Technical Tip

ZIP System® Sheathing Load-Span Tables

ZIP System® Sheathing is a combination wood structural panel, water-resistive barrier and air barrier when used as wall sheathing. When installed on the roof it replaces the need for felt as the roofing underlayment. The oriented strand board (OSB) substrate satisfies the provisions of U.S. Department of Commerce Voluntary Product Standard 2 (PS2) *Performance Standard for Wood-Based Structural-Use Panels.*

Load-span tables provided in this document are applicable to ZIP System Sheathing panels manufactured by Huber Engineered Woods LLC (HEW). Design capacities recognized in the product standard, PS2, 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 ZIP System sheathing panels for specific applications.

The values given in Table 1 are maximum allowable pounds per square foot (psf) design values for ZIP System Sheathing based on deflection, bending and shear capacities. Design values may be adjusted per Tables 3 and 4 based on span and duration of loading.

Installation Requirements

Installation recommendations and details for ZIP System sheathing are posted on zipsystem.com. For specific applications, such as sheathing in high wind areas, local building code provisions may be more restrictive than the published recommendations of HEW. For applications in which multiple and conflicting installation requirements exist, the most restrictive shall apply.

TABLE 1: ZIP System Sheathing Uniform Load-Span Table (psf) [A], [B]

Span Rating	Thick-ness (inches)	Load Governed By		Strength Axis [C]											
				Perpendicular to Supports (Center-to-Center of Supports, inches)								Parallel to Supports (Center-to-Center of Supports, inches)			
				12	16	19.2	24	30	32	36	40	12	16	24
24/16	7/16	Deflection	L/720	170	64	35	17					35	13	
			L/600	204	77	42	20					42	16	
			L/480	255	96	52	25					52	20	
			L/360	339	128	70	34					70	26	
			L/240	509	191	105	51					104	39	
			L/180	679	255	140	68					139	52	
		Bending		321	180	125	80					96	54	
		Shear		286	207	169	133					286	207	
32/16 Structural 1 Rated	1/2	Deflection	L/720	250	94	51	25	12				87	33	
			L/600	300	113	62	30	15	12			105	39	
			L/480	375	141	77	37	18	15			131	49	17
			L/360	500	188	103	50	24	20			174	65	22
			L/240	750	282	154	75	37	30			261	98	33
			L/180	1,001	376	206	100	49	40			348	131	44
		Bending		371	209	145	93	59	52			206	116	41
		Shear		314	228	186	147	116	108			314	228	141
40/20 Structural 1 Rated	5/8	Deflection	L/720	489	184	101	49	24	19			195	73	
			L/600	587	221	121	59	29	23	21		234	88	
			L/480	734	276	151	73	36	29	26	14	292	110	37
			L/360	979	368	201	98	48	39	34	25	390	147	50
			L/240	1,468	552	302	146	72	58	51	37	585	220	74
			L/180	1,958	736	403	195	96	78	69	49	780	293	99
		Bending		625	352	244	156	100	88	56	45	338	190	68
		Shear		390	283	232	182	144	134	114	102	390	283	175
Continuous Spans				3-Span	3-Span	3-Span	3-Span	3-Span	3-Span	2-Span	2-Span	3-Span	3-Span	2-Span

[A] Loads in highlighted areas require panel edge support for roof applications in accordance with ZIP System Sheathing Installation Instructions. Panel edge support may be blocking, T&G edges or panel edge clips (H-Clips) that have been approved by Huber Engineered Woods to be used with ZIP System Sheathing. Panel edge clips approved to be used with ZIP System Sheathing are Simpson Strong-Tie® PSCA, PSCL and TAMLYN PCS models. Use of any other brand or model of clip will void the ZIP System warranty. See zipsystem.com for more information.

[B] Normal duration of load, dry end-use conditions, minimum panel width of 24-inches.

[C] The strength axis is parallel with the long dimension of the panel.

[D] 24/0 span rated ZIP System Sheathing shall be used in wall applications ONLY. Do not use on roofs.

How To Determine the Maximum Allowable Loading

Step 1: Find the Span Rating and Thickness of the desired product in Table 1.
Step 2: Determine which deflection criteria applies to your job.
Step 3: Select the column in Table 1 which contains your on-center support spacing.
Step 4: Compare the values for Deflection, Bending and Shear. The lowest value of the three controls and is the maximum allowable load (psf) for that panel at that support spacing.
Step 5: Check the assumptions at the bottom of Table 1 to see if any further adjustments are needed based on span or duration of load.
Step 6: Make any necessary adjustments to the maximum allowable design load.

Deflection Serviceability

The deflection criteria used to develop Table 1 are typical of the limits commonly used for most conventional design applications. Building code minimums can be found in Section R301 of the IRC and Section 1604 of the IBC. Support spans and spacings may require more restrictive

deflection limitations for the panel component. For example, panels with a 24/16 span rating installed on roof supports spaced 24-inches on-center may appear to have too much deflection with certain types of shingles despite the fact that the panels comply with conventional design criteria and building code requirements.

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

TABLE 2: Deflection Limits (inches) for Specific Deflection Criteria and Support Spacings

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

Primary and Secondary Structural Axes

The primary axis referenced in Table 1 is that with the 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. When panels are installed perpendicular to supports it is commonly referred to as being oriented in the strong direction and when installed parallel, the weak direction.

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 defection criteria. Allowable loads in Table 1 apply to the panel component only.

Panel Width: Allowable uniformly-distributed loads provided in Table 1 are applicable to panels with widths of two-feet or greater applied over either two or three continuous spans as specified. If allowed by the authority having jurisdiction, panels as narrow as one-foot in width may be used but with reduced allowable loads. Allowable loads for panels one-foot in width are fifty-percent (50%) of those in Table 1. Allowable loads for panel widths between one and two feet shall be determined by linear interpolation. For example, allowable loads for panels 18-inches wide are seventy-five percent (75%) of what is listed in Table 1. Panel widths narrower than one-foot are not recommended.

Panel Moisture Content: Allowable uniformly-distributed loads provided in Table 1 are applicable for end-use conditions in which the equilibrium moisture content of the ZIP System panels are less than 16%.

Span Conditions: The number of continuous spans assumed in developing the allowable loads in Tables 1 is provided at the bottom of each column. When span conditions differ from those assumed in Tables 1, adjustment factors provided in Table 3 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 3 adjustment factors, single span applications are generally inefficient and should be avoided whenever possible.

TABLE 3: 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 by bending and planar shear strength capacities, are based on normal duration of load. Normal duration of load represents application of full design load for a period of ten years, either continuously or cumulatively. 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 4.

TABLE 4: Duration of Load Adjustment Factors [(A)]

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

[(A)] Factors are applicable to moment and shear, not deflection.

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

Example – Using the Load Span Table

Roof Application: Determine the maximum allowable uniform roof live and total loads (psf) for 5/8" ZIP System Sheathing. The panels will be installed oriented in the strong direction relative to the roof framing which are spaced 24-inches on-centers. The roof is located in an area that is subject to snowfall in the winter. The designer has specified that the panels must not exceed a live load deflection of L/240 and a total load deflection of L/180. Assume a nominal 15 psf dead load.

Step 1 – Determine maximum loads from Table 1 based on deflection, bending and shear.
Step 2 – Multiply those loads by the applicable duration of load factor from Table 4.
Step 3 – Subtract the dead load from the adjusted loads to get allowable live load values. (Do not subtract from the live load deflection value).
Step 4 – Compare the final number and choose the lowest of the three. The lowest numbers control and those are your maximum allowable uniform live and total loads.

TABLE 5: Example Solution to Using Load Span Tables

Load Limited By	Table 1, 24" o.c. (psf)	Table 4, Load Duration Factor	Adjusted Loads (psf)	Nominal Dead Load (psf)	Allowable Live Load (psf)	Allowable Total Load (psf)
L/240	146	1.0	146	n.a.	**146**	n.a.
L/180	195	1.0	195	15	180	195
Bending	156	1.15	179	15	164	**179**
Shear	182	1.15	209	15	194	209

Allowable Live Load of **146 psf** is controlled by L/240 deflection.
Allowable Total Load of **179 psf** is controlled by Bending.

Please visit zipsystem.com or contact our technical services department at 800-933-9220 with any questions or comments.

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