

TEXAS DEPARTMENT OF INSURANCE

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PRODUCT EVALUATION

FR-38

Effective June 1, 2010

Revised July 1, 2012

*The following product has been evaluated for compliance with the wind loads specified in the **International Residential Code (IRC)** and the **International Building Code (IBC)**. This product shall be subject to reevaluation **July 2014**.*

This product evaluation is not an endorsement of this product or a recommendation that this product be used. The Texas Department of Insurance has not authorized the use of any information contained in the product evaluation for advertising, or other commercial or promotional purpose.

This product evaluation is intended for use by those individuals who are following the design wind load criteria in Chapter 3 of the IRC and Section 1609 of the IBC. The design loads determined for the building or structure shall not exceed the design load rating specified for the products shown in the limitations section of this product evaluation. This product evaluation does not relieve a Texas licensed engineer of his responsibilities as outlined in the Texas Insurance Code, the Texas Administrative Code, and the Texas Engineering Practice Act.

Structural Insulated Panels (SIPs) as manufactured by:

Vantem Panels
710 FM 306
New Braunfels, Texas 78130
(830) 632-1500

will be acceptable as an alternative residential construction method in designated catastrophe areas along the Texas Gulf Coast when constructed in accordance with this product evaluation.

PRODUCT DESCRIPTION

Vantem Structural Insulated Panels are factory-assembled, engineered-wood-faced, structural insulated panels (SIP) with an expanded polystyrene (EPS) foam core. The panels are intended for use as load-bearing or non-load bearing wall and roof panels. Panels are available in 4-5/8-inch through 12-3/8-inch overall thicknesses. The panels are custom made to the specifications for each use and are assembled under factory-controlled conditions. The maximum panel size is 8-ft wide and up to 24-ft in length.

Facings consist of two single-ply oriented strand board (OSB) facings a minimum of 7/16-inch thick conforming to APA PRN-610 and DOC PS 2-04, 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 SIP panel bending provided the appropriate strength values are used.

The core material is 1.0 pcf density expanded polystyrene (EPS) foam (0.95 pcf minimum). The foam core has a flame spread rating not exceeding 75 and a smoke-developed rating not exceeding 450 when tested in accordance with ASTM E84. 4.2.3. Adhesive. Facing materials are adhered to the core material using a structural adhesive. The adhesive is applied during the lamination process in accordance with the in-plant quality control manual.

The facing, core and adhesive used in the construction of Vantem Structural Insulated Panels shall be composed only of materials from approved sources as identified in Table 7 of this report.

Product Identification: Each Vantem SIP shall bear the manufacturer's name, identification of the assembly and the label/stamp of the inspection agency, NTA, Inc.

INSTALLATION REQUIREMENTS

General: Vantem Structural Insulated Panels shall be fabricated, identified and erected in accordance with this report, the approved construction documents and the applicable code. 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.

Structures built using the Vantem SIPs shall be designed by a Texas licensed professional engineer. Requirements for the design of the SIPs shall be based on the tables and details specified in this evaluation report and the manufacturer's installation requirements. The tables presented in this evaluation report are for the design of the SIPs for walls, roof, and floors. The design of chords, struts, and connections (such as the attachment of diaphragms to chords and struts, the attachment of the SIPs to the foundation, and the hardware required to resist uplift, shear, and the overturning of the shearwall segments) shall be designed separately by a Texas licensed engineer. Design drawings shall include complete instructions for the connection and installation of the SIP panels. The design drawings shall be sealed and dated by a Texas licensed engineer. The design drawings shall reference the appropriate edition of the wind load standard (ASCE 7) used based on the current building specifications adopted by the Texas Department of Insurance. The basic wind speed and the Exposure Category used for the design shall also be referenced.

Vantem Structural Insulated Panels are interconnected with surface splines, block splines, dimensional lumber splines, or engineered structural splines (Refer to Vantem Construction details). Surface splines consist of 3 inch wide by minimum 7/16 inch thick, Oriented Strand Board (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. Block splines are manufactured in the same manner as the overall SIP panel except with an overall thickness that is 1 inch less than the overall thickness of the panel to be joined. Dimensional lumber splines consist of one or more plies of dimensional lumber. Structural splines consist of one or more plies of dimensional lumber or an engineered wood product. Splines shall be secured in place with not less than 0.113 inch x 2.375 inch ring shank nails (0.275 inch head diameter), 6 inches o.c., or an approved equivalent fastener. All joints shall be sealed in accordance with the Vantem installation instructions. Alternate spline connections may be required for panels subjected to in-plane racking forces. Such panels shall be interconnected exactly as required in Table 6, or as directed by a Texas licensed professional engineer.

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 0.113 inch x 2.375 inch nails (0.275 inch head diameter) spaced 6 inches o.c., on both sides, or an approved equivalent fastener as directed by a Texas licensed professional engineer. A second plate composed of 3/4 inch thick dimensional or engineered lumber with a $G \geq 0.42$ that is cut to the full thickness of the panel shall be secured under the first top plate using 0.133 inch x 3 inch nails (0.283 inch head diameter) or an approved equivalent fastener. This bottom plate shall be secured to the foundation or floor system in accordance with applicable building codes and shall be treated lumber when in contact with concrete or masonry.

Design loads: Design wind loads for the SIPs shall be determined using the wind load requirements for the structure as specified in the building specifications adopted by the Texas Department of Insurance. All loads on the SIPs shall not exceed the allowable loads specified in load design charts.

Load Design Charts: Allowable axial, transverse, and racking loads for the SIPs shall be as specified in Tables 1-7 of this evaluation report. NOTE: The requirements specified in the tables in this evaluation report shall govern if there are any conflicts between the manufacturer's Load Design Charts and the tables and figures in this evaluation report.

INSTALLATION REQUIREMENTS (Continued)

Foundation: The foundation is considered to be part of the structure and shall be considered part of the design for the structure. If the foundation is not designed by the engineer responsible for the design of the SIP system, then the design plans shall indicate such. As a minimum, the design plans shall indicate how the SIP system is to be anchored to the foundation. If the foundation is included as part of the design, then the design plans shall include all details and specifications related to the design of the foundation to resist the specified wind loads and shall indicate how the structure is to be anchored to the foundation.

Roof Coverings: The design plans shall indicate the requirements for the roof coverings. The roof coverings shall comply with the building specifications adopted by the Texas Department of Insurance. For roof coverings other than asphalt shingles, the design plans shall specify the design pressure requirements for the roof covering. The roof covering shall be installed as required to resist wind pressure.

Exterior wall coverings: Exterior wall coverings shall be installed as required to resist wind pressure. Products shall comply with the building specifications adopted by the Texas Department of Insurance. The design plans shall specify the design pressure requirements for the exterior wall coverings.

Windows, doors, garage doors, and skylights: Products shall be installed as specified in evaluation reports to resist wind pressure. Products shall comply with the building specifications adopted by the Texas Department of Insurance. The design plans shall specify the design pressured requirements for the products. The design plans shall indicate if the products are required to be windborne debris resistant. Windborne debris resistant products shall be installed as specified in evaluation reports to resist wind pressure and windborne debris.

Shutters: The design plans shall indicate if shutters are required. Products shall be installed as specified in evaluation reports or the building specifications adopted by the Texas Department of Insurance as required to resist wind pressure and windborne debris. Products shall comply with the building specifications adopted by the Texas Department of Insurance. The design plans shall specify the design pressures requirements for the shutters.

Note: A set of sealed plans, manufacturer's installation instructions, Vantem Load Design Charts for SIPs (Structural Insulated Panels), and this product evaluation report shall be available to the inspector at the job site at all times. All fasteners shall be corrosion resistant as specified in the International Residential Code (IRC), the International Building Code (IBC), and the Texas Revisions.

Table 1: Basic Properties¹

Property	Weak-Axis Bending	Strong-Axis Bending
Allowable Tensile Strength, F_t (psi)	245	495
Allowable Compressive Stress, F_c (psi)	355	575
Elastic modulus bending, E_b (psi)	771,000	760,000
Shear Modulus, G (psi)	300	440
Allowable Core Shear Stress, F_v (psi)	6.4	6.4
Reference Depth, h_o (inches)	4.625	4.625
Shear Depth Factor Exponent, m	0.86	0.86

Note: ¹ All properties are based on a minimum panel width of 24 inches.

Table 2: Section Properties

Panel Thickness h (inches)	Core Thickness c (inches)	Dead Weight w_d (psf)	Facing Area A_f (in ² /ft)	Shear Area A_v (in ² /ft)	Moment of Inertia, I (in ⁴ /ft)	Section Modulus S (in ³ /ft)	Radius of Gyration, r (inches)	Centroid-to-Facing Distance Y_c (inches)
4.625	3.75	3.2	10.5	50.3	46.0	19.9	2.09	2.31
6.625	5.63	3.3	10.5	72.8	96.5	29.7	3.03	3.25
8.375	7.38	3.5	10.5	93.8	160.2	38.8	3.91	4.13
10.375	9.38	3.6	10.5	117.8	252.7	49.3	--	--
12.375	11.38	3.8	10.5	141.8	366.3	59.8	--	--

Table 3: Allowable Uniform Transverse Loads¹ (psf)

Clear Span (ft)	4 $\frac{5}{8}$ inch Thick SIP			6 $\frac{1}{2}$ inch Thick SIP		
	Deflection Limit			Deflection Limit		
	L/180	L/240	L/360	L/180	L/240	L/360
8 WAB	50.8	44.6	29.7	75.8	71.0	47.3
8	76.4	57.3	38.2	104.8	94.0	62.7
10	50.4	37.8	25.2	80.6	64.5	43.0
12	34.6	26.0	17.3	61.0	45.8	30.5
14	24.6	18.4	12.3	44.5	33.4	22.3
16	--	--	--	33.2	24.9	16.6
18	--	--	--	25.3	19.0	12.7

Note: ¹ See notes below Table 4.

Table 4: Allowable Uniform Transverse Loads (cont.)^{1,2,3,4}
(psf)

Clear Span (ft)	8 ¼ inch Thick SIP			10 ¼ inch Thick SIP			12 ¼ inch Thick SIP		
	Deflection Limit			Deflection Limit			Deflection Limit		
	L/180	L/240	L/360	L/180	L/240	L/360	L/180	L/240	L/360
8 WAB	99.1	96.2	64.1	125.9	125.4	83.6	139.6	139.6	103.2
8	115.4	115.4	86.5	127.4	127.4	114.3	139.6	139.6	139.6
10	87.9	87.9	60.8	95.7	95.7	82.0	103.4	103.4	103.4
12	70.9	66.2	44.1	76.6	76.6	60.6	82.1	82.1	77.8
14	59.5	49.2	32.8	63.9	63.9	45.9	68.1	68.1	59.7
16	49.8	37.4	24.9	54.8	53.0	35.3	58.1	58.1	46.6
18	38.5	28.9	19.2	48.0	41.5	27.7	50.7	50.7	36.9
20	30.2	22.7	15.1	40.7	33.0	22.0	45.0	44.3	29.6

Notes: The following assumptions and limitations apply to Tables 3 and 4:

1. Table values assume a simply supported panel with 1.5 inches of continuous bearing on facing at supports ($C_v = 1.0$) with splines at bearing locations. Values do not include the dead weight of the panel. $C_v = 0.4$ shall be used where no bearing is provided.
2. Deflection limits shall be selected by the building designer based on the serviceability requirements of the structure and the requirements of the applicable building codes adopted by the Texas Department of Insurance. Deflection values based on loads of short duration only and do not consider effects of creep.
3. Tabulated values are based on the strong-axis of the facing material oriented parallel to the span direction. WAB indicates weak-axis-bending of the facing material i.e. the facing material weak-axis is parallel to the span direction.
4. Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.

Table 5: Allowable Axial Loads^{1,2,3,4,5}
(plf)

Lateral Brace Spacing (ft.)	Panel Thickness		
	4 ⅝ inches	6 ½ inches	8 ¼ inches
8 WAB	2420	2580	2650
8	3700	4080	4230
10	3370	3930	4140
12	2990	3730	4020
14	--	3500	3890
16	--	3240	3720
18	--	2960	3540
20	--	--	3340

Notes: ⁴

1. Permanent loads, such as dead load, shall not exceed 0.50 times the tabulated load.
2. All loads are for normal load 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 inches on center. Such members shall be fastened to a rim board or similar member to distribute along the top of the SIP panel.
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 span direction. WAB indicates weak-axis-bending of the facing material i.e. the facing material weak-axis is parallel to the span direction.

**Table 6: Allowable In-Plane Shear Strength for SIP Shear Walls
(Wind and Seismic Loads in Seismic Design Categories A, B and C) ^{1,2,3,4}**

Spline Type	Nominal SIP Thickness (inches)	Minimum Facing Connections			Shear Strength (plf)
		Chord	Plate	Spline	
Block or Surface Spline	4.625	0.113-in. x 2.375-in. ring shank nails (0.275-in. head diameter), spaced a maximum of 6" o.c.			380
	6.625				380
	8.375				400

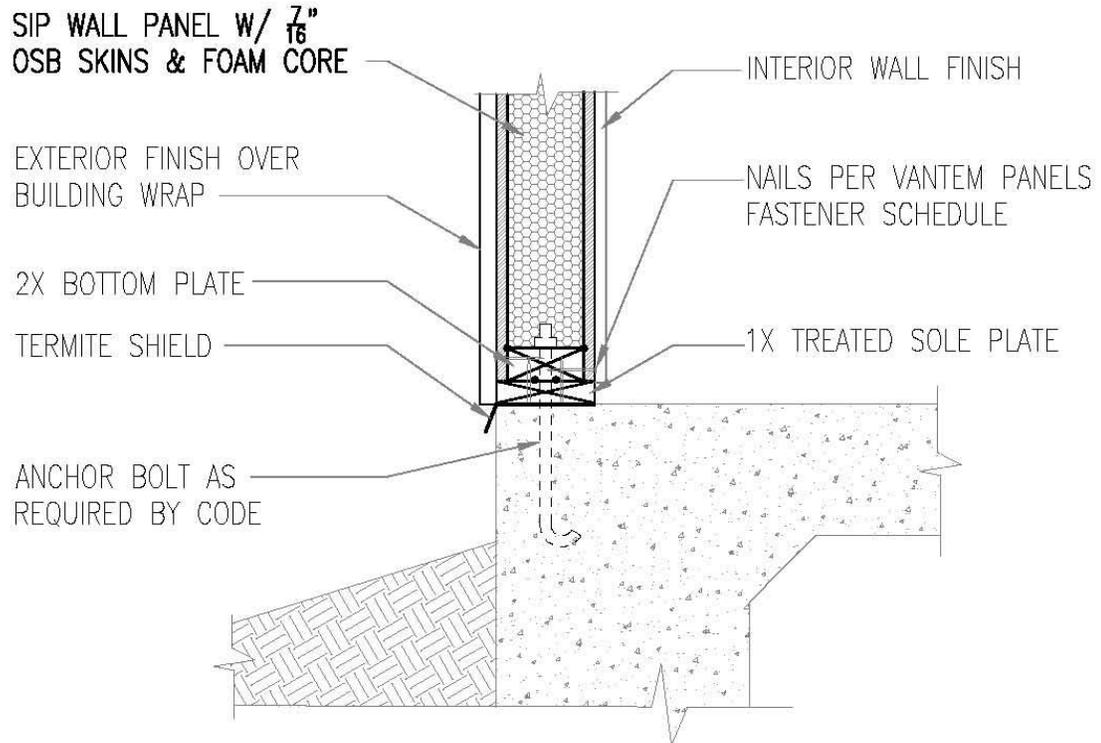
Notes: ⁵

1. The maximum shear wall height to width ratio shall be limited to 2:1 for resisting wind and seismic loads.
2. Chords, holddowns and connection to other structural elements must be designed by a Texas licensed engineer.
3. Spline type at interior panel-to-panel joints only, solid chord members are required at each end of each shear wall segment.
4. Connections must be made on each side of the panels. Dimensional or engineered lumber shall have an equivalent specific gravity $G \geq 0.42$.

Table 7: Approved Material Sources¹

Facing	Core	Adhesive
Ainsworth Lumber Co. Ltd. Suite 3194 Bentall 4 1055 Dunsmuir Street Vancouver BC, Canada V7X 1L3: Bemidji, MN (Mill 353) Barwick, Ontario (Mill 498)	Falcon Foam, A Division of Atlas Roofing 8240 Byron Center SW Byron Center, MI 49315: Falcon Foam Expanded Polystyrene Insulation Boards (Type I)	Rohm & Haas Chemicals LLC 2531 Technology Drive Elgin, IL 60124: Mor-Ad™ M- 640, Mor-Ad™ M-642 Mor-Ad™ M-6575
Tolko Industries Ltd 3203 30th Avenue Vernon BC, Canada V1T 6M1: High Prairie, AB (Mill 450) Meadow Lake, SK (Mill 492)	AFM Corporation 211 S River Ridge Circle, #102A Burnsville, MN 55337: Foam-Control EPS Boards (Type I)	Ashland Specialty Chemical Company 5200 Blazer Parkway Dublin, OH 43017 ISOSET EPI WD3-A322 with ISOSETCX47 ISOSET EPI WD3-A320 with ISOSETCS47
	OPCO, Inc. P.O. Box 101 Latrobe, PA 15650 EPS Boards (Type I)	
	Powerfoam Insulation 550 Murray Street/Highway 287 Midlothian, TX 76065 EPS Boards (Type I)	
	Iowa EPS Products, Inc. 5554 N.E. 18th Street Des Moines, Iowa 50313 EPS Boards (Type I)	

Note: ¹ Panels may be composed of any combination of approved materials.



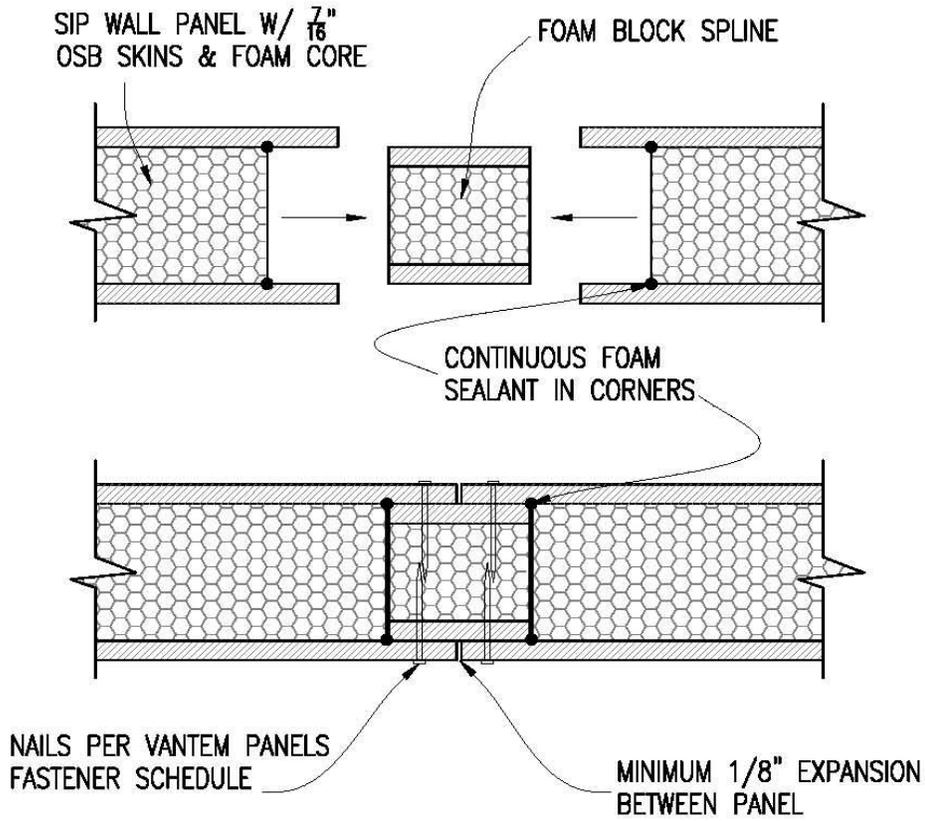
SIP WALL FRAMING TO CONCRETE FOUNDATION
SCALE: NTS

SERIES-# 101.2

Made 11/15/07

updated 06/28/11



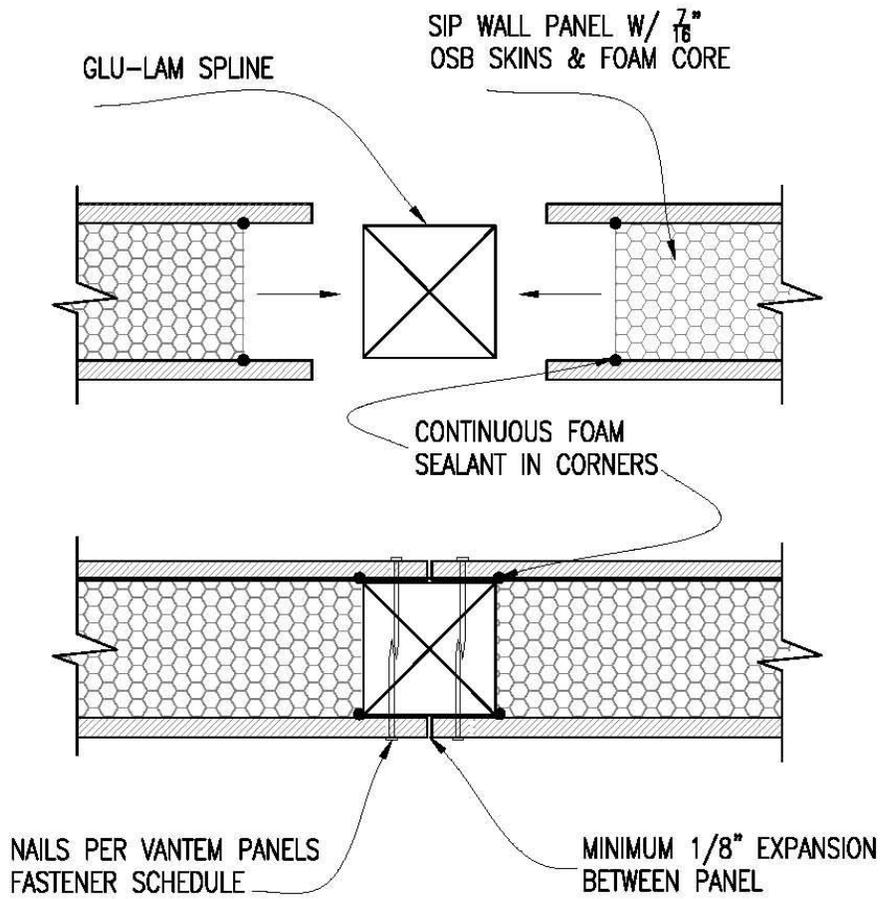


FOAM BLOCK SPLINE
SCALE: NTS

SERIES-201.1

Made 11/30/07
updated 06/29/11



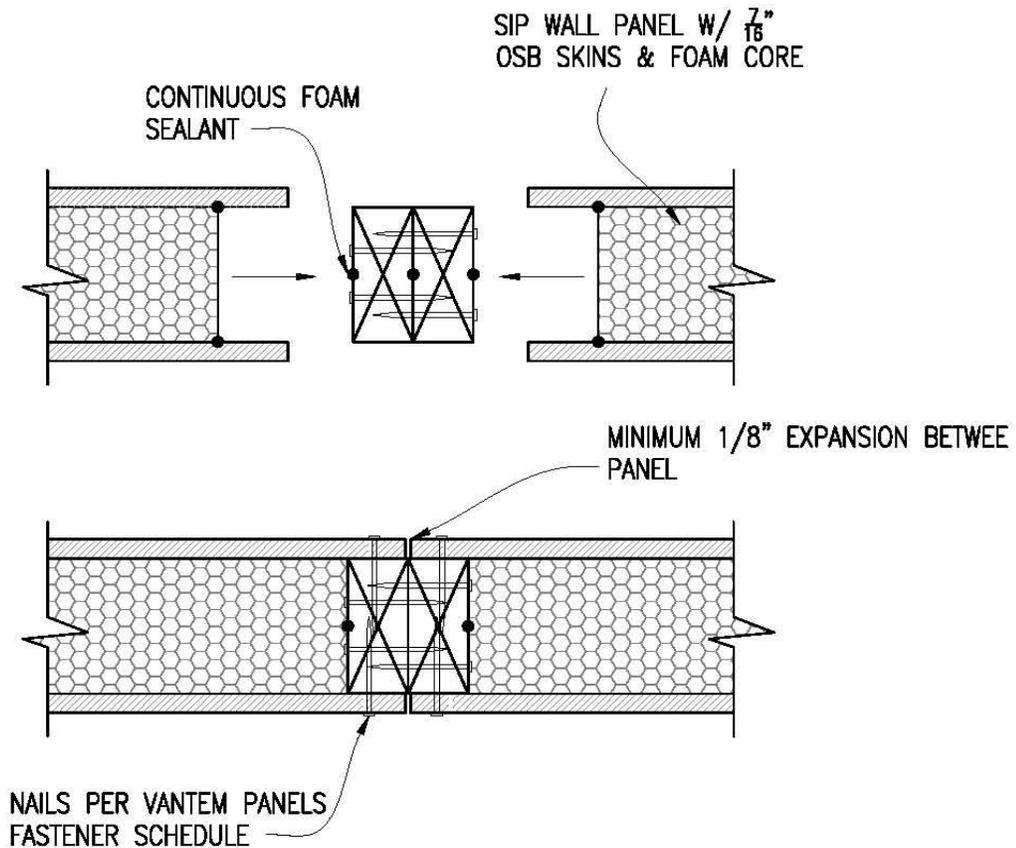


GLUE LAMINATED TIMBER SPLINE
SCALE: NTS

SERIES-201.2

Made 11/30/07
updated 06/29/11



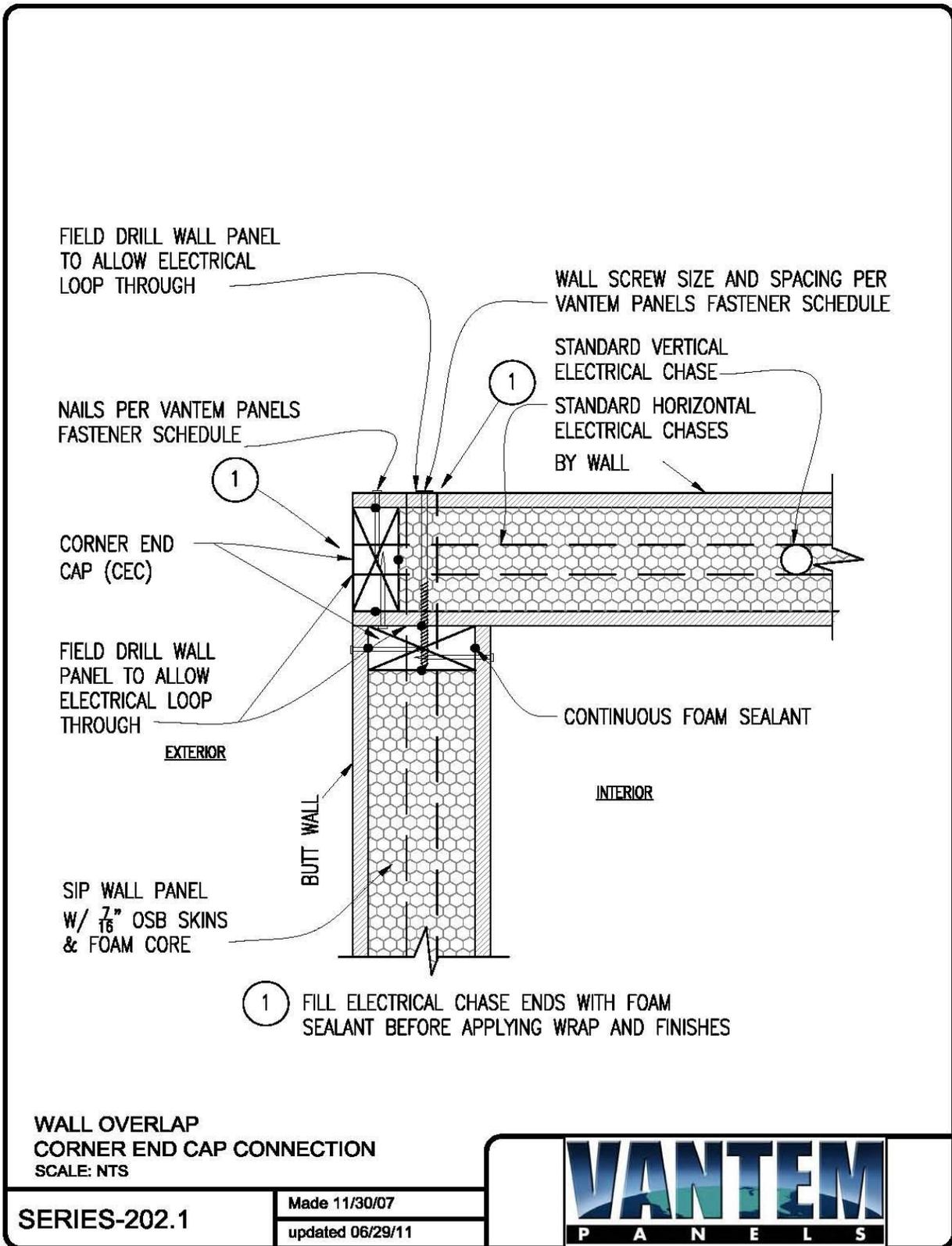


DOUBLE 2X SPLINE
SCALE: NTS

SERIES-201.4

Made 11/30/07
updated 06/29/11

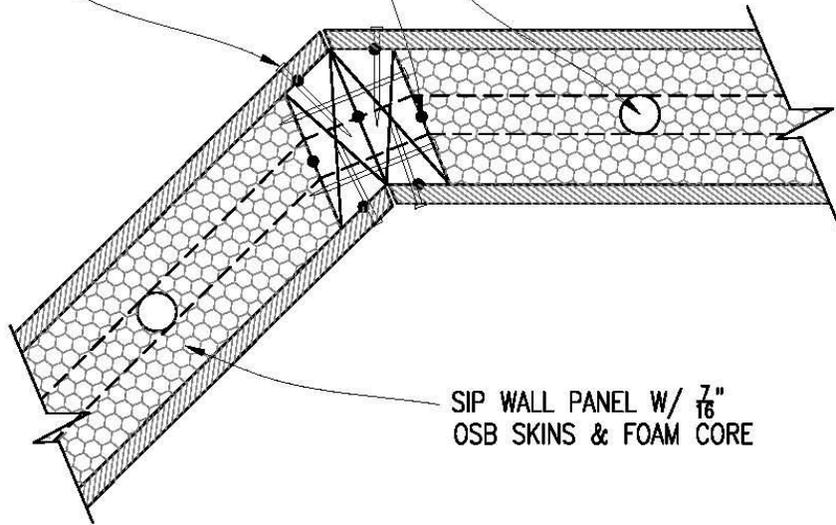




DOUBLE 2X SPLINE W/ ANGLE CUT.
NAILS AND SPACING PER BY VANTEM
PANELS FASTENER SCHEDULE

CONTINUOUS FOAM SEALANT

STANDARD VERTICAL ELECTRICAL CHASE



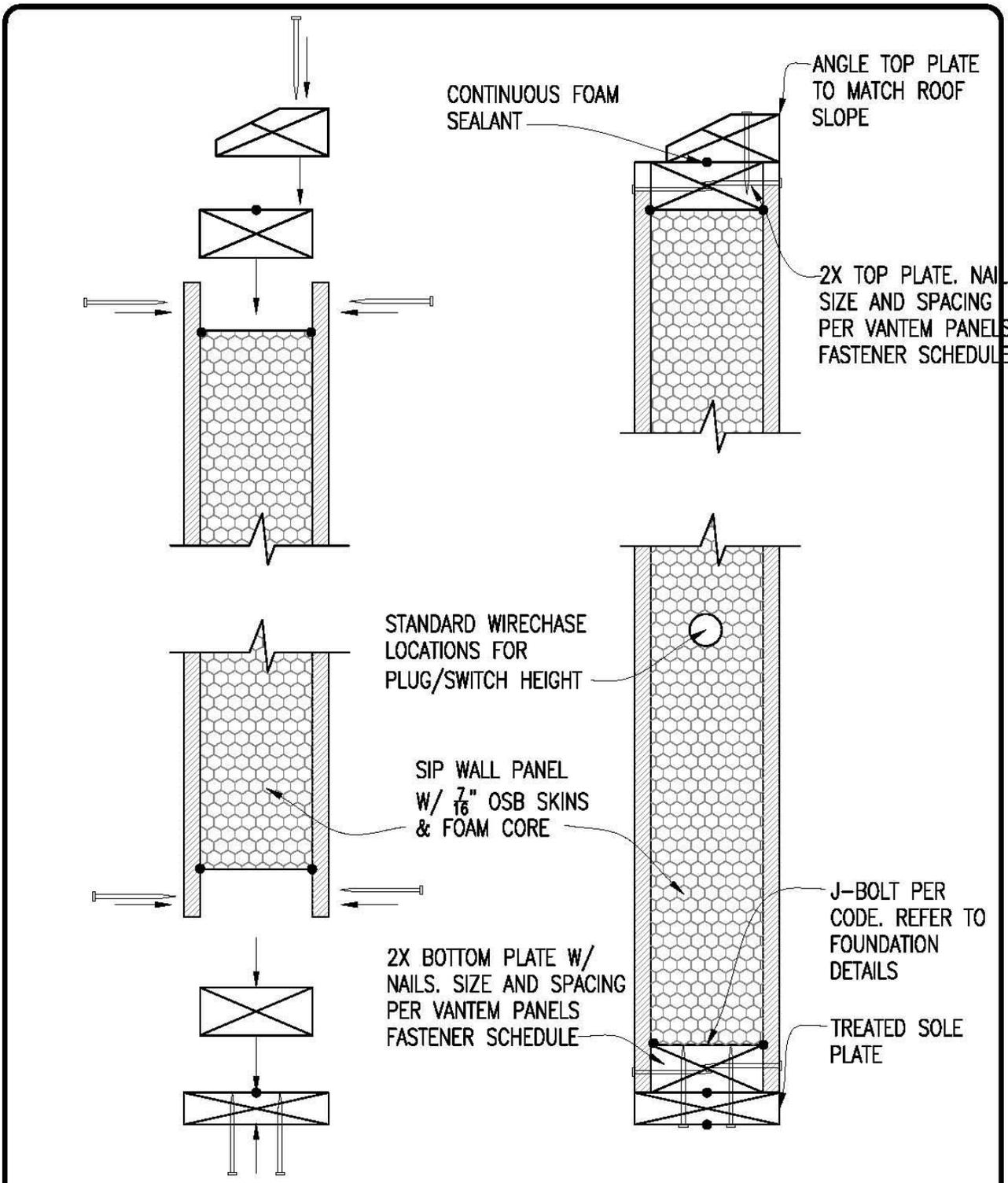
SIP WALL PANEL W/ $\frac{7}{16}$ "
OSB SKINS & FOAM CORE

ANGLE WALL SPLINE PLAN SECTION
SCALE: NTS

SERIES-202.2

Made 11/30/08
updated 06/29/11



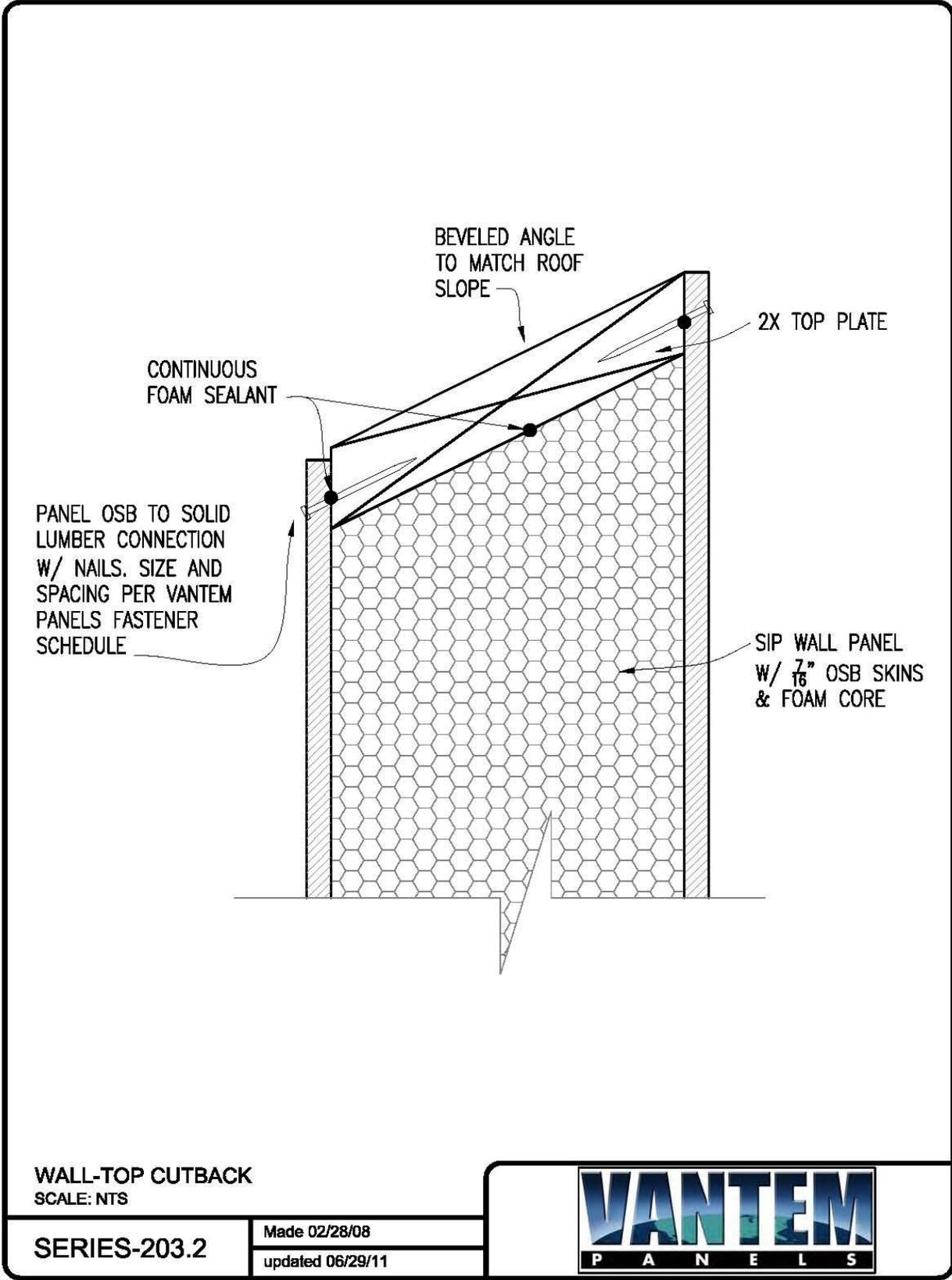


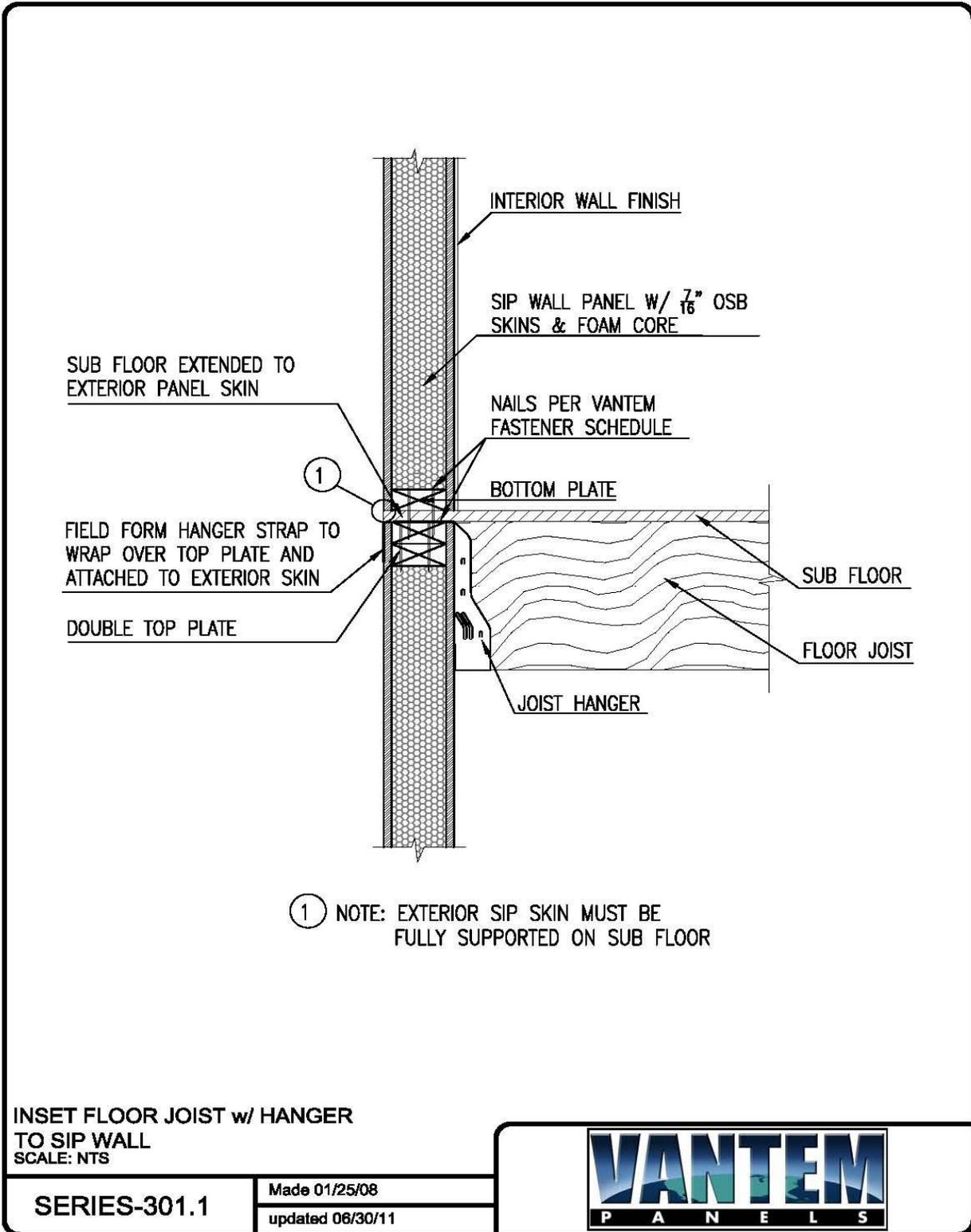
ANGLED TOP PLATE
 TO PANEL CONNECTION
 SCALE: NTS

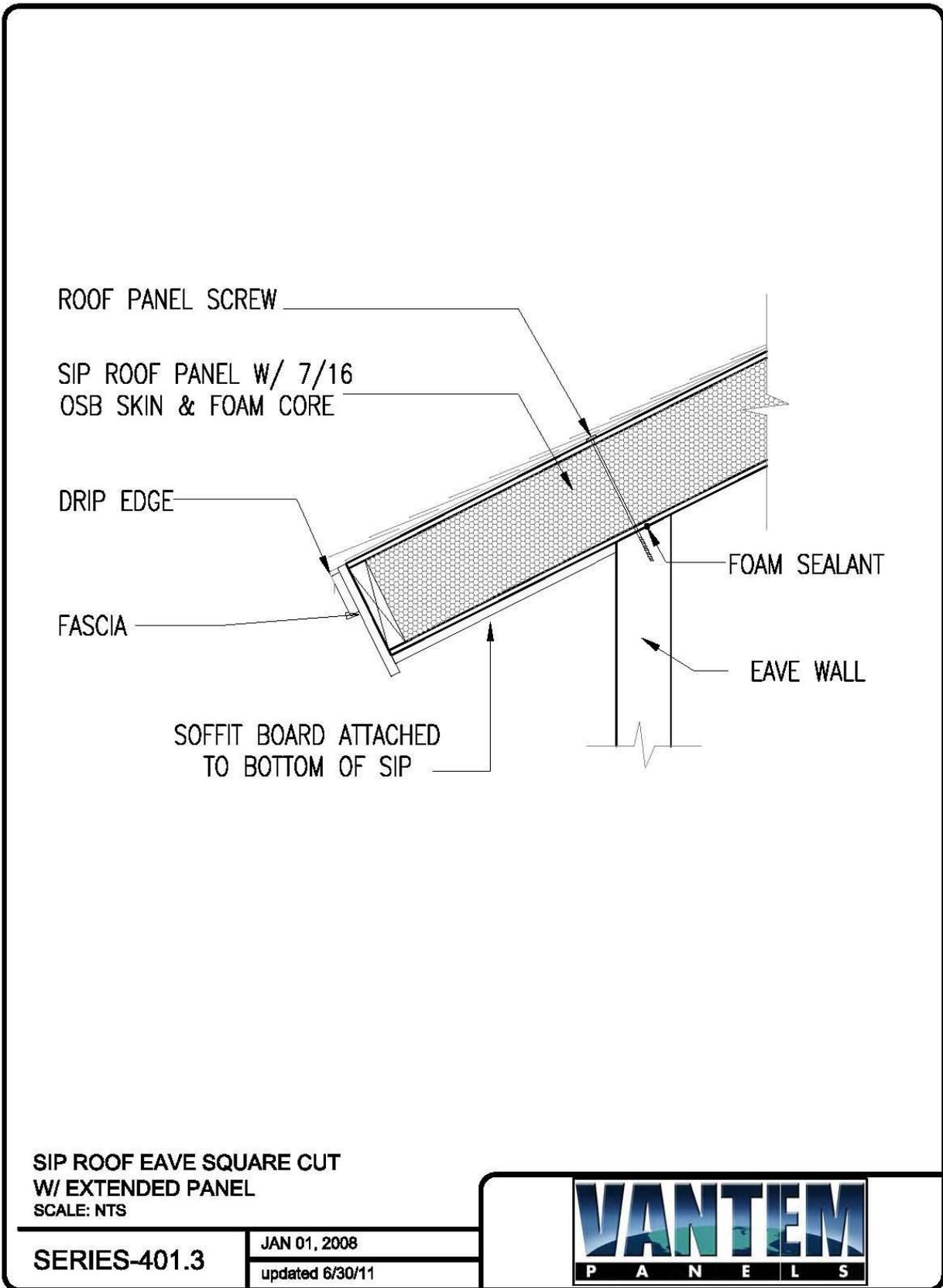
SERIES-203.1

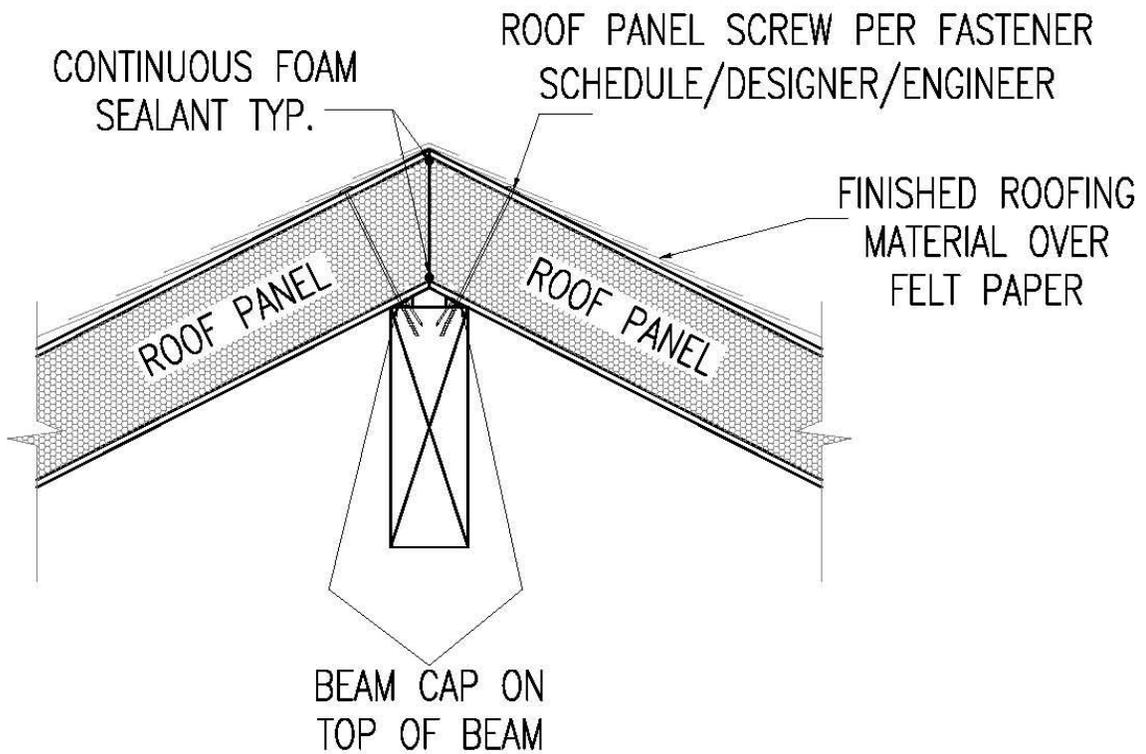
Made 11/30/08
 updated 06/29/11











ROOF RIDGE-PLUMB CUT
RIDGE BEAM
SCALE: NTS

SERIES-402.1

DEC 07, 2008
updated 6/30/11



