

Technical Bulletin

Wall Panel Design Charts (2x Lumber 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 *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 September 17, 2009 summarize design loads for Insulspan SIP wall panels with 2x dimensional lumber joint configurations as follows:

- Table W-1-L – Wall Panel Design Load (Single 2x Lumber Spline)
- Table W-2-DL – Wall Panel Design Load (Double 2x Lumber Spline)

For each joint configuration, two transverse load tables are provided based upon top plate and bottom plate support conditions illustrated in Insulspan Construction Assembly Details as follows:

1. **End Support** is illustrated in the following Insulspan details:
 - a. One story base connection: 100.02, 100.02A, 100.03, 100.05, 100.05A, 100.06, 100.07, 100.07A.
 - b. Lower story top connection and upper story base connection for two story construction: 200.01, 200.02, 200.02A.
 - c. Top connection: 300.01, 300.01A, 300.02, 300.02A, 300.03, 300.10.
2. **Face Support** is illustrated in the following Insulspan details:
 - a. Base connection for one story: 100.01, 100.04, 100.06A.
 - b. Top connection for timber frame application: 300.04, 300.04A, 300.05, 300.05A, 300.06, 300.06A, 300.07, 300.07A, 300.11, 300.11A.
3. **Modified End Support** is as per note 1 above with additional connection of OSB exterior skins to top and bottom plates using #8 by 2 1/2" long wood screws @ 12" on center both sides of plates.

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**.

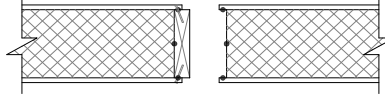
Contact:

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Table W-1-L WALL PANEL DESIGN LOAD



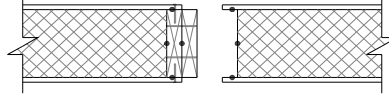
SINGLE 2 x LUMBER SPLINE @ 4'-0" On Center															
Thickness		Allowable Deflection	PANEL SPAN (feet)												
SIP	EPS		8	9	10	11	12	13	14	15	16	17	18	19	20
ALLOWABLE WIND LOAD (psf) - END SUPPORT															
4 1/2"	3 5/8"	L/360	38	30	25	20	16	14	12	-	-	-	-	-	
		L/240	46	41	37	30	25	21	17	-	-	-	-	-	
		L/180	46	41	37	33	31	28	23	-	-	-	-	-	
6 1/2"	5 5/8"	L/360	45	40	36	33	29	25	22	19	17	15	13	12	11
		L/240	45	40	36	33	30	28	26	24	23	21	20	18	16
		L/180	45	40	36	33	30	28	26	24	23	21	20	19	18
8 1/4"	7 3/8"	L/360	44	39	35	32	29	27	25	24	22	21	20	18	16
		L/240	44	39	35	32	29	27	25	24	22	21	20	19	18
		L/180	44	39	35	32	29	27	25	24	22	21	20	19	18
10 1/4"	9 3/8"	L/360	43	38	35	31	29	27	25	23	22	20	19	18	17
		L/240	43	38	35	31	29	27	25	23	22	20	19	18	17
		L/180	43	38	35	31	29	27	25	23	22	20	19	18	17
ALLOWABLE WIND LOAD (psf) - FACE SUPPORT OR MODIFIED END SUPPORT															
4 1/2"	3 5/8"	L/360	35	28	23	19	16	14	12	-	-	-	-	-	
		L/240	52	42	35	29	24	20	17	-	-	-	-	-	
		L/180	70	57	47	39	32	27	23	-	-	-	-	-	
6 1/2"	5 5/8"	L/360	84	67	54	45	37	31	26	22	19	16	14	12	11
		L/240	124	101	82	67	55	46	39	33	28	24	21	18	16
		L/180	124	110	99	87	74	62	52	44	37	32	28	24	21
8 1/4"	7 3/8"	L/360	130	104	84	69	57	48	40	34	29	25	21	19	16
		L/240	134	119	107	97	86	71	60	51	43	37	32	28	25
		L/180	134	119	107	97	89	78	67	58	51	45	41	36	33
10 1/4"	9 3/8"	L/360	147	131	118	100	85	72	61	53	45	39	34	30	27
		L/240	147	131	118	107	98	90	78	68	59	53	47	42	38
		L/180	147	131	118	107	98	90	78	68	59	53	47	42	38
ALLOWABLE AXIAL LOAD (plf)															
4 1/2"	3 5/8"		2321	2260	2200	2139	2078	2018	1957						
6 1/2"	5 5/8"		2508	2566	2624	2681	2739	2797	2855	2912	2970	3028	3086	3143	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

Revision : September 17, 2009

Notes:

- The tabulated values are design loads based upon design requirements of 2006 International Building Code® and International Residential Code®. Transverse load values printed in bold type are based on panel strength rather than stiffness.
- Insulspan SIP System must be assembled as per Insulspan Installation Guide and recommended assembly details.
- Acceptable 2x4 and 2x6 lumber for assembly of the Insulspan SIP System is SPF #2 or better; acceptable 2x8 and 2x10 lumber is Hem Fir #2 or better.
- Insulspan SIP skins are nailed to the lumber splines at longitudinal panel joints, top and bottom plates using minimum 8d box nails @ 6" o.c. or equivalent.
- Insulspan SIP System core material is molded expanded polystyrene (EPS) insulation complying with the requirements of ASTM C 578, type I.
- 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-DL WALL PANEL DESIGN LOAD



DOUBLE 2 x 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	40	32	26	22	18	15	13	-	-	-	-	-	
		L/240	46	41	37	33	27	23	20	-	-	-	-	-	
		L/180	46	41	37	33	31	28	26	-	-	-	-	-	
6 1/2"	5 5/8"	L/360	47	42	38	34	31	29	27	24	21	18	16	14	13
		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	40	33	26	22	18	15	13	-	-	-	-	-	
		L/240	59	49	39	33	27	23	20	-	-	-	-	-	
		L/180	78	65	52	44	36	31	26	-	-	-	-	-	
6 1/2"	5 5/8"	L/360	84	69	55	46	38	32	27	24	21	18	16	14	13
		L/240	124	103	82	69	57	49	41	36	31	27	24	21	19
		L/180	124	111	99	87	74	63	52	47	41	36	32	29	26
8 1/4"	7 3/8"	L/360	142	115	89	75	62	53	45	39	34	30	26	23	21
		L/240	148	129	111	100	90	78	66	57	49	44	39	35	31
		L/180	148	129	111	100	90	82	75	69	63	57	51	46	41
10 1/4"	9 3/8"	L/360	185	160	136	116	97	83	70	61	53	47	41	37	33
		L/240	185	160	136	120	105	96	88	81	75	69	64	56	48
		L/180	185	160	136	120	105	96	88	81	75	69	64	59	55
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

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