

## SECTION 074453 – GLASS-FIBER REINFORCED CEMENTITIOUS PANELS

### PART 1 – GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Concrete structural insulated panels (CSIP) are used as exterior and/or interior walls in buildings of combustible non-fire-resistance-rated construction. CSIP are factory assembled sandwich panels with facing of cement board bonded with extruded polystyrene foam insulation core material. The panels are used as load bearing wall components.
- B. CSIP is framing, sheathing, insulation, electrical wire chases and interior wall surface all in one.

#### 1.3 DEFINITIONS

- A. CSIP – Concrete Structural Insulated Panels: Sandwich panel that uses 2 lb/cf density expanded polystyrene as a core material with light weight concrete backer board as outer facings or skins.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Panels come in 8'-1-1/8", 9'-1-1/8", or 10 ft. panel lengths. Custom Heights available. Standard Panel width is 3'-0".
- B. Mold and mildew resistant materials—ASTM D 3273
- C. Meets IBC – 2009
- D. Meets IRC – 2009
- E. Passes 15 minute Corner Burn Test
- F. Moisture resistant skins and core.
- G. Panel lengths fit dimensional lumber.
- H. Long term insulation value (R-20).
- I. Require no special tool for installation.
- J. All connectors are galvanized or weather resistant coated

#### 1.5 SUBMITTALS:

- A. Product Data: Type of construction and component of CSIP
- B. Include panels cut and numbered to match your floor plan, elevations, sections, details of components, details of penetration and termination, flashing details, joint locations and configurations, fastening and anchorage details including mechanical fasteners, and connections and attachments to other work.
- C. Show all the precut window and door headers and under-window panels.
- D. Show all the wiring chases and box openings.

- E. Show all the hold down system for the Seismic & Severe Wind conditions.
  - F. Provide schedule for the fabrication.
  - G. Provide erection drawings that include drawings, diagrams, templates, instruction, and directions, as required, for lifting, handling, placing, and installation of CSIP panels.
  - H. Research/Evaluation reports on the CSIP.
  - I. Maintenance Data for CSIP maintenance manual and repair.
- 1.6 QUALITY ASSURANCE
- A. Fabricator Erector Qualifications: Certified in writing by CSIP manufacture as qualified to erect manufacturer's CSIP panel system.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Deliver materials in original packages with manufacturer's labels intact and clearly identifying products.
  - B. Store materials cover: keep them dry and protected from weather, surface contamination, corrosion, damaging temperatures, construction traffic, and the causes.
  - C. Keep all panels, steel components and fasteners protected from the elements prior to installation.
  - D. Store the panels laying flat.
  - E. Do not drop panels.
- 1.8 PROJECT CONDITIONS
- A. Field Measurements: Verify actual dimensions required for CSIP plans by field measurements before fabrication and indicate measurements on Shop Drawings.
- 1.9 COORDINATION
- A. Coordination installation of CSIP with related Work specified in other Sections to ensure that wall assemblies, including flashing, trim, joint sealants, windows and doors, plumbing and electrical.

## PART 2 – PRODUCTS

### 2.1 MANUFACTURERS

- A. ProTEC –concrete structural insulated panel system by T.Clear Corporation, (no known equal).

### 2.2 MATERIALS

- A. Facings:
  - a. Exterior and interior panel facings are 1/4" inch (6.35mm) thick Util-A-Crete Concrete Glass Fiber Mesh Reinforced Panels listed under NER-419 and manufactured by Fin-Pan, Inc.

B. Foam Core:

- a. The foam core is expanded polystyrene(EPS); 3.83 inch (97.28 mm) thick, nominal 2.0 pcf (32.04 kg/cubic m) density. Flame Spread Index (FSI) of 5 and a Smoke Development Index (SDI) of 250-350.

C. Adhesive:

- a. The adhesive used to bond the facings to the foam core is a moisture cure urethane similar to Ashland 3030D and meeting the requirements of ICC-ES- AC-05.

D. . Fasteners:

- a. The fasteners are T Clear Drill tip, corrosion resistant #14-12 x 4-1/4" Dual Thread, with a 5/8" diameter self drilling, square drive and #14-10x1-5/8 inch with a 5/8" pancake head square drive.
- b. Adhesive: Fomo Corp. expanding polyurethane is as part of the connection system to bond panels to the top and bottom track and to each other incorporating the "H" Studs and "H/2" studs, or steel or wood tubes, studs or posts at the panel joints. The adhesive is used in conjunction with the above described screws.

E. Steel Structural Components:

- a. Top and Bottom Track shall consist of minimum 20 ga. G-60 galvanized "U" shaped track nominally 2-5/8" OD (2-9/16" ID) web and 2" vertical legs. These pieces are 10' long.
- b. Corner angle shall consist of 18 ga. G-60 galvanized steel with 2" legs and length to fit the panel height ( 97", 109" 120" )
- c. Half "H" studs ("H/2") shall be G-60 galvanized steel. The outside dimension of the web shall be 2-1/2" and the legs shall be 2" long. One end of the "H/2" is painted blue to distinguish it from the top and bottom track. The H/2 will fit snugly into the top and bottom track. The standard H/2 studs are 97", 109" and 120" in length and are used to fit the appropriate panel length.
- d. "H" Studs consist of two H/2 studs that are factory spot welded together on the web. A urethane sealing compound is applied to the web of the H/2 studs prior to welding. They are then welded approximately 6" OC in a stagger pattern down the full length of the stud with two welds at each end of the stud.. The "H" stud fits into the bottom and top track and into the grooves of two adjoining panels. The "H" studs are 97", 109" and 120" in length and are sized to fit the panel length being used.

### 2.3 PANEL SIZES

- A. Thickness is nominal 4-1/2"
- B. Standard sizes are 36" x 97-1/8", 36" x 109-1/8" and 36" x 120"
- C. Custom Sizes are available.

## PART 3 – EXECUTION

### 3.1 GENERAL

- A. ProTEC CSIPs are installed in accordance with the manufacturer's published installation instructions.
- B. Engineering calculations and drawings providing floor plans, window details, door details, and connector details shall be submitted to the Architect.

### 3.2 PANEL CONNECTION

- A. The panels are fabricated with grooves in the insulation to install the Galvanized Steel top and bottom "C" Channels, "H" Studs, "H/2" studs, and Corner Angles. The panels are connected to these components by first injecting the Fomo Urethane Sub-Floor adhesive into the panel grooves and the "web" between the grooves. The panels are then placed in position, checked for plumb and level and then attached to the steel components using the appropriate screw- typically the #14 x 4-1/4" Dual Thread screw described above. There are 16 screws per panel – 1 in each corner and two at the third point on each vertical edge and on both inside and outside surfaces of the panel.

### 3.3 EXTERIOR AND INTERIOR WALL COVERINGS

- A. The exterior of the wall panels shall be covered with an approved exterior wall covering as indicated on the drawings. The panel facings on the interior have a Class A non- combustible interior finish rating.

### 3.4 OPENINGS

- A. Openings up to 72 inches (1829mm) in width, and having a minimum 13.5 inch (343mm) header depth, are permitted for door and window installations. Header channels must be installed and attached to the steel panel jamb C-Channels with two No. 10-16 by 1/2 inch (12.7mm) pan head self-drilling screws on each side of the opening. All header panels must be continuous, and installed on the header channel. Top header channels must be continuous over the opening and extend at least 6 inches (152mm) over each side of the opening. Proprietary No. 14-10 x 1-5/8 inch (41.3mm) wafer-head screws, spaced at 8 inches (203mm), are used to

connect the header panel to the steel header channel and steel top channel. A minimum of three wafer head screws are used to attach the header to the vertical splines at each end of the headers. Openings greater than 6 feet (1.8mm) and loads greater than those specified per manufacturer's standard must be designed by a registered professional engineer and framed by conventional methods.

### 3.5 FIELD FABRICATION

- A. Cutting the panel to reduce its width, cutting headers and window bases, and cutting panels to accommodate special situations.
  - a. Use circular saw with a carbide tip blade to cut the panel.
  - b. Thickness of the panel, the use of a hand held circular saw requires a cut be made on each of the panel.
  - c. Use metal straight edges and framing squares are helpful for making lines.
  - d. Where applicable, use a guide bar on the circular saw.
  - e. Cutting of the panel will remove some or all of the factory installed slots necessary for the installation of the steel components. These will have to be replaced as follows:
    - i. Set the circular saw blade depth at 2-1/8".
    - ii. If the factory installed slots have been removed, use the slots on both ends of the panel to set the guide bar on the circular saw, if possible. If it is not possible to use the guide bar, mark the lines on the panel. Then using either the guide bar or cut lines, cut the new 2 1/8" deep slots
  - f. When cutting a panel to reduce it width by 10" or less, make the cut on the side where there is no vertical electrical chase.
  - g. Headers cut for spans greater than 3 feet should not contain an electrical chase.

END OF THE SECTION