Glued Laminated Beam Design Tables

APA
THE ENGINEERED WOOD ASSOCIATION

WOOD
The Natural Choice

Engineered wood products are a good choice for the environment. They are manufactured for years of trouble-free, dependable use. They help reduce waste by decreasing disposal costs and product damage. Wood is a renewable, recyclable, biodegradable resource that is easily manufactured into a variety of viable products.

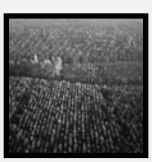
A few facts about wood.

- ***We're growing more wood every day.*** Forests fully cover one-third of the United States' and one-half of Canada's land mass. American landowners plant more than two billion trees every year. In addition, millions of trees seed naturally. The forest products industry, which comprises about 15 percent of forestland ownership, is responsible for 41 percent of replanted forest acreage. That works out to more than one billion trees a year, or about three million trees planted every day. This high rate of replanting accounts for the fact that each year, 27 percent more timber is grown than is harvested. Canada's replanting record shows a fourfold increase in the number of trees planted between 1975 and 1990.

- ***Life Cycle Assessment shows wood is the greenest building product.*** A 2004 Consortium for Research on Renewable Industrial Materials (CORRIM) study gave scientific validation to the strength of wood as a green building product. In examining building products' life cycles – from extraction of the raw material to demolition of the building at the end of its long lifespan – CORRIM found that wood was better for the environment than steel or concrete in terms of embodied energy, global warming potential, air emissions, water emissions and solid waste production. For the complete details of the report, visit www.CORRIM.org.

- ***Manufacturing wood is energy efficient.*** Wood products made up 47 percent of all industrial raw materials manufactured in the United States, yet consumed only 4 percent of the energy needed to manufacture all industrial raw materials, according to a 1987 study.

Material	Percent of Production	Percent of Energy Use
Wood	47	4
Steel	23	48
Aluminum	2	8



- ***Good news for a healthy planet.*** For every ton of wood grown, a young forest produces 1.07 tons of oxygen and absorbs 1.47 tons of carbon dioxide.

Wood: It's the natural choice for the environment, for design and for strong, lasting construction.

GLUED LAMINATED BEAM DESIGN TABLES

Glued laminated beams (glulams) are used in a wide range of applications in both commercial and residential construction. The tables in this data file provide recommended preliminary design loads for two of the most common glulam beam applications: roofs and floors.

The recommendations in this publication apply to glulam beams bearing the APA EWS trademark. The mark appears only on beams manufactured by APA members and signifies that beams are produced to the requirements of American National Standards Institute (ANSI) Standard A190.1. This is the national consensus standard recognized by all model code agencies for the manufacture and trademarking of glulam.

The tables included in this data file include values for section properties and capacities, and allowable loads for simple span and cantilevered beams. The tables are based on an allowable bending stress of F_b = 2,400 psi for both Douglas-fir and southern pine.

These tables assume the compression edge of the beam is braced to prevent lateral buckling. For other bracing conditions, the beams should be checked for lateral stability.

For Douglas-fir, an allowable horizontal shear stress of F_v = 265 psi was used. For southern pine, an allowable horizontal shear stress of F_v = 300 psi was used.

Glulam is also an excellent choice for vertical load carrying members (i.e., posts or columns). For information on the use of glulam for these applications, see APA publication, Design of Structural Glued Laminated Timber Columns, Form Y240.

CONTENTS

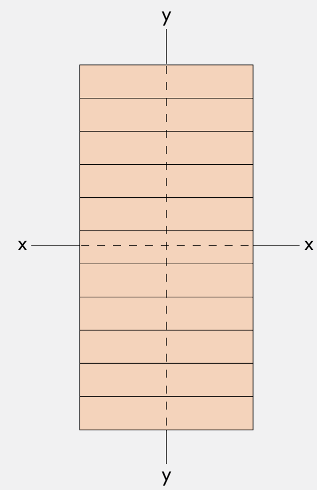
Section Properties and Capacities

Tables 1 and 7 provide section properties and capacities for two commonly used species of glulam beams under dry-use conditions. Bending moment and shear capacities are based on a normal (10-year) duration of load. Dimensions shown are net sizes, and capacities are based on loading perpendicular to the wide faces of the laminations; that is, bending about the x-x axis of the beam, as shown in Figure 1. ***Final design should include a complete analysis, including bearing stresses and lateral stability.***

See Design Examples 1 and 4 (pages 24 and 26) for examples of preliminary design using glulam beam section capacities from Tables 1 and 7.

FIGURE 1

TYPICAL GLULAM BEAM CROSS SECTION



Allowable Loads for Simple Span Glulam Beams

Tables 2, 3, 8 and 9 provide allowable loads for glulam beams used as simple span roof members in snow load areas (DOL factor = 1.15) and for non-snow loads (DOL factor = 1.25). Tables 4 and 10 provide similar information for floor members. The tables can be used to size such members for preliminary design. ***Final design should include a complete analysis, including bearing stresses and lateral stability.***

See Design Examples 2 and 3 (pages 24-25) for examples of preliminary design using glulam beam load-span tables.

Allowable Loads for Cantilevered Glulam Roof Beams

Tables 5, 6, 11 and 12 are for preliminary design of cantilevered roof beams. The tables are based on balanced (fully loaded) as well as unbalanced loading. They do ***not*** include deflection criteria limitations. Final designs should include deflection requirements per the applicable building code, in addition to the bending and shear strength assessments incorporated in these tables. ***Final design should include a complete analysis, including bearing stresses and lateral stability.***

A minimum roof slope of 1/4 inch per foot in addition to specified camber is recommended to help avoid ponding of water on the roof.

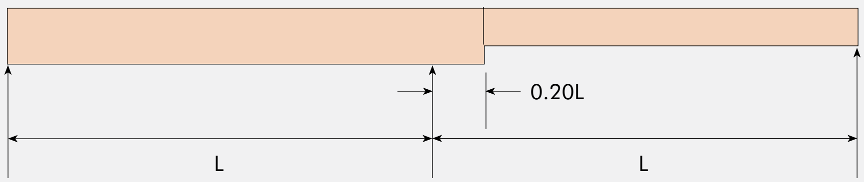
The cantilever beam tables presented are applicable to balanced layups, such as 24F-V8 for Douglas-fir and 24F-V5 for southern pine, for three different systems. See Figure 2 for details of the following typical cantilever systems:

- System 1 is a two-equal-span cantilever system with the cantilevered beam extending past the center support by approximately 0.20 times the span, or 0.20L. Its overall length is therefore 1.2L, and the suspended beam's length is 0.8L.
- System 2 is a three-equal-span cantilever system with each of the two outer cantilevered beams extending past the center support into the middle span by 0.25L. Their length is therefore 1.25L, and the interior suspended beam's length is 0.5L.
- System 3 is also a three-equal-span cantilever system, but the two outer span beams are suspended from the interior, double cantilevered beam, which extends past its two supports by approximately 0.17L. Its length is 1.34L, and the suspended beams are 0.83L each.

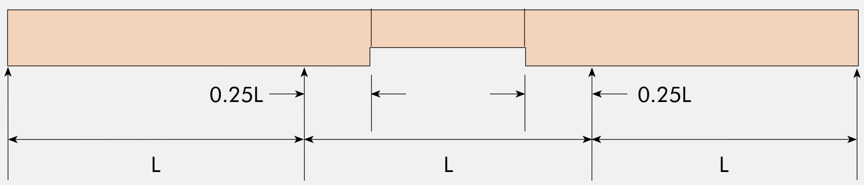
FIGURE 2

TYPICAL CANTILEVER BEAM SYSTEMS

SYSTEM 1



SYSTEM 2



SYSTEM 3

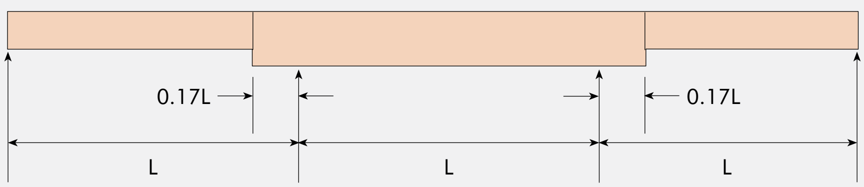


TABLE 1

DOUGLAS-FIR GLUED LAMINATED BEAM SECTION PROPERTIES AND CAPACITIES

F_b = 2,400 psi, E = 1.80 x 10^6 psi, F_v = 265 psi

3-1/8-INCH WIDTH

Depth (in.)	**6**	**7-1/2**	**9**	**10-1/2**	**12**	**13-1/2**	**15**	**16-1/2**	**18**	**19-1/2**	**21**	**22-1/2**	**24**	**25-1/2**	**27**
Beam Weight (lb/ft)	4.6	5.7	6.8	8.0	9.1	10.3	11.4	12.5	13.7	14.8	16.0	17.1	18.2	19.4	20.5
A (in.^{2})	18.75	23.44	28.13	32.81	37.50	42.19	46.88	51.56	56.25	60.94	65.63	70.31	75.00	79.69	84.38
S (in.^{3})	18.75	29.30	42.19	57.42	75.00	94.92	117.2	141.8	168.8	198.0	229.7	263.7	300.0	338.7	379.7
I (in.^{4})	56.25	109.9	189.8	301.5	450.0	640.7	878.9	1170	1519	1931	2412	2966	3600	4318	5126
EI (10^6 lb-in.^{2})	101.3	197.8	341.7	542.6	810.0	1153	1582	2106	2734	3476	4341	5339	6480	7773	9226
Moment Capacity (lb-ft)	3750	5859	8438	11480	15000	18980	23440	28360	33750	39610	45940	52730	60000	67730	75940
Shear Capacity (lb)	3313	4141	4969	5797	6625	7453	8281	9109	9938	10770	11590	12420	13250	14080	14910

3-1/2-INCH WIDTH

Depth (in.)	**6**	**7-1/2**	**9**	**10-1/2**	**12**	**13-1/2**	**15**	**16-1/2**	**18**	**19-1/2**	**21**	**22-1/2**	**24**	**25-1/2**	**27**
Beam Weight (lb/ft)	5.1	6.4	7.7	8.9	10.2	11.5	12.8	14.0	15.3	16.6	17.9	19.1	20.4	21.7	23.0
A (in.^{2})	21.00	26.25	31.50	36.75	42.00	47.25	52.50	57.75	63.00	68.25	73.50	78.75	84.00	89.25	94.50
S (in.^{3})	21.00	32.81	47.25	64.31	84.00	106.3	131.3	158.8	189.0	221.8	257.3	295.3	336.0	379.3	425.3
I (in.^{4})	63.00	123.0	212.6	337.6	504.0	717.6	984.4	1310	1701	2163	2701	3322	4032	4836	5741
EI (10^6 lb-in.^{2})	113.4	221.5	382.7	607.8	907.2	1292	1772	2358	3062	3893	4862	5980	7258	8705	10330
Moment Capacity (lb-ft)	4200	6563	9450	12860	16800	21260	26250	31760	37800	44360	51450	59060	67200	75860	85050
Shear Capacity (lb)	3710	4638	5565	6493	7420	8348	9275	10200	11130	12060	12990	13910	14840	15770	16700

5-1/8-INCH WIDTH

Depth (in.)	**12**	**13-1/2**	**15**	**16-1/2**	**18**	**19-1/2**	**21**	**22-1/2**	**24**	**25-1/2**	**27**	**28-1/2**	**30**	**31-1/2**	**33**
Beam Weight (lb/ft)	14.9	16.8	18.7	20.6	22.4	24.3	26.2	28.0	29.9	31.8	33.6	35.5	37.4	39.2	41.1
A (in.^{2})	61.50	69.19	76.88	84.56	92.25	99.94	107.6	115.3	123.0	130.7	138.4	146.1	153.8	161.4	169.1
S (in.^{3})	123.0	155.7	192.2	232.5	276.8	324.8	376.7	432.4	492.0	555.4	622.7	693.8	768.8	847.5	930.2
I (in.^{4})	738.0	1051	1441	1919	2491	3167	3955	4865	5904	7082	8406	9887	11530	13350	15350
EI (10^6 lb-in.^{2})	1328	1891	2595	3453	4483	5700	7119	8757	10630	12750	15130	17800	20760	24030	27630
Moment Capacity (lb-ft)	24600	31130	38440	46510	55350	64960	75340	86480	98400	111100	124500	138800	153800	169500	186000
Shear Capacity (lb)	10870	12220	13580	14940	16300	17660	19010	20370	21730	23090	24450	25800	27160	28520	29880

5-1/2-INCH WIDTH

Depth (in.)	**12**	**13-1/2**	**15**	**16-1/2**	**18**	**19-1/2**	**21**	**22-1/2**	**24**	**25-1/2**	**27**	**28-1/2**	**30**	**31-1/2**	**33**
Beam Weight (lb/ft)	16.0	18.0	20.1	22.1	24.1	26.1	28.1	30.1	32.1	34.1	36.1	38.1	40.1	42.1	44.1
A (in.^{2})	66.00	74.25	82.50	90.75	99.00	107.3	115.5	123.8	132.0	140.3	148.5	156.8	165.0	173.3	181.5
S (in.^{3})	132.0	167.1	206.3	249.6	297.0	348.6	404.3	464.1	528.0	596.1	668.3	744.6	825.0	909.6	998.3
I (in.^{4})	792.0	1128	1547	2059	2673	3398	4245	5221	6336	7600	9021	10610	12380	14330	16470
EI (10^6 lb-in.^{2})	1426	2030	2784	3706	4811	6117	7640	9397	11400	13680	16240	19100	22280	25790	29650
Moment Capacity (lb-ft)	26400	33410	41250	49910	59400	69710	80850	92810	105600	119200	133700	148900	165000	181900	199700
Shear Capacity (lb)	11660	13120	14580	16030	17490	18950	20410	21860	23320	24780	26240	27690	29150	30610	32070

6-3/4-INCH WIDTH

Depth (in.)	**18**	**19-1/2**	**21**	**22-1/2**	**24**	**25-1/2**	**27**	**28-1/2**	**30**	**31-1/2**	**33**	**34-1/2**	**36**	**37-1/2**	**39**
Beam Weight (lb/ft)	29.5	32.0	34.5	36.9	39.4	41.8	44.3	46.8	49.2	51.7	54.1	56.6	59.1	61.5	64.0
A (in.^{2})	121.5	131.6	141.8	151.9	162.0	172.1	182.3	192.4	202.5	212.6	222.8	232.9	243.0	253.1	263.3
S (in.^{3})	364.5	427.8	496.1	569.5	648.0	731.5	820.1	913.8	1013	1116	1225	1339	1458	1582	1711
I (in.^{4})	3281	4171	5209	6407	7776	9327	11070	13020	15190	17580	20210	23100	26240	29660	33370
EI (10^6 lb-in.^{2})	5905	7508	9377	11530	14000	16790	19930	23440	27340	31650	36390	41580	47240	53390	60060
Moment Capacity (lb-ft)	72900	85560	99230	113900	129600	146300	164000	182800	202500	223300	245000	267800	291600	316400	342200
Shear Capacity (lb)	21470	23250	25040	26830	28620	30410	32200	33990	35780	37560	39350	41140	42930	44720	46510

8-3/4-INCH WIDTH

Depth (in.)	**24**	**25-1/2**	**27**	**28-1/2**	**30**	**31-1/2**	**33**	**34-1/2**	**36**	**37-1/2**	**39**	**40-1/2**	**42**	**43-1/2**	**45**
Beam Weight (lb/ft)	51.0	54.2	57.4	60.6	63.8	67.0	70.2	73.4	76.6	79.8	82.9	86.1	89.3	92.5	95.7
A (in.^{2})	210.0	223.1	236.3	249.4	262.5	275.6	288.8	301.9	315.0	328.1	341.3	354.4	367.5	380.6	393.8
S (in.^{3})	840.0	948.3	1063	1185	1313	1447	1588	1736	1890	2051	2218	2392	2573	2760	2953
I (in.^{4})	10080	12090	14350	16880	19690	22790	26200	29940	34020	38450	43250	48440	54020	60020	66450
EI (10^6 lb-in.^{2})	18140	21760	25830	30380	35440	41020	47170	53900	61240	69210	77860	87190	97240	108000	119600
Moment Capacity (lb-ft)	168000	189700	212600	236900	262500	289400	317600	347200	378000	410200	443600	478400	514500	551900	590600
Shear Capacity (lb)	37100	39420	41740	44060	46380	48690	51010	53330	55650	57970	60290	62610	64930	67240	69560

Notes:

(1) Beam weight is based on density of 35 pcf.

(2) Moment capacity must be adjusted for volume effect. The volume factor for various glulam sizes and simple spans, as well as the complete formula, is given in Appendix A.

(3) Moment and shear capacities are based on a normal (10-year) duration of load and should be adjusted for the design duration of load per the applicable building code.

TABLE 2

ALLOWABLE LOADS FOR SIMPLE SPAN *DOUGLAS-FIR* GLUED LAMINATED ROOF BEAMS (PLF) — NON-SNOW LOADS
Load Duration Factor = 1.25, F_b = 2,400 psi, F_v = 265 psi, E_x = 1,800,000 psi

3-1/8-INCH WIDTH — SPAN (ft)

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
6	581	295	169	105	69	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7-1/2	910	580	333	208	137	95	68	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9	1312	837	579	362	240	167	120	88	66	51	—	—	—	—	—	—	—	—	—	—	—
10-1/2	1786	1140	790	578	385	268	193	143	108	84	65	52	—	—	—	—	—	—	—	—	—
12	2335	1491	1033	756	577	402	291	216	164	127	100	80	64	52	—	—	—	—	—	—	—
13-1/2	2956	1888	1308	958	731	576	417	311	237	184	145	116	94	77	63	52	—	—	—	—	—
15	3651	2332	1616	1184	904	712	575	429	328	255	202	162	132	108	89	74	62	52	—	—	—
16-1/2	4325	2823	1957	1434	1095	863	696	573	439	342	272	219	178	146	121	101	85	72	61	52	—
18	4955	3361	2330	1708	1305	1028	830	684	570	447	355	286	234	192	160	134	113	96	81	70	60
19-1/2	5651	3946	2736	2006	1532	1208	975	801	664	559	454	367	299	247	206	173	146	124	106	91	78
21	6425	4443	3174	2328	1778	1402	1131	923	766	645	550	460	377	311	260	218	185	158	135	116	100
22-1/2	7290	4952	3645	2673	2043	1611	1290	1053	874	736	628	541	466	385	322	271	230	196	169	145	126
24	8263	5503	4122	3043	2326	1825	1459	1191	989	834	711	612	533	467	393	332	282	241	207	179	155
25-1/2	9366	6102	4522	3436	2627	2049	1639	1338	1111	936	799	688	599	525	463	400	340	291	251	217	189
27	10627	6755	4948	3854	2933	2286	1828	1493	1240	1045	891	768	668	586	517	460	407	348	300	260	227

3-1/2-INCH WIDTH — SPAN (ft)

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
6	651	331	189	117	77	53	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7-1/2	1019	650	373	233	154	106	76	55	—	—	—	—	—	—	—	—	—	—	—	—	—
9	1469	937	649	406	269	187	134	99	74	57	—	—	—	—	—	—	—	—	—	—	—
10-1/2	2001	1277	884	647	431	300	216	160	121	94	73	58	—	—	—	—	—	—	—	—	—
12	2615	1670	1156	847	646	451	326	242	184	143	112	89	72	58	—	—	—	—	—	—	—
13-1/2	3311	2115	1465	1073	819	645	467	348	265	206	163	130	105	86	71	58	—	—	—	—	—
15	4089	2612	1810	1327	1013	797	643	480	367	286	226	182	147	121	100	83	69	58	—	—	—
16-1/2	4844	3162	2192	1606	1227	966	780	642	491	384	304	245	199	164	136	113	95	80	68	58	—
18	5550	3765	2610	1913	1461	1151	930	760	631	501	398	321	262	216	179	150	126	107	91	78	67
19-1/2	6329	4420	3064	2247	1716	1353	1086	886	736	619	509	411	335	277	231	194	164	139	119	102	88
21	7196	4976	3555	2607	1992	1566	1252	1022	848	714	609	516	422	349	291	245	207	177	151	130	112
22-1/2	8165	5546	4082	2994	2288	1787	1428	1166	968	815	695	599	520	432	361	304	258	220	189	163	141
24	9255	6163	4617	3408	2594	2021	1616	1319	1095	923	787	678	589	517	440	371	316	270	232	201	174
25-1/2	10490	6834	5065	3849	2912	2269	1814	1481	1230	1037	884	762	663	581	513	448	381	326	281	243	212
27	11902	7566	5542	4306	3247	2531	2024	1653	1373	1157	987	851	740	649	573	509	454	390	336	292	254

5-1/8-INCH WIDTH — SPAN (ft)

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
12	3829	2445	1693	1240	946	660	477	355	270	209	164	131	105	85	69	57	—	—	—	—	—
13-1/2	4848	3097	2145	1572	1199	944	684	509	389	302	238	191	154	126	103	85	71	59	—	—	—
15	5987	3825	2651	1942	1483	1160	926	703	537	419	332	266	216	177	146	121	101	85	72	60	51
16-1/2	7093	4630	3209	2352	1788	1392	1111	906	720	562	446	358	292	240	199	166	139	118	100	85	72
18	8126	5513	3821	2802	2111	1644	1313	1071	888	733	583	470	383	316	262	220	185	157	134	114	98
19-1/2	9268	6472	4487	3264	2460	1915	1530	1248	1036	872	743	601	491	405	338	284	240	204	174	149	128
21	10537	7287	5206	3759	2833	2207	1763	1439	1194	1005	857	738	618	511	426	358	303	259	221	191	165
22-1/2	11955	8121	5937	4287	3232	2518	2012	1642	1363	1148	979	843	732	632	528	445	377	322	277	239	207
24	13551	9024	6713	4848	3655	2848	2277	1858	1543	1300	1108	954	830	727	641	544	462	395	340	294	255
25-1/2	15360	10007	7416	5442	4103	3197	2556	2087	1733	1460	1245	1073	933	817	721	641	558	478	412	356	310
27	17428	11078	8115	6068	4576	3566	2851	2328	1934	1629	1390	1198	1042	913	806	716	639	572	493	427	372
28-1/2	19814	12252	8863	6726	5073	3953	3162	2582	2145	1807	1542	1329	1156	1014	895	795	710	638	575	506	441
30	22598	13544	9664	7416	5594	4360	3487	2848	2366	1994	1701	1467	1276	1119	988	878	785	705	636	576	519
31-1/2	25889	14972	10524	8110	6139	4785	3827	3126	2597	2189	1868	1611	1402	1230	1086	965	863	775	699	633	576
33	28892	16558	11451	8747	6708	5229	4183	3417	2839	2394	2043	1762	1533	1345	1188	1056	944	848	765	694	631

Notes:
(1) Span = simply supported beam.
(2) Maximum deflection = L/180 under total load. Other deflection limits may apply.
(3) Service condition = dry.
(4) Tabulated values represent total loads and have taken the dead weight of the beam (assumed 35 pcf) into account.
(5) Sufficient bearing length shall be provided at supports.
(6) Maximum beam shear is located at a distance from the supports equal to the depth of the beam.
(7) Unshaded (upper-right) areas limited by deflection; medium shaded areas limited by bending strength; darker shaded (lower-left) areas limited by shear strength.

TABLE 2 (continued)

5-1/2-INCH WIDTH											SPAN (ft)										
Depth (in.)	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**
12	4109	2624	1817	1331	1015	708	512	381	290	224	176	140	113	91	74	61	—	—	—	—	—
13-1/2	5203	3323	2302	1687	1287	1010	734	547	417	324	256	205	165	135	111	92	76	63	53	—	—
15	6425	4105	2845	2085	1588	1235	986	755	577	449	356	286	232	190	157	130	109	91	77	65	55
16-1/2	7612	4969	3444	2524	1905	1483	1184	965	772	603	478	385	313	257	213	178	150	126	107	91	77
18	8721	5916	4101	2985	2249	1751	1399	1141	946	787	625	504	411	339	281	236	199	168	143	122	105
19-1/2	9946	6945	4815	3478	2621	2041	1631	1330	1104	929	791	645	527	435	362	304	257	219	187	160	138
21	11308	7820	5547	4005	3019	2351	1879	1533	1272	1071	913	786	663	548	457	384	326	277	238	205	177
22-1/2	12830	8715	6326	4568	3444	2683	2144	1750	1453	1223	1043	898	780	678	567	477	405	346	297	256	222
24	14543	9685	7153	5166	3895	3034	2426	1980	1644	1385	1180	1017	884	774	683	584	496	424	365	315	273
25-1/2	16484	10739	7959	5799	4372	3407	2724	2224	1847	1556	1326	1143	994	871	769	682	599	513	442	382	332
27	18703	11889	8709	6466	4876	3800	3038	2481	2060	1736	1481	1276	1110	973	859	763	681	611	529	458	399
28-1/2	21264	13149	9511	7167	5405	4212	3369	2751	2285	1926	1643	1416	1232	1080	953	847	757	679	612	543	474
30	24252	14535	10371	7903	5960	4646	3716	3034	2521	2125	1813	1563	1360	1192	1053	936	836	751	677	613	557
31-1/2	27783	16067	11294	8672	6541	5099	4078	3331	2768	2333	1991	1716	1494	1310	1157	1028	919	825	745	675	613
33	30788	17770	12289	9387	7148	5572	4457	3641	3025	2550	2176	1877	1633	1433	1266	1125	1006	904	815	739	672

6-3/4-INCH WIDTH											SPAN (ft)										
Depth (in.)	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**	**50**
18	7260	4972	3589	2704	2105	1681	1371	1137	957	767	618	504	416	345	289	244	207	176	150	129	110
19-1/2	8507	5791	4181	3151	2453	1960	1599	1326	1116	951	792	647	534	445	373	316	268	229	197	169	146
21	9597	6669	4815	3629	2826	2259	1843	1529	1287	1097	944	813	672	561	472	400	341	292	251	217	188
22-1/2	10696	7605	5492	4140	3225	2577	2103	1746	1470	1253	1079	937	821	696	586	497	424	364	314	272	236
24	11886	8600	6211	4682	3648	2916	2380	1976	1664	1419	1222	1062	930	821	716	609	520	447	387	336	292
25-1/2	13179	9652	6971	5256	4095	3274	2673	2219	1870	1594	1373	1194	1046	923	820	732	630	542	469	408	356
27	14591	10688	7773	5862	4568	3652	2982	2476	2086	1779	1533	1333	1169	1031	916	818	734	649	562	490	428
28-1/2	16137	11673	8617	6498	5064	4050	3307	2747	2314	1974	1702	1480	1297	1145	1017	909	816	735	666	581	509
30	17838	12728	9501	7166	5585	4467	3647	3030	2554	2178	1878	1634	1433	1265	1124	1004	902	813	736	669	599
31-1/2	19719	13861	10426	7864	6130	4903	4004	3327	2804	2392	2063	1795	1574	1390	1235	1104	991	894	810	736	672
33	21808	15081	11392	8593	6698	5358	4376	3636	3065	2616	2256	1963	1722	1521	1352	1208	1085	979	887	807	736
34-1/2	24144	16400	12399	9353	7291	5833	4764	3959	3338	2849	2457	2138	1876	1657	1473	1317	1183	1068	968	880	803
36	26772	17828	13357	10143	7907	6326	5168	4295	3621	3091	2666	2321	2036	1799	1600	1430	1285	1160	1052	957	873
37-1/2	29520	19381	14364	10963	8547	6839	5587	4644	3916	3342	2883	2510	2203	1947	1731	1548	1391	1256	1139	1036	946
39	31806	21076	15439	11814	9211	7370	6022	5005	4221	3603	3109	2707	2375	2099	1867	1670	1501	1356	1229	1118	1021

8-3/4-INCH WIDTH											SPAN (ft)										
Depth (in.)	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**	**50**	**52**
24	10861	7844	5913	4606	3682	3005	2494	2101	1790	1542	1340	1174	1035	919	789	675	580	501	435	379	331
25-1/2	12190	8804	6638	5172	4134	3375	2802	2360	2012	1733	1507	1320	1165	1034	923	816	703	608	529	462	404
27	13592	9817	7403	5768	4612	3765	3126	2634	2246	1935	1683	1475	1301	1156	1032	926	834	729	635	555	487
28-1/2	15065	10882	8206	6395	5114	4175	3468	2922	2492	2148	1868	1637	1445	1284	1146	1029	927	839	753	660	580
30	16499	11999	9049	7052	5640	4605	3826	3224	2750	2370	2062	1808	1596	1418	1267	1137	1025	928	843	769	683
31-1/2	17968	13168	9931	7741	6191	5056	4200	3540	3020	2604	2265	1986	1754	1559	1393	1251	1128	1021	928	847	774
33	19550	14388	10852	8459	6766	5526	4591	3870	3302	2847	2478	2173	1919	1706	1524	1369	1235	1119	1017	928	849
34-1/2	21259	15659	11812	9207	7365	6016	4999	4214	3596	3101	2699	2368	2091	1859	1662	1493	1347	1220	1110	1013	927
36	23111	16980	12809	9986	7988	6526	5423	4572	3902	3365	2929	2570	2271	2019	1805	1621	1463	1326	1206	1101	1008
37-1/2	25124	18353	13845	10794	8636	7055	5863	4944	4220	3640	3168	2780	2457	2184	1953	1755	1584	1436	1307	1193	1092
39	27320	19776	14920	11632	9307	7604	6320	5329	4549	3924	3417	2998	2650	2356	2107	1894	1710	1550	1411	1288	1179
40-1/2	29404	21249	16032	12500	10002	8172	6793	5728	4890	4219	3673	3224	2850	2535	2267	2038	1840	1668	1518	1387	1270
42	31511	22772	17182	13397	10720	8759	7282	6141	5243	4524	3939	3458	3056	2719	2432	2187	1975	1791	1630	1489	1364
43-1/2	33686	24345	18369	14324	11462	9366	7787	6568	5608	4839	4214	3699	3270	2909	2603	2340	2114	1917	1745	1594	1461
45	35931	25968	19594	15280	12228	9992	8308	7008	5984	5164	4497	3948	3491	3106	2779	2499	2257	2048	1864	1703	1561

Notes:
(1) Span = simply supported beam.
(2) Maximum deflection = L/180 under total load. Other deflection limits may apply.
(3) Service condition = dry.
(4) Tabulated values represent total loads and have taken the dead weight of the beam (assumed 35 pcf) into account.
(5) Sufficient bearing length shall be provided at supports.
(6) Maximum beam shear is located at a distance from the supports equal to the depth of the beam.
(7) Unshaded (upper-right) areas limited by deflection; medium shaded areas limited by bending strength; darker shaded (lower-left) areas limited by shear strength.

TABLE 3

ALLOWABLE LOADS FOR SIMPLE SPAN *DOUGLAS-FIR* GLUED LAMINATED ROOF BEAMS (PLF) — SNOW LOADS

Load Duration Factor = 1.15, F_b = 2,400 psi, F_v = 265 psi, E_x = 1,800,000 psi

3-1/8-INCH WIDTH — SPAN (ft)

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
6	535	295	169	105	69	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7-1/2	837	533	333	208	137	95	68	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9	1206	769	532	362	240	167	120	88	66	51	—	—	—	—	—	—	—	—	—	—	—
10-1/2	1643	1049	726	531	385	268	193	143	108	84	65	52	—	—	—	—	—	—	—	—	—
12	2147	1371	949	695	530	402	291	216	164	127	100	80	64	52	—	—	—	—	—	—	—
13-1/2	2719	1736	1203	881	672	529	417	311	237	184	145	116	94	77	63	52	—	—	—	—	—
15	3358	2145	1486	1089	831	654	528	429	328	255	202	162	132	108	89	74	62	52	—	—	—
16-1/2	3978	2597	1799	1319	1007	793	640	527	439	342	272	219	178	146	121	101	85	72	61	52	—
18	4558	3091	2143	1571	1199	945	763	628	523	440	355	286	234	192	160	134	113	96	81	70	60
19-1/2	5198	3629	2516	1844	1409	1110	896	735	610	513	437	367	299	247	206	173	146	124	106	91	78
21	5910	4086	2919	2140	1635	1288	1039	848	703	592	504	434	377	311	260	218	185	158	135	116	100
22-1/2	6705	4554	3352	2458	1878	1480	1186	967	803	676	576	496	431	378	322	271	230	196	169	145	126
24	7601	5061	3791	2798	2138	1678	1341	1095	909	765	652	562	488	428	377	332	282	241	207	179	155
25-1/2	8615	5612	4159	3160	2415	1884	1506	1229	1021	860	733	632	549	481	425	377	336	291	251	217	189
27	9775	6213	4551	3544	2696	2101	1680	1372	1139	960	818	705	613	537	474	421	376	338	300	260	227

3-1/2-INCH WIDTH — SPAN (ft)

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
6	599	331	189	117	77	53	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7-1/2	937	597	373	233	154	106	76	55	—	—	—	—	—	—	—	—	—	—	—	—	—
9	1351	862	596	406	269	187	134	99	74	57	—	—	—	—	—	—	—	—	—	—	—
10-1/2	1840	1174	813	595	431	300	216	160	121	94	73	58	—	—	—	—	—	—	—	—	—
12	2405	1535	1063	778	594	451	326	242	184	143	112	89	72	58	—	—	—	—	—	—	—
13-1/2	3045	1945	1347	987	753	592	467	348	265	206	163	130	105	86	71	58	—	—	—	—	—
15	3761	2402	1664	1219	931	733	591	480	367	286	226	182	147	121	100	83	69	58	—	—	—
16-1/2	4456	2908	2015	1477	1127	888	717	590	490	384	304	245	199	164	136	113	95	80	68	58	—
18	5104	3462	2400	1759	1343	1058	854	698	579	487	398	321	262	216	179	150	126	107	91	78	67
19-1/2	5822	4065	2818	2066	1578	1243	998	814	675	568	484	411	335	277	231	194	164	139	119	102	88
21	6619	4577	3269	2397	1831	1440	1150	938	779	655	558	481	417	349	291	245	207	177	151	130	112
22-1/2	7510	5101	3754	2753	2103	1642	1313	1071	889	748	638	549	477	418	361	304	258	220	189	163	141
24	8513	5668	4246	3134	2385	1858	1485	1212	1006	847	722	622	541	474	418	371	316	270	232	201	174
25-1/2	9649	6285	4658	3539	2677	2086	1668	1361	1130	952	812	699	608	533	470	417	372	326	281	243	212
27	10948	6959	5097	3960	2986	2326	1860	1519	1261	1062	906	781	679	595	525	466	416	373	336	292	254

5-1/8-INCH WIDTH — SPAN (ft)

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
12	3521	2248	1557	1140	869	660	477	355	270	209	164	131	105	85	69	57	—	—	—	—	—
13-1/2	4459	2848	1972	1445	1102	867	684	509	389	302	238	191	154	126	103	85	71	59	—	—	—
15	5507	3518	2437	1786	1363	1065	850	693	537	419	332	266	216	177	146	121	101	85	72	60	51
16-1/2	6524	4258	2951	2163	1643	1279	1021	832	689	562	446	358	292	240	199	166	139	118	100	85	72
18	7474	5070	3514	2576	1940	1510	1206	983	815	686	583	470	383	316	262	220	185	157	134	114	98
19-1/2	8525	5952	4126	3001	2261	1760	1406	1146	951	800	681	586	491	405	338	284	240	204	174	149	128
21	9692	6702	4787	3456	2605	2028	1620	1322	1097	923	786	677	587	511	426	358	303	259	221	191	165
22-1/2	10997	7469	5459	3942	2971	2314	1849	1509	1252	1054	898	773	672	588	518	445	377	322	277	239	207
24	12465	8300	6173	4458	3360	2618	2092	1707	1417	1193	1017	876	761	666	588	521	462	395	340	294	255
25-1/2	14129	9203	6820	5004	3773	2939	2349	1917	1592	1341	1143	984	856	750	661	587	524	470	412	356	310
27	16031	10189	7463	5580	4207	3278	2621	2139	1776	1496	1276	1099	956	837	739	656	585	525	473	427	372
28-1/2	18226	11269	8151	6185	4664	3634	2906	2372	1970	1660	1416	1220	1061	930	820	729	651	584	526	476	432
30	20787	12457	8887	6820	5143	4008	3205	2617	2174	1832	1562	1346	1171	1027	906	805	719	645	582	527	478
31-1/2	23814	13771	9679	7458	5645	4399	3518	2873	2387	2011	1716	1479	1287	1128	996	885	791	710	640	579	527
33	26578	15230	10531	8044	6168	4807	3845	3140	2609	2199	1876	1617	1407	1234	1090	968	865	777	701	635	577

Notes:
(1) Span = simply supported beam.
(2) Maximum deflection = L/180 under total load. Other deflection limits may apply.
(3) Service condition = dry.
(4) Tabulated values represent total loads and have taken the dead weight of the beam (assumed 35 pcf) into account.
(5) Sufficient bearing length shall be provided at supports.
(6) Maximum beam shear is located at a distance from the supports equal to the depth of the beam.
(7) Unshaded upper-right areas limited by deflection; medium shaded areas limited by bending strength; darker shaded lower-left areas limited by shear strength.

TABLE 3 (continued)

5-1/2-INCH WIDTH — **SPAN (ft)**

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
12	3779	2413	1671	1223	933	708	512	381	290	224	176	140	113	91	74	61	—	—	—	—	—
13-1/2	4785	3056	2117	1550	1183	927	734	547	417	324	256	205	165	135	111	92	76	63	53	—	—
15	5910	3775	2615	1916	1459	1135	906	738	577	449	356	286	232	190	157	130	109	91	77	65	55
16-1/2	7002	4570	3167	2321	1751	1362	1088	886	735	603	478	385	313	257	213	178	150	126	107	91	77
18	8021	5441	3771	2744	2067	1609	1285	1048	869	730	622	504	411	339	281	236	199	168	143	122	105
19-1/2	9149	6387	4428	3197	2409	1875	1498	1222	1013	852	726	624	527	435	362	304	257	219	187	160	138
21	10401	7192	5101	3683	2775	2161	1726	1408	1168	983	837	721	626	548	457	384	326	277	238	205	177
22-1/2	11801	8015	5817	4200	3166	2466	1970	1607	1334	1123	957	824	715	626	552	477	405	346	297	256	222
24	13377	8907	6578	4750	3581	2789	2229	1819	1510	1271	1083	933	811	710	626	555	495	424	365	315	273
25-1/2	15163	9877	7319	5332	4020	3132	2503	2043	1696	1428	1218	1049	912	798	704	625	558	500	442	382	332
27	17204	10935	8009	5946	4483	3493	2792	2279	1893	1594	1359	1171	1018	892	787	699	624	559	504	456	399
28-1/2	19560	12094	8747	6591	4970	3872	3096	2528	2099	1769	1508	1300	1130	990	874	776	693	622	560	507	460
30	22308	13369	9538	7267	5480	4271	3415	2788	2316	1951	1664	1435	1248	1094	965	858	766	687	620	561	509
31-1/2	25557	14778	10387	7975	6015	4687	3749	3061	2543	2143	1828	1576	1371	1202	1061	943	842	756	682	617	561
33	28321	16345	11302	8632	6572	5123	4097	3346	2780	2343	1999	1723	1499	1315	1161	1032	922	828	747	676	615

6-3/4-INCH WIDTH — **SPAN (ft)**

Depth (in.)	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50
18	6677	4572	3299	2485	1934	1544	1259	1044	878	747	618	504	416	345	289	244	207	176	150	129	110
19-1/2	7824	5325	3844	2896	2254	1801	1468	1218	1024	872	750	647	534	445	373	316	268	229	197	169	146
21	8827	6133	4427	3336	2598	2075	1692	1404	1182	1006	866	752	658	561	472	400	341	292	251	217	188
22-1/2	9837	6994	5050	3806	2964	2368	1932	1603	1349	1150	990	859	752	663	586	497	424	364	314	272	236
24	10932	7909	5711	4305	3353	2679	2186	1815	1528	1302	1121	974	853	752	667	595	520	447	387	336	292
25-1/2	12122	8877	6410	4833	3764	3009	2456	2038	1717	1463	1260	1095	959	846	751	670	600	541	469	408	356
27	13420	9830	7148	5389	4199	3356	2740	2275	1916	1633	1407	1223	1072	945	839	749	672	605	547	490	428
28-1/2	14842	10735	7924	5975	4655	3722	3038	2523	2125	1812	1562	1358	1190	1050	932	832	747	673	609	553	503
30	16407	11705	8737	6589	5134	4105	3352	2784	2345	2000	1724	1499	1314	1160	1030	920	825	744	673	612	557
31-1/2	18137	12748	9588	7231	5635	4506	3680	3056	2576	2197	1894	1647	1444	1275	1132	1012	908	819	741	673	614
33	20059	13871	10477	7901	6158	4925	4022	3341	2816	2402	2071	1802	1580	1395	1239	1107	994	897	812	738	673
34-1/2	22208	15083	11402	8600	6703	5361	4379	3638	3066	2616	2256	1963	1721	1520	1351	1207	1084	978	886	805	734
36	24626	16397	12283	9327	7270	5815	4750	3947	3327	2839	2448	2130	1869	1651	1467	1311	1178	1063	963	875	799
37-1/2	27154	17826	13210	10081	7859	6287	5135	4267	3597	3070	2648	2304	2022	1786	1588	1419	1275	1151	1043	948	865
39	29257	19385	14198	10864	8469	6775	5535	4600	3878	3310	2855	2485	2180	1926	1713	1531	1376	1242	1126	1024	934

8-3/4-INCH WIDTH — **SPAN (ft)**

Depth (in.)	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52
24	9988	7212	5436	4234	3383	2760	2291	1928	1643	1415	1229	1076	948	841	750	672	580	501	435	379	331
25-1/2	11211	8095	6103	4753	3799	3100	2573	2167	1847	1590	1382	1210	1067	947	845	757	682	608	529	462	404
27	12500	9027	6806	5302	4238	3459	2872	2418	2062	1776	1543	1352	1193	1058	945	847	763	690	626	555	487
28-1/2	13855	10007	7545	5878	4700	3836	3185	2683	2288	1971	1713	1501	1325	1176	1050	942	848	767	697	634	579
30	15174	11034	8320	6483	5184	4232	3514	2961	2525	2176	1892	1658	1463	1299	1160	1041	938	849	771	702	642
31-1/2	16525	12109	9132	7116	5690	4646	3859	3251	2773	2390	2079	1822	1608	1429	1276	1145	1032	934	849	774	707
33	17980	13231	9978	7777	6219	5078	4218	3555	3032	2614	2274	1994	1760	1564	1397	1254	1131	1024	930	848	775
34-1/2	19553	14400	10861	8465	6770	5529	4593	3871	3303	2847	2477	2172	1918	1704	1523	1367	1233	1117	1015	926	847
36	21256	15616	11779	9181	7343	5997	4983	4200	3584	3090	2689	2358	2083	1851	1654	1486	1340	1214	1104	1007	921
37-1/2	23108	16878	12731	9924	7938	6484	5388	4542	3876	3342	2909	2551	2254	2003	1791	1608	1451	1315	1196	1091	998
39	25128	18187	13719	10695	8556	6989	5808	4896	4179	3604	3137	2752	2431	2161	1932	1736	1567	1420	1291	1178	1079
40-1/2	27045	19542	14742	11493	9195	7511	6242	5263	4492	3875	3373	2959	2615	2325	2079	1868	1686	1528	1390	1269	1162
42	28983	20943	15800	12318	9855	8052	6692	5643	4817	4155	3617	3174	2805	2494	2230	2004	1810	1640	1492	1363	1248
43-1/2	30984	22390	16892	13170	10538	8610	7156	6035	5152	4444	3869	3396	3001	2669	2387	2146	1937	1756	1598	1459	1337
45	33048	23883	18019	14050	11242	9185	7635	6439	5497	4743	4130	3625	3204	2850	2549	2291	2069	1876	1708	1559	1429

Notes:
(1) Span = simply supported beam.
(2) Maximum deflection = L/180 under total load. Other deflection limits may apply.
(3) Service condition = dry.
(4) Tabulated values represent total loads and have taken the dead weight of the beam (assumed 35 pcf) into account.
(5) Sufficient bearing length shall be provided at supports.
(6) Maximum beam shear is located at a distance from the supports equal to the depth of the beam.
(7) Unshaded (upper-right) areas limited by deflection; medium shaded areas limited by bending strength; darker shaded (lower-left) areas limited by shear strength.

TABLE 4

ALLOWABLE LOADS FOR SIMPLE SPAN *DOUGLAS-FIR* GLUED LAMINATED FLOOR BEAMS (PLF)
Load Duration Factor = 1.00, F_b = 2,400 psi, F_v = 265 psi, E_x = 1,800,000 psi

3-1/8-INCH WIDTH — SPAN (ft)

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
6	362	183	104	64	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7-1/2	710	361	206	128	84	57	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9	1048	626	359	224	148	102	72	53	—	—	—	—	—	—	—	—	—	—	—	—	—
10-1/2	1428	911	574	358	237	164	118	86	65	—	—	—	—	—	—	—	—	—	—	—	—
12	1866	1191	824	538	357	248	178	132	99	76	59	—	—	—	—	—	—	—	—	—	—
13-1/2	2363	1508	1044	765	511	356	257	190	144	111	87	69	55	—	—	—	—	—	—	—	—
15	2918	1864	1291	945	704	491	355	264	201	155	122	97	78	63	51	—	—	—	—	—	—
16-1/2	3458	2256	1563	1145	874	656	475	354	270	209	165	132	106	87	71	59	—	—	—	—	—
18	3961	2686	1861	1364	1041	820	619	462	353	274	217	174	141	115	95	79	65	55	—	—	—
19-1/2	4518	3154	2186	1602	1223	963	777	590	451	351	278	224	182	149	123	102	86	72	61	51	—
21	5137	3551	2536	1859	1420	1118	901	735	566	441	350	282	229	189	156	131	110	93	78	67	57
22-1/2	5828	3958	2913	2135	1631	1285	1029	839	696	545	433	349	285	234	195	163	137	116	99	84	72
24	6607	4398	3294	2431	1857	1457	1164	950	788	663	528	426	348	287	239	200	169	144	123	105	90
25-1/2	7489	4877	3614	2745	2097	1636	1307	1067	885	745	635	514	420	347	289	243	206	175	150	129	111
27	8497	5400	3954	3079	2342	1824	1458	1190	988	832	709	611	501	414	346	291	246	210	180	155	134

3-1/2-INCH WIDTH — SPAN (ft)

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
6	405	205	116	71	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7-1/2	795	404	231	143	94	64	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9	1174	701	403	251	165	114	81	59	—	—	—	—	—	—	—	—	—	—	—	—	—
10-1/2	1599	1020	642	401	266	184	132	97	72	55	—	—	—	—	—	—	—	—	—	—	—
12	2090	1334	923	602	400	278	200	148	111	85	66	52	—	—	—	—	—	—	—	—	—
13-1/2	2646	1690	1170	856	573	399	288	213	162	125	97	77	62	—	—	—	—	—	—	—	—
15	3268	2087	1446	1059	788	550	397	295	225	174	137	109	87	71	58	—	—	—	—	—	—
16-1/2	3873	2527	1751	1282	979	735	532	396	302	234	185	148	119	97	80	66	54	—	—	—	—
18	4437	3009	2085	1528	1166	918	693	517	395	307	243	195	158	129	106	88	73	61	51	—	—
19-1/2	5060	3532	2448	1794	1370	1079	866	660	505	394	312	250	203	167	138	115	96	81	68	57	—
21	5753	3978	2840	2082	1590	1249	998	814	633	494	392	316	257	211	175	146	123	104	88	75	64
22-1/2	6528	4433	3262	2392	1827	1426	1139	929	771	611	485	391	319	263	218	183	154	130	111	95	81
24	7400	4926	3690	2722	2071	1613	1289	1051	872	734	592	477	390	322	268	225	190	161	137	118	101
25-1/2	8388	5463	4047	3075	2325	1811	1447	1181	980	825	703	575	470	388	324	272	230	196	168	144	124
27	9517	6048	4429	3440	2593	2020	1614	1317	1094	921	785	676	561	464	387	326	276	235	202	174	150

5-1/8-INCH WIDTH — SPAN (ft)

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
12	3060	1953	1352	882	586	407	293	216	163	125	97	76	60	—	—	—	—	—	—	—	—
13-1/2	3875	2474	1713	1254	838	584	421	312	237	182	143	113	90	72	58	—	—	—	—	—	—
15	4786	3056	2117	1550	1154	805	582	433	329	255	200	159	128	104	84	69	56	—	—	—	—
16-1/2	5671	3700	2563	1878	1426	1076	779	580	442	343	271	216	175	142	117	96	79	66	55	—	—
18	6497	4406	3053	2237	1684	1310	1015	757	578	450	356	285	231	189	156	129	107	90	75	63	53
19-1/2	7410	5172	3585	2606	1963	1527	1219	967	739	576	457	367	298	244	202	168	141	118	100	84	71
21	8424	5824	4159	3002	2261	1760	1406	1146	928	724	574	462	376	309	256	214	180	152	129	109	93
22-1/2	9559	6491	4744	3424	2580	2008	1604	1308	1085	895	711	573	467	385	320	267	225	191	162	139	119
24	10835	7213	5364	3873	2918	2272	1815	1481	1228	1034	867	699	571	471	392	329	278	236	201	172	148
25-1/2	12282	7999	5926	4347	3276	2551	2039	1663	1380	1162	990	843	689	569	474	398	337	287	245	211	182
27	13936	8856	6485	4848	3654	2846	2274	1856	1540	1297	1105	951	821	679	567	477	404	345	295	254	220
28-1/2	15844	9795	7083	5374	4051	3156	2522	2058	1709	1439	1226	1056	918	803	671	565	479	409	351	303	262
30	18071	10828	7723	5926	4467	3480	2782	2271	1885	1588	1354	1166	1013	888	783	663	563	481	414	358	310
31-1/2	20703	11969	8411	6480	4903	3820	3054	2493	2070	1744	1487	1281	1114	976	861	764	656	561	483	418	363
33	23106	13238	9152	6989	5358	4175	3338	2725	2263	1907	1626	1401	1218	1068	942	837	747	649	559	484	421

Notes:
(1) Span = simply supported beam.
(2) Maximum deflection = L/360 under live load, based on live/total load = 0.8. Where additional stiffness is desired or for other live/total load ratios design for deflection must be modified per requirements.
(3) Service condition = dry.
(4) Tabulated values represent total loads based on live/total load = 0.8 and have taken the dead weight of the beam (assumed 35 pcf) into account.
(5) Sufficient bearing length shall be provided at supports.
(6) Maximum beam shear is located at a distance from the supports equal to the depth of the beam.
(7) Unshaded upper-right areas limited by deflection; medium shaded areas limited by bending strength; darker shaded lower-left areas limited by shear strength.

TABLE 4 (continued)

5-1/2-INCH WIDTH	SPAN (ft)																			
Depth (in.)	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**
12	3284	2096	1451	946	628	437	314	232	175	134	104	82	65	51	—	—	—	—	—	—	—
13-1/2	4159	2655	1838	1346	900	626	452	335	254	196	153	121	97	78	63	50	—	—	—	—	—
15	5136	3280	2272	1664	1239	864	624	464	353	273	215	171	137	111	90	74	61	—	—	—	—
16-1/2	6086	3971	2751	2015	1520	1155	836	622	474	368	291	232	187	153	125	103	85	71	59	—	—
18	6972	4728	3276	2383	1795	1396	1090	813	620	483	382	306	248	203	167	138	115	96	81	67	57
19-1/2	7952	5551	3847	2777	2091	1627	1299	1038	793	618	490	393	320	262	217	180	151	127	107	90	76
21	9041	6250	4432	3199	2410	1875	1498	1221	995	777	616	496	404	332	275	230	193	163	138	117	100
22-1/2	10258	6966	5055	3649	2749	2140	1709	1394	1156	960	763	614	501	413	343	287	242	205	174	149	127
24	11628	7741	5716	4126	3110	2421	1934	1578	1309	1101	930	750	612	505	421	353	298	253	216	185	159
25-1/2	13181	8584	6360	4632	3491	2719	2172	1772	1470	1238	1054	904	739	610	509	428	362	308	263	226	195
27	14955	9504	6960	5165	3893	3032	2423	1977	1641	1381	1177	1014	881	729	608	512	434	370	317	273	236
28-1/2	17003	10511	7601	5726	4317	3362	2687	2193	1820	1533	1306	1125	978	856	720	606	515	439	377	325	282
30	19393	11620	8288	6314	4760	3708	2964	2419	2009	1692	1442	1242	1080	946	834	712	604	517	444	384	333
31-1/2	22218	12845	9027	6929	5225	4071	3254	2656	2206	1858	1584	1365	1186	1040	917	814	704	602	518	448	390
33	24622	14207	9822	7501	5709	4449	3557	2904	2411	2031	1732	1493	1298	1137	1004	891	796	697	600	520	452

6-3/4-INCH WIDTH	SPAN (ft)																			
Depth (in.)	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**	**50**
18	5802	3972	2865	2157	1678	1337	997	761	593	469	375	304	249	205	170	141	118	99	83	69	58
19-1/2	6800	4626	3338	2514	1956	1562	1272	974	759	601	483	392	322	266	221	185	156	131	111	94	79
21	7671	5328	3845	2897	2254	1800	1467	1216	954	757	609	495	407	338	282	237	200	169	144	123	104
22-1/2	8549	6077	4386	3305	2572	2054	1675	1389	1169	936	754	615	506	421	352	297	251	214	183	156	134
24	9501	6872	4961	3738	2910	2325	1896	1573	1323	1127	921	752	620	516	433	366	310	265	227	195	168
25-1/2	10535	7713	5569	4197	3268	2611	2130	1767	1487	1267	1090	907	749	625	525	444	378	323	278	239	207
27	11664	8542	6210	4681	3645	2913	2376	1972	1660	1415	1218	1058	895	747	628	532	454	389	335	289	251
28-1/2	12900	9329	6884	5189	4042	3230	2636	2188	1842	1570	1352	1175	1029	884	744	631	539	463	399	346	300
30	14261	10172	7591	5723	4458	3563	2908	2414	2033	1733	1493	1297	1136	1002	873	742	634	545	471	409	356
31-1/2	15765	11078	8331	6281	4893	3912	3193	2651	2233	1904	1640	1425	1249	1102	978	864	739	636	550	478	417
33	17436	12054	9103	6864	5348	4276	3490	2898	2442	2082	1794	1560	1367	1206	1071	956	855	737	638	555	485
34-1/2	19304	13109	9908	7471	5821	4655	3800	3156	2659	2268	1954	1699	1489	1315	1167	1042	935	843	734	640	559
36	21406	14251	10673	8103	6314	5049	4123	3424	2885	2461	2121	1845	1617	1428	1268	1132	1016	916	829	732	641
37-1/2	23604	15493	11479	8758	6826	5459	4457	3703	3120	2662	2294	1996	1750	1545	1373	1226	1101	993	899	816	729
39	25432	16848	12338	9438	7356	5883	4804	3991	3364	2870	2474	2152	1888	1667	1481	1323	1188	1072	970	882	804

8-3/4-INCH WIDTH	SPAN (ft)																			
Depth (in.)	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**	**50**	**52**
24	8679	6265	4720	3675	2935	2394	1985	1670	1422	1193	974	804	669	561	474	402	343	294	253	218	188
25-1/2	9741	7032	5300	4126	3297	2689	2231	1877	1599	1376	1176	971	810	680	575	490	419	360	310	268	232
27	10862	7842	5911	4603	3678	3000	2490	2096	1785	1537	1335	1160	968	814	690	588	504	434	375	325	283
28-1/2	12040	8694	6553	5104	4079	3328	2762	2325	1981	1706	1482	1298	1144	965	819	699	600	517	448	390	340
30	13186	9587	7227	5629	4499	3672	3048	2566	2187	1884	1637	1434	1264	1122	962	822	707	610	530	461	403
31-1/2	14361	10521	7932	6179	4939	4031	3347	2819	2403	2070	1799	1576	1390	1234	1101	958	825	713	620	541	473
33	15626	11496	8668	6753	5399	4407	3659	3082	2628	2264	1968	1724	1521	1351	1205	1081	955	827	720	629	551
34-1/2	16993	12512	9435	7351	5877	4798	3984	3357	2862	2466	2144	1879	1658	1473	1315	1180	1063	952	829	725	636
36	18473	13569	10232	7973	6375	5205	4323	3642	3106	2677	2328	2041	1801	1600	1428	1282	1155	1046	949	831	730
37-1/2	20083	14666	11060	8619	6893	5628	4675	3939	3360	2896	2519	2208	1949	1732	1547	1388	1252	1133	1029	938	832
39	21840	15804	11919	9289	7429	6066	5039	4247	3623	3123	2717	2382	2103	1869	1669	1499	1351	1224	1112	1014	927
40-1/2	23506	16982	12808	9983	7984	6520	5417	4566	3895	3358	2922	2562	2262	2010	1796	1613	1455	1318	1198	1092	999
42	25191	18200	13727	10700	8558	6990	5807	4895	4177	3601	3134	2748	2427	2157	1928	1731	1562	1415	1286	1173	1073
43-1/2	26931	19457	14677	11440	9151	7475	6211	5236	4468	3853	3353	2941	2598	2309	2064	1854	1673	1515	1378	1257	1150
45	28725	20755	15656	12205	9763	7975	6627	5587	4768	4112	3579	3139	2773	2465	2204	1980	1787	1619	1472	1344	1230

Notes:

(1) Span = simply supported beam.

(2) Maximum deflection = L/360 under live load, based on live/total load = 0.8. Where additional stiffness is desired or for other live/total load ratios design for deflection must be modified per requirements.

(3) Service condition = dry.

(4) Tabulated values represent total loads based on live/total load = 0.8 and have taken the dead weight of the beam (assumed 35 pcf) into account.

(5) Sufficient bearing length shall be provided at supports.

(6) Maximum beam shear is located at a distance from the supports equal to the depth of the beam.

(7) Unshaded upper-right areas limited by deflection; medium shaded areas limited by bending strength; darker shaded lower-left areas limited by shear strength.

TABLE 5

ALLOWABLE LOADS FOR CANTILEVERED *DOUGLAS-FIR* GLUED LAMINATED ROOF BEAMS (PLF) – NON-SNOW LOADS
Load Duration Factor = 1.25, F_b = 2,400 psi, F_v = 265 psi

5-1/8-INCH WIDTH — SPAN (ft)

Depth (in.)	44			48			52			56			60			64		
	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3
24	495	489	585	407	402	482	340	335	403	286	283	341	244	241	291	209	206	250
25-1/2	557	550	658	459	453	543	383	378	454	323	319	384	275	272	328	236	233	282
27	623	615	735	513	507	607	428	423	508	362	357	430	309	305	367	265	262	316
28-1/2	692	684	816	570	563	674	477	471	564	403	398	478	344	339	409	296	292	352
30	764	755	902	630	623	745	527	521	624	446	440	529	381	376	452	328	324	390
31-1/2	840	830	991	693	685	819	580	573	686	491	485	582	419	414	498	361	357	430
33	920	909	1085	759	750	897	635	628	751	538	531	637	460	454	546	396	391	471
34-1/2	1003	991	1182	828	818	977	693	685	819	587	580	695	502	496	596	433	428	515
36	1089	1076	1283	899	889	1061	753	744	890	638	631	755	546	540	648	471	465	560

6-3/4-INCH WIDTH — SPAN (ft)

Depth (in.)	44			48			52			56			60			64		
	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3
24	633	625	748	521	514	617	434	429	515	366	361	435	311	307	371	267	263	319
25-1/2	713	704	842	587	579	694	489	483	580	413	408	491	351	347	419	302	298	360
27	797	787	941	656	648	776	548	541	649	462	457	549	394	389	469	339	334	404
28-1/2	885	875	1045	729	721	863	609	602	722	515	508	611	439	434	522	378	373	450
30	978	966	1154	806	797	953	674	666	798	570	563	676	486	480	578	418	413	499
31-1/2	1075	1063	1269	887	877	1048	742	733	878	628	620	744	536	529	637	461	456	549
33	1177	1163	1388	971	960	1147	813	803	961	688	679	815	588	580	698	506	500	602
34-1/2	1283	1268	1513	1059	1047	1251	887	876	1048	751	742	889	642	634	762	553	546	658
36	1393	1377	1642	1151	1137	1358	964	952	1139	816	806	966	698	690	828	602	595	716
37-1/2	1508	1490	1777	1246	1231	1470	1044	1031	1233	884	874	1047	757	748	897	653	645	776
39	1627	1608	1917	1345	1329	1586	1127	1113	1331	955	944	1130	818	808	969	706	697	838
40-1/2	1750	1730	2062	1447	1430	1706	1213	1198	1432	1028	1016	1216	881	870	1043	761	751	903
42	1878	1856	2212	1553	1534	1831	1302	1286	1537	1104	1091	1305	946	935	1120	817	807	969
43-1/2	2010	1986	2366	1662	1643	1959	1394	1377	1645	1183	1169	1398	1014	1001	1200	876	865	1039
45	2146	2121	2526	1775	1754	2092	1489	1471	1757	1264	1249	1493	1083	1070	1282	937	925	1110
46-1/2	2286	2259	2617	1891	1869	2229	1587	1568	1872	1347	1331	1591	1155	1141	1366	999	987	1184
48	2430	2402	2701	2011	1988	2370	1688	1668	1991	1433	1416	1693	1229	1215	1454	1064	1051	1259

8-3/4-INCH WIDTH — SPAN (ft)

Depth (in.)	44			48			52			56			60			64		
	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3
36	1758	1737	2073	1452	1434	1714	1215	1201	1437	1029	1017	1219	880	869	1044	759	749	902
37-1/2	1903	1880	2243	1572	1553	1855	1316	1300	1556	1115	1102	1320	954	942	1131	823	813	978
39	2053	2029	2419	1696	1676	2001	1421	1404	1679	1204	1190	1425	1031	1018	1222	890	879	1056
40-1/2	2209	2183	2602	1825	1804	2153	1530	1511	1807	1297	1281	1534	1110	1097	1315	959	947	1138
42	2370	2342	2791	1959	1936	2310	1642	1623	1939	1393	1376	1647	1193	1178	1412	1030	1018	1222
43-1/2	2536	2506	2987	2097	2072	2472	1758	1737	2076	1492	1474	1763	1278	1262	1513	1104	1091	1309
45	2708	2676	3188	2240	2213	2640	1878	1856	2217	1594	1575	1883	1366	1349	1616	1181	1166	1399
46-1/2	2885	2851	3392	2386	2358	2813	2002	1978	2362	1699	1679	2007	1457	1439	1723	1259	1244	1492
48	3067	3031	3501	2538	2508	2990	2129	2104	2512	1808	1786	2135	1550	1531	1833	1341	1324	1588
49-1/2	3255	3217	3611	2694	2662	3173	2261	2234	2666	1920	1897	2267	1646	1627	1947	1424	1407	1687
51	3448	3407	3720	2854	2820	3362	2395	2367	2825	2035	2010	2402	1746	1725	2063	1511	1492	1788
52-1/2	3646	3603	3830	3018	2983	3501	2534	2504	2988	2153	2127	2541	1847	1825	2183	1599	1580	1892
54	3838	3804	3939	3187	3150	3601	2676	2645	3155	2274	2247	2684	1952	1928	2306	1690	1669	1999
55-1/2	3944	3987	4048	3360	3321	3701	2822	2789	3326	2399	2370	2830	2059	2034	2432	1783	1762	2109
57	4051	4095	4158	3538	3497	3801	2972	2937	3499	2526	2496	2980	2169	2143	2562	1879	1856	2222
58-1/2	4157	4202	4267	3720	3676	3901	3125	3088	3592	2657	2625	3134	2282	2254	2694	1977	1953	2337
60	4264	4310	4377	3898	3861	4001	3282	3244	3684	2791	2758	3291	2397	2369	2830	2077	2052	2455

See page 5 for description of cantilever systems.

Notes:
(1) Span = spacing of column supports for cantilevered beams.
(2) Load duration factor = as noted.
(3) Cantilevered beam layup = balanced.
(4) Deflection has not been considered.
(5) Service condition = dry.
(6) Tabulated values represent total loads and have taken the dead weight of the beam into account (assumed 35 pcf). Live load is assumed to be 0.6 x total load for purpose of checking strength under full unbalanced live load.
(7) Volume factor is included.
(8) Values inside shaded areas are limited by shear strength; all other values are limited by bending strength.

TABLE 6

ALLOWABLE LOADS FOR CANTILEVERED *DOUGLAS-FIR* GLUED LAMINATED ROOF BEAMS (PLF) – SNOW LOADS

Load Duration Factor = 1.15, F_b = 2,400 psi, F_v = 265 psi

5-1/8-INCH WIDTH — SPAN (ft)

Depth (in.)	44			48			52			56			60			64		
	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3
24	453	447	536	372	368	441	310	306	368	261	258	311	222	219	265	190	187	228
25-1/2	510	504	603	419	414	497	350	345	415	295	291	351	251	247	299	215	212	257
27	570	563	674	469	464	556	392	387	464	330	326	393	281	278	335	241	238	288
28-1/2	634	626	748	522	516	617	436	430	516	368	363	437	313	309	373	269	266	321
30	700	692	827	577	570	682	482	476	571	407	402	483	347	343	413	298	295	356
31-1/2	770	761	909	635	627	750	531	524	628	448	443	532	383	378	455	329	325	392
33	843	833	994	695	687	822	581	574	688	492	486	583	420	415	499	361	357	430
34-1/2	919	908	1084	758	749	896	634	627	750	537	530	636	459	453	545	395	390	470
36	998	986	1177	824	814	973	690	681	815	584	577	691	499	493	592	430	425	511

6-3/4-INCH WIDTH — SPAN (ft)

Depth (in.)	44			48			52			56			60			64		
	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3
24	579	572	685	476	470	564	396	391	471	333	329	397	283	279	338	242	239	290
25-1/2	652	644	771	536	530	635	447	441	531	376	372	448	320	316	382	274	271	328
27	729	721	862	600	593	711	500	494	594	422	417	502	359	354	428	308	304	368
28-1/2	811	801	958	667	659	790	557	550	660	470	464	558	400	395	477	344	339	410
30	896	885	1058	738	729	873	616	609	730	520	514	618	444	438	528	381	376	455
31-1/2	985	973	1163	812	802	960	678	670	804	573	566	680	489	483	582	420	415	501
33	1079	1066	1273	889	879	1051	743	734	880	628	621	745	536	530	638	462	456	550
34-1/2	1176	1162	1387	970	958	1146	811	801	960	686	678	814	586	579	696	505	498	601
36	1277	1262	1506	1054	1042	1245	882	871	1043	746	737	884	638	630	757	549	542	654
37-1/2	1383	1366	1630	1141	1128	1348	955	944	1130	809	799	958	691	683	820	596	589	709
39	1492	1474	1759	1232	1217	1454	1032	1019	1219	874	863	1034	747	738	886	644	636	766
40-1/2	1605	1586	1892	1326	1310	1565	1110	1097	1312	941	929	1114	805	795	954	695	686	825
42	1722	1702	2029	1423	1406	1679	1192	1178	1408	1010	998	1196	865	854	1025	747	737	886
43-1/2	1843	1822	2171	1523	1505	1797	1277	1261	1508	1082	1069	1280	927	916	1098	800	790	950
45	1968	1945	2318	1627	1608	1919	1364	1348	1610	1157	1143	1368	991	979	1173	856	845	1015
46-1/2	2097	2072	2401	1734	1714	2044	1454	1437	1716	1233	1219	1458	1057	1044	1251	913	902	1083
48	2230	2203	2479	1844	1822	2174	1547	1528	1825	1312	1297	1551	1125	1111	1331	972	960	1152

8-3/4-INCH WIDTH — SPAN (ft)

Depth (in.)	44			48			52			56			60			64		
	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3
36	1611	1592	1901	1329	1314	1571	1112	1098	1316	941	929	1115	803	793	954	692	683	824
37-1/2	1744	1724	2057	1440	1422	1700	1205	1190	1425	1019	1007	1208	871	860	1034	751	741	893
39	1882	1860	2219	1554	1536	1835	1301	1285	1538	1101	1088	1304	942	930	1117	812	802	965
40-1/2	2025	2001	2387	1673	1653	1974	1400	1384	1655	1186	1172	1404	1015	1002	1203	875	864	1040
42	2173	2147	2561	1795	1774	2118	1504	1486	1777	1274	1259	1508	1090	1077	1292	941	929	1117
43-1/2	2326	2298	2740	1922	1899	2267	1610	1591	1902	1365	1348	1615	1168	1154	1384	1008	996	1197
45	2483	2454	2926	2053	2028	2421	1720	1700	2032	1459	1441	1725	1249	1234	1479	1079	1065	1280
46-1/2	2646	2615	3113	2188	2162	2580	1834	1812	2165	1555	1537	1839	1332	1316	1578	1151	1137	1365
48	2814	2781	3213	2327	2299	2743	1951	1928	2303	1655	1635	1956	1418	1401	1679	1225	1210	1453
49-1/2	2986	2951	3313	2470	2441	2911	2071	2047	2444	1758	1737	2077	1506	1488	1783	1302	1286	1543
51	3163	3126	3414	2617	2586	3084	2195	2169	2590	1863	1841	2201	1597	1578	1890	1381	1364	1636
52-1/2	3345	3306	3514	2768	2735	3212	2322	2295	2740	1972	1948	2329	1691	1670	2000	1462	1444	1732
54	3521	3491	3615	2923	2889	3304	2453	2424	2893	2083	2058	2460	1786	1765	2112	1546	1527	1830
55-1/2	3619	3659	3715	3082	3046	3396	2587	2556	3051	2197	2171	2594	1885	1862	2228	1631	1611	1931
57	3717	3757	3815	3245	3207	3487	2724	2692	3210	2314	2287	2732	1986	1962	2347	1719	1698	2034
58-1/2	3815	3856	3916	3412	3372	3579	2865	2831	3294	2434	2405	2873	2089	2064	2469	1809	1787	2140
60	3913	3955	4016	3576	3542	3671	3009	2974	3379	2557	2527	3018	2195	2169	2593	1901	1878	2248

See page 5 for description of cantilever systems.

Notes:

(1) Span = spacing of column supports for cantilevered beams.
(2) Load duration factor = as noted.
(3) Cantilevered beam layup = balanced.
(4) Deflection has not been considered.
(5) Service condition = dry.
(6) Tabulated values represent total loads and have taken the dead weight of the beam into account (assumed 35 pcf). Live load is assumed to be 0.6 x total load for purpose of checking strength under full unbalanced live load.
(7) Volume factor is included.
(8) Values inside shaded areas are limited by shear strength; all other values are limited by bending strength.

TABLE 7

SOUTHERN PINE GLUED LAMINATED BEAM SECTION PROPERTIES AND CAPACITIES

F_b = 2,400 psi, E = 1.80 x 10^6 psi, F_v = 300 psi

3-INCH WIDTH

Depth (in.)	6-7/8	8-1/4	9-5/8	11	12-3/8	13-3/4	15-1/8	16-1/2	17-7/8	19-1/4	20-5/8	22	23-3/8	24-3/4	26-1/8
Beam Weight (lb/ft)	5.2	6.2	7.2	8.3	9.3	10.3	11.3	12.4	13.4	14.4	15.5	16.5	17.5	18.6	19.6
A (in.^{2})	20.63	24.75	28.88	33.00	37.13	41.25	45.38	49.50	53.63	57.75	61.88	66.00	70.13	74.25	78.38
S (in.^{3})	23.63	34.03	46.32	60.50	76.57	94.53	114.4	136.1	159.8	185.3	212.7	242.0	273.2	306.3	341.3
I (in.^{4})	81.24	140.4	222.9	332.8	473.8	649.9	865.0	1123	1428	1783	2193	2662	3193	3790	4458
EI (10^6 lb-in.^{2})	146.2	252.7	401.2	599.0	852.8	1170	1557	2021	2570	3210	3948	4792	5747	6822	8024
Moment Capacity (lb-ft)	4727	6806	9264	12100	15310	18910	22880	27230	31950	37060	42540	48400	54640	61260	68250
Shear Capacity (lb)	4125	4950	5775	6600	7425	8250	9075	9900	10730	11550	12380	13200	14030	14850	15680

3-1/2-INCH WIDTH

Depth (in.)	6-7/8	8-1/4	9-5/8	11	12-3/8	13-3/4	15-1/8	16-1/2	17-7/8	19-1/4	20-5/8	22	23-3/8	24-3/4	26-1/8
Beam Weight (lb/ft)	6.0	7.2	8.4	9.6	10.8	12.0	13.2	14.4	15.6	16.8	18.0	19.3	20.5	21.7	22.9
A (in.^{2})	24.06	28.88	33.69	38.50	43.31	48.13	52.94	57.75	62.56	67.38	72.19	77.00	81.81	86.63	91.44
S (in.^{3})	27.57	39.70	54.04	70.58	89.33	110.3	133.4	158.8	186.4	216.2	248.1	282.3	318.7	357.3	398.1
I (in.^{4})	94.78	163.8	260.1	388.2	552.7	758.2	1009	1310	1666	2081	2559	3106	3725	4422	5201
EI (10^6 lb-in.^{2})	170.6	294.8	468.1	698.8	994.9	1365	1817	2358	2998	3745	4606	5590	6705	7959	9361
Moment Capacity (lb-ft)	5514	7941	10810	14120	17870	22060	26690	31760	37280	43230	49630	56470	63750	71470	79630
Shear Capacity (lb)	4813	5775	6738	7700	8663	9625	10590	11550	12510	13480	14440	15400	16360	17330	18290

5-INCH WIDTH

Depth (in.)	12-3/8	13-3/4	15-1/8	16-1/2	17-7/8	19-1/4	20-5/8	22	23-3/8	24-3/4	26-1/8	27-1/2	28-7/8	30-1/4	31-5/8
Beam Weight (lb/ft)	15.5	17.2	18.9	20.6	22.3	24.1	25.8	27.5	29.2	30.9	32.7	34.4	36.1	37.8	39.5
A (in.^{2})	61.88	68.75	75.63	82.50	89.38	96.25	103.1	110.0	116.9	123.8	130.6	137.5	144.4	151.3	158.1
S (in.^{3})	127.6	157.6	190.6	226.9	266.3	308.8	354.5	403.3	455.3	510.5	568.8	630.2	694.8	762.6	833.5
I (in.^{4})	789.6	1083	1442	1872	2380	2972	3656	4437	5322	6317	7429	8665	10030	11530	13180
EI (10^6 lb-in.^{2})	1421	1950	2595	3369	4284	5350	6580	7986	9579	11370	13370	15600	18060	20760	23720
Moment Capacity (lb-ft)	25520	31510	38130	45380	53250	61760	70900	80670	91070	102100	113800	126000	139000	152500	166700
Shear Capacity (lb)	12380	13750	15130	16500	17880	19250	20630	22000	23380	24750	26130	27500	28880	30250	31630

5-1/2-INCH WIDTH

Depth (in.)	12-3/8	13-3/4	15-1/8	16-1/2	17-7/8	19-1/4	20-5/8	22	23-3/8	24-3/4	26-1/8	27-1/2	28-7/8	30-1/4	31-5/8
Beam Weight (lb/ft)	17.0	18.9	20.8	22.7	24.6	26.5	28.4	30.3	32.1	34.0	35.9	37.8	39.7	41.6	43.5
A (in.2)	68.06	75.63	83.19	90.75	98.31	105.9	113.4	121.0	128.6	136.1	143.7	151.3	158.8	166.4	173.9
S (in.^{3})	140.4	173.3	209.7	249.6	292.9	339.7	389.9	443.7	500.9	561.5	625.6	693.2	764.3	838.8	916.8
I (in.^{4})	868.6	1191	1586	2059	2618	3269	4021	4880	5854	6949	8172	9532	11030	12690	14500
EI (10^6 lb-in.^{2})	1563	2145	2855	3706	4712	5885	7238	8785	10540	12510	14710	17160	19860	22840	26090
Moment Capacity (lb-ft)	28080	34660	41940	49910	58580	67940	77990	88730	100200	112300	125100	138600	152900	167800	183400
Shear Capacity (lb)	13610	15130	16640	18150	19660	21180	22690	24200	25710	27230	28740	30250	31760	33280	34790

6-3/4-INCH WIDTH

Depth (in.)	17-7/8	19-1/4	20-5/8	22	23-3/8	24-3/4	26-1/8	27-1/2	28-7/8	30-1/4	31-5/8	33	34-3/8	35-3/4	37-1/8
Beam Weight (lb/ft)	30.2	32.5	34.8	37.1	39.4	41.8	44.1	46.4	48.7	51.0	53.4	55.7	58.0	60.3	62.6
A (in.^{2})	120.7	129.9	139.2	148.5	157.8	167.1	176.3	185.6	194.9	204.2	213.5	222.8	232.0	241.3	250.6
S (in.^{3})	359.5	416.9	478.6	544.5	614.7	689.1	767.8	850.8	938.0	1029	1125	1225	1329	1438	1551
I (in.^{4})	3213	4012	4935	5990	7184	8528	10030	11700	13540	15570	17790	20210	22850	25700	28780
EI (10^6 lb-in.^{2})	5783	7222	8883	10780	12930	15350	18050	21060	24380	28030	32020	36390	41130	46260	51810
Moment Capacity (lb-ft)	71890	83380	95710	108900	122900	137800	153600	170200	187600	205900	225000	245000	265900	287600	310100
Shear Capacity (lb)	24130	25990	27840	29700	31560	33410	35270	37130	38980	40840	42690	44550	46410	48260	50120

8-1/2-INCH WIDTH

Depth (in.)	24-3/4	26-1/8	27-1/2	28-7/8	30-1/4	31-5/8	33	34-3/8	35-3/4	37-1/8	38-1/2	39-7/8	41-1/4	42-5/8	44
Beam Weight (lb/ft)	52.6	55.5	58.4	61.4	64.3	67.2	70.1	73.0	76.0	78.9	81.8	84.7	87.7	90.6	93.5
A (in.^{2})	210.4	222.1	233.8	245.4	257.1	268.8	280.5	292.2	303.9	315.6	327.3	338.9	350.6	362.3	374.0
S (in.^{3})	867.8	966.9	1071	1181	1296	1417	1543	1674	1811	1953	2100	2253	2411	2574	2743
I (in.^{4})	10740	12630	14730	17050	19610	22400	25460	28770	32360	36240	40420	44910	49720	54860	60340
EI (10^6 lb-in.^{2})	19330	22730	26520	30700	35290	40330	45820	51790	58260	65240	72760	80840	89490	98740	108600
Moment Capacity (lb-ft)	173600	193400	214300	236200	259300	283400	308600	334800	362100	390500	420000	450500	482100	514800	548500
Shear Capacity (lb)	42080	44410	46750	49090	51430	53760	56100	58440	60780	63110	65450	67790	70130	72460	74800

Notes:
(1) Beam weight is based on density of 36 pcf.
(2) Moment capacity must be adjusted for volume effect. The volume factor for various glulam sizes and simple spans, as well as the complete formula, is given in Appendix B.
(3) Moment and shear capacities are based on a normal (10-year) duration of load and should be adjusted for the design duration of load per the applicable building code.

TABLE 8

ALLOWABLE LOADS FOR SIMPLE SPAN *SOUTHERN PINE* GLULAM ROOF BEAMS (PLF) – NON-SNOW LOADS

Load Duration Factor = 1.25, F_b = 2,400 psi, F_v = 300 psi, E_x = 1,800,000 psi

3-INCH WIDTH	SPAN (ft)																				
Depth (in.)	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**
6-7/8	733	428	246	153	101	69	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8-1/4	1057	674	427	267	177	122	87	64	—	—	—	—	—	—	—	—	—	—	—	—	—
9-5/8	1440	919	636	426	283	197	141	104	79	60	—	—	—	—	—	—	—	—	—	—	—
11	1882	1202	832	609	425	296	214	158	120	93	73	57	—	—	—	—	—	—	—	—	—
12-3/8	2384	1522	1054	772	589	424	307	228	174	134	106	84	68	55	—	—	—	—	—	—	—
13-3/4	2944	1880	1303	954	728	573	423	315	240	187	148	118	95	78	64	53	—	—	—	—	—
15-1/8	3563	2276	1577	1156	882	695	561	422	322	251	199	160	129	106	88	73	61	51	—	—	—
16-1/2	4242	2710	1878	1377	1051	828	668	550	421	328	260	209	170	140	116	97	81	68	58	—	—
17-7/8	4979	3182	2205	1617	1235	973	785	647	537	420	333	269	219	180	150	125	106	89	76	65	55
19-1/4	5776	3691	2559	1876	1433	1129	912	751	627	527	419	338	276	228	189	159	134	114	97	83	72
20-5/8	6631	4238	2939	2155	1646	1297	1048	861	718	607	517	418	342	282	235	198	167	142	122	105	90
22	7546	4824	3345	2453	1874	1477	1192	978	815	689	590	509	417	345	288	242	205	175	150	129	112
23-3/8	8520	5446	3777	2770	2117	1669	1343	1101	919	777	665	575	502	416	347	293	249	212	182	157	136
24-3/4	9553	6107	4235	3107	2374	1869	1502	1232	1028	870	744	644	562	494	415	350	297	254	219	189	164
26-1/8	10645	6806	4720	3463	2646	2078	1670	1370	1143	967	828	716	625	550	487	414	352	301	259	225	195

3-1/2-INCH WIDTH	SPAN (ft)																				
Depth (in.)	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**
6-7/8	856	499	287	178	117	81	57	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8-1/4	1234	787	498	311	206	143	102	75	56	—	—	—	—	—	—	—	—	—	—	—	—
9-5/8	1680	1072	742	497	330	229	165	122	92	70	55	—	—	—	—	—	—	—	—	—	—
11	2196	1402	971	711	496	345	249	185	140	108	85	67	54	—	—	—	—	—	—	—	—
12-3/8	2781	1776	1230	901	687	495	358	266	202	157	123	98	79	64	52	—	—	—	—	—	—
13-3/4	3434	2194	1520	1113	850	669	493	368	280	218	172	138	111	91	75	62	51	—	—	—	—
15-1/8	4157	2656	1840	1348	1029	811	654	492	376	293	232	186	151	124	102	85	71	59	—	—	—
16-1/2	4948	3162	2191	1606	1226	966	780	642	491	383	304	244	199	163	135	113	95	80	68	57	—
17-7/8	5809	3712	2573	1886	1440	1135	916	752	627	490	389	313	255	210	175	146	123	104	89	76	65
19-1/4	6738	4306	2985	2189	1672	1317	1062	870	725	613	489	394	322	265	221	185	157	133	113	97	83
20-5/8	7736	4945	3428	2514	1921	1513	1216	997	831	703	601	487	398	329	274	231	195	166	142	122	105
22	8804	5627	3902	2862	2186	1717	1380	1132	944	798	683	590	486	402	336	283	240	204	175	151	131
23-3/8	9940	6354	4406	3232	2468	1934	1554	1275	1063	899	770	665	580	485	405	342	290	248	213	184	159
24-3/4	11145	7125	4941	3625	2760	2163	1739	1426	1190	1007	862	745	650	572	484	408	347	297	255	221	192
26-1/8	12419	7940	5507	4040	3068	2405	1933	1586	1323	1120	959	829	724	636	563	483	411	352	303	262	228

5-INCH WIDTH	SPAN (ft)																				
Depth (in.)	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**
12-3/8	3973	2537	1757	1287	982	707	511	380	289	224	176	141	113	92	75	61	50	—	—	—	—
13-3/4	4906	3134	2171	1590	1214	955	705	525	401	311	246	197	159	130	107	88	73	61	51	—	—
15-1/8	5939	3794	2629	1926	1470	1155	927	703	537	419	331	266	216	177	146	121	101	85	71	60	51
16-1/2	7069	4517	3130	2294	1750	1370	1100	901	701	547	434	349	284	233	193	161	135	114	97	82	70
17-7/8	8298	5303	3676	2695	2047	1603	1288	1055	879	700	556	448	365	301	250	209	176	149	127	108	92
19-1/4	9626	6152	4265	3120	2367	1854	1489	1221	1017	860	698	563	460	379	316	265	224	190	162	139	119
20-5/8	11052	7064	4898	3571	2710	2123	1706	1398	1166	985	843	696	569	470	392	330	279	237	203	175	151
22	12577	8039	5568	4052	3075	2410	1936	1588	1324	1119	958	828	695	575	480	404	342	292	250	216	186
23-3/8	14200	9077	6269	4562	3463	2714	2181	1789	1492	1261	1080	933	814	693	579	488	414	354	304	262	227
24-3/4	15921	10178	7010	5102	3873	3035	2440	2001	1669	1412	1209	1045	912	802	691	583	495	424	365	315	274
26-1/8	17741	11336	7791	5671	4305	3375	2713	2225	1857	1571	1345	1163	1015	892	790	689	586	502	432	374	326
27-1/2	19660	12530	8612	6269	4760	3731	3000	2461	2054	1738	1488	1287	1123	988	875	780	688	589	508	440	384
28-7/8	21677	13783	9473	6897	5237	4105	3301	2709	2260	1913	1638	1417	1237	1088	964	859	770	686	592	514	448
30-1/4	23792	15093	10375	7553	5735	4497	3616	2968	2477	2096	1795	1554	1356	1193	1057	942	845	761	684	594	518
31-5/8	26006	16462	11316	8239	6257	4906	3945	3238	2703	2288	1960	1696	1481	1303	1155	1029	923	831	752	683	596

Notes:
(1) Span = simply supported beam.
(2) Maximum deflection = L/180 under total load. Other deflection limits may apply.
(3) Service condition = dry.
(4) Tabulated values represent total loads and have taken the dead weight of the beam (assumed 36 pcf) into account.
(5) Sufficient bearing length shall be provided at supports.
(6) Maximum beam shear is located at a distance from the supports equal to the depth of the beam.
(7) Unshaded (upper-right) areas limited by deflection; medium shaded areas limited by bending strength; shear strength not a controlling design consideration.

5-1/2-INCH WIDTH											SPAN (ft)										
Depth (in.)	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**
12-3/8	4370	2791	1933	1415	1080	777	562	418	318	247	194	155	124	101	82	67	55	—	—	—	—
13-3/4	5397	3447	2388	1750	1335	1048	775	578	441	343	271	216	175	143	117	97	80	67	56	—	—
15-1/8	6532	4173	2892	2119	1615	1264	1015	774	591	460	364	292	237	194	160	133	111	93	78	66	56
16-1/2	7776	4969	3443	2524	1916	1500	1204	986	772	602	478	384	312	257	213	177	149	126	106	90	77
17-7/8	9128	5833	4043	2955	2241	1755	1409	1155	962	770	611	492	401	331	275	230	194	164	139	119	102
19-1/4	10589	6767	4691	3416	2592	2030	1630	1336	1114	941	768	619	506	417	347	291	246	209	178	153	131
20-5/8	12157	7770	5373	3910	2967	2324	1867	1531	1276	1079	923	766	626	517	431	362	307	261	223	192	166
22	13834	8843	6096	4436	3366	2638	2120	1738	1449	1225	1048	906	764	632	528	444	376	321	275	237	205
23-3/8	15620	9985	6863	4995	3791	2971	2387	1958	1633	1381	1182	1022	891	762	637	537	456	389	334	289	250
24-3/4	17513	11167	7674	5585	4240	3323	2671	2191	1827	1546	1323	1144	998	877	760	641	545	466	401	347	301
26-1/8	19515	12410	8529	6208	4713	3694	2970	2436	2032	1719	1472	1273	1111	977	865	758	645	552	476	412	358
27-1/2	21626	13718	9428	6863	5211	4085	3284	2694	2248	1902	1629	1409	1230	1081	958	853	757	648	559	484	422
28-7/8	23844	15089	10371	7550	5733	4494	3614	2965	2474	2094	1793	1551	1354	1191	1055	940	843	755	651	565	492
30-1/4	26132	16523	11358	8269	6279	4923	3959	3249	2711	2295	1965	1701	1485	1306	1157	1031	924	832	753	654	570
31-5/8	28500	18021	12388	9020	6849	5371	4319	3545	2958	2504	2145	1856	1621	1426	1264	1127	1010	910	823	748	656

6-3/4-INCH WIDTH											SPAN (ft)										
Depth (in.)	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**	**50**
17-7/8	7159	4934	3589	2722	2132	1712	1403	1169	945	750	604	493	406	337	282	238	201	171	146	125	107
19-1/4	8303	5703	4149	3148	2466	1980	1623	1353	1143	942	760	621	512	426	358	302	256	219	187	161	139
20-5/8	9501	6527	4749	3603	2823	2268	1859	1550	1310	1120	940	768	635	529	445	376	320	274	236	203	176
22	10777	7405	5388	4089	3204	2574	2111	1760	1488	1273	1100	938	776	648	545	462	394	338	291	252	218
23-3/8	12132	8336	6067	4605	3608	2900	2378	1983	1677	1435	1241	1082	935	782	659	559	478	410	354	307	267
24-3/4	13565	9321	6784	5150	4036	3244	2661	2219	1877	1607	1389	1212	1065	933	787	669	572	492	426	370	322
26-1/8	15075	10360	7541	5725	4487	3607	2959	2468	2088	1788	1546	1349	1186	1050	931	792	678	584	505	440	384
27-1/2	16663	11452	8337	6329	4962	3989	3273	2730	2310	1978	1711	1493	1313	1163	1036	928	796	686	595	518	453
28-7/8	18329	12598	9171	6963	5459	4389	3602	3005	2543	2178	1884	1645	1447	1281	1142	1023	921	799	693	604	529
30-1/4	20072	13796	10044	7627	5980	4808	3946	3293	2787	2387	2065	1803	1586	1405	1253	1122	1011	914	802	700	613
31-5/8	21891	15048	10956	8320	6524	5246	4305	3593	3041	2605	2255	1969	1732	1535	1368	1226	1105	999	908	805	706
33	23788	16352	11907	9042	7090	5702	4680	3907	3307	2833	2452	2141	1884	1670	1489	1335	1202	1088	988	901	807
34-3/8	25761	17709	12895	9793	7680	6177	5070	4233	3583	3070	2657	2321	2043	1811	1615	1448	1304	1180	1073	978	895
35-3/4	27811	19119	13923	10574	8293	6670	5476	4571	3870	3316	2871	2508	2208	1957	1745	1565	1410	1277	1160	1058	968
37-1/8	29937	20582	14988	11384	8928	7182	5896	4923	4168	3572	3093	2702	2378	2109	1881	1687	1520	1376	1251	1141	1045

8-1/2-INCH WIDTH											SPAN (ft)										
Depth (in.)	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**	**50**	**52**
24-3/4	11603	8445	6410	5024	4038	3312	2762	2336	1999	1729	1508	1326	1173	991	842	720	620	536	465	406	355
26-1/8	12896	9387	7126	5585	4489	3683	3072	2599	2225	1924	1679	1476	1307	1164	997	854	735	637	554	483	424
27-1/2	14255	10377	7878	6176	4965	4073	3398	2875	2462	2129	1858	1634	1447	1289	1155	1002	864	749	652	570	500
28-7/8	15681	11416	8667	6795	5463	4483	3740	3165	2710	2345	2047	1800	1594	1421	1273	1146	1006	873	761	666	585
30-1/4	17173	12503	9493	7443	5985	4911	4098	3468	2970	2570	2244	1974	1749	1558	1396	1257	1137	1010	881	772	679
31-5/8	18731	13638	10356	8120	6530	5359	4472	3785	3242	2806	2450	2156	1910	1702	1526	1374	1243	1129	1013	889	783
33	20355	14821	11255	8825	7097	5825	4862	4116	3526	3052	2665	2345	2078	1853	1661	1496	1354	1230	1121	1016	895
34-3/8	22044	16052	12190	9560	7688	6311	5268	4460	3821	3307	2888	2542	2253	2009	1801	1623	1469	1334	1217	1113	1018
35-3/4	23799	17330	13162	10322	8302	6815	5690	4817	4127	3573	3121	2747	2435	2172	1947	1755	1588	1443	1316	1205	1106
37-1/8	25620	18657	14170	11113	8939	7339	6127	5188	4445	3849	3362	2960	2624	2340	2099	1892	1712	1556	1420	1299	1193
38-1/2	27505	20031	15214	11933	9599	7881	6580	5572	4775	4134	3612	3180	2820	2515	2256	2033	1841	1674	1527	1398	1283
39-7/8	29456	21452	16295	12781	10282	8442	7049	5969	5116	4430	3871	3408	3022	2696	2419	2180	1974	1795	1638	1500	1377
41-1/4	31472	22921	17411	13657	10987	9022	7534	6380	5469	4736	4138	3644	3232	2883	2587	2332	2112	1921	1753	1605	1474
42-5/8	33553	24438	18564	14562	11716	9620	8034	6804	5833	5051	4414	3888	3448	3077	2760	2489	2254	2050	1871	1714	1574
44	35699	26001	19752	15495	12467	10238	8550	7242	6208	5377	4699	4139	3671	3276	2940	2651	2401	2184	1994	1826	1678

Notes:
(1) Span = simply supported beam.
(2) Maximum deflection = L/180 under total load. Other deflection limits may apply.
(3) Service condition = dry.
(4) Tabulated values represent total loads and have taken the dead weight of the beam (assumed 36 pcf) into account.
(5) Sufficient bearing length shall be provided at supports.
(6) Maximum beam shear is located at a distance from the supports equal to the depth of the beam.
(7) Unshaded (upper-right) areas limited by deflection; medium shaded areas limited by bending strength; shear strength not a controlling design consideration.

TABLE 9

ALLOWABLE LOADS FOR SIMPLE SPAN *SOUTHERN PINE* GLULAM ROOF BEAMS (PLF) – SNOW LOADS
Load Duration Factor = 1.15, F_b = 2,400 psi, F_v = 300 psi, E_x = 1,800,000 psi

3-INCH WIDTH — SPAN (ft)

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
6-7/8	674	428	246	153	101	69	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8-1/4	972	620	427	267	177	122	87	64	—	—	—	—	—	—	—	—	—	—	—	—	—
9-5/8	1324	845	585	426	283	197	141	104	79	60	—	—	—	—	—	—	—	—	—	—	—
11	1731	1105	765	560	425	296	214	158	120	93	73	57	—	—	—	—	—	—	—	—	—
12-3/8	2192	1400	969	710	541	424	307	228	174	134	106	84	68	55	—	—	—	—	—	—	—
13-3/4	2707	1729	1198	877	669	527	423	315	240	187	148	118	95	78	64	53	—	—	—	—	—
15-1/8	3277	2093	1450	1062	811	638	515	422	322	251	199	160	129	106	88	73	61	51	—	—	—
16-1/2	3901	2492	1727	1266	966	761	614	505	421	328	260	209	170	140	116	97	81	68	58	—	—
17-7/8	4580	2926	2028	1486	1135	894	721	594	497	420	333	269	219	180	150	125	106	89	76	65	55
19-1/4	5312	3395	2353	1725	1317	1038	838	690	575	486	416	338	276	228	189	159	134	114	97	83	72
20-5/8	6100	3898	2702	1981	1513	1192	963	791	659	557	476	412	342	282	235	198	167	142	122	105	90
22	6941	4436	3076	2255	1723	1358	1095	898	749	633	541	468	408	345	288	242	205	175	150	129	112
23-3/8	7837	5009	3473	2547	1946	1534	1234	1012	844	713	610	528	460	404	347	293	249	212	182	157	136
24-3/4	8787	5617	3895	2857	2183	1718	1381	1132	944	799	683	591	515	453	401	350	297	254	219	189	164
26-1/8	9792	6260	4341	3184	2433	1910	1535	1259	1050	888	760	657	574	504	446	397	352	301	259	225	195

3-1/2-INCH WIDTH — SPAN (ft)

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
6-7/8	787	499	287	178	117	81	57	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8-1/4	1134	723	498	311	206	143	102	75	56	—	—	—	—	—	—	—	—	—	—	—	—
9-5/8	1545	986	682	497	330	229	165	122	92	70	55	—	—	—	—	—	—	—	—	—	—
11	2020	1289	892	653	496	345	249	185	140	108	85	67	54	—	—	—	—	—	—	—	—
12-3/8	2557	1633	1131	828	631	495	358	266	202	157	123	98	79	64	52	—	—	—	—	—	—
13-3/4	3159	2017	1397	1023	781	614	493	368	280	218	172	138	111	91	75	62	51	—	—	—	—
15-1/8	3823	2442	1692	1240	946	745	601	492	376	293	232	186	151	124	102	85	71	59	—	—	—
16-1/2	4551	2908	2015	1476	1127	887	716	589	491	383	304	244	199	163	135	113	95	80	68	57	—
17-7/8	5343	3414	2366	1734	1324	1043	842	691	575	486	389	313	255	210	175	146	123	104	89	76	65
19-1/4	6198	3961	2745	2012	1537	1211	975	799	666	563	481	394	322	265	221	185	157	133	113	97	83
20-5/8	7116	4548	3153	2311	1765	1391	1117	916	763	645	551	476	398	329	274	231	195	166	142	122	105
22	8098	5176	3588	2631	2010	1578	1268	1040	867	733	627	541	472	402	336	283	240	204	175	151	131
23-3/8	9143	5844	4052	2972	2269	1778	1428	1171	977	826	706	611	532	468	405	342	290	248	213	184	159
24-3/4	10252	6553	4544	3333	2538	1989	1598	1311	1093	924	791	684	596	524	464	408	347	297	255	221	192
26-1/8	11423	7303	5064	3715	2821	2211	1777	1458	1216	1028	880	761	664	584	517	460	411	352	303	262	228

5-INCH WIDTH — SPAN (ft)

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
12-3/8	3654	2333	1615	1183	902	707	511	380	289	224	176	141	113	92	75	61	50	—	—	—	—
13-3/4	4512	2882	1996	1462	1115	878	705	525	401	311	246	197	159	130	107	88	73	61	51	—	—
15-1/8	5462	3489	2417	1771	1351	1061	851	697	537	419	331	266	216	177	146	121	101	85	71	60	51
16-1/2	6502	4154	2878	2109	1608	1259	1010	827	689	547	434	349	284	233	193	161	135	114	97	82	70
17-7/8	7633	4877	3380	2477	1882	1473	1183	969	807	681	556	448	365	301	250	209	176	149	127	108	92
19-1/4	8854	5658	3922	2869	2176	1704	1368	1121	934	789	675	563	460	379	316	265	224	190	162	139	119
20-5/8	10166	6497	4504	3284	2491	1951	1567	1284	1070	905	773	668	569	470	392	330	279	237	203	175	151
22	11568	7394	5121	3726	2827	2215	1779	1458	1216	1028	879	759	662	575	480	404	342	292	250	216	186
23-3/8	13061	8349	5765	4195	3183	2494	2004	1643	1370	1158	991	856	747	656	579	488	414	354	304	262	227
24-3/4	14645	9362	6446	4691	3561	2790	2242	1839	1533	1297	1109	959	836	735	650	579	495	424	365	315	274
26-1/8	16319	10427	7165	5215	3958	3102	2493	2045	1705	1442	1234	1067	931	818	724	645	577	502	432	374	326
27-1/2	18084	11525	7920	5765	4376	3430	2757	2262	1887	1596	1366	1181	1031	906	802	714	640	576	508	440	384
28-7/8	19940	12677	8713	6342	4815	3774	3034	2489	2077	1757	1504	1301	1135	998	884	787	705	635	574	514	448
30-1/4	21886	13883	9542	6946	5274	4134	3324	2727	2275	1925	1649	1426	1245	1095	970	864	774	697	630	572	518
31-5/8	23922	15142	10407	7577	5753	4510	3626	2976	2483	2101	1800	1557	1359	1196	1059	944	846	761	689	625	570

Notes:
(1) Span = simply supported beam.
(2) Maximum deflection = L/180 under total load. Other deflection limits may apply.
(3) Service condition = dry.
(4) Tabulated values represent total loads and have taken the dead weight of the beam (assumed 36 pcf) into account.
(5) Sufficient bearing length shall be provided at supports.
(6) Maximum beam shear is located at a distance from the supports equal to the depth of the beam.
(7) Unshaded (upper-right) areas limited by deflection; medium shaded areas limited by bending strength; shear strength not a controlling design consideration.

TABLE 9 (continued)

5-1/2-INCH WIDTH — SPAN (ft)

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
12-3/8	4019	2566	1777	1301	992	777	562	418	318	247	194	155	124	101	82	67	55	—	—	—	—
13-3/4	4964	3170	2196	1608	1227	963	772	578	441	343	271	216	175	143	117	97	80	67	56	—	—
15-1/8	6008	3838	2659	1948	1484	1161	932	763	591	460	364	292	237	194	160	133	111	93	78	66	56
16-1/2	7152	4569	3166	2320	1761	1378	1106	906	754	602	478	384	312	257	213	177	149	126	106	90	77
17-7/8	8396	5365	3718	2716	2060	1613	1295	1061	883	746	611	492	401	331	275	230	194	164	139	119	102
19-1/4	9739	6224	4314	3140	2382	1865	1498	1227	1023	864	738	619	506	417	347	291	246	209	178	153	131
20-5/8	11182	7147	4941	3595	2727	2136	1716	1406	1172	990	847	731	626	517	431	362	307	261	223	192	166
22	12725	8133	5606	4079	3095	2424	1948	1597	1331	1125	962	831	724	632	528	444	376	321	275	237	205
23-3/8	14368	9184	6311	4592	3485	2730	2194	1799	1500	1268	1085	937	817	718	635	537	456	389	334	289	250
24-3/4	16110	10271	7057	5136	3898	3054	2454	2013	1678	1419	1214	1050	915	804	712	634	545	466	401	347	301
26-1/8	17951	11415	7844	5709	4333	3396	2729	2238	1867	1579	1351	1168	1019	896	793	706	632	552	476	412	358
27-1/2	19893	12617	8671	6311	4791	3755	3018	2476	2065	1747	1495	1293	1128	992	878	782	700	630	559	484	422
28-7/8	21933	13879	9538	6943	5271	4132	3321	2725	2273	1923	1646	1424	1243	1093	968	862	772	695	628	565	492
30-1/4	24038	15198	10446	7604	5773	4526	3639	2985	2491	2108	1805	1561	1363	1198	1061	946	847	763	689	626	570
31-5/8	26216	16576	11393	8295	6298	4938	3970	3258	2718	2300	1970	1704	1488	1309	1159	1033	926	833	754	684	623

6-3/4-INCH WIDTH — SPAN (ft)

Depth (in.)	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50
17-7/8	6584	4537	3299	2502	1959	1572	1288	1073	906	750	604	493	406	337	282	238	201	171	146	125	107
19-1/4	7636	5244	3815	2893	2266	1819	1491	1242	1049	897	760	621	512	426	358	302	256	219	187	161	139
20-5/8	8738	6002	4366	3312	2594	2084	1708	1423	1202	1028	888	768	635	529	445	376	320	274	236	203	176
22	9912	6809	4954	3759	2945	2365	1939	1616	1366	1168	1009	880	772	648	545	462	394	338	291	252	218
23-3/8	11158	7666	5578	4233	3317	2665	2185	1821	1540	1317	1138	992	872	771	659	559	478	410	354	307	267
24-3/4	12476	8572	6238	4734	3710	2981	2445	2038	1724	1475	1275	1112	977	864	769	669	572	492	426	370	322
26-1/8	13866	9528	6934	5263	4125	3315	2719	2267	1918	1641	1419	1238	1088	963	857	767	678	584	505	440	384
27-1/2	15327	10532	7666	5819	4561	3666	3007	2508	2122	1816	1570	1370	1205	1066	949	850	765	686	595	518	453
28-7/8	16859	11586	8434	6402	5018	4034	3310	2761	2336	2000	1729	1509	1327	1175	1047	937	843	762	692	604	529
30-1/4	18462	12688	9237	7013	5497	4420	3626	3025	2560	2192	1896	1655	1455	1289	1148	1029	926	837	760	692	613
31-5/8	20136	13840	10075	7650	5997	4822	3957	3302	2794	2393	2070	1807	1589	1408	1254	1124	1012	915	831	757	692
33	21881	15040	10950	8314	6519	5242	4301	3590	3038	2602	2251	1965	1729	1532	1365	1224	1102	996	905	825	754
34-3/8	23696	16288	11859	9005	7061	5678	4660	3889	3292	2820	2440	2131	1875	1661	1481	1327	1195	1081	982	895	819
35-3/4	25581	17585	12804	9723	7625	6132	5033	4201	3556	3046	2636	2302	2026	1795	1601	1435	1293	1170	1062	969	886
37-1/8	27537	18930	13784	10468	8209	6602	5419	4524	3830	3281	2840	2480	2183	1935	1725	1547	1394	1261	1146	1045	956

8-1/2-INCH WIDTH — SPAN (ft)

Depth (in.)	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52
24-3/4	10670	7765	5893	4618	3710	3043	2537	2145	1835	1586	1383	1215	1075	957	842	720	620	536	465	406	355
26-1/8	11860	8631	6551	5134	4126	3384	2822	2386	2042	1766	1540	1353	1198	1066	954	854	735	637	554	483	424
27-1/2	13110	9542	7243	5677	4563	3743	3122	2640	2260	1954	1705	1499	1327	1181	1058	951	859	749	652	570	500
28-7/8	14422	10498	7969	6246	5021	4119	3436	2907	2488	2152	1878	1651	1462	1302	1166	1049	948	860	761	666	585
30-1/4	15794	11497	8729	6842	5501	4513	3765	3186	2728	2359	2059	1811	1604	1429	1280	1152	1041	945	861	772	679
31-5/8	17227	12541	9522	7465	6002	4925	4109	3477	2978	2576	2248	1978	1752	1561	1398	1259	1138	1033	941	860	783
33	18721	13630	10349	8114	6524	5354	4468	3781	3238	2802	2446	2152	1906	1699	1522	1371	1240	1126	1026	938	860
34-3/8	20275	14762	11209	8789	7067	5800	4841	4097	3509	3037	2651	2333	2067	1842	1651	1487	1345	1222	1114	1018	934
35-3/4	21889	15938	12103	9490	7632	6264	5228	4426	3791	3281	2865	2521	2234	1992	1785	1608	1455	1322	1205	1102	1011
37-1/8	23564	17158	13030	10218	8218	6745	5630	4766	4084	3535	3087	2717	2408	2147	1925	1734	1569	1426	1300	1189	1091
38-1/2	25298	18422	13991	10972	8825	7244	6047	5120	4387	3797	3316	2919	2587	2307	2069	1864	1687	1533	1398	1279	1174
39-7/8	27093	19729	14984	11752	9453	7760	6478	5485	4700	4069	3554	3129	2774	2474	2218	1999	1810	1645	1500	1373	1260
41-1/4	28948	21081	16011	12558	10101	8293	6924	5863	5024	4350	3800	3346	2966	2646	2373	2139	1936	1760	1606	1470	1349
42-5/8	30862	22475	17071	13390	10771	8843	7384	6253	5359	4640	4054	3569	3165	2823	2532	2283	2067	1879	1714	1569	1441
44	32836	23914	18165	14248	11462	9411	7858	6655	5704	4939	4316	3800	3370	3006	2697	2431	2202	2002	1827	1673	1536

Notes:
(1) Span = simply supported beam.
(2) Maximum deflection = L/180 under total load. Other deflection limits may apply.
(3) Service condition = dry.
(4) Tabulated values represent total loads and have taken the dead weight of the beam (assumed 36 pcf) into account.
(5) Sufficient bearing length shall be provided at supports.
(6) Maximum beam shear is located at a distance from the supports equal to the depth of the beam.
(7) Unshaded (upper-right) areas limited by deflection; medium shaded areas limited by bending strength; shear strength not a controlling design consideration.

TABLE 10

ALLOWABLE LOADS FOR SIMPLE SPAN *SOUTHERN PINE* GLULAM FLOOR BEAMS (PLF)

Load Duration Factor = 1.00, F_b = 2,400 psi, F_v = 300 psi, E_x = 1,800,000 psi

3-INCH WIDTH										SPAN (ft)											
Depth (in.)	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**
6-7/8	524	266	152	94	61	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8-1/4	845	462	265	164	108	74	52	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9-5/8	1151	734	423	264	174	120	86	63	—	—	—	—	—	—	—	—	—	—	—	—	—
11	1504	960	634	396	263	182	130	96	72	55	—	—	—	—	—	—	—	—	—	—	—
12-3/8	1905	1216	842	566	376	262	188	139	105	81	63	—	—	—	—	—	—	—	—	—	—
13-3/4	2353	1502	1040	761	519	361	260	193	146	113	88	70	56	—	—	—	—	—	—	—	—
15-1/8	2848	1819	1260	922	693	483	349	259	197	153	120	95	77	62	50	—	—	—	—	—	—
16-1/2	3391	2166	1500	1099	838	630	456	339	258	201	158	126	102	83	68	56	—	—	—	—	—
17-7/8	3981	2543	1762	1291	985	776	582	434	331	257	203	163	132	108	89	73	61	51	—	—	—
19-1/4	4618	2950	2044	1498	1144	901	727	544	416	324	256	206	167	137	113	94	78	66	55	—	—
20-5/8	5302	3388	2348	1721	1314	1035	835	671	513	401	318	255	208	171	141	118	99	83	70	60	51
22	6034	3856	2672	1959	1496	1179	950	779	625	488	388	312	254	209	174	145	122	103	88	75	64
23-3/8	6812	4354	3018	2213	1690	1332	1071	878	731	588	467	377	307	253	211	176	149	126	107	92	79
24-3/4	7638	4882	3385	2482	1896	1491	1198	982	819	692	557	449	367	303	252	212	179	152	130	111	96
26-1/8	8512	5441	3772	2766	2113	1658	1332	1092	911	770	657	531	434	358	299	251	213	181	155	133	115

3-1/2-INCH WIDTH										SPAN (ft)											
Depth (in.)	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**
6-7/8	611	310	177	109	71	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8-1/4	985	539	309	192	126	86	61	—	—	—	—	—	—	—	—	—	—	—	—	—	—
9-5/8	1343	856	493	308	203	140	100	73	54	—	—	—	—	—	—	—	—	—	—	—	—
11	1755	1120	739	462	306	212	152	112	84	64	—	—	—	—	—	—	—	—	—	—	—
12-3/8	2222	1418	982	661	439	305	219	162	122	94	73	57	—	—	—	—	—	—	—	—	—
13-3/4	2745	1753	1213	888	605	421	304	225	171	132	103	82	65	52	—	—	—	—	—	—	—
15-1/8	3323	2122	1470	1076	808	564	407	303	230	178	140	111	89	72	59	—	—	—	—	—	—
16-1/2	3956	2527	1750	1282	978	734	531	396	301	234	185	147	119	97	79	65	54	—	—	—	—
17-7/8	4644	2967	2055	1506	1149	905	678	506	386	300	237	190	154	126	103	86	71	59	—	—	—
19-1/4	5387	3442	2385	1748	1334	1051	846	634	485	378	299	240	195	160	132	110	92	77	65	54	—
20-5/8	6186	3952	2739	2008	1533	1207	969	783	599	467	371	298	242	199	165	137	115	97	82	70	59
22	7039	4498	3118	2286	1745	1370	1100	902	730	570	452	364	297	244	203	169	143	120	102	87	74
23-3/8	7948	5079	3521	2581	1970	1543	1239	1016	847	686	545	439	358	295	246	206	174	147	125	107	92
24-3/4	8912	5696	3949	2895	2204	1726	1387	1137	948	801	650	524	428	353	294	247	209	177	151	130	112
26-1/8	9930	6347	4401	3227	2450	1920	1542	1264	1054	891	762	619	506	418	349	293	248	211	181	155	134

5-INCH WIDTH										SPAN (ft)											
Depth (in.)	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**
12-3/8	3175	2026	1403	944	627	436	314	232	175	134	104	82	65	51	—	—	—	—	—	—	—
13-3/4	3922	2504	1733	1269	864	602	434	322	244	188	147	117	93	75	60	—	—	—	—	—	—
15-1/8	4747	3031	2099	1537	1154	805	582	432	329	255	200	159	128	103	84	69	56	—	—	—	—
16-1/2	5651	3609	2500	1831	1396	1049	759	565	431	334	264	210	170	138	113	93	77	64	53	—	—
17-7/8	6634	4238	2936	2151	1633	1278	969	723	551	429	339	271	220	179	148	122	102	85	71	59	—
19-1/4	7696	4917	3407	2491	1889	1479	1187	906	693	540	427	343	278	228	188	156	131	110	92	78	66
20-5/8	8837	5646	3913	2852	2163	1693	1359	1114	856	668	529	426	346	284	235	196	165	139	117	99	84
22	10056	6426	4449	3236	2455	1922	1543	1265	1042	814	646	520	424	349	289	242	204	172	146	124	106
23-3/8	11354	7256	5009	3644	2764	2165	1739	1425	1187	980	779	628	512	422	351	294	248	210	179	153	131
24-3/4	12731	8137	5601	4075	3092	2422	1946	1595	1329	1123	928	749	612	505	420	353	298	253	216	185	159
26-1/8	14186	9062	6226	4530	3438	2693	2164	1774	1479	1250	1069	885	723	597	498	419	354	302	258	222	191
27-1/2	15721	10017	6883	5009	3801	2978	2393	1962	1636	1383	1183	1023	847	701	585	492	417	355	305	262	227
28-7/8	17334	11019	7571	5510	4182	3277	2634	2160	1801	1523	1303	1127	983	815	681	573	486	415	356	307	266
30-1/4	19026	12067	8292	6035	4581	3590	2885	2367	1974	1669	1429	1235	1078	940	786	663	563	481	414	357	310
31-5/8	20797	13161	9045	6583	4997	3917	3148	2583	2154	1822	1560	1349	1177	1035	902	761	647	553	476	412	358

Notes:

(1) Span = simply supported beam.

(2) Maximum deflection = L/360 under live load, based on live/total load = 0.8. Where additional stiffness is desired or for other live/total load ratios design for deflection must be modified per requirements.

(3) Service condition = dry.

(4) Tabulated values represent total loads based on live/total load = 0.8 and have taken the dead weight of the beam (assumed 36 pcf) into account.

(5) Sufficient bearing length shall be provided at supports.

(6) Maximum beam shear is located at a distance from the supports equal to the depth of the beam.

(7) Unshaded (upper-right) areas limited by deflection; medium shaded areas limited by bending strength; shear strength not a controlling design consideration.

TABLE 10 (continued)

5-1/2-INCH WIDTH	SPAN (ft)																				
Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
12-3/8	3492	2229	1543	1038	690	479	345	255	192	148	115	90	71	57	—	—	—	—	—	—	—
13-3/4	4314	2754	1907	1396	951	662	478	354	268	207	162	128	102	82	66	53	—	—	—	—	—
15-1/8	5222	3334	2309	1691	1270	886	640	476	362	280	220	175	141	114	93	76	62	51	—	—	—
16-1/2	6216	3970	2750	2015	1528	1154	835	622	474	368	290	231	187	152	124	102	85	70	58	—	—
17-7/8	7298	4662	3230	2359	1788	1399	1066	795	607	472	373	299	242	197	162	134	112	93	78	65	54
19-1/4	8466	5408	3748	2727	2068	1619	1299	997	762	594	470	377	306	251	207	172	144	121	101	85	72
20-5/8	9720	6211	4293	3122	2368	1854	1488	1219	941	734	582	468	381	313	259	216	181	153	129	109	93
22	11061	7068	4871	3543	2687	2104	1690	1384	1147	895	711	572	466	384	318	266	224	189	161	137	117
23-3/8	12489	7982	5484	3989	3026	2370	1903	1560	1300	1078	857	691	563	464	386	323	273	231	197	168	144
24-3/4	14004	8927	6132	4461	3385	2652	2130	1746	1455	1230	1021	824	673	555	462	388	328	279	238	204	175
26-1/8	15605	9921	6816	4959	3763	2948	2369	1942	1619	1368	1170	973	795	657	548	461	390	332	284	244	210
27-1/2	17293	10967	7535	5483	4161	3260	2620	2148	1791	1514	1295	1120	932	771	643	541	459	391	335	289	249
28-7/8	19067	12063	8289	6032	4578	3588	2883	2364	1971	1667	1427	1233	1075	896	749	631	535	457	392	338	293
30-1/4	20897	13210	9078	6607	5015	3930	3159	2591	2161	1827	1564	1352	1179	1034	865	729	619	529	455	393	341
31-5/8	22791	14409	9902	7207	5471	4288	3446	2827	2358	1995	1707	1476	1288	1132	992	837	712	609	524	453	393

6-3/4-INCH WIDTH	SPAN (ft)																				
Depth (in.)	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50
17-7/8	5721	3941	2865	2172	1699	1308	976	744	579	458	366	297	242	199	165	137	114	96	80	67	56
19-1/4	6636	4556	3313	2512	1966	1578	1224	935	728	577	463	376	308	254	211	176	148	125	105	88	75
20-5/8	7594	5215	3792	2876	2251	1807	1480	1155	901	715	574	467	384	318	265	222	187	158	134	114	97
22	8614	5916	4303	3264	2556	2052	1681	1401	1099	872	702	572	471	391	327	275	232	197	168	143	123
23-3/8	9698	6661	4846	3676	2879	2312	1895	1579	1323	1051	847	691	570	474	397	335	284	242	207	177	152
24-3/4	10843	7449	5419	4111	3221	2587	2120	1767	1493	1253	1011	826	681	568	476	402	342	292	250	215	186
26-1/8	12051	8279	6024	4571	3581	2877	2358	1966	1662	1421	1194	976	807	672	565	478	407	348	299	258	223
27-1/2	13321	9153	6660	5054	3960	3182	2609	2175	1839	1573	1360	1144	946	789	664	563	480	411	354	306	266
28-7/8	14653	10068	7327	5561	4358	3502	2871	2394	2025	1732	1498	1306	1100	919	774	657	561	481	415	359	312
30-1/4	16047	11027	8025	6091	4774	3836	3146	2624	2219	1899	1642	1432	1259	1061	895	760	649	558	482	418	364
31-5/8	17502	12028	8754	6645	5208	4186	3434	2864	2422	2074	1793	1564	1375	1217	1027	873	747	643	556	483	421
33	19019	13071	9514	7222	5661	4551	3733	3114	2634	2255	1950	1702	1496	1325	1172	997	854	735	637	554	483
34-3/8	20597	14156	10305	7823	6133	4930	4045	3374	2855	2444	2114	1845	1623	1437	1280	1132	970	836	724	631	551
35-3/4	22237	15283	11126	8447	6622	5324	4368	3645	3084	2641	2285	1994	1754	1553	1384	1240	1096	945	820	714	625
37-1/8	23937	16453	11978	9095	7130	5733	4704	3926	3322	2845	2461	2149	1890	1674	1492	1337	1204	1064	923	805	705

8-1/2-INCH WIDTH	SPAN (ft)																				
Depth (in.)	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52
24-3/4	9272	6745	5117	4008	3220	2639	2199	1858	1578	1273	1040	858	715	600	507	431	368	315	271	234	202
26-1/8	10306	7498	5689	4457	3580	2935	2447	2068	1769	1504	1229	1016	847	712	602	513	439	377	325	281	244
27-1/2	11393	8290	6291	4929	3960	3247	2707	2288	1958	1692	1440	1191	994	836	709	604	518	446	386	334	291
28-7/8	12533	9120	6922	5424	4358	3574	2980	2520	2156	1863	1625	1385	1157	975	827	706	606	523	453	393	343
30-1/4	13726	9989	7582	5942	4775	3916	3266	2762	2364	2043	1782	1566	1337	1127	957	818	703	607	527	459	401
31-5/8	14971	10897	8271	6483	5210	4274	3564	3015	2580	2231	1946	1711	1514	1294	1100	941	809	700	608	530	464
33	16270	11843	8990	7046	5664	4646	3876	3279	2807	2427	2118	1862	1648	1468	1256	1075	926	802	697	609	533
34-3/8	17621	12827	9738	7633	6136	5034	4200	3553	3042	2631	2296	2019	1788	1593	1425	1221	1053	912	794	694	609
35-3/4	19024	13849	10514	8243	6627	5437	4536	3838	3287	2843	2481	2183	1933	1722	1543	1380	1190	1032	900	787	691
37-1/8	20480	14910	11320	8875	7136	5855	4886	4134	3541	3063	2674	2352	2083	1856	1663	1497	1339	1162	1014	888	780
38-1/2	21988	16008	12155	9530	7663	6288	5248	4441	3804	3291	2873	2528	2239	1996	1788	1610	1456	1302	1137	996	876
39-7/8	23548	17145	13019	10208	8209	6737	5622	4759	4076	3527	3080	2710	2401	2140	1918	1727	1563	1419	1269	1113	980
41-1/4	25160	18319	13912	10908	8772	7200	6009	5087	4357	3771	3293	2898	2568	2289	2052	1848	1672	1519	1385	1238	1091
42-5/8	26824	19532	14833	11632	9354	7678	6409	5425	4648	4023	3513	3092	2740	2443	2190	1973	1785	1622	1479	1353	1210
44	28541	20782	15783	12377	9955	8171	6821	5775	4948	4283	3740	3292	2918	2602	2333	2102	1902	1729	1576	1442	1324

Notes:
(1) Span = simply supported beam.
(2) Maximum deflection = L/360 under live load, based on live/total load = 0.8. Where additional stiffness is desired or for other live/total load ratios design for deflection must be modified per requirements.
(3) Service condition = dry.
(4) Tabulated values represent total loads based on live/total load = 0.8 and have taken the dead weight of the beam (assumed 36 pcf) into account.
(5) Sufficient bearing length shall be provided at supports.
(6) Maximum beam shear is located at a distance from the supports equal to the depth of the beam.
(7) Unshaded (upper-right) areas limited by deflection; medium shaded areas limited by bending strength; shear strength not a controlling design consideration.

TABLE 11

ALLOWABLE LOADS FOR CANTILEVERED *SOUTHERN PINE* GLUED LAMINATED ROOF BEAMS (PLF) – NON-SNOW LOADS
Load Duration Factor = 1.25, F_b = 2,400 psi, F_v = 300 psi

5-INCH WIDTH — **SPAN (ft)**

Depth (in.)	44			48			52			56			60			64		
	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3
24-3/4	551	545	649	456	451	538	382	378	451	324	320	383	277	274	329	239	236	284
26-1/8	614	607	722	509	503	599	427	422	503	362	358	428	310	306	367	267	264	318
27-1/2	681	673	800	564	557	664	473	468	558	402	397	475	344	340	407	297	294	353
28-7/8	750	742	882	622	615	732	522	516	616	444	438	524	380	376	450	329	325	390
30-1/4	823	814	967	683	675	803	574	567	676	487	482	575	418	413	494	362	357	428
31-5/8	899	889	1056	746	737	877	627	620	739	533	527	629	458	452	541	396	391	469
33	979	968	1149	812	803	955	683	675	804	581	574	685	499	493	589	432	427	511
34-3/8	1062	1050	1246	881	871	1036	741	733	872	631	623	743	542	536	640	470	464	555
35-3/4	1148	1135	1347	953	942	1120	802	793	944	683	675	804	587	580	692	509	502	601

6-3/4-INCH WIDTH — **SPAN (ft)**

Depth (in.)	44			48			52			56			60			64		
	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3
24-3/4	733	724	862	606	599	714	508	502	600	431	425	509	368	364	437	317	313	377
26-1/8	816	807	960	676	668	796	567	560	669	481	475	568	411	406	488	355	351	422
27-1/2	904	894	1063	749	740	882	629	621	742	534	527	630	457	452	541	395	390	468
28-7/8	997	986	1172	826	817	972	694	686	818	589	582	696	505	499	598	436	431	517
30-1/4	1094	1081	1285	907	896	1067	762	753	898	647	640	764	555	549	657	480	474	569
31-5/8	1195	1182	1404	991	980	1166	833	824	981	708	700	836	608	601	718	526	520	623
33	1301	1286	1528	1079	1067	1269	908	897	1069	772	763	910	663	655	783	574	567	679
34-3/8	1411	1395	1657	1171	1158	1377	985	974	1159	838	828	988	720	711	850	624	616	737
35-3/4	1526	1508	1791	1267	1252	1488	1066	1053	1254	907	896	1069	779	770	920	675	667	798
37-1/8	1645	1626	1930	1366	1350	1604	1149	1136	1352	979	967	1153	841	831	992	729	721	862
38-1/2	1768	1747	2074	1468	1451	1724	1236	1222	1454	1053	1040	1240	905	895	1067	785	776	927
39-7/8	1895	1873	2223	1575	1556	1849	1326	1311	1559	1130	1116	1330	972	960	1145	843	833	995
41-1/4	2027	2004	2377	1684	1665	1977	1419	1403	1668	1209	1195	1423	1041	1028	1226	903	892	1065
42-5/8	2163	2138	2536	1798	1777	2110	1515	1497	1780	1291	1276	1519	1112	1098	1309	965	953	1138
44	2303	2277	2701	1915	1893	2247	1614	1595	1896	1376	1360	1618	1185	1171	1395	1029	1017	1213
45-3/8	2448	2420	2870	2036	2012	2389	1716	1696	2015	1463	1446	1721	1260	1246	1484	1095	1082	1290
46-3/4	2597	2568	2986	2160	2135	2534	1821	1800	2139	1553	1535	1826	1338	1322	1575	1163	1149	1370

8-1/2-INCH WIDTH — **SPAN (ft)**

Depth (in.)	44			48			52			56			60			64		
	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3
37-1/8	2046	2023	2401	1699	1679	1996	1430	1413	1682	1217	1203	1434	1046	1034	1234	907	896	1072
38-1/2	2200	2174	2581	1827	1806	2146	1538	1520	1809	1310	1294	1542	1126	1113	1328	976	965	1153
39-7/8	2358	2331	2766	1959	1936	2300	1650	1631	1939	1405	1389	1654	1209	1194	1425	1048	1036	1238
41-1/4	2522	2493	2958	2096	2072	2461	1765	1745	2075	1504	1487	1770	1294	1279	1525	1123	1110	1325
42-5/8	2692	2661	3156	2237	2211	2626	1885	1863	2215	1606	1588	1890	1383	1366	1629	1200	1186	1416
44	2866	2834	3361	2383	2355	2796	2008	1985	2359	1712	1692	2013	1474	1456	1736	1280	1264	1509
45-3/8	3046	3012	3571	2533	2504	2972	2135	2110	2508	1821	1799	2141	1568	1549	1846	1362	1345	1605
46-3/4	3232	3195	3760	2688	2657	3153	2266	2240	2661	1933	1910	2272	1665	1645	1959	1446	1429	1704
48-1/8	3423	3384	3871	2847	2814	3339	2401	2373	2819	2048	2024	2407	1764	1744	2076	1533	1515	1806
49-1/2	3619	3578	3981	3010	2976	3531	2539	2510	2981	2166	2141	2546	1867	1845	2196	1622	1603	1911
50-7/8	3820	3777	4092	3179	3142	3728	2681	2650	3147	2288	2262	2688	1972	1949	2319	1714	1694	2019
52-1/4	4027	3981	4203	3351	3313	3843	2827	2795	3318	2413	2385	2835	2080	2056	2446	1809	1787	2129
53-5/8	4202	4191	4313	3528	3488	3944	2977	2943	3493	2541	2512	2985	2191	2166	2576	1905	1883	2243
55	4310	4357	4424	3709	3667	4045	3130	3095	3673	2673	2642	3139	2305	2278	2709	2005	1981	2359
56-3/8	4418	4466	4534	3895	3851	4146	3288	3250	3818	2807	2775	3296	2421	2393	2846	2106	2082	2478
57-3/4	4526	4575	4645	4085	4039	4248	3449	3409	3911	2945	2911	3458	2541	2511	2986	2211	2185	2600
59-1/8	4633	4684	4756	4237	4231	4349	3613	3572	4005	3086	3051	3623	2663	2632	3129	2317	2290	2725

See page 5 for description of cantilever systems.

Notes:

(1) Span = spacing of column supports for cantilevered beams.
(2) Load duration factor = as noted.
(3) Cantilevered beam layup = balanced.
(4) Deflection has not been considered.
(5) Service condition = dry.
(6) Tabulated values represent total loads and have taken the dead weight of the beam into account (assumed 36 pcf). Live load is assumed to be 0.6 x total load for purpose of checking strength under full unbalanced live load.
(7) Volume factor is included.
(8) Values inside shaded areas are limited by shear strength; all other values are limited by bending strength.

TABLE 12

ALLOWABLE LOADS FOR CANTILEVERED *SOUTHERN PINE* GLUED LAMINATED ROOF BEAMS (PLF) – SNOW LOADS
Load Duration Factor = 1.15, F_b = 2,400 psi, F_v = 300 psi

5-INCH WIDTH — **SPAN (ft)**

Depth (in.)	44			48			52			56			60			64		
	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3
24-3/4	505	499	594	417	412	492	349	345	413	296	292	350	253	250	300	218	215	259
26-1/8	563	556	662	465	460	548	390	385	461	330	326	391	283	279	335	243	240	290
27-1/2	623	616	733	516	510	608	433	428	511	367	362	434	314	310	372	271	267	322
28-7/8	687	679	808	569	562	670	478	472	563	405	400	479	347	343	411	300	296	356
30-1/4	754	746	887	625	618	736	525	518	619	445	440	526	382	377	452	330	326	391
31-5/8	824	815	969	683	675	804	574	567	676	487	482	575	418	413	494	361	357	428
33	897	887	1054	744	735	875	625	618	737	531	525	627	456	450	539	394	389	467
34-3/8	973	962	1143	807	798	949	679	671	799	577	570	681	495	489	585	429	423	507
35-3/4	1053	1040	1236	873	863	1027	734	726	864	625	617	736	536	530	633	464	459	549

6-3/4-INCH WIDTH — **SPAN (ft)**

Depth (in.)	44			48			52			56			60			64		
	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3
24-3/4	671	663	790	554	548	654	464	458	548	393	388	465	335	331	398	289	285	344
26-1/8	747	739	880	618	611	729	518	512	612	439	433	519	375	370	445	323	319	384
27-1/2	828	819	975	685	677	808	575	568	678	487	481	576	417	412	494	359	355	427
28-7/8	913	903	1074	756	747	891	634	627	749	538	532	636	461	455	546	398	393	472
30-1/4	1002	991	1178	830	821	978	697	689	822	592	584	699	507	501	600	438	432	519
31-5/8	1096	1083	1287	908	897	1068	762	753	899	647	640	764	555	548	657	480	474	569
33	1193	1179	1401	989	977	1163	831	821	979	706	697	833	605	598	716	523	517	620
34-3/8	1294	1279	1519	1073	1060	1262	902	891	1062	766	757	904	658	650	777	569	562	674
35-3/4	1399	1383	1643	1160	1147	1364	976	964	1149	830	820	978	712	704	841	617	609	730
37-1/8	1508	1491	1770	1251	1237	1471	1053	1040	1239	895	885	1055	769	760	908	666	658	788
38-1/2	1621	1602	1903	1346	1330	1581	1132	1119	1332	963	952	1135	828	818	977	717	709	848
39-7/8	1738	1718	2040	1443	1427	1695	1215	1200	1429	1034	1022	1218	889	878	1048	770	761	910
41-1/4	1859	1838	2181	1544	1526	1814	1300	1285	1529	1107	1094	1303	952	940	1122	825	815	975
42-5/8	1984	1962	2328	1648	1629	1936	1388	1372	1632	1182	1168	1392	1017	1005	1199	882	871	1041
44	2113	2089	2479	1756	1736	2062	1479	1462	1738	1260	1245	1483	1084	1071	1278	940	929	1110
45-3/8	2246	2221	2634	1867	1845	2191	1573	1554	1848	1340	1325	1577	1153	1140	1359	1001	989	1181
46-3/4	2383	2356	2741	1981	1958	2325	1669	1650	1961	1423	1406	1674	1225	1210	1442	1063	1051	1254

8-1/2-INCH WIDTH — **SPAN (ft)**

Depth (in.)	44			48			52			56			60			64		
	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3	sys 1	sys 2	sys 3
37-1/8	1876	1855	2203	1557	1539	1830	1309	1294	1541	1114	1100	1313	956	945	1129	828	818	980
38-1/2	2017	1994	2368	1674	1655	1967	1408	1392	1657	1198	1184	1412	1030	1017	1215	892	881	1054
39-7/8	2163	2138	2538	1796	1775	2110	1511	1493	1778	1286	1271	1515	1105	1092	1304	958	946	1132
41-1/4	2313	2287	2714	1921	1899	2257	1617	1598	1902	1377	1361	1621	1184	1170	1396	1026	1014	1212
42-5/8	2469	2441	2897	2051	2027	2409	1727	1707	2030	1471	1453	1731	1265	1250	1491	1097	1084	1295
44	2630	2599	3084	2185	2160	2565	1840	1819	2163	1567	1549	1845	1348	1332	1589	1170	1156	1381
45-3/8	2795	2763	3278	2323	2296	2727	1957	1934	2299	1667	1648	1962	1435	1418	1690	1245	1230	1469
46-3/4	2965	2932	3451	2465	2436	2893	2077	2053	2440	1770	1749	2082	1523	1506	1795	1322	1307	1560
48-1/8	3141	3105	3553	2611	2581	3064	2200	2175	2585	1876	1854	2206	1615	1596	1902	1402	1385	1653
49-1/2	3321	3283	3654	2761	2730	3240	2327	2301	2734	1985	1961	2334	1709	1689	2012	1484	1467	1750
50-7/8	3506	3466	3756	2916	2882	3421	2458	2430	2887	2096	2072	2465	1806	1784	2125	1568	1550	1848
52-1/4	3696	3654	3857	3074	3039	3527	2592	2562	3044	2211	2185	2599	1905	1883	2242	1655	1636	1950
53-5/8	3857	3847	3959	3237	3200	3620	2730	2698	3205	2329	2302	2737	2007	1983	2361	1744	1723	2054
55	3956	3999	4060	3403	3364	3712	2871	2838	3370	2450	2421	2878	2111	2086	2483	1835	1813	2161
56-3/8	4055	4099	4162	3574	3533	3805	3015	2980	3503	2573	2543	3023	2218	2192	2609	1928	1906	2270
57-3/4	4154	4199	4263	3749	3706	3898	3163	3127	3589	2700	2669	3171	2328	2301	2737	2024	2000	2382
59-1/8	4253	4299	4365	3888	3883	3991	3314	3276	3674	2829	2797	3323	2440	2411	2868	2122	2097	2497

See page 5 for description of cantilever systems.

Notes:
(1) Span = spacing of column supports for cantilevered beams.
(2) Load duration factor = as noted.
(3) Cantilevered beam layup = balanced.
(4) Deflection has not been considered.
(5) Service condition = dry.
(6) Tabulated values represent total loads and have taken the dead weight of the beam into account (assumed 36 pcf). Live load is assumed to be 0.6 x total load for purpose of checking strength under full unbalanced live load.
(7) Volume factor is included.
(8) Values inside shaded areas are limited by shear strength; all other values are limited by bending strength.

DESIGN EXAMPLE 1 – Low Slope Roof Design Using Section Capacities

Given:

- 24-ft span, 24-ft-wide tributary area
- Live load = 30 psf (snow); Duration of load = 1.15
- Dead load = 10 psf (actual)
- Allowable total load deflection = L/180
  Allowable live load deflection = L/240
- Use 24F Douglas-fir glulam

Then:

- Glulam span = 24 ft
- Load, w = (30 + 10) (24) = 960 lb/ft to glulam
- Max. Moment = $\frac{wL^2}{8} = 960 \times \frac{24^2}{8} = 69{,}120$ lb-ft
- Max. Shear = $\frac{wL}{2} = 960 \times \frac{24}{2} = 11{,}520$ lb

Design:

- From Table 1, try 5-1/8 x 21 (weight = 26 lb/ft)
  Total load = 960 + 26 = 986 lb/ft
- From Appendix A, volume factor = 0.9330
- Design moment capacity = 75,340 x 0.9330 x 1.15 = 80,836 lb-ft

  $69{,}120 \times \frac{986}{960} = 70{,}992$ lb-ft < 80,836 lb-ft OK

- Design shear capacity = 19,010 x 1.15 = 21,862 lb

  (For shear design, neglect all loads within a distance from supports equal to the depth of the beam)

  $11{,}520 \times \frac{986}{960} - \left(\frac{21}{12} \times 986\right) = 10{,}107$ lb < 21,862 lb OK

- Deflection, total load = $\frac{5wL^4}{384\,EI} = \frac{5 \times 986 \times 24^4 \times 1{,}728}{384 \times 7{,}119 \times 10^6} = 1.03$ in. = L/279 < L/180 OK
- Deflection, live load = $\frac{30 \times 24}{986} \times 1.03 = 0.75$ in. = L/383 < L/240 OK

DESIGN EXAMPLE 2 – Low Slope Roof Design Using Load-Span Tables

Given:

- 24-ft span, 24-ft-wide tributary area
- Live load = 30 psf (snow); Duration of load = 1.15
- Dead load = 10 psf (actual)
- Maximum deflection under total load = L/180
- Use 24F southern pine glulam

Then:

- Total applied load, w = (30 + 10) (24) = 960 lb/ft, excluding beam weight
- From Table 9 for 24-ft span, select 3 x 26-1/8 (w = 1,050 lb/ft)

  or 3-1/2 x 23-3/8 (w = 977 lb/ft)

  or 5 x 20-5/8 (w = 1,070 lb/ft)

  or 5-1/2 x 19-1/4 (w = 1,023 lb/ft)

  or 6-3/4 x 17-7/8 (w = 1,073 lb/ft)

  Note that the beam weight is included in the table.

DESIGN EXAMPLE 3 – Panelized Roof Design Using Load-Span Tables

A warehouse/office building is to be 85 ft x 180 ft. It has a “flat” roof with a minimum slope of 1/4:12. The design live load (non-snow load) is the minimum required by the International Building Code (IBC), with a duration of load factor of 1.25. Assume design dead load = 8 psf. It is desired to minimize the number of interior columns.

Assume three 60-ft bays (equals 180 ft) and two 42.5-ft bays (equals 85 ft) requiring two interior columns.

Main Beam Design

Option 1

Try System 3 (double cantilever) with three 60-ft bays. The tributary area for each cantilever beam’s main span is 60 x 42.5 = 2,550 ft^2. The suspended beam’s tributary area is 0.83 x 60 x 42.5 = 2,117 ft^2. Per Section 1607.11.2.1 of the 2006 IBC, the minimum design live load is 12 psf for tributary areas greater than 600 ft^2 per beam. Therefore, the design live load for these beams is 12 x 42.5 = 510 lb/ft and the design total load, excluding beam weight, is (12 + 8) x 42.5 = 850 lb/ft.

Assume 24F-V8 Douglas-fir glulam with F_b = 2,400 psi and E = 1,800,000 psi for the main cantilever beam. From Table 5, a double cantilever beam (System 3) with 60-ft span, 6-3/4-inches wide and 37-1/2-inches deep can carry 897 lb/ft. Note that the beam weight has been included in the table. OK.

From Table 2, a simple span 24F-V4 Douglas-fir glulam beam 50 ft (0.83 x 60) long, 6-3/4-inches wide and 36-inches deep can carry 873 lb/ft. Note that the beam weight has been included in the table. OK.

Option 2

Try System 2 (single cantilever with suspended center beam) with three 60-ft bays.

Loads are the same as for Option 1, since all members carry more than 600 ft^2 of tributary area.

From Table 5, a single cantilever beam (System 2) with a 60-ft main span, 6-3/4-inches wide and 40-1/2-inches deep can carry 870 lb/ft. Note that the beam weight has been included in the table. OK.

From Table 2, a simple span beam 30 ft (2 x 0.25 x 60) long, 5-1/8-inches wide and 24-inches deep can carry 954 lb/ft. Note that the beam weight is included in the table. OK.

Note: A 6-3/4- x 21-inch beam can carry 944 lb/ft, which is acceptable, but its area of 142 $in.^2$ is greater than the area of the 5-1/8- x 24-inch beam (123 $in.^2$), suggesting it may be less economical.

The two options can then be compared by beam volume, with the smaller volume typically indicating the most economical option.

Beam Volume for Option 1

$$\frac{6.75 \times 37.5}{144}(1 + 2 \times 0.17)\,60 + \frac{2(6.75 \times 36)}{144}(0.83 \times 60) = 309.4\ ft^3$$

Beam Volume for Option 2

$$\frac{2(6.75 \times 40.5)}{144}(1 + 0.25)\,60 + \frac{(5.125 \times 24)}{144}[(1 - 2 \times 0.25) \times 60] = 310.4\ ft^3$$

For this example, the beam volumes are approximately equal and the final selection is the designer’s option.

Secondary Beam Design

Secondary beams, all perpendicular to the main beams and all simple span, are spaced at 8 ft on center as is typical with a panelized system panel deck. For a non-panelized system, they could be spaced farther apart, such as 20 ft on center, with subpurlins between these members at a closer on center spacing.

The secondary beams have a simple span of approximately 42 ft.

Assume secondary beams 8 ft on center. The tributary area is 42 x 8 = 336 ft^2. Per Section 1607.11.2.1 of the 2006 IBC, the design live load is 18 psf. Total load, excluding beam weight, is 8(18 + 8) = 208 lb/ft. From Table 2, a simple span beam 42-ft long, 3-1/8-inches wide and 24-inches deep can carry 241 lb/ft. OK.

Other types of framing members, such as solid-sawn lumber, wood I-joists or wood trusses can also be used as secondary beams depending on the span and loading conditions.

A comparison of material costs will provide guidance as to their relative economies. In addition, hardware (hanger) requirements, as well as any labor differences, need to be considered in order to obtain a complete economic comparison of the systems.

DESIGN EXAMPLE 4 – Floor Design Using Section Capacities

Given:

- Two-span continuous beams with spans of 23.25 ft and 19.25 ft. Beams spaced at 10 ft on center.
- Floor live load = 125 psf (light storage); Duration of load = 1.0
- Dead load = 10 psf (actual)
- Allowable total load deflection = L/240
- Allowable live load deflection = L/360
- Beam depth limited to 24 inches or less, due to height restrictions
- Use 24F-V5 southern pine glulam

Then:

- Assume beam weight of 36 lb/ft
- Live load, w_ℓ = 125 x 10 = 1,250 lb/ft
- Dead load, w_d = (10 x 10) + 36 = 136 lb/ft
- Total load, w_t = 1250 + 136 = 1,386 lb/ft
- Maximum moment, fully loaded, M = 80,312 lb/ft, at interior reaction
- Maximum moment, unbalanced loading, M_u = 69,790 lb/ft at approximately 10 ft from the outer support of the 23.25-ft span
- Maximum shear, fully loaded, V = 16,795 lb at 24 inches away from the interior reaction, in the 23.25-ft span
- Maximum shear, unbalanced loading, V_u = 15,544 lb
- Maximum reaction, R = 37,079 lb at interior support

Design:

- From Table 7, a 3-1/2-inch-wide beam would exceed the depth limitation, based on shear requirements.
- Try a 5-inch-wide x 23-3/8-inch-deep beam. (For purposes of the volume factor, the moment capacity span is the distance between points of zero moment and is approximately 20 ft.) From Table 7 and Appendix B, the allowable moment capacity = 91,070 x 0.9708 = 88,411 lb-ft > 80,312 lb-ft. The actual beam weight of 29.2 lb/ft is less than the assumed 36 lb/ft. OK.
- The allowable compression perpendicular to grain, $F_{c\perp}$ = 740 psi. Minimum bearing length at interior support = $\frac{37{,}079}{740 \times 5}$ = 10 inches. Revised design shear, V = 16,867 lb at 23-3/8 inches away from the face of the interior support < 21,038 lb. OK
- Maximum deflection: total load on longer span, dead load only on shorter span = 0.66 in. = L/425 < L/240. OK.
- Maximum deflection: live load on longer span = 0.62 in. = L/454 < L/360. OK.

VOLUME FACTORS (C_V) FOR SIMPLE SPAN *DOUGLAS-FIR* LAMINATED BEAMS

3-1/8-INCH WIDTH — SPAN (ft)

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
7-1/2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
9	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9998	0.9956
10-1/2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9984	0.9935	0.9889	0.9845	0.9804
12	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9956	0.9902	0.9851	0.9804	0.9758	0.9715	0.9673
13-1/2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9956	0.9896	0.9839	0.9786	0.9736	0.9689	0.9644	0.9601	0.9560
15	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9984	0.9915	0.9851	0.9792	0.9736	0.9684	0.9634	0.9587	0.9543	0.9500	0.9460
16-1/2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9963	0.9889	0.9821	0.9758	0.9699	0.9644	0.9592	0.9543	0.9496	0.9452	0.9410	0.9370
18	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9956	0.9876	0.9804	0.9736	0.9673	0.9615	0.9560	0.9509	0.9460	0.9414	0.9370	0.9329	0.9289
19-1/2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9963	0.9876	0.9798	0.9725	0.9658	0.9596	0.9538	0.9484	0.9433	0.9385	0.9339	0.9296	0.9254	0.9215
21	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9984	0.9889	0.9804	0.9725	0.9654	0.9587	0.9525	0.9468	0.9414	0.9363	0.9315	0.9270	0.9227	0.9186	0.9147
22-1/2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9915	0.9821	0.9736	0.9658	0.9587	0.9521	0.9460	0.9403	0.9349	0.9299	0.9251	0.9206	0.9163	0.9123	0.9084
24	1.0000	1.0000	1.0000	1.0000	1.0000	0.9956	0.9851	0.9758	0.9673	0.9596	0.9525	0.9460	0.9399	0.9342	0.9289	0.9239	0.9192	0.9147	0.9105	0.9064	0.9026
25-1/2	1.0000	1.0000	1.0000	1.0000	1.0000	0.9896	0.9792	0.9699	0.9615	0.9538	0.9468	0.9403	0.9342	0.9286	0.9233	0.9183	0.9136	0.9092	0.9050	0.9009	0.8971
27	1.0000	1.0000	1.0000	1.0000	0.9956	0.9839	0.9736	0.9644	0.9560	0.9484	0.9414	0.9349	0.9289	0.9233	0.9180	0.9131	0.9084	0.9040	0.8998	0.8958	0.8920

3-1/2-INCH WIDTH — SPAN (ft)

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
6	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
7-1/2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
9	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9976	0.9930	0.9886	0.9844
10-1/2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9976	0.9922	0.9871	0.9823	0.9778	0.9734	0.9693
12	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9960	0.9900	0.9844	0.9791	0.9740	0.9693	0.9648	0.9605	0.9564
13-1/2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9976	0.9907	0.9844	0.9784	0.9728	0.9676	0.9626	0.9580	0.9535	0.9493	0.9452
15	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9945	0.9871	0.9804	0.9740	0.9682	0.9626	0.9574	0.9525	0.9479	0.9435	0.9393	0.9353
16-1/2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9930	0.9850	0.9778	0.9711	0.9648	0.9590	0.9535	0.9484	0.9435	0.9389	0.9346	0.9304	0.9265
18	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9930	0.9844	0.9765	0.9693	0.9626	0.9564	0.9507	0.9452	0.9401	0.9353	0.9308	0.9265	0.9224	0.9184
19-1/2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9945	0.9850	0.9765	0.9687	0.9616	0.9550	0.9488	0.9431	0.9377	0.9327	0.9279	0.9234	0.9191	0.9150	0.9111
21	1.0000	1.0000	1.0000	1.0000	1.0000	0.9976	0.9871	0.9778	0.9693	0.9616	0.9545	0.9479	0.9418	0.9361	0.9308	0.9258	0.9210	0.9165	0.9123	0.9082	0.9044
22-1/2	1.0000	1.0000	1.0000	1.0000	1.0000	0.9907	0.9804	0.9711	0.9626	0.9550	0.9479	0.9414	0.9353	0.9297	0.9244	0.9194	0.9147	0.9102	0.9060	0.9020	0.8982
24	1.0000	1.0000	1.0000	1.0000	0.9960	0.9844	0.9740	0.9648	0.9564	0.9488	0.9418	0.9353	0.9293	0.9237	0.9184	0.9135	0.9088	0.9044	0.9002	0.8962	0.8924
25-1/2	1.0000	1.0000	1.0000	1.0000	0.9900	0.9784	0.9682	0.9590	0.9507	0.9431	0.9361	0.9297	0.9237	0.9181	0.9129	0.9080	0.9033	0.8989	0.8948	0.8908	0.8870
27	1.0000	1.0000	1.0000	0.9976	0.9844	0.9728	0.9626	0.9535	0.9452	0.9377	0.9308	0.9244	0.9184	0.9129	0.9077	0.9028	0.8982	0.8938	0.8897	0.8857	0.8819

5-1/8-INCH WIDTH — SPAN (ft)

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
12	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9954	0.9867	0.9789	0.9716	0.9650	0.9588	0.9530	0.9475	0.9424	0.9376	0.9330	0.9287	0.9246	0.9207
13-1/2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9931	0.9837	0.9752	0.9674	0.9603	0.9537	0.9475	0.9418	0.9364	0.9314	0.9266	0.9221	0.9178	0.9138	0.9099
15	1.0000	1.0000	1.0000	1.0000	1.0000	0.9931	0.9827	0.9734	0.9650	0.9573	0.9502	0.9437	0.9376	0.9319	0.9266	0.9216	0.9169	0.9124	0.9082	0.9042	0.9003
16-1/2	1.0000	1.0000	1.0000	1.0000	0.9954	0.9837	0.9734	0.9642	0.9558	0.9482	0.9412	0.9347	0.9287	0.9231	0.9178	0.9129	0.9082	0.9038	0.8996	0.8956	0.8918
18	1.0000	1.0000	1.0000	1.0000	0.9867	0.9752	0.9650	0.9558	0.9475	0.9400	0.9330	0.9266	0.9207	0.9151	0.9099	0.9050	0.9003	0.8960	0.8918	0.8878	0.8841
19-1/2	1.0000	1.0000	1.0000	0.9920	0.9789	0.9674	0.9573	0.9482	0.9400	0.9325	0.9256	0.9192	0.9133	0.9078	0.9026	0.8978	0.8932	0.8888	0.8847	0.8808	0.8770
21	1.0000	1.0000	1.0000	0.9847	0.9716	0.9603	0.9502	0.9412	0.9330	0.9256	0.9188	0.9124	0.9066	0.9011	0.8960	0.8911	0.8866	0.8823	0.8782	0.8743	0.8706
22-1/2	1.0000	1.0000	0.9931	0.9779	0.9650	0.9537	0.9437	0.9347	0.9266	0.9192	0.9124	0.9062	0.9003	0.8949	0.8898	0.8850	0.8805	0.8762	0.8721	0.8683	0.8646
24	1.0000	1.0000	0.9867	0.9716	0.9588	0.9475	0.9376	0.9287	0.9207	0.9133	0.9066	0.9003	0.8945	0.8891	0.8841	0.8793	0.8748	0.8706	0.8665	0.8627	0.8590
25-1/2	1.0000	0.9988	0.9808	0.9658	0.9530	0.9418	0.9319	0.9231	0.9151	0.9078	0.9011	0.8949	0.8891	0.8838	0.8787	0.8740	0.8695	0.8653	0.8613	0.8575	0.8538
27	1.0000	0.9931	0.9752	0.9603	0.9475	0.9364	0.9266	0.9178	0.9099	0.9026	0.8960	0.8898	0.8841	0.8787	0.8737	0.8690	0.8646	0.8604	0.8564	0.8526	0.8489
28-1/2	1.0000	0.9878	0.9699	0.9551	0.9424	0.9314	0.9216	0.9129	0.9050	0.8978	0.8911	0.8850	0.8793	0.8740	0.8690	0.8643	0.8599	0.8557	0.8517	0.8480	0.8444
30	1.0000	0.9827	0.9650	0.9502	0.9376	0.9266	0.9169	0.9082	0.9003	0.8932	0.8866	0.8805	0.8748	0.8695	0.8646	0.8599	0.8555	0.8513	0.8474	0.8436	0.8400
31-1/2	1.0000	0.9779	0.9603	0.9456	0.9330	0.9221	0.9124	0.9038	0.8960	0.8888	0.8823	0.8762	0.8706	0.8653	0.8604	0.8557	0.8513	0.8472	0.8433	0.8395	0.8360
33	0.9954	0.9734	0.9558	0.9412	0.9287	0.9178	0.9082	0.8996	0.8918	0.8847	0.8782	0.8721	0.8665	0.8613	0.8564	0.8517	0.8474	0.8433	0.8394	0.8356	0.8321

The complete volume factor formula for Douglas-fir is:

$$C_v = \left(\frac{12}{d}\right)^{1/10} \times \left(\frac{5.125}{b}\right)^{1/10} \times \left(\frac{21}{L}\right)^{1/10} \leqslant 1.0$$

where: d = beam depth (in.)
b = beam width (in.)
L = beam length (ft)

5-1/2-INCH WIDTH — **SPAN (ft)**

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
12	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9978	0.9884	0.9798	0.9720	0.9648	0.9582	0.9520	0.9463	0.9409	0.9358	0.9310	0.9265	0.9222	0.9181	0.9142
13-1/2	1.0000	1.0000	1.0000	1.0000	1.0000	0.9966	0.9861	0.9768	0.9683	0.9606	0.9535	0.9470	0.9409	0.9352	0.9298	0.9248	0.9201	0.9156	0.9114	0.9073	0.9035
15	1.0000	1.0000	1.0000	1.0000	0.9978	0.9861	0.9758	0.9665	0.9582	0.9505	0.9435	0.9370	0.9310	0.9254	0.9201	0.9151	0.9105	0.9060	0.9018	0.8978	0.8940
16-1/2	1.0000	1.0000	1.0000	1.0000	0.9884	0.9768	0.9665	0.9574	0.9491	0.9415	0.9346	0.9281	0.9222	0.9166	0.9114	0.9065	0.9018	0.8974	0.8933	0.8893	0.8855
18	1.0000	1.0000	1.0000	0.9930	0.9798	0.9683	0.9582	0.9491	0.9409	0.9334	0.9265	0.9201	0.9142	0.9087	0.9035	0.8986	0.8940	0.8897	0.8855	0.8816	0.8779
19-1/2	1.0000	1.0000	1.0000	0.9850	0.9720	0.9606	0.9505	0.9415	0.9334	0.9259	0.9191	0.9128	0.9069	0.9014	0.8963	0.8914	0.8869	0.8826	0.8785	0.8746	0.8709
21	1.0000	1.0000	0.9930	0.9778	0.9648	0.9535	0.9435	0.9346	0.9265	0.9191	0.9123	0.9060	0.9002	0.8948	0.8897	0.8849	0.8803	0.8760	0.8720	0.8681	0.8644
22-1/2	1.0000	1.0000	0.9861	0.9711	0.9582	0.9470	0.9370	0.9281	0.9201	0.9128	0.9060	0.8998	0.8940	0.8886	0.8835	0.8788	0.8743	0.8700	0.8660	0.8621	0.8585
24	1.0000	0.9978	0.9798	0.9648	0.9520	0.9409	0.9310	0.9222	0.9142	0.9069	0.9002	0.8940	0.8883	0.8829	0.8779	0.8731	0.8687	0.8644	0.8604	0.8566	0.8530
25-1/2	1.0000	0.9918	0.9739	0.9590	0.9463	0.9352	0.9254	0.9166	0.9087	0.9014	0.8948	0.8886	0.8829	0.8775	0.8725	0.8678	0.8634	0.8592	0.8552	0.8514	0.8478
27	1.0000	0.9861	0.9683	0.9535	0.9409	0.9298	0.9201	0.9114	0.9035	0.8963	0.8897	0.8835	0.8779	0.8725	0.8676	0.8629	0.8585	0.8543	0.8503	0.8466	0.8430
28-1/2	1.0000	0.9808	0.9631	0.9484	0.9358	0.9248	0.9151	0.9065	0.8986	0.8914	0.8849	0.8788	0.8731	0.8678	0.8629	0.8582	0.8539	0.8497	0.8458	0.8420	0.8384
30	0.9978	0.9758	0.9582	0.9435	0.9310	0.9201	0.9105	0.9018	0.8940	0.8869	0.8803	0.8743	0.8687	0.8634	0.8585	0.8539	0.8495	0.8453	0.8414	0.8377	0.8341
31-1/2	0.9930	0.9711	0.9535	0.9389	0.9265	0.9156	0.9060	0.8974	0.8897	0.8826	0.8760	0.8700	0.8644	0.8592	0.8543	0.8497	0.8453	0.8412	0.8373	0.8336	0.8301
33	0.9884	0.9665	0.9491	0.9346	0.9222	0.9114	0.9018	0.8933	0.8855	0.8785	0.8720	0.8660	0.8604	0.8552	0.8503	0.8458	0.8414	0.8373	0.8334	0.8297	0.8262

6-3/4-INCH WIDTH — **SPAN (ft)**

Depth (in.)	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50
18	1.0000	0.9879	0.9728	0.9599	0.9487	0.9387	0.9298	0.9218	0.9144	0.9077	0.9014	0.8956	0.8902	0.8852	0.8804	0.8759	0.8716	0.8676	0.8637	0.8601	0.8566
19-1/2	0.9981	0.9801	0.9651	0.9523	0.9411	0.9313	0.9224	0.9144	0.9071	0.9005	0.8943	0.8885	0.8831	0.8781	0.8734	0.8689	0.8647	0.8607	0.8568	0.8532	0.8497
21	0.9907	0.9728	0.9580	0.9452	0.9342	0.9244	0.9156	0.9077	0.9005	0.8938	0.8877	0.8819	0.8766	0.8716	0.8669	0.8625	0.8583	0.8543	0.8505	0.8469	0.8435
22-1/2	0.9839	0.9661	0.9514	0.9387	0.9278	0.9180	0.9093	0.9014	0.8943	0.8877	0.8816	0.8759	0.8706	0.8656	0.8610	0.8566	0.8524	0.8484	0.8447	0.8411	0.8377
24	0.9776	0.9599	0.9452	0.9327	0.9218	0.9121	0.9035	0.8956	0.8885	0.8819	0.8759	0.8702	0.8650	0.8601	0.8554	0.8510	0.8469	0.8430	0.8392	0.8357	0.8323
25-1/2	0.9717	0.9541	0.9395	0.9271	0.9162	0.9066	0.8980	0.8902	0.8831	0.8766	0.8706	0.8650	0.8598	0.8549	0.8503	0.8459	0.8418	0.8379	0.8342	0.8306	0.8272
27	0.9661	0.9487	0.9342	0.9218	0.9110	0.9014	0.8929	0.8852	0.8781	0.8716	0.8656	0.8601	0.8549	0.8500	0.8454	0.8411	0.8370	0.8331	0.8294	0.8259	0.8225
28-1/2	0.9609	0.9436	0.9291	0.9168	0.9061	0.8966	0.8881	0.8804	0.8734	0.8669	0.8610	0.8554	0.8503	0.8454	0.8408	0.8365	0.8325	0.8286	0.8249	0.8214	0.8181
30	0.9560	0.9387	0.9244	0.9121	0.9014	0.8920	0.8835	0.8759	0.8689	0.8625	0.8566	0.8510	0.8459	0.8411	0.8365	0.8323	0.8282	0.8244	0.8207	0.8172	0.8139
31-1/2	0.9514	0.9342	0.9199	0.9077	0.8971	0.8877	0.8792	0.8716	0.8647	0.8583	0.8524	0.8469	0.8418	0.8370	0.8325	0.8282	0.8242	0.8204	0.8167	0.8132	0.8099
33	0.9470	0.9298	0.9156	0.9035	0.8929	0.8835	0.8752	0.8676	0.8607	0.8543	0.8484	0.8430	0.8379	0.8331	0.8286	0.8244	0.8204	0.8165	0.8129	0.8095	0.8062
34-1/2	0.9428	0.9257	0.9116	0.8995	0.8889	0.8796	0.8713	0.8637	0.8568	0.8505	0.8447	0.8392	0.8342	0.8294	0.8249	0.8207	0.8167	0.8129	0.8093	0.8059	0.8026
36	0.9387	0.9218	0.9077	0.8956	0.8852	0.8759	0.8676	0.8601	0.8532	0.8469	0.8411	0.8357	0.8306	0.8259	0.8214	0.8172	0.8132	0.8095	0.8059	0.8025	0.7992
37-1/2	0.9349	0.9180	0.9040	0.8920	0.8816	0.8723	0.8640	0.8566	0.8497	0.8435	0.8377	0.8323	0.8272	0.8225	0.8181	0.8139	0.8099	0.8062	0.8026	0.7992	0.7959
39	0.9313	0.9144	0.9005	0.8885	0.8781	0.8689	0.8607	0.8532	0.8464	0.8401	0.8344	0.8290	0.8240	0.8193	0.8149	0.8107	0.8068	0.8030	0.7995	0.7961	0.7928

8-3/4-INCH WIDTH — **SPAN (ft)**

Depth (in.)	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50
24	0.9525	0.9353	0.9210	0.9088	0.8982	0.8888	0.8803	0.8727	0.8657	0.8594	0.8534	0.8480	0.8428	0.8380	0.8335	0.8292	0.8252	0.8214	0.8177	0.8143	0.8109
25-1/2	0.9468	0.9297	0.9155	0.9033	0.8927	0.8834	0.8750	0.8674	0.8605	0.8542	0.8483	0.8428	0.8377	0.8330	0.8285	0.8242	0.8202	0.8164	0.8128	0.8093	0.8060
27	0.9414	0.9244	0.9102	0.8982	0.8877	0.8784	0.8700	0.8625	0.8556	0.8493	0.8435	0.8380	0.8330	0.8282	0.8237	0.8195	0.8155	0.8118	0.8082	0.8047	0.8014
28-1/2	0.9363	0.9194	0.9053	0.8933	0.8829	0.8736	0.8653	0.8578	0.8510	0.8447	0.8389	0.8335	0.8285	0.8237	0.8193	0.8151	0.8111	0.8074	0.8038	0.8004	0.7971
30	0.9315	0.9147	0.9007	0.8888	0.8784	0.8691	0.8609	0.8534	0.8466	0.8404	0.8346	0.8292	0.8242	0.8195	0.8151	0.8109	0.8070	0.8033	0.7997	0.7963	0.7930
31-1/2	0.9270	0.9102	0.8963	0.8844	0.8741	0.8649	0.8567	0.8493	0.8425	0.8363	0.8305	0.8252	0.8202	0.8155	0.8111	0.8070	0.8031	0.7993	0.7958	0.7924	0.7892
33	0.9227	0.9060	0.8922	0.8803	0.8700	0.8609	0.8527	0.8453	0.8386	0.8324	0.8267	0.8214	0.8164	0.8118	0.8074	0.8033	0.7993	0.7956	0.7921	0.7887	0.7855
34-1/2	0.9186	0.9020	0.8882	0.8764	0.8662	0.8571	0.8490	0.8416	0.8349	0.8287	0.8230	0.8177	0.8128	0.8082	0.8038	0.7997	0.7958	0.7921	0.7886	0.7852	0.7820
36	0.9147	0.8982	0.8844	0.8727	0.8625	0.8534	0.8453	0.8380	0.8313	0.8252	0.8195	0.8143	0.8093	0.8047	0.8004	0.7963	0.7924	0.7887	0.7852	0.7819	0.7787
37-1/2	0.9110	0.8945	0.8808	0.8691	0.8590	0.8500	0.8419	0.8346	0.8280	0.8218	0.8162	0.8109	0.8060	0.8014	0.7971	0.7930	0.7892	0.7855	0.7820	0.7787	0.7755
39	0.9074	0.8910	0.8774	0.8657	0.8556	0.8466	0.8386	0.8313	0.8247	0.8186	0.8130	0.8078	0.8029	0.7983	0.7940	0.7899	0.7861	0.7825	0.7790	0.7757	0.7725
40-1/2	0.9040	0.8877	0.8741	0.8625	0.8524	0.8435	0.8355	0.8282	0.8216	0.8155	0.8099	0.8047	0.7999	0.7953	0.7910	0.7870	0.7831	0.7795	0.7760	0.7727	0.7696
42	0.9007	0.8844	0.8709	0.8594	0.8493	0.8404	0.8324	0.8252	0.8186	0.8126	0.8070	0.8018	0.7970	0.7924	0.7881	0.7841	0.7803	0.7767	0.7732	0.7699	0.7668
43-1/2	0.8976	0.8813	0.8679	0.8563	0.8463	0.8374	0.8295	0.8223	0.8158	0.8097	0.8042	0.7990	0.7942	0.7896	0.7854	0.7814	0.7776	0.7740	0.7705	0.7672	0.7641
45	0.8945	0.8784	0.8649	0.8534	0.8435	0.8346	0.8267	0.8195	0.8130	0.8070	0.8014	0.7963	0.7915	0.7870	0.7827	0.7787	0.7749	0.7713	0.7679	0.7647	0.7615

The complete volume factor formula for Douglas-fir is:

$$C_v = \left(\frac{12}{d}\right)^{1/10} \times \left(\frac{5.125}{b}\right)^{1/10} \times \left(\frac{21}{L}\right)^{1/10} \leqslant 1.0$$

where: d = beam depth (in.)
b = beam width (in.)
L = beam length (ft)

VOLUME FACTOR (C_V) FOR SIMPLE SPAN *SOUTHERN PINE* GLUED LAMINATED BEAMS

3-INCH WIDTH — **SPAN (ft)**

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
6-7/8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
8-1/4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
9-5/8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9986	0.9965
11	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9989	0.9965	0.9942	0.9920	0.9898
12-3/8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9983	0.9956	0.9930	0.9906	0.9883	0.9861	0.9840
13-3/4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9989	0.9959	0.9930	0.9904	0.9878	0.9854	0.9831	0.9809	0.9789
15-1/8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9974	0.9942	0.9912	0.9883	0.9857	0.9831	0.9807	0.9785	0.9763	0.9742
16-1/2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9965	0.9930	0.9898	0.9868	0.9840	0.9814	0.9789	0.9765	0.9742	0.9720	0.9700
17-7/8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9962	0.9925	0.9891	0.9859	0.9829	0.9801	0.9775	0.9750	0.9726	0.9703	0.9682	0.9661
19-1/4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9965	0.9925	0.9888	0.9854	0.9822	0.9793	0.9765	0.9738	0.9713	0.9690	0.9667	0.9646	0.9625
20-5/8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9974	0.9930	0.9891	0.9854	0.9820	0.9789	0.9759	0.9731	0.9705	0.9680	0.9656	0.9634	0.9613	0.9592
22	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9989	0.9942	0.9898	0.9859	0.9822	0.9789	0.9757	0.9728	0.9700	0.9674	0.9649	0.9625	0.9603	0.9582	0.9561
23-3/8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9959	0.9912	0.9868	0.9829	0.9793	0.9759	0.9728	0.9698	0.9670	0.9644	0.9620	0.9596	0.9574	0.9553	0.9532
24-3/4	1.0000	1.0000	1.0000	1.0000	1.0000	0.9983	0.9930	0.9883	0.9840	0.9801	0.9765	0.9731	0.9700	0.9670	0.9643	0.9617	0.9592	0.9569	0.9547	0.9525	0.9505
26-1/8	1.0000	1.0000	1.0000	1.0000	1.0000	0.9956	0.9904	0.9857	0.9814	0.9775	0.9738	0.9705	0.9674	0.9644	0.9617	0.9591	0.9566	0.9543	0.9521	0.9500	0.9479

3-1/2-INCH WIDTH — **SPAN (ft)**

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
6-7/8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
8-1/4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9986	0.9965
9-5/8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9979	0.9954	0.9931	0.9909	0.9888
11	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9993	0.9965	0.9938	0.9912	0.9888	0.9865	0.9843	0.9822
12-3/8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9997	0.9965	0.9935	0.9906	0.9879	0.9854	0.9830	0.9807	0.9786	0.9765
13-3/4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9979	0.9944	0.9912	0.9882	0.9854	0.9828	0.9802	0.9779	0.9756	0.9734	0.9713
15-1/8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9968	0.9931	0.9897	0.9865	0.9835	0.9807	0.9781	0.9756	0.9732	0.9709	0.9688	0.9667
16-1/2	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9965	0.9925	0.9888	0.9854	0.9822	0.9793	0.9765	0.9738	0.9713	0.9690	0.9667	0.9646	0.9625
17-7/8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9968	0.9925	0.9885	0.9849	0.9815	0.9783	0.9754	0.9726	0.9700	0.9675	0.9651	0.9629	0.9607	0.9587
19-1/4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9979	0.9931	0.9888	0.9849	0.9812	0.9779	0.9747	0.9718	0.9690	0.9664	0.9639	0.9615	0.9593	0.9572	0.9551
20-5/8	1.0000	1.0000	1.0000	1.0000	1.0000	0.9997	0.9944	0.9897	0.9854	0.9815	0.9779	0.9745	0.9713	0.9684	0.9656	0.9630	0.9606	0.9582	0.9560	0.9539	0.9519
22	1.0000	1.0000	1.0000	1.0000	1.0000	0.9965	0.9912	0.9865	0.9822	0.9783	0.9747	0.9713	0.9682	0.9653	0.9625	0.9599	0.9575	0.9551	0.9529	0.9508	0.9488
23-3/8	1.0000	1.0000	1.0000	1.0000	0.9993	0.9935	0.9882	0.9835	0.9793	0.9754	0.9718	0.9684	0.9653	0.9624	0.9596	0.9570	0.9546	0.9523	0.9500	0.9479	0.9459
24-3/4	1.0000	1.0000	1.0000	1.0000	0.9965	0.9906	0.9854	0.9807	0.9765	0.9726	0.9690	0.9656	0.9625	0.9596	0.9569	0.9543	0.9519	0.9495	0.9473	0.9452	0.9432
26-1/8	1.0000	1.0000	1.0000	1.0000	0.9938	0.9879	0.9828	0.9781	0.9738	0.9700	0.9664	0.9630	0.9599	0.9570	0.9543	0.9517	0.9493	0.9470	0.9448	0.9427	0.9407

5-INCH WIDTH — **SPAN (ft)**

Depth (in.)	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48
12-3/8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9974	0.9930	0.9891	0.9854	0.9820	0.9789	0.9759	0.9731	0.9705	0.9680	0.9656	0.9634	0.9613	0.9592
13-3/4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9969	0.9921	0.9878	0.9839	0.9802	0.9769	0.9737	0.9708	0.9680	0.9654	0.9629	0.9606	0.9583	0.9562	0.9542
15-1/8	1.0000	1.0000	1.0000	1.0000	1.0000	0.9974	0.9921	0.9874	0.9831	0.9792	0.9756	0.9722	0.9691	0.9662	0.9634	0.9608	0.9583	0.9560	0.9538	0.9517	0.9496
16-1/2	1.0000	1.0000	1.0000	1.0000	0.9989	0.9930	0.9878	0.9831	0.9789	0.9750	0.9713	0.9680	0.9649	0.9620	0.9592	0.9566	0.9542	0.9519	0.9496	0.9475	0.9455
17-7/8	1.0000	1.0000	1.0000	1.0000	0.9949	0.9891	0.9839	0.9792	0.9750	0.9711	0.9675	0.9641	0.9610	0.9581	0.9554	0.9528	0.9504	0.9481	0.9458	0.9437	0.9417
19-1/4	1.0000	1.0000	1.0000	0.9979	0.9912	0.9854	0.9802	0.9756	0.9713	0.9675	0.9639	0.9606	0.9575	0.9546	0.9519	0.9493	0.9469	0.9445	0.9423	0.9403	0.9383
20-5/8	1.0000	1.0000	1.0000	0.9944	0.9878	0.9820	0.9769	0.9722	0.9680	0.9641	0.9606	0.9573	0.9542	0.9513	0.9486	0.9460	0.9436	0.9413	0.9391	0.9370	0.9350
22	1.0000	1.0000	0.9989	0.9912	0.9846	0.9789	0.9737	0.9691	0.9649	0.9610	0.9575	0.9542	0.9511	0.9482	0.9455	0.9430	0.9406	0.9383	0.9361	0.9340	0.9320
23-3/8	1.0000	1.0000	0.9959	0.9882	0.9817	0.9759	0.9708	0.9662	0.9620	0.9581	0.9546	0.9513	0.9482	0.9454	0.9427	0.9401	0.9377	0.9354	0.9332	0.9312	0.9292
24-3/4	1.0000	1.0000	0.9930	0.9854	0.9789	0.9731	0.9680	0.9634	0.9592	0.9554	0.9519	0.9486	0.9455	0.9427	0.9400	0.9374	0.9350	0.9327	0.9306	0.9285	0.9265
26-1/8	1.0000	0.9994	0.9904	0.9828	0.9762	0.9705	0.9654	0.9608	0.9566	0.9528	0.9493	0.9460	0.9430	0.9401	0.9374	0.9349	0.9325	0.9302	0.9281	0.9260	0.9240
27-1/2	1.0000	0.9969	0.9878	0.9802	0.9737	0.9680	0.9629	0.9583	0.9542	0.9504	0.9469	0.9436	0.9406	0.9377	0.9350	0.9325	0.9301	0.9278	0.9257	0.9236	0.9217
28-7/8	1.0000	0.9944	0.9854	0.9779	0.9713	0.9656	0.9606	0.9560	0.9519	0.9481	0.9445	0.9413	0.9383	0.9354	0.9327	0.9302	0.9278	0.9256	0.9234	0.9214	0.9194
30-1/4	1.0000	0.9921	0.9831	0.9756	0.9691	0.9634	0.9583	0.9538	0.9496	0.9458	0.9423	0.9391	0.9361	0.9332	0.9306	0.9281	0.9257	0.9234	0.9213	0.9192	0.9173
31-5/8	1.0000	0.9899	0.9809	0.9734	0.9669	0.9613	0.9562	0.9517	0.9475	0.9437	0.9403	0.9370	0.9340	0.9312	0.9285	0.9260	0.9236	0.9214	0.9192	0.9172	0.9153

The complete volume factor formula for southern pine is:

$$C_v = \left(\frac{12}{d}\right)^{1/20} \times \left(\frac{5.125}{b}\right)^{1/20} \times \left(\frac{21}{L}\right)^{1/20} \leq 1.0$$

where: d = beam depth (in.)
b = beam width (in.)
L = beam length (ft)

5-1/2-INCH WIDTH	SPAN (ft)																				
Depth (in.)	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**
12-3/8	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.9974	0.9926	0.9883	0.9844	0.9807	0.9774	0.9742	0.9713	0.9685	0.9659	0.9634	0.9611	0.9588	0.9567	0.9547
13-3/4	1.0000	1.0000	1.0000	1.0000	1.0000	0.9974	0.9921	0.9874	0.9831	0.9792	0.9756	0.9722	0.9691	0.9662	0.9634	0.9608	0.9583	0.9560	0.9538	0.9517	0.9496
15-1/8	1.0000	1.0000	1.0000	1.0000	0.9985	0.9926	0.9874	0.9827	0.9785	0.9745	0.9709	0.9676	0.9645	0.9616	0.9588	0.9562	0.9538	0.9515	0.9492	0.9471	0.9451
16-1/2	1.0000	1.0000	1.0000	1.0000	0.9942	0.9883	0.9831	0.9785	0.9742	0.9703	0.9667	0.9634	0.9603	0.9574	0.9547	0.9521	0.9496	0.9473	0.9451	0.9430	0.9410
17-7/8	1.0000	1.0000	1.0000	0.9968	0.9902	0.9844	0.9792	0.9745	0.9703	0.9664	0.9629	0.9596	0.9565	0.9536	0.9508	0.9483	0.9458	0.9435	0.9414	0.9393	0.9373
19-1/4	1.0000	1.0000	1.0000	0.9931	0.9865	0.9807	0.9756	0.9709	0.9667	0.9629	0.9593	0.9560	0.9529	0.9500	0.9473	0.9448	0.9423	0.9401	0.9379	0.9358	0.9338
20-5/8	1.0000	1.0000	0.9974	0.9897	0.9831	0.9774	0.9722	0.9676	0.9634	0.9596	0.9560	0.9527	0.9496	0.9468	0.9441	0.9415	0.9391	0.9368	0.9346	0.9326	0.9306
22	1.0000	1.0000	0.9942	0.9865	0.9800	0.9742	0.9691	0.9645	0.9603	0.9565	0.9529	0.9496	0.9466	0.9437	0.9410	0.9385	0.9361	0.9338	0.9316	0.9296	0.9276
23-3/8	1.0000	1.0000	0.9912	0.9835	0.9770	0.9713	0.9662	0.9616	0.9574	0.9536	0.9500	0.9468	0.9437	0.9409	0.9382	0.9356	0.9332	0.9310	0.9288	0.9267	0.9248
24-3/4	1.0000	0.9974	0.9883	0.9807	0.9742	0.9685	0.9634	0.9588	0.9547	0.9508	0.9473	0.9441	0.9410	0.9382	0.9355	0.9330	0.9306	0.9283	0.9262	0.9241	0.9221
26-1/8	1.0000	0.9947	0.9857	0.9781	0.9716	0.9659	0.9608	0.9562	0.9521	0.9483	0.9448	0.9415	0.9385	0.9356	0.9330	0.9305	0.9281	0.9258	0.9237	0.9216	0.9196
27-1/2	1.0000	0.9921	0.9831	0.9756	0.9691	0.9634	0.9583	0.9538	0.9496	0.9458	0.9423	0.9391	0.9361	0.9332	0.9306	0.9281	0.9257	0.9234	0.9213	0.9192	0.9173
28-7/8	1.0000	0.9897	0.9807	0.9732	0.9667	0.9611	0.9560	0.9515	0.9473	0.9435	0.9401	0.9368	0.9338	0.9310	0.9283	0.9258	0.9234	0.9212	0.9190	0.9170	0.9151
30-1/4	0.9985	0.9874	0.9785	0.9709	0.9645	0.9588	0.9538	0.9492	0.9451	0.9414	0.9379	0.9346	0.9316	0.9288	0.9262	0.9237	0.9213	0.9190	0.9169	0.9149	0.9129
31-5/8	0.9963	0.9852	0.9763	0.9688	0.9623	0.9567	0.9517	0.9471	0.9430	0.9393	0.9358	0.9326	0.9296	0.9267	0.9241	0.9216	0.9192	0.9170	0.9149	0.9128	0.9109

6-3/4-INCH WIDTH	SPAN (ft)																				
Depth (in.)	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**	**50**
17-7/8	1.0000	0.9943	0.9867	0.9801	0.9743	0.9692	0.9646	0.9604	0.9566	0.9531	0.9498	0.9467	0.9439	0.9412	0.9386	0.9362	0.9339	0.9318	0.9297	0.9277	0.9258
19-1/4	0.9997	0.9906	0.9830	0.9765	0.9707	0.9656	0.9611	0.9569	0.9531	0.9495	0.9463	0.9432	0.9404	0.9377	0.9351	0.9327	0.9305	0.9283	0.9263	0.9243	0.9224
20-5/8	0.9963	0.9872	0.9796	0.9731	0.9674	0.9623	0.9577	0.9536	0.9498	0.9463	0.9430	0.9400	0.9371	0.9344	0.9319	0.9295	0.9273	0.9251	0.9231	0.9211	0.9192
22	0.9930	0.9840	0.9765	0.9700	0.9643	0.9592	0.9547	0.9505	0.9467	0.9432	0.9400	0.9369	0.9341	0.9314	0.9289	0.9265	0.9243	0.9221	0.9201	0.9181	0.9163
23-3/8	0.9900	0.9811	0.9735	0.9670	0.9614	0.9563	0.9518	0.9476	0.9439	0.9404	0.9371	0.9341	0.9313	0.9286	0.9261	0.9237	0.9215	0.9193	0.9173	0.9154	0.9135
24-3/4	0.9872	0.9783	0.9707	0.9643	0.9586	0.9536	0.9491	0.9449	0.9412	0.9377	0.9344	0.9314	0.9286	0.9260	0.9235	0.9211	0.9189	0.9167	0.9147	0.9127	0.9109
26-1/8	0.9845	0.9756	0.9681	0.9617	0.9560	0.9510	0.9465	0.9424	0.9386	0.9351	0.9319	0.9289	0.9261	0.9235	0.9210	0.9186	0.9164	0.9142	0.9122	0.9103	0.9084
27-1/2	0.9820	0.9731	0.9656	0.9592	0.9536	0.9486	0.9441	0.9400	0.9362	0.9327	0.9295	0.9265	0.9237	0.9211	0.9186	0.9163	0.9140	0.9119	0.9099	0.9079	0.9061
28-7/8	0.9796	0.9707	0.9633	0.9569	0.9513	0.9463	0.9418	0.9377	0.9339	0.9305	0.9273	0.9243	0.9215	0.9189	0.9164	0.9140	0.9118	0.9097	0.9077	0.9057	0.9039
30-1/4	0.9774	0.9685	0.9611	0.9547	0.9491	0.9441	0.9396	0.9355	0.9318	0.9283	0.9251	0.9221	0.9193	0.9167	0.9142	0.9119	0.9097	0.9076	0.9056	0.9036	0.9018
31-5/8	0.9752	0.9663	0.9589	0.9525	0.9469	0.9420	0.9375	0.9334	0.9297	0.9263	0.9231	0.9201	0.9173	0.9147	0.9122	0.9099	0.9077	0.9056	0.9035	0.9016	0.8998
33	0.9731	0.9643	0.9569	0.9505	0.9449	0.9400	0.9355	0.9314	0.9277	0.9243	0.9211	0.9181	0.9154	0.9127	0.9103	0.9079	0.9057	0.9036	0.9016	0.8997	0.8979
34-3/8	0.9711	0.9623	0.9549	0.9486	0.9430	0.9380	0.9336	0.9295	0.9258	0.9224	0.9192	0.9163	0.9135	0.9109	0.9084	0.9061	0.9039	0.9018	0.8998	0.8979	0.8960
35-3/4	0.9692	0.9604	0.9531	0.9467	0.9412	0.9362	0.9318	0.9277	0.9240	0.9206	0.9174	0.9145	0.9117	0.9091	0.9066	0.9043	0.9021	0.9000	0.8980	0.8961	0.8943
37-1/8	0.9674	0.9586	0.9513	0.9449	0.9394	0.9344	0.9300	0.9260	0.9223	0.9189	0.9157	0.9127	0.9100	0.9074	0.9049	0.9026	0.9004	0.8983	0.8963	0.8944	0.8926

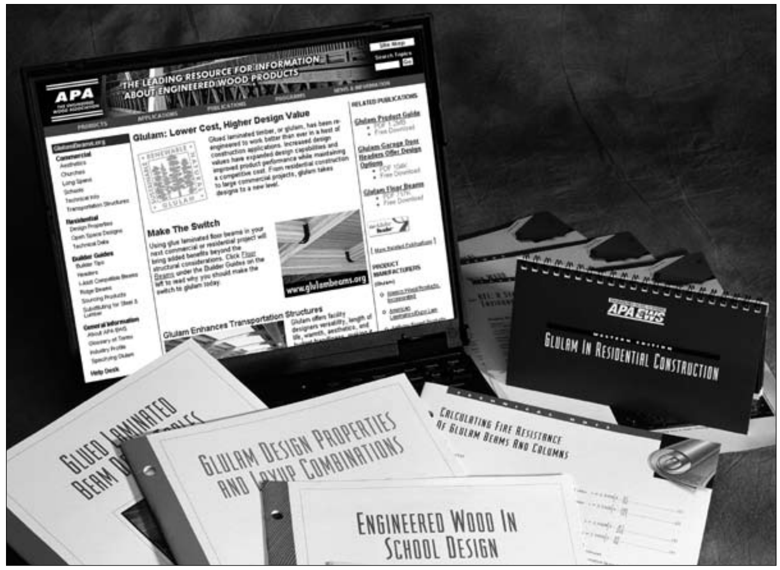
8-1/2-INCH WIDTH	SPAN (ft)																				
Depth (in.)	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**	**28**	**30**	**32**	**34**	**36**	**38**	**40**	**42**	**44**	**46**	**48**	**50**
24-3/4	0.9759	0.9670	0.9596	0.9532	0.9476	0.9427	0.9382	0.9341	0.9304	0.9269	0.9237	0.9208	0.9180	0.9154	0.9129	0.9105	0.9083	0.9062	0.9042	0.9023	0.9004
26-1/8	0.9733	0.9644	0.9570	0.9507	0.9451	0.9401	0.9356	0.9316	0.9279	0.9244	0.9212	0.9183	0.9155	0.9129	0.9104	0.9081	0.9059	0.9038	0.9018	0.8998	0.8980
27-1/2	0.9708	0.9620	0.9546	0.9482	0.9427	0.9377	0.9332	0.9292	0.9255	0.9221	0.9189	0.9159	0.9132	0.9105	0.9081	0.9058	0.9036	0.9015	0.8995	0.8975	0.8957
28-7/8	0.9684	0.9596	0.9523	0.9459	0.9404	0.9354	0.9310	0.9269	0.9232	0.9198	0.9166	0.9137	0.9109	0.9083	0.9059	0.9036	0.9014	0.8993	0.8973	0.8954	0.8935
30-1/4	0.9662	0.9574	0.9500	0.9437	0.9382	0.9332	0.9288	0.9248	0.9211	0.9177	0.9145	0.9116	0.9088	0.9062	0.9038	0.9015	0.8993	0.8972	0.8952	0.8933	0.8915
31-5/8	0.9640	0.9553	0.9479	0.9416	0.9361	0.9312	0.9267	0.9227	0.9190	0.9156	0.9125	0.9095	0.9068	0.9042	0.9018	0.8995	0.8973	0.8952	0.8932	0.8913	0.8895
33	0.9620	0.9532	0.9459	0.9396	0.9341	0.9292	0.9248	0.9208	0.9171	0.9137	0.9105	0.9076	0.9049	0.9023	0.8998	0.8975	0.8954	0.8933	0.8913	0.8894	0.8876
34-3/8	0.9600	0.9513	0.9440	0.9377	0.9322	0.9273	0.9229	0.9189	0.9152	0.9118	0.9087	0.9058	0.9030	0.9004	0.8980	0.8957	0.8935	0.8915	0.8895	0.8876	0.8858
35-3/4	0.9581	0.9494	0.9421	0.9359	0.9304	0.9255	0.9211	0.9171	0.9134	0.9100	0.9069	0.9040	0.9013	0.8987	0.8963	0.8940	0.8918	0.8897	0.8877	0.8858	0.8840
37-1/8	0.9563	0.9476	0.9404	0.9341	0.9286	0.9237	0.9193	0.9154	0.9117	0.9083	0.9052	0.9023	0.8996	0.8970	0.8946	0.8923	0.8901	0.8880	0.8861	0.8842	0.8824
38-1/2	0.9546	0.9459	0.9387	0.9324	0.9269	0.9221	0.9177	0.9137	0.9100	0.9067	0.9036	0.9006	0.8979	0.8954	0.8929	0.8907	0.8885	0.8864	0.8844	0.8826	0.8808
39-7/8	0.9529	0.9443	0.9370	0.9308	0.9253	0.9204	0.9161	0.9121	0.9084	0.9051	0.9020	0.8991	0.8963	0.8938	0.8914	0.8891	0.8869	0.8849	0.8829	0.8810	0.8792
41-1/4	0.9513	0.9427	0.9354	0.9292	0.9237	0.9189	0.9145	0.9105	0.9069	0.9036	0.9004	0.8975	0.8948	0.8923	0.8899	0.8876	0.8854	0.8834	0.8814	0.8795	0.8777
42-5/8	0.9497	0.9411	0.9339	0.9277	0.9222	0.9174	0.9130	0.9091	0.9054	0.9021	0.8990	0.8961	0.8934	0.8908	0.8884	0.8861	0.8840	0.8819	0.8800	0.8781	0.8763
44	0.9482	0.9396	0.9324	0.9262	0.9208	0.9159	0.9116	0.9076	0.9040	0.9006	0.8975	0.8947	0.8919	0.8894	0.8870	0.8847	0.8826	0.8805	0.8786	0.8767	0.8749

The complete volume factor formula for southern pine is:

$$C_v = \left(\frac{12}{d}\right)^{1/20} \times \left(\frac{5.125}{b}\right)^{1/20} \times \left(\frac{21}{L}\right)^{1/20} \leq 1.0$$

where: d = beam depth (in.)
b = beam width (in.)
L = beam length (ft)

ABOUT APA



APA – The Engineered Wood Association is a nonprofit trade association of and for structural wood panel, glulam timber, wood I-joist, laminated veneer lumber and other engineered wood product manufacturers. Based in Tacoma, Washington, APA represents approximately 150 mills throughout North America, ranging from small, independently owned and operated companies to large integrated corporations.

Always insist on engineered wood products bearing the mark of quality – the APA or *APA EWS* trademark. Your APA engineered wood purchase is not only your highest possible assurance of product quality, but an investment in the many trade services that APA provides on your behalf. The Association's trademark appears only on products manufactured by member mills and is the manufacturer's assurance that the product conforms to the standard shown on the trademark.

Glulam beams manufactured by APA members are certified with the *APA EWS* trademark. The mark signifies that the manufacturer is committed to a rigorous program of quality verification and testing and that products are manufactured in conformance with ANSI Standard A190.1, American National Standard for Structural Glued Laminated Timber. The *APA EWS* trademark is recognized by all major model building codes.

APA's services go far beyond quality testing and inspection. Research and promotion programs play important roles in developing and improving plywood and other panel construction systems, and in helping users and specifiers to better understand and apply engineered wood products. For more information on wood construction systems, contact *APA – The Engineered Wood Association,* 7011 S. 19th St., Tacoma, Washington 98466, or visit the Association's web site at **www.apawood.org.**

We have field representatives in many major U.S. cities and in Canada
who can help answer questions involving APA and *APA EWS* trademarked products.
For additional assistance in specifying engineered wood products, contact us:

APA – THE ENGINEERED WOOD ASSOCIATION

HEADQUARTERS

7011 So. 19th St. ▪ Tacoma, Washington 98466 ▪ (253) 565-6600 ▪ Fax: (253) 565-7265

www.apawood.org

PRODUCT SUPPORT HELP DESK

(253) 620-7400 ▪ E-mail Address: help@apawood.org

Form No. EWS S475H/Revised June 2007/0300

APA
THE ENGINEERED WOOD ASSOCIATION