1. SUBJECT
1.1 Structural Insulated Panels. Wall and Roof Panels 8-ft to 24-ft long, 4-5/8-in. to 15-in. thick.

2. SCOPE
NTA, Inc. has evaluated the above product(s) for compliance with the applicable sections of the following codes:
2.1 2012, 2015 International Building Code (IBC)
2.2 2012, 2015 International Residential Code (IRC)

3. USES
3.1 General. Structural Insulated Panels are used as structural insulated roof and wall panels capable of resisting transverse, axial and in-plane shear loads.

3.2 Construction Types. Structural Insulated Panels shall be considered combustible building elements when determining the Type of Construction in accordance with IBC Chapter 6. (IM 014 NACU1)

3.3 Fire Resistant Assemblies. Structural Insulated Panels shall not be used as part of a fire-rated assembly unless suitable evidence and details are submitted and approved by the authority having jurisdiction. (IM 014 ACU14)

4. DESCRIPTION
4.1 General. Structural Insulated Panels are factory-assembled, engineered-wood-faced, structural insulated panels (SIPs) with an expanded polystyrene (EPS) foam core. The product is intended for use as load-bearing or non-load-bearing wall and roof panels. Structural Insulated Panels are available in 4-5/8-in. through 15-in. overall thicknesses and are custom-made to the specifications for each use. The maximum product size is 8-ft wide and up to 24-ft in length.

4.2 Materials.
4.2.1 Facing. The facing consists of two single-ply oriented strand board (OSB) facings a minimum of 7/16-in. thick conforming to the properties shown in Table 3. Additionally, facing materials shall conform to DOC PS 2, Exposure 1, Rated Sheathing with a span index of 24/16. Panels may be manufactured with the facing strength axis oriented in either direction with respect to the direction of product bending provided the appropriate design values are used. (IM 014 ACU4)

4.2.2 Core. The core material is EPS foam plastic insulation conforming to ASTM C578. Type I. The foam core, up to 4-in. thickness, has a flame spread rating not exceeding 75 and a smoke-developed rating not exceeding 450 when tested in accordance with ASTM E84. Cores used in structural insulated panels up to 15-in thick, comply with IBC Section 2603.3 Exception 4.

4.2.3 Adhesive. Facing materials are adhered to the core material using a thin-film adhesive. The adhesive is applied during the lamination process in accordance with the in-plant quality system documentation.

4.2.4 Material Sources. The facing, core and adhesive used in the construction of Structural Insulated Panels must be materials from approved sources as identified in the in-plant quality system documentation. A list of material suppliers is provided in Table 17.

4.2.5 Splines. Structural Insulated Panels are interconnected with surface splines, block splines, or I-joists (Figure 1). Connections using dimensional lumber splines or engineered structural splines not specifically addressed in this report must be designed in accordance with accepted engineering practice to meet applicable code requirements. (IM 014 ACU20)

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4.2.5.1 Surface Splines. Surface splines (Figure 1) consist of 3-in. wide by 7/16-in. thick or thicker OSB. At each panel joint, one surface spline is inserted into each of two tight-fitting slots in the core. The slots in the core are located just inside the facing.

4.2.5.2 Block Splines. Block splines (Figure 1) are manufactured in the same manner as the SIP except with an overall thickness that is 1-in. less than the overall thickness of the panels to be joined.

4.2.5.3 I-Joist Splines. Structural capacities for prefabricated wood I-joists splines (Figure 1) shall be established and monitored in accordance with ASTM D5055 with properties equal to or greater than those shown in Table 4. The overall depth of the joist is 1-in. less than the overall thickness of the panels to be joined.

5. DESIGN
5.1 Overall Structural System. The scope of this report is limited to the evaluation of the SIP component. Panel connections and other details related to incorporation of the product into the overall structural system of a building are beyond the scope of this report. (IM 014 NACU3)

5.2 Design Approval. Where required by the authority having jurisdiction, structures using Structural Insulated Panels shall be designed by a registered design professional. Construction documents, including engineering calculations and drawings providing floor plans, window details, door details and connector details, shall be submitted to the code official when application is made for a permit. The individual preparing such documents shall possess the necessary qualifications as required by the applicable code and the professional registration laws of the state where the construction is undertaken. Approved construction documents shall be available at all times on the jobsite during installation. (IM 014 NACU4)

5.3 Design Loads. Design loads to be resisted by the product shall be as required under the applicable code. Loads on the panels shall not exceed the loads noted in this report. Where loading conditions result in superimposed stresses, the sum of the ratio of actual loads over allowable loads shall not exceed one. Calculations demonstrating that the loads applied are less than the allowable loads described in this report shall be submitted to the code official for approval. (IM 014 NACU5)

5.4 Allowable Loads. Allowable axial, transverse and in-plane shear loads may be calculated using the panel properties provided in Tables 1, 2 and 4 or selected from Tables 5 through 15. For loading conditions not specifically addressed herein, structural members designed in accordance with accepted engineering practice shall be provided to meet applicable code requirements.

5.5 Concentrated Loads. Axial loads shall be applied to the product through continuous members such as structural insulated roof or floor panels or repetitive members such as joists, trusses or rafter detail. Details for repetitive members spaced at regular intervals of 24-in. on center or less. Such members shall be fastened to a rim board or similar member to distribute the load to the product. For other loading conditions, reinforcement shall be provided. This reinforcement shall be designed in accordance with accepted engineering practice. (IM 014 ACU12)

5.6 Eccentric and Side Loads. Axial loads shall be applied concentrically to the top of the product. Loads shall not be applied eccentrically or through framing attached to one side of the panel (such as balloon framing) except where additional engineering documentation is provided. (IM 014 ACU13)

5.7 Openings. Openings in panels are permitted when the header depth is at least 12-in., and the interior of the opening is reinforced with minimum 0.42 SG lumber graded #2 around the perimeter, secured in place with not less than 0.131-in. x 2-1/2-in. nails, spaced 6-in. on center. The panels are not used to resist in-plane shear loads. SIP splines are not permitted within 6-in. of the end of the header and are not permitted within the header. Allowable loads for maximum header spans of 36-in. may be selected from Tables 10 and 12. Allowable loads for maximum header spans of 72-in. may be selected from Tables 11 and 13. Openings in panels beyond the scope of this report shall be reinforced with wood or steel designed in accordance with accepted engineering practice to resist all loads applied to the opening as required by the adopted code. Details for door and window openings shall be provided to clarify the manner of supporting axial, transverse and/or in-plane shear loads at openings. Such details shall be subject to approval by the local authority having jurisdiction. (IM 014 ACU8)

5.8 In-Plane Shear Design. Shear walls utilizing block or surface splines shall be sized to resist all code required wind and seismic loads without exceeding the allowable loads provided herein. Shear wall chords, hold-downs and connections to transfer shear forces between the wall and surrounding structure shall be designed in accordance with accepted engineering practice. (IM 014 ACU17) Allowable strengths for SIP shear walls with structural splines along each panel edge shall be designed in accordance with accepted engineering practice and are subject to the limitations for wood sheathed shear walls.

5.8.1 Seismic Design Categories A, B, and C. Use of the shear wall configurations in Table 14 is limited to structures in Seismic Design Categories A, B and C. Where SIPs are used to resist seismic forces the following factors...
shall be used for design: Response Modification Coefficient, $R = 2.0$; System Overstrength Factor, $Q_0 = 2.5$; Deflection Amplification Factor, $C_d = 2.0$. The maximum panel height-to-width ratio shall be 2:1. (IM 014 ACU17)

5.8.2 Seismic Design Categories D, E, and F. Use of the shear wall configurations in Table 15 are permitted in Seismic Design Categories D, E and F. Such walls shall be designed using the seismic design coefficients and limitations provided in ASCE 7-10 for light-framed walls sheathed with wood structural panels rated for shear resistance (SFRS A13) and the following factors for design: Response Modification Coefficient, $R = 6.5$; System Overstrength Factor, $Q_0 = 3.0$; Deflection Amplification Factor, $C_d = 4.0$. (IM 014 ACU16) The maximum panel height-to-width ratio shall be 1:1. (IM 014 ACU17)

5.8.3 Adhesives and Sealants. Adhesives and sealants shall not be applied to wood-to-wood or spline-to-facing interfaces in shear walls in Seismic Design Categories D, E and F. (IM 014 NACU10) Adhesives and sealants may be applied to wood-to-foam or facing-to-foam interfaces. Flexible SIP tape may be applied over panel joints.

5.9 Horizontal Diaphragms. Horizontal diaphragms shall be sized to resist all code required wind and seismic loads without exceeding the allowable loads provided herein. Diaphragm chords and connections to transfer shear forces between the diaphragm and surrounding structure shall be designed in accordance with accepted engineering practice. The maximum diaphragm length-to-width ratio shall not exceed 3:1. (IM 014 ACU18)

5.10 Combined Loads. Panels subjected to any combination of transverse, axial or in-plane shear loads shall be analyzed utilizing a straight line interaction in accordance with Structural Insulated Panel (SIP) Engineering Design Guide (SIP-EDG01-19).

5.11 Panel Reinforcements. Allowable transverse loads for panels reinforced with I-joists meeting the minimum properties shown in Table 4 are presented in Table 8. Panels reinforced with I-joists have not been evaluated for use in wall applications. Panels reinforced with I-joist splines may be designed in accordance with Structural Insulated Panel (SIP) Engineering Design Guide (SIP-EDG01-19).

6. INSTALLATION

6.1 General. Structural Insulated Panels shall be fabricated, identified and erected in accordance with this report, the approved construction documents and the applicable codes. In the event of a conflict between the manufacturer’s published installation instructions and this report, this report shall govern. Approved construction documents shall be available at all times on the jobsite during installation. (IM 014 NACU7)

6.2 Splines. Structural Insulated Panels are interconnected at the panel edges through the use of a spline. The spline type may be of any configuration listed in Section 4.2.5 as required by the specific design. The spline shall be secured in place with not less than 0.131-in. x 2-1/2-in. nails, spaced 6-in. on center on both sides of the panel, or an approved equivalent fastener. All joints shall be sealed in accordance with the SIP manufacturer’s installation instructions. Alternate spline connections may be required for panels subjected to in-plane shear forces. Such panels shall be interconnected exactly as required in Tables 14 through 16 or as directed by the designer.

6.3 Plates. The top and bottom plates of the panels shall be dimensional or engineered lumber sized to match the core thickness of the panel. The plates shall be secured using not less than 0.131-in. x 2-1/2-in. nails, spaced 6-in. on center on both sides of the panel, or an approved equivalent fastener. A second top plate of 1-1/8-in. minimum thickness dimensional or engineered lumber with a specific gravity of 0.42 that is cut to the full thickness of the panel shall be secured to the first top plate using 0.131-in. x 3-in. nails or an approved equivalent fastener.

6.4 Cutting and Notching. No field cutting or routing of the panels shall be permitted except as shown on approved construction documents. (IM 014 NACU6)

6.5 Protection from Decay. SIPs that rest on exterior foundation walls shall not be located within 8-in. of exposed earth. SIPs supported by concrete or masonry that is in direct contact with earth shall be protected from the concrete or masonry by a moisture barrier. (IM 014 ACU6)

6.6 Protection from Termites. In areas subject to damage from termites, SIPs shall be protected from termites using an approved method. Panels shall not be installed below grade or in contact with earth. (IM 014 ACU7) (IM 014 ACU22)

6.7 Heat-Producing Fixtures. Heat-producing fixtures shall not be installed in the panels unless protected by a method approved by the code official or documented in test reports. This limitation shall not be interpreted to prohibit heat-producing elements with suitable protection. (IM 014 NACU9)

6.8 Plumbing Installation Restrictions. Plumbing and waste lines may extend at right angles through the wall panels but are not permitted vertically within the core. Lines shall not interrupt splines or panel plates unless approved by a registered design professional.
6.9 Voids and Holes

6.9.1 Voids in Core. In lieu of openings designed in accordance with section 5.7, the following voids are permitted. Voids may be provided in the panel core during fabrication at predetermined locations only. Voids parallel to the panel span shall be limited to a single 1-in. maximum diameter hole. Such voids shall be spaced a minimum of 4-ft on center measured perpendicular to the panel span. Two 1/2-in. diameter holes may be substituted for the single 1-in. hole provided they are maintained parallel and within 2-in. of each other. Voids perpendicular to the panel span shall be limited to a single 1-in. maximum diameter hole placed not closer than 16-in. from the support. Additional voids in the same direction shall be spaced not less than 28-in. on center.

6.9.2 Holes in Panels. Holes may be placed in panels during fabrication at predetermined locations only. Holes shall be limited to 4-in. by 4-in. square. The minimum distance between holes shall not be less than 4-ft on center measured perpendicular to the panel span and 24-in. on center measured parallel to the panel span. Not more than three holes shall be permitted in a single line parallel to the panel span. The holes may intersect voids permitted elsewhere in this report.

6.10 Panel Cladding

6.10.1 Roof Covering. The roof covering, underlayment and flashing shall comply with the applicable codes. All roofing materials must be installed in accordance with the manufacturer’s installation instructions. The use of roof coverings requiring the application of heat during installation shall be reviewed and approved by a registered design professional.

6.10.2 Exterior Wall Covering. Panels shall be covered on the exterior by a water-resistive barrier as required by the applicable code. The water-resistive barrier shall be attached with flashing in such a manner as to provide a continuous water-resistive barrier behind the exterior wall veneer.

6.11 Interior Finish. The SIP foam plastic core shall be separated from the interior of the building by an approved thermal barrier of 1/2-in. gypsum wallboard or equivalent thermal barrier where required by IBC Section 2603.4.

7. CONDITIONS OF USE

Structural Insulated Panels as described in this report comply with the codes listed in Section 2 above, subject to the following conditions:

7.1 Installation complies with this report and the approved construction documents.
9. FINDINGS
All products referenced herein are manufactured under an in-plant Quality Assurance program to ensure that the production quality meets or exceeds the requirements of the codes noted herein and the criteria as established by NTA, Inc. Furthermore, product must comply with the conditions of this report.

This report is subject to annual review.

10. IDENTIFICATION
Each eligible product shall be permanently marked to provide the following information:
10.1 The NTA, Inc. certification mark, shown below.
10.2 NTA's NER No. NER-1035 or ENR012012-21
10.3 The name of the report holder
10.4 Identifier for production facility
10.5 Project or batch number, date and shift of manufacture or other means of tracing product to quality documentation
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### Table 1: Basic Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Weak-Axis Bending</th>
<th>Strong-Axis Bending</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allowable Tensile Stress, $F_t$ (psi)</td>
<td>245</td>
<td>495</td>
</tr>
<tr>
<td>Allowable Compressive Stress, $F_c$ (psi)</td>
<td>340</td>
<td>580</td>
</tr>
<tr>
<td>Elastic Modulus (Bending), $E_b$ (psi)</td>
<td>738900</td>
<td>658800</td>
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<tr>
<td>Shear Modulus, $G$ (psi)</td>
<td>270</td>
<td>405</td>
</tr>
<tr>
<td>Allowable Core Shear Stress, $F_v$ (psi)</td>
<td>4.5</td>
<td>5.0</td>
</tr>
<tr>
<td>Core Compressive Modulus, $E_c$ (psi)</td>
<td>360</td>
<td>360</td>
</tr>
<tr>
<td>Reference Depth, $h_o$ (in.)</td>
<td>4.625</td>
<td>4.625</td>
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<tr>
<td>Shear Depth Factor Exponent, $m$</td>
<td>0.84</td>
<td>0.86</td>
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<tr>
<td>Face Peeling Factor, $C_p$</td>
<td>0.4</td>
<td>0.4</td>
</tr>
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</table>

1 All properties are based on a minimum panel width of 24-in.

2 Refer to Structural Insulated Panel (SIP) Engineering Design Guide (SIP-EDG01-19) for details on engineered design using basic panel properties.

### Table 2: Section Properties

<table>
<thead>
<tr>
<th>Panel Thickness, $h$ (in.)</th>
<th>Core Thickness, $c$ (in.)</th>
<th>Dead Weight, $w_d$ (psf)</th>
<th>Facing Area, $A_f$ (in.$^2$/ft)</th>
<th>Shear Area, $A_v$ (in.$^2$/ft)</th>
<th>Moment of Inertia, $I$ (in.$^4$/ft)</th>
<th>Section Modulus, $S$ (in.$^3$/ft)</th>
<th>Radius of Gyration, $r$ (in.)</th>
<th>Centroid -to- Facing Dist., $y_c$ (in.)</th>
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</thead>
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<tr>
<td>4.625</td>
<td>3.75</td>
<td>3.2</td>
<td>10.5</td>
<td>50.3</td>
<td>46.0</td>
<td>19.9</td>
<td>2.09</td>
<td>2.31</td>
</tr>
<tr>
<td>6.50</td>
<td>5.625</td>
<td>3.3</td>
<td>10.5</td>
<td>72.8</td>
<td>96.5</td>
<td>29.7</td>
<td>3.03</td>
<td>3.25</td>
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<td>8.25</td>
<td>7.375</td>
<td>3.5</td>
<td>10.5</td>
<td>93.8</td>
<td>160.2</td>
<td>38.8</td>
<td>3.91</td>
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<td>10.25</td>
<td>9.375</td>
<td>3.6</td>
<td>10.5</td>
<td>117.8</td>
<td>252.7</td>
<td>49.3</td>
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<tr>
<td>12.25</td>
<td>11.375</td>
<td>3.8</td>
<td>10.5</td>
<td>141.8</td>
<td>366.3</td>
<td>59.8</td>
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<tr>
<td>15</td>
<td>14.125</td>
<td>4.0</td>
<td>10.5</td>
<td>174.8</td>
<td>556.7</td>
<td>74.2</td>
<td>--</td>
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</tr>
</tbody>
</table>

### Table 3: OSB Facing Minimum Properties

<table>
<thead>
<tr>
<th>Thickness (in.)</th>
<th>Flatwise Stiffness (lb-in.$^2$/ft)</th>
<th>Flatwise Strength (lb-in./ft)</th>
<th>Tension (lb/ft)</th>
<th>Density (pcf)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Along</td>
<td>Across</td>
<td>Along</td>
<td>Across</td>
</tr>
<tr>
<td>7/16</td>
<td>54,700</td>
<td>27,100</td>
<td>950</td>
<td>870</td>
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</table>

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### Table 4: Minimum I-Joist Properties for Use as Reinforcements

<table>
<thead>
<tr>
<th>Depth (in.)</th>
<th>Bending Stiffness EI (lb-in.² x 10⁶)</th>
<th>Moment Capacity M (lb-ft)</th>
<th>Shear Capacity V (lb)</th>
<th>Coefficient of Shear Deflection K (lb x 10⁶)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.25</td>
<td>185</td>
<td>2715</td>
<td>1155</td>
<td>4.81</td>
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<td>11.25</td>
<td>296</td>
<td>3410</td>
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<tr>
<td>14</td>
<td>482</td>
<td>4270</td>
<td>1710</td>
<td>7.28</td>
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</table>

1 Properties are based on certification in accordance with ASTM D5055 or equivalent.

2 Refer to Structural Insulated Panel (SIP) Engineering Design Guide (SIP-EDG01-19) for details on engineered design of reinforced panels using I-joists and basic panel properties.

### Figure 1: SIP Spline Types

- Surface Spline
- Block Spline
- I-Joist Spline
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Table 5: Allowable Roof Uniform Transverse Loads (psf)\(^1,4\)

<table>
<thead>
<tr>
<th>Panel Length (ft)</th>
<th>4-5/8-in. SIP thickness</th>
<th>6-1/2-in. SIP thickness</th>
<th>8-1/4-in. SIP thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deflection Limit(^2)</td>
<td>Deflection Limit(^2)</td>
<td>Deflection Limit(^2)</td>
</tr>
<tr>
<td>L/180 L/240 L/360</td>
<td>L/180 L/240 L/360</td>
<td>L/180 L/240 L/360</td>
<td>L/180 L/240 L/360</td>
</tr>
<tr>
<td>8 WAB(^3)</td>
<td>50  40  27</td>
<td>73  64  43</td>
<td>80  80  58</td>
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<tr>
<td>8</td>
<td>68  51  34</td>
<td>82  82  56</td>
<td>90  90  78</td>
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<td>10</td>
<td>45  33  22</td>
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See Table 6 for notes.
Table 6: Allowable Roof Uniform Transverse Loads (psf)\(^1,4\)

<table>
<thead>
<tr>
<th>Panel Length (ft)</th>
<th>10-1/4-in. SIP thickness</th>
<th>12-1/4-in. SIP thickness</th>
<th>15-in. SIP thickness</th>
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<tbody>
<tr>
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<td>Deflection Limit(^2)</td>
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<td>29 23 15</td>
<td>31 31 21</td>
<td>33 33 29</td>
</tr>
<tr>
<td>24</td>
<td>25 19 12</td>
<td>28 26 17</td>
<td>29 29 24</td>
</tr>
</tbody>
</table>

\(^1\) Table values assume a simply supported panel with 1-1/2-in. of continuous bearing on facing at supports (C\(_p\) = 1.0) with solid wood plates at bearing locations. Values do not include the dead weight of the panel.

\(^2\) Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of adopted building code. Values are based on loads of short duration only and do not consider the effects of creep.

\(^3\) Tabulated values are based on the strong-axis of the facing material oriented parallel to the direction of panel bending. WAB indicates weak-axis bending of the facing material; the strong-axis of the facing material is oriented perpendicular to the direction of panel bending.

\(^4\) Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.
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Table 7: Allowable Wall Uniform Transverse Loads (psf)\(^1,4\)

<table>
<thead>
<tr>
<th>Panel Length (ft)</th>
<th>4-5/8-in. SIP thickness</th>
<th>6-1/2-in. SIP thickness</th>
<th>8-1/4-in. SIP thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L/180</td>
<td>L/240</td>
<td>L/360</td>
</tr>
<tr>
<td>8 WAB(^3)</td>
<td>22</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>8</td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>10</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>12</td>
<td>16</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td>14</td>
<td>--</td>
</tr>
<tr>
<td>16</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>18</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>20</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

1 Table values represent wall panel capacities (4-5/8-in., 6-1/2-in. and 8-1/4-in. thickness panels only) utilizing a zero bearing configuration (Figure 2). Allowable loads are determined based on \(C_P\) reported in Table 1.
2 Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of adopted building code. Values are based on loads of short duration only and do not consider the effects of creep.
3 Tabulated values are based on the strong-axis of the facing material oriented parallel to the direction of panel bending. WAB indicates weak-axis bending of the facing material; the strong-axis of the facing material is oriented perpendicular to the direction of panel bending.
4 Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.
**Table 8: Allowable Uniform Transverse Loads with I-Joist Reinforcements (psf) 

<table>
<thead>
<tr>
<th>Panel Length (ft)</th>
<th>10-1/4-in. SIP thickness</th>
<th>12-1/4-in. SIP thickness</th>
<th>15-in. SIP thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L/180</td>
<td>L/240</td>
<td>L/360</td>
</tr>
<tr>
<td>8</td>
<td>115</td>
<td>115</td>
<td>115</td>
</tr>
<tr>
<td>10</td>
<td>92</td>
<td>92</td>
<td>92</td>
</tr>
<tr>
<td>12</td>
<td>76</td>
<td>76</td>
<td>76</td>
</tr>
<tr>
<td>14</td>
<td>65</td>
<td>65</td>
<td>65</td>
</tr>
<tr>
<td>16</td>
<td>57</td>
<td>57</td>
<td>57</td>
</tr>
<tr>
<td>18</td>
<td>51</td>
<td>51</td>
<td>44</td>
</tr>
<tr>
<td>20</td>
<td>46</td>
<td>46</td>
<td>33</td>
</tr>
<tr>
<td>22</td>
<td>41</td>
<td>38</td>
<td>25</td>
</tr>
<tr>
<td>24</td>
<td>36</td>
<td>30</td>
<td>20</td>
</tr>
</tbody>
</table>

1 Table values are calculated based on the properties provided in Tables 1, 2 and 4 using Structural Insulated Panel (SIP) Engineering Design Guide (SIP-EDG01-19). Values assume a simply supported panel with 1-1/2-in. of continuous bearing on facing at supports. Values do not include the dead weight of the panel.
2 Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of adopted building code. Values are based on loads of short duration only and do not consider the effects of creep.
3 Tabulated values are based on the strong-axis of the facing material oriented parallel to the direction of panel bending.
4 Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.

**Table 9: Allowable Axial Loads (plf) 

<table>
<thead>
<tr>
<th>Lateral Brace Spacing (ft)</th>
<th>Panel Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4-5/8-in.</td>
</tr>
<tr>
<td>8 WAB</td>
<td>2320</td>
</tr>
<tr>
<td>8</td>
<td>3630</td>
</tr>
<tr>
<td>10</td>
<td>3260</td>
</tr>
<tr>
<td>12</td>
<td>2810</td>
</tr>
<tr>
<td>14</td>
<td>--</td>
</tr>
<tr>
<td>16</td>
<td>--</td>
</tr>
<tr>
<td>18</td>
<td>--</td>
</tr>
<tr>
<td>20</td>
<td>--</td>
</tr>
</tbody>
</table>

1 Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.
2 All values are for normal duration and may not be increased for other durations.
3 Axial loads shall be applied concentrically to the top of the panel through repetitive members spaced not more than 24-in. on center. Such members shall be fastened to a rim board or similar member to distribute along the top of the SIP.
4 The ends of both facings must bear on the supporting foundation or structure to achieve the tabulated axial loads.
5 Tabulated values are based on the strong-axis of the facing material oriented parallel to the direction of panel bending. WAB indicates weak-axis bending of the facing material; the strong-axis of the facing material is oriented perpendicular to the direction of panel bending.
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### Table 10: Allowable Uniform Transverse Loads for SIPs with Openings, 36-in. maximum span (psf)\(^{1,4,5,6}\)

<table>
<thead>
<tr>
<th>Panel Length (ft)</th>
<th>4-5/8-in. SIP thickness</th>
<th>6-1/2-in. SIP thickness</th>
<th>8-1/4-in. SIP thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deflection Limit(^2)</td>
<td>Deflection Limit(^2)</td>
<td>Deflection Limit(^2)</td>
</tr>
<tr>
<td></td>
<td>L/180</td>
<td>L/240</td>
<td>L/360</td>
</tr>
<tr>
<td>8 WAB(^3)</td>
<td>23</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>8</td>
<td>31</td>
<td>23</td>
<td>15</td>
</tr>
<tr>
<td>10</td>
<td>17</td>
<td>13</td>
<td>8</td>
</tr>
<tr>
<td>12</td>
<td>10</td>
<td>8</td>
<td>5</td>
</tr>
<tr>
<td>14</td>
<td>7</td>
<td>5</td>
<td>--</td>
</tr>
<tr>
<td>16</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>18</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>20</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

See Table 11 for notes.

### Table 11: Allowable Uniform Transverse Loads for SIPs with Openings, 72-in. maximum span (psf)\(^{1,4,5,6}\)

<table>
<thead>
<tr>
<th>Panel Length (ft)</th>
<th>4-5/8-in. SIP thickness</th>
<th>6-1/2-in. SIP thickness</th>
<th>8-1/4-in. SIP thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deflection Limit(^2)</td>
<td>Deflection Limit(^2)</td>
<td>Deflection Limit(^2)</td>
</tr>
<tr>
<td></td>
<td>L/180</td>
<td>L/240</td>
<td>L/360</td>
</tr>
<tr>
<td>8 WAB(^3)</td>
<td>16</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>8</td>
<td>23</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>10</td>
<td>12</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>12</td>
<td>7</td>
<td>5</td>
<td>--</td>
</tr>
<tr>
<td>14</td>
<td>5</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>16</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>18</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>20</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

1 Table values represent wall panel capacities utilizing a zero bearing configuration (Figure 2). Construction shall be as described in Section 5.7 of this report.
2 Deflection limit shall be selected by building designer based on the serviceability requirements of the structure and the requirements of adopted building code. Values are based on loads of short duration only and do not consider the effects of creep.
3 Tabulated values are based on the strong-axis of the facing material oriented parallel to the direction of panel bending. WAB indicates weak-axis bending of the facing material; the strong-axis of the facing material is oriented perpendicular to the direction of panel bending.
4 Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.
5 Tabulated values assume header depths ranging from 12-in. to 36-in.
6 SIP splines are not permitted within 6-in. of the end of the header and are not permitted within the header.
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PHONE: 574.773.7975
FAX: 574.773.2260

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### Table 12: Allowable Axial Loads for SIPs with Openings, 36-in. maximum span (plf)\(^{1,2,3,4,6,7}\)

<table>
<thead>
<tr>
<th>Lateral Brace Spacing (ft)</th>
<th>Panel Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4-5/8-in.</td>
</tr>
<tr>
<td>8 WAB(^5)</td>
<td>770</td>
</tr>
<tr>
<td>8</td>
<td>1210</td>
</tr>
<tr>
<td>10</td>
<td>1085</td>
</tr>
<tr>
<td>12</td>
<td>935</td>
</tr>
<tr>
<td>14</td>
<td>--</td>
</tr>
<tr>
<td>16</td>
<td>--</td>
</tr>
<tr>
<td>18</td>
<td>--</td>
</tr>
<tr>
<td>20</td>
<td>--</td>
</tr>
</tbody>
</table>

See Table 13 for notes.

### Table 13: Allowable Axial Loads for SIPs with Openings, 72-in. maximum span (plf)\(^{1,2,3,4,6,7}\)

<table>
<thead>
<tr>
<th>Lateral Brace Spacing (ft)</th>
<th>Panel Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4-5/8-in.</td>
</tr>
<tr>
<td>8 WAB(^5)</td>
<td>460</td>
</tr>
<tr>
<td>8</td>
<td>725</td>
</tr>
<tr>
<td>10</td>
<td>650</td>
</tr>
<tr>
<td>12</td>
<td>560</td>
</tr>
<tr>
<td>14</td>
<td>--</td>
</tr>
<tr>
<td>16</td>
<td>--</td>
</tr>
<tr>
<td>18</td>
<td>--</td>
</tr>
<tr>
<td>20</td>
<td>--</td>
</tr>
</tbody>
</table>

\(1\) Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.
\(2\) All values are for normal duration and may not be increased for other durations.
\(3\) Axial loads shall be applied concentrically to the top of the panel through repetitive members spaced not more than 24-in. on center. Such members shall be fastened to a rim board or similar member to distribute along the top of the SIP.
\(4\) The ends of both facings must bear on the supporting foundation or structure to achieve the tabulated axial loads.
\(5\) Tabulated values are based on the strong-axis of the facing material oriented parallel to the direction of panel bending. WAB indicates weak-axis bending of the facing material; the strong-axis of the facing material is oriented perpendicular to the direction of panel bending.
\(6\) Tabulated values assume header depths ranging from 12-in. to 36-in.
\(7\) SIP splines are not permitted within 6-in. of the end of the header and are not permitted within the header.
Table 14: Allowable In-Plane Shear Strength (Pounds per Foot) for SIP Shear Walls (Wind and Seismic Loads in Seismic Design Categories A, B and C) 1, 3

<table>
<thead>
<tr>
<th>Spline Type 4</th>
<th>Minimum Nominal SIP Thickness (in.)</th>
<th>Minimum Facing Connections 3, 5</th>
<th>Shear Strength (plf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block or Surface Spline</td>
<td>4-5/8</td>
<td>Chord 3: 0.131-in. x 2-1/2-in. nails, 6-in. on center</td>
<td>380</td>
</tr>
<tr>
<td></td>
<td>8-1/4</td>
<td>Plate 3: 0.131-in. x 2-1/2-in. nails, 6-in. on center</td>
<td>400</td>
</tr>
</tbody>
</table>

See Table 15 for notes.

Table 15: Allowable In-Plane Shear Strength (Pounds per Foot) for SIP Shear Walls (Wind and Seismic Loads in Seismic Design Categories D, E and F) 2, 3

<table>
<thead>
<tr>
<th>Spline Type 4</th>
<th>Minimum Nominal SIP Thickness (in.)</th>
<th>Minimum Facing Connections 3, 5</th>
<th>Shear Strength (plf)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Block or Surface Spline</td>
<td>6-1/2</td>
<td>Chord 3: 0.131-in. x 2-1/2-in. nails, 3-in. on center, 3/8-in. edge distance</td>
<td>900</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Plate 3: 0.131-in. x 2-1/2-in. nails, 3-in. on center, 3/8-in. edge distance</td>
<td></td>
</tr>
</tbody>
</table>

1 Maximum shear wall dimensions ratio shall not exceed 2:1 (height: width) for resisting wind or seismic loads.
2 Maximum shear wall dimension ratio shall not exceed 1:1 (height: width) for resisting wind or seismic loads.
3 Chords, hold downs and connections to other structural elements must be designed by a registered design professional in accordance with accepted engineering practice.
4 Spline type at interior panel-to-panel joints only. Solid chord members are required at each end of each shear wall segment.
5 Required connections must be made on each side of the panel. Dimensional or engineered lumber shall have an equivalent specific gravity of 0.42 or greater.
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FAX: 574.773.2260

Table 16: Allowable In-Plane Shear Strength (Pounds per Foot) for Horizontal Diaphragms Subjected to Wind or Seismic Loading

<table>
<thead>
<tr>
<th>Minimum Nominal SIP Thickness (in.)</th>
<th>Minimum Connections</th>
<th>Shear Strength (plf)</th>
<th>Max. Aspect Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface Spline¹ (Figure 3b)</td>
<td>Boundary Support Element (Figure 3c)</td>
<td>Interior Support Spline²,³ (Figure 3a)</td>
<td></td>
</tr>
<tr>
<td>8-1/4</td>
<td>0.131-in. x 2-1/2-in. nails, 6-in. on center 7/16-in. x 3-in. OSB Surface Spline</td>
<td>10-in. length, 0.190-in. Shank diameter, 0.255-in. Thread o.d., 2.750-in. Thread length, 0.625-in. Head diameter SIP screw, 6-in. on center</td>
<td>0.131-in. x 2-1/2-in. nails, 6-in. on center</td>
</tr>
<tr>
<td>8-1/4</td>
<td>0.131-in. x 2-1/2-in. nails, 4-in. on center 7/16-in. x 3-in. OSB Surface Spline</td>
<td>10-in. length, 0.190-in. Shank diameter, 0.255-in. Thread o.d., 2.750-in. Thread length, 0.625-in. Head diameter SIP screw, 4-in. on center</td>
<td>0.131-in. x 2-1/2-in. nails, 4-in. on center</td>
</tr>
<tr>
<td>8-1/4</td>
<td>0.131-in. x 2-1/2-in. nails, 2-in. on center, two rows staggered 3/8-in. 7/16-in. x 3-in. OSB Surface Spline</td>
<td>10-in. length, 0.190-in. Shank diameter, 0.255-in. Thread o.d., 2.750-in. Thread length, 0.625-in. Head diameter SIP screw, 3-in. on center</td>
<td>0.131-in. x 2-1/2-in. nails, 2-in. on center, two rows staggered 3/8-in.</td>
</tr>
</tbody>
</table>

¹Surface or block spline only at interior panel-to-panel joints. Specified fasteners are required on both sides of panel joint through the top surface only, as shown in Figure 3b.

²Interior support spline shall be solid lumber 1-1/2-in. wide minimum and have a specific gravity of 0.42 or greater. Specified fasteners are required through both facings as shown in Figure 3c.

³Attachment of panels to interior supports is the responsibility of the designer and are not included with the shear strength capacities in this table.

Figure 3a: Interior Support Spline
Figure 3b: Surface Spline
Figure 3c: Boundary Support Element
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Table 17: Component Material Sources

<table>
<thead>
<tr>
<th>Facing</th>
<th>Core</th>
<th>Adhesive</th>
</tr>
</thead>
</table>
| Louisiana-Pacific Corporation  
Sagola, MI  
Distributed by:  
Viking Forest Products, LLC  
7615 Smetana Lane  
Eden Prairie, MN 55344 | ACH Corporation  
Plant U-37 - Fond du Lac, WI | Ashland  
5200 Blazer Parkway  
Dublin, OH 43017 |
| Norbord, Inc.  
1 Toronto Street, Suite 600  
Toronto ON, Canada M5C 2W4 | Atlas EPS,  
A Division of Atlas Roofing Corporation  
8240 Byron Center Road SW  
Byron Center, MI 49315 | DuPont Specialty Products  
200 Larkin Center  
1501 Larkin Center Drive  
Midland, MI 48674 |
| Tolko Industries, Ltd.  
3203 30th Avenue  
Vernon BC, Canada V1T 6M1 | Benchmark Foam, Inc.  
401 Pheasant Ridge Drive  
Watertown, SD 57201 |  |
|  | Carpenter Foam  
1021 E Springfield Road  
High Point, NC 27263 |  |
|  | Creative Packaging Company  
6301 Midland Industrial Drive  
Shelbyville, KY 40065 |  |
|  | Insulfoam, a Carlisle Company  
1507 Sunburst Lane  
Mead, NE 68041 (I-41) |  |
|  | Iowa EPS Products, Inc.  
5554 N.E. 16th Street  
Des Moines, IA 50313 |  |
|  | OPCO, Inc.  
P.O. Box 101  
Latrobe, PA 15650 |  |
|  | Plymouth Foam  
1 Southern Gateway Drive  
Gnadenhutten, OH 44629 |  |
|  | Polar Industries, Inc.  
32 Gramar Avenue  
Prospect, CT 06712 |  |
|  | Powerfoam Insulation  
Division of Metl-Span LTD.  
550 Murray Street, Highway 287  
Midlothian, TX 76065 |  |
|  | Thermal Foams, Inc.  
2101 Kenmore Avenue  
Buffalo, NY 14207 |  |