

# Technical Bulletin

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

Page 1 of 3

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 Laminated Veneer Lumber (LVL) joint configurations as noted.

- Table W-1-LVL – Wall Panel Design Load (Single LVL Spline)
- Table W-2-LVL – Wall Panel Design Load (Double LVL 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**.

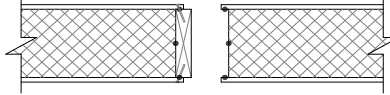
### Contact:

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**Table W-1-LVL WALL PANEL DESIGN LOAD**



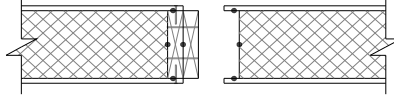
SINGLE LVL LUMBER SPLINE @ 4'-0" On Center														
Thickness		Allowable Deflection	PANEL SPAN (feet)											
SIP	EPS		8	9	10	11	12	13	14	15	16	17	18	19
<b>ALLOWABLE WIND LOAD (psf) - END SUPPORT</b>														
4 1/2"	3 5/8"	L/360	38	30	25	20	17	14	12	-	-	-	-	-
		L/240	<b>46</b>	<b>41</b>	<b>37</b>	30	25	21	18	-	-	-	-	-
		L/180	<b>46</b>	<b>41</b>	<b>37</b>	<b>33</b>	<b>31</b>	<b>28</b>	24	-	-	-	-	-
6 1/2"	5 5/8"	L/360	<b>47</b>	<b>42</b>	<b>38</b>	<b>34</b>	<b>31</b>	<b>29</b>	26	22	19	17	15	13
		L/240	<b>47</b>	<b>42</b>	<b>38</b>	<b>34</b>	<b>31</b>	<b>29</b>	<b>27</b>	<b>25</b>	<b>24</b>	<b>22</b>	<b>21</b>	19
		L/180	<b>47</b>	<b>42</b>	<b>38</b>	<b>34</b>	<b>31</b>	<b>29</b>	<b>27</b>	<b>25</b>	<b>24</b>	<b>22</b>	<b>21</b>	<b>20</b>
8 1/4"	7 3/8"	L/360	<b>48</b>	<b>43</b>	<b>38</b>	<b>35</b>	<b>32</b>	<b>30</b>	<b>27</b>	<b>26</b>	<b>24</b>	<b>23</b>	<b>21</b>	<b>20</b>
		L/240	<b>48</b>	<b>43</b>	<b>38</b>	<b>35</b>	<b>32</b>	<b>30</b>	<b>27</b>	<b>26</b>	<b>24</b>	<b>23</b>	<b>21</b>	<b>20</b>
		L/180	<b>48</b>	<b>43</b>	<b>38</b>	<b>35</b>	<b>32</b>	<b>30</b>	<b>27</b>	<b>26</b>	<b>24</b>	<b>23</b>	<b>21</b>	<b>20</b>
10 1/4"	9 3/8"	L/360	<b>49</b>	<b>44</b>	<b>39</b>	<b>36</b>	<b>33</b>	<b>30</b>	<b>28</b>	<b>26</b>	<b>25</b>	<b>23</b>	<b>22</b>	<b>21</b>
		L/240	<b>49</b>	<b>44</b>	<b>39</b>	<b>36</b>	<b>33</b>	<b>30</b>	<b>28</b>	<b>26</b>	<b>25</b>	<b>23</b>	<b>22</b>	<b>21</b>
		L/180	<b>49</b>	<b>44</b>	<b>39</b>	<b>36</b>	<b>33</b>	<b>30</b>	<b>28</b>	<b>26</b>	<b>25</b>	<b>23</b>	<b>22</b>	<b>21</b>
<b>ALLOWABLE WIND LOAD (psf) - FACE SUPPORT OR MODIFIED END SUPPORT</b>														
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
		L/240	124	103	82	68	55	47	39	33	28	24	21	19
		L/180	142	120	99	87	74	63	52	44	37	32	28	25
8 1/4"	7 3/8"	L/360	130	107	84	70	57	48	40	34	29	26	23	20
		L/240	<b>174</b>	143	113	99	86	73	60	51	43	38	33	30
		L/180	<b>174</b>	<b>157</b>	<b>140</b>	119	98	84	71	62	54	48	43	38
10 1/4"	9 3/8"	L/360	<b>183</b>	153	123	104	85	73	62	54	46	41	36	32
		L/240	<b>183</b>	<b>175</b>	<b>167</b>	144	122	105	89	77	66	58	51	46
		L/180	<b>183</b>	<b>175</b>	<b>167</b>	<b>156</b>	<b>145</b>	129	114	99	84	74	65	58
<b>ALLOWABLE AXIAL LOAD (plf)</b>														
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												

Revision : September 17, 2009

**Notes:**

1. The tabulated values are design loads based upon design requirements of 2006 International Building Code<sup>®</sup> and International Residential Code<sup>®</sup>. 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
			<b>ALLOWABLE WIND LOAD (psf) - END SUPPORT</b>												
4 1/2"	3 5/8"	L/360	45	36	28	23	19	16	14	-	-	-	-	-	-
		L/240	<b>46</b>	<b>41</b>	<b>37</b>	<b>33</b>	29	25	21	-	-	-	-	-	-
		L/180	<b>46</b>	<b>41</b>	<b>37</b>	<b>33</b>	<b>31</b>	<b>28</b>	26	-	-	-	-	-	-
6 1/2"	5 5/8"	L/360	<b>47</b>	<b>42</b>	<b>38</b>	<b>34</b>	<b>31</b>	<b>29</b>	<b>27</b>	<b>25</b>	23	20	18	16	14
		L/240	<b>47</b>	<b>42</b>	<b>38</b>	<b>34</b>	<b>31</b>	<b>29</b>	<b>27</b>	<b>25</b>	<b>24</b>	<b>22</b>	<b>21</b>	<b>20</b>	<b>19</b>
		L/180	<b>47</b>	<b>42</b>	<b>38</b>	<b>34</b>	<b>31</b>	<b>29</b>	<b>27</b>	<b>25</b>	<b>24</b>	<b>22</b>	<b>21</b>	<b>20</b>	<b>19</b>
8 1/4"	7 3/8"	L/360	<b>48</b>	<b>43</b>	<b>38</b>	<b>35</b>	<b>32</b>	<b>30</b>	<b>27</b>	<b>26</b>	<b>24</b>	<b>23</b>	<b>21</b>	<b>20</b>	<b>19</b>
		L/240	<b>48</b>	<b>43</b>	<b>38</b>	<b>35</b>	<b>32</b>	<b>30</b>	<b>27</b>	<b>26</b>	<b>24</b>	<b>23</b>	<b>21</b>	<b>20</b>	<b>19</b>
		L/180	<b>48</b>	<b>43</b>	<b>38</b>	<b>35</b>	<b>32</b>	<b>30</b>	<b>27</b>	<b>26</b>	<b>24</b>	<b>23</b>	<b>21</b>	<b>20</b>	<b>19</b>
10 1/4"	9 3/8"	L/360	<b>49</b>	<b>44</b>	<b>39</b>	<b>36</b>	<b>33</b>	<b>30</b>	<b>28</b>	<b>26</b>	<b>25</b>	<b>23</b>	<b>22</b>	<b>21</b>	<b>20</b>
		L/240	<b>49</b>	<b>44</b>	<b>39</b>	<b>36</b>	<b>33</b>	<b>30</b>	<b>28</b>	<b>26</b>	<b>25</b>	<b>23</b>	<b>22</b>	<b>21</b>	<b>20</b>
		L/180	<b>49</b>	<b>44</b>	<b>39</b>	<b>36</b>	<b>33</b>	<b>30</b>	<b>28</b>	<b>26</b>	<b>25</b>	<b>23</b>	<b>22</b>	<b>21</b>	<b>20</b>
			<b>ALLOWABLE WIND LOAD (psf) - FACE SUPPORT OR MODIFIED END SUPPORT</b>												
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	<b>156</b>	140	124	103	82	70	58	51	44	39	34	30	27
8 1/4"	7 3/8"	L/360	<b>179</b>	144	110	92	75	64	53	46	39	34	30	26	23
		L/240	<b>179</b>	<b>165</b>	<b>152</b>	130	109	93	77	66	56	49	43	38	34
		L/180	<b>179</b>	<b>165</b>	<b>152</b>	<b>143</b>	<b>135</b>	117	100	86	73	64	56	50	44
10 1/4"	9 3/8"	L/360	<b>185</b>	<b>179</b>	<b>174</b>	148	122	104	87	75	64	56	49	43	38
		L/240	<b>185</b>	<b>179</b>	<b>174</b>	<b>164</b>	<b>154</b>	140	126	110	94	82	71	63	55
		L/180	<b>185</b>	<b>179</b>	<b>174</b>	<b>164</b>	<b>154</b>	<b>147</b>	<b>140</b>	131	122	107	92	82	72
			<b>ALLOWABLE AXIAL LOAD (plf)</b>												
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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