



# ICC-ES Evaluation Report

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## ESR-1112

This report is subject to renewal May 2024.

**DIVISION: 03 00 00—CONCRETE**
**Section: 03 51 13—Cementitious Wood Fiber Decks**
**DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES**
**Section: 06 12 00—Structural Panels**
**Section: 06 12 13—Cementitious Reinforced Panels**
**DIVISION: 09 00 00—FINISHES**
**Section: 09 84 00—Acoustic Room Components**
**REPORT HOLDER:**
**TECTUM, INC.**
**EVALUATION SUBJECT:**
**TECTUM I, TECTUM III, TECTUM IIW, TECTUM E AND TECTUM V ROOF DECK PANELS**

### 1.0 EVALUATION SCOPE

**Compliance with the following code:**

- 2018, 2015, 2012, 2009 and 2006 *International Building Code®* (IBC)

**Properties evaluated:**

- Structural
- Fire performance

### 2.0 USES

Tectum I, Tectum III, Tectum IIW, Tectum E and Tectum V panels are used for roof deck construction and as acoustical panels and suspended ceiling tiles.

### 3.0 DESCRIPTION

#### 3.1 Tectum I Panels:

Tectum I panels are composed of wood fibers impregnated and bonded together into slab form with mineral cements. The panels vary in thickness from 1 inch (25 mm) to 3 inches (76 mm) and have widths up to 48 inches (1219 mm) and lengths up to 192 inches (4877 mm). Tectum I panels are available as Tectum I planks, Tectum I long-span planks and Tectum I roof tiles. Tectum I planks have 1/2-inch (13 mm) tongues and grooves on the long edges.

Tectum I Long-span planks have tongue-and-groove edges on long edges and incorporate 3/4-inch-deep-by-1/2-inch-wide (19 mm by 13 mm) or 1 1/2-inch-deep-by-1/2-inch-wide (38 mm by 13 mm), No. 16 gage [0.0635 inch

(1.65 mm) base-metal thickness] galvanized steel channels that are installed in the groove side of the panel.

Tectum I roof tiles have a 1/2-inch-wide (13 mm) rabbet along the long edge of the tiles for installation between bulb tees or truss tees, which are attached to the top of, and span between, supporting members as described in Section 4.3.

#### 3.2 Tectum III Panels:

Tectum III panels are factory-assembled composite panels consisting of 1 1/2-inch- to 6-inch-thick (38 mm to 152 mm) Dow Chemical Co. Styrofoam Panel Core, a Styrofoam Brand extruded polystyrene foam plastic insulation board, complying with ASTM C578, Type IV. The foam plastic core is factory-bonded, with a Type II Class 2 adhesive complying with ICC-ES Acceptance Criteria for Sandwich Panel Adhesives (AC05), to facings of minimum 1 1/2-inch-thick (38 mm) Tectum I panels and minimum 7/16-inch-thick (11 mm) oriented strand board (OSB) or minimum 1/2-inch-thick (12.7 mm) plywood complying with DOC PS-2. Tectum III panels are available as Tectum III planks and as Tectum III roof tiles in widths up to 48 inches (1219 mm) and lengths up to 192 inches (4877 mm).

Tectum III planks have 1/2-inch-deep (13 mm) tongues and grooves along the long edge in the Tectum I plank layer, while Tectum III roof tiles have a 1/2-inch-wide (13 mm) rabbet on the long edge of the tiles for installation between bulb tees or truss tees attached to the top of, and spanning between, supporting members, as noted in Section 4.4.

Tectum III panels are mechanically and adhesively fastened to all support members as noted in Sections 4.1 and 4.4. See Figure 1 for typical edge details and Figure 2 for typical end conditions.

#### 3.3 Tectum IIW Panels:

Tectum IIW panels are factory-assembled composite panels consisting of 3-inch-to-8-inch-thick (76 to 203 mm) Dow Chemical Co. Styrofoam Panel Core, a Styrofoam Brand extruded polystyrene foam plastic insulation board, complying with ASTM C578, Type IV. The foam plastic core is factory-bonded, with a Type II Class 2 adhesive complying with ICC-ES AC05, to facings of minimum 1 1/2-inch-thick (38 mm) Tectum I panel and minimum 1 9/32-inch-thick (15 mm) plywood complying with DOC PS-2. Tectum IIW panels are available as Tectum IIW planks and as Tectum IIW roof tiles in widths up to 48 inches (1219 mm) and lengths up to 192 inches (4877 mm).

Tectum IIW planks have 1/2-inch-deep (13 mm) tongues and grooves along the long edge in the Tectum I plank layer,

while Tectum IIIW roof tiles have a 1/2-inch-wide (13 mm) rabbet on the long edge of the tiles for installation between bulb tees or truss tees attached to the top of, and spanning between, supporting members, as noted in Section 4.4.

Tectum IIIW panels are mechanically and adhesively fastened to all support members as noted in Sections 4.1 and 4.4. See Figure 1 for typical edge details and Figure 2 for typical end conditions.

### 3.4 Tectum E Panels:

Tectum E panels are factory-assembled composite panels consisting of 3/4-inch- to 6 1/2-inch-thick (19 mm to 165 mm) expanded polystyrene foam plastic insulation core recognized in a current ICC-ES evaluation report and complying with ASTM C578, Type I. The foam plastic core is factory-bonded to facings of minimum 1 1/2-inch-thick (38 mm) Tectum I panels on the bottom face and minimum 7/16-inch-thick (11 mm) OSB or minimum 1/2-inch-thick (12.7 mm) plywood complying with DOC PS-2 on the top face, with a Type II Class 2 adhesive complying with ICC-ES AC05. Panels are available as Tectum E roof planks and Tectum E roof tiles in widths up to 48 inches (1219 mm) and lengths up to 192 inches (4877 mm). Tectum E roof planks have 1/2-inch-deep (13 mm) tongues and grooves along the long edge in the Tectum I panel layer. Tectum E roof tiles have a 1/2-inch-wide (13 mm) rabbet joint on the long edge of the Tectum panel layer for installation between bulb tees or truss tees attached to the top of and spanning between supporting members as noted in Section 4.4. Tectum E roof planks and Tectum E roof tiles are mechanically and adhesively fastened to all supporting members, as noted in Section 4.1. See Figure 1 for typical edge details and Figure 2 for typical end conditions.

### 3.5 Tectum V Panels:

Tectum V panels are factory-assembled composite roof panels consisting of, from the bottom face layer to the top face layer; minimum 1 1/2-inch-thick (38.1 mm) Tectum I panels, 1/2-inch-thick (12.7 mm) expanded polystyrene (EPS) foam plastic core complying with ASTM C578, Type I, minimum 7/16-inch-thick (11 mm) oriented strand board (OSB) or minimum 1/2-inch-thick (12.7 mm) plywood complying with DOC PS-2, 6-inch-thick (152.4 mm) EPS foam plastic core complying with ASTM C578, Type I, and minimum 7/16-inch-thick (11 mm) OSB or minimum 1/2-inch-thick (12.7 mm) plywood complying with DOC PS-2. The layers are factory-bonded with Type II, Class 2 adhesives complying with ICC-ES AC05. Tectum V panels are available in width up to 48 inches (1219 mm) and length up to 192 inches (4877 mm). Tectum V panels are manufactured with Tectum I panels having a 1/2-inch-deep (12.7 mm) tongue and groove along the long edges and are mechanically and adhesively fastened to supporting members, as noted in Section 4.1. See Figure 1 for typical edge details and Figure 2 for typical end conditions.

### 3.6 Acoustical Board and Suspending Ceiling Tile:

The acoustical boards and suspended ceiling tiles are fabricated from 1- to 2-inch-thick (25 to 51 mm) Tectum I panel and are available in various sizes with square, beveled or face-rabbeted edges. Panels with face-rabbeted edges are also available in maximum 3-inch (76 mm) thicknesses. The acoustical boards and suspended ceiling tiles may be installed between suspended ceiling runners, directly to substrate, to steel subpurlins or to furring strips spaced 24 inches (610 mm) on center on walls or ceilings.

### 3.7 Thermal Barrier:

Tectum I, III, IIIW, E and V panels are qualified as thermal barriers for use in separating foam plastic insulation from the

interior of a building under IBC Section 2603.4 provided the edges are tongue-and-groove, covered with a 1-inch-thick (25 mm) wood strip, or joints are filled with a solid gypsum cement grout or 3M fire barrier sealant designated CP 25WB+ intumescent when minimum 1 1/2-inch-thick Tectum I is used as a thermal barrier.

### 3.8 Interior Finish:

Tectum I panels have a flame-spread index of not more than 25 and a smoke-developed index of not more than 450, when tested in accordance with ASTM E84. The panels are therefore classified as Class A interior finish in accordance with IBC Section 803.

## 4.0 DESIGN AND INSTALLATION

### 4.1 General:

The manufacturer's published installation instructions and this report shall be strictly adhered to and a copy of these must be available on the jobsite during installation. The instructions within this report govern if there are any conflicts between the manufacturer's instructions and this report.

All panels must be installed with the long dimension of the panel perpendicular to the continuous supports. All panels must be fastened to wood framing with screws that penetrate into the framing at least 1 inch (25 mm), unless otherwise noted in this report. All panels must be fastened to steel supports with screws long enough to penetrate the steel at least 1/2 inch (13 mm), unless otherwise noted in this report.

Tectum I panels must be attached to supporting members with screws and must be adhesively attached along tongue-and-groove edge joints and to supports in accordance with Section 4.3. See Figure 1 for typical Tectum I panel edge details, and Figure 2 for typical connections. See Table 1 for allowable gravity loads, spans, panel thicknesses and required support member widths.

The Tectum III/IIIW panels must be placed over steel, wood or concrete framing on flat or sloped roofs with the Tectum I facing placed face down towards the interior of the building. Maximum center-to-center spacing of supports with associated allowable gravity loads is noted in Tables 2 and 3.

The Tectum V panels must be placed over steel framing on flat roofs with the Tectum I panel facing placed face down toward the interior of the building. The maximum center-to-center spacing of supports and the associated allowable gravity loads are noted in Table 4.

On concrete supports, a steel or wood insert must be cast in the concrete for installation. Screws for Tectum I panels must be Construction Fasteners, Inc., Dekfast 14 [0.234-inch-diameter (6 mm) shaft, 0.441-inch-diameter (11 mm) head] screws with 2-inch-diameter (51 mm) with 1 1/2-inch-diameter (38 mm) Construction Fasteners, Inc., washers. Screws for Tectum III and Tectum E panels must be Dekfast 14 screws with 1 1/2-inch-diameter (38 mm) Construction Fastener, Inc., washers; or SIP screws [0.194-inch-diameter (5 mm) shaft, 0.610-inch-diameter (16 mm) head]. When adhesion is required, a continuous 3/8-inch-diameter (10 mm) bead of Miracle Construction adhesive, meeting the requirements of APA Specification AFG-01 and of caulking gun consistency, must be used.

### 4.2 Tectum I, III, IIIW, E, and V Screwed/Glued Roof Diaphragm:

Product thickness, fastenings, supports and diaphragm length-to-width ratios are set forth for Tectum I planks in Table 7; and in Table 8 for Tectum I long-span planks, 3-inch-thick (76 mm) Tectum I planks, Tectum III panels,

Tectum E panels, and Tectum V panels. Tectum I diaphragms noted in Table 8 require No. 22 gage [0.0336 inch (0.85 mm) base-metal thickness], galvanized steel nailing strips, 1½ inches (38 mm) wide at the periphery and 4 inches (102 mm) wide over supporting subpurlins.

Tectum panels and planks must be laid with the long edge perpendicular to purlins and square-edge supported ends staggered in adjacent rows. Panels and planks at unsupported tongue-and-groove edges between adjacent rows must be adhered to each other with a ⅜-inch (10 mm) continuous bead of Miracle Construction adhesive placed in the groove of each panel and planks, and the tongue-and-groove joints driven tight. Each supported square-edge end must be butted tight against the adjacent panel or plank. Each supported square-edge end and crossing where panels or planks are continuous over purlins must be adhered to the purlins or the diaphragm boundary supports with a ⅜-inch (10 mm) continuous bead of adhesive and attached to supports with screws. The minimum length of panel or planks must be sufficient to span three purlins, except for end filler to accommodate staggered joint installation.

#### 4.3 Tectum I Roof Tile Diaphragm:

Tectum I roof tiles, 2 inches (51 mm) or more in thickness and 31½ inches (800 mm) wide, must be grouted with gypsum concrete (ASTM C317 Class A) between truss tees of a minimum size of 000-5-14-2. The truss tees must be welded to steel structural supports using a 1-inch (25 mm) fillet weld on each side of the tee at each support. The supports must be spaced a maximum of 96 inches (2438 mm) on center. Tile ends must be attached with two screws per panel end and glued using a ⅜-inch (10 mm) bead of construction adhesive. The perimeter of the diaphragm must be attached using a ⅜-inch (10 mm) bead of Miracle Construction adhesive and screws with 2-inch (51 mm) diameter washers spaced at 10½ inches (267 mm) on center. Screws must be minimum No. 11 gage [0.200 inch (5.08 mm)] and the adhesive must meet the requirements of APA Specification AFG-01. Allowable shear value is 280 pounds per linear foot (4086 N/m).

#### 4.4 Tectum III and Tectum E Roof Tile Diaphragm:

Tectum III and Tectum E roof tiles, 3½ inches (89 mm) or more in thickness and 47½ inches (1206 mm) wide, must be grouted between truss tees of a minimum size of 000-3-14-3½. The truss tees must be welded to steel structural supports using a 1-inch (25 mm) fillet weld on each side of the tee at each support. The supports must be spaced a maximum of 96 inches (2438 mm) on center. Tile ends must be attached with three Dekfast 14 screws with 1½-inch-diameter (38 mm) washers per tile end, and must be glued using a ⅜-inch-diameter (10 mm) bead of construction adhesive. The boundary of the diaphragm must be attached to supports using a ⅜-inch-diameter (10 mm) bead of Miracle Construction adhesive and screws with 1½-inch-diameter (38 mm) washers spaced at 12 inches (305 mm) on center. Screws must be a minimum of No. 14 gage [0.240 inch (6.10 mm)] and the adhesive must meet the requirements of APA Specification AFG-01. Allowable shear value is 310 pounds per linear foot (4553 N/m).

#### 4.5 Tectum IIW Roof Diaphragm:

Tectum IIW panels have square ends with a tongue-and-groove joint along the long edge. The tongue and groove of each panel interlock with a ⅜-inch (9.5 mm) bead of construction adhesive meeting the requirements of AFG-01. Panel ends are adhered together with a ⅜-inch (9.5 mm) bead of construction adhesive. Panels are screw attached

with a ⅜-inch (5 mm) diameter by 7-inch (178 mm) Trufast flat head screw and 1-½-inch (38 mm) diameter-by-⅜-inch (2 mm) thick steel washers located 6-inches (150 mm) from each end and spaced 12-inches (300 mm) on center with a minimum 2-inch (50 mm) penetration into the supports.

#### 4.6 Wind Uplift:

Uplift resistance for Tectum I, III IIW, E and V panels fastened with screws is noted in Tables 6, 7, 8 and 9.

#### 4.7 Special Inspection:

Special inspection in accordance with IBC Chapter 17 is required where diaphragm construction incorporates adhesives. The special inspector must verify adhesive type, placement, and curing. Special inspections for seismic resistance must comply with 2018 and 2015 IBC Section 1705.12.

### 5.0 CONDITIONS OF USE

The Tectum I, Tectum III, IIW, Tectum E, and Tectum V Roof Deck Panels described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The roof deck panels must be installed in accordance with the Tectum Inc. published installation instructions, this evaluation report and the applicable code. If there are any conflicts between the Tectum Inc. published installation instructions and this evaluation report, this evaluation report governs.
- 5.2 The Tectum I, Tectum III, Tectum IIW, Tectum E, and Tectum V Roof Deck Panels are for use in buildings of Type III or V construction or in buildings of Types I and II construction where fire-retardant-treated wood is allowed in accordance with IBC Section 603.1(1). When use is as an alternative to fire-retardant-treated wood, the allowable spans for Tectum III, Tectum IIW, Tectum E, and Tectum V panels are limited to the span of Tectum I, supported by 3-inch-wide purlins, noted in Table 1.
- 5.3 When used as roof decks, the Tectum III, Tectum IIW, Tectum E and Tectum V roof deck panels must be a component of a Class A, B, or C roof covering assembly.
- 5.4 The Tectum I decks, with a 1¾-inch (44 mm) minimum thickness may be used as a roof deck in applications where Type IV (heavy timber) construction is allowed. Decking must be a minimum of 20 feet (6 m) above the floor immediately below.
- 5.5 Structural calculations must be submitted to the code official. Calculations and drawings must be prepared, signed and sealed by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.6 For use as diaphragms, structural calculations must be submitted to the code official. Calculations and drawings must be prepared, signed and sealed by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.7 The panels must be covered with an approved roof covering immediately after installation and must not be left exposed to the weather.
- 5.8 Panels with a maximum allowable load of less than 50 psf must be limited to applications that are not subject to the concentrated live loads specified in IBC Table 1607.1 Item 30.

- 5.9 The products must be manufactured at the Tectum, Inc., plant located in Newark, Ohio, or Tectum Lamination Facility dba Lamit Industries plant located in Hebron, Ohio, under a quality control program with inspections by ICC-ES.

## 6.0 EVIDENCE SUBMITTED

- 6.1 Reports of tests for gravity load capacity, full-scale diaphragm load capacity, flame spread and smoke-developed indices, and wind uplift.
- 6.2 Reports of room fire tests in accordance with UBC Standard 26-3 (UL 1715).
- 6.3 Quality documentation.

## 7.0 IDENTIFICATION

- 7.1 Labels attached to stacks, skid loads, and crates of the Tectum products bear the Tectum, Inc., name, product

name, and the ICC-ES evaluation report number (ESR-1112).

- 7.2 The report holder's contact information is the following:

**TECTUM INC.**  
**POST OFFICE BOX 3002**  
**NEWARK, OHIO 43058-3002**  
**(740) 345-9691**  
**(888) 977-9691**  
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**TABLE 1—ALLOWABLE ROOF DECK SPANS FOR TECTUM I PANELS**

NOMINAL THICKNESS (inches)	WEIGHT (psf)	ALLOWABLE SPANS (inches) <sup>2</sup>			
		4-inch-wide Purlins			3-inch-wide Purlins
		35 psf Design Load <sup>1</sup>	40 psf Design Load <sup>1</sup>	45 psf Design Load <sup>1</sup>	50 psf Design Load <sup>1</sup>
1½	2.4	---	---	---	24
2	3.5	42	40	38	36
2½	4.5	48	46	44	42
3	5.3	54	52	50	48
2 long span	3.8	60	---	---	48
2½ long span	4.7	66	---	---	60
3 long span	5.5	---	---	---	72

For **SI**: 1 inch = 25.4 mm, 1 psf = 0.0479 kPa.

<sup>1</sup>The tabulated design load is the total permitted and does not include the weight of the Tectum plank.

<sup>2</sup>Center to center of supports.

**TABLE 2—ALLOWABLE ROOF DECK SPANS FOR TECTUM III PANELS<sup>1</sup>**

NOMINAL THICKNESS (inches)	WEIGHT (psf)	ALLOWABLE SPANS <sup>3</sup> (inches)		
		30 psf Superimposed Design Load	50 psf Superimposed Design Load	60 psf Superimposed Design Load
3½	4.4	---	72 <sup>4</sup>	---
4	4.6	---	72 <sup>2</sup>	---
5	5.0	96 <sup>2</sup>	---	72 <sup>2</sup>
8	5.5	---	96 <sup>2</sup>	---

For **SI**: 1 inch = 25.4 mm, 1 psf = 0.0479 kPa.

<sup>1</sup>Values limited to a maximum deflection of  $L/240$  where L is the span in inches.

<sup>2</sup>Support conditions require a minimum 4-inch bearing width.

<sup>3</sup>Center to center of supports.

<sup>4</sup>Support conditions require a minimum 2½-inch bearing width.

**TABLE 3—ALLOWABLE ROOF DECK SPANS FOR TECTUM IIW PANELS<sup>1,2</sup>**

NOMINAL THICKNESS (inches)	WEIGHT (psf)	ALLOWABLE SPANS <sup>3</sup> (inches)					
		30 psf Superimposed Design Load	40 psf Superimposed Design Load	50 psf Superimposed Design Load	60 psf Superimposed Design Load	70 psf Superimposed Design Load	80 psf Superimposed Design Load
6	4.8	117	101	90	82	76	71
7	5.1	120	112	100	92	85	79
8	5.2	—	120	109	100	92	86

For **SI**: 1 inch = 25.4 mm, 1 psf = 0.0479 kPa.

<sup>1</sup>Values limited to a maximum deflection of  $L/240$  where L is the span in inches.

<sup>2</sup>Support conditions require a minimum 4-inch bearing width.

<sup>3</sup>Center to center of supports.



TABLE 4—ALLOWABLE ROOF DECK SPANS FOR TECTUM E PANELS<sup>1,2</sup>

NOMINAL THICKNESS (inches)	WEIGHT (psf)	ALLOWABLE SPANS <sup>3</sup> (inches)	
		40 psf Superimposed Design Load	50 psf Superimposed Design Load
2 <sup>3</sup> / <sub>4</sub>	4.4	---	48
4	4.6	72	60
5	5.0	---	72
6	5.2	---	84
8 <sup>1</sup> / <sub>2</sub>	5.5	---	96

For **SI**: 1 inch = 25.4 mm, 1 psf = 0.0479 kPa.

<sup>1</sup>Values limited to a maximum deflection of  $L/240$ , where L is the span in inches.

<sup>2</sup>Support conditions require a minimum 4-inch bearing width.

<sup>3</sup>Center to center of supports.

TABLE 5—ALLOWABLE ROOF DECK SPANS FOR TECTUM V PANELS<sup>1,2</sup>

NOMINAL THICKNESS (inches)	WEIGHT (psf)	ALLOWABLE SPANS <sup>3</sup> (inches)		
		55 psf Superimposed Design Load	60 psf Superimposed Design Load	65 psf Superimposed Design Load
9	6.0	141	133	126

For **SI**: 1 inch = 25.4 mm, 1 psf = 0.0479 kPa.

<sup>1</sup>Values limited to a maximum deflection of  $L/240$ , where L is the span in inches.

<sup>2</sup>Support conditions require a minimum 4-inch bearing width.

<sup>3</sup>Center to center of supports.

TABLE 6—UPLIFT RESISTANCE FOR TECTUM I DECKS IN POUNDS PER SQUARE FOOT<sup>1,2,3</sup>

PANEL WIDTH (inches)	SPAN (inches)	SCREWS PER JOIST	UPLIFT RESISTANCE FOR 1-INCH PENETRATION IN WOOD	UPLIFT RESISTANCE FOR ATTACHMENT TO STEEL OR 1.5-INCH PENETRATION IN WOOD
31	24	2	110	130
47	24	2	73	86
31	36	2	74	87
47	36	2	49	57
47	36	3	73	86
31	42	2	63	74
47	42	2	42	49
47	42	3	63	74
31	48	2	55	65
31	48	3	83	98
47	48	2	37	43
47	48	3	55	65
31	60	2	37	44
31	60	3	55	65
31	72	2	30	35
31	72	3	46	54

For **SI**: 1 inch = 25.4 mm, 1 psf = 0.0479 kPa.

<sup>1</sup>Screws are Dekfast No. 14 screws with a 2-inch-diameter washer described in Section 4.1.

<sup>2</sup>Values are based on screws acting alone and panels installed in a two-span condition.

<sup>3</sup>Wood framing must have a minimum specific gravity of 0.50.

TABLE 7—UPLIFT RESISTANCE OF TECTUM III AND TECTUM E DECK IN POUNDS PER SQUARE FOOT<sup>1</sup>

PANEL WIDTH (inches)	SPAN (inches)	SCREWS PER JOIST	UPLIFT RESISTANCE FOR 1-INCH PENETRATION IN WOOD <sup>2</sup>	UPLIFT RESISTANCE FOR ATTACHMENT TO STEEL <sup>3</sup>
47	48	2	50	69
47	48	3	75	104
47	60	3	60	83
47	60	4	79	110
47	72	3	50	69
47	72	4	66	92
47	84	3	43	59
47	84	4	57	79
47	96	3	37	52
47	96	4	50	69

For **SI**: 1 inch = 25.4 mm, 1 psf = 0.0479 kPa.

<sup>1</sup>Values are based on nails acting alone and panels installed in a two-span condition.

<sup>2</sup>Screws are SIP screws described in Section 4.1. Wood framing must have a minimum specific gravity of 0.50.

<sup>3</sup>Screw are Dekfast No. 14 screws described in Section 4.1.

TABLE 8—UPLIFT RESISTANCE OF TECTUM IIIW DECK IN POUNDS PER SQUARE FOOT<sup>1</sup>

PANEL WIDTH (inches)	SPAN (inches)	SCREWS PER JOIST	UPLIFT RESISTANCE FOR 2-INCH PENETRATION IN WOOD <sup>2</sup>
47	36	4	214
47	42	4	183
47	48	4	160
47	60	4	110
47	72	4	107

For **SI**: 1 inch = 25.4 mm, 1 psf = 0.0479 kPa

<sup>1</sup>Values are based on nails acting alone and panels installed in a two-span condition.

<sup>2</sup>Screws are Trufast flat head screw as described in Section 4.5.

<sup>3</sup>Wood framing must have a minimum specific gravity of 0.50

TABLE 9— UPLIFT RESISTANCE OF TECTUM V PANEL SPANS<sup>1,2</sup>

NOMINAL THICKNESS (inches)	WEIGHT (psf)	ALLOWABLE SPANS <sup>3</sup> (inches)					
		55 psf Superimposed Design Load		60 psf Superimposed Design Load		65 psf Superimposed Design Load	
		Multiple Span	Single Span	Multiple Span	Single Span	Multiple Span	Single Span
9	6.0	122	141	113	133	105	126

For **SI**: 1 inch = 25.4 mm, 1 psf = 0.0479 kPa.

<sup>1</sup>Values limited to a maximum deflection of  $L/240$ , where L is the span in inches.

<sup>2</sup>Support conditions require a minimum 4-inch bearing width.

<sup>3</sup>Center to center of supports.

TABLE 10—TECTUM I ALLOWABLE SHEAR OR SEISMIC LOAD IN POUNDS PER LINEAL FOOT<sup>5,6,7</sup>

THICKNESS (inches)	WOOD PURLINS OR WOOD NAILERS BOLTED TO METAL PURLINS													METAL PURLINS		
	Length-to-Width Ratio <sup>1</sup>								Length-to-Width Ratio Not Over 2:1		Length-to-Width Ratio Not Over 3:1			Length-to-Width Ratio Not Over 3:1		
	Screw Size	Unblocked Diaphragm, Uniform Screw Spacing on Supports <sup>2,3</sup>		Blocked Diaphragm, Uniform Screw Spacing on All Panel Edges <sup>2</sup>		Unblocked Diaphragm, Screws Spaced 4 inches o.c. through Metal Strips <sup>2,3</sup>			Unblocked Diaphragm, Screws Spaced 4 inches o.c. through Metal Strip and Glued <sup>3</sup>			Unblocked Diaphragm, Screws Spaced 8 inches o.c. through Metal Strip and Glued <sup>3</sup>			Unblocked Diaphragm, Self-tapping Screws Spaced 8 inches o.c. through Metal Strip and Glued <sup>3</sup>	
		3-inch Purlin Width <sup>4</sup>		3-inch Purlin Width <sup>4</sup>		Screw Size	3-inch Purlin Width <sup>4</sup>	4-inch Purlin Width <sup>4</sup>	Screw Size	3-inch Purlin Width <sup>4</sup>	4-inch Purlin Width <sup>4</sup>	Screw Size	3-inch Purlin Width <sup>4</sup>	4-inch Purlin Width <sup>4</sup>	Screw Size	4-inch Nominal Top Flange Width
		4" o.c.	2" o.c.	4" o.c.	2" o.c.											
2	3½" 14 ga	140	200	200	350	3½" 14 ga	175	175	3½" 14 ga	230	300	3½" 14 ga	200	250	3/16"	250
2½	4" 14 ga	140	200	200	350	4" 14 ga	---	200	4" 14 ga	250	330	4" 14 ga	210	280	3/16"	280
3"	----	---	---	---	---	4½" 14 ga	---	200	4½" 14 ga	250	360	4½" 14 ga	220	300	3/16"	300

For **SI**: 1 inch = 25.4 mm, 1 plf = 14.5939 N/m.

<sup>1</sup>The diaphragm length-to-width ratio for wood frame construction must not exceed 3:1. The diaphragm deflection limit for masonry or concrete construction must be determined as follows:

$$\Delta p = \frac{h^2 f}{0.01(E_w)(t)}$$

where:

- $\Delta p$  = Allowable diaphragm deflection, inches.  
 $H$  = Unsupported height of the wall, feet.  
 $F$  = Allowable flexural compressive strength of the wall, pounds per square inch.  
 $E_w$  = Modulus of elasticity of the wall, pounds per square inch.

Table 10 notes continued on the next page.

Table 10 notes continued from the previous page.

The diaphragm deflection is determined by the formula:

$$\Delta d = \Delta s + \Delta b = \frac{(F)(Q_{avg})(L)}{2 \times 10^6} + \frac{5wL^4 \times 1728}{384EI}$$

where:

- $\Delta d$  = Total diaphragm deflection, inches.  
 $\Delta s$  = Shear deflection, inches.  
 $\Delta b$  = Bending deflection, inches.

$$F = \frac{33,000Q_{avg}}{(Qd)^2}$$

(For a diaphragm having a uniform shear distribution across its span)

$Q_{avg}$  = Average unit shear on diaphragm in pounds per foot between points for which deflection is to be determined. (For a simply supported diaphragm uniformly loaded, “ $Q_{avg}$ ” is equal to the actual diaphragm shear per foot divided by two.)

$Qd$  = Allowable diaphragm shear in pounds per foot from table.

$W$  = Uniform load on diaphragm in pounds per foot.

$L$  = Diaphragm span, feet.

$E$  = Modulus of elasticity of diaphragm chord, psi.

$I$  = Moment of inertia of chords, inches<sup>4</sup>.

<sup>2</sup>Values may be increased one-fourth if the boundary fastening of the diaphragm has the screw spacing reduced one-half.

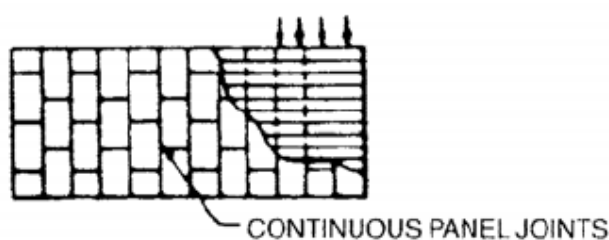
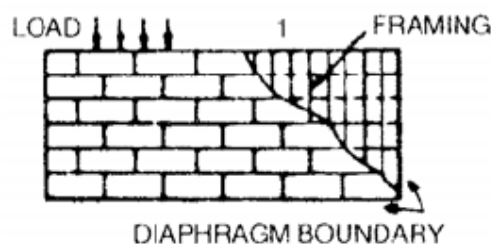
<sup>3</sup>Values must be decreased one-fourth when continuous unblocked joints are parallel to the direction of horizontal forces.

<sup>4</sup>Purlin widths are nominal dimensions.

<sup>5</sup>In addition to screw fastening, all boards must be fastened to one another at tongue-and-groove edge joints and to supports with <sup>3</sup>/<sub>8</sub>-inch-diameter bead of adhesive.

<sup>6</sup>Minimum thickness of structural steel support must be 0.20 inch.

<sup>7</sup>The planks are oriented to the load and framing as follows:





**TABLE 11—ALLOWABLE SHEAR FOR WIND OR SEISMIC FORCES IN POUNDS PER FOOT FOR HORIZONTAL ROOF DIAPHRAGMS CONSISTING OF TECTUM III, IIIW, E OR TECTUM V PANELS, TECTUM I LONG-SPAN PLANK AND 3-INCH-THICK TECTUM I PLANK<sup>1,2,3</sup>**

ITEM	SCREW SIZE	MINIMUM PENETRATION INTO FRAMING (inches)	THICKNESS (inches)	MAXIMUM SUPPORT SPACING (inches)	MINIMUM NORMAL WIDTH OF WOOD/STEEL FRAMING MEMBER (inches)	FIELD FASTENER SPACING (inches)	PERIMETER FASTENER SPACING (inches)	UNBLOCKED DIAPHRAGM (plf)	SHEAR STIFFNESS, $G_a$ (kips/in.)
Tectum III/E Panel	No. 14 self-tapping with 1½-inch-diameter steel washer	1 <sup>4</sup>	5 MAX	96	Steel support only <sup>5</sup>	16	12	310	90
Tectum III/E Panel	No. 14 self-tapping with 5/8-inch-diameter head	2	5 MAX	72	4	16	12	320	33
		2½	3½ MAX	60	4	16	12	360	42
		2½	3½ MAX	72	4	16	12	340	34
Tectum III/E <sup>6</sup> Panel with Overlay	No. 14 self-tapping with 1½-inch-diameter steel washer	1	5 MAX	72	4	8	6	785	52
Tectum IIIW Panel	7-inch by 14-Gage SIP Screw with 1½-inch washer	2	5 MAX	72	4	16	12	320	33
Tectum IIIW <sup>6</sup> Panel with Overlay	7-inch by 14-Gage SIP Screw with 1½-inch washer	2	5 MAX	72	4	8	6	785	52
Tectum V	W-11 Trufast	2	9	144	4	6	6	415	34
2-inch-thick long-span plank <sup>7</sup>	No. 14 with 2-inch-diameter washer	1¼	2	48	4	16	12	320	76
2½-inch-thick long-span plank <sup>7</sup>	No. 14 with 2-inch-diameter washer	1¼	2½	60	4	16	10	390	31
3-inch-thick long-span plank <sup>8</sup>	No. 14 with 2-inch-diameter washer	1½	3	72	4	16	12	280	16
3-inch-thick plank	No. 11 with 2-inch-diameter washer	15/16 <sup>4</sup>	3	48	Steel support only <sup>5</sup>	10	10 ends 16 length	450	11

For **SI**: 1 inch = 25.4 mm, 1 plf = 14.5939 N/m.

<sup>1</sup>In addition to screw fastening, all boards must be fastened to one another at tongue-and-groove edge joints and to supports with a 3/8-inch-diameter bead of adhesive.

<sup>2</sup>The diaphragm length-to-width ratio for wood frame construction must not exceed 3:1. The panels are oriented to the load and framing are oriented to the load and framing as shown in Footnote 7 to Table 9.

<sup>3</sup>The diaphragm deflection may be calculated by using the equations in NDS Section 4.2.2 or standard formulae in engineering references. When calculating deflection, both bending and shear deformations must be included. The tabulated shear stiffness,  $G_a$ , must be used in shear deformation calculation.

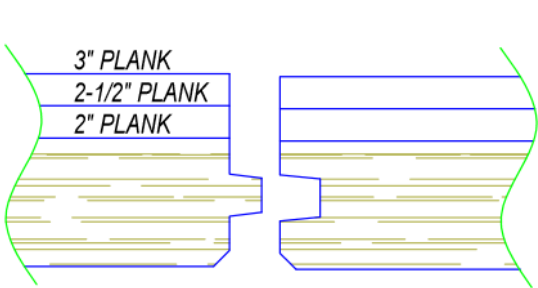
<sup>4</sup>Minimum penetration beyond the structural steel support.

<sup>5</sup>Minimum thickness of structural steel support must be 0.20 inch and the bearing length 4 inches.

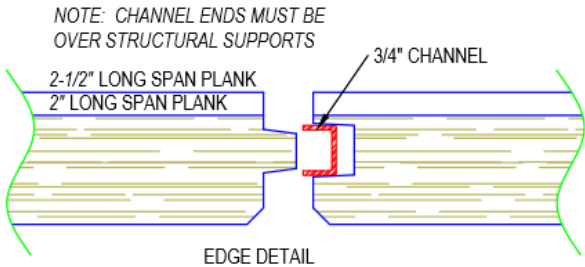
<sup>6</sup>An overlayment of 7/16-inch-thick-by-44-inch-wide-by-144-inch-long OSB must be attached to the top of the panels. Two-inch, No. 16 gauge staples at 4 inches on center spacing must be at the perimeter of each overlayment and at 8 inches on center spacing at 24 inch intervals. A 3/8-inch bead of adhesive must be applied at the perimeter and at 24-inch intervals. All overlayment joints offset panel joints.

<sup>7</sup>Long-span plank utilizes a 1½-inch-by-3/4-inch, No. 16 gauge steel channel section along the tongue-and-groove edges.

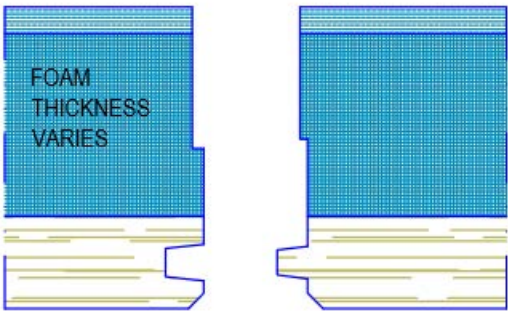
<sup>8</sup>Long-span plank utilizes a 5/8-inch-by-1½-inch, No. 16 gauge steel channel section along the tongue-and-groove edges.



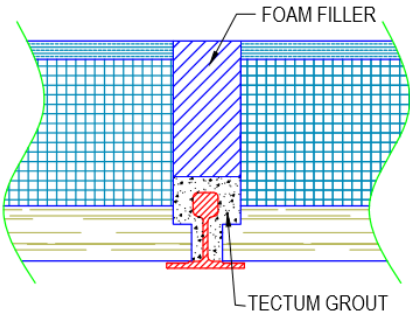
Tectum I Plank Edge Detail



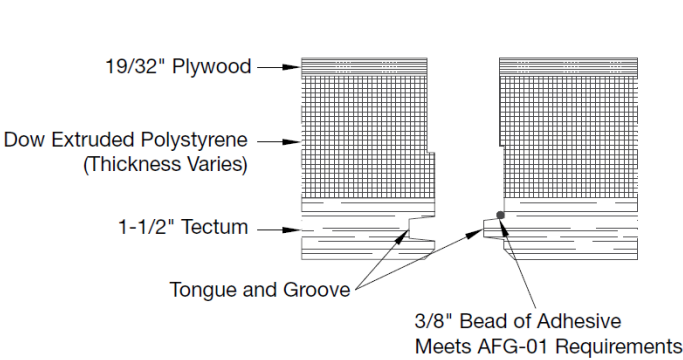
Tectum I Long Span Edge Detail



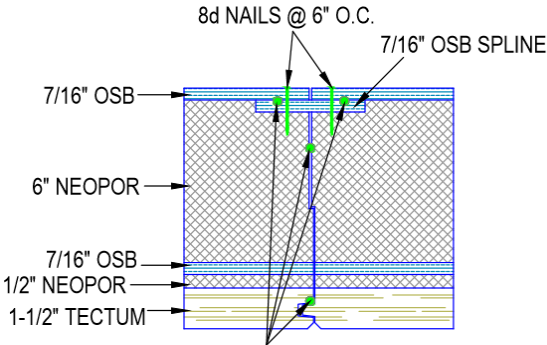
Tectum III/E Roof Plank Edge Detail



Tectum III/E Roof Tile Edge Detail

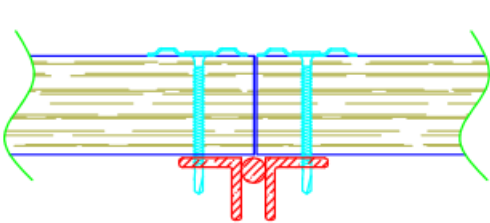


Tectum IIIW Panel Edge Detail

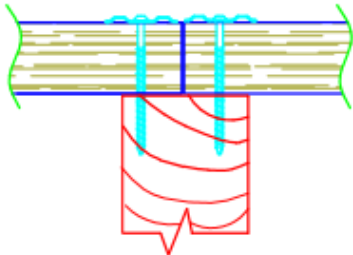


Tectum V Panel Edge Detail

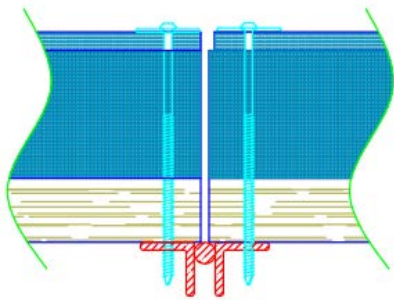
FIGURE 1—TYPICAL EDGE DETAILS



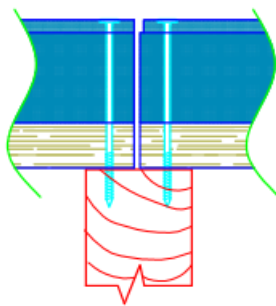
Tectum I Panel Typical End Condition on Steel



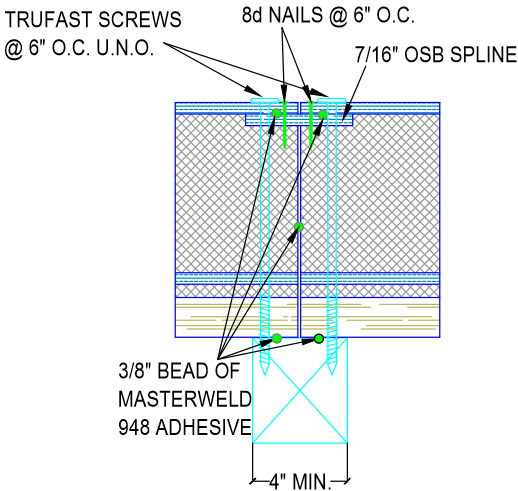
Tectum I Panel Typical End Condition on Wood



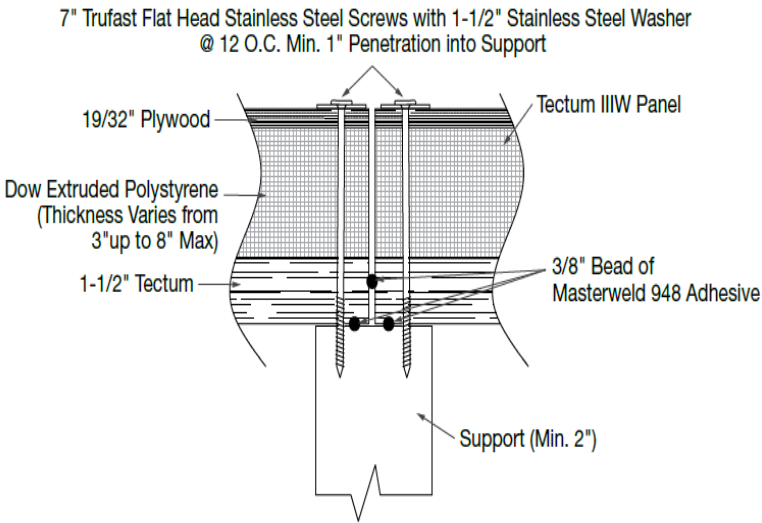
Tectum III/E Panel Typical End Condition on Steel



Tectum III/E Panel Typical End Condition on Wood

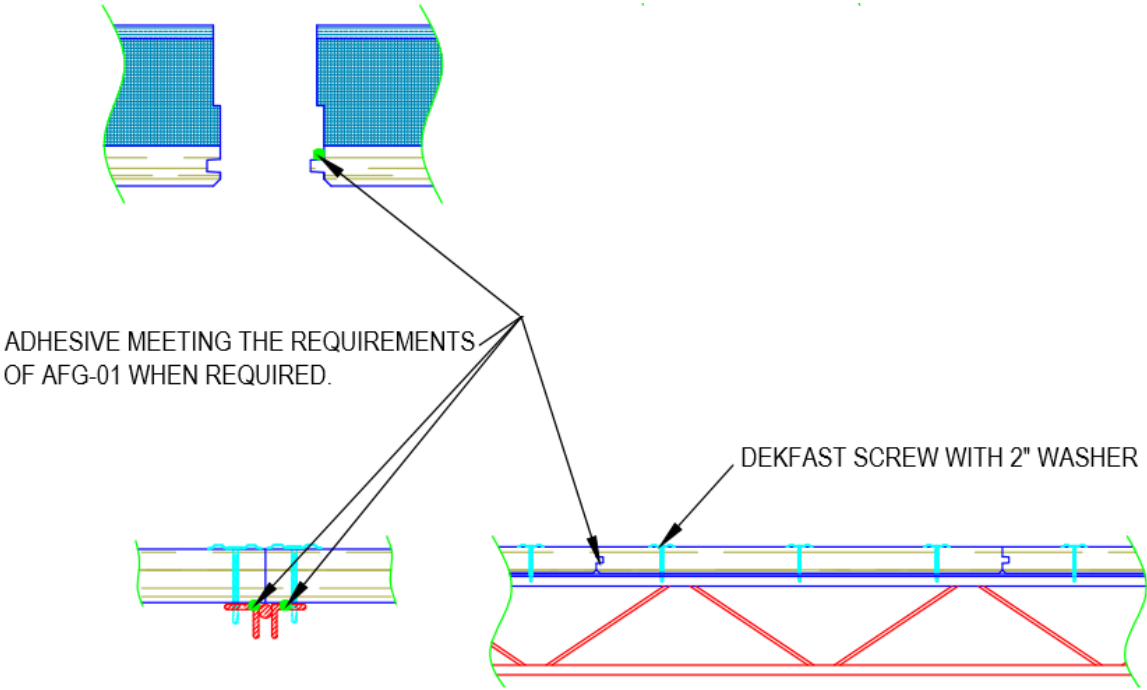


Tectum V Panel Typical End Condition on Wood

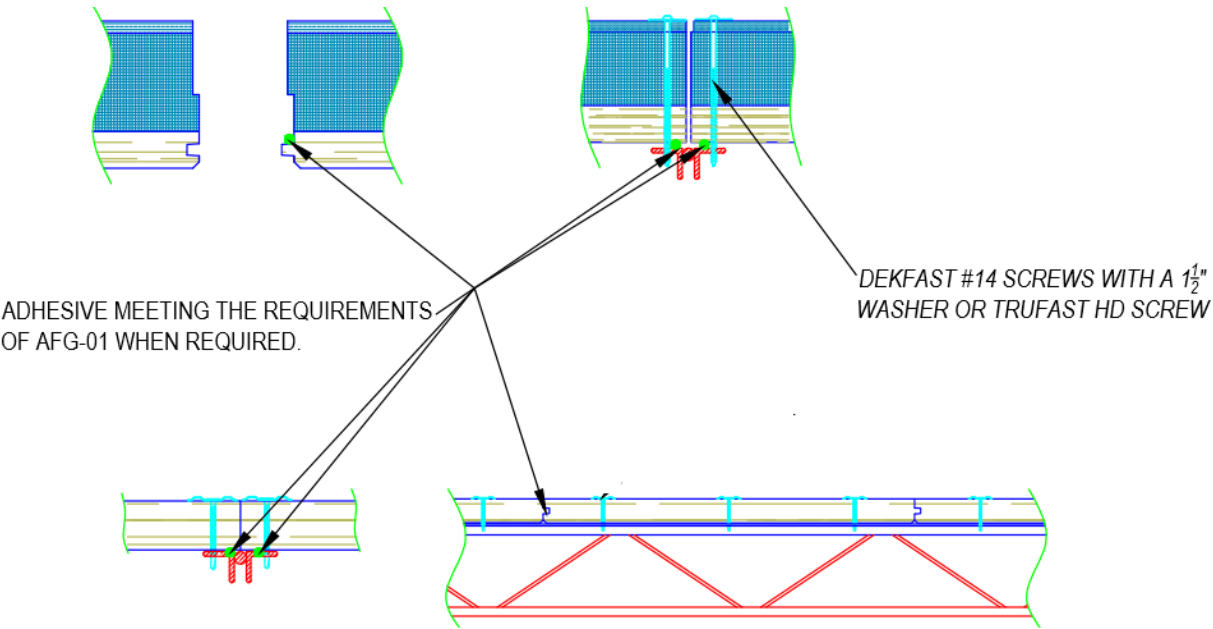


Tectum IIIW Panel Typical End Condition on Wood Support

FIGURE 2—TYPICAL END CONDITIONS



Tectum I Roof Deck Construction



Tectum III, IIIW and E Roof Deck Construction

FIGURE 3—TYPICAL ROOF DECK CONSTRUCTIONS

**DIVISION: 03 00 00—CONCRETE****Section: 03 51 13—Cementitious Wood Fiber Decks****DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES****Section: 06 12 00—Structural Panels****Section: 06 12 13—Cementitious Reinforced Panels****DIVISION: 09 00 00—FINISHES****Section: 09 84 00—Acoustic Room Components****REPORT HOLDER:**

TECTUM, INC.

**EVALUATION SUBJECT:**

TECTUM I, TECTUM III, TECTUM IIIW, TECTUM E AND TECTUM V ROOF DECK PANELS

**1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that the Tectum I, III, IIIW, E, and V roof deck panels, described in ICC-ES evaluation report ESR-1112, have also been evaluated for compliance with the codes noted below.

**Applicable code editions:**

- 2019 *California Building Code* (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) and Division of the State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2019 *California Residential Code* (CRC)

**2.0 CONCLUSIONS****2.1 CBC**

The Tectum I, III, IIIW, E, and V roof deck panels, described in Sections 2.0 through 7.0 of the evaluation report ESR-1112, comply with CBC Chapters 3, 8, 23 and 26, provided the design and installation are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report and the additional requirements of the CBC Chapters 3, 8, 23 and 26, as applicable.

**2.1.1 OSHPD:**

OSHPD requirements as indicated in the CBC are beyond the scope of this supplement.

**2.1.2 DSA:**

DSA requirements as indicated in the CBC are beyond the scope of this supplement.

**2.2 CRC**

The Tectum I, III, IIIW, E, and V roof deck panels, as described in Sections 2.0 through 7.0 of the evaluation report ESR-1112, comply with the CRC, provided the design and installation are in accordance with the 2018 *International Residential Code*® (IRC) provisions noted in the evaluation report.

This supplement expires concurrently with the evaluation report ESR-1112, reissued May 2022.