



PRODUCT: *ProTEC® Concrete Structural Insulated Panels*
DIVISION: Wood and Plastics (06)
SECTION: Structural Panels (06 12 00)

Report Holder

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Manufacturing Locations
*As noted above***1. SUBJECT**

ProTEC® Concrete Structural Insulated Panels

2. SCOPE

NTA, Inc. has evaluated the above product(s) for compliance with relevant sections of the following codes:

- 2006 International Building Code (IBC)
- 2006 International Residential Code (IRC)

This NTA, Inc. is limited to evaluation of the following properties of the above product(s):

- Structural performance under axial, transverse, and racking loads
- Surface burning characteristics
- Thermal barrier—room corner fire test

3. USES

3.1. ProTEC® Concrete Structural Insulated Panels are used as exterior walls in buildings of combustible construction, (Type V).^(NACU1)

3.2. Fire Resistive Assemblies. *ProTEC® Concrete Structural Insulated Panels* shall not be used as part of a fire-rated assembly.^(ACU15)

4. DESCRIPTION

4.1. General. *ProTEC® Concrete Structural Insulated Panels* are prefabricated sandwich panels with facings of cement board bonded with expanded polystyrene foam insulation core material. The panels are used as load bearing wall components. The panels are 4-1/2 inches thick and produced in standard widths of 18 and 36 inches and in lengths up to 120 inches long

4.2. Materials

4.2.1. Facing. Facing materials are 1/4-inch-thick Util-A-Crete-concrete, glass-fiber-mesh-reinforced panels manufactured by FinPan, Inc.

4.2.2. Core. Core material is expanded polystyrene foam plastic, manufactured by Plymouth Foam Inc. and recognized in ICC-ES ESR-1634. The foam plastic core has a nominal density of 2.0 pcf, and is manufactured in a 3-13/16 inch thickness for use in panel fabrication.

4.2.3. Adhesive. The facing material is bonded to the core using the proprietary sandwich panel adhesive manufactured by FinPan, Inc. The adhesive is a Type II, Class 2, cementitious product composed of Type I Portland cement, Type F flyash, and a latex/water emulsion.

4.2.4. Splines. Top/Bottom Tracks. Splines, top channels and top/bottom tracks are manufactured from 20 gage (base-metal thickness of 0.036 inch) CQ G-90 galvanized steel conforming to ASTM A792 (Gr 33). Top and bottom tracks consist of C-channels, measuring 2-1/2 inches x 2 inches, with the flanges inserted into the pre-cut grooves along the edges of each sandwich panel.

H Studs and Angles are manufactured from 18 gage (base-metal thickness of 0.048 inch) CQ G-90 galvanized steel conforming to ASTM A653 (Gr 33). H Studs consist of two C-channels, measuring 2-1/2 inches x 2 inches, spot welded web-to-web to form a H-section. The H-section flanges are inserted into the pre-cut grooves along the edges of each sandwich panel. 1/2H-channel splines are used at panel ends.

4.2.5 Fasteners.

4.2.5.1 Standard Fasteners. After the steel splines or plates are set in the grooves of a panel, the panel is secured to the splines and plates using T Clear Driller corrosion resistant No. 14-10 x 1-5/8 inch proprietary heavy-duty wafer-head screws and 1-1/2 inch x 0.140 inch diameter, ITW Buildex GYP-FAST™ pneumatic coil nails.

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4.2.5.2 Alternative Fastening. Handi-Stick[®] Adhesive by Fomo Product, Inc. and T Clear #14 x4.00-in. Dual Thread Shear Fastener (a proprietary heavy duty wafer-head screw) are used in place of the #14-10 x 1 5/8 fasteners. Fasteners are used at each corner of every panel and at third points on the vertical long sides of every panel.

5. DESIGN

5.1. Overall Structural System. The scope of this report is limited to the evaluation of the SIP panel component. Panel connections and other issues concerning the panel's incorporation into the overall structural system of a building are beyond the scope of this report.^(NACU4)

5.2. Design Approval. Where required by the authority having jurisdiction, structures using *ProTEC 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.^(NACU5)

5.3. Design Loads. Design loads to be resisted by the SIP panels shall be as required under the applicable code. Loadings on the panels shall not exceed the loads noted in this report. Where loading conditions result in several modes of superimposed stressing, 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.^(NACU6)

5.3.1. Strength Limited to Tested Height/Span Only. In use panel heights/spans shall not exceed the values listed herein. Extrapolation beyond the values listed herein is not permitted.^(ACU2)

5.3.2 Strength Limited to Tested Thickness Only. This report applied only to the panel thicknesses specifically listed herein.^(ACU3)

5.4. Allowable Loads. Allowable axial, transverse, and racking loads are noted in Tables 1 through 4. Design for combined shear, axial, and/or transverse loading shall be in accordance with NTA, Inc. *Inspection Method 14.0 SEP 01* (IM014). For loading conditions not specifically addressed herein, the specific condition shall be framed by other methods to meet applicable code requirements.

5.5. Concentrated Loads. Axial loads shall be applied to SIP panel through repetitive members spaced at regular intervals of 24-inches on center, or less. Reinforcement designed in accordance with accepted engineering practice shall support all concentrated loads.^(ACU13)

5.6. Eccentric and Side Loads. Axial loads shall be applied concentrically to the top of the SIP panel. Loads shall not be applied eccentrically or through framing attached to one side of the panel (such as balloon framing).^(ACU14)

5.7. Openings. Openings up to 72 inches in width, and having a minimum 13.5 inch header depth, are permitted for door and window installations. Header channels must be installed and attached to the splines adjacent to the opening with two (2) #10-16 x 1/2-inch pan head self-drilling screws on each side of the opening. All top tracks over the header must be continuous over the opening and extend at least 6 inches over each side of the opening. T Clear Driller corrosion resistant No. 14-10 x 1-5/8 inch proprietary heavy-duty wafer-head screws shall be installed 8 inches on center connecting the header panel to the steel header channel and the top track. A minimum of three T Clear Driller screws shall be used to attach the header to the vertical studs at each end of the header. Openings greater than 6 feet and/or openings with loads greater than those specified in Table 3 must be designed by a registered design professional and frame by conventional methods. Such details shall be subject to approval by the local authority having jurisdiction.^(ACU8)

5.8. Shear Wall Design. Shear walls shall be sized to resist all code required wind and seismic loads without exceeding the allowable loads provided in Table 4. The maximum panel height-to-width ratio shall be 2:1.^(ACU18)

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5.9. Seismic Design Where *ProTEC® Concrete Structural Insulated Panels* are used to resist seismic forces the following factors shall be used for design: Response Modification Coefficient, $R = 2.0$; System Overstrength Factor, $\Omega_0 = 2.5$; Deflection Amplification Factor, $C_d = 2.0$.^(ACU17)

5.10. Seismic Design Limits. Use of panels as shear walls (racking shear) is limited to structures in Seismic Design Categories A, B and C.^(NACU3)

6. INSTALLATION

6.1. General.

6.1.1 *ProTEC® Concrete Structural Insulated Panels* shall be fabricated, identified and erected in accordance with this report, the manufacturer's published installation instructions, and the applicable code. In the event of a conflict between the manufacturer's published installation instructions and this report, this report shall govern. A copy of the installation instructions shall be available at all times on the jobsite during installation.^(NACU8)

6.1.2 Where required by the authority having jurisdiction, structures using *ProTEC® Concrete Structural Insulated Panels* shall be designed by a registered design professional. Drawings shall be provided that bear the design professional's registered stamp or seal when application is made for a building permit. Such drawings shall contain specific instructions with regard to connections, erection, and installation of the panels, and shall be available at all times on the jobsite during installation. These documents are not covered by this report.

6.2. Splines.

6.2.1 Standard Fastening *ProTEC® Concrete Structural Insulated Panels* are connected to each other at the panel edges through the use of an H-section stud. The stud is secured in place by the field application of one T Clear Driller corrosion resistant No. 14-10 x 1-5/8 inch proprietary heavy-duty wafer-head screws in each corner of each panel on both sides. Each screw shall be installed to penetrate one flange of the spline and one flange of the top/bottom track. Between the screws, along each panel edge, 1-1/2 inch x 0.140 inch diameter, ITW Buildex GYP-FAST™ pneumatic coil nails, shall be provided at a spacing not to exceed 8-inches on center, on both sides of the panel. Each nail shall penetrate one flange of the spline

6.2.2 Alternative Fastening Handi-Stick® Adhesive by Fomo Product, Inc. is applied in a single bead in all saw kerfs and a serpentine bead on all edge faces between saw kerfs to adhere framing members. After the steel splines or plates are set in the groves of a panel, the panel is secured to the splines and plates using T Clear #14x4.00-in. Duel Thread Shear Fastener (a proprietary heavy duty wafer-head screw). Fastening is done at each corner of every panel and at third points on the vertical long sides of every panel

6.3. Cutting and Notching. No field cutting or routing of the panels shall be permitted except as shown on approved drawings.^(NACU7)

6.4. Electrical Installation. Electrical raceways may be installed in the panels during fabrication at predetermined locations only. Electrical raceways are limited to two 1-1/2-inch maximum (outside diameter) vertical raceway at 8-inches from edge of panel for 3-foot wide panels and one for 9-inches from edge of panel for 18- inch wide panels.

6.5. Panel Cladding

6.5.1 Exterior Wall Covering. Panels, at the time of their erection and placement, 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.^(ACU10) The exterior facing of the SIP wall shall be covered with weather protection as require by the adopted building code or other approved materials.^(ACU11) All exterior panel joints must be sealed with latex thin-set mortar or compatible acrylic latex. Fiberglass mesh shall be imbedded in the thin-set or sealant. Mesh shall be no less than 4" wide.

6.5.2 Interior Wall Covering. The *ProTEC® Concrete Structural Insulated Panels* qualify as a Class A interior finish rating and does not require a 15 minute thermal barrier as required in applicable sections of the code listed in Section 2.0.^(ACU9)

7. CONDITIONS OF USE

ProTEC® Concrete Structural Insulated Panels as described in this report comply with relevant sections of the codes listed in Section 2.0, subject to the following conditions:

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7.1 ProTEC® Concrete Structural Insulated Panels shall not be used in areas classified as High Velocity Hurricane Zones (Broward and Dade Counties) as indicated in the referenced codes.

7.2 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. ^(NACU10)

7.3 Vertical Use Only. SIP shall be installed vertically only and shall not be used horizontally as a roof or floor assembly. ^(ACU5)

7.4 The panels are manufactured in the production facility(ies) noted in this report and under a quality control program approved by NTA, Inc. ^(NACU9)

8. EVIDENCE SUBMITTED

NTA, Inc. has examined the following evidence to evaluate this product:

8.1 Review of plant quality assurance manual

8.2 Plant certification inspection of manufacturer's production facilities, test procedures, frequency and quality control sampling methods, test equipment and equipment calibration procedures, test records, dates and causes of failures when applicable.

8.3 Qualification test data in accordance with NTA, Inc. *Inspection Method 14.0 SEP 01* (IM014).

8.4 Follow-up quality assurance audits of the production facility(ies).

8.5 Follow-up testing in accordance with NTA, Inc. *Inspection Method 14.0 SEP 01* (IM014).

Evaluation evidence and data are on file with NTA, Inc. (Rule 9B-1, F.A.C. Rule 9B-72, F.A.C. System ID #'s QUA3504, VAL3479, TST3478)

9. FINDINGS

The panels are manufactured in the production facility(ies) noted in this report and under a quality control program approved by NTA, Inc. ^(NACU9)

This report expires one year from the issue date noted below.

Evaluation evidence and data are on file with NTA, Inc. NTA, Inc. is accredited by the International Accreditation Service (IAS) as follows:

ISO17020 Inspection Agency (AA-682)

ISO17025 Testing Laboratory (TL-259)

ISO Guide 65 Product Certification Agency (PCA-102)

The scope of accreditation related to testing, inspection or product certification pertain only to the test methods and/or standard referenced therein. Design parameters and the application of building code requirements, such as special inspection, have not been reviewed by IAS and are not covered in the accreditation. Product evaluations are performed under the direct supervision of Professional Engineers licensed in all jurisdictions within the United States as required by the building code and state engineering board rules.

10. IDENTIFICATION

Each eligible panel shall be permanently marked to provide the following information:

- The NTA, Inc. listing mark, shown below;
- NTA's Listing No. TCC121205-17;
- in-plant quality assurance stamp;
- identifier for production facility;
- project or batch number.



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Table 1: Allowable Transverse Load

Clear Span (ft-in)	Deflection Limit					
	Standard Fastening					
	18 Inch Wide Panels			36 Inch Wide Panels		
	L/180	L/240	L/360	L/180	L/240	L/360
8'-0"	88.2 ¹	65.5 ¹	44.3 ¹	54.5 ¹	40.8 ¹	27.0 ¹
9'-0"	60.0 ¹	45.4 ¹	29.7 ¹	43.0 ¹	34.6 ¹	24.4 ¹
10'-0"	51.5 ¹	40.5 ¹	27.2 ¹	31.1 ¹	24.9 ¹	17.6 ¹
Alternative Fastening						
8'-0"	n/a	n/a	n/a	54.5 ¹	40.8 ¹	27.0 ¹
9'-0"	n/a	n/a	n/a	51.2 ¹	38.1 ¹	25.2 ¹
10'-0"	n/a	n/a	n/a	41.6 ¹	34.1 ¹	22.5 ¹

¹ Load governed by deflection.

² Load governed by ultimate strength divided by 3.0.

Table 2: Allowable Axial Compressive Load¹

Clear Span (ft-in.)	Uniform Compressive Load (plf)	
	18 Inch Wide Panels	36 Inch Wide Panels
Standard Fastening		
8'-0"	2842	2430
9'-0"		
10'-0"		
Alternative Fastening		
8'-0"	n/a	3320
9'-0"		
10'-0"		

¹ Allowable axial tension loads shall not exceed the allowable compression loads above. Loads may be interpolated to determine the allowable load under transverse loads or spans bounded by those provided. Axial loads consider an eccentricity equal to approximately 1/6 the overall thickness of the panel. For applications requiring greater eccentricities, contact the manufacturer for design assistance.

Table 3: Allowable Header Loads^{1, 2} (Dead + Live)

Span (ft)	Uniform Header Loads (plf)
Standard Fastening	
3'-0"	664
4'-0"	447
5'-0"	316
6'-0"	273

¹ See Section 5.2.2 for description of header assembly.

² Load governed by ultimate strength divided by 3.0, unless otherwise noted

³ Load governed by deflection limit of L/240.

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**Table 4: In-Plane Shear Loading¹**

Assembly Description	Overall Panel Thickness (in.)	Maximum Height/Length Ratio	Allowable Shear Strength (plf)	Shear at 1/8-inch Deflection (plf)
Standard Fastening 18 inch wide panels secured as described in Section 5.1.3	4-1/2	2:1	282	104
Standard Fastening 36 inch wide panels secured as described in Section 5.1.3	4-1/2	2:1	265	100
Alternative Fastening 36 inch wide panels secured as described in Section 5.1.4	4-1/2	2:1	405	284

¹ Limited to IBC seismic design categories A, B, and C. Tie-downs and connection to other structural elements must be design by a registered design professional.

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