CHAPTER 16

REFERENCE INFORMATION

Table 16-1. -Design notation.

A	cross-sectional area; net bearing area; maximum expected acceleration of bedrock at the site
A_1	cross-sectional area of main wood member(s) before boring or grooving
A_2	sum of cross-sectional areas of wood or metal side member(s) before boring or drilling
A_E	effective bearing area
A_P	bearing plate area
A_S	cross-sectional area of a steel prestressing rod
A_V	cross-sectional area of a transverse glulam deck panel used for determining the magnitude of horizontal shear
b	width of rectangular member; bridge width measured between the outside deck edges
B	buoyancy
b_d	for transverse decks, the wheel load distribution width perpendicular to the deck span
b_t	for transverse decks, the wheel load distribution width in the direction of the deck span; for longitudinal decks, the truck tire width perpendicular to traffic
C	centrifugal force in percent of live load, combined response coefficient; adjustment factor for railing loads
C_B	butt joint factor
C_C	curvature factor
C_D	duration of load factor
C_e	edge-distance factor
C_F	size factor
CF	centrifugal force
C_f	form factor
C_g	group action factor
C_i	interaction stress factor
C_k	for bending members the largest value of the slenderness factor, C_s, at which the intermediate beam equation applies
C_L	lateral stability of beams factor
C_{lb}	lag screw factor

Table 16-1. - Design notation *(continued).*

C_{LS}	load-sharing factor
C_m	steel dowel bending-stress coefficient
C_M	moisture content factor
C_n	end-distance factor
C_P	lateral stability of columns factor
C_R	fire-retardant factor; steel dowel shear-stress coefficient
C_S	spacing factor
C_s	slenderness factor for bending member
C_{st}	steel side-plate factor
C_t	temperature factor
d	depth of rectangular member; least dimension of rectangular compression member; pennyweight of nail or spike
D	dead load; degree of curve; diameter
d_c	depth of steel channel
DL	uniform dead load of the deck and wearing surface
D_W	for longitudinal decks, the wheel load distribution width transverse to the deck span
e	eccentricity
E	modulus of elasticity; tabulated modulus of elasticity; earth pressure
E'	allowable modulus of elasticity
EQ	equivalent static horizontal force applied at the center of gravity of the structure; earthquake
E_{TS}	transverse bending modulus of a stress-laminated system
f_a	applied stress from axial loading, either tension or compression
F	framing factor
F_a'	allowable stress from axial loading, either tension or compression
f_b	applied bending stress
F_b	tabulated bending stress
F_b'	allowable bending stress
F_b''	intermediate bending stress used to compute C_k
f_c	applied stress in compression parallel to grain
F_c	tabulated stress in compression parallel to grain
F_c'	allowable stress in compression parallel to grain
F_c''	intermediate stress in compression parallel to grain used to compute K
$f_{c\perp}$	applied stress in compression perpendicular to grain

Table 16-4. - Design notation *(continued).*

$F_{c\perp}$	tabulated stress in compression perpendicular to grain
$F_{c\perp}'$	allowable stress in compression perpendicular to grain
f_g	applied stress in end grain in bearing
F_g	tabulated stress for end grain in bearing
F_g'	allowable stress for end grain in bearing
F_L	longitudinal force transferred to the bridge
F_n'	allowable stress in compression at an angle to the grain
F_{ps}	prestressing force required in a prestressing rod
f_{pu}	specified minimum ultimate tensile stress for a prestressing rod
f_t	applied stress in tension parallel to grain
F_t	tabulated stress in tension parallel to grain
F_t'	allowable stress in tension parallel to grain
f_v	applied stress in horizontal shear
F_v	tabulated stress in horizontal shear
F_v'	allowable stress in horizontal shear
F_y	minimum specified yield point of steel
g	acceleration due to gravity (32.2 ft/sec^2)
G	shear modulus; tabulated shear modulus; specific gravity
G_{TS}	transverse shear modulus of a stress-laminated system
GVW	gross vehicle weight
h	height of the top rail above the reference surface
I	moment of inertia; vehicle live load impact factor
ICE	ice pressure
J	unitless convenience factor for the design of members subjected to combined compression and bending
K	minimum value of ℓ_e/d at which a column can be expected to perform as an Euler column; design constant based on the wheel load contact area; a constant for the shape of a pier
K_e	effective buckling length factor for columns
ℓ	unbraced length between points of lateral support along the column length; length of bolt in the main member
L	span length of bending member; loaded length of sidewalk; vehicle live load, post spacing
L_A	anchorage plate length
ℓ_b	length of bearing
ℓ_e	effective span length of bending member; effective length of compression member
LF	longitudinal force from vehicle live load

Table 16-1. - Design notation *(continued).*

L_P	bearing plate length
ℓ_u	laterally unsupported span length of a bending member
M	bending or resisting moment
MC	moisture content
M_D	dowel moment capacity
M_{DL}	dead load moment
M_{DLx}	primary dead load moment
M_{LL}	live load moment
M_T	magnitude of transverse bending from applied wheel loads
M_{WL}	maximum live load moment produced by one wheel line of the design vehicle
M_x	primary live load bending moment
M_y	secondary live load bending moment
n	number of steel dowels required for each deck span
N	applied load on a fastener or fastener group at an angle to the grain; load group number; minimum uniform compressive prestress in service
N'	allowable load on a fastener or fastener group at an angle to the grain
N_i	level of uniform compressive prestress required at the time of installation
P	magnitude of wheel load; magnitude of a concentrated load; magnitude of an axial load; applied or tabulated load parallel to grain on a fastener or fastener group; sidewalk load, stream-flow pressure; total uniform force required to cause a 1-inch maximum horizontal deflection of the structure; highway design load for vehicular railing
P'	allowable load parallel to grain on a fastener or fastener group; distributed outward transverse post load for vehicular railing
P_M	concentrated lane load for moment
P'_{MAX}	maximum allowable load for shear plates loaded parallel to grain
P_N	applied or tabulated lateral load for nails and spikes
P_N'	allowable lateral load for nails and spikes
P_V	concentrated lane load for shear
P_W	applied or tabulated fastener load in axial withdrawal
P_W'	allowable fastener load in axial withdrawal
Q	applied or tabulated load perpendicular to grain on a fastener or fastener group
Q'	allowable load perpendicular to grain on a fastener or fastener group

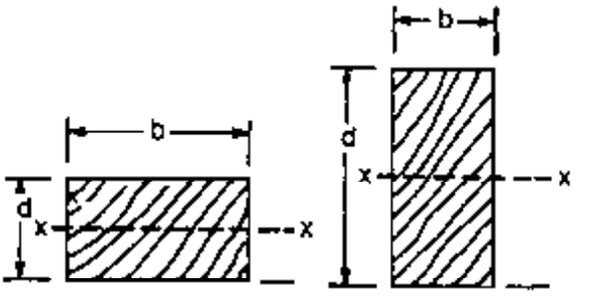
Table 16-1. - Design notation *(continued).*

Q'_{MAX}	maximum allowable load for shear plates loaded perpendicular to grain
r	radius of gyration
R	reaction or bearing force at the support; radius of curve; rib shortening
R_D	dowel shear capacity
R_{DL}	dead load reaction
R_{DLx}	primary dead load vertical shear
R_{LL}	live load reaction
R_{WL}	maximum reaction produced by one wheel line of the design vehicle
R_x	primary live load vertical shear
R_y	secondary live load vertical shear
s	effective deck span
S	section modulus; beam spacing; design speed; shrinkage
SF	stream-flow pressure
S_p	center-to-center spacing of prestressing rods
t	thickness
T	temperature; period of vibration of the structure
t_p	bearing plate thickness
t_w	steel channel web thickness
V	vertical shear force; water velocity
V_{DL}	dead load vertical shear
V_{LD}	maximum vertical shear produced when wheel lines are laterally distributed as specified for moment
V_{LL}	live load vertical shear
V_{LU}	maximum vertical shear from an undistributed wheel line
V_T	magnitude of transverse shear from applied wheel loads
V_{WL}	maximum vertical shear produced by one wheel line of the design vehicle
w	magnitude of uniform load; pedestrian or bicycle loading
W	total dead load weight of the structure; wind load on structure; vehicle weight; sidewalk width
W_A	anchorage plate width
w_{DL}	uniform dead load supported by a beam; uniform deck dead load; uniform deck dead load over the wheel load distribution width, D_w
WL	wheel line; wind load on live load

Table 16-1. - Design notation *(continued).*

WLF	the portion of the maximum force or deflection produced by one wheel line that is supported by one longitudinal glulam deck panel
w_p	longitudinal glulam panel width in inches
W_p	longitudinal glulam panel width in feet; bearing-plate width
α	a unitless factor used for determining the wheel load distribution width and magnitude of transverse bending in longitudinal stress-laminated lumber decks
β	load coefficient (with appropriate subscript); a unitless factor used for determining the magnitude of transverse shear in longitudinal stress-laminated lumber decks
γ	load factor
Δ_{DL}	dead load deflection
Δ_{LL}	live load deflection
Δ_{WL}	deflection from one wheel line of the design vehicle
θ	angle between the direction of load and direction of grain; a unitless factor used for determining the wheel load distribution width and magnitude of transverse bending in longitudinal stress-laminated lumber decks
π	pi
σ	dowel stress from applied loads
σ_A	allowable dowel stress in bending
σ_{PL}	proportional limit stress for wood, perpendicular to grain
μ	Poisson’s ratio, coefficient of friction
$^\circ F$	temperature in degrees fahrenheit
Ø	diameter
$\leq$	less than or equal to
$<$	less than
$\geq$	greater than or equal to
$>$	greater than

Table 16-2. - Section properties of structural lumber[a]



Nominal size *b* x *d* (in.)	Dressed size *b* x *d* (in.)	Area *A* (in²)	*S* (in³)	*I* (in⁴)	Volume (ft³/ft)	Weight[b] (lb/ft)
1 x 3	3/4 x 2-1/2	1.88	0.78	0.98	0.01	0.65
1 x 4	3/4 x 3-1/2	2.63	1.53	2.68	0.02	0.91
1 x 6	3/4 x 5-1/2	4.13	3.78	10.40	0.03	1.43
1 x 8	3/4 x 7-1/4	5.44	6.57	23.82	0.04	1.89
1 x 10	3/4 x 9-1/4	6.94	10.70	49.47	0.05	2.41
1 x 12	3/4 x 11-1/4	8.44	15.82	88.99	0.06	2.93
2 x 3	1-1/2 x 2-1/2	3.75	1.56	1.95	0.03	1.30
2 x 4	1-1/2 x 3-1/2	5.25	3.06	5.36	0.04	1.82
2 x 6	1-1/2 x 5-1/2	8.25	7.56	20.80	0.06	2.86
2 x 8	1-1/2 x 7-1/4	10.88	13.14	47.63	0.08	3.78
2 x 10	1-1/2 x 9-1/4	13.88	21.39	98.93	0.10	4.82
2 x 12	1-1/2 x 11-1/4	16.88	31.64	177.98	0.12	5.86
2 x 14	1-1/2 x 13-1/4	19.88	43.89	290.78	0.14	6.90
3 x 1	2-1/2 x 3/4	1.88	0.23	0.09	0.01	0.65
3 x 2	2-1/2 x 1-1/2	3.75	0.94	0.70	0.03	1.30
3 x 4	2-1/2 x 3-1/2	8.75	5.10	8.93	0.06	3.04
3 x 6	2-1/2 x 5-1/2	13.75	12.60	34.66	0.10	4.77
3 x 8	2-1/2 x 7-1/4	18.13	21.90	79.39	0.13	6.29
3 x 10	2-1/2 x 9-1/4	23.13	35.65	164.89	0.16	8.03
3 x 12	2-1/2 x 11-1/4	28.13	52.73	296.63	0.20	9.77
3 x 14	2-1/2 x 13-1/4	33.13	73.15	484.63	0.23	11.50
3 x 16	2-1/2 x 15-1/4	38.13	96.90	738.87	0.26	13.24
4 x 1	3-1/2 x 3/4	2.63	0.33	0.12	0.02	0.91
4 x 2	3-1/2 x 1-1/2	5.25	1.31	0.98	0.04	1.82
4 x 3	3-1/2 x 2-1/2	8.75	3.65	4.56	0.06	3.04
4 x 4	3-1/2 x 3-1/2	12.25	7.15	12.51	0.09	4.25
4 x 6	3-1/2 x 5-1/2	19.25	17.65	48.53	0.13	6.68
4 x 8	3-1/2 x 7-1/4	25.38	30.66	111.15	0.18	8.81
4 x 10	3-1/2 x 9-1/4	32.38	49.91	230.84	0.22	11.24
4 x 12	3-1/2 x 11-1/4	39.38	73.83	415.28	0.27	13.67
4 x 14	3-1/2 x 13-1/4	46.38	02.41	678.48	0.32	16.09
4 x 16	3-1/2 x 15-1/4	53.38	35.66	,034.42	0.37	18.54
6 x 1	5-1/2 x 3/4	4.13	0.52	0.19	0.03	1.43
6 x 2	5-1/2 x 1-1/2	8.25	2.06	1.55	0.06	2.86
6 x 3	5-1/2 x 2-1/2	13.75	5.73	7.16	0.10	4.77
6 x 4	5-1/2 x 3-1/2	19.25	11.23	19.65	0.13	6.68

[a] Based on dressed (S4S) sizes.

[b] Based on a unit weight of 50 lb/ft³.

Table 16-2. - Section properties of structural lumber[a] *(confinued).*

Nominal size *b* x *d* (in.)	Dressed size *b* x *d* (in.)	Area *A* (in²)	*S* (in³)	*I* (in⁴)	Volume (ft³/ft)	Weight[b] (lb/ft)
6 x 6	5-1/2 x 5-1/2	30.25	27.73	76.26	0.21	10.50
6 x 8	5-1/2 x 7-1/2	41.25	51.56	193.36	0.29	14.32
6 x 10	5-1/2 x 9-1/2	52.25	82.73	392.96	0.36	18.14
6 x 12	5-1/2 x 11-1/2	63.25	121.23	697.07	0.44	21.96
6 x 14	5-1/2 x 13-1/2	74.25	167.06	1,127.67	0.52	25.78
6 x 16	5-1/2 x 15-1/2	85.25	220.23	1,706.78	0.59	29.60
6 x 18	5-1/2 x 17-1/2	96.25	280.73	2,456.38	0.67	33.42
6 x 20	5-1/2 x 19-1/2	107.25	348.56	3,398.48	0.74	37.24
6 x 22	5-1/2 x 21-1/2	118.25	423.73	4,555.09	0.82	41.06
6 x 24	5-1/2 x 23-1/2	129.25	506.23	5,948.19	0.90	44.88
8 x 1	7-1/4 x 3/4	5.44	0.68	0.26	0.05	2.78
8 x 2	7-1/4 x 1-1/2	10.88	2.72	2.04	0.08	3.78
8 x 3	7-1/4 x 2-1/2	18.13	7.55	9.44	0.13	6.29
8 x 4	7-1/4 x 3-1/2	25.38	14.80	25.90	0.18	8.81
8 x 6	7-1/2 x 5-1/2	41.25	37.81	103.98	0.29	14.32
8 x 8	7-1/2 x 7-1/2	56.25	70.31	263.67	0.39	19.53
8 x 10	7-1/2 x 9-1/2	71.25	112.81	535.86	0.49	24.74
8 x 12	7-1/2 x 11-1/2	86.25	165.31	950.55	0.60	29.95
8 x 14	7-1/2 x 13-1/2	101.25	227.81	1,537.73	0.70	35.16
8 x 16	7-1/2 x 15-1/2	116.25	300.31	2,327.42	0.81	40.36
8 x 18	7-1/2 x 17-1/2	131.25	382.81	3,349.61	0.91	45.57
8 x 20	7-1/2 x 19-1/2	146.25	475.31	4,634.30	1.02	50.78
8 x 22	7-1/2 x 21-1/2	161.25	577.81	6,211.48	1.12	55.99
8 x 24	7-1/2 x 23-1/2	176.25	690.31	8,111.17	1.22	61.20
10 x 1	9-1/4 x 3/4	6.94	0.87	0.33	0.05	2.41
10 x 2	9-1/4 x 1-1/2	13.88	3.47	2.60	0.10	4.82
10 x 3	9-1/4 x 2-1/2	23.13	9.64	12.04	0.16	8.03
10 x 4	9-1/4 x 3-1/2	32.38	18.89	33.05	0.22	11.24
10 x 6	9-1/2 x 5-1/2	52.25	47.90	131.71	0.36	18.14
10 x 8	9-1/2 x 7-1/2	71.25	89.06	333.98	0.49	24.74
10 x 10	9-1/2 x 9-1/2	90.25	142.90	678.76	0.63	31.34
10 x 12	9-1/2 x 11-1/2	109.25	209.40	1,204.03	0.76	37.93
10 x 14	9-1/2 x 13-1/2	128.25	288.56	1,947.80	0.89	44.53
10 x 16	9-1/2 x 15-1/2	147.25	380.40	2,948.07	1.02	51.13
10 x 18	9-1/2 x 17-1/2	166.25	484.90	4,242.84	1.15	57.73
10 x 20	9-1/2 x 19-1/2	185.25	602.06	5,870.11	1.29	64.32
10 x 22	9-1/2 x 21-1/2	204.25	731.90	7,867.88	1.42	70.92
10 x 24	9-1/2 x 23-1/2	223.25	874.40	10,274.15	1.55	77.52
12 x 1	11-1/4 x 3/4	8.44	1.05	0.40	0.06	2.93
12 x 2	11-1/4 x 1-1/2	16.88	4.22	3.16	0.12	5.86
12 x 3	11-1/4 x 2-1/2	28.13	11.72	14.65	0.20	9.77
12 x 4	11-1/4 x 3-1/2	39.38	22.97	40.20	0.27	13.67
12 x 6	11-1/2 x 5-1/2	63.25	57.98	159.44	0.44	21.96
12 x 8	11-1/2 x 7-1/2	86.25	107.81	404.30	0.60	29.95
12 x 10	11-1/2 x 9-1/2	109.25	172.98	821.65	0.76	37.93
12 x 12	11-1/2 x 11-1/2	132.25	253.48	1,457.51	0.92	45.92
12 x 14	11-1/2 x 13-1/2	155.25	349.31	2,357.86	1.08	53.91
12 x 16	11-1/2 x 15-1/2	178.25	460.48	3,568.71	1.24	61.89
12 x 18	11-1/2 x 17-1/2	201.25	586.98	5,136.07	1.40	69.88

[a] Based on dressed (S4S) sizes.

[b] Based on a unit weight of 50 lb/ft³.

Table 16-2. - Section properties of structural lumber[a] *(continued).*

Nominal size *b* x *d* (in.)	Dressed size *b* x *d* (in.)	Area *A* (in²)	*S* (in³)	*I* (in⁴)	Volume (ft³/ft)	Weight[b] (lb/ft)
12 x 20	11-1/2 x 19-1/2	224.25	728.81	7,105.92	1.56	77.86
12 x 22	11-1/2 x 21-1/2	247.25	885.98	9,524.28	1.72	85.85
12 x 24	11-1/2 x 23-1/2	270.25	1,058.48	12,437.13	1.88	93.84
14 x 2	13-1/4 x 1-1/2	19.88	4.97	3.73	0.14	6.90
14 x 3	13-1/4 x 2-1/2	33.13	13.80	17.25	0.23	11.50
14 x 4	13-1/2 x 3-1/2	47.25	27.56	48.23	0.33	16.41
14 x 6	13-1/2 x 5-1/2	74.25	68.06	187.17	0.52	25.78
14 x 8	13-1/2 x 7-1/2	101.25	126.56	474.61	0.70	35.16
14 x 10	13-1/2 x 9-1/2	128.25	203.06	964.55	0.89	44.53
14 x 12	13-1/2 x 11-1/2	155.25	297.56	1,710.98	1.08	53.91
14 x 14	13-1/2 x 13-1/2	182.25	410.06	2,767.92	1.27	63.28
14 x 16	13-1/2 x 15-1/2	209.25	540.56	4,189.36	1.45	72.66
14 x 18	13-1/2 x 17-1/2	236.25	689.06	6,029.30	1.64	82.03
14 x 20	13-1/2 x 19-1/2	263.25	855.56	8,341.73	1.83	91.41
14 x 22	13-1/2 x 21-1/2	290.25	1,040.06	11,180.67	2.02	100.78
14 x 24	13-1/2 x 23-1/2	317.25	1,242.56	14,600.11	2.20	110.16
16 x 3	15-1/2 x 2-1/2	38.75	16.15	20.18	0.27	13.45
16 x 4	15-1/2 x 3-1/2	54.25	31.65	55.38	0.38	18.84
16 x 6	15-1/2 x 5-1/2	85.25	78.15	214.90	0.59	29.60
16 x 8	15-1/2 x 7-1/2	116.25	145.31	544.92	0.81	40.36
16 x 10	15-1/2 x 9-1/2	147.25	233.15	1,107.44	1.02	51.13
16 x 12	15-1/2 x 11-1/2	178.25	341.65	1,964.46	1.24	61.89
16 x 14	15-1/2 x 13-1/2	209.25	470.81	3,177.98	1.45	72.66
16 x 16	15-1/2 x 15-1/2	240.25	620.65	4,810.01	1.67	83.42
16 x 18	15-1/2 x 17-1/2	271.25	791.15	6,922.53	1.88	94.18
16 x 20	15-1/2 x 19-1/2	302.25	982.31	9,577.55	2.10	104.95
16 x 22	15-1/2 x 21-1/2	333.25	1,194.15	12,837.07	2.31	115.71
16 x 24	15-1/2 x 23-1/2	364.25	1,426.65	16,763.09	2.53	126.48
18 x 6	17-1/2 x 5-1/2	96.25	88.23	242.63	0.67	33.42
18 x 8	17-1/2 x 7-1/2	131.25	164.06	615.23	0.91	45.57
18 x 10	17-1/2 x 9-1/2	166.25	263.23	1,250.34	1.15	57.73
18 x 12	17-1/2 x 11-1/2	201.25	385.73	2,217.94	1.40	69.88
18 x 14	17-1/2 x 13-1/2	236.25	531.56	3,588.05	1.64	82.03
18 x 16	17-1/2 x 15-1/2	271.25	700.73	5,430.65	1.88	94.18
18 x 18	17-1/2 x 17-1/2	306.25	893.23	7,815.76	2.13	106.34
18 x 20	17-1/2 x 19-1/2	341.25	1,109.06	10,813.36	2.37	118.49
18 x 22	17-1/2 x 21-1/2	376.25	1,348.23	14,493.46	2.61	130.64
18 x 24	17-1/2 x 23-1/2	411.25	1,610.73	18,926.07	2.86	142.80
20 x 6	19-1/2 x 5-1/2	107.25	98.31	270.36	0.74	37.24
20 x 8	19-1/2 x 7-1/2	146.25	182.81	685.55	1.02	50.78
20 x 10	19-1/2 x 9-1/2	185.25	293.31	1,393.23	1.29	64.32
20 x 12	19-1/2 x 11-1/2	224.25	429.81	2,471.42	1.56	77.86
20 x 14	19-1/2 x 13-1/2	263.25	592.31	3,998.11	1.83	91.41
20 x 16	19-1/2 x 15-1/2	302.25	780.81	6,051.30	2.10	104.95
20 x 18	19-1/2 x 17-1/2	341.25	995.31	8,708.98	2.37	118.49
20 x 20	19-1/2 x 19-1/2	380.25	1,235.81	12,049.17	2.64	132.03
20 x 22	19-1/2 x 21-1/2	419.25	1,502.31	16,149.86	2.91	145.57
20 x 24	19-1/2 x 23-1/2	458.25	1,794.81	21,089.05	3.18	159.11

[a] Based on dressed (S4S) sizes.

[b] Based on a unit weight of 50 lb/ft³.

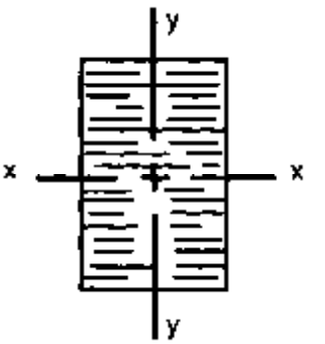
Table 16-2. - Section properties of structural lumber[a] *(continued).*

Nominal size *b* x *d* (in.)	Dressed size *b* x *d* (in.)	Area *A* (in²)	*S* (in³)	*I* (in⁴)	Volume (ft³/ft)	Weight[b] (lb/ft)
22 x 6	21-1/2 x 5-1/2	118.25	108.40	298.09	0.82	41.06
22 x 8	21-1/2 x 7-1/2	161.25	201.56	755.86	1.12	55.99
22 x 10	21-1/2 x 9-1/2	204.25	323.40	1,536.13	1.42	70.92
22 x 12	21-1/2 x 11-1/2	247.25	473.90	2,724.90	1.72	85.85
22 x 14	21-1/2 x 13-1/2	290.25	653.06	4,408.17	2.02	100.78
22 x 16	21-1/2 x 15-1/2	333.25	860.90	6,671.94	2.31	115.71
22 x 18	21-1/2 x 17-1/2	376.25	1,097.40	9,602.21	2.61	130.64
22 x 20	21-1/2 x 19-1/2	419.25	1,362.56	13,284.98	2.91	145.57
22 x 22	21-1/2 x 21-1/2	462.25	1,656.40	17,806.26	3.21	160.50
22 x 24	21-1/2 x 23-1/2	505.25	1,978.90	23,252.03	3.51	175.43
24 x 6	23-1/2 x 5-1/2	129.25	118.48	325.82	0.90	44.88
24 x 8	23-1/2 x 7-1/2	176.25	220.31	826.17	1.22	61.20
24 x 10	23-1/2 x 9-1/2	223.25	353.48	1,679.03	1.55	77.52
24 x 12	23-1/2 x 11-1/2	270.25	517.98	2,978.38	1.88	93.84
24 x 14	23-1/2 x 13-1/2	317.25	713.81	4,818.23	2.20	110.16
24 x 16	23-1/2 x 15-1/2	364.25	940.98	7,292.59	2.53	126.48
24 x 18	23-1/2 x 17-1/2	411.25	1,199.48	10,495.44	2.86	142.80
24 x 20	23-1/2 x 19-1/2	458.25	1,489.31	14,520.80	3.18	159.11
24 x 22	23-1/2 x 21-1/2	505.25	1,810.48	19,462.65	3.51	175.43
24 x 24	23-1/2 x 23-1/2	552.25	2,162.98	25,415.01	3.84	191.75

[a] Based on dressed (S4S) sizes.

[b] Based on a unit weight of 50 lb/ft³.

Table 16-3. - Section properties for structural glulam manufactured from western species with 1-1/2-inch-thick laminations.



Depth d (in.)	Size factor C_F	Area A (in²)	X-X axis S_x (in³)	X-X axis S_xC_F (in³)	X-X axis I_x (in⁴)	Y-Y axis S_y (in³)	Y-Y axis I_y (in⁴)	Volume (ft³/ft)	Weight[a] (lb/ft)
				3-1/8 inch width					
3	1.00	9.4	4.7	4.7	7.0	4.9	7.6	0.07	3.3
4-1/2	1.00	14.1	10.5	10.5	23.7	7.3	11.4	0.10	4.9
6	1.00	18.8	18.8	18.8	56.3	9.8	15.3	0.13	6.5
7-1/2	1.00	23.4	29.3	29.3	109.9	12.2	19.1	0.16	8.1
9	1.00	28.1	42.2	42.2	189.8	14.6	22.9	0.20	9.8
10-1/2	1.00	32.8	57.4	57.4	301.5	17.1	26.7	0.23	11.4
12	1.00	37.5	75.0	75.0	450.0	19.5	30.5	0.26	13.0
13-1/2	0.99	42.2	94.9	93.7	640.7	22.0	34.3	0.29	14.6
15	0.98	46.9	117.2	114.3	878.9	24.4	38.1	0.33	16.3
16-1/2	0.97	51.6	141.8	136.9	1,169.8	26.9	42.0	0.36	17.9
18	0.96	56.3	168.8	161.3	1,518.8	29.3	45.8	0.39	19.5
19-1/2	0.95	60.9	198.0	187.6	1,931.0	31.7	49.6	0.42	21.2
21	0.94	65.6	229.7	215.8	2,411.7	34.2	53.4	0.46	22.8
22-1/2	0.93	70.3	263.7	245.9	2,966.3	36.6	57.2	0.49	24.4
24	0.93	75.0	300.0	277.8	3,600.0	39.1	61.0	0.52	26.0
25-1/2	0.92	79.7	338.7	311.5	4,318.1	41.5	64.8	0.55	27.7
27	0.91	84.4	379.7	347.0	5,125.8	43.9	68.7	0.59	29.3
28-1/2	0.91	89.1	423.0	384.3	6,028.4	46.4	72.5	0.62	30.9
30	0.90	93.8	468.8	423.4	7,031.3	48.8	76.3	0.65	32.6
				5-1/8-inch width					
3	1.00	15.4	7.7	7.7	11.5	13.1	33.7	0.11	5.3
4-1/2	1.00	23.1	17.3	17.3	38.9	19.7	50.5	0.16	8.0
6	1.00	30.8	30.8	30.8	92.3	26.3	67.3	0.21	10.7
7-1/2	1.00	38.4	48.0	48.0	180.2	32.8	84.1	0.27	13.3
9	1.00	46.1	69.2	69.2	311.3	39.4	101.0	0.32	16.0
10-1/2	1.00	53.8	94.2	94.2	494.4	46.0	117.8	0.37	18.7
12	1.00	61.5	123.0	123.0	738.0	52.5	134.6	0.43	21.4
13-1/2	0.99	69.2	155.7	153.6	1,050.8	59.1	151.4	0.48	24.0
15	0.98	76.9	192.2	187.5	1,441.4	65.7	168.3	0.53	26.7
16-1/2	0.97	84.6	232.5	224.5	1,918.5	72.2	185.1	0.59	29.4
18	0.96	92.3	276.8	264.6	2,490.8	78.8	201.9	0.64	32.0

[a] Based on a unit weight of 50 lb/ft³.

Table 16-3. - Section properties for structural glulam manufactured from western species with 1-1/2-inch-thick laminations *(continued).*

Depth d (in.)	Size factor C_F	Area A (in^2)	X-X axis S_x (in^3)	X-X axis S_xC_F (in^3)	X-X axis I_x (in^4)	Y-Y axis S_y (in^3)	Y-Y axis I_y (in^4)	Volume (ft^3/ft)	Weight[a] (lb/ft)
5-1/8-inch width (continued)									
19-1/2	0.95	99.9	324.8	307.7	3,166.8	85.4	218.7	0.69	34.7
21	0.94	107.6	376.7	354.0	3,955.2	91.9	235.6	0.75	37.4
22-1/2	0.93	115.3	432.4	403.3	4,864.7	98.5	252.4	0.80	40.0
24	0.93	123.0	492.0	455.5	5,904.0	105.1	269.2	0.85	42.7
25-1/2	0.92	130.7	555.4	510.8	7,081.6	111.6	286.0	0.91	45.4
27	0.91	138.4	622.7	569.0	8,406.3	118.2	302.9	0.96	48.0
28-1/2	0.91	146.1	693.8	630.2	9,886.6	124.8	319.7	1.01	50.7
30	0.90	153.8	768.8	694.3	11,531.3	131.3	336.5	1.07	53.4
31-1/2	0.90	161.4	847.5	761.4	13,348.9	137.9	353.4	1.12	56.1
33	0.89	169.1	930.2	831.3	15,348.1	144.5	370.2	1.17	58.7
34-1/2	0.89	176.8	1,016.7	904.1	17,537.6	151.0	387.0	1.23	61.4
36	0.89	184.5	1,107.0	979.8	19,926.0	157.6	403.8	1.28	64.1
6-3/4-inch width									
6	1.00	40.5	40.5	40.5	121.5	45.6	153.8	0.28	14.1
7-1/2	1.00	50.6	63.3	63.3	237.3	57.0	192.2	0.35	17.6
9	1.00	60.8	91.1	91.1	410.1	68.3	230.7	0.42	21.1
10-1/2	1.00	70.9	124.0	124.0	651.2	79.7	269.1	0.49	24.6
12	1.00	81.0	162.0	162.0	972.0	91.1	307.5	0.56	28.1
13-1/2	0.99	91.1	205.0	202.4	1,384.0	102.5	346.0	0.63	31.6
15	0.98	101.3	253.1	246.9	1,898.4	113.9	384.4	0.70	35.2
16-1/2	0.97	111.4	306.3	295.6	2,526.8	125.3	422.9	0.77	38.7
18	0.96	121.5	364.5	348.4	3,280.5	136.7	461.3	0.84	42.2
19-1/2	0.95	131.6	427.8	405.3	4,170.9	148.1	499.8	0.91	45.7
21	0.94	141.8	496.1	466.2	5,209.3	159.5	538.2	0.98	49.2
22-1/2	0.93	151.9	569.5	531.1	6,407.2	170.9	576.7	1.05	52.7
24	0.93	162.0	648.0	600.0	7,776.0	182.3	615.1	1.13	56.3
25-1/2	0.92	172.1	731.5	672.8	9,327.0	193.6	653.5	1.20	59.8
27	0.91	182.3	820.1	749.5	11,071.7	205.0	692.0	1.27	63.3
28-1/2	0.91	192.4	913.8	830.1	13,021.4	216.4	730.4	1.34	66.8
30	0.90	202.5	1,012.5	914.5	15,187.5	227.8	768.9	1.41	70.3
31-1/2	0.90	212.6	1,116.3	1,002.8	17,581.4	239.2	807.3	1.48	73.8
33	0.89	222.8	1,225.1	1,094.9	20,214.6	250.6	845.8	1.55	77.3
34-1/2	0.89	232.9	1,339.0	1,190.8	23,098.3	262.0	884.2	1.62	80.9
36	0.89	243.0	1,458.0	1,290.5	26,244.0	273.4	922.6	1.69	84.4
37-1/2	0.88	253.1	1,582.0	1,393.9	29,663.1	284.8	961.1	1.76	87.9
39	0.88	263.3	1,711.1	1,501.1	33,366.9	296.2	999.5	1.83	91.4
40-1/2	0.87	273.4	1,845.3	1,612.0	37,366.9	307.5	1,038.0	1.90	94.9
42	0.87	283.5	1,984.5	1,726.7	41,674.5	318.9	1,076.4	1.97	98.4
43-1/2	0.87	293.6	2,128.8	1,845.0	46,301.0	330.3	1,114.9	2.04	102.0
45	0.86	303.8	2,278.1	1,967.0	51,257.8	341.7	1,153.3	2.11	105.5
46-1/2	0.86	313.9	2,432.5	2,092.7	56,556.4	353.1	1,191.7	2.18	109.0
48	0.86	324.0	2,592.0	2,222.0	62,208.0	364.5	1,230.2	2.25	112.5

[a] Based on a unit weight of 50 lb/ft^3.

Table 16-3. - Section properties for structural glulam manufactured from western species with 1-1/2-inch-thick laminations *(continued).*

Depth d (In.)	Size factor C_F	Area A (in²)	X-X axis S_x (in³)	X-X axis S_xC_F (in³)	X-X axis I_x (in⁴)	Y-Y axis S_y (in³)	Y-Y axis I_y (in⁴)	Volume (ft³/ft)	Weight[a] (lb/ft)
				8-3/4-inch width					
7-1/2	1.00	65.6	82.0	82.0	307.6	95.7	418.7	0.46	22.8
9	1.00	78.8	118.1	118.1	531.6	114.8	502.4	0.55	27.3
10-1/2	1.00	91.9	160.8	160.8	844.1	134.0	586.2	0.64	31.9
12	1.00	105.0	210.0	210.0	1,260.0	153.1	669.9	0.73	36.5
13-1/2	0.99	118.1	265.8	262.3	1,794.0	172.3	753.7	0.82	41.0
15	0.98	131.3	328.1	320.1	2,460.9	191.4	837.4	0.91	45.6
16-1/2	0.97	144.4	397.0	383.2	3,275.5	210.5	921.1	1.00	50.1
18	0.96	157.5	472.5	451.7	4,252.5	229.7	1,004.9	1.09	54.7
19-1/2	0.95	170.6	554.5	525.4	5,406.7	248.8	1,088.6	1.18	59.2
21	0.94	183.8	643.1	604.4	6,752.8	268.0	1,172.4	1.28	63.8
22-1/2	0.93	196.9	738.3	688.5	8,305.7	287.1	1,256.1	1.37	68.4
24	0.93	210.0	840.0	777.7	10,080.0	306.3	1,339.8	1.46	72.9
25-1/2	0.92	223.1	948.3	872.1	12,090.6	325.4	1,423.6	1.55	77.5
27	0.91	236.3	1,063.1	971.5	14,352.2	344.5	1,507.3	1.64	82.0
28-1/2	0.91	249.4	1,184.5	1,076.0	16,879.6	363.7	1,591.1	1.73	86.6
30	0.90	262.5	1,312.5	1,185.5	19,687.5	382.8	1,674.8	1.82	91.1
31-1/2	0.90	275.6	1,447.0	1,299.9	22,790.7	402.0	1,758.5	1.91	95.7
33	0.89	288.8	1,588.1	1,419.3	26,204.1	421.1	1,842.3	2.01	100.3
34-1/2	0.89	301.9	1,735.8	1,543.6	29,942.2	440.2	1,926.0	2.10	104.8
36	0.89	315.0	1,890.0	1,672.8	34,020.0	459.4	2,009.8	2.19	109.4
37-1/2	0.88	328.1	2,050.8	1,806.9	38,452.1	478.5	2,093.5	2.28	113.9
39	0.88	341.3	2,218.1	1,945.9	43,253.4	497.7	2,177.2	2.37	118.5
40-1/2	0.87	354.4	2,392.0	2,089.7	48,438.6	516.8	2,261.0	2.46	123.0
42	0.87	367.5	2,572.5	2,238.3	54,022.5	535.9	2,344.7	2.55	127.6
43-1/2	0.87	380.6	2,759.5	2,391.6	60,019.8	555.1	2,428.5	2.64	132.2
45	0.86	393.8	2,953.1	2,549.8	66,445.3	574.2	2,512.2	2.73	136.7
46-1/2	0.86	406.9	3,153.3	2,712.7	73,313.8	593.4	2,595.9	2.83	141.3
48	0.86	420.0	3,360.0	2,880.4	80,640.0	612.5	2,679.7	2.92	145.8
49-1/2	0.85	433.1	3,573.3	3,052.8	88,438.7	631.6	2,763.4	3.01	150.4
51	0.85	446.3	3,793.1	3,229.9	96,724.7	650.8	2,847.2	3.10	154.9
52-1/2	0.85	459.4	4,019.5	3,411.6	105,512.7	669.9	2,930.9	3.19	159.5
54	0.85	472.5	4,252.5	3,598.1	114,817.5	689.1	3,014.6	3.28	164.1
55-1/2	0.84	485.6	4,492.0	3,789.2	124,653.9	708.2	3,098.4	3.37	168.6
57	0.84	498.8	4,738.1	3,985.0	135,036.6	727.3	3,182.1	3.46	173.2
58-1/2	0.84	511.9	4,990.8	4,185.4	145,980.4	746.5	3,265.9	3.55	177.7
60	0.84	525.0	5,250.0	4,390.4	157,500.0	765.6	3,349.6	3.65	182.3
61-1/2	0.83	538.1	5,515.8	4,600.0	169,610.3	784.8	3,433.3	3.74	186.8
				10-3/4-inch width					
10-1/2	1.00	112.9	197.5	197.5	1,037.0	202.2	1,087.0	0.78	39.2
12	1.00	129.0	258.0	258.0	1,548.0	231.1	1,242.3	0.90	44.8
13-1/2	0.99	145.1	326.5	322.3	2,204.1	260.0	1,397.6	1.01	50.4
15	0.98	161.3	403.1	393.3	3,023.4	288.9	1,552.9	1.12	56.0
16-1/2	0.97	177.4	487.8	470.8	4,024.2	317.8	1,708.2	1.23	61.6

[a] Based on a unit weight of 50 lb/ft³.

Table 16-3. - Section properties for structural glulam manufactured from western species with 1-1/2-inch-thick laminations *(continued).*

Depth d (In.)	Size factor C_F	Area A (in²)	X-X axis S_x (In³)	X-X axis S_xC_F (in³)	X-X axis I_x (In⁴)	Y-Y axis S_y (In³)	Y-Y axis I_y (In⁴)	Volume (ft³/ft)	Weight[a] (lb/ft)
10-3/4-inch width (continued)									
18	0.96	193.5	580.5	554.9	5,224.5	346.7	1,863.4	1.34	67.2
19-1/2	0.95	209.6	681.3	645.5	6,642.5	375.6	2,018.7	1.46	72.8
21	0.94	225.8	790.1	742.5	8,296.3	404.5	2,174.0	1.57	78.4
22-1/2	0.93	241.9	907.0	845.8	10,204.1	433.4	2,329.3	1.68	84.0
24	0.93	258.0	1,032.0	955.5	12,384.0	462.3	2,484.6	1.79	89.6
25-1/2	0.92	274.1	1,165.0	1,071.4	14,854.1	491.1	2,639.9	1.90	95.2
27	0.91	290.3	1,306.1	1,193.6	17,632.7	520.0	2,795.2	2.02	100.8
28-1/2	0.91	306.4	1,455.3	1,321.9	20,737.8	548.9	2,950.5	2.13	106.4
30	0.90	322.5	1,612.5	1,456.4	24,187.5	577.8	3,105.7	2.24	112.0
31-1/2	0.90	338.6	1,777.8	1,597.0	28,000.1	606.7	3,261.0	2.35	117.6
33	0.89	354.8	1,951.1	1,743.7	32,193.6	635.6	3,416.3	2.46	123.2
34-1/2	0.89	370.9	2,132.5	1,896.4	36,786.2	664.5	3,571.6	2.58	128.8
36	0.89	387.0	2,322.0	2,055.2	41,796.0	693.4	3,726.9	2.69	134.4
37-1/2	0.88	403.1	2,519.5	2,219.9	47,241.2	722.3	3,882.2	2.80	140.0
39	0.88	419.3	2,725.1	2,390.7	53,139.9	751.2	4,037.5	2.91	145.6
40-1/2	0.87	435.4	2,938.8	2,567.3	59,510.3	780.0	4,192.8	3.02	151.2
42	0.87	451.5	3,160.5	2,749.9	66,370.5	808.9	4,348.0	3.14	156.8
43-1/2	0.87	467.6	3,390.3	2,938.3	73,738.6	837.8	4,503.3	3.25	162.4
45	0.86	483.8	3,628.1	3,132.6	81,632.8	866.7	4,658.6	3.36	168.0
46-1/2	0.86	499.9	3,874.0	3,332.8	90,071.2	895.6	4,813.9	3.47	173.6
48	0.86	516.0	4,128.0	3,538.8	99,072.0	924.5	4,969.2	3.58	179.2
49-1/2	0.85	532.1	4,390.0	3,750.5	108,653.3	953.4	5,124.5	3.70	184.8
51	0.85	548.3	4,660.1	3,968.1	118,833.2	982.3	5,279.8	3.81	190.4
52-1/2	0.85	564.4	4,938.3	4,191.4	129,629.9	1,011.2	5,435.0	3.92	196.0
54	0.85	580.5	5,224.5	4,420.5	141,061.5	1,040.1	5,590.3	4.03	201.6
55-1/2	0.84	596.6	5,518.8	4,655.3	153,146.2	1,069.0	5,745.6	4.14	207.2
57	0.84	612.8	5,821.1	4,895.8	165,902.1	1,097.8	5,900.9	4.26	212.8
58-1/2	0.84	628.9	6,131.5	5,142.0	179,347.3	1,126.7	6,056.2	4.37	218.4
60	0.84	645.0	6,450.0	5,393.9	193,500.0	1,155.6	6,211.5	4.48	224.0
61-1/2	0.83	661.1	6,776.5	5,651.5	208,378.3	1,184.5	6,366.8	4.59	229.6
63	0.83	677.3	7,111.1	5,914.6	224,000.4	1,213.4	6,522.1	4.70	235.2
64-1/2	0.83	693.4	7,453.8	6,183.5	240,384.4	1,242.3	6,677.3	4.82	240.8
66	0.83	709.5	7,804.5	6,457.9	257,548.5	1,271.2	6,832.6	4.93	246.4
67-1/2	0.83	725.6	8,163.3	6,737.9	275,510.7	1,300.1	6,987.9	5.04	252.0
69	0.82	741.8	8,530.1	7,023.5	294,289.3	1,329.0	7,143.2	5.15	257.6
70-1/2	0.82	757.9	8,905.0	7,314.7	313,902.4	1,357.9	7,298.5	5.26	263.2
72	0.82	774.0	9,288.0	7,611.5	334,368.0	1,386.8	7,453.8	5.38	268.8
73-1/2	0.82	790.1	9,679.0	7,913.8	355,704.4	1,415.6	7,609.1	5.49	274.3
75	0.82	806.3	10,078.1	8,221.6	377,929.7	1,444.5	7,764.4	5.60	279.9
12-1/4-inch width									
12	1.00	147.0	294.0	294.0	1,764.0	300.1	1,838.3	1.02	51.0
13-1/2	0.99	165.4	372.1	367.3	2,511.6	337.6	2,068.0	1.15	57.4
15	0.98	183.8	459.4	448.1	3,445.3	375.2	2,297.8	1.28	63.8
16-1/2	0.97	202.1	555.8	536.5	4,585.7	412.7	2,527.6	1.40	70.2

[a] Based on a unit weight of 50 lb/ft³.

Table 16-3. - Section properties for structural glulam manufactured from western species with 1-1/2-inch-thick laminations *(continued).*

Depth d (in.)	Size factor C_F	Area A (in²)	X-X axis S_x (in³)	X-X axis S_xC_F (in³)	X-X axis I_x (in⁴)	Y-Y axis S_y (in³)	Y-Y axis I_y (in⁴)	Volume (ft³/ft)	Weight[a] (lb/ft)
12-1/4-inch width (continued)									
18	0.96	220.5	661.5	632.4	5,953.5	450.2	2,757.4	1.53	76.6
19-1/2	0.95	238.9	776.3	735.6	7,569.4	487.7	2,987.2	1.66	82.9
21	0.94	257.3	900.4	846.1	9,453.9	525.2	3,217.0	1.79	89.3
22-1/2	0.93	275.6	1,033.6	963.9	11,627.9	562.7	3,446.7	1.91	95.7
24	0.93	294.0	1,176.0	1,088.8	14,112.0	600.3	3,676.5	2.04	102.1
25-1/2	0.92	312.4	1,327.6	1,220.9	16,926.8	637.8	3,906.3	2.17	108.5
27	0.91	330.8	1,488.4	1,360.1	20,093.1	675.3	4,136.1	2.30	114.8
28-1/2	0.91	349.1	1,658.3	1,506.4	23,631.4	712.8	4,365.9	2.42	121.2
30	0.90	367.5	1,837.5	1,659.6	27,562.5	750.3	4,595.7	2.55	127.6
31-1/2	0.90	385.9	2,025.8	1,819.9	31,907.0	787.8	4,825.4	2.68	134.0
33	0.89	404.3	2,223.4	1,987.0	36,685.7	825.3	5,055.2	2.81	140.4
34-1/2	0.89	422.6	2,430.1	2,161.1	41,919.1	862.9	5,285.0	2.93	146.7
36	0.89	441.0	2,646.0	2,342.0	47,628.0	900.4	5,514.8	3.06	153.1
37-1/2	0.88	459.4	2,871.1	2,529.7	53,833.0	937.9	5,744.6	3.19	159.5
39	0.88	477.8	3,105.4	2,724.2	60,554.8	975.4	5,974.4	3.32	165.9
40-1/2	0.87	496.1	3,348.8	2,925.5	67,814.1	1,012.9	6,204.1	3.45	172.3
42	0.87	514.5	3,601.5	3,133.6	75,631.5	1,050.4	6,433.9	3.57	178.6
43-1/2	0.87	532.9	3,863.3	3,348.3	84,027.7	1,088.0	6,663.7	3.70	185.0
45	0.86	551.3	4,134.4	3,569.7	93,023.4	1,125.5	6,893.5	3.83	191.4
46-1/2	0.86	569.6	4,414.6	3,797.8	102,639.3	1,163.0	7,123.3	3.96	197.8
48	0.86	588.0	4,704.0	4,032.5	112,896.0	1,200.5	7,353.1	4.08	204.2
49-1/2	0.85	606.4	5,002.6	4,273.9	123,814.2	1,238.0	7,582.8	4.21	210.5
51	0.85	624.8	5,310.4	4,521.8	135,414.6	1,275.5	7,812.6	4.34	216.9
52-1/2	0.85	643.1	5,627.3	4,776.3	147,717.8	1,313.0	8,042.4	4.47	223.3
54	0.85	661.5	5,953.5	5,037.3	160,744.5	1,350.6	8,272.2	4.59	229.7
55-1/2	0.84	679.9	6,288.8	5,304.9	174,515.4	1,388.1	8,502.0	4.72	236.1
57	0.84	698.3	6,633.4	5,579.0	189,051.2	1,425.6	8,731.8	4.85	242.4
58-1/2	0.84	716.6	6,987.1	5,859.5	204,372.5	1,463.1	8,961.5	4.98	248.8
60	0.84	735.0	7,350.0	6,146.6	220,500.0	1,500.6	9,191.3	5.10	255.2
61-1/2	0.83	753.4	7,722.1	6,440.0	237,454.4	1,538.1	9,421.1	5.23	261.6
63	0.83	771.8	8,103.4	6,739.9	255,256.3	1,575.7	9,650.9	5.36	268.0
64-1/2	0.83	790.1	8,493.8	7,046.3	273,926.5	1,613.2	9,880.7	5.49	274.3
66	0.83	808.5	8,893.5	7,359.0	293,485.5	1,650.7	10,110.5	5.61	280.7
67-1/2	0.83	826.9	9,302.3	7,678.1	313,954.1	1,688.2	10,340.2	5.74	287.1
69	0.82	845.3	9,720.4	8,003.6	335,352.9	1,725.7	10,570.0	5.87	293.5
70-1/2	0.82	863.6	10,147.6	8,335.4	357,702.7	1,763.2	10,799.8	6.00	299.9
72	0.82	882.0	10,584.0	8,673.6	381,024.0	1,800.8	11,029.6	6.13	306.3
73-1/2	0.82	900.4	11,029.6	9,018.0	405,337.6	1,838.3	11,259.4	6.25	312.6
75	0.82	918.8	11,484.4	9,368.8	430,664.1	1,875.8	11,489.2	6.38	319.0
76-1/2	0.81	937.1	11,948.3	9,725.9	457,024.1	1,913.3	11,718.9	6.51	325.4
78	0.81	955.5	12,421.5	10,089.3	484,438.5	1,950.8	11,948.7	6.64	331.8
79-1/2	0.81	973.9	12,903.8	10,458.9	512,927.8	1,988.3	12,178.5	6.76	338.2
81	0.81	992.3	13,395.4	10,834.8	542,512.7	2,025.8	12,408.3	6.89	344.5
82-1/2	0.81	1,010.6	13,896.1	11,216.9	573,213.9	2,063.4	12,638.1	7.02	350.9
84	0.81	1,029.0	14,406.0	11,605.2	605,052.0	2,100.9	12,867.9	7.15	357.3

[a] Based on a unit weight of 50 lb/ft³.

Table 16-3. - Section properties for structural glulam manufactured from western species with 1-1/2-inch-thick laminations *(continued).*

Depth d (in.)	Size factor C_F	Area A (in^2)	X-X axis S_x (in^3)	X-X axis S_xC_F (in^3)	X-X axis I_x (in^4)	Y-Y axis S_y (in^3)	Y-Y axis I_y (in^4)	Volume (ft^3/ft)	Weight[a] (lb/ft)
14-1/4-inch width									
13-1/2	0.99	192.4	432.8	427.2	2,921.7	456.9	3,255.3	1.34	66.8
15	0.98	213.8	534.4	521.3	4,007.8	507.7	3,617.1	1.48	74.2
16-1/2	0.97	235.1	646.6	624.1	5,334.4	558.4	3,978.8	1.63	81.6
18	0.96	256.5	769.5	735.6	6,925.5	609.2	4,340.5	1.78	89.1
19-1/2	0.95	277.9	903.1	855.7	8,805.2	660.0	4,702.2	1.93	96.5
21	0.94	299.3	1,047.4	984.2	10,997.4	710.7	5,063.9	2.08	103.9
22-1/2	0.93	320.6	1,202.3	1,121.2	13,526.4	761.5	5,425.6	2.23	111.3
24	0.93	342.0	1,368.0	1,266.6	16,416.0	812.3	5,787.3	2.38	118.8
25-1/2	0.92	363.4	1,544.3	1,420.3	19,690.4	863.0	6,149.0	2.52	126.2
27	0.91	384.8	1,731.4	1,582.2	23,373.6	913.8	6,510.7	2.67	133.6
28-1/2	0.91	406.1	1,929.1	1,752.3	27,489.6	964.5	6,872.4	2.82	141.0
30	0.90	427.5	2,137.5	1,930.6	32,062.5	1,015.3	7,234.1	2.97	148.4
31-1/2	0.90	448.9	2,356.6	2,117.0	37,116.4	1,066.1	7,595.8	3.12	155.9
33	0.89	470.3	2,586.4	2,311.4	42,675.2	1,116.8	7,957.5	3.27	163.3
34-1/2	0.89	491.6	2,826.8	2,513.9	48,763.1	1,167.6	8,319.2	3.41	170.7
36	0.89	513.0	3,078.0	2,724.3	55,404.0	1,218.4	8,680.9	3.56	178.1
37-1/2	0.88	534.4	3,339.8	2,942.7	62,622.1	1,269.1	9,042.6	3.71	185.5
39	0.88	555.8	3,612.4	3,169.0	70,441.3	1,319.9	9,404.3	3.86	193.0
40-1/2	0.87	577.1	3,895.6	3,403.2	78,885.8	1,370.7	9,766.0	4.01	200.4
42	0.87	598.5	4,189.5	3,645.2	87,979.5	1,421.4	10,127.7	4.16	207.8
43-1/2	0.87	619.9	4,494.1	3,895.0	97,746.5	1,472.2	10,489.4	4.30	215.2
45	0.86	641.3	4,809.4	4,152.5	108,210.9	1,523.0	10,851.2	4.45	222.7
46-1/2	0.86	662.6	5,135.3	4,417.9	119,396.7	1,573.7	11,212.9	4.60	230.1
48	0.86	684.0	5,472.0	4,690.9	131,328.0	1,624.5	11,574.6	4.75	237.5
49-1/2	0.85	705.4	5,819.3	4,971.6	144,028.8	1,675.3	11,936.3	4.90	244.9
51	0.85	726.8	6,177.4	5,260.1	157,523.1	1,726.0	12,298.0	5.05	252.3
52-1/2	0.85	748.1	6,546.1	5,556.1	171,835.0	1,776.8	12,659.7	5.20	259.8
54	0.85	769.5	6,925.5	5,859.8	186,988.5	1,827.6	13,021.4	5.34	267.2
55-1/2	0.84	790.9	7,315.6	6,171.0	203,007.7	1,878.3	13,383.1	5.49	274.6
57	0.84	812.3	7,716.4	6,489.8	219,916.7	1,929.1	13,744.8	5.64	282.0
58-1/2	0.84	833.6	8,127.8	6,816.2	237,739.4	1,979.9	14,106.5	5.79	289.5
60	0.84	855.0	8,550.0	7,150.1	256,500.0	2,030.6	14,468.2	5.94	296.9
61-1/2	0.83	876.4	8,982.8	7,491.5	276,222.4	2,081.4	14,829.9	6.09	304.3
63	0.83	897.8	9,426.4	7,840.3	296,930.8	2,132.2	15,191.6	6.23	311.7
64-1/2	0.83	919.1	9,880.6	8,196.7	318,649.1	2,182.9	15,553.3	6.38	319.1
66	0.83	940.5	10,345.5	8,560.5	341,401.5	2,233.7	15,915.0	6.53	326.6
67-1/2	0.83	961.9	10,821.1	8,931.7	365,211.9	2,284.5	16,276.7	6.68	334.0
69	0.82	983.3	11,307.4	9,310.3	390,104.4	2,335.2	16,638.4	6.83	341.4
70-1/2	0.82	1,004.6	11,804.3	9,696.3	416,103.1	2,386.0	17,000.1	6.98	348.8
72	0.82	1,026.0	12,312.0	10,089.6	443,232.0	2,436.8	17,361.8	7.13	356.3
73-1/2	0.82	1,047.4	12,830.3	10,490.4	471,515.1	2,487.5	17,723.5	7.27	363.7
75	0.82	1,068.8	13,359.4	10,898.4	500,976.6	2,538.3	18,085.3	7.42	371.1
76-1/2	0.81	1,090.1	13,899.1	11,313.8	531,640.3	2,589.0	18,447.0	7.57	378.5
78	0.81	1,111.5	14,449.5	11,736.5	563,530.5	2,639.8	18,808.7	7.72	385.9

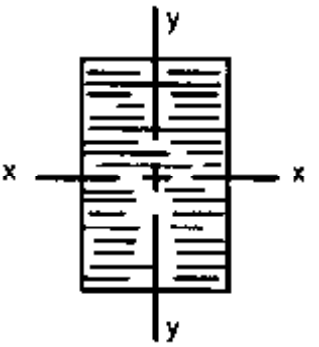
[a] Based on a unit weight of 50 lb/ft^3.

Table 16-3. - Section properties for structural glulam manufactured from western species with 1-1/2-inch-thick laminations *(continued).*

Depth d (in.)	Size factor C_F	Area A (in^2)	X-X axis S_x (in^3)	X-X axis S_xC_F (in^3)	X-X axis I_x (in^4)	Y-Y axis S_y (in^3)	Y-Y axis I_y (in^4)	Volume (ft^3/ft)	Weight[a] (lb/ft)
14-1/4-inch width (continued)									
79-1/2	0.81	1,132.9	15,010.6	12,166.5	596,671.1	2,690.6	19,170.4	7.87	393.4
81	0.81	1,154.3	15,582.4	12,603.7	631,086.2	2,741.3	19,532.1	8.02	400.8
82-1/2	0.81	1,175.6	16,164.8	13,048.2	666,799.8	2,792.1	19,893.8	8.16	408.2
84	0.81	1,197.0	16,758.0	13,499.9	703,836.0	2,842.9	20,255.5	8.31	415.6
85-1/2	0.80	1,218.4	17,361.8	13,958.9	742,218.8	2,893.6	20,617.2	8.46	423.0
87	0.80	1,239.8	17,976.4	14,425.1	781,972.3	2,944.4	20,978.9	8.61	430.5
88-1/2	0.80	1,261.1	18,601.6	14,898.5	823,120.5	2,995.2	21,340.6	8.76	437.9
90	0.80	1,282.5	19,237.5	15,379.0	865,687.5	3,045.9	21,702.3	8.91	445.3
91-1/2	0.80	1,303.9	19,884.1	15,866.8	909,697.3	3,096.7	22,064.0	9.05	452.7
93	0.80	1,325.3	20,541.4	16,361.7	955,173.9	3,147.5	22,425.7	9.20	460.2
94-1/2	0.80	1,346.6	21,209.3	16,863.7	1,002,141.5	3,198.2	22,787.4	9.35	467.6
96	0.79	1,368.0	21,888.0	17,372.9	1,050,624.0	3,249.0	23,149.1	9.50	475.0

[a] Based on a unit weight of 50 lb/ft^3.

Table 16-4 - Section properties for structural glulam manufactured from Southern Pine with 1-3/8-inch-thick laminations.



Depth d (in.)	Size factor C_F	Area A (in^2)	X-X axis S_x (in^3)	X-X axis S_xC_F (in^3)	X-X axis I_x (in^4)	Y-Y axis S_y (in^3)	Y-Y axis I_y (in^4)	Volume (ft^3/ft)	Weight[a] (lb/ft)
				3-inch width					
2-3/4	1.00	8.3	3.8	3.8	5.2	4.1	6.2	0.06	2.9
4-1/8	1.00	12.4	8.5	8.5	17.5	6.2	9.3	0.09	4.3
5-1/2	1.00	16.5	15.1	15.1	41.6	8.3	12.4	0.11	5.7
6-7/8	1.00	20.6	23.6	23.6	81.2	10.3	15.5	0.14	7.2
8-1/4	1.00	24.8	34.0	34.0	140.4	12.4	18.6	0.17	8.6
9-5/8	1.00	28.9	46.3	46.3	222.9	14.4	21.7	0.20	10.0
11	1.00	33.0	60.5	60.5	332.8	16.5	24.8	0.23	11.5
12-3/8	1.00	37.1	76.6	76.3	473.8	18.6	27.8	0.26	12.9
13-3/4	0.98	41.3	94.5	93.1	649.9	20.6	30.9	0.29	14.3
15-1/8	0.97	45.4	114.4	111.5	865.0	22.7	34.0	0.32	15.8
16-1/2	0.97	49.5	136.1	131.4	1,123.0	24.8	37.1	0.34	17.2
17-7/8	0.96	53.6	159.8	152.8	1,427.8	26.8	40.2	0.37	18.6
19-1/4	0.95	57.8	185.3	175.8	1,783.3	28.9	43.3	0.40	20.1
20-5/8	0.94	61.9	212.7	200.3	2,193.4	30.9	46.4	0.43	21.5
22	0.93	66.0	242.0	226.2	2,662.0	33.0	49.5	0.46	22.9
23-3/8	0.93	70.1	273.2	253.7	3,193.0	35.1	52.6	0.49	24.3
24-3/4	0.92	74.3	306.3	282.6	3,790.2	37.1	55.7	0.52	25.8
26-1/8	0.92	78.4	341.3	313.0	4,457.7	39.2	58.8	0.54	27.2
27-1/2	0.91	82.5	378.1	344.8	5,199.2	41.3	61.9	0.57	28.6
28-7/8	0.91	86.6	416.9	378.1	6,018.7	43.3	65.0	0.60	30.1
30-1/4	0.90	90.8	457.5	412.9	6,920.2	45.4	68.1	0.63	31.5
				5-inch width					
2-3/4	1.00	13.8	6.3	6.3	8.7	11.5	28.6	0.10	4.8
4-1/8	1.00	20.6	14.2	14.2	29.2	17.2	43.0	0.14	7.2
5-1/2	1.00	27.5	25.2	25.2	69.3	22.9	57.3	0.19	9.5
6-7/8	1.00	34.4	39.4	39.4	135.4	28.6	71.6	0.24	11.9
8-1/4	1.00	41.3	56.7	56.7	234.0	34.4	85.9	0.29	14.3
9-5/8	1.00	48.1	77.2	77.2	371.5	40.1	100.3	0.33	16.7
11	1.00	55.0	100.8	100.8	554.6	45.8	114.6	0.38	19.1

[a] Based on a unit weight of 50 lb/ft^3.

Table 16-4. - Section properties for structural glulam manufactured from Southern Pine with 1-3/8-inch-thick laminations *(continued).*

Depth d (In.)	Size factor C_F	Area A (in²)	X-X axis S_x (in³)	X-X axis S_xC_F (in³)	X-X axis I_x (in⁴)	Y-Y axis S_y (in³)	Y-Y axis I_y (in⁴)	Volume (ft³/ft)	Weight[a] (lb/ft)
5-inch width (continued)									
12-3/8	1.00	61.9	127.6	127.2	789.6	51.6	128.9	0.43	21.5
13-3/4	0.98	68.8	157.6	155.2	1,083.2	57.3	143.2	0.48	23.9
15-1/8	0.97	75.6	190.6	185.8	1,441.7	63.0	157.6	0.53	26.3
16-1/2	0.97	82.5	226.9	219.0	1,871.7	68.8	171.9	0.57	28.6
17-7/8	0.96	89.4	266.3	254.7	2,379.7	74.5	186.2	0.62	31.0
19-1/4	0.95	96.3	308.8	293.0	2,972.2	80.2	200.5	0.67	33.4
20-5/8	0.94	103.1	354.5	333.8	3,655.7	85.9	214.8	0.72	35.8
22	0.93	110.0	403.3	377.1	4,436.7	91.7	229.2	0.76	38.2
23-3/8	0.93	116.9	455.3	422.8	5,321.6	97.4	243.5	0.81	40.6
24-3/4	0.92	123.8	510.5	471.0	6,317.1	103.1	257.8	0.86	43.0
26-1/8	0.92	130.6	568.8	521.7	7,429.5	108.9	272.1	0.91	45.4
27-1/2	0.91	137.5	630.2	574.7	8,665.4	114.6	286.5	0.95	47.7
28-7/8	0.91	144.4	694.8	630.2	10,031.2	120.3	300.8	1.00	50.1
30-1/4	0.90	151.3	762.6	688.1	11,533.6	126.0	315.1	1.05	52.5
31-5/8	0.90	158.1	833.5	748.4	13,178.9	131.8	329.4	1.10	54.9
33	0.89	165.0	907.5	811.0	14,973.8	137.5	343.8	1.15	57.3
34-3/8	0.89	171.9	984.7	876.0	16,924.5	143.2	358.1	1.19	59.7
35-3/4	0.89	178.8	1,065.1	943.4	19,037.8	149.0	372.4	1.24	62.1
6-3/4-inch width									
5-1/2	1.00	37.1	34.0	34.0	93.6	41.8	141.0	0.26	12.9
6-7/8	1.00	46.4	53.2	53.2	182.8	52.2	176.2	0.32	16.1
8-1/4	1.00	55.7	76.6	76.6	315.9	62.6	211.4	0.39	19.3
9-5/8	1.00	65.0	104.2	104.2	501.6	73.1	246.7	0.45	22.6
11	1.00	74.3	136.1	136.1	748.7	83.5	281.9	0.52	25.8
12-3/8	1.00	83.5	172.3	171.7	1,066.0	94.0	317.2	0.58	29.0
13-3/4	0.98	92.8	212.7	209.5	1,462.3	104.4	352.4	0.64	32.2
15-1/8	0.97	102.1	257.4	250.8	1,946.3	114.9	387.6	0.71	35.4
16-1/2	0.97	111.4	306.3	295.6	2,526.8	125.3	422.9	0.77	38.7
17-7/8	0.96	120.7	359.5	343.9	3,212.6	135.7	458.1	0.84	41.9
19-1/4	0.95	129.9	416.9	395.6	4,012.5	146.2	493.4	0.90	45.1
20-5/8	0.94	139.2	478.6	450.6	4,935.2	156.6	528.6	0.97	48.3
22	0.93	148.5	544.5	509.0	5,989.5	167.1	563.8	1.03	51.6
23-3/8	0.93	157.8	614.7	570.8	7,184.2	177.5	599.1	1.10	54.8
24-3/4	0.92	167.1	689.1	635.9	8,528.0	187.9	634.3	1.16	58.0
26-1/8	0.92	176.3	767.8	704.2	10,029.8	198.4	669.6	1.22	61.2
27-1/2	0.91	185.6	850.8	775.9	11,698.2	208.8	704.8	1.29	64.5
28-7/8	0.91	194.9	938.0	850.8	13,542.2	219.3	740.0	1.35	67.7
30-1/4	0.90	204.2	1,029.4	928.9	15,570.4	229.7	775.3	1.42	70.9
31-5/8	0.90	213.5	1,125.2	1,010.3	17,791.6	240.2	810.5	1.48	74.1
33	0.89	222.8	1,225.1	1,094.9	20,214.6	250.6	845.8	1.55	77.3
34-3/8	0.89	232.0	1,329.3	1,182.6	22,848.1	261.0	881.0	1.61	80.6
35-3/4	0.89	241.3	1,437.8	1,273.6	25,701.0	271.5	916.2	1.68	83.8
37-1/8	0.88	250.6	1,550.5	1,367.7	28,782.1	281.9	951.5	1.74	87.0
38-1/2	0.88	259.9	1,667.5	1,464.9	32,100.0	292.4	986.7	1.80	90.2

[a] Based on a unit weight of 50 lb/ft³.

Table 16-4. - Section properties for structural glulam manufactured from Southern Pine with 1-3/8-inch-thick laminations *(continued).*

Depth d (in.)	Size factor C_F	Area A (in^2)	X-X axis S_x (in^3)	X-X axis S_xC_F (in^3)	X-X axis I_x (in^4)	Y-Y axis S_y (in^3)	Y-Y axis I_y (in^4)	Volume (ft^3/ft)	Weight[a] (lb/ft)
6-3/4-inch width (continued)									
39-7/8	0.88	269.2	1,788.8	1,565.3	35,663.6	302.8	1,022.0	1.87	93.5
41-1/4	0.87	278.4	1,914.3	1,668.9	39,481.6	313.2	1,057.2	1.93	96.7
42-5/8	0.87	287.7	2,044.0	1,775.5	43,562.8	323.7	1,092.4	2.00	99.9
44	0.87	297.0	2,178.0	1,885.2	47,916.0	334.1	1,127.7	2.06	103.1
45-3/8	0.86	306.3	2,316.3	1,998.0	52,550.0	344.6	1,162.9	2.13	106.3
46-3/4	0.86	315.6	2,458.8	2,113.9	57,473.5	355.0	1,198.2	2.19	109.6
48-1/8	0.86	324.8	2,605.5	2,232.9	62,695.3	365.4	1,233.4	2.26	112.8
8-1/2-inch width									
8-1/4	1.00	70.1	96.4	96.4	397.7	99.3	422.2	0.49	24.3
9-5/8	1.00	81.8	131.2	131.2	631.6	115.9	492.6	0.57	28.4
11	1.00	93.5	171.4	171.4	942.8	132.5	562.9	0.65	32.5
12-3/8	1.00	105.2	216.9	216.2	1,342.4	149.0	633.3	0.73	36.5
13-3/4	0.98	116.9	267.8	263.8	1,841.4	165.6	703.7	0.81	40.6
15-1/8	0.97	128.6	324.1	315.9	2,450.9	182.1	774.1	0.89	44.6
16-1/2	0.97	140.3	385.7	372.3	3,181.9	198.7	844.4	0.97	48.7
17-7/8	0.96	151.9	452.6	433.0	4,045.5	215.2	914.8	1.06	52.8
19-1/4	0.95	163.6	525.0	498.1	5,052.8	231.8	985.2	1.14	56.8
20-5/8	0.94	175.3	602.6	567.4	6,214.7	248.4	1,055.5	1.22	60.9
22	0.93	187.0	685.7	641.0	7,542.3	264.9	1,125.9	1.30	64.9
23-3/8	0.93	198.7	774.1	718.8	9,046.7	281.5	1,196.3	1.38	69.0
24-3/4	0.92	210.4	867.8	800.7	10,739.0	298.0	1,266.6	1.46	73.0
26-1/8	0.92	222.1	966.9	886.8	12,630.1	314.6	1,337.0	1.54	77.1
27-1/2	0.91	233.8	1,071.4	977.0	14,731.1	331.1	1,407.4	1.62	81.2
28-7/8	0.91	245.4	1,181.2	1,071.4	17,053.1	347.7	1,477.7	1.70	85.2
30-1/4	0.90	257.1	1,296.3	1,169.8	19,607.1	364.3	1,548.1	1.79	89.3
31-5/8	0.90	268.8	1,416.9	1,272.2	22,404.2	380.8	1,618.5	1.87	93.3
33	0.89	280.5	1,542.8	1,378.7	25,455.4	397.4	1,688.8	1.95	97.4
34-3/8	0.89	292.2	1,674.0	1,489.3	28,771.7	413.9	1,759.2	2.03	101.5
35-3/4	0.89	303.9	1,810.6	1,603.8	32,364.3	430.5	1,829.6	2.11	105.5
37-1/8	0.88	315.6	1,952.5	1,722.3	36,244.1	447.0	1,899.9	2.19	109.6
38-1/2	0.88	327.3	2,099.9	1,844.7	40,422.2	463.6	1,970.3	2.27	113.6
39-7/8	0.88	338.9	2,252.5	1,971.2	44,909.7	480.2	2,040.7	2.35	117.7
41-1/4	0.87	350.6	2,410.5	2,101.5	49,717.5	496.7	2,111.1	2.43	121.7
42-5/8	0.87	362.3	2,573.9	2,235.8	54,856.8	513.3	2,181.4	2.52	125.8
44	0.87	374.0	2,742.7	2,374.0	60,338.7	529.8	2,251.8	2.60	129.9
45-3/8	0.86	385.7	2,916.8	2,516.0	66,174.0	546.4	2,322.2	2.68	133.9
46-3/4	0.86	397.4	3,096.2	2,662.0	72,374.0	562.9	2,392.5	2.76	138.0
48-1/8	0.86	409.1	3,281.0	2,811.8	78,949.6	579.5	2,462.9	2.84	142.0
49-1/2	0.85	420.8	3,471.2	2,965.5	85,911.9	596.1	2,533.3	2.92	146.1
50-7/8	0.85	432.4	3,666.7	3,123.0	93,271.9	612.6	2,603.6	3.00	150.2
52-1/4	0.85	444.1	3,867.6	3,284.4	101,040.8	629.2	2,674.0	3.08	154.2
53-5/8	0.85	455.8	4,073.8	3,449.5	109,229.4	645.7	2,744.4	3.17	158.3
55	0.84	467.5	4,285.4	3,618.5	117,849.0	662.3	2,814.7	3.25	162.3
56-3/8	0.84	479.2	4,502.4	3,791.3	126,910.4	678.8	2,885.1	3.33	166.4

[a] Based on a unit weight of 50 lb/ft^3.

Table 16-4. - Section properties for structural glulam manufactured from Southern Pine with 1-3/8-inch-thick laminations *(continued).*

Depth d (in.)	Size factor C_F	Area A (in^2)	X-X axis S_x (in^3)	X-X axis S_xC_F (in^3)	X-X axis I_x (in^4)	Y-Y axis S_y (in^3)	Y-Y axis I_y (in^4)	Volume (ft^3/ft)	Weight[a] (lb/ft)
8-1/2-inch width (continued)									
57-3/4	0.84	490.9	4,724.7	3,967.8	136,424.9	695.4	2,955.5	3.41	170.4
59-1/8	0.84	502.6	4,952.3	4,148.2	146,403.4	712.0	3,025.8	3.49	174.5
60-1/2	0.84	514.3	5,185.4	4,332.3	156,857.0	728.5	3,096.2	3.57	178.6
61-7/8	0.83	525.9	5,423.7	4,520.1	167,796.7	745.1	3,166.6	3.65	182.6
10-1/2-inch width									
11	1.00	115.5	211.8	211.8	1,164.6	202.1	1,061.2	0.80	40.1
12-3/8	1.00	129.9	268.0	267.1	1,658.2	227.4	1,193.8	0.90	45.1
13-3/4	0.98	144.4	330.9	325.9	2,274.7	252.7	1,326.4	1.00	50.1
15-1/8	0.97	158.8	400.3	390.2	3,027.6	277.9	1,459.1	1.10	55.1
16-1/2	0.97	173.3	476.4	459.9	3,930.6	303.2	1,591.7	1.20	60.2
17-7/8	0.96	187.7	559.2	534.9	4,997.4	328.5	1,724.4	1.30	65.2
19-1/4	0.95	202.1	648.5	615.3	6,241.7	353.7	1,857.0	1.40	70.2
20-5/8	0.94	216.6	744.4	701.0	7,677.0	379.0	1,989.7	1.50	75.2
22	0.93	231.0	847.0	791.8	9,317.0	404.3	2,122.3	1.60	80.2
23-3/8	0.93	245.4	956.2	887.9	11,175.4	429.5	2,255.0	1.70	85.2
24-3/4	0.92	259.9	1,072.0	989.1	13,265.8	454.8	2,387.6	1.80	90.2
26-1/8	0.92	274.3	1,194.4	1,095.5	15,601.9	480.0	2,520.2	1.90	95.2
27-1/2	0.91	288.8	1,323.4	1,206.9	18,197.3	505.3	2,652.9	2.01	100.3
28-7/8	0.91	303.2	1,459.1	1,323.5	21,065.6	530.6	2,785.5	2.11	105.3
30-1/4	0.90	317.6	1,601.4	1,445.0	24,220.6	555.8	2,918.2	2.21	110.3
31-5/8	0.90	332.1	1,750.2	1,571.6	27,675.8	581.1	3,050.8	2.31	115.3
33	0.89	346.5	1,905.8	1,703.1	31,444.9	606.4	3,183.5	2.41	120.3
34-3/8	0.89	360.9	2,067.9	1,839.7	35,541.5	631.6	3,316.1	2.51	125.3
35-3/4	0.89	375.4	2,236.6	1,981.1	39,979.4	656.9	3,448.8	2.61	130.3
37-1/8	0.88	389.8	2,412.0	2,127.5	44,772.1	682.2	3,581.4	2.71	135.4
38-1/2	0.88	404.3	2,593.9	2,278.8	49,933.3	707.4	3,714.0	2.81	140.4
39-7/8	0.88	418.7	2,782.5	2,435.0	55,476.6	732.7	3,846.7	2.91	145.4
41-1/4	0.87	433.1	2,977.7	2,596.0	61,415.8	758.0	3,979.3	3.01	150.4
42-5/8	0.87	447.6	3,179.6	2,761.9	67,764.3	783.2	4,112.0	3.11	155.4
44	0.87	462.0	3,388.0	2,932.6	74,536.0	808.5	4,244.6	3.21	160.4
45-3/8	0.86	476.4	3,603.1	3,108.1	81,744.4	833.8	4,377.3	3.31	165.4
46-3/4	0.86	490.9	3,824.7	3,288.4	89,403.2	859.0	4,509.9	3.41	170.4
48-1/8	0.86	505.3	4,053.0	3,473.4	97,526.0	884.3	4,642.6	3.51	175.5
49-1/2	0.85	519.8	4,287.9	3,663.3	106,126.5	909.6	4,775.2	3.61	180.5
50-7/8	0.85	534.2	4,529.5	3,857.8	115,218.3	934.8	4,907.8	3.71	185.5
52-1/4	0.85	548.6	4,777.6	4,057.2	124,815.0	960.1	5,040.5	3.81	190.5
53-5/8	0.85	563.1	5,032.4	4,261.2	134,930.4	985.4	5,173.1	3.91	195.5
55	0.84	577.5	5,293.8	4,469.9	145,578.1	1,010.6	5,305.8	4.01	200.5
56-3/8	0.84	591.9	5,561.7	4,683.3	156,771.7	1,035.9	5,438.4	4.11	205.5
57-3/4	0.84	606.4	5,836.4	4,901.4	168,524.9	1,061.2	5,571.1	4.21	210.5
59-1/8	0.84	620.8	6,117.6	5,124.2	180,851.2	1,086.4	5,703.7	4.31	215.6
60-1/2	0.84	635.3	6,405.4	5,351.6	193,764.5	1,111.7	5,836.4	4.41	220.6
61-7/8	0.83	649.7	6,699.9	5,583.7	207,278.2	1,137.0	5,969.0	4.51	225.6
63-1/4	0.83	664.1	7,001.0	5,820.4	221,406.1	1,162.2	6,101.6	4.61	230.6

[a] Based on a unit weight of 50 lb/ft^3.

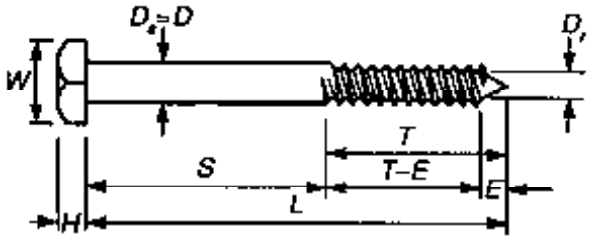
Table 16-4. - Section properties for structural glulam manufactured from Southern Pine with 1-3/8-inch-thick laminations *(continued).*

Depth d (in.)	Size factor C_F	Area A (in^2)	X-X axis S_x (in^3)	X-X axis S_xC_F (in^3)	X-X axis I_x (in^4)	Y-Y axis S_y (in^3)	Y-Y axis I_y (in^4)	Volume (ft^3/ft)	Weight[a] (lb/ft)
10-1/2-inch width (continued)									
64-5/8	0.83	678.6	7,308.7	6,061.7	236,161.8	1,187.5	6,234.3	4.71	235.6
66	0.83	693.0	7,623.0	6,307.6	251,559.0	1,212.8	6,366.9	4.81	240.6
67-3/8	0.83	707.4	7,943.9	6,558.1	267,611.3	1,238.0	6,499.6	4.91	245.6
68-3/4	0.82	721.9	8,271.5	6,813.2	284,332.3	1,263.3	6,632.2	5.01	250.7
70-1/8	0.82	736.3	8,605.7	7,072.9	301,735.7	1,288.5	6,764.9	5.11	255.7
71-1/2	0.82	750.8	8,946.4	7,337.1	319,835.1	1,313.8	6,897.5	5.21	260.7
72-7/8	0.82	765.2	9,293.8	7,605.9	338,644.3	1,339.1	7,030.2	5.31	265.7
74-1/4	0.82	779.6	9,647.9	7,879.2	358,176.8	1,364.3	7,162.8	5.41	270.7
75-5/8	0.82	794.1	10,008.5	8,157.1	378,446.3	1,389.6	7,295.4	5.51	275.7

[a] Based on a unit weight of 50 lb/ft^3.

Table 16-5. - Typical dimensions of standard lag screws for wood.

All dimensions are in inches



D = Nominal diameter
D_s = D = Diameter of shank
D_r = Diameter at root of thread
W = Width of head across flats
E = Length of tapered tip
H = Height of head
L = Nominal length
S = Length of shank
T = Length of thread
N = Number of threads per inch

Nominal length, L (in.)[a]	Item	Dimension of lag screws with various nominal diameters D									
		1/4	3/8	1/2	9/16	5/8	3/4	7/8	1	1-1/8	1-1/4
All lengths	$D_s=D$	0.250	0.375	0.500	0.5625	0.625	0.750	0.875	1.000	1.125	1.250
	D_r	0.173	0.265	0.371	0.435	0.471	0.579	0.683	0.780	0.887	1.012
	E	3/16	1/4	5/16	3/8	3/8	7/16	1/2	9/16	5/8	3/4
	H	11/64	1/4	21/64	3/8	27/64	1/2	19/32	21/32	3/4	27/32
	W	3/8	9/16	3/4	7/8	15/16	1-1/8	1-5/16	1-1/2	1-11/16	1-7/8
	N	10	7	6	6	5	4-1/2	4	3-1/2	3-1/4	3-1/4
4	S	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2	1-1/2
	T	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2
	$T–E$	2-5/16	2-1/4	2-3/16	2-1/8	2-1/8	2-1/16	2	1-15/16	1-7/8	1-3/4
5	S	2	2	2	2	2	2	2	2	2	2
	T	3	3	3	3	3	3	3	3	3	3
	$T–E$	2-13/16	2-3/4	2-11/16	2-5/8	2-5/8	2-9/16	2-1/2	2-7/16	2-3/8	2-1/4
6	S	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2	2-1/2
	T	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2
	$T–E$	3-5/16	3-1/4	3-3/16	3-1/8	3-1/8	3-1/16	3	2-15/16	2-7/8	2-3/4
7	S	3	3	3	3	3	3	3	3	3	3
	T	4	4	4	4	4	4	4	4	4	4
	$T–E$	3-13/16	3-3/4	3-11/16	3-5/8	3-5/8	3-9/16	3-1/2	3-7/16	3-3/8	3-1/4
8	S	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2	3-1/2
	T	4-1/2	4-1/2	4-1/2	4-1/2	4-1/2	4-1/2	4-1/2	4-1/2	4-1/2	4-1/2
	$T–E$	4-5/16	4-1/4	4-3/16	4-1/8	4-1/8	4-1/16	4	3-15/16	3-7/8	3-3/4
9	S	4	4	4	4	4	4	4	4	4	4
	T	5	5	5	5	5	5	5	5	5	5
	$T–E$	4-13/16	4-3/4	4-11/16	4-5/8	4-5/8	4-9/16	4-1/2	4-7/16	4-3/8	4-1/4
10	S	4-3/4	4-3/4	4-3/4	4-3/4	4-3/4	4-3/4	4-3/4	4-3/4	4-3/4	4-3/4
	T	5-1/4	5-1/4	5-1/4	5-1/4	5-1/4	5-1/4	5-1/4	5-1/4	5-1/4	5-1/4
	$T–E$	5-1/16	5	4-15/16	4-7/8	4-7/8	4-13/16	4-3/4	4-11/16	4-5/8	4-1/2
11	S	5-1/2	5-1/2	5-1/2	5-1/2	5-1/2	5-1/2	5-1/2	5-1/2	5-1/2	5-1/2
	T	5-1/2	5-1/2	5-1/2	5-1/2	5-1/2	5-1/2	5-1/2	5-1/2	5-1/2	5-1/2
	$T–E$	5-9/32	5-1/4	5-3/16	5-1/8	5-1/8	5-1/16	5	4-15/16	4-7/8	4-3/4
12	S	6	6	6	6	6	6	6	6	6	6
	T	6	6	6	6	6	6	6	6	6	6
	$T–E$	5-13/16	5-3/4	5-11/16	5-5/8	5-5/8	5-9/16	5-1/2	5-7/16	5-3/8	5-1/4

[a] Length of thread T on intervening bolt lengths is the same as that of the next shorter length listed. The length of thread T on standard lag screw lengths in excess of 12 inches is equal to one-half the lag screw length, $L/2$.

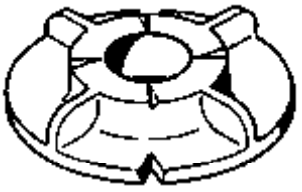
Table 16-6. - Typical dimensions for timber connectors.

Split rings	Dimensions (in.)	
	2-1/2 in.	**4 in.**
Split ring		
Inside diameter at center when closed	2.500	4.000
Thickness of metal at center	0.163	0.193
Depth of metal (width of ring) 0.750	1.000	
Groove		
Inside diameter	2.56	4.08
Width	0.18	0.21
Depth	0.375	0.50
Bolt hole, diameter in timber	9/16	13/16
Washers, standard		
Round, cast or malleable iron, diameter	2-5/8	3
Round, wrought iron (minimum)		
Diameter	1-3/8	2
Thickness	3/32	5/32
Square plate		
Length of side	2	3
Thickness	1/8	3/16
Projected area		
Portion of one ring within member (in^2)	1.10	2.24

Table 16-6. - Typical dimensions for timber connectors (continued).

Shear plates	Dimensions (in.)			
	2-5/8 in.	2-5/8 in.	4-in.	4-in.
Shear plate, material	Pressed steel	Light gage	Malleable iron	Malleable iron
Diameter of plate	2.62	2.62	4.03	4.03
Diameter of hole	0.81	0.81	0.81	0.94
Thickness of plate	0.17	0.12	0.20	0.20
Depth of plate	0.42	0.35	0.64	0.64
Dolt hole, diameter in timber	13/16	13/16	13/16	15/16
Washers, standard				
Round, cast or malleable iron, diameter	3	3	3	3-1/2
Round, wrought iron, minimum				
Diameter	2	2	2	2-1/4
Thickness	5/32	5/32	5/32	11/64
Square Plate				
Length of side	3	3	3	3
Thickness	1/4	1/4	1/4	1/4
Projected area				
Portion of one shear plate within member (in^2)	1.18	1.00	2.58	2.58

Table 16-7. - Typical dimensions and weights for malleable iron washers.



Bolt size (in.)	Outside diameter (in.)	Inside diameter (in.)	Thickness (in.)	Weight per 100 pieces (lb)	Number in 100 lb
3/8	2-1/2	5/8	1/4	20	500
1/2	2-1/2	5/8	1/4	23	435
5/8	2-3/4	3/4	5/16	26	385
3/4	3	7/8	7/16	40	250
7/8	3-1/2	1	7/16	54	185
1	4	1-1/8	1/2	72	139
1-1/8	4-1/2	1-1/4	1/2	108	93
1-1/4	5	1-3/8	9/16	144	69
1-3/8	5-1/2	1-1/2	5/8	150	67
1-1/2	6	1-5/8	3/4	182	55
1-3/4	6	1-7/8	3/4	255	39
2	7-1/2	2-1/8	3/4	420	24

Table 16-8. - Maximum vehicle moment, reaction, and deflection coefficient. Simple span, one wheel line, impact factor not included.

Vehicle type H 15-44

Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient	Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient	Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient
10	30.00	12.00	4.32×10^{8}	47	155.88	15.39[c]	5.19×10^{10}	84	353.43[c]	19.83[c]	4.13×10^{11c}
11	33.00	12.00	5.75×10^{8}	48	159.61	15.51[c]	5.55×10^{10}	85	360.19[c]	19.95[c]	4.31×10^{11c}
12	36.00	12.00	7.46×10^{8}	49	163.35	15.63[c]	5.92×10^{10}	86	367.01[c]	20.07[c]	4.50×10^{11c}
13	39.00	12.00	9.49×10^{8}	50	167.09	15.75[c]	6.31×10^{10}	87	373.88[c]	20.19[c]	4.69×10^{11c}
14	42.00	12.00	1.19×10^{9}	51	170.83	15.87[c]	6.71×10^{10}	88	380.82[c]	20.31[c]	4.89×10^{11c}
15	45.00	12.20	1.46×10^{9}	52	174.57	15.99[c]	7.13×10^{10}	89	387.82[c]	20.43[c]	5.10×10^{11c}
16	48.00	12.38	1.77×10^{9}	53	178.30	16.11[c]	7.57×10^{10}	90	394.88[c]	20.55[c]	5.31×10^{11c}
17	51.00	12.53	2.12×10^{9}	54	182.04	16.23[c]	8.02×10^{10}	91	401.99[c]	20.67[c]	5.53×10^{11c}
18	54.00	12.67	2.52×10^{9}	55	185.78	16.35[c]	8.49×10^{10}	92	409.17[c]	20.79[c]	5.76×10^{11c}
19	57.00	12.79	2.96×10^{9}	56	189.53	16.47[c]	8.98×10^{10}	93	416.41[c]	20.91[c]	5.99×10^{11c}
20	60.00	12.90	3.46×10^{9}	57	193.66[c]	16.59[c]	1.02×10^{11c}	94	423.71[c]	21.03[c]	6.23×10^{11c}
21	63.00	13.00	4.00×10^{9}	58	198.80[c]	16.71[c]	1.09×10^{11c}	95	431.06[c]	21.15[c]	6.48×10^{11c}
22	66.00	13.09	4.60×10^{9}	59	203.99[c]	16.83[c]	1.15×10^{11c}	96	438.48[c]	21.27[c]	6.74×10^{11c}
23	69.00	13.17	5.26×10^{9}	60	209.25[c]	16.95[c]	1.22×10^{11c}	97	445.96[c]	21.39[c]	7.00×10^{11c}
24	72.00	13.25	5.97×10^{9}	61	214.57[c]	17.07[c]	1.30×10^{11c}	98	453.50[c]	21.51[c]	7.27×10^{11c}
25	75.00	13.32	6.75×10^{9}	62	219.95[c]	17.19[c]	1.38×10^{11c}	99	461.09[c]	21.63[c]	7.55×10^{11c}
26	78.00	13.38	7.59×10^{9}	63	225.38[c]	17.31[c]	1.46×10^{11c}	100	468.75[c]	21.75[c]	7.83×10^{11c}
27	81.34	13.44	8.53×10^{9}	64	230.88[c]	17.43[c]	1.54×10^{11c}	101	476.47[c]	21.87[c]	8.12×10^{11c}
28	85.05	13.50	9.65×10^{9}	65	236.44[c]	17.55[c]	1.63×10^{11c}	102	484.25[c]	21.99[c]	8.42×10^{11c}
29	88.76	13.55	1.09×10^{10}	66	242.06[c]	17.67[c]	1.72×10^{11c}	103	492.08[c]	22.11[c]	8.73×10^{11c}
30	92.48	13.60	1.22×10^{10}	67	247.73[c]	17.79[c]	1.82×10^{11c}	104	499.98[c]	22.23[c]	9.05×10^{11c}
31	96.20	13.65	1.36×10^{10}	68	253.47[c]	17.91[c]	1.92×10^{11c}	105	507.94[c]	22.35[c]	9.38×10^{11c}
32	99.92	13.69	1.51×10^{10}	69	259.27[c]	18.03[c]	2.02×10^{11c}	106	515.96[c]	22.47[c]	9.71×10^{11c}
33	103.64	13.73	1.67×10^{10}	70	265.13[c]	18.15[c]	2.13×10^{11c}	107	524.03[c]	22.59[c]	1.01×10^{12c}
34	107.36	13.83[c]	1.84×10^{10}	71	271.04[c]	18.27[c]	2.24×10^{11c}	108	532.17[c]	22.71[c]	1.04×10^{12c}
35	111.09	13.95[c]	2.02×10^{10}	72	277.02[c]	18.39[c]	2.36×10^{11c}	109	540.37[c]	22.83[c]	1.08×10^{12c}
36	114.82	14.07[c]	2.22×10^{10}	73	283.06[c]	18.51[c]	2.48×10^{11c}	110	548.63[c]	22.95[c]	1.11×10^{12c}
37	118.54	14.19[c]	2.42×10^{10}	74	289.16[c]	18.63[c]	2.60×10^{11c}	111	556.94[c]	23.07[c]	1.15×10^{12c}
38	122.27	14.31[c]	2.64×10^{10}	75	295.31[c]	18.75[c]	2.73×10^{11c}	112	565.32[c]	23.19[c]	1.19×10^{12c}
39	126.00	14.43[c]	2.87×10^{10}	76	301.53[c]	18.87[c]	2.87×10^{11c}	113	573.76[c]	23.31[c]	1.23×10^{12c}
40	129.74	14.55[c]	3.11×10^{10}	77	307.81[c]	18.99[c]	3.01×10^{11c}	114	582.26[c]	23.43[c]	1.27×10^{12c}
41	133.47	14.67[c]	3.37×10^{10}	78	314.15[c]	19.11[c]	3.15×10^{11c}	115	590.81[c]	23.55[c]	1.31×10^{12c}
42	137.20	14.79[c]	3.64×10^{10}	79	320.54[c]	19.23[c]	3.30×10^{11c}	116	599.43[c]	23.67[c]	1.36×10^{12c}
43	140.93	14.91[c]	3.92×10^{10}	80	327.00[c]	19.35[c]	3.46×10^{11c}	117	608.11[c]	23.79[c]	1.40×10^{12c}
44	144.67	15.03[c]	4.22×10^{10}	81	333.52[c]	19.47[c]	3.62×10^{11c}	118	616.85[c]	23.91[c]	1.45×10^{12c}
45	148.40	15.15[c]	4.53×10^{10}	82	340.09[c]	19.59[c]	3.78×10^{11c}	119	625.64[c]	24.03[c]	1.49×10^{12c}
46	152.14	15.27[c]	4.85×10^{10}	83	346.73[c]	19.71[c]	3.95×10^{11c}	120	634.50[c]	24.15[c]	1.54×10^{12c}

[a] Reactions are based on point bearing at span ends.

[b] To obtain deflection for one wheel line in inches, divide the deflection coefficient by EI ($lb\text{-}in^2$).

[c] Controlled by lane load rather than truck load.

Table 16-8. - Maximum vehicle moment, reaction, and deflection coefficient. Simple span, one wheel line, impact factor not included *(continued).*

Vehicle type H 20-44

Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient	Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient	Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient
10	40.00	16.00	5.76×10^{8}	47	207.83	20.52[c]	6.92×10^{10}	84	471.24[c]	26.44[c]	5.51×10^{11c}
11	44.00	16.00	7.67×10^{8}	48	212.82	20.68[c]	7.40×10^{10}	85	480.25[c]	26.60[c]	5.75×10^{11c}
12	48.00	16.00	9.95×10^{8}	49	217.80	20.84[c]	7.89×10^{10}	86	489.34[c]	26.76[c]	6.00×10^{11c}
13	52.00	16.00	1.27×10^{9}	50	222.78	21.00[c]	8.41×10^{10}	87	498.51[c]	26.92[c]	6.26×10^{11c}
14	56.00	16.00	1.58×10^{9}	51	227.77	21.16[c]	8.95×10^{10}	88	507.76[c]	27.08[c]	6.53×10^{11c}
15	60.00	16.27	1.94×10^{9}	52	232.75	21.32[c]	9.51×10^{10}	89	517.09[c]	27.24[c]	6.80×10^{11c}
16	64.00	16.50	2.36×10^{9}	53	237.74	21.48[c]	1.01×10^{11}	90	526.50[c]	27.40[c]	7.86×10^{11c}
17	68.00	16.71	2.83×10^{9}	54	242.73	21.64[c]	1.07×10^{11}	91	535.99[c]	27.56[c]	7.38×10^{11c}
18	72.00	16.89	3.36×10^{9}	55	247.71	21.80[c]	1.13×10^{11}	92	545.56[c]	27.72[c]	7.68×10^{11c}
19	76.00	17.05	3.95×10^{9}	56	252.70	21.96[c]	1.20×10^{11}	93	555.21[c]	27.88[c]	7.99×10^{11c}
20	80.00	17.20	4.61×10^{9}	57	258.21[c]	22.12[c]	1.36×10^{11c}	94	564.94[c]	28.04[c]	8.31×10^{11c}
21	84.00	17.33	5.33×10^{9}	58	265.06[c]	22.28[c]	1.45×10^{11c}	95	574.75[c]	28.20[c]	8.64×10^{11c}
22	88.00	17.45	6.13×10^{9}	59	271.99[c]	22.44[c]	1.54×10^{11c}	96	584.64[c]	28.36[c]	8.98×10^{11c}
23	92.00	17.57	7.01×10^{9}	60	279.00[c]	22.60[c]	1.63×10^{11c}	97	594.61[c]	28.52[c]	9.33×10^{11c}
24	96.00	17.67	7.96×10^{9}	61	286.09[c]	22.76[c]	1.73×10^{11c}	98	604.66[c]	28.68[c]	9.69×10^{11c}
25	100.00	17.76	9.00×10^{9}	62	293.26[c]	22.92[c]	1.84×10^{11c}	99	614.79[c]	28.84[c]	1.01×10^{12c}
26	104.00	17.85	1.01×10^{10}	63	300.51[c]	23.08[c]	1.94×10^{11c}	100	625.00[c]	29.00[c]	1.04×10^{12c}
27	108.45	17.93	1.14×10^{10}	64	307.84[c]	23.24[c]	2.06×10^{11c}	101	635.29[c]	29.16[c]	1.08×10^{12c}
28	113.40	18.00	1.29×10^{10}	65	315.25[c]	23.40[c]	2.18×10^{11c}	102	645.66[c]	29.32[c]	1.12×10^{12c}
29	118.35	18.07	1.45×10^{10}	66	322.74[c]	23.56[c]	2.30×10^{11c}	103	656.11[c]	29.48[c]	1.16×10^{12c}
30	123.31	18.13	1.62×10^{10}	67	330.31[c]	23.72[c]	2.43×10^{11c}	104	666.64[c]	29.64[c]	1.21×10^{12c}
31	128.26	18.19	1.81×10^{10}	68	337.96[c]	23.88[c]	2.56×10^{11c}	105	677.25[c]	29.80[c]	1.25×10^{12c}
32	133.23	18.25	2.01×10^{10}	69	345.69[c]	24.04[c]	2.70×10^{11c}	106	687.94[c]	29.96[c]	1.29×10^{12c}
33	138.19	18.30	2.23×10^{10}	70	353.50[c]	24.20[c]	2.84×10^{11c}	107	698.71[c]	30.12[c]	1.34×10^{12c}
34	143.15	18.44[c]	2.46×10^{10}	71	361.39[c]	24.36[c]	2.99×10^{11c}	108	709.56[c]	30.28[c]	1.39×10^{12c}
35	148.12	18.60[c]	2.70×10^{10}	72	369.36[c]	24.52[c]	3.14×10^{11c}	109	720.49[c]	30.44[c]	1.44×10^{12c}
36	153.09	18.76[c]	2.96×10^{10}	73	377.41[c]	24.68[c]	3.31×10^{11c}	110	731.50[c]	30.60[c]	1.49×10^{12c}
37	158.06	18.92[c]	3.23×10^{10}	74	385.54[c]	24.84[c]	3.47×10^{11c}	111	742.59[c]	30.76[c]	1.54×10^{12c}
38	163.03	19.08[c]	3.52×10^{10}	75	393.75[c]	25.00[c]	3.65×10^{11c}	112	753.76[c]	30.92[c]	1.59×10^{12c}
39	168.01	19.24[c]	3.83×10^{10}	76	402.04[c]	25.16[c]	3.82×10^{11c}	113	765.01[c]	31.08[c]	1.64×10^{12c}
40	172.98	19.40[c]	4.15×10^{10}	77	410.41[c]	25.32[c]	4.01×10^{11c}	114	776.34[c]	31.24[c]	1.70×10^{12c}
41	177.96	19.56[c]	4.49×10^{10}	78	418.86[c]	25.48[c]	4.20×10^{11c}	115	787.75[c]	31.40[c]	1.75×10^{12c}
42	182.93	19.72[c]	4.85×10^{10}	79	427.39[c]	25.64[c]	4.40×10^{11c}	116	799.24[c]	31.56[c]	1.81×10^{12c}
43	187.91	19.88[c]	5.23×10^{10}	80	436.00[c]	25.80[c]	4.61×10^{11c}	117	810.81[c]	31.72[c]	1.87×10^{12c}
44	192.89	20.04[c]	5.62×10^{10}	81	444.69[c]	25.96[c]	4.82×10^{11c}	118	822.46[c]	31.88[c]	1.93×10^{12c}
45	197.87	20.20[c]	6.04×10^{10}	82	453.46[c]	26.12[c]	5.04×10^{11c}	119	834.19[c]	32.04[c]	1.99×10^{12c}
46	202.85	20.36[c]	6.47×10^{10}	83	462.31[c]	26.28[c]	5.27×10^{11c}	120	846.00[c]	32.20[c]	2.05×10^{12c}

[a] Reactions are based on point bearing at span ends.

[b] To obtain deflection for one wheel line in inches, divide the deflection coefficient by EI (lb-in^2).

[c] Controlled by lane load rather than truck load.

Table 16-8. - Maximum vehicle moment, reaction, and deflection coefficient. Simple span, one wheel line, impact factor not included *(continued).*

Vehicle type HS 15-44

Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient	Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient	Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient
10	30.00	12.00	4.32×10^{8}	47	215.38	21.64	8.14×10^{10}	84	463.75	24.00	5.38×10^{11}
11	33.00	12.00	5.75×10^{8}	48	222.06	21.75	8.75×10^{10}	85	470.48	24.04	5.58×10^{11}
12	36.00	12.00	7.46×10^{8}	49	228.75	21.86	9.39×10^{10}	86	477.21	24.07	5.79×10^{11}
13	39.00	12.00	9.49×10^{8}	50	235.44	21.96	1.00×10^{11}	87	483.94	24.10	6.00×10^{11}
14	42.00	12.00	1.19×10^{9}	51	242.13	22.06	1.07×10^{11}	88	490.67	24.14	6.22×10^{11}
15	45.00	12.80	1.46×10^{9}	52	248.83	22.15	1.15×10^{11}	89	497.40	24.17	6.44×10^{11}
16	48.00	13.50	1.77×10^{9}	53	255.52	22.25	1.22×10^{11}	90	504.13	24.20	6.67×10^{11}
17	51.00	14.12	2.12×10^{9}	54	262.22	22.33	1.30×10^{11}	91	510.87	24.23	6.91×10^{11}
18	54.00	14.67	2.52×10^{9}	55	268.92	22.42	1.38×10^{11}	92	517.60	24.26	7.15×10^{11}
19	57.00	15.16	2.96×10^{9}	56	275.63	22.50	1.47×10^{11}	93	524.33	24.29	7.39×10^{11}
20	60.00	15.60	3.46×10^{9}	57	282.33	22.58	1.55×10^{11}	94	531.06	24.32	7.64×10^{11}
21	63.00	16.00	4.00×10^{9}	58	289.03	22.66	1.65×10^{11}	95	537.80	24.35	7.90×10^{11}
22	66.00	16.36	4.60×10^{9}	59	295.74	22.73	1.74×10^{11}	96	544.53	24.38	8.16×10^{11}
23	69.00	16.70	5.26×10^{9}	60	302.45	22.80	1.84×10^{11}	97	551.27	24.40	8.42×10^{11}
24	72.25	17.00	7.03×10^{9}	61	309.16	22.87	1.94×10^{11}	98	558.00	24.43	8.69×10^{11}
25	77.76	17.28	8.34×10^{9}	62	315.87	22.94	2.05×10^{11}	99	564.73	24.45	8.97×10^{11}
26	83.31	17.54	9.77×10^{9}	63	322.58	23.00	2.15×10^{11}	100	571.47	24.48	9.26×10^{11}
27	88.89	17.78	1.13×10^{10}	64	329.30	23.06	2.27×10^{11}	101	578.21	24.50	9.55×10^{11}
28	94.50	18.00	1.30×10^{10}	65	336.01	23.12	2.38×10^{11}	102	584.94	24.53	9.84×10^{11}
29	100.14	18.31	1.49×10^{10}	66	342.73	23.18	2.50×10^{11}	103	591.68	24.55	1.01×10^{12}
30	105.80	18.60	1.69×10^{10}	67	349.44	23.24	2.63×10^{11}	104	598.41	24.58	1.04×10^{12}
31	111.48	18.87	1.91×10^{10}	68	356.16	23.29	2.75×10^{11}	105	605.15	24.60	1.08×10^{12}
32	117.19	19.13	2.14×10^{10}	69	362.88	23.35	2.89×10^{11}	106	611.89	24.62	1.11×10^{12}
33	122.91	19.36	2.39×10^{10}	70	369.60	23.40	3.02×10^{11}	107	618.62	24.64	1.14×10^{12}
34	128.82	19.59	2.65×10^{10}	71	376.32	23.45	3.16×10^{11}	108	625.38	24.67	1.17×10^{12}
35	135.45	19.80	2.93×10^{10}	72	383.04	23.50	3.31×10^{11}	109	632.10	24.69	1.21×10^{12}
36	142.08	20.00	3.24×10^{10}	73	389.76	23.55	3.45×10^{11}	110	638.84	24.71	1.24×10^{12}
37	148.72	20.19	3.56×10^{10}	74	396.49	23.59	3.61×10^{11}	111	645.57	24.73	1.28×10^{12}
38	155.37	20.37	3.89×10^{10}	75	403.21	23.64	3.76×10^{11}	112	652.31	24.75	1.31×10^{12}
39	162.02	20.54	4.25×10^{10}	76	409.93	23.68	3.92×10^{11}	113	659.05	24.77	1.35×10^{12}
40	168.68	20.70	4.63×10^{10}	77	416.66	23.73	4.09×10^{11}	114	665.79	24.79	1.39×10^{12}
41	175.34	20.85	5.06×10^{10}	78	423.38	23.77	4.26×10^{11}	115	672.53	24.81	1.42×10^{12}
42	182.00	21.00	5.51×10^{10}	79	430.11	23.81	4.43×10^{11}	116	679.27	24.83	1.46×10^{12}
43	188.67	21.14	5.98×10^{10}	80	436.84	23.85	4.61×10^{11}	117	686.01	24.85	1.50×10^{12}
44	195.34	21.27	6.48×10^{10}	81	443.56	23.89	4.80×10^{11}	118	692.75	24.86	1.54×10^{12}
45	202.02	21.40	7.01×10^{10}	82	450.29	23.93	4.99×10^{11}	119	699.49	24.88	1.58×10^{12}
46	208.70	21.52	7.56×10^{10}	83	457.02	23.96	5.18×10^{11}	120	706.23	24.90	1.62×10^{12}

[a] Reactions are based on point bearing at span ends.

[b] To obtain deflection for one wheel line in inches, divide the deflection coefficient by EI (lb-in^2).

[c] Truck loads control for all spans shown.

Table 16-8. - Maximum vehicle moment, reaction, and deflection coefficient. Simple span, one wheel line, impact factor not included *(continued).*

Vehicle type HS 20-44

Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient	Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient	Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient
10	40.00	16.00	5.76×10^{8}	47	287.17	28.85	1.09×10^{11}	84	618.33	32.00	7.17×10^{11}
11	44.00	16.00	7.67×10^{8}	48	296.08	29.00	1.17×10^{11}	85	627.31	32.05	7.44×10^{11}
12	48.00	16.00	9.95×10^{8}	49	305.00	29.14	1.25×10^{11}	86	636.28	32.09	7.72×10^{11}
13	52.00	16.00	1.27×10^{9}	50	313.92	29.28	1.34×10^{11}	87	645.25	32.14	8.00×10^{11}
14	56.00	16.00	1.58×10^{9}	51	322.84	29.41	1.43×10^{11}	88	654.23	32.18	8.29×10^{11}
15	60.00	17.07	1.94×10^{9}	52	331.77	29.54	1.53×10^{11}	89	663.20	32.22	8.59×10^{11}
16	64.00	18.00	2.36×10^{9}	53	340.70	29.66	1.63×10^{11}	90	672.18	32.27	8.90×10^{11}
17	68.00	18.82	2.83×10^{9}	54	349.63	29.78	1.73×10^{11}	91	681.15	32.31	9.21×10^{11}
18	72.00	19.56	3.36×10^{9}	55	358.56	29.89	1.84×10^{11}	92	690.13	32.35	9.53×10^{11}
19	76.00	20.21	3.95×10^{9}	56	367.50	30.00	1.96×10^{11}	93	699.11	32.39	9.85×10^{11}
20	80.00	20.80	4.61×10^{9}	57	376.44	30.11	2.07×10^{11}	94	708.09	32.43	1.02×10^{12}
21	84.00	21.33	5.33×10^{9}	58	385.38	30.21	2.19×10^{11}	95	717.06	32.46	1.05×10^{12}
22	88.00	21.82	6.40×10^{9}	59	394.32	30.31	2.32×10^{11}	96	726.04	32.50	1.09×10^{12}
23	92.00	22.26	7.81×10^{9}	60	403.27	30.40	2.45×10^{11}	97	735.02	32.54	1.12×10^{12}
24	96.33	22.67	9.38×10^{9}	61	412.21	30.49	2.59×10^{11}	98	744.00	32.57	1.16×10^{12}
25	103.68	23.04	1.11×10^{10}	62	421.16	30.58	2.73×10^{11}	99	752.98	32.61	1.20×10^{12}
26	111.08	23.38	1.30×10^{10}	63	430.11	30.67	2.87×10^{11}	100	761.96	32.64	1.23×10^{12}
27	118.52	23.70	1.51×10^{10}	64	439.06	30.75	3.02×10^{11}	101	770.94	32.67	1.27×10^{12}
28	126.00	24.00	1.74×10^{10}	65	448.02	30.83	3.18×10^{11}	102	779.92	32.71	1.31×10^{12}
29	133.52	24.41	1.99×10^{10}	66	456.97	30.91	3.34×10^{11}	103	788.90	32.74	1.35×10^{12}
30	141.07	24.80	2.25×10^{10}	67	465.93	30.99	3.50×10^{11}	104	797.88	32.77	1.39×10^{12}
31	148.65	25.16	2.54×10^{10}	68	474.88	31.06	3.67×10^{11}	105	806.87	32.80	1.44×10^{12}
32	156.25	25.50	2.85×10^{10}	69	483.84	31.13	3.85×10^{11}	106	815.85	32.83	1.48×10^{12}
33	163.88	25.82	3.18×10^{10}	70	492.80	31.20	4.03×10^{11}	107	824.83	32.86	1.52×10^{12}
34	171.76	26.12	3.53×10^{10}	71	501.76	31.27	4.22×10^{11}	108	833.81	32.89	1.57×10^{12}
35	180.60	26.40	3.91×10^{10}	72	510.72	31.33	4.41×10^{11}	109	842.80	32.92	1.61×10^{12}
36	189.44	26.67	4.31×10^{10}	73	519.68	31.40	4.61×10^{11}	110	851.78	32.95	1.66×10^{12}
37	198.30	26.92	4.74×10^{10}	74	528.65	31.46	4.81×10^{11}	111	860.77	32.97	1.70×10^{12}
38	207.16	27.16	5.19×10^{10}	75	537.61	31.52	5.02×10^{11}	112	869.75	33.00	1.75×10^{12}
39	216.03	27.38	5.67×10^{10}	76	546.58	31.58	5.23×10^{11}	113	878.73	33.03	1.80×10^{12}
40	224.90	27.60	6.18×10^{10}	77	555.55	31.64	5.45×10^{11}	114	887.72	33.05	1.85×10^{12}
41	233.78	27.80	6.74×10^{10}	78	564.51	31.69	5.68×10^{11}	115	896.70	33.08	1.90×10^{12}
42	242.67	28.00	7.34×10^{10}	79	573.48	31.75	5.91×10^{11}	116	905.69	33.10	1.95×10^{12}
43	251.56	28.19	7.98×10^{10}	80	582.45	31.80	6.15×10^{11}	117	914.68	33.13	2.00×10^{12}
44	260.45	28.36	8.65×10^{10}	81	591.42	31.85	6.40×10^{11}	118	923.68	33.15	2.06×10^{12}
45	269.36	28.53	9.35×10^{10}	82	600.39	31.90	6.65×10^{11}	119	932.65	33.18	2.11×10^{12}
46	278.26	28.70	1.01×10^{11}	83	609.36	31.95	6.91×10^{11}	120	941.63	33.20	2.16×10^{12}

[a] Reactions are based on point bearing at span ends.

[b] To obtain deflection for one wheel line in inches, divide the deflection coefficient by EI (lb-in^2).

[c] Truck loads control for all spans shown.

Table 16-8. - Maximum vehicle moment, reaction, and deflection coefficient. Simple span, one wheel line, impact factor not included *(continued).*

Vehicle type HS 25-44

Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient	Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient	Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient
10	50.00	20.00	7.20×10^{8}	47	358.96	36.06	1.36×10^{11}	84	772.92	40.00	8.96×10^{11}
11	55.00	20.00	9.58×10^{8}	48	370.10	36.25	1.46×10^{11}	85	784.13	40.06	9.30×10^{11}
12	60.00	20.00	1.24×10^{9}	49	381.25	36.43	1.56×10^{11}	86	795.35	40.12	9.65×10^{11}
13	65.00	20.00	1.58×10^{9}	50	392.40	36.60	1.67×10^{11}	87	806.57	40.17	1.00×10^{12}
14	70.00	20.00	1.98×10^{9}	51	403.55	36.76	1.79×10^{11}	88	817.78	40.23	1.04×10^{12}
15	75.00	21.33	2.43×10^{9}	52	414.71	36.92	1.91×10^{11}	89	829.00	40.28	1.07×10^{12}
16	80.00	22.50	2.95×10^{9}	53	425.87	37.08	2.04×10^{11}	90	840.22	40.33	1.11×10^{12}
17	85.00	23.53	3.54×10^{9}	54	437.04	37.22	2.17×10^{11}	91	851.44	40.38	1.15×10^{12}
18	90.00	24.44	4.20×10^{9}	55	448.20	37.36	2.30×10^{11}	92	862.66	40.43	1.19×10^{12}
19	95.00	25.26	4.94×10^{9}	56	459.38	37.50	2.44×10^{11}	93	873.88	40.48	1.23×10^{12}
20	100.00	26.00	5.76×10^{9}	57	470.55	37.63	2.59×10^{11}	94	885.11	40.53	1.27×10^{12}
21	105.00	26.67	6.67×10^{9}	58	481.72	37.76	2.74×10^{11}	95	896.33	40.58	1.32×10^{12}
22	110.00	27.27	7.99×10^{9}	59	492.90	37.88	2.90×10^{11}	96	907.55	40.63	1.36×10^{12}
23	115.00	27.83	9.76×10^{9}	60	504.08	38.00	3.06×10^{11}	97	918.78	40.67	1.40×10^{12}
24	120.42	28.33	1.17×10^{10}	61	515.27	38.11	3.23×10^{11}	98	930.00	40.71	1.45×10^{12}
25	129.60	28.80	1.39×10^{10}	62	526.45	38.23	3.41×10^{11}	99	941.22	40.76	1.50×10^{12}
26	138.85	29.23	1.63×10^{10}	63	537.64	38.33	3.59×10^{11}	100	952.45	40.80	1.54×10^{12}
27	148.15	29.63	1.89×10^{10}	64	548.83	38.44	3.78×10^{11}	101	963.68	40.84	1.59×10^{12}
28	157.50	30.00	2.17×10^{10}	65	560.02	38.54	3.97×10^{11}	102	974.90	40.88	1.64×10^{12}
29	166.90	30.52	2.48×10^{10}	66	571.21	38.64	4.17×10^{11}	103	986.13	40.92	1.69×10^{12}
30	176.33	31.00	2.82×10^{10}	67	582.41	38.73	4.38×10^{11}	104	997.36	40.96	1.74×10^{12}
31	185.81	31.45	3.18×10^{10}	68	593.60	38.82	4.59×10^{11}	105	1,008.58	41.00	1.79×10^{12}
32	195.31	31.88	3.56×10^{10}	69	604.80	38.91	4.81×10^{11}	106	1,019.81	41.04	1.85×10^{12}
33	204.85	32.27	3.98×10^{10}	70	616.00	39.00	5.04×10^{11}	107	1,031.04	41.07	1.90×10^{12}
34	214.71	32.65	4.42×10^{10}	71	627.20	39.08	5.27×10^{11}	108	1,042.27	41.11	1.96×10^{12}
35	225.75	33.00	4.89×10^{10}	72	638.40	39.17	5.51×10^{11}	109	1,053.50	41.15	2.01×10^{12}
36	236.81	33.33	5.39×10^{10}	73	649.61	39.25	5.76×10^{11}	110	1,064.73	41.18	2.07×10^{12}
37	247.87	33.65	5.93×10^{10}	74	660.81	39.32	6.01×10^{11}	111	1,075.96	41.22	2.13×10^{12}
38	258.95	33.95	6.49×10^{10}	75	672.02	39.40	6.27×10^{11}	112	1,087.19	41.25	2.19×10^{12}
39	270.03	34.23	7.09×10^{10}	76	683.22	39.47	6.54×10^{11}	113	1,098.42	41.28	2.25×10^{12}
40	281.13	34.50	7.72×10^{10}	77	694.43	39.55	6.82×10^{11}	114	1,109.65	41.32	2.31×10^{12}
41	292.23	34.76	8.43×10^{10}	78	705.64	39.62	7.10×10^{11}	115	1,120.88	41.35	2.37×10^{12}
42	303.33	35.00	9.18×10^{10}	79	716.85	39.68	7.39×10^{11}	116	1,132.11	41.38	2.44×10^{12}
43	314.45	35.23	9.97×10^{10}	80	728.06	39.75	7.69×10^{11}	117	1,143.34	41.41	2.50×10^{12}
44	325.57	35.45	1.08×10^{11}	81	739.27	39.81	8.00×10^{11}	118	1,154.58	41.44	2.57×10^{12}
45	336.69	35.67	1.17×10^{11}	82	750.49	39.88	8.31×10^{11}	119	1,165.81	41.47	2.64×10^{12}
46	347.83	35.87	1.26×10^{11}	83	761.70	39.94	8.63×10^{11}	120	1,177.04	41.50	2.71×10^{12}

[a] Reactions are based on point bearing at span ends.

[b] To obtain deflection for one wheel line in inches, divide the deflection coefficient by EI (lb-in^2).

[c] Truck loads control for all spans shown.

Table 16-8. - Maximum vehicle moment, reaction, and deflection coefficient. Simple span, one wheel line, impact factor not included *(continued).*

Vehicle type Alternate Military Loading

Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient	Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient	Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient
10	50.40	19.20	6.84×10^{8}	47	270.51	22.98	8.88×10^{10}	84	492.29	23.43	5.10×10^{11}
11	56.18	19.64	9.50×10^{8}	48	276.50	23.00	9.46×10^{10}	85	498.28	23.44	5.29×10^{11}
12	62.00	20.00	1.27×10^{9}	49	282.49	23.02	1.01×10^{11}	86	504.28	23.44	5.48×10^{11}
13	67.85	20.31	1.66×10^{9}	50	288.48	23.04	1.07×10^{11}	87	510.28	23.45	5.67×10^{11}
14	73.71	20.57	2.11×10^{9}	51	294.47	23.06	1.14×10^{11}	88	516.27	23.45	5.87×10^{11}
15	79.60	20.80	2.63×10^{9}	52	300.46	23.08	1.20×10^{11}	89	522.27	23.46	6.07×10^{11}
16	85.50	21.00	3.23×10^{9}	53	306.45	23.09	1.28×10^{11}	90	528.27	23.47	6.28×10^{11}
17	91.41	21.18	3.92×10^{9}	54	312.44	23.11	1.35×10^{11}	91	534.26	23.47	6.49×10^{11}
18	97.33	21.33	4.69×10^{9}	55	318.44	23.13	1.43×10^{11}	92	540.26	23.48	6.71×10^{11}
19	103.26	21.47	5.56×10^{9}	56	324.43	23.14	1.51×10^{11}	93	546.26	23.48	6.93×10^{11}
20	109.20	21.60	6.52×10^{9}	57	330.42	23.16	1.59×10^{11}	94	552.26	23.49	7.16×10^{11}
21	115.14	21.71	7.59×10^{9}	58	336.41	23.17	1.67×10^{11}	95	558.25	23.49	7.39×10^{11}
22	121.09	21.82	8.77×10^{9}	59	342.41	23.19	1.76×10^{11}	96	564.25	23.50	7.62×10^{11}
23	127.04	21.91	1.01×10^{10}	60	348.40	23.20	1.85×10^{11}	97	570.25	23.51	7.87×10^{11}
24	133.00	22.00	1.15×10^{10}	61	354.39	23.21	1.95×10^{11}	98	576.24	23.51	8.11×10^{11}
25	138.96	22.08	1.30×10^{10}	62	360.39	23.23	2.05×10^{11}	99	582.24	23.52	8.36×10^{11}
26	144.92	22.15	1.47×10^{10}	63	366.38	23.24	2.15×10^{11}	100	588.24	23.52	8.62×10^{11}
27	150.89	22.22	1.65×10^{10}	64	372.38	23.25	2.25×10^{11}	101	594.24	23.52	8.88×10^{11}
28	156.86	22.29	1.84×10^{10}	65	378.37	23.26	2.36×10^{11}	102	600.24	23.53	9.15×10^{11}
29	162.83	22.34	2.05×10^{10}	66	384.36	23.27	2.47×10^{11}	103	606.23	23.53	9.42×10^{11}
30	168.80	22.40	2.27×10^{10}	67	390.36	23.28	2.58×10^{11}	104	612.23	23.54	9.70×10^{11}
31	174.77	22.45	2.51×10^{10}	68	396.35	23.29	2.70×10^{11}	105	618.23	23.54	9.98×10^{11}
32	180.75	22.50	2.77×10^{10}	69	402.35	23.30	2.82×10^{11}	106	624.23	23.55	1.03×10^{12}
33	186.73	22.55	3.04×10^{10}	70	408.34	23.31	2.95×10^{11}	107	630.22	23.55	1.06×10^{12}
34	192.71	22.59	3.33×10^{10}	71	414.34	23.32	3.08×10^{11}	108	636.22	23.56	1.09×10^{12}
35	198.69	22.63	3.63×10^{10}	72	420.33	23.33	3.21×10^{11}	109	642.22	23.56	1.12×10^{12}
36	204.67	22.67	3.96×10^{10}	73	426.33	23.34	3.35×10^{11}	110	648.22	23.56	1.15×10^{12}
37	210.65	22.70	4.30×10^{10}	74	432.32	23.35	3.49×10^{11}	111	654.22	23.57	1.18×10^{12}
38	216.63	22.74	4.66×10^{10}	75	438.32	23.36	3.63×10^{11}	112	660.21	23.57	1.21×10^{12}
39	222.62	22.77	5.05×10^{10}	76	444.32	23.37	3.78×10^{11}	113	666.21	23.58	1.24×10^{12}
40	228.60	22.80	5.45×10^{10}	77	450.31	23.38	3.93×10^{11}	114	672.21	23.58	1.28×10^{12}
41	234.59	22.83	5.87×10^{10}	78	456.31	23.38	4.08×10^{11}	115	678.21	23.58	1.31×10^{12}
42	240.57	22.86	6.32×10^{10}	79	462.30	23.39	4.24×10^{11}	116	684.21	23.59	1.35×10^{12}
43	246.56	22.88	6.78×10^{10}	80	468.30	23.40	4.41×10^{11}	117	690.21	23.59	1.38×10^{12}
44	252.55	22.91	7.27×10^{10}	81	474.30	23.41	4.58×10^{11}	118	696.20	23.59	1.42×10^{12}
45	258.53	22.93	7.78×10^{10}	82	480.29	23.41	4.75×10^{11}	119	702.20	23.60	1.45×10^{12}
46	264.52	22.96	8.32×10^{10}	83	486.29	23.42	4.92×10^{11}	120	708.20	23.60	1.49×10^{12}

[a] Reactions are based on point bearing at span ends.

[b] To obtain deflection for one wheel line in inches, divide the deflection coefficient by EI ($lb\text{-}in^2$).

Table 16-8. - Maximum vehicle moment, reaction, and deflection coefficient. Simple span, one wheel line, impact factor not included *(continued).*

Vehicle type U80

Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient	Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient	Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient
10	55.56	28.68	9.88×10^{8}	47	552.82	57.17	2.18×10^{11}	84	1,287.94	67.23	1.54×10^{12}
11	64.38	29.43	1.39×10^{9}	48	572.59	57.65	2.35×10^{11}	85	1,307.87	67.38	1.60×10^{12}
12	73.28	30.06	1.88×10^{9}	49	592.37	58.10	2.52×10^{11}	86	1,327.80	67.52	1.66×10^{12}
13	82.23	30.60	2.46×10^{9}	50	612.15	58.54	2.71×10^{11}	87	1,347.73	67.67	1.72×10^{12}
14	91.22	31.05	3.15×10^{9}	51	631.95	58.96	2.91×10^{11}	88	1,367.66	67.81	1.79×10^{12}
15	100.25	31.45	3.95×10^{9}	52	651.75	59.37	3.11×10^{11}	89	1,387.60	67.94	1.85×10^{12}
16	109.30	31.80	4.87×10^{9}	53	671.57	59.76	3.33×10^{11}	90	1,407.53	68.08	1.92×10^{12}
17	118.38	32.10	5.92×10^{9}	54	691.38	60.13	3.56×10^{11}	91	1,427.47	68.21	1.99×10^{12}
18	127.48	32.38	7.10×10^{9}	55	711.21	60.49	3.79×10^{11}	92	1,447.40	68.34	2.06×10^{12}
19	136.59	33.10	8.43×10^{9}	56	731.04	60.84	4.03×10^{11}	93	1,467.34	68.46	2.13×10^{12}
20	145.72	34.22	9.91×10^{9}	57	750.88	61.18	4.29×10^{11}	94	1,487.28	68.59	2.20×10^{12}
21	154.85	35.23	1.15×10^{10}	58	770.72	61.50	4.55×10^{11}	95	1,507.23	68.71	2.28×10^{12}
22	164.00	36.15	1.34×10^{10}	59	790.57	61.81	4.82×10^{11}	96	1,527.17	68.82	2.36×10^{12}
23	173.16	36.99	1.53×10^{10}	60	810.42	62.12	5.11×10^{11}	97	1,547.11	68.94	2.43×10^{12}
24	182.33	38.54	1.75×10^{10}	61	830.28	62.41	5.40×10^{11}	98	1,567.06	69.05	2.51×10^{12}
25	191.50	39.96	1.99×10^{10}	62	850.14	62.69	5.71×10^{11}	99	1,587.00	69.16	2.60×10^{12}
26	200.68	41.27	2.24×10^{10}	63	870.01	62.97	6.02×10^{11}	100	1,606.95	69.27	2.68×10^{12}
27	209.86	42.48	2.52×10^{10}	64	889.88	63.24	6.35×10^{11}	101	1,626.90	69.38	2.76×10^{12}
28	222.34	43.61	2.82×10^{10}	65	909.75	63.49	6.68×10^{11}	102	1,646.85	69.48	2.85×10^{12}
29	236.04	44.66	3.29×10^{10}	66	929.63	63.74	7.03×10^{11}	103	1,666.80	69.58	2.94×10^{12}
30	249.76	45.63	3.84×10^{10}	67	949.51	63.99	7.39×10^{11}	104	1,686.75	69.68	3.03×10^{12}
31	263.48	46.55	4.44×10^{10}	68	969.40	64.22	7.76×10^{11}	105	1,706.70	69.78	3.12×10^{12}
32	278.08	47.41	5.09×10^{10}	69	989.29	64.45	8.15×10^{11}	106	1,726.66	69.88	3.22×10^{12}
33	295.72	48.21	5.79×10^{10}	70	1,009.18	64.67	8.54×10^{11}	107	1,746.61	69.97	3.31×10^{12}
34	313.41	48.97	6.54×10^{10}	71	1,029.08	64.89	8.95×10^{11}	108	1,766.57	70.07	3.41×10^{12}
35	331.15	49.69	7.35×10^{10}	72	1,048.98	65.10	9.37×10^{11}	109	1,786.52	70.16	3.51×10^{12}
36	348.93	50.36	8.21×10^{10}	73	1,068.88	65.30	9.80×10^{11}	110	1,806.48	70.25	3.61×10^{12}
37	366.75	51.00	9.13×10^{10}	74	1,088.78	65.50	1.02×10^{12}	111	1,826.44	70.33	3.71×10^{12}
38	384.61	51.76	1.01×10^{11}	75	1,108.69	65.69	1.07×10^{12}	112	1,846.40	70.42	3.82×10^{12}
39	402.49	52.49	1.11×10^{11}	76	1,128.60	65.88	1.12×10^{12}	113	1,866.35	70.50	3.93×10^{12}
40	420.41	53.18	1.22×10^{11}	77	1,148.51	66.07	1.17×10^{12}	114	1,886.31	70.59	4.03×10^{12}
41	438.36	53.83	1.34×10^{11}	78	1,168.42	66.24	1.22×10^{12}	115	1,906.27	70.67	4.15×10^{12}
42	456.33	54.45	1.46×10^{11}	79	1,188.34	66.42	1.27×10^{12}	116	1,926.23	70.75	4.26×10^{12}
43	474.33	55.05	1.59×10^{11}	80	1,208.25	66.59	1.32×10^{12}	117	1,946.20	70.83	4.37×10^{12}
44	493.57	55.61	1.73×10^{11}	81	1,228.17	66.75	1.37×10^{12}	118	1,966.16	70.91	4.49×10^{12}
45	513.31	56.16	1.88×10^{11}	82	1,248.09	66.92	1.43×10^{12}	119	1,986.12	70.98	4.61×10^{12}
46	533.06	56.67	2.03×10^{11}	83	1,268.02	67.07	1.48×10^{12}	120	2,006.09	71.06	4.73×10^{12}

[a] Reactions are based on point bearing at span ends.

[b] To obtain deflection for one wheel line in inches, divide the deflection coefficient by EI ($lb\text{-}in^2$).

Table 16-8. - Maximum vehicle moment, reaction, and deflection coefficient. Simple span, one wheel line, impact factor not included *(continued).*

Vehicle type U102

Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient	Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient	Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient
10	84.09	43.40	1.50×10^{9}	47	596.51	54.45	2.07×10^{11}	84	1,191.86	74.32	1.39×10^{12}
11	97.44	44.55	2.10×10^{9}	48	610.48	54.92	2.20×10^{11}	85	1,215.49	74.65	1.45×10^{12}
12	110.91	45.50	2.84×10^{9}	49	624.45	55.38	2.34×10^{11}	86	1,239.15	74.98	1.52×10^{12}
13	124.45	46.31	3.72×10^{9}	50	638.42	56.24	2.49×10^{11}	87	1,262.83	75.29	1.59×10^{12}
14	138.06	47.00	3.77×10^{9}	51	652.39	57.07	2.64×10^{11}	88	1,286.53	75.60	1.66×10^{12}
15	151.72	47.60	5.98×10^{9}	52	666.36	57.87	2.80×10^{11}	89	1,310.25	75.91	1.74×10^{12}
16	165.43	48.13	7.37×10^{9}	53	680.34	58.63	2.97×10^{11}	90	1,333.99	76.20	1.81×10^{12}
17	179.17	48.59	8.96×10^{10}	54	694.31	59.37	3.14×10^{11}	91	1,357.75	76.49	1.89×10^{12}
18	192.94	49.00	1.07×10^{10}	55	708.29	60.08	3.32×10^{11}	92	1,381.53	76.77	1.97×10^{12}
19	206.73	49.37	1.28×10^{10}	56	722.27	60.77	3.51×10^{11}	93	1,405.33	77.05	2.06×10^{12}
20	220.54	49.70	1.50×10^{10}	57	736.24	61.43	3.70×10^{11}	94	1,429.15	77.32	2.14×10^{12}
21	234.37	50.00	1.75×10^{10}	58	750.22	62.07	3.90×10^{11}	95	1,452.98	77.59	2.23×10^{12}
22	248.22	50.27	2.02×10^{10}	59	764.20	62.69	4.11×10^{11}	96	1,476.83	77.85	2.32×10^{12}
23	262.08	50.52	2.32×10^{10}	60	778.18	63.29	4.32×10^{11}	97	1,500.69	78.10	2.41×10^{12}
24	275.95	50.75	2.65×10^{10}	61	792.16	63.86	4.54×10^{11}	98	1,524.57	78.35	2.50×10^{12}
25	289.83	50.96	3.01×10^{10}	62	806.14	64.42	4.77×10^{11}	99	1,548.47	78.59	2.60×10^{12}
26	303.73	51.15	3.39×10^{10}	63	820.12	64.96	5.00×10^{11}	100	1,572.38	78.83	2.70×10^{12}
27	317.62	51.33	3.81×10^{10}	64	834.11	65.52	5.25×10^{11}	101	1,596.65	79.07	2.80×10^{12}
28	331.53	51.50	4.26×10^{10}	65	848.09	66.09	5.50×10^{11}	102	1,621.41	79.30	2.90×10^{12}
29	345.44	51.66	4.75×10^{10}	66	862.07	66.64	5.76×10^{11}	103	1,646.20	79.52	3.00×10^{12}
30	359.36	51.80	5.27×10^{10}	67	876.06	67.17	6.02×10^{11}	104	1,670.99	79.74	3.11×10^{12}
31	373.29	51.94	5.83×10^{10}	68	890.04	67.69	6.30×10^{11}	105	1,695.81	79.96	3.22×10^{12}
32	387.21	52.06	6.41×10^{10}	69	904.03	68.20	6.58×10^{11}	106	1,720.63	80.17	3.33×10^{12}
33	401.15	52.18	7.05×10^{10}	70	918.01	68.69	6.87×10^{11}	107	1,745.48	80.38	3.44×10^{12}
34	415.08	52.29	7.72×10^{10}	71	932.00	69.16	7.17×10^{11}	108	1,770.34	80.58	3.56×10^{12}
35	429.02	52.40	8.44×10^{10}	72	945.98	69.63	7.48×10^{11}	109	1,795.21	80.79	3.68×10^{12}
36	442.97	52.50	9.19×10^{10}	73	959.97	70.08	7.80×10^{11}	110	1,820.09	80.98	3.80×10^{12}
37	456.92	52.59	9.99×10^{10}	74	973.96	70.52	8.25×10^{11}	111	1,844.99	81.18	3.92×10^{12}
38	470.87	52.68	1.08×10^{11}	75	987.94	70.94	8.74×10^{11}	112	1,869.90	81.37	4.05×10^{12}
39	484.82	52.77	1.17×10^{11}	76	1,003.73	71.36	9.24×10^{11}	113	1,894.83	81.55	4.18×10^{12}
40	498.77	52.85	1.27×10^{11}	77	1,027.14	71.76	9.76×10^{11}	114	1,919.77	81.74	4.31×10^{12}
41	512.73	52.93	1.37×10^{11}	78	1,050.59	72.16	1.03×10^{12}	115	1,944.71	81.92	4.44×10^{12}
42	526.69	53.00	1.47×10^{11}	79	1,074.07	72.54	1.08×10^{12}	116	1,969.67	82.10	4.58×10^{12}
43	540.65	53.07	1.58×10^{11}	80	1,097.57	72.91	1.14×10^{12}	117	1,994.65	82.27	4.71×10^{12}
44	554.61	53.14	1.69×10^{11}	81	1,121.10	73.28	1.20×10^{12}	118	2,019.63	82.44	4.85×10^{12}
45	568.57	53.44	1.81×10^{11}	82	1,144.66	73.64	1.26×10^{12}	119	2,044.62	82.61	5.00×10^{12}
46	582.54	53.95	1.94×10^{11}	83	1,168.25	73.98	1.32×10^{12}	120	2,069.63	82.78	5.14×10^{12}

[a] Reactions are based on point bearing at span ends.

[b] To obtain deflection for one wheel line in inches, divide the deflection coefficient by EI ($lb\text{-}in^2$).

Table 16-8. - Maximum vehicle moment, reaction, and deflection coefficient. Simple span, one wheel line, impact factor not included *(continued).*

Vehicle type L90

Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient	Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient	Span (ft)	Moment (ft-kips)	Reaction[a] (kips)	Deflection[b] coefficient
0	75.00	30.00	3.60×10^{7}	47	888.75	75.64	3.21×10^{11}	84	1,721.25	81.96	1.89×10^{12}
11	90.75	33.00	4.79×10^{7}	48	911.25	75.94	3.42×10^{11}	85	1,743.75	82.06	1.96×10^{12}
12	108.00	36.00	6.22×10^{7}	49	933.75	76.22	3.65×10^{11}	86	1,766.25	82.15	2.03×10^{12}
13	126.75	39.00	7.91×10^{7}	50	956.25	76.50	3.88×10^{11}	87	1,788.75	82.24	2.10×10^{12}
14	147.00	42.00	9.88×10^{7}	51	978.75	76.76	4.13×10^{11}	88	1,811.25	82.33	2.18×10^{12}
15	168.75	45.00	1.22×10^{8}	52	1,001.25	77.02	4.38×10^{11}	89	1,833.75	82.42	2.25×10^{12}
16	191.25	47.81	8.81×10^{8}	53	1,023.75	77.26	4.64×10^{11}	90	1,856.25	82.50	2.33×10^{12}
17	213.75	50.29	1.11×10^{10}	54	1,046.25	77.50	4.92×10^{11}	91	1,878.75	82.58	2.41×10^{12}
18	236.25	52.50	1.37×10^{10}	55	1,068.75	77.73	5.20×10^{11}	92	1,901.25	82.66	2.49×10^{12}
19	258.75	54.47	1.67×10^{10}	56	1,091.25	77.95	5.50×10^{11}	93	1,923.75	82.74	2.57×10^{12}
20	281.25	56.25	2.00×10^{10}	57	1,113.75	78.16	5.81×10^{11}	94	1,946.25	82.82	2.66×10^{12}
21	303.75	57.86	2.37×10^{10}	58	1,136.25	78.36	6.12×10^{11}	95	1,968.75	82.89	2.74×10^{12}
22	326.25	59.32	2.78×10^{10}	59	1,158.75	78.56	6.45×10^{11}	96	1,991.25	82.97	2.83×10^{12}
23	348.75	60.65	3.24×10^{10}	60	1,181.25	78.75	6.79×10^{11}	97	2,013.75	83.04	2.92×10^{12}
24	371.25	61.88	3.74×10^{10}	61	1,203.75	78.93	7.15×10^{11}	98	2,036.25	83.11	3.02×10^{12}
25	393.75	63.00	4.29×10^{10}	62	1,226.25	79.11	7.51×10^{11}	99	2,058.75	83.18	3.11×10^{12}
26	416.25	64.04	4.88×10^{10}	63	1,248.75	79.29	7.89×10^{11}	100	2,081.25	83.25	3.20×10^{12}
27	438.75	65.00	5.53×10^{10}	64	1,271.25	79.45	8.27×10^{11}	101	2,103.75	83.32	3.30×10^{12}
28	461.25	65.89	6.23×10^{10}	65	1,293.75	79.62	8.67×10^{11}	102	2,126.25	83.38	3.40×10^{12}
29	483.75	66.72	6.98×10^{10}	66	1,316.25	79.77	9.09×10^{11}	103	2,148.75	83.45	3.50×10^{12}
30	506.25	67.50	7.79×10^{10}	67	1,338.75	79.93	9.51×10^{11}	104	2,171.25	83.51	3.61×10^{12}
31	528.75	68.23	8.66×10^{10}	68	1,361.25	80.07	9.95×10^{11}	105	2,193.75	83.57	3.71×10^{12}
32	551.25	68.91	9.59×10^{10}	69	1,383.75	80.22	1.04×10^{12}	106	2,216.25	83.63	3.82×10^{12}
33	573.75	69.55	1.06×10^{11}	70	1,406.25	80.36	1.09×10^{12}	107	2,238.75	83.69	3.93×10^{12}
34	596.25	70.15	1.16×10^{11}	71	1,428.75	80.49	1.14×10^{12}	108	2,261.25	83.75	4.04×10^{12}
35	618.75	70.71	1.28×10^{11}	72	1,451.25	80.63	1.18×10^{12}	109	2,283.75	83.81	4.16×10^{12}
36	641.25	71.25	1.39×10^{11}	73	1,473.75	80.75	1.24×10^{12}	110	2,306.25	83.86	4.27×10^{12}
37	663.75	71.76	1.52×10^{11}	74	1,496.25	80.88	1.29×10^{12}	111	2,328.75	83.92	4.39×10^{12}
38	686.25	72.24	1.65×10^{11}	75	1,518.75	81.00	1.34×10^{12}	112	2,351.25	83.97	4.51×10^{12}
39	708.75	72.69	1.79×10^{11}	76	1,541.25	81.12	1.40×10^{12}	113	2,373.75	84.03	4.64×10^{12}
40	731.25	73.13	1.94×10^{11}	77	1,563.75	81.23	1.45×10^{12}	114	2,396.25	84.08	4.76×10^{12}
41	753.75	73.54	2.10×10^{11}	78	1,586.25	81.35	1.51×10^{12}	115	2,418.75	84.13	4.89×10^{12}
42	776.25	73.93	2.26×10^{11}	79	1,608.75	81.46	1.57×10^{12}	116	2,441.25	84.18	5.02×10^{12}
43	798.75	74.30	2.43×10^{11}	80	1,631.25	81.56	1.63×10^{12}	117	2,463.75	84.23	5.15×10^{12}
44	821.25	74.66	2.61×10^{11}	81	1,653.75	81.67	1.69×10^{12}	118	2,486.25	84.28	5.28×10^{12}
45	843.75	75.00	2.80×10^{11}	82	1,676.25	81.77	1.76×10^{12}	119	2,508.75	84.33	5.42×10^{12}
46	866.25	75.33	3.00×10^{11}	83	1,698.75	81.87	1.82×10^{12}	120	2,531.25	84.38	5.56×10^{12}

[a] Reactions are based on point bearing at span ends.

[b] To obtain deflection for one wheel line in inches, divide the deflection coefficient by EI (lb-in^2).

Table 16-9. - Timber industry abbreviations.*

ACA	Ammoniacal copper arsenite
ACC	Acid copper chromate
AD	Air-dried
ADF	After deducting freight
ADI	After date of invoice
AF	Alpine fir
ALS	American Lumber Standard
AS	Ashes
AST	Anti-stain treated
AV	Average
AVG	Average
AW&L	All widths and lengths
B/L	Bill of lading
B&B	B and better
B&BTR	B and better
B&S	Beams & stringers
B1S	Edge bead one side
B2S	Edge bead two sides
BC&2S	Edge and bead two sides
BD FT	Board feet
BD	Board
BDL	Bundle
BE	Beech
BEV	Beveled
BH	Boxed heart
Bl	Birch
BL	Bill of lading
BM	Board measure
BSND	Bright sapwood no defect
BTR	Better
BW	Black walnut
C/L	Carload
CB	Center beaded
CB1S	Center bead on one side
CB2S	Center bead on two sides
CC	Cubical content
CCA	Chromated copper arsenate
CF	Cost and freight
CFT	Cubic foot
CG2E	Center groove on two edges
CIF	Cost, insurance, and freight
CIFE	Cost, insurance, freight, and exchange
CLF	Hundred lineal feet
CLG	Ceiling
CLR	Clear
CM	Center matched
COM	Common
CONST	Construction
CS	Caulking seam
CSG	Casing
CU FT	Cubic feet
CV	Center Vee
CV1S	Center Vee on one side
CV2S	Center Vee on two sides
CWT	Hundredweight
D/S	Drop siding
D/SDG	Drop siding
D&CM	Dressed and center matched
D&H	Dressed and headed
D&M	Dressed and matched
D&SM	Dressed and standard matched
D1S	Surfaced one side
D2S	Surfaced two sides
D2S&CM	Dressed two sides and center matched
D2S&SM	Dressed two sides and standard matched
DB PART	Double beaded partition
DB CLG	Double beaded ceiling
DB2S	Edge and center beads two sides
DET	Double end trimmed
DF	Douglas fir
DF-L	Douglas Fir-Larch
DIM	Dimension
DKG	Decking
DS	Drop siding
DV1S	Edge and center Vee one side
DV2S	Edge and center Vee two sides
E	Edge
E&CB1S	Edge and center bead one side
E&CB2S	Edge and center bead two sides

[a] Capitalization and punctuation of abbreviations may vary.

Table 16-9. - Timber industry abbreviations *(continued).*

E&CV1S	Edge and center Vee one side
E&CV2S	Edge and center Vee two sides
EB1S	Edge bead one side
EB2S	Edge bead two sides
EE	Eased edges
EG	Edge grain
EM	End matched
ES	Engelmann spruce
EV1S	Edge Vee one side
EV2S	Edge Vee two sides
FA	Facial area
FAC	Factory
FAS	Firsts and seconds
FAS1F	Firsts and seconds one face
FBM	Feet board measure
FCPW	Flat car paper wrapped
FG	Flat or slash grain
FJ	Finger joint
FLG	Flooring
FOB	Freight on board
FOHC	Free of heart center
FOK	Free of knots
FRM	Framing
FRT	Freight
FT SM	Feet surface measure
G	Girth
G/R	Grooved roofing
G/S	Gradestamped
GM	Grade marked
H OR M	Hit or miss
H-F	Hem-Fir
H&M	Hit and miss
HB	Hollow back
HEM	Hemlock
HI	Hickory
HRT	Heart
HRT G	Heart girth
HRT FA	Heart facial area
HRT CC	Heart cubical content
IC	Incense cedar
IND	Industrial
IWP	Idaho white pine
J&P	Joists and planks
JP	Jack pine
JTD	Jointed
KD	Kiln dried
L	Western larch
L	Longer
LBR	Lumber
LCL	Less than carload
LF	Light framing
LFT	Linear feet
LFVC	Loaded fully visual capacity
LGR	Longer
LGTH	Length
LIN	Lineal
LIN FT	Linear feet
LL	Long leaf
LNG	Lining
LP	Lodgepole pine
LVL	Laminated lumber veneer
M	Thousand
M-S	Mixed species
MA	Maple
MBF	Thousand board feet
MBM	Thousand feet board measure
MC	Moisture content
MERCH	Merchantable
MFT	Thousand feet
MG	Mixed grain
MG	Medium grain
MIN	Minimum
ML	Mixed lengths
MLDG	Moulding
MOE	Modulus of elasticity
MOR	Modulus of rupture
MSR	Machine stress rated
N	Nosed
N1E	Nosed one edge
N2E	Nosed two edges
NBM	Net board measure
NO	Number
NP	Red pine (northern)
OA	Oak

Table 16-9. -Timber industry abbreviations *(continued).*

OG	Ogee
ORD	Order
P&T	Posts and timbers
P1S	Planed (surfaced) one side
P2S	Planed (surfaced) two sides
PAD	Partially airdry
PART	Partition
PAT	Pattern
PC	Piece
PCS	Pieces
PE	Plain end
PET	Precision end trimmed
PO	Purchase order
PP	Ponderosa pine
PW	Paper wrapped
QC	Quality control
R/L	Random lengths
R/S	Resawn
R/W	Random widths
RC	Red cedar
RDM	Random
REG	Regular
RES	Resawn
RGH	Rough
RL	Random lengths
RW	Redwood
RW	Random widths
RW&L	Random lengths and widths
S-Dry	Surfaced dry
S-GRN	Surfaced green
S/LAP	Shiplap
S&E	Side & edge
S1E	Surfaced one edge
S1S	Surfaced one side
S1S&CM	Surfaced one side and center matched
S1S1E	Surfaced one side and one edge
S1S2E	Surfaced one side and two edges
S2E	Surfaced two edges
S2S	Surfaced two sides
S2S&CM	Surfaced two sides and center matched
S2S&SL	Surfaced two sides and shiplapped
S2S&SM	Surfaced two sides and standard matched
S2S1E	Surfaced two sides, one edge
S4S	Surfaced four sides
S4S&CS	Surfaced four sides and caulking
S4SEE	Surfaced four sides, eased edges
SB1S	Single bead one side
SB2S	Edge bead two sides
SDG	Siding
SE	Squared edge
SE&S	Square edge and sound
SEL	Select
SG	Slash or flat grain
SGSSND	Sapwood, gum spots and streaks, no defect
SIT SPR	Sitka Spruce
SL	Shiplap
SL&C	Shipper's load and count
SM	Surface measure
SM	Standard matched
SP	Sugar pine
SP	Southern Pine
SPECS	Specifications
SQ	Square
SQRS	Squares
SR	Stress rated
SS	Sitka Spruce
SSND	Sap stain no defect (stained)
STD	Standard
STD M	Standard matched
STK	Stock
STND	Stained
STPG	Stepping
STR	Structural
STRUC	Structural
STRUCT	Structural
SV1S	Edge Vee one side
SV2S	Edge Vee two sides
SYP	Southern yellow pine
T&G	Tongued and grooved
T&T	Truck and trailer
TAD	Thoroughly air dried
TBR	Timber
UTIL	Utility

Table 16-9. - Timber industry abbreviations *(continued).*

V&CV1S	Edge and center Vee one side	WHAD	Worm holes a defect
V&CV2S	Edge and center Vee two sides	WHND	Worm holes no defect
V1S	Edge Vee one side	WP	Ponderosa pine
V2S	Edge Vee two sides	WRC	Western redcedar
VG	Vertical (edge) grained	WRD	Western redcedar
WC	Western redcedar	WT	Weight
WCH	West Coast hemlock	WTH	Width
WCW	West Coast woods	WW	White woods
WDR	Wider	YC	Alaska yellow cedar
WF	Western fir or White fir	YP	Yellow pine

Table 16-10. - List of institutes, agencies, and industry associations.

American Association of State Highway and Transportation Officials (AASHTO)
444 North Capitol Street NW, Suite 225
Washington, DC 20001

American Consulting Engineers Council (ACEC)
1015 Fifteenth Street NW, #802
Washington, DC 20005
(202) 347-7474

American Forest Institute (AFI)
1619 Massachusetts Avenue NW
Washington, DC 20036

American Institute of Architects (AIA)
1735 New York Avenue NW
Washington, D.C. 20006
(202) 626-7300

American Institute of Timber Construction (AITC)
11818 SE Mill Plaine Blvd, Suite 415
Vancover, WA 98684
(206) 254-9132

American Lumber Standards Committee (ALSC)
P.O. Box 210
Germantown, MD 20874
(301) 972-1700

American National Standards Institute (ANSI)
1430 Broadway
New York, NY 10018
(212) 642-4972

American Plywood Association (APA)
P.O. Box 11700
Tacoma, WA 98411
(206) 565-6600

American Society for Testing and Materials (ASTM)
1916 Race Street
Philadelphia, PA 19103
(215) 299-5400

American Society of Civil Engineers (ASCE)
345 East 47th Street
New York, NY 10017
(212) 705-7490

American Wood Council (AWC)
1250 Connecticut Avenue NW, Suite 230
Washington, DC 20036
(202) 833-1595

American Wood Preservers Bureau (AWPB)
P.O. Box 5283
Springfield, VA 22150
(703) 339-6660

American Wood Preservers Institute (AWPI)
1945 Gallows Road, Suite 405
Vienna, VA 22180
(703) 893-4005

American Wood Preservers' Association (AWPA)
P.O. Box 849
Stevensville, MD 21666
(301) 643-4163

Associated General Contractors (AGC)
1957 East Street NW
Washington, DC 20006
(202) 393-2040

California Redwood Association (CRA)
591 Redwood Highway, Suite 3100
Mill Valley, CA 94941
(415) 381-1304

Canadian Wood Council (CWC)
85 Albert St.
Ottawa, ON, Canada K1P 6A4
(613) 235-7221

Construction Specifications Institute (CSI)
601 Madison Street
Alexandria, VA 22314
(703) 684-0300

Table 16-10. - List of institutes, agencies, and industry associations *(continued).*

Forest Products Laboratory (FPL)
U.S. Department of Agriculture
One Gifford Pinchot Drive
Madison, WI 53705-2398
(608) 231-9200

Forest Products Research Society (FPRS)
2801 Marshall Court
Madison, WI 53705
(608) 231-1361

National Bureau of Standards (NBS)
U.S. Department of Commerce
Washington, DC 20234

Ministry of Transportation and Communications
Research and Development Branch
Room 331, Central Building, Third Floor
1201 Wilson Avenue
Downsview, ON, Canada M3M 1J8
(416) 235-4700

National Forest Products Association (NFPA)
1250 Connecticut Avenue NW
Washington, DC 20036
(202) 463-2700

National Hardwood Lumber Association (NHLA)
P.O. Box 34518
Memphis, TN 38134
(901) 377-1818

National Institute of Building Science (NIBS)
1015 Fifteenth Street NW, Suite 700
Washington, DC 20006

National Lumber Grades Authority (NLGA)
P.O. Box 97
Ganges, BC, Canada VDS 1E0

National Technical Information Service (NTIS)
US. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161

National Timber Piling Council, Inc. (NTPC)
P.O. Box 358
Fords, NJ 08863
(201) 738-8811

North American Wholesale Lumber Association (NAWLA)
2340 South Arlington Heights Road, Suite 680
Arlington Heights, IL 60005
(312) 981-8630

North West Timber Association (NWTA)
1355 Oak Street, Suite D
P.O. Box 5554
Eugene, OR 97405
(503) 686-9603

Northeastern Lumber Manufacturers Association (NELMA)
4 Fundy Road
Falmouth, ME 04105
(207) 781-2252

Redwood Inspection Service (RIS)
591 Redwood Highway, Suite 3100
Mill Valley, CA 94941
(415) 381-1304

Society of American Wood Preservers, Inc.
7297 Lee Highway-Unit P
Falls Church, VA 22042
(703) 237-0900

Southern Forest Products Association (SFPA)
P.O. Box 52468
New Orleans, LA 70152
(504) 443-4464

Southern Pine Inspection Bureau (SPIB)
4709 Scenic Highway
Pensacola, FL 32504-9094
(904) 434-2611

Table 16-10. - Listof institutes, agencies, and industry associations *(continued).*

Truss Plate Institute (TPI)
583 D'Onofrio Drive, Suite 200
Madison, WI 53719
(608) 833-5900

West Coast Lumber Inspection Bureau (WCLIB)
6980 SW Varnes Road
P.O. Box 23145
Portland, OR 97223
(503) 639-0651

Western Red Cedar Lumber Association (WRCLA)
1500 Yeon Building
Portland, OR 97204
(503) 224-3930

Western Wood Preservers Institute
1499 Bayshore Highway, Suite 208
Burlingame, CA 94010
(415) 692-0958

Western Wood Products Association (WWPA)
1500 Yeon Building
Portland, OR 97204
(503) 224-3930

Wood Truss Council of America (NTCA)
111 Wacker Drive
Chicago, IL 60601
(312) 644-6601

Table 16-11. - Partial list of firms and plants equipped to produce structural glulam.[a]

Alamco Wood Products, Inc.
1410 West 9th Street
Albert Lea, MN 56007
(507) 373-1401

American Laminators, Inc.
P.O. Box 1846
Eugene, OR 97440
(503) 345-7777
Laminating plant locations:
Drain, OR 97435
Swisshome, OR 97480

Anthony Forest Products Company
Laminating Division
P.O. Box 1877
El Dorado, AR 71730
(501) 862-5594

Bohemia, Inc.
P.O. Box 1819
Eugene, OR 97401
(503) 342-6262

Boise Cascade Corporation
P.O. Box 50
Boise, ID 83728
(208) 384-7151

Unit Structures, Inc.
P.O. Box 23215
Louisville, KY 97479
(502) 244-0825
Laminating plant locations:
Magnolia, AR 71753
Morrisville, NC 27560

Laminated Technologies Inc.
P.O. Box 69
Magna, UT 84044
(801) 250-1585

Laminated Timbers, Inc.
P.O. Box 788
London, KY 40741
(606) 864-5134

Laminated Wood Products Company
P.0. Box L
Ontario, OR 97914
(503) 889-5357

Mississippi Laminators
P.O. Box 405
Shubuta, MS 39360
(601) 687-1571

QB Corporation
P.O. Box 1647
Salmon, ID 83467
(208) 756-4248

Riddle Laminators
P.O. Box 66
Riddle, OR 97469
(503) 874-3151

Rosboro Lumber Company
P.O. Box 20
Springfield, OR 97477
(503) 746-8411

Sentinel Structures, Inc.
477 South Peck Avenue
Peshtigo, WI 54157
(715) 582-4544

Shelton Structures, Inc.
P.O. Box 237
Shelton, WA 98584
(206) 426-5488

[a] This list is based on information current at the time of publication and may be incomplete. Inclusion of firm names implies no endorsement as to quality or prices.

Table 16-11. -Partial list of firms and plants equipped to produce structural glulam *(continued).*

Southern Laminators, Inc.
P.O. Box 1062
Denham Springs, LA 70726
(504) 664-3359

Standard Structures, Inc.
P.O. Box K
Santa Rosa, CA 95402
(707) 544-2982

Structural Wood Systems, Inc.
P.O. Box 250
Greenville, AL 36037
(205) 382-6534

Timberweld Manufacturing
P.O. Box 1535
Billings, MT 59103
(406) 252-7119

Timfab, Inc.
P.O. Box 7
Clackamas, OR 97015
(503) 656-1668

Tyee Timbers, Inc.
P.O. Box 308
Sutherlin, OR 97479
(503) 459-5384

Unadilla Laminated Products
Unadilla, NY 13849
(607) 369-9341

Weyerhaeuser Company
Tacoma, WA 98477
(206) 924-2345
Laminating plant location:
Cottage Grove, OR 97424

Wood Fabricators, Inc.
Iron Horse Park
North Billerica, MA 01862
(617) 663-6511

Table 16-12. - Partial list of suppliers of pressure-treated wood for bridge construction.

The following list of suppliers of pressure treated wood was compiled from responses received from a questionnaire distributed by the American Wood Preservers Institute and the Society of American Wood Preservers, Inc. To simplify use, the list has been prepared by geographic regions identified on the map below. These regions are based on marketing areas identified through the questionnaire. For more current information, contact one of the national wood preserving associations given in Table 16-10.

Inclusion of a company name in this listing is for informational purposes only and implies no endorsement as to price or quality.

Company name	Geographic region(s)
Alabama/Georgia Wood Preserving Co. P.O. Drawer 9 Lafayette, AL 36862 (205) 864-9303 CCA	Southeast, Midwest, Southeast
Allweather Wood Treaters, Inc. P.O. Box 227 Washougal, WA 98671 (206) 835-8547 CCA	Southwest, Rocky Mountain, West Coast

Table 16-12. - Partial list of suppliers of pressure-treated wood for bridge construction *(continued).*

Company name	Geographic region(s)
Atlantic Wood Industries, Inc. P.O. Box 1608 Savannah, GA 31402 (912) 964-1234 CCA, Creosote & Penta	Northeast, Middle Atlantic, Southeast, Midwest, Southcentral, Northcentral
Ayres & Baker Pole & Post Co. P.O. Box 610 Mt. View, WY 82939 (307) 782-3170 CCA	Southwest, Rocky Mountain
J.H. Baxter & Company P.O. Box 10797 Eugene, OR 97440 (503) 689-3020 ACZA, Creosote & Penta	Nationwide
Cherokee Wood Preservers, Inc. P.O. Box 68 Mosheim, TN 37818 (615) 422-4131 CCA	Middle Atlantic, Southeast, Midwest, Southcentral
Colfax Creosoting Company P.O. Box 231 Pineville, LA 71361 (318) 442-2467 CCA, Creosote & Penta	Nationwide
Conasauga River Lumber Co. P.O. Box 2 Conasauga, TN 37316 (615) 338-2886 CCA	Southeast, Southcentral
Conrad Lumber Company 3998 Wildwood Dr. North Bend, OR 97459 (503) 756-2595 CCA	Rocky Mountain, West Coast.

Table 16-12. - Partial list of suppliers of pressure-treated wood for bridge construction *(continued).*

Company name	Geographic region(s)
Continental Wood Preservers, Inc. 7500 E. Division Detroit, MI 48212 (313) 365-4200 CCA	Midwest
Fernwood Industries P.O. Box 90 Fernwood, MS 39635 (601) 684-2011 Creosote & Penta	Southcentral, Northcentral, Southwest
Follen Wood Preserving Co., Inc. P.O. Box 8121 Jackson, MS 39204 (601) 948-1746 CCA	Southeast, Southcentral
Fontana Wholesale Lumber, Inc. P.O. Box 1070 Fontana, CA 92335 (714) 350-1214 CCA	Southwest, Rocky Mountain, West Coast
Frontier Lumber Co., Inc. 1941 Elmwood Ave. Buffalo, NY 14207 (716) 873-8500 CCA	Middle Atlantic
Great Southern Wood Preservers P.O. Box 458 Abbeville, AL 36310 (205) 585-2291 CCA	Southeast, Southcentral
Green Bay Wood Preserving P.O. Box 194 Sheboygan Falls, WI 53085 (414) 467-2671 CCA	Midwest

Table 16-12. - Partial list of suppliers of pressure-treated wood for bridge construction *(continued).*

Company name	Geographic region(s)
Hatheway & Patterson Co., Inc. 15 County St., Box 177 Mansfield, MA 02048 (617) 339-8934 CCA & Penta	Northeast, Middle Atlantic
Hoover Treated Wood Products P.O. Box 746 Thomson, GA 30824 (800) 832-9663 CCA	Northeast, Middle Atlantic, Southeast, Midwest, Northcentral, Southcentral
Hughes Brothers, Inc. P.O. Box 159 Seward, NE 68434 (402) 643-2991 Penta	Nationwide
Jasper Wood Treating, Inc. P.O. Box 106 Jasper, OR 97438 (800) 331-0656 CCA	Southwest, Rocky Mountain, West Coast
Koppers Industries 436 7th Avenue Pittsburgh, PA 15219-1800 (412) 227-2001 CCA, Creosote & Penta	Nationwide
Land O'Lakes Wood Preserving P.O. Box 87 Tenstrike, MN 56683 (218) 586-2203 CCA	Midwest, Northcentral
Langdale Forest Products Co. P.O. Box 1088 Valdosta, GA 31603 (912) 242-7450 CCA	Northeast, Middle Atlantic, Southeast, Midwest, Southcentral

Table 16-12. - Partial list of suppliers of pressure-treated wood for bridge construction *(continued).*

Company name	Geographic region(s)
L.L. Brewton Lumber Co. P.O. Box 191 Winnfield, LA 71483 (318) 628-4131 CCA	Southcentral, Southwest
The Maine Wood Treaters, Inc. RFD 1, Box 5130 Mechanic Falls, ME 04356 (207) 345-8411 CCA	Northeast
McArthur Lumber & Post Co., Inc State Route 93N McArthur, OH 45651 (614) 596-5880 CCA	Midwest, Southcentral
McCormick & Baxter Creosoting P.O. Box 3048 Portland, OR 97208 (503) 286-8394 ACZA, Creosote & Penta	West Coast
McFarland Cascade P.O. Box 1496 Tacoma, WA 98401 (800) 426-8430 ACZA, CCA, Creosote & Penta	Nationwide
T.R. Miller Mill Co. Inc. P.O. Box 708 Brewton, AL 36427 CCA, Creosote & Penta (205) 867-4331	Northeast, Middle Atlantic, Southeast, Midwest, Southcentral, Northcentral
Morgan Lumber Company, Inc. P.O. Drawer 309 Marshville, NC 28103 (704) 624-2146 CCA	Southeast

Table 16-12. - Partial list of suppliers of pressure-treated wood for bridge construction *(continued).*

Company name	Geographic region(s)
National Wood Preservers, Inc. P.O. Box F Havertown, PA 19083 (215) 528-6490 CCA	Northeast, Middle Atlantic
Niedermeyer-Martin Co. P.O. Box 3768 Portland, OR 97208 (800) 547-6952 CCA, Creosote & Penta	Nationwide
Pacific Wood Preserving of Bakersfield 5601 District Blvd. Bakersfield, CA 93313 (805) 833-0429 CCA, Creosote	Southwest, Rocky Mountain, West Coast
Permapost Products Company P.O. Box 100 Hillsboro, OR 97123 (800) 828-0222 CCA & Penta	Nationwide
Pressure Treating Timber Co. 3200 Gowen Rd. Boise, ID 83705 (208) 343-6456 Penta	Southwest, Rocky Mountain, West Coast
Seaman Timber Co., Inc. P.O. Box 372 Montevallo, AL 35115 (205) 665-2536 CCA & Creosote	Southeast, Southcentral, Midwest, Southwest
Selma Treating Co. P.O. Box 89 Selma, CA 93662 (209) 896-1234 CCA & Penta	Southwest, Rocky Mountain, West Coast

Table 16-12. - Partial list of suppliers of pressure-treated wood for bridge construction *(continued).*

Company name	Geographic region(s)
Southern Wood Piedmont P.O. Box 5447 New South Park Spartanburg, SC 29304 (803) 576-7660 CCA, Creosote & Penta	Northeast, Southeast, Middle Atlantic, Midwest
Straits Wood Preserving, Inc. P.O. Box 316 Grayling, MI 49738 (517) 348-2893 CCA	Midwest
Straits Wood Treating, Inc. 610 Oak St. Tawas City, MI 48763 (800) 292-1158 ext.280 CCA	Midwest
Swift Lumber, Inc. P.O. Drawer 1298 Atmore, AL 36504 (205) 368-8800 CCA	Southeast, Southcentral
Taylor-Ramsey Corp. P.O. Box 11888 Lynchburg, VA 24506 (804) 846-6571 CCA	Northeast, Middle Atlantic, Southeast, Southcentral, Midwest
Universal Forest Products P.O. Box 129 Granger, IN 46530 (219) 277-7670 CCA	Midwest
Universal Forest Products P.O. Box 31 Gordon, PA 17936 (717) 875-2811 CCA	Middle Atlantic

Table 16-12. - Partial list of suppliers of pressure-treated wood for bridge construction *(continued).*

Company name	Geographic region(s)
Universal Forest Products 1118 Humes Road Janesville, WI 53545 (608) 755-6200 CCA	Midwest
Western Wood Preserving Co. P.O. Box L Sumner, WA 98390 (206) 863-8191 CCA	West Coast
Weyerhaeuser Company Tacoma, WA 98477 (206) 924-3630 Creosote & Penta	Nationwide
Wheeler Consolidated, Inc. P.O. Box 26100 St. Louis Park, MN 55426 (612) 929-7854 CCA, Creosote & Penta	Nationwide
Wigland Corp. 850 Elkton Dr. Colorado Springs, CO 80907 (303) 599-8838 CCA	Northcentral, Southwest, Rocky Mountain
Wood Preservers, Inc. P.O. Box 1018 Warsaw, VA 22572 (804) 333-4022 CCA & Creosote	Northeast, Southeast, Middle Atlantic
Wyckoff Company 1508 Peoples Bank Bldg. Seattle, WA 98171 (206) 624-3535 ACZA, Creosote & Penta	Nationwide

Consumer Information Sheet

CREOSOTE PRESSURE-TREATED WOOD

CONSUMER INFORMATION

This wood has been preserved by pressure treatment with an EPA-registered pesticide containing creosote to protect it from insect attack and decay. Wood treated with creosote should be used only where such protection is important.

Creosote penetrates deeply into and remains in the pressure-treated wood for a long time. Exposure to creosote may present certain hazards. Therefore, the following precautions should be taken both when handling the treated wood and in determining where to use the treated wood.

USE SITE PRECAUTIONS

Wood treated with creosote should not be used where it will be in frequent or prolonged contact with bare skin (for example, chairs and other outdoor furniture) unless an effective sealer has been applied.

Creosote-treated wood should not be used in residential interiors. Creosote-treated wood in interiors of industrial buildings should be used only for industrial building components which are in ground contact and are subject to decay or insect infestation and wood block flooring. For such uses, two coats of an appropriate sealer must be applied. Sealers may be applied at the installation site.

Wood treated with creosote should not be used in the interiors of farm buildings where there may be direct contact with domestic animals or livestock which may crib (bite) or lick the wood.

In interiors of farm buildings where domestic animals or livestock are unlikely to crib (bite) or lick the wood, creosote-treated wood may be used for building components which are in ground contact and are subject to decay or insect infestation if two coats of an effective sealer are applied. Sealers may be applied at the installation site.

Do not use creosote-treated wood for farrowing or brooding facilities.

Do not use treated wood under circumstances where the preservative may become a component of food or animal feed. Examples of such use would be structures or containers for storing silage or food.

Do not use treated wood for cutting-boards or countertops.

Only treated wood that is visibly clean and free of surface residues should be used for patios, decks and walkways.

Do not use treated wood for construction of those portions of beehives which may come into contact with the honey.

Creosote-treated wood should not be used where it may come into direct or indirect contact with public drinking water, except for uses involving incidental contact such as docks and bridges.

Do not use creosote-treated wood where it may come into direct or indirect contact with drinking water for domestic animals or livestock, except for uses involving incidental contact such as docks and bridges.

HANDLING PRECAUTIONS

Dispose of treated wood by ordinary trash collection or burial. Treated wood should not be burned in open fires or in stoves, fireplaces, or residential boilers, because toxic chemicals may be produced as part of the smoke and ashes. Treated wood from commercial or industrial use (e.g., construction sites) may be burned only in commercial or industrial incinerators or boilers in accordance with state and Federal regulations.

Avoid frequent or prolonged inhalation of sawdust from treated wood. When sawing and machining treated wood, wear a dust mask. Whenever possible, these operations should be performed outdoors to avoid indoor accumulations of airborne sawdust from treated wood.

Avoid frequent or prolonged skin contact with creosote-treated wood; when handling the treated wood, wear long-sleeved shirts and long pants and use gloves impervious to the chemicals (for example, gloves that are vinyl-coated).

When power-sawing and machining, wear goggles to protect eyes from flying particles.

After working with the wood, and before eating, drinking, and use of tobacco products, wash exposed areas thoroughly.

If oily preservatives or sawdust accumulate on clothes, launder before reuse. Wash work clothes separately from other household clothing.

Coal tar pitch and coal tar pitch emulsion are effective sealers for creosote-treated wood-block flooring. Urethane, epoxy, and shellac are acceptable sealers for all creosote-treated wood.

Approved by the U.S. Environmental Protection Agency 9/85

Figure 16-1—Consumer information sheet for creosote pressure-treated wood.

Consumer Information Sheet

PENTACHLOROPHENOL PRESSURE-TREATED WOOD

CONSUMER INFORMATION

This wood has been preserved by pressure-treatment with an EPA-registered pesticide containing pentachlorophenol to protect it from insect attack and decay. Wood treated with pentachlorophenol should be used only where such protection is important.

Pentachlorophenol penetrates deeply into and remains in the pressure-treated wood for a long time. Exposure to pentachlorophenol may present certain hazards. Therefore, the following precautions should be taken both when handling the treated wood and in determining where to use and dispose of the treated wood.

USE SITE PRECAUTIONS

Logs treated with pentachlorophenol should not be used for log homes.

Wood treated with pentachlorophenol should not be used where it will be in frequent or prolonged contact with bare skin (for example, chairs and other outdoor furniture), unless an effective sealer has been applied.

Pentachlorophenol-treated wood should not be used in residential, industrial, or commercial interiors except for laminated beams or for building components which are in ground contact and are subject to decay or insect infestation and where two coats of an appropriate sealer are applied. Sealers may be applied at the installation site.

Wood treated with pentachlorophenol should not be used in the interiors of farm buildings where there may be direct contact with domestic animals or livestock which may crib (bite) or lick the wood.

In interiors of farm buildings where domestic animals or livestock are unlikely to crib (bite) or lick the wood, pentachlorophenol-treated wood may be used for building components which are in ground contact and are subject to decay or insect infestation and where two coats of an appropriate sealer are applied. Sealers may be applied at the installation site.

Do not use pentachlorophenol-treated wood for farrowing or brooding facilities.

Do not use treated wood under circumstances where the preservative may become a component of food or animal feed. Examples of such sites would be structures or containers for storing silage or food.

Do not use treated wood for cutting-boards or countertops.

Only treated wood that is visibly clean and free of surface residue should be used for patios, decks and walkways.

Do not use treated wood for construction of those portions of beehives which may come into contact with the honey.

Pentachlorophenol-treated wood should not be used where it may come into direct or indirect contact with public drinking water, except for uses involving incidental contact such as docks and bridges.

Do not use pentachlorophenol-treated wood where it may come into direct or indirect contact with drinking water for domestic animals or livestock, except for uses involving incidental contact such as docks and bridges.

HANDLING PRECAUTIONS

Dispose of treated wood by ordinary trash collection or burial. Treated wood should not be burned in open fires or in stoves, fireplaces, or residential boilers because toxic chemicals may be produced as part of the smoke and ashes. Treated wood from commercial or industrial use (e.g., construction sites) may be burned only in commercial or industrial incinerators or boilers rated at 20 million BTU/hour or greater heat input or its equivalent in accordance with state and Federal regulations.

Avoid frequent or prolonged inhalation of sawdust from treated wood. When sawing and machining treated wood, wear a dust mask. Whenever possible, these operations should be performed outdoors to avoid indoor accumulations of airborne sawdust from treated wood.

Avoid frequent or prolonged skin contact with pentachlorophenol-treated wood; when handling the treated wood, wear long-sleeved shirts and long pants and use gloves impervious to the chemicals (for example, gloves that are vinyl-coated).

When power-sawing and machining, wear goggles to protect eyes from flying particles.

After working with the wood, and before eating, drinking, and use of tobacco products, wash exposed areas thoroughly.

If oily preservatives or sawdust accumulate on clothes, launder before reuse. Wash work clothes separately from other household clothing.

Urethane, shellac, latex epoxy enamel and varnish are acceptable sealers for pentachlorophenol-treated wood.

Approved by the U.S. Environmental Protection Agency 9/85

Figure 16-2—Consumer information sheet for pentachlorophenol pressure-treated wood.

Consumer Information Sheet

INORGANIC ARSENICAL PRESSURE-TREATED WOOD

(Including: CCA, ACA, and ACZA)

CONSUMER INFORMATION

This wood has been preserved by pressure-treatment with an EPA-registered pesticide containing inorganic arsenic to protect it from insect attack and decay. Wood treated with inorganic arsenic should be used only where such protection is important.

Inorganic arsenic penetrates deeply into and remains in the pressure-treated wood for a long time. Exposure to inorganic arsenic may present certain hazards. Therefore, the following precautions should be taken both when handling the treated wood and in determining where to use or dispose of the treated wood.

USE SITE PRECAUTIONS

Wood pressure-treated with waterborne arsenical preservatives may be used inside residences as long as all sawdust and construction debris are cleaned up and disposed of after construction.

Do not use treated wood under circumstances where the preservative may become a component of food or animal feed. Examples of such sites would be structures or containers for storing silage or food.

Do not use treated wood for cutting-boards or countertops.

Only treated wood that is visibly clean and free of surface residue should be used for patios, decks and walkways.

Do not use treated wood for construction of those portions of beehives which may come into contact with the honey.

Treated wood should not be used where it may come into direct or indirect contact with public drinking water, except for uses involving incidental contact such as docks and bridges.

HANDLING PRECAUTIONS

Dispose of treated wood by ordinary trash collection or burial. Treated wood should not be burned in open fires or in stoves, fireplaces, or residential boilers because toxic chemicals may be produced as part of the smoke and ashes. Treated wood from commercial or industrial use (e.g., construction sites) may be burned only in commercial or industrial incinerators or boilers in accordance with state and Federal regulations.

Avoid frequent or prolonged inhalation of sawdust from treated wood. When sawing and machining treated wood, wear a dust mask. Whenever possible, these operations should be performed outdoors to avoid indoor accumulations of airborne sawdust from treated wood.

When power-sawing and machining, wear goggles to protect eyes from flying particles.

After working with the wood, and before eating, drinking, and use of tobacco products, wash exposed areas thoroughly.

If preservatives or sawdust accumulate on clothes, launder before reuse. Wash work clothes separately from other household clothing.

Approved by the U.S. Environmental Protection Agency 7/85

Figure 16-3—Consumer information sheet for inorganic arsenical pressure-treated wood.