

Load-Span Tables for AdvanTech® Subflooring and Sheathing

AdvanTech wood structural panels are high performance panels designed around 3 performance pillars: 1) superior moisture resistance, 2) superior strength and stiffness, and 3) highest quality and service. AdvanTech 1/2", 5/8" and 23/32" panels are made in accordance with the evaluation service report, ESR-1785, which have strength and stiffness design values that surpass what is required of commodity OSB and plywood in the product standard, PS 2-10, *Performance Standard for Wood-Based Structural-Use Panels*.

Load-span tables provided in this document are applicable to AdvanTech panels manufactured by Huber Engineered Woods LLC. Design capacities recognized in the International Code Council (ICC) evaluation service report, ESR-1785 and the product standard, PS 2-10 were used in developing these load-span tables. The design assumptions used to develop the load-span tables are reviewed in this document, and adjustment factors are provided for applications in which the design conditions differ from those assumed. The information provided in this document should be considered in its entirety when specifying AdvanTech panels for specific applications.

Property Standardization and Product Certification

AdvanTech sheathing and flooring panels are certified as conforming to PS2 in addition to the higher performance requirements specified in ESR-1785 for 1/2", 5/8" and 23/32" thicknesses, which indicates that design capacities are superior to those of commodity PS2 panels. Independent third-party services for both ESR-1785 and PS 2-10 certification are provided by TECO Corporation (IAS AA-654, www.tecotested.com).

Installation Requirements

Installation recommendations for AdvanTech panels are posted on huberwood.com and advantechperforms.com. For specific applications, such as for roof sheathing in high wind areas, local building code provisions may be more restrictive than the recommendations of Huber Engineered Woods. Installation provisions provided in the model building codes and ER-5637 for products certified to PS2 should also be checked. For applications in which multiple and conflicting installation requirements exist, the most restrictive installation requirements shall apply.

TABLE 1. Uniform Load Tables for AdvanTech Flooring (Normal Duration), loads in psf															
Span Rating	Thickness (in)	Load Governed By	Strength Axis Perpendicular to Supports (Inches, Center-to-Center of Supports)									Strength Axis Parallel to Supports (Inches, Center-to-Center of Supports)			
			12	16	19.2	24	30	32	36	40	48	12	16	24	
20 oc	19/32	Deflection	L/720	457	172	94	46	22	18	13	9	5	88	33	9
			L/600	548	206	113	55	27	22	15	11	6	106	40	11
			L/480	685	258	141	68	33	27	19	14	8	132	50	13
			L/360	914	344	188	91	45	36	25	18	10	176	66	18
			L/240	1,370	516	282	137	67	55	38	27	15	264	99	26
			L/180	1,827	687	376	182	89	73	50	36	20	352	133	35
		Bending	479	270	187	120	77	67	53	43	30	208	117	52	
		Shear	390	283	232	182	144	134	119	106	88	390	283	182	
24 oc ESR-1785 AT 1.05 Struct 1	23/32	Deflection	L/720	835	314	172	83	41	33	23	16	9	337	127	43
			L/600	1,002	377	206	100	49	40	35	25	16	405	152	51
			L/480	1,252	471	258	125	61	50	44	31	21	506	190	64
			L/360	1,670	628	344	166	82	67	58	42	27	674	254	86
			L/240	2,505	942	516	250	122	100	88	63	41	1,011	381	128
			L/180	3,339	1,256	687	333	163	133	117	84	55	1,349	507	171
		Bending	1,042	586	407	260	167	146	93	75	52	592	333	118	
		Shear	695	503	412	324	256	239	203	182	157	695	503	311	
32 oc	7/8, 1	Deflection	L/720	1,414	532	291	141	69	56	49	36	23	511	192	65
			L/600	1,697	638	349	169	83	68	59	43	28	613	231	78
			L/480	2,121	798	437	211	104	84	74	53	35	767	288	97
			L/360	2,828	1,064	582	282	138	113	99	71	46	1,022	385	130
			L/240	4,242	1,596	873	423	207	169	148	107	70	1,534	577	195
			L/180	5,656	2,128	1,164	564	276	225	198	142	93	2,045	769	260
		Bending	875	492	342	219	140	123	78	63	44	571	321	114	
		Shear	571	414	339	267	211	197	167	150	129	571	414	256	
48 oc	1-1/8	Deflection	L/720	2,502	941	515	249	122	100	88	63	41	1,077	405	137
			L/600	3,002	1,129	618	299	147	120	105	75	49	1,292	486	164
			L/480	3,752	1,412	772	374	183	149	131	94	62	1,615	608	205
			L/360	5,003	1,882	1,030	499	244	199	175	126	82	2,154	810	273
			L/240	7,505	2,823	1,545	748	367	299	263	189	123	3,230	1,215	410
			L/180	10,006	3,764	2,060	998	489	399	350	252	164	4,307	1,620	547
		Bending	1,583	891	618	396	253	223	141	114	79	1,000	563	200	
		Shear	733	531	435	342	270	252	214	192	166	733	531	329	
Continuous Spans			3-span	3-span	3-span	3-span	3-span	3-span	2-span	2-span	2-span	3-span	3-span	2-span	
Normal Duration of load, dry-end use conditions, minimum panel width 24-inches, panels applied over multiple spans as indicated															

TABLE 2. Uniform Load Tables for AdvanTech Sheathing (Normal Duration), loads in psf																
Span Rating	Thickness (in)	Load Governed By	Strength Axis Perpendicular to Supports (Inches, Center-to-Center of Supports)									Strength Axis Parallel to Supports (Inches, Center-to-Center of Supports)				
			12	16	19.2	24	30	32	36	40	48	12	16	24		
32/16 ESR-1785 AT 1.10 Struct 1	1/2	Deflection	L/720	291	109	60	29	14	12	10	7		126	47	16	
			L/600	349	131	72	35	17	14	12	9		151	57	19	
			L/480	436	164	90	44	21	17	15	11		189	71	24	
			L/360	582	219	120	58	28	23	20	15	10		252	95	32
			L/240	873	328	180	87	43	35	31	22	14		378	142	48
			L/180	1,164	438	240	116	57	46	41	29	19		505	190	64
		Bending	554	312	216	139	89	78	49	40	28		333	188	67	
		Shear	533	386	316	249	196	184	156	140	121	533	386	239		
40/20 ESR-1785 AT 1.10 Struct 1	5/8	Deflection	L/720	557	209	115	56	27	22	19	14	9	248	93	31	
			L/600	668	251	138	67	33	27	23	17	11	298	112	38	
			L/480	835	314	172	83	41	33	29	21	14	372	140	47	
			L/360	1,114	419	229	111	54	44	39	28	18	496	187	63	
			L/240	1,671	628	344	167	82	67	58	42	27	744	280	94	
			L/180	2,227	838	458	222	109	89	78	56	37	992	373	126	
		Bending	863	485	337	216	138	121	77	62	43		521	293	104	
		Shear	667	483	395	311	246	230	195	175	151	667	483	299		
Continuous Spans			3-span	3-span	3-span	3-span	3-span	3-span	2-span	2-span	2-span	3-span	3-span	2-span		
Normal Duration of load, dry-end use conditions, minimum panel width 24-inches, panels applied over multiple spans as indicated																

Deflection Serviceability

The deflection criteria used to develop the uniform loads in Table 1 and Table 2 are typical of the limits commonly used for most conventional design applications. The structural-use panel component of floor, roof, and wall systems is but one factor influencing system serviceability. Support spans and spacings may require more restrictive deflection limitations for the panel component. For example, panels with a 24 oc span rating installed over joists spaced 24-inches on-center may exhibit unacceptable deflection under foot traffic, despite the fact that the panels comply with conventional design criteria and building code requirements. Similarly, conventional deflection criteria may not be adequate for floor applications in which relatively brittle floor coverings are used, such as ceramic or marble tile.

Table 3 provides absolute deflection values associated with deflection criteria and support spacings provided in Tables 1 and 2.

TABLE 3. Deflection limits for specific deflection criteria and support spacings (spans)

Deflection Criteria	Deflection Limits, inches								
	Span, in. c-c								
	12	16	19.2	24	30	32	36	40	48
L/720	0.017	0.022	0.027	0.033	0.042	0.044	0.050	0.056	0.067
L/600	0.020	0.027	0.032	0.040	0.050	0.053	0.060	0.067	0.080
L/480	0.025	0.033	0.040	0.050	0.063	0.067	0.075	0.083	0.100
L/360	0.033	0.044	0.053	0.067	0.083	0.089	0.100	0.111	0.133
L/240	0.050	0.067	0.080	0.100	0.125	0.133	0.150	0.167	0.200
L/180	0.067	0.089	0.107	0.133	0.167	0.178	0.200	0.222	0.267

Primary and Secondary Structural Axes

The primary axis referenced in the Uniform Load Span Tables is that with higher stiffness and strength capacities relative to the secondary axis. For typical 4 x 8-ft. panels, the primary axis corresponds to the 8-ft. panel dimension and the secondary axis corresponds to the 4-ft. panel dimension. If the primary axis does not correspond to the panel length dimension, the primary axis ("strength" axis) will be stamped on the panel.

Design Assumptions and Adjustment Factors

Design Criteria: Allowable uniformly-distributed loads are provided for each product-span combination as limited by bending strength (moment) capacity, planar shear capacity, and deflection criteria. Allowable uniformly-distributed loads provided in Tables 1 and 2 are applicable to design of the panel component only.

Panel Width: Allowable uniformly-distributed loads provided in Tables 1 and 2 are applicable to panels with widths of two-feet or greater applied over either two or three continuous spans as specified in the tables. If allowed in a specific application by local building code officials, panels as narrow as one-foot in width may be used, but with reductions in allowable loads. Allowable loads for panels one-foot in width are fifty-percent (50%) of those provided in Tables 1 and 2. Allowable loads for panel widths intermediate between one- and two-feet shall be determined by linear interpolation. For example, allowable loads for panels 18-inches in width are seventy-five percent (75%) of values provided in Tables 1 and 2. Panel widths narrower than one-foot are not recommended.

Panel Moisture Content: Allowable uniformly-distributed loads provided in Tables 1 and 2 are applicable for end-use conditions in which the equilibrium moisture content of the AdvanTech panels is less than 16%. AdvanTech panels are not suitable for use in applications in which the in-service panel equilibrium moisture content is greater than or equal to 16%.

Span Conditions: The number of continuous spans assumed in developing the allowable loads in Tables 1 and 2 is provided in the bottom row of each table. When span conditions differ from those assumed in Tables 1 and 2, adjustment factors provided in Table 4 shall be applied to the tabulated loads. These adjustment factors are simply ratios of constants in corresponding design equations. As is evident in the Table 4 adjustment factors, single span applications are generally inefficient and should be avoided whenever possible.

TABLE 4. Span Adjustment Factors

	3-spans to 2-spans	3-spans to 1-span	2-spans to 1-span
Deflection	1.27	0.53	0.42
Moment	0.80	0.80	1.00
Shear	0.96	1.20	1.25

Duration of Load: Allowable loads, limited in Tables 1 and 2 by bending and planar shear strength capacities, are based on normal duration of load¹. Since panel strength design capacities are dependent upon duration of loading, corresponding allowable loads shall be adjusted when the design load duration differs from the assumed normal duration of load. Duration of load adjustment factors are provided in Table 5.

¹ Normal duration of load represents application of full design load for a period of ten years, either continuously or cumulatively.

Table 5. Duration of Load Adjustment Factors

Load Duration	Adjustment Factor	Typical Design Condition
Permanent	0.9	Dead Load
Ten Years	1.0	Occupancy Live Load
Two Months	1.15	Snow Load
Seven Days	1.25	Construction Load
Ten Minutes	1.6	Wind or Earthquake
Impact	2.0	Impact Load

Factors are applicable to moment and shear, not to deflection

Ref. AF&PA National Design Specification

Long-Term Deflection: Uniform loads limited in Tables 1 and 2 by deflection criteria (deflection limits) are based on the assumption of initial elastic deflection. Wood products under constant (permanent) loading may exhibit long-term (creep) deflection. For seasoned (dry) wood products, creep deflection may be as much as 1.5 times that of initial elastic deflection. Creep deflection may be a design consideration if the dead load or sustained live load represents a high percentage of the total design load. Significant permanent loads are not typical of conventional panel applications, so creep deflection is not usually considered in panel design. However, use of the full dead load in determination of the total design load limited by deflection represents consideration of creep effects.

Support Width: In developing the allowable uniformly-distributed loads provided in Tables 1 and 2, the support width was assumed to be 1.5 inches for support spacings (panel spans) less than 48-inches, and 3.5 inches for 48-inch support spacings.

Panel Edge Support and Maximum Spans: Building code provisions limit maximum spans of span-rated panels used in conventional applications. Maximum span limitations reflect consideration of PS2 performance criteria for concentrated static and impact loads as well as uniform loads. Panel edge support conditions are also considered in establishing maximum spans for roof applications.

Table 6 summarizes the maximum span and edge support provisions of the 2006 International Residential Code for One- and Two-Family Dwellings (Table R503.2.1.1(1)). Maximum spans for floor applications may be increased in some cases with the use of specific finish flooring - check governing code provisions.

TABLE 6. Building Code Maximum Span and Edge Support Provisions

Span Rating	Maximum Span, inches c-c			
	Roof		Floor	
	With Edge Support	Without Edge Support	Single Floor	Subfloor
20 oc	32	32	20	--
24 oc	48	36	24	--
Str. 1 32/16	32	28	--	16
Str. 1 40/20	40	32	--	20

Edge support may be provided by tongue-and-groove edges, edge clips (one spaced midway between supports, except two equally spaced when span is 48 inches), lumber blocking, or other approved type of edge support.

Single Floor panels are combined subfloor-underlayment panels.

Example - Use of Load-Span Tables

Roof Application: Determine allowable uniform live load and total load for 1/2" Structural 1 Sheathing 32/16 AdvanTech for application in a roof system subject to snow loads. The primary axis is applied perpendicular to roof trusses spaced 24-inches on center. The snow load duration adjustment factor of 1.15 is provided in Table 5. Assume a nominal dead load of 10 psf. As summarized in Table 7, the specified panels can support a live load of 87 psf and a total load of 116 psf.

TABLE 7. Roof application example, supports 24" o.c.

Structural 1 Sheathing 32/16, Roof Application, Snow Load Duration

Load Limited by	Table 1, 24" o.c.	Duration of Load	Adjusted Loads	Nominal Dead Load	Allowable Live Load	Allowable Total Load
L/240	87	1.0	87	n.a.	87	n.a.
L/180	116	1.0	116	10	106	116
Moment	138	1.15	159	10	149	159
Shear	249	1.15	286	10	276	286
					87	116

Allowable Live Load of 87 psf is limited by L/240 deflection criterion.

Allowable Total Load of 116 psf is limited by L/180 deflection criterion.