



Updated: May 26, 2023

QB CORPORATION

ALASKAN YELLOW CEDAR

GLUED LAMINATED TIMBERS

1. THE MANUFACTURE AND FABRICATION OF STRUCTURAL GLUED LAMINATED TIMBERS SHALL BE IN CONFORMANCE WITH THE CURRENT EDITION OF "TIMBER CONSTRUCTION STANDARDS" BY THE AMERICAN INSTITUTE OF TIMBER CONSTRUCTION.
2. LAMINATIONS TO BE OF TWO-INCH MAXIMUM NOMINAL SIZE LUMBER.
3. CUTTING, NOTCHING, OR DRILLING OF GLU-LAMS IS PERMITTED ONLY WITH PRIOR APPROVAL OF AN ENGINEER.
4. MINIMUM REQUIRED STRESSES: 20F-V12 AC/AC
 - a. REFER TO TABLE A1
5. MINIMUM REQUIRED STRESSES: 20F-V13 AC/AC
 - a. REFER TO TABLE A1
6. MINIMUM REQUIRED STRESSES: COMBINATION #70 AC
 - a. REFER TO TABLE A2
7. APPEARANCE:
 - a. COLUMNS: ARCHITECTURAL SURFACED 4-SIDES UNLESS OTHERWISE SPECIFIED.
 - b. BEAMS: ARCHITECTURAL SURFACED 3-SIDES UNLESS OTHERWISE SPECIFIED.
8. CAMBER:
 - a. COLUMNS: 0" UNLESS OTHERWISE SPECIFIED.
 - b. BEAMS: 5000' RADIUS UNLESS OTHERWISE SPECIFIED
9. ADHESIVE: WET USE PER U.B.C. STANDARDS
10. WRAP:
 - a. ARCHITECTURAL OR GREATER APPEARANCE: INDIVIDUAL WRAP PLASTIC COATED PAPER WITH WATER RESISTANT SEAMS UNLESS OTHERWISE SPECIFIED.
 - b. INDUSTRIAL OR FRAMING APPEARANCE: BUNDLE WRAP PLASTIC COATED PAPER WITH WATER RESISTANT SEAMS UNLESS OTHERWISE SPECIFIED
11. SEAL: ENDS ONLY.

TABLE A1-EXPANDED

REFERENCE DESIGN VALUES FOR STRUCTURAL GLUED LAMINATED SOFTWOOD TIMBER COMBINATIONS^(a)
 (Members stressed primarily in bending) (Tabulated design values are for normal load duration and dry service conditions.)

Combination Symbol	Species Outer/ Core	Bending About X-X Axis (Loaded Perpendicular to Wide Faces of Laminations)							Bending About Y-Y Axis (Loaded Parallel to Wide Faces of Laminations)						Axially Loaded		Fasteners					
		Extreme Fiber in Bending		Compression Perpendicular to Grain		Shear Parallel to Grain	Modulus of Elasticity			Extreme Fiber in Bending	Compression Perpendicular to Grain	Shear Parallel to Grain	Modulus of Elasticity			Tension Parallel to Grain	Compression Parallel to Grain	Specific Gravity for Fastener Design				
		Bottom of beam Stressed in Tension (Positive Bending)	Top of Beam Stressed in Tension (Negative Bending)	Tension Face	Compression Face		F _{bx} ⁺ (psi)	F _{bx} ⁻ (psi)	F _{cLx} (psi)				F _{vx} ^(b) (psi)	E _{xtrue} (10 ⁶ psi)	E _{xapp} (10 ⁶ psi)			E _{xmin} (10 ⁶ psi)	F _{by} (psi)	F _{cLy} (psi)	F _{vy} ^(c) (psi)	E _{ytrue} (10 ⁶ psi)
16F-1.3E		1600	925	315		195	1.4	1.3	0.69	800	315	170	1.2	1.1	0.58	675	925	0.41				
16F-V3	DF/DF	1600	1250	560	560	265	1.6	1.5	0.79	1450	560	230	1.6	1.5	0.79	975	1500	0.50	0.50			
16F-V6	DF/DF	1600	1600	560	560	265	1.7	1.6	0.85	1450	560	230	1.6	1.5	0.79	1000	1600	0.50	0.50			
16F-E2	HF/HF	1600	1050	375	375	215	1.5	1.4	0.74	1200	375	190	1.4	1.3	0.69	825	1150	0.43	0.43			
16F-E3	DF/DF	1600	1200	560	560	265	1.7	1.6	0.85	1400	560	230	1.6	1.5	0.79	975	1600	0.50	0.50			
16F-E6	DF/DF	1600	1600	560	560	265	1.7	1.6	0.85	1550	560	230	1.6	1.5	0.79	1000	1600	0.50	0.50			
16F-E7	HF/HF	1600	1600	375	375	215	1.5	1.4	0.74	1350	375	190	1.4	1.3	0.74	875	1250	0.43	0.43			
16F-V2	SP/SP	1600	1400	740	650	300	1.6	1.5	0.79	1450	650	260	1.5	1.4	0.74	1000	1300	0.55	0.55			
16F-V3	SP/SP	1600	1450	740	740	300	1.5	1.4	0.74	1450	650	260	1.5	1.4	0.74	975	1400	0.55	0.55			
16F-V5	SP/SP	1600	1600	650	650	300	1.7	1.6	0.85	1600	650	260	1.6	1.5	0.79	1000	1550	0.55	0.55			
16F-E1	SP/SP	1600	1250	650	650	300	1.7	1.6	0.85	1400	650	260	1.7	1.6	0.85	1050	1550	0.55	0.55			
16F-E3	SP/SP	1600	1600	650	650	300	1.8	1.7	0.90	1650	650	260	1.7	1.6	0.85	1100	1550	0.55	0.55			
20F-1.5E		2000	1100	425		195	1.6	1.5	0.79	800	315	170	1.3	1.2	0.63	725	925	0.41				
20F-V3	DF/DF	2000	1450	650	560	265	1.7	1.6	0.85	1450	560	230	1.6	1.5	0.79	1000	1550	0.50	0.50			
20F-V7	DF/DF	2000	2000	650	650	265	1.7	1.6	0.85	1450	560	230	1.7	1.6	0.85	1050	1600	0.50	0.50			
20F-V12	AC/AC	2000	1400	560	560	265	1.6	1.5	0.79	1250	470	230	1.5	1.4	0.74	925	1500	0.46	0.46			
20F-V13	AC/AC	2000	2000	560	560	265	1.6	1.5	0.79	1250	470	230	1.5	1.4	0.74	950	1550	0.46	0.46			
20F-V14	POC/POC	2000	1450	560	560	265	1.6	1.5	0.79	1300	470	230	1.5	1.4	0.74	900	1600	0.46	0.46			
20F-V15	POC/POC	2000	2000	560	560	265	1.6	1.5	0.79	1300	470	230	1.5	1.4	0.74	900	1600	0.46	0.46			
20F-E2	HF/HF	2000	1400	500	500	215	1.7	1.6	0.85	1200	375	190	1.5	1.4	0.74	925	1350	0.43	0.43			
20F-E3	DF/DF	2000	1200	560	560	265	1.8	1.7	0.90	1400	560	230	1.7	1.6	0.85	1050	1600	0.50	0.50			
20F-E6	DF/DF	2000	2000	560	560	265	1.8	1.7	0.90	1550	560	230	1.7	1.6	0.85	1150	1650	0.50	0.50			
20F-E7	HF/HF	2000	2000	500	500	215	1.8	1.6	0.85	1450	375	190	1.5	1.4	0.74	1050	1450	0.43	0.43			
20F-E8	ES/ES	2000	1300	450	450	200	1.6	1.5	0.79	1000	315	175	1.5	1.4	0.74	825	1100	0.41	0.41			
24F-E/SPF1	SPF/SPF	2400	2400	560	560	215	1.7	1.6	0.85	1150	470	190	1.7	1.6	0.85	1150	2000	0.42	0.42			
24F-E/SPF3	SPF/SPF	2400	1550	560	650	215	1.7	1.6	0.85	1200	470	195	1.6	1.5	0.79	900	1750	0.42	0.42			
20F-V2	SP/SP	2000	1550	740	650	300	1.6	1.5	0.79	1450	650	260	1.5	1.4	0.74	1000	1400	0.55	0.55			
20F-V3	SP/SP	2000	1450	650	650	300	1.6	1.5	0.79	1600	650	260	1.6	1.5	0.79	1000	1400	0.55	0.55			
20F-V5	SP/SP	2000	2000	740	740	300	1.7	1.6	0.85	1450	650	260	1.5	1.4	0.74	1050	1500	0.55	0.55			
20F-E1	SP/SP	2000	1300	650	650	300	1.8	1.7	0.90	1400	650	260	1.7	1.6	0.85	1050	1550	0.55	0.55			
20F-E3	SP/SP	2000	2000	650	650	300	1.8	1.7	0.90	1700	650	260	1.7	1.6	0.85	1150	1600	0.55	0.55			
24F-1.7E		2400	1450	500		210	1.8	1.7	0.90	1050	315	185	1.4	1.3	0.69	775	1000	0.42				
24F-V5	DF/HF	2400	1600	650	650	215	1.8	1.7	0.90	1350	375	200	1.6	1.5	0.79	1100	1450	0.50	0.43			
24F-V10	DF/HF	2400	2400	650	650	215	1.9	1.8	0.95	1450	375	200	1.6	1.5	0.79	1150	1550	0.50	0.43			
24F-E11	HF/HF	2400	2400	500	500	215	1.9	1.8	0.95	1550	375	190	1.6	1.5	0.79	1150	1550	0.43	0.43			
24F-E15	HF/HF	2400	1600	500	500	215	1.9	1.8	0.95	1200	375	190	1.6	1.5	0.79	975	1500	0.43	0.43			
24F-V1	SP/SP	2400	1750	740	650	300	1.8	1.7	0.90	1450	650	260	1.6	1.5	0.79	1100	1500	0.55	0.55			
24F-V4 ^(d)	SP/SP	2400	1650	740	650	210	1.8	1.7	0.90	1350	470	230	1.6	1.5	0.79	975	1350	0.55	0.43			
24F-V5	SP/SP	2400	2400	740	740	300	1.8	1.7	0.90	1700	650	260	1.7	1.6	0.85	1150	1600	0.55	0.55			

TABLE A2

REFERENCE DESIGN VALUES FOR STRUCTURAL GLUED LAMINATED SOFTWOOD TIMBER
(Members stressed primarily in axial tension or compression)

(Tabulated design values are for normal load duration and dry service conditions.)

Combination Symbol	Species	Grade	All Loading				Axially Loaded				Bending about Y-Y Axis Loaded Parallel to Wide Faces of Laminations				Bending About X-X Axis Loaded Perpendicular to Wide Faces of Laminations	
			Modulus of Elasticity			Compression Perpendicular to Grain F _{cL} (psi)	Tension Parallel to Grain F _t (psi)	Compression Parallel to Grain		Bending				Shear Parallel to Grain (a)(b)(c) F _{vy} (psi)	Bending F _{bx} (psi)	Shear Parallel to Grain ^(c) F _{vx} (psi)
			E _{axial} (10 ⁶ psi)	0.95 E _{axial} (10 ⁶ psi)	E _{axial min} (10 ⁶ psi)			2 or More Laminations F _c (psi)	4 or More Laminations F _c (psi)	2 or 3 Laminations F _{by} (psi)	4 or More Laminations F _{by} (psi)	3 Laminations F _{by} (psi)	2 Laminations F _{by} (psi)			
Visually Graded Western Species																
1	DF	L3	1.6	1.5	0.79	560	950	1550	1250	1450	1250	1000	230	1250	265	
2	DF	L2	1.7	1.6	0.85	560	1250	1950	1600	1800	1600	1300	230	1700	265	
3	DF	L2D	2.0	1.9	1.00	650	1450	2300	1900	2100	1850	1550	230	2000	265	
4	DF	L1CL	2.0	1.9	1.00	590	1400	2100	1950	2200	2000	1650	230	2100	265	
5	DF	L1	2.1	2.0	1.06	650	1650	2400	2100	2400	2100	1800	230	2200	265	
14	HF	L3	1.4	1.3	0.69	375	800	1100	1050	1200	1050	850	190	1100	215	
15	HF	L2	1.5	1.4	0.74	375	1050	1350	1350	1500	1350	1100	190	1450	215	
16	HF	L1	1.7	1.6	0.85	375	1200	1500	1500	1750	1550	1300	190	1600	215	
17	HF	L1D	1.8	1.7	0.90	500	1400	1750	1750	2000	1850	1550	190	1900	215	
22 ^(e)	SW	L3	1.1	1.0	0.53	315	525	850	725	800	700	575	170	725	195	
69	AC	L3	1.3	1.2	0.63	470	725	1150	1100	1100	975	775	230	1000	265	
70	AC	L2	1.4	1.3	0.69	470	975	1450	1450	1400	1250	1000	230	1350	265	
71	AC	L1D	1.7	1.6	0.85	560	1250	1900	1900	1850	1650	1400	230	1750	265	
72	AC	L1S	1.7	1.6	0.85	560	1250	1900	1900	1850	1650	1400	230	1900	265	
73	POC	L3	1.4	1.3	0.69	470	775	1500	1200	1200	1050	825	230	1050	265	
74	POC	L2	1.5	1.4	0.74	470	1050	1900	1550	1450	1300	1100	230	1400	265	
75	POC	L1D	1.8	1.7	0.90	560	1350	2300	2050	1950	1750	1500	230	1850	265	
Visually Graded Southern Pine																
47	SP	N2M12	1.5	1.4	0.74	650	1200	1900	1150	1750	1550	1300	260	1400	300	
47 1:10	SP	N2M10	1.5	1.4	0.74	650	1150	1700	1150	1750	1550	1300	260	1400	300	
47 1:8	SP	N2M	1.5	1.4	0.74	650	1000	1500	1150	1600	1550	1300	260	1400	300	
48	SP	N2D12	1.8	1.7	0.90	740	1400	2200	1350	2000	1800	1500	260	1600	300	
48 1:10	SP	N2D10	1.8	1.7	0.90	740	1350	2000	1350	2000	1800	1500	260	1600	300	
48 1:8	SP	N2D	1.8	1.7	0.90	740	1150	1750	1350	1850	1800	1500	260	1600	300	
49	SP	N1M16	1.8	1.7	0.90	650	1350	2100	1450	1950	1750	1500	260	1800	300	
49 1:14	SP	N1M14	1.8	1.7	0.90	650	1350	2000	1450	1950	1750	1500	260	1800	300	
49 1:12	SP	N1M12	1.8	1.7	0.90	650	1300	1900	1450	1950	1750	1500	260	1800	300	
49 1:10	SP	N1M	1.8	1.7	0.90	650	1150	1700	1450	1850	1750	1500	260	1800	300	
50	SP	N1D14	2.0	1.9	1.00	740	1550	2300	1700	2300	2100	1750	260	2100	300	
50 1:12	SP	N1D12	2.0	1.9	1.00	740	1500	2200	1700	2300	2100	1750	260	2100	300	
50 1:10	SP	N1D	2.0	1.9	1.00	740	1350	2000	1700	2100	2100	1750	260	2100	300	

Footnotes to Table A2

- (a) For members with 2 or 3 laminations, the shear design value for transverse loads parallel to the wide faces of the laminations, F_{vy}, shall be reduced by multiplying by a factor of 0.84 or 0.95, respectively.
- (b) The shear design value for transverse loads applied parallel to the wide faces of the laminations, F_{vy}, shall be multiplied by 0.4 for members with 5, 7, or 9 laminations manufactured from multiple piece laminations (across width) that are not edge bonded. The shear design value, F_{vy}, shall be multiplied by 0.5 for all other members manufactured from multiple piece laminations with unbonded edge joints. This reduction shall be cumulative with the adjustment in footnotes (a) and (c).
- (c) The design values for shear, F_{vx}, and F_{vy}, shall be decreased by multiplying by a factor of 0.72 for non-prismatic members, notched members, and for all members subject to impact or cyclic loading. The reduced design value shall be used for design of members at connections that transfer shear by mechanical fasteners. The reduced design value shall also be used for determination of design values for radial tension and torsion.
- (d) The tabulated F_{bx} values are for members without special tension lams up to 15 inches in depth. If the member depth is greater than 15 inches without special tension lams, the tabulated F_{bx} values must be multiplied by a factor of 0.88. If special tension lams are used, the tabulated F_{bx} values are permitted to be increased by a factor of 1.18 regardless of the member depth.
- (e) When Western Cedars, Western Cedars (North), Western Woods, and Redwood (open grain) are used in combinations for Softwood Species (SW), the design value for modulus of elasticity shall be reduced by 100,000 psi. When Coast Sitka Spruce, Coast Species, Western White Pine, and Eastern White Pine are used in combinations for Softwood Species (SW) tabulated design values for shear parallel to grain, F_{vx} and F_{vy}, shall be reduced by 10 psi, before applying any other adjustments.