



LOAD-SPAN TABLES FOR APA STRUCTURAL-USE PANELS

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Load-span tables for specific structural-use panel applications are included in several APA publications. Recommended loads for sheathing and flooring applications in these publications directly reflect minimum performance criteria given in APA PRP-108, Performance Standards and Policies for Structural-Use Panels and Voluntary Product Standard PS 2-92, Performance Standard for Wood-Based Structural-Use Panels. To qualify for a given Span Rating under the standards, a panel must meet all of the criteria for that rating. As a result, mechanical properties that are characteristic of APA structural-use panels are actually greater than the minimum necessary to pass one criterion.

Because it is sometimes necessary to have engineering design information for structural panel products for conditions not specifically covered in the other APA literature, APA publishes separate design section capacities for the various Span Ratings. These values are listed in APA Technical Note N375 – Design Capacities of APA Performance Rated Structural-Use Panels. The uniform loads in the following tables were calculated using these section capacities. These loads are recommended when engineering

principles are used for design. It is important to remember that structural engineering principles alone do not necessarily take into account other factors, such as moisture and thermal conditions, which may impact design.

This information applies only to products tested and inspected under APA programs. Comparisons cannot be made with products manufactured or inspected under other standards or programs.

The following load-span tables apply to APA trademarked structural-use panels qualified and manufactured in accordance with APA PRP-108, Performance Standards and Policies for Structural-Use Panels and Voluntary Product Standard PS 2-92, Performance Standard for Wood-Based Structural-Use Panels. These panels include plywood, composite (COM-PLY®) and mat-formed products such as oriented strand board (OSB). Loads are provided for applications where the panel strength axis is applied across supports and applied parallel to supports. For each combination of span and Span Rating, loads are given for deflections of $L/360$, $L/240$ and $L/180$, and maximum loads controlled by bending and shear capacity. The values given in Tables 1 and 2 may be adjusted for panel type using Table 3, Adjustments to Allowable Load Capacities Based on Panel Grade and Construction. For special application conditions, use the factors listed in Table 4, Application

Adjustment Factors. Table 5, Typical APA Panel Constructions, is provided to assist in selecting panel constructions for specific Span Ratings.

Table 1 applies to APA Rated Sheathing. For APA Rated Sturd-I-Floor, see Table 2.

The values given in Tables 1 and 2 represent the maximum allowable loads without regard to panel type. Using Table 3, these values may, in some cases, be adjusted upward for specific types of structural-use panels. Once the allowable loads have been adjusted for panel type, they should be further adjusted for application conditions using Table 4. The values in Tables 1 and 2 are generated assuming dry conditions, normal duration of load and untreated, Exposure 1, structural panels. For other conditions, the loads should be appropriately adjusted using the factors given. See the examples for proper use of panel construction and application adjustment factors.

For strength axis across supports, and spans of 32 inches and less, three spans are assumed. Two spans are assumed for spans greater than 32 inches. For strength axis parallel to supports, tables are based on three spans for spans of 16 inches and less, and two spans for 24 inches. The tables do not apply directly to panels having a single span.

For one-span conditions, use the adjustment factors from Table 4.

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TABLE 1

**UNIFORM LOADS (PSF) ON APA RATED SHEATHING. MULTI-SPAN,
NORMAL DURATION OF LOAD, DRY CONDITIONS, PANELS 24 INCHES OR WIDER**

Span Rating	Load Governed By	Strength Axis Across Supports Span Center-to-Center of Supports (inches)										Strength Axis Parallel to Supports Span, Center-to-Center of Supports (inches)		
		12	16	19.2	24	30	32	36	40	48	60	12	16	24
24/0	L/360	261	98	54	26	13	10	9				16	6	
	L/240	392	147	81	39	19	16	14				23	9	
	L/180	522	196	107	52	26	21	18				31	12	
	Bending	208	117	81	52	33	29	19				45	25	
	Shear	314	228	186	147	116	108	92				200	145	
24/16	L/360	339	128	70	34	17	14	12	9			23	9	
	L/240	509	191	105	51	25	20	18	13			34	13	
	L/180	679	255	140	68	33	27	24	17			45	17	
	Bending	267	150	104	67	43	38	24	19			53	30	
	Shear	362	262	215	169	133	125	106	95			200	145	
32/16	L/360	500	188	103	50	24	20	18	13			35	13	4
	L/240	750	282	154	75	37	30	26	19			53	20	7
	L/180	1001	376	206	100	49	40	35	25			70	27	9
	Bending	308	173	120	77	49	43	27	22			77	43	15
	Shear	400	290	237	187	147	138	117	105			248	179	111
40/20	L/360	979	368	201	98	48	39	34	25	16		78	29	10
	L/240	1468	552	302	146	72	58	51	37	24		117	44	15
	L/180	1958	736	403	195	96	78	69	49	32		157	59	20
	Bending	521	293	203	130	83	73	46	38	26		125	70	25
	Shear	505	366	299	236	186	174	147	132	114		314	228	141
48/24	L/360	1740	655	358	174	85	69	61	44	29	14	128	48	16
	L/240	2610	982	537	260	128	104	91	66	43	21	193	72	24
	L/180	3480	1309	716	347	170	139	122	88	57	28	257	97	33
	Bending	704	396	275	176	113	99	63	51	35	23	188	105	38
	Shear	648	469	384	302	239	223	189	170	147	116	362	262	162

TABLE 2

**UNIFORM LOADS (PSF) ON APA RATED STURD-I-FLOOR. MULTI-SPAN,
NORMAL DURATION OF LOAD, DRY CONDITIONS, PANELS 24 INCHES OR WIDER**

Span Rating	Load Governed By	Strength Axis Across Supports Span Center-to-Center of Supports (inches)										Strength Axis Parallel to Supports Span, Center-to-Center of Supports (inches)		
		12	16	19.2	24	30	32	36	40	48	60	12	16	24
16 oc	L/360	653	245	134	65	32	26	23	16	11		48	18	6
	L/240	979	368	201	98	48	39	34	25	16		72	27	9
	L/180	1305	491	269	130	64	52	46	33	21		96	36	12
	Bending	346	195	135	86	55	49	31	25	17		83	47	17
	Shear	429	310	254	200	158	148	125	112	97		276	200	124
20 oc	L/360	914	344	188	91	45	36	32	23	15		57	21	7
	L/240	1370	516	282	137	67	55	48	34	22		85	32	11
	L/180	1827	687	376	182	89	73	64	46	30		113	43	14
	Bending	400	225	156	100	64	56	36	29	20		117	66	23
	Shear	505	366	299	236	186	174	147	132	114		324	234	145
24 oc	L/360	1305	491	269	130	64	52	46	33	21	10	113	43	14
	L/240	1958	736	403	195	96	78	69	49	32	16	170	64	22
	L/180	2610	982	537	260	128	104	91	66	43	21	226	85	29
	Bending	533	300	208	133	85	75	47	38	27	17	179	101	36
	Shear	648	469	384	302	239	223	189	170	147	116	371	269	166
32 oc	L/360	2828	1064	582	282	138	113	99	71	46	23	326	123	41
	L/240	4242	1596	873	423	207	169	148	107	70	34	489	184	62
	L/180	5656	2128	1164	564	276	225	198	142	93	45	653	245	83
	Bending	725	408	283	181	116	102	64	52	36	23	317	178	63
	Shear	762	552	452	356	281	262	223	199	173	136	533	386	239
48 oc	L/360	5003	1882	1030	499	244	199	175	126	82	40	696	262	88
	L/240	7505	2823	1545	748	367	299	263	189	123	60	1044	393	133
	L/180	10006	3764	2060	998	489	399	350	252	164	80	1392	524	177
	Bending	1333	750	521	333	213	188	119	96	67	43	567	319	113
	Shear	1143	828	678	533	421	393	334	299	259	204	857	621	384

(Continued from page 1)

Effects of support width have been considered when determining the loads based on shear and deflection. Supports are assumed to be 2x nominal members for spans less than 48 inches, and 4x members for 48-inch and greater spans. Support-width factors are those established in APA Laboratory Report 120.

It is important to note that some structural panel applications are not controlled by uniform loads. Residential floors are a good example. They are commonly designed for 40 psf live load. The allowable uniform floor load on panels applied at maximum span according to APA recommendations is greatly in excess of the typical design loads. This excess does not mean that floor spans for structural panels can be increased, but only that there is considerable reserve strength and stiffness for uniform loads. Actually, the recommendations for panel floors are based on performance under concentrated loads, how the floor “feels” to passing foot traffic, and other subjective factors which relate to public acceptance. Always check the maximum floor and roof spans for structural panels before making a final panel selection for these applications.

TABLE 3

**ADJUSTMENTS TO ALLOWABLE LOAD CAPACITIES
BASED ON PANEL GRADE AND CONSTRUCTION, C_G**

	Strength Axis ^(a)			
	Perpendicular to Supports		Parallel to Supports	
	Other	Structural I	Other	Structural I
STIFFNESS (L/360, L/240, L/180)				
3-Ply Plywood	1.1	1.1	1.0	1.5
4-Ply Plywood, COM-PLY	1.1	1.1	2.2	3.3
5-Ply Plywood ^(b)	1.1	1.1	3.1	5.2
OSB	1.0	1.0	3.1	5.2
BENDING				
3-Ply Plywood	1.0	1.0	1.0	1.3
4-Ply Plywood	1.1	1.1	1.2	1.7
COM-PLY	1.2	1.2	1.2	1.7
5-Ply Plywood ^(b) , OSB	1.2	1.2	1.8	2.8
SHEAR				
3-Ply Plywood	1.0	1.4	2.8	5.2
4-Ply Plywood	1.0	1.4	3.9	7.9
5-Ply Plywood ^(b)	1.1	1.6	1.0	1.4
OSB, COM-PLY	1.0	1.0	1.0	1.0

(a) The strength axis is the long panel dimension unless otherwise identified.

(b) Adjustments apply to plywood with 5 or more layers; for 5-ply/3-layer plywood, use adjustments for 4-ply.

TABLE 4

APPLICATION ADJUSTMENT FACTORS

Duration of Load, C_D (Applies to Bending and Shear Only):

Permanent load (over 10 years)	0.90
2 months, as for snow	1.15
7 days	1.25
Wind or earthquake	1.60
Impact	2.00

Span Adjustments:

2-span to 1-span	
Deflection	0.42
Bending	1.00
Shear	1.25
3-span to 1-span	
Deflection	0.53
Bending	0.80
Shear	1.20

Wet or Damp Locations, C_M (Moisture Content 16% or more):

Deflection	0.85
Bending	0.75
Shear	0.75

TABLE 5

TYPICAL APA PANEL CONSTRUCTIONS^(a)

APA RATED WAREHOUSE FLOORING					
Span Rating	Plywood			COM-PLY	OSB
	3-Ply	4-Ply	5-Ply ^(b)		
APA RATED SHEATHING					
24/0	X				X
24/16					X
32/16	X	X	X		X
40/20	X	X	X		X
48/24		X	X		X
APA RATED STURD-I-FLOOR					
16 oc					
20 oc		X	X	X	X
24 oc		X	X	X	X
32 oc			X	X	X
48 oc			X	X	X

(a) Constructions may not be available in every area. Check with suppliers concerning availability.

(b) Applies to plywood with 5 or more layers.

EXAMPLES SHOWING USE OF LOAD-SPAN TABLES

EXAMPLE 1:

Find the allowable uniform floor load for APA RATED SHEATHING 32/16, plywood, when applied at its rated span. From Table 5 it can be seen that 32/16 plywood sheathing is available in 3-, 4- or 5-ply. Since actual construction may not be known during design, assume the most conservative values. Table 3 indicates the most conservative values for plywood are those for 3-ply. Assume 10 psf dead load, and panel strength axis across supports 16 inches o.c. Unless stated otherwise, assume floor deflection criteria to be L/360 under live load and L/240 under total load.

Note: In these examples, panel type is selected for illustrative purposes. Often, specification is by grade and Span Rating without regard to panel type, and calculations should assume the lowest adjustments (Table 3) applicable to typical constructions (Table 5) for the specified Span Rating.

FROM TABLE 1

FOR APA RATED SHEATHING PANELS WITH STRENGTH AXIS ACROSS SUPPORTS:

Load Governed by	Load (psf)		Adjustment for Panel Grade and Construction, C_G		Adjusted Load (psf)
L/360	188	x	1.1	=	207
L/240	282	x	1.1	=	310
L/180	376	x	1.1	=	414
Bending	173	x	1.0	=	173
Shear	290	x	1.0	=	290

Allowable total load for floors is the least of loads for L/240, bending and shear. Allowable total load is 173 psf.

Live load is the lesser of the load for L/360, and total load, as determined above, minus dead load.

$$L/360 = 207 \text{ psf}$$

$$\text{Total load} - \text{dead load} = 173 - 10 = 163 \text{ psf}$$

Allowable live load = 163 psf, or 165 psf (rounded to nearest 5 psf).

Note: Do not increase span beyond the floor Span Rating even though the allowable uniform live load greatly exceeds the 40 psf design live load normally used for floors. Recommended maximum span reflects performance under concentrated and impact loads in addition to uniform load.

EXAMPLE 2:

Find the allowable snow load for APA RATED STURD-I-FLOOR 24 oc, OSB, when the panel is used as roof sheathing with the strength axis across supports spaced 32 inches o.c. In question are several panels in the 1-span condition. Deflection criteria are L/240 under live load only and L/180 under total load. Assuming a 2-month duration of load for snow, allowable loads for bending and shear may be increased 15%. Assume that 10 psf dead load is supported by the Sturd-I-Floor.

FROM TABLE 2

FOR APA RATED STURD-I-FLOOR PANELS WITH STRENGTH AXIS ACROSS SUPPORTS:

Load Governed by	Load (psf)		Adjustment for Panel Grade and Construction, C_G		Adjustment for Duration of Load, C_D		Adjustment for Span		Adjusted Load (psf)
L/360	52	x	1.0		x	0.53	=		28
L/240	78	x	1.0		x	0.53	=		41
L/180	104	x	1.0		x	0.53	=		55
Bending	75	x	1.2	x	1.15	x	0.80	=	83
Shear	223	x	1.0	x	1.15	x	1.20	=	308

Allowable total load is the lesser of the load for L/180, bending and shear. Allowable total load is 55 psf.

Live load is the lesser of the load for L/240, and total load as determined above minus dead load.

$$L/240 = 41 \text{ psf}$$

$$\text{Total load} - \text{dead load} = 55 - 10 = 45 \text{ psf}$$

In this case, live load is governed by deflection of L/240: Allowable live load = 41 psf, or 40 psf (rounded to nearest 5 psf).

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