

SOUTHERN PINE ALLOWABLE LOAD TABLES



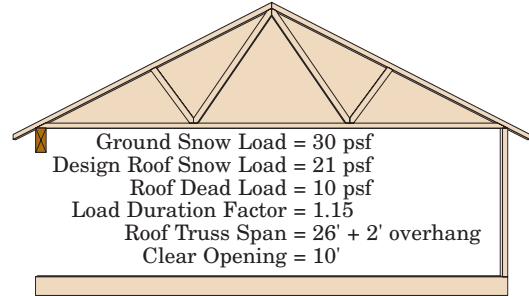
Requirements for Use of Allowable Load Tables

1. These tables are for gravity loads only. Consult a registered design professional for wind and seismic load analysis and design.
2. All tables are based on uniformly distributed loads only. Other loads, such as concentrated or unbalanced snow loads, have not been considered and must be analyzed separately.
3. These tables are only applicable to members used under dry-service conditions where the moisture content in use is a maximum of 19% for lumber and less than 16% for glued laminated timber.
4. The compression edge of the header or beam must be laterally supported at intervals of 24" or less. In addition, lateral support must be provided at bearing points.
5. Allowable total and live plf (pounds per lineal foot) loads used to select a header or beam must be equal to or greater than the actual plf loads applied.
6. Multiple-member headers and beams must be properly connected together. See page 5 for connection guidelines.
7. These tables assume unbalanced glued laminated timber combinations used in simple-span applications. Balanced beam combinations with equal or greater design values may be substituted and used in either simple-span or continuous-span applications.
8. These tables are only applicable to members used under ordinary ranges of temperature and occasionally heated in use up to 150° F.

Example: Allowable Roof Loads

Key – for each clear opening there are three rows of values:

- TL: Maximum total load in pounds per lineal foot (plf) with deflection limited to $\ell/180$
- LL: Maximum live load in pounds per lineal foot (plf) with deflection limited to $\ell/240$
- BL: Required bearing length in inches



Total Load = $(26/2 + 2') \times (21 + 10) \text{ psf} = 465 \text{ plf}$
 Live Load = $(26/2 + 2') \times 21 \text{ psf} = 315 \text{ plf}$

Steps in Sizing Headers and Beams:

1. Determine the required total load (live load + dead load) in plf.
2. Determine the required live load in plf.
3. Select a clear opening and find columns where the plf value in the TL row equals or exceeds the required total load, *and* the plf value in the LL row equals or exceeds the required live load.
4. Check required bearing lengths in the BL row.
5. Find product size options at the top of the columns meeting the total load, live load and bearing length requirements.

Select the 10' clear opening in Tables 27-32. Read across the TL row in each table to find columns with total loads equal to or greater than the required 465 plf. Then check the LL row in those columns to make sure the corresponding live loads are equal to or greater than the required 315 plf. Solutions include: from Table 27 for No.1 SP lumber, select (2) 2x12s, (3) 2x10s or (4) 2x8s; from Table 28 for No.2 SP lumber, select (3) 2x12s or (4) 2x10s; from Table 29 for No.3 SP lumber, select (4) 2x12s; from Table 30 for 24F-1.7E (V4) SP glulam, select a 3-1/2x9-1/4" beam; from Table 32 for 24F-1.8E (V3) SP glulam, select a 3-1/8x8-1/4" beam. All of the lumber solutions and the 24F-1.8E glulam solution require a 1.5" bearing length, while the 24F-1.7E glulam solution requires a 3.0" bearing length.

Table 27 – No. 1 Southern Pine Lumber

Clear Opening		1-ply				2-ply				3-ply				4-ply			
		2 x 6	2 x 8	2 x 10	2 x 12	2 x 6	2 x 8	2 x 10	2 x 12	2 x 6	2 x 8	2 x 10	2 x 12	2 x 6	2 x 8	2 x 10	2 x 12
4'	TL	464	725	962	1296	928	1450	1925	2591	1590	2472	3266	4366	2120	3296	4355	5821
	LL	464	725	962	1296	928	1450	1925	2591	1590	2472	3266	4366	2120	3296	4355	5821
	BL	1.5	3.0	3.0	4.5	1.5	3.0	3.0	4.5	1.5	3.0	3.0	4.5	1.5	3.0	3.0	4.5
6'	TL	211	335	453	626	422	671	906	1252	726	1152	1552	2139	968	1536	2070	2852
	LL	211	335	453	626	422	671	906	1252	726	1152	1552	2139	968	1536	2070	2852
	BL	1.5	1.5	3.0	3.0	1.5	1.5	3.0	3.0	1.5	1.5	3.0	3.0	1.5	1.5	3.0	3.0
8'	TL	119	190	259	361	238	381	517	722	410	656	890	1240	547	875	1187	1654
	LL	119	190	259	361	238	381	517	722	410	656	890	1240	547	875	1187	1654
	BL	1.5	1.5	1.5	3.0	1.5	1.5	1.5	3.0	1.5	1.5	1.5	3.0	1.5	1.5	1.5	3.0
10'	TL	76	122	166	233	151	244	332	466	262	421	573	802	349	561	764	1069
	LL	73	122	166	233	146	244	332	466	219	421	573	802	292	561	764	1069
	BL	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	3.0	1.5	1.5	1.5	3.0
12'	TL	52	84	115	162	104	168	230	323	164	291	397	558	218	388	529	744
	LL	42	84	115	162	85	168	230	323	127	290	397	558	170	386	529	744
	BL	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
14'	TL	34	61	84	118	68	123	168	236	101	212	290	409	135	283	387	545
	LL	27	61	84	118	54	122	168	236	80	183	290	409	107	244	387	545
	BL	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
16'	TL	22	46	64	90	44	93	127	180	66	156	220	311	88	208	294	415
	LL	18	41	64	90	36	82	127	180	54	123	220	311	72	164	294	415
	BL	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
18'	TL	15	36	50	70	30	72	99	141	45	108	172	244	60	144	230	325
	LL	13	29	50	70	25	58	99	141	38	87	172	244	51	116	230	325
	BL	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5

(See *Requirements for Use* on page 23, and *Key, Example and Notes* on this page)

Notes for Tables 27 - 32: Allowable Roof Loads (plf) - 1.15 Load Duration Factor

- Tabulated total loads (TL) and live loads (LL) represent the allowable uniformly distributed loads that a beam can support in addition to its own weight. Deflection is limited to $\ell/180$ for total load and $\ell/240$ for live load. To determine an allowable live load for a deflection limit other than $\ell/240$, multiply the LL value by the ratio of 240 divided by the desired deflection constant. The result must not exceed the corresponding TL value for the same clear opening and product.
- Tabulated bearing lengths (BL) reflect the number of 2x trimmers required at each end of the header or beam based on the corresponding plf loads (e.g., 1.5" = one trimmer, 3.0" = two trimmers, etc.). Additional checks may be required for bearing length and trimmers.
- See *Assumptions for Table Development* beginning on page 2 for details on design assumptions made to generate these tables.
- Interpolation between clear openings is permitted.
- The design span is assumed to be the clear opening plus 1/2 the required bearing length at each end.

Table 27A – 2400F-2.0E Southern Pine Lumber

Clear Opening		1-ply				2-ply				3-ply				4-ply			
		2 x 6	2 x 8	2 x 10	2 x 12	2 x 6	2 x 8	2 x 10	2 x 12	2 x 6	2 x 8	2 x 10	2 x 12	2 x 6	2 x 8	2 x 10	2 x 12
4'	TL	777	1132	1641	2309	1555	2264	3282	4619	2332	3397	4923	6928	3110	4529	6564	9237
	LL	777	1132	1641	2309	1555	2264	3282	4619	2332	3397	4923	6928	3110	4529	6564	9237
	BL	1.5	3.0	3.0	4.5	1.5	3.0	3.0	4.5	1.5	3.0	3.0	4.5	1.5	3.0	3.0	4.5
6'	TL	374	639	903	1188	748	1277	1806	2375	1287	1976	2710	3563	1716	2634	3613	4751
	LL	374	639	903	1188	748	1277	1806	2375	1226	1976	2710	3563	1634	2634	3613	4751
	BL	1.5	3.0	3.0	4.5	1.5	3.0	3.0	4.5	1.5	3.0	3.0	4.5	1.5	3.0	3.0	4.5
8'	TL	212	365	586	798	424	731	1171	1597	698	1257	1867	2395	931	1675	2490	3194
	LL	176	365	586	798	353	731	1171	1597	528	1186	1867	2395	704	1581	2490	3194
	BL	1.5	1.5	3.0	3.0	1.5	1.5	3.0	3.0	1.5	1.5	3.0	3.0	1.5	1.5	3.0	3.0
10'	TL	120	235	380	555	239	470	759	1110	359	810	1306	1803	479	1080	1741	2404
	LL	91	206	380	555	183	413	759	1110	274	617	1258	1803	365	823	1678	2404
	BL	1.5	1.5	3.0	3.0	1.5	1.5	3.0	3.0	1.5	1.5	3.0	3.0	1.5	1.5	3.0	3.0
12'	TL	69	158	265	389	138	316	530	778	206	474	912	1338	275	632	1216	1784
	LL	53	120	247	389	106	241	495	778	159	361	739	1308	212	482	985	1744
	BL	1.5	1.5	1.5	3.0	1.5	1.5	1.5	3.0	1.5	1.5	3.0	3.0	1.5	1.5	3.0	3.0
14'	TL	43	99	195	287	85	198	389	574	128	297	617	988	171	396	822	1318
	LL	34	76	157	279	67	153	314	559	101	229	470	835	134	305	627	1113
	BL	1.5	1.5	1.5	3.0	1.5	1.5	1.5	3.0	1.5	1.5	1.5	3.0	1.5	1.5	1.5	3.0
16'	TL	28	66	138	220	56	131	275	439	84	197	413	740	112	263	550	986
	LL	22	51	106	189	45	103	212	377	67	154	317	564	90	205	423	752
	BL	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	3.0	1.5	1.5	1.5	3.0
18'	TL	19	45	96	173	38	91	192	347	57	136	288	520	76	182	384	693
	LL	16	36	75	133	32	72	149	266	47	108	224	399	63	144	298	532
	BL	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5

Table 27B – M-23 Southern Pine Lumber

Clear Opening		1-ply				2-ply				3-ply				4-ply			
		2 x 6	2 x 8	2 x 10	2 x 12	2 x 6	2 x 8	2 x 10	2 x 12	2 x 6	2 x 8	2 x 10	2 x 12	2 x 6	2 x 8	2 x 10	2 x 12
4'	TL	777	1132	1641	2309	1555	2264	3282	4619	2332	3397	4923	6928	3110	4529	6564	9237
	LL	777	1132	1641	2309	1555	2264	3282	4619	2332	3397	4923	6928	3110	4529	6564	9237
	BL	1.5	3.0	3.0	4.5	1.5	3.0	3.0	4.5	1.5	3.0	3.0	4.5	1.5	3.0	3.0	4.5
6'	TL	374	639	903	1188	748	1277	1806	2375	1287	1976	2710	3563	1716	2634	3613	4751
	LL	370	639	903	1188	740	1277	1806	2375	1103	1976	2710	3563	1471	2634	3613	4751
	BL	1.5	3.0	3.0	4.5	1.5	3.0	3.0	4.5	1.5	3.0	3.0	4.5	1.5	3.0	3.0	4.5
8'	TL	210	365	586	798	420	731	1171	1597	629	1257	1867	2395	839	1675	2490	3194
	LL	159	358	586	798	318	716	1171	1597	477	1067	1867	2395	635	1423	2490	3194
	BL	1.5	1.5	3.0	3.0	1.5	1.5	3.0	3.0	1.5	1.5	3.0	3.0	1.5	1.5	3.0	3.0
10'	TL	108	235	380	555	215	470	759	1110	323	734	1306	1803	430	979	1741	2404
	LL	82	186	380	555	164	372	759	1110	247	557	1132	1803	329	742	1510	2404
	BL	1.5	1.5	3.0	3.0	1.5	1.5	3.0	3.0	1.5	1.5	3.0	3.0	1.5	1.5	3.0	3.0
12'	TL	62	142	265	389	123	284	530	778	185	426	877	1338	247	568	1169	1784
	LL	48	109	223	389	96	217	445	778	143	326	666	1177	191	434	887	1570
	BL	1.5	1.5	1.5	3.0	1.5	1.5	1.5	3.0	1.5	1.5	1.5	3.0	1.5	1.5	1.5	3.0
14'	TL	38	89	185	287	76	178	370	574	115	267	555	988	153	356	740	1318
	LL	30	69	141	252	60	138	283	503	91	206	424	751	121	275	565	1002
	BL	1.5	1.5	1.5	3.0	1.5	1.5	1.5	3.0	1.5	1.5	1.5	3.0	1.5	1.5	1.5	3.0
16'	TL	25	59	124	220	50	118	247	439	75	177	371	666	100	236	495	888
	LL	20	46	95	170	41	92	191	339	61	139	286	509	81	185	381	679
	BL	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
18'	TL	17	41	86	156	34	81	172	312	51	122	259	468	68	163	345	623
	LL	14	33	67	120	28	65	134	240	43	98	202	360	57	130	269	480
	BL	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5

(See Requirements for Use on page 23, Key, Example and Notes on page 29)