

Technical Bulletin

Wall Panel Design Charts (LVL Splines) - US Model Codes

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This bulletin provides design loads for the Insulspan® Structural Insulating Panel (SIP) System when used as a component in wall systems designed in accordance with the 2012, 2009 and 2006 *International Building Code*® and *International Residential Code*®. Structural testing of the Insulspan SIP System has been completed for this application using a third party testing laboratory following the requirements of ASTM E72, **Standard Test Methods of Conducting Strength Tests of Panels for Building Construction**.

The attached **Wall Panel Design Load Charts** dated January 20, 2014 summarize design loads for Insulspan SIP wall panel applications with single LVL splines (Table W-1-LVL) and double LVL splines (Table W-2-DLVL). For each spline configuration, two transverse load tables are provided based upon top plate and bottom plate support conditions as noted in the table below.

Support Condition	Application Description	Insulspan Reference Details
End Support	SIP connection @ base for one story	100.02 to 100.07A
	SIP connection @ top for one story & SIP connection @ base for two story	200.01 to 200.02A
	SIP connection @ top for two story	300.01 to 300.03 and 300.10
Modified End Support	SIP connections as per end support application with additional connection to top & bottom plates as noted	OSB skins connected to top & bottom plates using #8 by 2-1/2" long wood screws @ 12" both sides of plates.
Face Support	SIP connection @ base for one story	100.01, 100.04, 100.06A
	SIP connection @ top for timber frame construction	300.04 to 300.07A, 300.11 and 300.11A

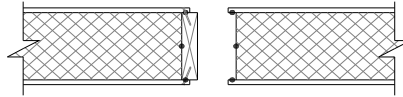
For wall panels subject to combined wind load and axial load, the following design checks are required for the required SIP thickness and span:

1. **Design wind load** is the component and cladding design value determined in accordance with the provisions of **ASCE 7**.
2. **Deflection check** is performed by comparing 70% of **design wind load** against **allowable wind load** at L/240 table value for support condition used (i.e. end support or face support condition).
3. **Shear and connection strength check** is performed by comparing 100% of **design wind load** against **allowable wind load** at L/180 for support condition used.
4. **Bending strength check** is performed using the following unity equation with 100% of **design wind load** over **allowable wind load** at L/180 for face support condition plus **design axial load** over **allowable axial load** as follows:

$$\frac{f_c \text{ or Design Axial Load}}{F_c \text{ or Allowable Axial Load}} + \frac{f_b \text{ or Design Wind Load}}{F_b \text{ or Allowable Wind Load}} \leq 1$$

For non-load bearing wall panels subject to wind load only use the load chart for applicable support condition to check 70% of **design wind load** against the L/240 **allowable wind load** and 100% of **design wind load** against L/180 **allowable wind load**.

Table W-1-LVL WALL PANEL DESIGN LOAD



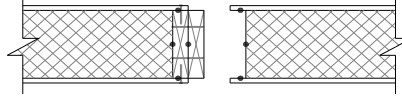
			SINGLE LVL LUMBER SPLINE @ 4'-0" On Center												
Thickness		Allowable Deflection	PANEL SPAN (feet)												
SIP	EPS		8	9	10	11	12	13	14	15	16	17	18	19	20
			ALLOWABLE WIND LOAD (psf) - END SUPPORT												
4 1/2"	3 5/8"	L/360	38	30	25	20	17	14	12	-	-	-	-	-	-
		L/240	46	41	37	30	25	21	18	-	-	-	-	-	-
		L/180	46	41	37	33	31	28	24	-	-	-	-	-	-
6 1/2"	5 5/8"	L/360	47	42	38	34	31	29	26	22	19	17	15	13	12
		L/240	47	42	38	34	31	29	27	25	24	22	21	19	17
		L/180	47	42	38	34	31	29	27	25	24	22	21	20	19
8 1/4"	7 3/8"	L/360	48	43	38	35	32	30	27	26	24	23	21	20	18
		L/240	48	43	38	35	32	30	27	26	24	23	21	20	19
		L/180	48	43	38	35	32	30	27	26	24	23	21	20	19
10 1/4"	9 3/8"	L/360	49	44	39	36	33	30	28	26	25	23	22	21	20
		L/240	49	44	39	36	33	30	28	26	25	23	22	21	20
		L/180	49	44	39	36	33	30	28	26	25	23	22	21	20
			ALLOWABLE WIND LOAD (psf) - FACE SUPPORT OR MODIFIED END SUPPORT												
4 1/2"	3 5/8"	L/360	36	30	24	20	17	14	12	-	-	-	-	-	-
		L/240	53	44	35	30	25	21	18	-	-	-	-	-	-
		L/180	70	58	47	40	33	28	24	-	-	-	-	-	-
6 1/2"	5 5/8"	L/360	84	69	54	45	37	31	26	22	19	17	15	13	12
		L/240	124	103	82	68	55	47	39	33	28	24	21	19	17
		L/180	142	120	99	87	74	63	52	44	37	32	28	25	23
8 1/4"	7 3/8"	L/360	130	107	84	70	57	48	40	34	29	26	23	20	18
		L/240	174	143	113	99	86	73	60	51	43	38	33	30	27
		L/180	174	157	140	119	98	84	71	62	54	48	43	38	34
10 1/4"	9 3/8"	L/360	183	153	123	104	85	73	62	54	46	41	36	32	28
		L/240	183	175	167	144	122	105	89	77	66	58	51	46	41
		L/180	183	175	167	156	145	129	114	99	84	74	65	58	52
			ALLOWABLE AXIAL LOAD (plf)												
4 1/2"	3 5/8"		2865	2728	2592	2455	2318	2138	1957						
6 1/2"	5 5/8"		2762	2799	2835	2872	2908	2945	2982	3018	3055	3091	3128	3164	3201
8 1/4"	7 3/8"		2672	2696	2720	2745	2769	2793	2817	2841	2865	2890	2914	2938	2962
10 1/4"	9 3/8"		2672	2696	2720	2745	2769	2793	2817	2841	2865	2890	2914	2938	2866

Notes:

Revision : January 20, 2014

1. The tabulated values are design loads based upon design requirements of International Building Code® and International Residential Code®. Transverse load values printed in **bold type** are based on panel strength rather than stiffness.
2. Insulspan SIP System must be assembled as per Insulspan Installation Guide and recommended assembly details.
3. Acceptable LVL for assembly of the Insulspan SIP System is 1.8E LVL or better.
4. Insulspan SIP skins are nailed to the LVL splines at longitudinal panel joints, top and bottom plates using minimum 8d box nails @ 6" o.c. or equivalent.
5. Insulspan SIP System core material is molded expanded polystyrene (EPS) insulation complying with the requirements of ASTM C 578, type I.
6. Insulspan SIP System exterior skins are minimum 7/16" thick structural grade oriented strand board (OSB) conforming to DOC PS2, exposure 1.

Table W-2-DLVL WALL PANEL DESIGN LOAD



			DOUBLE LVL LUMBER SPLINE @ 4'-0" On Center												
Thickness		Allowable Deflection	PANEL SPAN (feet)												
SIP	EPS		8	9	10	11	12	13	14	15	16	17	18	19	20
			ALLOWABLE WIND LOAD (psf) - END SUPPORT												
4 1/2"	3 5/8"	L/360	45	36	28	23	19	16	14	-	-	-	-	-	-
		L/240	46	41	37	33	29	25	21	-	-	-	-	-	-
		L/180	46	41	37	33	31	28	26	-	-	-	-	-	-
6 1/2"	5 5/8"	L/360	47	42	38	34	31	29	27	25	23	20	18	16	14
		L/240	47	42	38	34	31	29	27	25	24	22	21	20	19
		L/180	47	42	38	34	31	29	27	25	24	22	21	20	19
8 1/4"	7 3/8"	L/360	48	43	38	35	32	30	27	26	24	23	21	20	19
		L/240	48	43	38	35	32	30	27	26	24	23	21	20	19
		L/180	48	43	38	35	32	30	27	26	24	23	21	20	19
10 1/4"	9 3/8"	L/360	49	44	39	36	33	30	28	26	25	23	22	21	20
		L/240	49	44	39	36	33	30	28	26	25	23	22	21	20
		L/180	49	44	39	36	33	30	28	26	25	23	22	21	20
			ALLOWABLE WIND LOAD (psf) - FACE SUPPORT OR MODIFIED END SUPPORT												
4 1/2"	3 5/8"	L/360	45	36	28	23	19	16	14	-	-	-	-	-	-
		L/240	67	54	42	35	29	25	21	-	-	-	-	-	-
		L/180	88	72	56	47	39	33	28	-	-	-	-	-	-
6 1/2"	5 5/8"	L/360	104	84	65	54	43	37	31	27	23	20	18	16	14
		L/240	150	122	95	79	63	54	45	39	33	29	26	23	21
		L/180	156	140	124	103	82	70	58	51	44	39	34	30	27
8 1/4"	7 3/8"	L/360	179	144	110	92	75	64	53	46	39	34	30	26	23
		L/240	179	165	152	130	109	93	77	66	56	49	43	38	34
		L/180	179	165	152	143	135	117	100	86	73	64	56	50	44
10 1/4"	9 3/8"	L/360	185	179	174	148	122	104	87	75	64	56	49	43	38
		L/240	185	179	174	164	154	140	126	110	94	82	71	63	55
		L/180	185	179	174	164	154	147	140	131	122	107	92	82	72
			ALLOWABLE AXIAL LOAD (plf)												
4 1/2"	3 5/8"		2865	2728	2592	2455	2318	2138	1957						
6 1/2"	5 5/8"		2762	2799	2835	2872	2908	2945	2982	3018	3055	3091	3128	3164	3201
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10 1/4"	9 3/8"		2672	2696	2720	2745	2769	2793	2817	2841	2865	2890	2914	2938	2866

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