260	135	1,300,000
	No. 3	600	265	605	260	135	1,200,000
	Construction	775	350	1,150	260	135	1,200,000
	Standard	450	200	950	260	135	1,100,000
	Utility	200	100	625	260	135	1,000,000
Stud	605	275	605	260	135	1,200,000	
NORWAY SPRUCE / SCOTS PINE from Estonia & Lithuania	Select Structural	1,650	750	1,325	430	130	1,500,000
	No. 1	1,125	525	1,150	430	130	1,300,000
	No. 2	975	450	1,035	430	130	1,100,000
	No. 3	565	265	605	430	130	1,000,000
	Construction	750	325	1,100	430	130	1,100,000
	Standard	425	200	925	430	130	1,000,000
	Utility	200	100	600	430	130	900,000
Stud	580	250	605	430	130	1,000,000	

See footnotes, page 21

SECTION 3. (cont.)

6" Nominal (page 1 of 2)	VALUES BY SIZE						
DOMESTIC SPECIES	GRADE	Fb	Ft	Fc	Fc	Fv	E
DOUGLAS FIR	Select Structural	1,950	1,300	1,870	625	180	1,900,000
	No. 1 & Btr.	1,560	1,040	1,705	625	180	1,800,000
	No. 1	1,300	880	1,650	625	180	1,700,000
	No. 2	1,170	750	1,485	625	180	1,600,000
	No. 3	685	425	855	625	180	1,400,000
	Stud	700	450	850	625	180	1,400,000
HEM-FIR	Select Structural	1,820	1,205	1,650	405	150	1,600,000
	No. 1 & Btr.	1,430	945	1,485	405	150	1,500,000
	No. 1	1,270	815	1,485	405	150	1,500,000
	No. 2	1,105	685	1,430	405	150	1,300,000
	No. 3	650	390	800	405	150	1,200,000
	Stud	675	400	800	405	150	1,200,000
SPRUCE-PINE-FIR - SOUTH	Select Structural	1,690	750	1,320	335	135	1,300,000
	No. 1	1,140	520	1,155	335	135	1,200,000
	No. 2	1,010	455	1,100	335	135	1,100,000
	No. 3	585	260	635	335	135	1,000,000
	Stud	600	275	625	335	135	1,000,000
WESTERN WOODS	Select Structural	1,170	520	1,155	335	135	1,200,000
	No. 1	880	390	1,045	335	135	1,100,000
	No. 2	880	390	990	335	135	1,000,000
	No. 3	490	230	580	335	135	900,000
	Stud	525	225	575	355	135	900,000
WESTERN CEDARS	Select Structural	1,300	780	1,100	425	155	1,100,000
	No. 1	945	555	910	425	155	1,000,000
	No. 2	910	555	715	425	155	1,000,000
	No. 3	520	325	415	425	155	900,000
	Stud	550	325	400	425	155	900,000
PORT ORFORD CEDAR	Select Structural	1,625	910	1,265	470	165	1,600,000
	No. 1	1,365	750	1,155	470	165	1,500,000
	No. 2	1,140	620	965	470	165	1,400,000
	No. 3	650	360	550	470	165	1,300,000
	Stud	675	375	550	470	165	1,300,000
IMPORTED SPECIES	GRADE	Fb	Ft	Fc	Fc	Fv	E
AUSTRIAN SPRUCE - AUSTRIA/CZECH REP.	Select Structural	1,885	845	1,375	260	175	1,600,000
	No. 1	1,235	555	1,210	260	175	1,500,000
	No. 2	1,075	490	1,100	260	175	1,300,000
	No. 3	620	295	635	260	175	1,200,000
	Stud	650	300	650	260	175	1,200,000
NORWAY SPRUCE - BALTIC COUNTRIES ESTONIA, LATVIA, LITHUANIA	Select Structural	1,560	715	1,320	430	150	1,600,000
	No. 1	1,075	490	1,155	430	150	1,400,000
	No. 2	945	425	1,045	430	150	1,200,000
	No. 3	555	260	605	430	150	1,100,000
	Stud	575	250	600	430	150	1,100,000
NORWAY SPRUCE - FINLAND	Select Structural	1,755	780	1,320	220	125	1,500,000
	No. 1	1,105	490	1,100	220	125	1,400,000
	No. 2	815	360	965	220	125	1,200,000
	No. 3	490	230	550	220	125	1,100,000
	Stud	500	225	550	220	125	1,100,000
NORWAY SPRUCE - GERMANY	Select Structural	1,625	715	1,320	355	170	1,600,000
	No. 1	1,040	455	1,100	355	170	1,400,000
	No. 2	845	390	990	355	170	1,100,000
	No. 3	490	230	580	355	170	1,000,000
	Stud	500	225	575	355	170	1,000,000
NORWAY SPRUCE - SWEDEN	Select Structural	1,625	715	1,320	285	170	1,600,000
	No. 1	1,075	490	1,155	285		

SECTION 3. (cont.)

6" Nominal (page 2 of 2)	VALUES BY SIZE						
IMPORTED SPECIES (cont.)	GRADE	Fb	Ft	Fc	Fc	Fv	E
SCOTS PINE - AUSTRIA/CZECH REP.	Select Structural	1,690	780	1,320	270	135	1,700,000
	No. 1	1,105	490	1,155	270	135	1,500,000
	No. 2	910	390	1,020	270	135	1,300,000
	No. 3	520	230	580	270	135	1,200,000
	Stud	550	250	575	270	135	1,200,000
SCOTS PINE - BALTIC COUNTRIES ESTONIA, LITHUANIA	Select Structural	1,430	650	1,265	430	130	1,500,000
	No. 1	975	455	1,100	430	130	1,300,000
	No. 2	845	390	990	430	130	1,100,000
	No. 3	490	230	580	430	130	1,000,000
	Stud	525	225	575	430	130	1,000,000
SCOTS PINE - FINLAND.	Select Structural	1,690	780	1,320	210	150	1,500,000
	No. 1	1,235	555	1,210	210	150	1,400,000
	No. 2	1,205	555	1,210	210	150	1,300,000
	No. 3	685	325	690	210	150	1,200,000
	Stud	725	325	675	210	150	1,200,000
SCOTS PINE - GERMANY	Select Structural	1,560	715	1,320	395	160	1,600,000
	No. 1	1,040	490	1,155	395	160	1,400,000
	No. 2	910	425	1,045	395	160	1,100,000
	No. 3	520	230	605	395	160	1,000,000
	Stud	550	250	600	395	160	1,000,000
SCOTS PINE - SWEDEN	Select Structural	1,755	780	1,320	410	120	1,700,000
	No. 1	1,075	490	1,100	410	120	1,500,000
	No. 2	750	325	910	410	120	1,200,000
	No. 3	425	195	525	410	120	1,100,000
	Stud	450	200	525	410	120	1,100,000
SPECIES COMBINATIONS	GRADE	Fb	Ft	Fc	Fc	Fv	E
DOUGLAS FIR/ DOUGLAS FIR - North	Select Structural	1,755	1,075	1,870	625	180	1,900,000
	No. 1	1,105	650	1,540	625	180	1,600,000
	No. 2	1,105	650	1,485	625	180	1,600,000
	No. 3	620	390	855	625	180	1,400,000
	Stud	650	400	850	625	180	1,400,000
HEM-FIR/ HEM-FIR - North	Select Structural	1,690	1,010	1,650	370	145	1,600,000
	No. 1	1,270	750	1,485	370	145	1,500,000
	No. 2	1,105	685	1,430	370	145	1,300,000
	No. 3	650	390	800	370	145	1,200,000
	Stud	675	400	800	370	145	1,200,000
SPRUCE-PINE-FIR/ SPRUCE-PINE-FIR-South	Select Structural	1,625	750	1,320	335	135	1,300,000
	No. 1	1,140	520	1,155	335	135	1,200,000
	No. 2	1,010	455	1,100	335	135	1,100,000
	No. 3	585	260	635	335	135	1,000,000
	Stud	600	275	625	335	135	1,000,000
AUSTRIAN SPRUCE / SCOTS PINE from Austria & Czech Republic	Select Structural	1,690	780	1,320	260	135	1,600,000
	No. 1	1,105	490	1,155	260	135	1,500,000
	No. 2	910	390	1,020	260	135	1,300,000
	No. 3	520	230	580	260	135	1,200,000
	Stud	550	250	575	260	135	1,200,000
NORWAY SPRUCE / SCOTS PINE from Estonia & Lithuania	Select Structural	1,430	650	1,265	430	130	1,500,000
	No. 1	975	455	1,100	430	130	1,300,000
	No. 2	845	390	990	430	130	1,100,000
	No. 3	490	230	580	430	130	1,000,000
	Stud	525	225	575	430	130	1,000,000

See footnotes, page 21

SECTION 3. (cont.)

8" Nominal (page 1 of 2)	VALUES BY SIZE								
	DOMESTIC SPECIES	GRADE	Fb		Ft	Fc	Fc	Fv	E
			2" Thk	4" Thk					
DOUGLAS FIR	Select Structural	1,800	1,950	1,200	1,785	625	180	1,900,000	
	No. 1 & Btr.	1,440	1,560	960	1,630	625	180	1,800,000	
	No. 1	1,200	1,300	810	1,575	625	180	1,700,000	
	No. 2	1,080	1,170	690	1,420	625	180	1,600,000	
HEM-FIR	No. 3 / Stud	630	685	390	815	625	180	1,400,000	
	Select Structural	1,680	1,820	1,110	1,575	405	150	1,600,000	
	No. 1 & Btr.	1,320	1,430	870	1,420	405	150	1,500,000	
	No. 1	1,170	1,270	750	1,420	405	150	1,500,000	
SPRUCE-PINE-FIR - SOUTH	No. 2	1,020	1,105	630	1,365	405	150	1,300,000	
	No. 3 / Stud	600	650	360	760	405	150	1,200,000	
	Select Structural	1,560	1,690	690	1,260	335	135	1,300,000	
	No. 1	1,050	1,140	480	1,105	335	135	1,200,000	
WESTERN WOODS	No. 2	930	1,010	420	1,050	335	135	1,100,000	
	No. 3 / Stud	540	585	240	605	335	135	1,000,000	
	Select Structural	1,080	1,170	480	1,105	335	135	1,200,000	
	No. 1	810	880	360	1,000	335	135	1,100,000	
WESTERN CEDARS	No. 2	810	880	360	945	335	135	1,000,000	
	No. 3 / Stud	450	490	210	550	335	135	900,000	
	Select Structural	1,200	1,300	720	1,050	425	155	1,100,000	
	No. 1	870	945	510	865	425	155	1,000,000	
PORT ORFORD CEDAR	No. 2	840	910	510	685	425	155	1,000,000	
	No. 3 / Stud	480	520	300	395	425	155	900,000	
	Select Structural	1,500	1,625	840	1,210	470	165	1,600,000	
	No. 1	1,260	1,365	690	1,105	470	165	1,500,000	
IMPORTED SPECIES	No. 2	1,050	1,140	570	920	470	165	1,400,000	
	No. 3 / Stud	600	650	330	525	470	165	1,300,000	
	Select Structural	1,740	1,885	780	1,315	260	175	1,600,000	
	No. 1	1,140	1,235	510	1,155	260	175	1,500,000	
AUSTRIAN SPRUCE - AUSTRIA/CZECH REP.	No. 2	990	1,075	450	1,050	260	175	1,300,000	
	No. 3 / Stud	570	620	270	605	260	175	1,200,000	
	Select Structural	1,440	1,560	660	1,260	430	150	1,600,000	
	No. 1	990	1,075	450	1,105	430	150	1,400,000	
NORWAY SPRUCE - BALTIC COUNTRIES ESTONIA, LATVIA, LITHUANIA	No. 2	870	945	390	1,000	430	150	1,200,000	
	No. 3 / Stud	510	555	240	580	430	150	1,100,000	
	Select Structural	1,620	1,755	720	1,260	220	125	1,500,000	
	No. 1	1,020	1,105	450	1,050	220	125	1,400,000	
NORWAY SPRUCE - FINLAND	No. 2	750	815	330	920	220	125	1,200,000	
	No. 3 / Stud	450	490	210	525	220	125	1,100,000	
	Select Structural	1,500	1,625	660	1,260	355	170	1,600,000	
	No. 1	960	1,040	420	1,050	355	170	1,400,000	
NORWAY SPRUCE - GERMANY	No. 2	780	845	360	945	355	170	1,400,000	
	No. 3 / Stud	450	490	210	550	355	170	1,000,000	
	Select Structural	1,500	1,625	660	1,260	285	170	1,600,000	
	No. 1	990	1,075	450	1,105	285	170	1,400,000	
NORWAY SPRUCE - SWEDEN	No. 2	810	880	360	970	285	170	1,200,000	
	No. 3 / Stud	480	520	210	550	285	170	1,100,000	

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SECTION 3. (cont.)

8" Nominal (page 2 of 2)		VALUES BY SIZE						
IMPORTED SPECIES (cont.)	GRADE	Fb		Ft	Fc	Fc	Fv	E
		2" Thk	4" Thk					
SCOTS PINE - AUSTRIA/CZECH REP.	Select Structural	1,560	1,690	720	1,260	270	135	1,700,000
	No. 1	1,020	1,105	450	1,105	270	135	1,500,000
	No. 2	840	910	360	970	270	135	1,300,000
	No. 3 / Stud	480	520	210	550	270	135	1,200,000
SCOTS PINE - BALTIC COUNTRIES ESTONIA, LITHUANIA	Select Structural	1,320	1,430	600	1,210	430	130	1,500,000
	No. 1	900	975	420	1,050	430	130	1,300,000
	No. 2	780	845	360	945	430	130	1,100,000
	No. 3 / Stud	450	490	210	550	430	130	1,000,000
SCOTS PINE - FINLAND	Select Structural	1,560	1,690	720	1,260	210	150	1,500,000
	No. 1	1,140	1,235	510	1,155	210	150	1,400,000
	No. 2	1,110	1,205	510	1,155	210	150	1,300,000
	No. 3 / Stud	630	685	300	655	210	150	1,200,000
SCOTS PINE - GERMANY	Select Structural	1,440	1,560	660	1,260	395	160	1,600,000
	No. 1	960	1,040	450	1,105	395	160	1,400,000
	No. 2	840	910	390	1,000	395	160	1,100,000
	No. 3 / Stud	480	520	210	580	395	160	1,000,000
SCOTS PINE - SWEDEN	Select Structural	1,620	1,755	720	1,260	410	120	1,700,000
	No. 1	990	1,075	450	1,050	410	120	1,500,000
	No. 2	690	750	300	865	410	120	1,200,000
	No. 3 / Stud	390	425	180	500	410	120	1,100,000
OTHER SPECIES COMBINATIONS	GRADE	Fb		Ft	Fc	Fc	Fv	E
		2" Thk	4" Thk					
DOUGLAS FIR/ DOUGLAS FIR - North	Select Structural	1,620	1,755	990	1,785	625	180	1,900,000
	No. 1	1,020	1,105	600	1,470	625	180	1,600,000
	No. 2	1,020	1,105	600	1,420	625	180	1,600,000
	No. 3 / Stud	570	620	360	815	625	180	1,400,000
HEM-FIR/ HEM-FIR - North	Select Structural	1,560	1,690	930	1,575	370	145	1,600,000
	No. 1	1,170	1,270	690	1,420	370	145	1,500,000
	No. 2	1,020	1,105	630	1,365	370	145	1,300,000
	No. 3 / Stud	600	650	360	760	370	145	1,200,000
SPRUCE-PINE-FIR/ SPRUCE-PINE-FIR-South	Select Structural	1,500	1,625	690	1,260	335	135	1,300,000
	No. 1	1,050	1,140	480	1,105	335	135	1,200,000
	No. 2	930	1,010	420	1,050	335	135	1,100,000
	No. 3 / Stud	540	585	240	605	335	135	1,000,000
AUSTRIAN SPRUCE / SCOTS PINE from Austria & Czech Republic	Select Structural	1,560	1,690	720	1,260	260	135	1,600,000
	No. 1	1,020	1,105	450	1,105	260	135	1,500,000
	No. 2	840	910	360	970	260	135	1,300,000
	No. 3 / Stud	480	520	210	550	260	135	1,200,000
NORWAY SPRUCE / SCOTS PINE from Estonia & Lithuania	Select Structural	1,320	1,430	600	1,210	430	130	1,500,000
	No. 1	900	975	420	1,050	430	130	1,300,000
	No. 2	780	845	360	945	430	130	1,100,000
	No. 3 / Stud	450	490	210	550	430	130	1,000,000

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SECTION 3. (cont.)

10" Nominal (page 1 of 2)		VALUES BY SIZE						
DOMESTIC SPECIES	GRADE	Fb		Ft	Fc	Fc	Fv	E
		2" Thk	4" Thk					
DOUGLAS FIR	Select Structural	1,650	1,800	1,100	1,700	625	180	1,900,000
	No. 1 & Btr.	1,320	1,440	880	1,550	625	180	1,800,000
	No. 1	1,100	1,200	745	1,500	625	180	1,700,000
	No. 2	990	1,080	635	1,350	625	180	1,600,000
	No. 3 / Stud	580	630	360	775	625	180	1,400,000
HEM-FIR	Select Structural	1,540	1,680	1,020	1,500	405	150	1,600,000
	No. 1 & Btr.	1,210	1,320	800	1,350	405	150	1,500,000
	No. 1	1,075	1,170	690	1,350	405	150	1,500,000
	No. 2	935	1,020	580	1,300	405	150	1,300,000
	No. 3 / Stud	550	600	330	725	405	150	1,200,000
SPRUCE-PINE-FIR - SOUTH	Select Structural	1,430	1,560	635	1,200	335	135	1,300,000
	No. 1	965	1,050	440	1,050	335	135	1,200,000
	No. 2	855	930	385	1,000	335	135	1,100,000
	No. 3 / Stud	495	540	220	575	335	135	1,000,000
WESTERN WOODS	Select Structural	990	1,080	440	1,050	335	135	1,200,000
	No. 1	745	810	330	950	335	135	1,100,000
	No. 2	745	810	330	900	335	135	1,000,000
	No. 3 / Stud	415	450	195	525	335	135	900,000
WESTERN CEDARS	Select Structural	1,100	1,200	660	1,000	425	155	1,100,000
	No. 1	800	870	470	825	425	155	1,000,000
	No. 2	770	840	470	650	425	155	1,000,000
	No. 3 / Stud	440	480	275	375	425	155	900,000
PORT ORFORD CEDAR	Select Structural	1,375	1,500	770	1,150	470	165	1,600,000
	No. 1	1,155	1,260	635	1,050	470	165	1,500,000
	No. 2	965	1,050	525	875	470	165	1,400,000
	No. 3 / Stud	550	600	305	500	470	165	1,300,000
IMPORTED SPECIES	GRADE	Fb		Ft	Fc	Fc	Fv	E
		2" Thk	4" Thk					
AUSTRIAN SPRUCE - AUSTRIA/CZECH REP.	Select Structural	1,595	1,740	715	1,250	260	175	1,600,000
	No. 1	1,045	1,140	470	1,100	260	175	1,500,000
	No. 2	910	990	415	1,000	260	175	1,300,000
	No. 3 / Stud	525	570	250	575	260	175	1,200,000
NORWAY SPRUCE - BALTIC COUNTRIES ESTONIA, LATVIA, LITHUANIA	Select Structural	1,320	1,440	605	1,200	430	150	1,600,000
	No. 1	910	990	415	1,050	430	150	1,400,000
	No. 2	800	870	360	950	430	150	1,200,000
	No. 3 / Stud	470	510	220	550	430	150	1,100,000
NORWAY SPRUCE - FINLAND	Select Structural	1,485	1,620	660	1,200	220	125	1,500,000
	No. 1	935	1,020	415	1,000	220	125	1,400,000
	No. 2	690	750	305	875	220	125	1,200,000
	No. 3 / Stud	415	450	195	500	220	125	1,100,000
NORWAY SPRUCE - GERMANY	Select Structural	1,375	1,500	605	1,200	355	170	1,600,000
	No. 1	880	960	385	1,000	355	170	1,400,000
	No. 2	715	780	330	900	355	170	1,100,000
	No. 3 / Stud	415	450	195	525	355	170	1,000,000
NORWAY SPRUCE - SWEDEN	Select Structural	1,375	1,500	605	1,200	285	170	1,600,000
	No. 1	910	990	415	1,050	285	170	1,400,000
	No. 2	745	810	330	925	285	170	1,200,000
	No. 3 / Stud	440	480	195	525	285	170	1,100,000

See footnotes, page 21

SECTION 3. (cont.)

10" Nominal (page 2 of 2)		VALUES BY SIZE						
IMPORTED SPECIES (cont.)	GRADE	Fb		Ft	Fc	Fc	Fv	E
		2" Thk	4" Thk					
SCOTS PINE - AUSTRIA/CZECH REP.	Select Structural No. 1 No. 2 No. 3 / Stud	1,430 935 770 440	1,560 1,020 840 480	660 415 330 195	1,200 1,050 925 525	270 270 270 270	135 135 135 135	1,700,000 1,500,000 1,300,000 1,200,000
SCOTS PINE - BALTIC COUNTRIES ESTONIA, LITHUANIA	Select Structural No. 1 No. 2 No. 3 / Stud	1,210 825 715 415	1,320 900 780 450	550 385 330 195	1,150 1,000 900 525	430 430 430 430	130 130 130 130	1,500,000 1,300,000 1,100,000 1,000,000
SCOTS PINE - FINLAND	Select Structural No. 1 No. 2 No. 3 / Stud	1,430 1,045 1,020 580	1,560 1,140 1,110 630	660 470 470 275	1,200 1,100 1,100 625	210 210 210 210	150 150 150 150	1,500,000 1,400,000 1,300,000 1,200,000
SCOTS PINE - GERMANY	Select Structural No. 1 No. 2 No. 3 / Stud	1,320 880 770 440	1,440 960 840 480	605 415 360 195	1,200 1,050 950 550	395 395 395 395	160 160 160 160	1,600,000 1,400,000 1,100,000 1,000,000
SCOTS PINE - SWEDEN	Select Structural No. 1 No. 2 No. 3 / Stud	1,485 910 635 360	1,620 990 690 390	660 415 275 165	1,200 1,000 825 475	410 410 410 410	120 120 120 120	1,700,000 1,500,000 1,200,000 1,100,000
OTHER SPECIES COMBINATIONS	GRADE	Fb		Ft	Fc	Fc	Fv	E
		2" Thk	4" Thk					
DOUGLAS FIR/ DOUGLAS FIR - North	Select Structural No. 1 No. 2 No. 3 / Stud	1,485 935 935 525	1,620 1,020 1,020 570	910 550 550 330	1,700 1,400 1,350 775	625 625 625 625	180 180 180 180	1,900,000 1,600,000 1,600,000 1,400,000
HEM-FIR/ HEM-FIR - North	Select Structural No. 1 No. 2 No. 3 / Stud	1,430 1,075 935 550	1,560 1,170 1,020 600	855 635 580 330	1,500 1,350 1,300 725	370 370 370 370	145 145 145 145	1,600,000 1,500,000 1,300,000 1,200,000
SPRUCE-PINE-FIR/ SPRUCE-PINE-FIR-South	Select Structural No. 1 No. 2 No. 3 / Stud	1,375 965 855 495	1,500 1,050 930 540	635 440 385 220	1,200 1,050 1,000 575	335 335 335 335	135 135 135 135	1,300,000 1,200,000 1,100,000 1,000,000
AUSTRIAN SPRUCE / SCOTS PINE from Austria & Czech Republic	Select Structural No. 1 No. 2 No. 3 / Stud	1,430 935 770 440	1,560 1,020 840 480	660 415 330 195	1,200 1,050 925 525	260 260 260 260	135 135 135 135	1,600,000 1,500,000 1,300,000 1,200,000
NORWAY SPRUCE / SCOTS PINE from Estonia & Lithuania	Select Structural No. 1 No. 2 No. 3 / Stud	1,210 825 715 415	1,320 900 780 450	550 385 330 195	1,150 1,000 900 525	430 430 430 430	130 130 130 130	1,500,000 1,300,000 1,100,000 1,000,000

See footnotes, page 21

SECTION 3. (cont.)

12" Nominal (page 1 of 2)		VALUES BY SIZE						
DOMESTIC SPECIES	GRADE	Fb		Ft	Fc	Fc	Fv	E
		2" Thk	4" Thk					
DOUGLAS FIR	Select Structural	1,500	1,650	1,000	1,700	625	180	1,900,000
	No. 1 & Btr.	1,200	1,320	800	1,550	625	180	1,800,000
	No. 1	1,000	1,100	675	1,500	625	180	1,700,000
	No. 2	900	990	575	1,350	625	180	1,600,000
	No. 3 / Stud	525	580	325	775	625	180	1,400,000
HEM-FIR	Select Structural	1,400	1,540	925	1,500	405	150	1,600,000
	No. 1 & Btr.	1,100	1,210	725	1,350	405	150	1,500,000
	No. 1	975	1,075	625	1,350	405	150	1,500,000
	No. 2	850	935	525	1,300	405	150	1,300,000
	No. 3 / Stud	500	550	300	725	405	150	1,200,000
SPRUCE-PINE-FIR - SOUTH	Select Structural	1,300	1,430	575	1,200	335	135	1,300,000
	No. 1	875	965	400	1,050	335	135	1,200,000
	No. 2	775	855	350	1,000	335	135	1,100,000
	No. 3 / Stud	450	495	200	575	335	135	1,000,000
WESTERN WOODS	Select Structural	900	990	400	1,050	335	135	1,200,000
	No. 1	675	745	300	950	335	135	1,100,000
	No. 2	675	745	300	900	335	135	1,000,000
	No. 3 / Stud	375	415	175	525	335	135	900,000
WESTERN CEDARS	Select Structural	1,000	1,100	600	1,000	425	155	1,100,000
	No. 1	725	800	425	825	425	155	1,000,000
	No. 2	700	770	425	650	425	155	1,000,000
	No. 3 / Stud	400	440	250	375	425	155	900,000
PORT ORFORD CEDAR	Select Structural	1,250	1,375	700	1,150	470	165	1,600,000
	No. 1	1,050	1,155	575	1,050	470	165	1,500,000
	No. 2	875	965	475	875	470	165	1,400,000
	No. 3 / Stud	500	550	275	500	470	165	1,300,000
IMPORTED SPECIES	GRADE	Fb		Ft	Fc	Fc	Fv	E
		2" Thk	4" Thk					
AUSTRIAN SPRUCE - AUSTRIA/CZECH REP.	Select Structural	1,450	1,595	650	1,250	260	175	1,600,000
	No. 1	950	1,045	425	1,100	260	175	1,500,000
	No. 2	825	910	375	1,000	260	175	1,300,000
	No. 3 / Stud	475	525	225	575	260	175	1,200,000
NORWAY SPRUCE - BALTIC COUNTRIES ESTONIA, LATVIA, LITHUANIA	Select Structural	1,200	1,320	550	1,200	430	150	1,600,000
	No. 1	825	910	375	1,050	430	150	1,400,000
	No. 2	725	800	325	950	430	150	1,200,000
	No. 3 / Stud	425	470	200	550	430	150	1,100,000
NORWAY SPRUCE - FINLAND	Select Structural	1,350	1,485	600	1,200	220	125	1,500,000
	No. 1	850	935	375	1,000	220	125	1,400,000
	No. 2	625	690	275	875	220	125	1,200,000
	No. 3 / Stud	375	415	175	500	220	125	1,100,000
NORWAY SPRUCE - GERMANY	Select Structural	1,250	1,375	550	1,200	355	170	1,600,000
	No. 1	800	880	350	1,000	355	170	1,400,000
	No. 2	650	715	300	900	355	170	1,100,000
	No. 3 / Stud	375	415	175	525	355	170	1,000,000
NORWAY SPRUCE - SWEDEN	Select Structural	1,250	1,375	550	1,200	285	170	1,600,000
	No. 1	825	910	375	1,050	285	170	1,400,000
	No. 2	675	745	300	925	285	170	1,200,000
	No. 3 / Stud	400	440	175	525	285	170	1,100,000

See footnotes, page 21

SECTION 3. (cont.)

12" Nominal (page 2 of 2)		VALUES BY SIZE						
IMPORTED SPECIES (cont.)	GRADE	Fb		Ft	Fc	Fc	Fv	E
		2" Thk	4" Thk					
SCOTS PINE - AUSTRIA/CZECH REP.	Select Structural	1,300	1,430	600	1,200	270	135	1,700,000
	No. 1	850	935	375	1,050	270	135	1,500,000
	No. 2	700	770	300	925	270	135	1,300,000
	No. 3 / Stud	400	440	175	525	270	135	1,200,000
SCOTS PINE - BALTIC COUNTRIES ESTONIA, LITHUANIA	Select Structural	1,100	1,210	500	1,150	430	130	1,500,000
	No. 1	750	825	350	1,000	430	130	1,300,000
	No. 2	650	715	300	900	430	130	1,100,000
	No. 3 / Stud	375	415	175	525	430	130	1,000,000
SCOTS PINE - FINLAND	Select Structural	1,300	1,430	600	1,200	210	150	1,500,000
	No. 1	950	1,045	425	1,100	210	150	1,400,000
	No. 2	925	1,020	425	1,100	210	150	1,300,000
	No. 3 / Stud	525	580	250	625	210	150	1,200,000
SCOTS PINE - GERMANY	Select Structural	1,200	1,320	550	1,200	395	160	1,600,000
	No. 1	800	880	375	1,050	395	160	1,400,000
	No. 2	700	770	325	950	395	160	1,100,000
	No. 3 / Stud	400	440	175	550	395	160	1,000,000
SCOTS PINE - SWEDEN	Select Structural	1,350	1,485	600	1,200	410	120	1,700,000
	No. 1	825	910	375	1,000	410	120	1,500,000
	No. 2	575	635	250	825	410	120	1,200,000
	No. 3 / Stud	325	360	150	475	410	120	1,100,000
OTHER SPECIES COMBINATIONS	GRADE	Fb		Ft	Fc	Fc	Fv	E
		2" Thk	4" Thk					
DOUGLAS FIR/ DOUGLAS FIR - North	Select Structural	1,350	1,485	825	1,700	625	180	1,900,000
	No. 1	850	935	500	1,400	625	180	1,600,000
	No. 2	850	935	500	1,350	625	180	1,600,000
	No. 3 / Stud	475	525	300	775	625	180	1,400,000
HEM-FIR/ HEM-FIR - North	Select Structural	1,300	1,430	775	1,500	370	145	1,600,000
	No. 1	975	1,075	575	1,350	370	145	1,500,000
	No. 2	850	935	525	1,300	370	145	1,300,000
	No. 3 / Stud	500	550	300	725	370	145	1,200,000
SPRUCE-PINE-FIR/ SPRUCE-PINE-FIR - SOUTH	Select Structural	1,250	1,375	575	1,200	335	135	1,300,000
	No. 1	875	965	400	1,050	335	135	1,200,000
	No. 2	775	855	350	1,000	335	135	1,100,000
	No. 3 / Stud	450	495	200	575	335	135	1,000,000
AUSTRIAN SPRUCE / SCOTS PINE from Austria & Czech Republic	Select Structural	1,300	1,430	600	1,200	260	135	1,600,000
	No. 1	850	935	375	1,050	260	135	1,500,000
	No. 2	700	770	300	925	260	135	1,300,000
	No. 3 / Stud	400	440	175	525	260	135	1,200,000
NORWAY SPRUCE / SCOTS PINE from Estonia & Lithuania	Select Structural	1,100	1,210	500	1,150	430	130	1,500,000
	No. 1	750	825	350	1,000	430	130	1,300,000
	No. 2	650	715	300	900	430	130	1,100,000
	No. 3 / Stud	375	415	175	525	430	130	1,000,000

See footnotes, page 21

SECTION 3. (cont.)

14" & Wdr. Nominal (page 1 of 2)		VALUES BY SIZE						
DOMESTIC SPECIES	GRADE	Fb		Ft	Fc	Fc	Fv	E
		2" Thk	4" Thk					
DOUGLAS FIR	Select Structural	1,350	1,500	900	1,530	625	180	1,900,000
	No. 1 & Btr.	1,080	1,200	720	1,395	625	180	1,800,000
	No. 1	900	1,000	610	1,350	625	180	1,700,000
	No. 2	810	900	520	1,215	625	180	1,600,000
	No. 3 / Stud	475	525	295	700	625	180	1,400,000
HEM-FIR	Select Structural	1,260	1,400	835	1,350	405	150	1,600,000
	No. 1 & Btr.	990	1,100	655	1,215	405	150	1,500,000
	No. 1	880	975	565	1,215	405	150	1,500,000
	No. 2	765	850	475	1,170	405	150	1,300,000
	No. 3 / Stud	450	500	270	655	405	150	1,200,000
SPRUCE-PINE-FIR - SOUTH	Select Structural	1,170	1,300	520	1,080	335	135	1,300,000
	No. 1	790	875	360	945	335	135	1,200,000
	No. 2	700	775	315	900	335	135	1,100,000
	No. 3 / Stud	405	450	180	520	335	135	1,000,000
WESTERN WOODS	Select Structural	810	900	360	945	335	135	1,200,000
	No. 1	610	675	270	855	335	135	1,100,000
	No. 2	610	675	270	810	335	135	1,000,000
	No. 3 / Stud	340	375	160	475	335	135	900,000
WESTERN CEDARS	Select Structural	900	1,000	540	900	425	155	1,100,000
	No. 1	655	725	385	745	425	155	1,000,000
	No. 2	630	700	385	585	425	155	1,000,000
	No. 3 / Stud	360	400	225	340	425	155	900,000
PORT ORFORD CEDAR	Select Structural	1,125	1,250	630	1,035	470	165	1,600,000
	No. 1	945	1,050	520	945	470	165	1,500,000
	No. 2	790	875	430	790	470	165	1,400,000
	No. 3 / Stud	450	500	250	450	470	165	1,300,000
IMPORTED SPECIES	GRADE	Fb		Ft	Fc	Fc	Fv	E
		2" Thk	4" Thk					
AUSTRIAN SPRUCE - AUSTRIA/CZECH REP.	Select Structural	1,305	1,450	585	1,125	260	175	1,600,000
	No. 1	855	950	385	990	260	175	1,500,000
	No. 2	745	825	340	900	260	175	1,300,000
	No. 3 / Stud	430	475	205	520	260	175	1,200,000
NORWAY SPRUCE - BALTIC COUNTRIES ESTONIA, LATVIA, LITHUANIA	Select Structural	1,080	1,200	495	1,080	430	150	1,600,000
	No. 1	745	825	340	945	430	150	1,400,000
	No. 2	655	725	295	855	430	150	1,200,000
	No. 3 / Stud	385	425	180	495	430	150	1,100,000
NORWAY SPRUCE - FINLAND	Select Structural	1,215	1,350	540	1,080	220	125	1,500,000
	No. 1	765	850	340	900	220	125	1,400,000
	No. 2	565	625	250	790	220	125	1,200,000
	No. 3 / Stud	340	375	160	450	220	125	1,100,000
NORWAY SPRUCE - GERMANY	Select Structural	1,125	1,250	495	1,080	355	170	1,600,000
	No. 1	720	800	315	900	355	170	1,400,000
	No. 2	585	650	270	810	355	170	1,100,000
	No. 3 / Stud	340	375	160	475	355	170	1,000,000
NORWAY SPRUCE - SWEDEN	Select Structural	1,125	1,250	495	1,080	285	170	1,600,000
	No. 1	745	825	340	945	285	170	1,400,000
	No. 2	610	675	270	835	285	170	1,200,000
	No. 3 / Stud	360	400	160	475	285	170	1,100,000

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SECTION 3. (cont.)

14" & Wdr. Nominal (cont.)	VALUES BY SIZE								
	IMPORTED SPECIES (cont.)	GRADE	Fb		Ft	Fc	Fc	Fv	E
			2" Thk	4" Thk					
SCOTS PINE - AUSTRIA/CZECH REP.	Select Structural	1,170	1,300	540	1,080	270	135	1,700,000	
	No. 1	765	850	340	945	270	135	1,500,000	
	No. 2	630	700	270	835	270	135	1,300,000	
	No. 3 / Stud	360	400	160	475	270	135	1,200,000	
SCOTS PINE - BALTIC COUNTRIES ESTONIA, LITHUANIA	Select Structural	990	1,100	450	1,035	430	130	1,500,000	
	No. 1	675	750	315	900	430	130	1,300,000	
	No. 2	585	650	270	810	430	130	1,100,000	
	No. 3 / Stud	340	375	160	475	430	130	1,000,000	
SCOTS PINE - FINLAND	Select Structural	1,170	1,300	540	1,080	210	150	1,500,000	
	No. 1	855	950	385	990	210	150	1,400,000	
	No. 2	835	925	385	990	210	150	1,300,000	
	No. 3 / Stud	475	525	225	565	210	150	1,200,000	
SCOTS PINE - GERMANY	Select Structural	1,080	1,200	495	1,080	395	160	1,600,000	
	No. 1	720	800	340	945	395	160	1,400,000	
	No. 2	630	700	295	855	395	160	1,100,000	
	No. 3 / Stud	360	400	160	495	395	160	1,000,000	
SCOTS PINE - SWEDEN	Select Structural	1,215	1,350	540	1,080	410	120	1,700,000	
	No. 1	745	825	340	900	410	120	1,500,000	
	No. 2	520	575	225	745	410	120	1,200,000	
	No. 3 / Stud	295	325	135	430	410	120	1,100,000	
OTHER SPECIES COMBINATIONS	GRADE	Fb		Ft	Fc	Fc	Fv	E	
DOUGLAS FIR/ DOUGLAS FIR - North	Select Structural	1,215	1,350	745	1,530	625	180	1,900,000	
	No. 1	765	850	450	1,260	625	180	1,600,000	
	No. 2	765	850	450	1,215	625	180	1,600,000	
	No. 3 / Stud	430	475	270	700	625	180	1,400,000	
HEM-FIR/ HEM-FIR - North	Select Structural	1,170	1,300	700	1,350	370	145	1,600,000	
	No. 1	880	975	520	1,215	370	145	1,500,000	
	No. 2	765	850	475	1,170	370	145	1,300,000	
	No. 3 / Stud	450	500	270	655	370	145	1,200,000	
SPRUCE-PINE-FIR/ SPRUCE-PINE-FIR-South	Select Structural	1,125	1,250	520	1,080	335	135	1,300,000	
	No. 1	790	875	360	945	335	135	1,200,000	
	No. 2	700	775	315	900	335	135	1,100,000	
	No. 3 / Stud	405	450	180	520	335	135	1,000,000	
AUSTRIAN SPRUCE / SCOTS PINE from Austria & Czech Republic	Select Structural	1,170	1,300	540	1,080	260	135	1,600,000	
	No. 1	765	850	340	945	260	135	1,500,000	
	No. 2	630	700	270	835	260	135	1,300,000	
	No. 3 / Stud	360	400	160	475	260	135	1,200,000	
NORWAY SPRUCE / SCOTS PINE from Estonia & Lithuania	Select Structural	990	1,100	450	1,035	430	130	1,500,000	
	No. 1	675	750	315	900	430	130	1,300,000	
	No. 2	585	650	270	810	430	130	1,100,000	
	No. 3 / Stud	340	375	160	475	430	130	1,000,000	

- Notes: - All values are in psi. Values for specific widths are the product of the Base Value for the grade and the width adjustment factor. Values for specific sizes are rounded to the nearest 5 psi. Property values are for dimension lumber surfaced either green or dry used at 19% maximum moisture content as in most covered structures. For other use conditions see WCLIB Standard Grading Rules No. 17.
- Allowable property values are for Normal Loading.
 - Published property values developed in accordance with ASTM standards D1990, D2555, D245.
 - Published Base Values approved by the American Lumber Standard Board of Review.
 - When two or more species or species groupings (each with its own published Allowable Properties) are combined, as in the case of the OTHER SPECIES COMBINATIONS listings in these tables, the lowest assigned Allowable Property value among the species or species groups included in the combination is applied to the entire group.

SECTION 3. (cont.)

ASSIGNED SPECIFIC GRAVITY

For

ALL SIZES OF VISUAL STRESS GRADES

Species	Specific Gravity*
Domestic Species	
Douglas fir	0.50
Hem-Fir	0.43
S-P-F South	0.36
Western Cedars	0.36
Port Orford Cedar	0.44
Western Woods	0.36
Imported Species	
Austrian Spruce	0.43
N. Spruce-Estonia, Latvia, Lithuania	0.43
N. Spruce-Finland	0.42
N. Spruce-Germany	0.42
N. Spruce-Sweden	0.42
Scots Pine-Austria, Czech Republic	0.50
Scots Pine-Estonia, Lithuania	0.45
Scots Pine-Finland	0.48
Scots Pine-Germany	0.53
Scots Pine-Sweden	0.47
Douglas fir/European Larch	0.48
Species Combinations	
Douglas fir / Douglas fir North	0.49
Hem-Fir / Hem-Fir North	0.43
S-P-F / S-P-F South	0.36
Austrian Spruce / Scots Pine - Austria and Czech Republic	0.43
Norway Spruce / Scots Pine - Estonia and Lithuania	0.43

*Assigned specific gravity values are average species values determined in accordance with ASTM D2395 at oven dry volume and oven dry weight.

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SECTION 4.

**DESIGN VALUES
FOR
MACHINE STRESS RATED LUMBER**

(Effective April 24, 1997)

MSR Grade	Modulus of Elasticity* E (psi)	Extreme fiber in bending Fb (psi)	Tension parallel to grain Ft (psi)	Compression parallel to grain Fc (psi)
1.0E-900f	1,000,000	900	350	1,050
1.2E-1200f	1,200,000	1,200	600	1,400
1.3E-1350f	1,300,000	1,350	750	1,600
1.3E-1450f	1,300,000	1,450	800	1,625
1.4E-1250f	1,400,000	1,250	800	1,475
1.4E-1500f	1,400,000	1,500	900	1,650
1.5E-1450f	1,500,000	1,450	875	1,625
1.5E-1650f	1,500,000	1,650	1,020	1,700
1.6E-1650f	1,600,000	1,650	1,175	1,700
1.6E-1700f	1,600,000	1,700	1,175	1,725
1.6E-1800f	1,600,000	1,800	1,175	1,750
1.7E-1950f	1,700,000	1,950	1,375	1,800
1.8E-1650f	1,800,000	1,650	1,200	1,700
1.8E-1800f	1,800,000	1,800	1,375	1,750
1.8E-2100f	1,800,000	2,100	1,575	1,875
1.8E-2250f	1,800,000	2,250	1,750	1,925
1.9E-2250f	1,900,000	2,250	1,750	1,925
2.0E-1750f	2,000,000	1,750	1,125	1,725
2.0E-2400f	2,000,000	2,400	1,925	1,975
2.0E-2700f	2,000,000	2,700	1,800	2,100
2.1E-2550f	2,100,000	2,550	2,050	2,025
2.2E-2500f	2,200,000	2,500	1,750	2,000
2.2E-2700f	2,200,000	2,700	2,150	2,100
2.3E-2850f	2,300,000	2,850	2,300	2,150

Notes: All values are in psi. Values are for lumber 2" or less in thickness, all widths surfaced either green or dry used at 19% maximum moisture content as in most covered structures. For other use conditions see WCLIB Standard Grading Rules No. 17. Allowable properties are for Normal Loading.

* For flatwise use, the modulus of elasticity (E) value listed in the table may be increased 100,000 psi for grades with assigned E greater than 1,300,000 psi, and 50,000 psi for grades with assigned E of 1,300,000 psi or less.

SECTION 4. (cont.)

**MACHINE STRESS RATED LUMBER
Assigned Horizontal Shear and
Compression Perpendicular to Grain**

Species	Horizontal shear** Fv (psi)	Compression perpendicular to grain* Fc (psi)	Species	Horizontal shear** Fv (psi)	Compression perpendicular to grain* Fc (psi)
Douglas fir	180	625	N. Spruce-Germany	170	355
Hem-Fir	150	405	N. Spruce-Sweden	170	285
S-P-F South	135	335	Scots Pine-Austria, Czech Republic	135	270
Western Cedars	155	425	Scots Pine-Estonia, Lithuania	130	430
Western Woods	135	335	Scots Pine-Finland	150	210
Austrian Spruce	175	260	Scots Pine-Germany	160	395
N. Spruce-Estonia, Latvia, Lithuania	150	430	Scots Pine-Sweden	120	410
N. Spruce-Finland	125	220			

Notes:

* MSR grades may qualify for higher values, when the specific gravity is verified by test and subject to daily quality control. See Standard Grading Rules No. 17, Revised 2000, paragraph 206.

** MSR grades may qualify for higher values, when the specific gravity of the grade exceeds the species average value. See Standard Grading Rules No. 17, Revised 2000, paragraph 206.

For adjustment factors applied to wet use, repetitive member design, flatwise use, horizontal shear, and compression perpendicular to grain, use the adjustment factors shown for visually graded lumber in Section 6.

**MACHINE STRESS RATED LUMBER
Assigned Specific Gravity**

Species	Grade Modulus of Elasticity (psi)	Specific Gravity*	Species	Grade Modulus of Elasticity (psi)	Specific Gravity*
Douglas fir	Less than 2,000,000	0.50	Austrian Spruce	All Grades	0.43
	2,000,000	0.51	N. Spruce-Estonia, Latvia, Lithuania	All Grades	0.43
	2,100,000	0.52	N. Spruce-Finland	All Grades	0.42
	2,200,000	0.53	N. Spruce-Germany	All Grades	0.42
	2,300,000	0.54	N. Spruce-Sweden	All Grades	0.42
	2,400,000	0.55	Scots Pine-Austria, Czech Republic	All Grades	0.50
Hem-Fir	Less than 1,600,000	0.43	Scots Pine-Estonia, Lithuania	All Grades	0.45
	1,600,000	0.44	Scots Pine-Finland	All Grades	0.48
	1,700,000	0.45	Scots Pine-Germany	All Grades	0.53
	1,800,000	0.46	Scots Pine-Sweden	All Grades	0.47
	1,900,000	0.47	Douglas fir/European Larch	All Grades	0.48
	2,000,000	0.48			
	2,100,000	0.49			
	2,200,000	0.50			
	2,300,000	0.51			
2,400,000	0.52				
S-P-F South	All Grades	0.36			
Western Cedars	All Grades	0.36			
Western Woods	All Grades	0.36			

*Assigned specific gravity values are average values determined in accordance with ASTM D2395 at oven dry volume and oven dry weight.

SECTION 5.

DESIGN VALUES FOR BEAMS & STRINGERS AND POSTS & TIMBERS

BEAMS & STRINGERS (WCLIB Standard Grading Rules No. 17, paragraph 130)

SPECIES	GRADE	Extreme fiber in bending F _b	Tension parallel to grain F _t	Compression parallel to grain F _c	Compression perpendicular to grain F _c	Horizontal shear F _v	Modulus of Elasticity E
DOUGLAS FIR	Dense Select Structural	1,900	1,100	1,300	730	170	1,700,000
	Select Structural	1,600	950	1,100	625	170	1,600,000
	Dense No. 1	1,550	775	1,100	730	170	1,700,000
	No. 1	1,350	675	925	625	170	1,600,000
	No. 2	875	425	600	625	170	1,300,000
WESTERN HEMLOCK	Select Structural	1,400	825	1,000	410	170	1,400,000
	No. 1	1,150	575	850	410	170	1,400,000
	No. 2	750	375	550	410	170	1,100,000
HEM-FIR	Select Structural	1,300	750	925	405	140	1,300,000
	No. 1	1,050	525	750	405	140	1,300,000
	No. 2	675	350	500	405	140	1,100,000
WESTERN CEDARS	Select Structural	1,150	675	875	425	140	1,000,000
	No. 1	975	475	725	425	140	1,000,000
	No. 2	625	325	475	425	140	800,000
PORT ORFORD CEDAR	Select Structural	1,500	725	1,100	470	155	1,400,000
	No. 1	1,250	525	900	470	155	1,400,000
	No. 2	825	325	600	470	155	1,100,000
SITKA SPRUCE	Select Structural	1,200	675	825	435	140	1,300,000
	No. 1	1,000	500	675	435	140	1,300,000
	No. 2	650	325	450	435	140	1,000,000
MOUNTAIN HEMLOCK	Select Structural	1,350	775	875	570	170	1,100,000
	No. 1	1,100	550	725	570	170	1,100,000
	No. 2	725	375	475	570	170	900,000
SPRUCE-PINE-FIR SOUTH	Select Structural	1,050	625	675	335	125	1,200,000
	No. 1	900	450	550	335	125	1,200,000
	No. 2	575	300	375	335	125	1,000,000
WESTERN WOODS	Select Structural	1,050	625	750	345	125	1,100,000
	No. 1	900	450	625	345	125	1,100,000
	No. 2	575	300	425	345	125	900,000

Notes: All values are in psi. Allowable properties are for Normal Loading. Design values are for 12" width. For widths greater than 12", ASTM D245 provides a method for adjustment of bending stress values (see paragraph 200f, Standard Grading Rules No. 17, and Section 1 of this publication). Values apply to lumber used under protected conditions. For other use conditions see WCLIB Standard Grading Rules No. 17, and section 6 of this publication.

SECTION 5. (cont.)

POSTS & TIMBERS (WCLIB Standard Grading Rules No. 17, paragraph 131)

SPECIES	GRADE	Extreme fiber in bending Fb	Tension parallel to grain Ft	Compression parallel to grain Fc	Compression perpendicular to grain Fc	Horizontal shear Fv	Modulus of Elasticity E
DOUGLAS FIR	Dense Select Structural	1,750	1,150	1,350	730	170	1,700,000
	Select Structural	1,500	1,000	1,150	625	170	1,600,000
	Dense No. 1	1,400	950	1,200	730	170	1,700,000
	No. 1	1,200	825	1,000	625	170	1,600,000
	No. 2	750	475	700	625	170	1,300,000
WESTERN HEMLOCK	Select Structural	1,300	875	1,100	410	170	1,400,000
	No. 1	1,050	700	950	410	170	1,400,000
	No. 2	650	425	650	410	170	1,100,000
HEM-FIR	Select Structural	1,200	800	975	405	140	1,300,000
	No. 1	975	650	850	405	140	1,300,000
	No. 2	575	375	575	405	140	1,100,000
WESTERN CEDARS	Select Structural	1,100	725	925	425	140	1,000,000
	No. 1	875	600	800	425	140	1,000,000
	No. 2	550	350	550	425	140	800,000
PORT ORFORD CEDAR	Select Structural	1,400	775	1,150	470	155	1,400,000
	No. 1	1,150	625	1,000	470	155	1,400,000
	No. 2	675	375	700	470	155	1,000,000
SITKA SPRUCE	Select Structural	1,150	750	875	435	140	1,300,000
	No. 1	925	600	750	435	140	1,300,000
	No. 2	550	350	525	435	140	1,000,000
MOUNTAIN HEMLOCK	Select Structural	1,250	825	925	570	170	1,100,000
	No. 1	1,000	675	800	570	170	1,100,000
	No. 2	625	400	550	570	170	900,000
SPRUCE-PINE-FIR SOUTH	Select Structural	1,000	675	700	335	125	1,200,000
	No. 1	800	550	625	335	125	1,200,000
	No. 2	475	325	425	335	125	1,000,000
WESTERN WOODS	Select Structural	1,000	675	800	345	125	1,100,000
	No. 1	800	525	700	345	125	1,100,000
	No. 2	475	325	475	345	125	900,000

Notes: All values are in psi. Allowable properties are for Normal Loading. Design values are for 12" width. For widths greater than 12", ASTM D245 provides a method for adjustment of bending stress values (see paragraph 200f, Standard Grading Rules No. 17, and Section 1 of this publication). Values apply to lumber used under protected conditions. For other use conditions see WCLIB Standard Grading Rules No. 17, and Section 6 of this publication.

SECTION 6.

ADJUSTMENTS TO ALLOWABLE PROPERTY VALUES

WET USE FACTORS

When lumber is used where the moisture content will exceed 19% for an extended period of time, the size adjusted allowable properties should be multiplied by the following factors:

LUMBER THICKNESS	PROPERTY					
	Fb	Ft	Fc	Fv	Fc	E
4" and Thinner	0.85 *	1.0	0.80 **	0.97	0.67	0.9
5" and Thicker	1.0	1.0	0.91	1.0	0.67	1.0

* When size adjusted bending values do not exceed 1150 psi, a factor of 1.0 may be used.

** When size adjusted compression values do not exceed 750 psi, a factor of 1.0 may be used.

FLATWISE USE

When grades of **Light Framing, Structural Light Framing, Stud, Structural Joist & Planks, and MSR** are used flatwise rather than on edge, the size adjusted fiber stress in bending (Fb) value may be multiplied by the following factors:

THICKNESS	WIDTH					
	3" & Less	4"	5"	6"	8"	10" & Wdr.
2" & 3" Thicknesses	1.00	1.10	1.10	1.15	1.15	1.20
4" Thickness	1.00	1.05	1.05	1.05	1.05	1.10

To determine allowable design stresses for structural loads applied to the wide face of **Beams & Stringers** graded per paragraph 130 of Standard Grading Rules No. 17, multiply the assigned design values by the following factors:

BEAM & STRINGER GRADE	FACTORS		
	Extreme fiber in Bending, Fb	Modulus of Elasticity, E	Other Properties
Select Structural	0.86	1.0	1.0
No. 1	0.74	0.9	1.0
No. 2	1.0	1.0	1.0

REPETITIVE MEMBER DESIGN VALUES

When 2" to 4" thick lumber is used repetitively such as for studs, joists, rafters, or decking, the adjacent members can act together sharing the load and enhancing the strength of the entire system. Therefore when three or more members are in contact or spaced not more than 24 inches on centers and are joined by roof, floor, or other load distributing elements, the size adjusted fiber stress in bending value (Fb) may be multiplied by 1.15.

HORIZONTAL SHEAR

The tabulated horizontal shear values shown in the tables are derived from clear wood tests using the standard procedures of ASTM D245, "Standard Practice for Establishing Structural Grades and Related Allowable Properties for Visually Graded Lumber." The procedures of ASTM D245 were substantially revised in 1999, which required revision of all published allowable horizontal shear values, Fv. The revised Fv values were submitted to and approved by the American Lumber Standard Board of Review in July 1999. The published values presented in these tables reflect those changes.

NOTE:

An additional change to the grading rules which resulted from the revisions to ASTM D245 was the elimination of the adjustment factors for split length, formerly listed in paragraph 200-i of Standard Grading Rules No. 17 (1996 and prior revisions). Those adjustment factors do not apply, and are not to be used with the revised Fv values as listed in this booklet and Standard Grading Rules No. 17 (2000 Revision). The adjustment factors previously listed in paragraph 200-i of Standard Grading Rules No. 17 are only applicable to allowable Fv values published prior to the 1999 revisions to ASTM D245.

COMPRESSION PERPENDICULAR TO GRAIN

Compression perpendicular to grain design values are calculated according to the latest editions of ASTM standard D-2555 and D-245. These design values are based on an allowable deformation limit of 0.04 inches and are for standard design of most structures. Values at 0.02 inch deformation can be obtained by using the formula:

$$F_c_{(0.02)} = 0.73 * F_c_{(0.04)} + 5.60$$

SECTION 7. (cont.) SPECIES GROUPS

OTHER SPECIES COMBINATIONS	SPECIES INCLUDED		
	COMMON NAME		SCIENTIFIC NAME
DOUGLAS FIR/ DOUGLAS FIR-North	Douglas fir	U.S. & Can.	Pseudotsuga menziesii
DOUGLAS FIR-LARCH/ DOUGLAS FIR-LARCH-North	Douglas fir Western Larch	U.S. & Can.	Pseudotsuga menziesii Larix occidentalis
HEM-FIR/HEM-FIR-North	Western Hemlock California Red Fir Grand Fir Noble Fir Pacific Silver Fir White Fir	U.S. & Can.	Tsuga heterophylla Abies magnifica Abies grandis Abies procera Abies amabilis Abies concolor
SPRUCE-PINE-FIR/ SPRUCE-PINE-FIR-South	Balsam Fir Eastern Spruces Engelmann Spruce Jack Pine Lodgepole Pine Red Pine Sitka Spruce Alpine Fir	U.S. & Can. U.S. only U.S. & Can. U.S. only Canada only	Abies balsamea Picea rubens Picea glauca Picea mariana Picea engelmannii Pinus banksiana Pinus contorta Pinus resinosa Picea sitchensis Abies lasiocarpa

SECTION 8.

LOAD RESISTANCE FACTOR DESIGN (LRFD)

Design values listed in this booklet are for use with Allowable Stress Design (ASD) procedures. Load Resistance Factor Design (LRFD) is an alternate engineering design procedure. Reference resistance values for LRFD are generally listed in ksi (thousand pounds per square inch) units to avoid confusion with ASD design values which are listed in psi (pounds per square inch) units. Reference resistance values in ksi for use with LRFD design procedures may be computed from the ASD design values listed in this book by multiplying the design values by the factors listed in the table below:

CONVERSION FACTORS FOR USE WITH LRFD DESIGN*
(Multiply Size Adjusted Values by Appropriate Factor)

	Extreme fiber in bending F _b	Tension parallel to grain F _t	Compression parallel to grain F _c	Compression perpendicular to grain F _c	Horizontal shear F _v	Modulus of Elasticity E
Factor	0.00254	0.0027	0.0024	0.00208	0.00288	0.001

* Factors convert allowable design values in pounds per square inch (psi) for ASD design procedures to reference resistance values in thousands pounds per square inch (ksi) for use in LRFD design procedures.

Other useful literature & work aids published by the West Coast Lumber Inspection Bureau

STANDARD GRADING RULES NO. 17

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GRADE STAMPS FOR WEST COAST LUMBER

Pamphlet illustrating facsimiles of official grade stamps for West Coast Lumber. A helpful guide for anyone who buys, sells, or distributes lumber.

TECHNICAL REPORT NO. 1

COMPARING MACHINE STRESS RATED AND VISUALLY GRADED LUMBER IN WALLS AND COLUMNS

A 13-page booklet comparing the design of walls and columns for MSR and Visual grades. A useful resource for architects and engineers responsible for lumber specification.

WEB SITE

Several of these publications are available for downloading as pdf documents from the WCLIB web site, <http://www.wclib.org>. The web site also contains an interactive membership directory and Buyers Guide.



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