

# UL Solutions Evaluation Report

**UL ER22158-02**

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**UL Category Code: ULEX – Thermal Protection**

**CSI MasterFormat®**

DIVISION: 06 00 00 – WOOD, PLASTICS AND COMPOSITES  
Sub-level : 06 16 00 – Sheathing  
Sub-level : 06 16 13 – Insulating Sheathing  
Sub-level : 06 16 63 – Cementitious Sheathing

DIVISION: 07 00 00 – THERMAL PROTECTION  
Sub-level : 07 44 00 – Faced Panels  
Sub-level : 07 44 53 – Glass-Fiber-Reinforced Cementitious Panels

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## 1. Subject

PERMABASE CI® INSULATED CEMENT BOARD (Type PBCI) Units.

## 2. Scope of Evaluation

- 2021, 2018, 2015 *International Building Code* ® (IBC)
- 2021, 2018, 2015 *International Residential Code* ® (IRC)
- 2023, 2020 Florida Building Code (FBC)
- ICC-ES Acceptance Criteria for Quality Documentation (AC10)

The products were evaluated for the following properties:

- Surface Burning Characteristics
- Physical Properties
- Structural
- Noncombustible construction
- Fire-resistance-rated construction

## 3. Referenced documents

- ICC-ES:
  - ICC-ES Acceptance Criteria for Quality Documentation (AC10)
- ANSI/UL:
  - UL 263, Fire Tests of Building Construction and Materials
- ASTM:
  - ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials
  - ASTM E330, Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
- NFPA:
  - NFPA 285, Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components.
  - NFPA 268, Standard Test Method for Determining Ignitability of Exterior Wall Assemblies Using a Radiant Heat Energy Source.
  - NFPA 259, Standard Test Method for Potential Heat of Building Materials.

#### 4. Uses

PermaBASE CI Insulated Cement Board units (Type PBCI) are intended for use as an exterior backer board for manufactured stone, natural stone, slate, marble, ceramic, tile, brick, and stucco installed in accordance with 2021 and 2018 IBC Sections 1404.10, 2015 IBC and FBC Section 1405.10 and/or IRC Section R703.12. The units are suitable for use in either combustible or noncombustible construction as described in IBC and FBC Section 2603.5.1, and IRC Tables R302.1(1) and R302.1(2) when installed over the exterior face of a fire-resistance rated wall. When installed as a part of an exterior wall, PermaBASE CI Insulated Cement Board units (Type PBCI) comply with the applicable requirements of IBC Section 1405.1, 2015 IBC Section 1406.2, and FBC Section 1406.2.

PermaBASE CI Insulated Cement Board units (Type PBCI) are a Class A material with a flame spread index of less than 25 and smoke developed index less than 450.

PermaBASE CI Insulated Cement Board units (Type PBCI) may be installed on exterior walls more than one story of Types I, II, III, or IV construction in accordance with IBC and FBC Section 2603.5 when part of an exterior wall assembly as shown in Table 4.1 of this report. When NFPA 285 compliance is required, a layer of 1/2 in. thick gypsum sheathing is required, otherwise the insulated units may be installed directly to framing.

**Table 4.1 NFPA 285 Compliant Assembly Options**

Base Wall
<ol style="list-style-type: none"> <li>1) Cast Concrete Walls</li> <li>2) CMU Concrete Wall</li> <li>3) Steel Stud Framed Wall                             <ol style="list-style-type: none"> <li>a. 20 Ga, 3-5/8 in. min. steel studs spaced 24 in. OC max.</li> <li>b. Lateral Bracing every 4 ft. vertically</li> <li>c. 5/8 in. Type X interior gypsum board</li> <li>d. Cavity Insulation                                     <ol style="list-style-type: none"> <li>i. None</li> <li>ii. Fiberglass batt insulation (Class A faced or unfaced)</li> <li>iii. Mineral wool (Class A faced or unfaced) or any other noncombustible insulation</li> </ol> </li> <li>e. 1/2 in. thick exterior sheathing</li> </ol> </li> </ol>
Fire Stopping at Floor Lines
<ol style="list-style-type: none"> <li>1) 4 pcf density mineral fiber insulation installed in each stud cavity at floor line. Thickness must match stud cavity depth.</li> </ol>
Cavity Insulation
<ol style="list-style-type: none"> <li>1) No cavity insulation shall be used.</li> </ol>
Exterior Sheathing
<ol style="list-style-type: none"> <li>1) Minimum 1/2 in. thick exterior glass mat gypsum sheathing.</li> </ol>
Water-Resistive Barrier Over Exterior Sheathing
<ol style="list-style-type: none"> <li>1) None</li> <li>2) BASF Master Seal AWB 660</li> <li>3) Carlisle (CCW) Fire Resist Barritech NP</li> <li>4) Carlisle (CCW) Fire Resist Barritech VP (or VP LT)</li> <li>5) Carlisle (CCW) 705</li> <li>6) Carlisle (CCW) Fire Resist 705FR-A</li> <li>7) Carlisle (CCW) 705VP</li> <li>8) GE Momentive Elemax 2600</li> <li>9) Henry Air-Bloc 32MR</li> <li>10) Henry Air-Bloc 31MR</li> <li>11) Henry EnviroCap 108</li> <li>12) Henry Air-Bloc 33MR</li> <li>13) Henry Air-Bloc 21 FR</li> <li>14) Henry Blueskin VP 160</li> <li>15) Henry Air-Bloc 21S</li> <li>16) Henry Air-Bloc 17MR</li> <li>17) Henry BlueSkin SA</li> <li>18) Henry Air-Bloc 16MR</li> <li>19) Henry FoilSkin</li> <li>20) Henry MetalClad</li> <li>21) Polyguard Air Lok Flex</li> <li>22) Polyguard Air Lok Flex VP</li> <li>23) Polyguard FlexGuard</li> <li>24) Polyguard Air Lok Sheet UV400 NP</li> <li>25) Dörken Delta Vent SA</li> <li>26) Dörken Delta Vent S/Plus</li> <li>27) Dörken Delta Fassade S</li> <li>28) Dörken Delta Foxx/Plus</li> <li>29) Dörken Delta Maxx/Plus</li> </ol>

<ul style="list-style-type: none"> <li>30) Soprema Sopraseal Stick VP</li> <li>31) Soprema Soprasolin HD</li> <li>32) Soprema LM 204 VP</li> <li>33) Prosoco Spraywrap MVP</li> <li>34) Prosoco R-Guard VB</li> <li>35) Prosoco R-Guard Cat 5</li> <li>36) Prosoco R-Guard Cat 5 Rain Screen</li> <li>37) Vaproshield Revealshield SA</li> <li>38) Vaproshield Wrapshield SA</li> <li>39) GCP (Grace) PAB NPL 10</li> <li>40) GCP (Grace) PAB NPS</li> <li>41) GCP (Grace) PAB NPL</li> <li>42) GCP (Grace) PAB VPL</li> <li>43) GCP (Grace) PAB VPL LT</li> <li>44) GCP (Grace) PAB VPS</li> <li>45) GCP (Grace) PAB AWM</li> <li>46) GCP (Grace) PAB VPL 50</li> <li>47) WR Meadows Air-Shield LMP (Gray)</li> <li>48) WR Meadows Air-Shield LMP (Black)</li> <li>49) WR Meadows Air-Shield TMP</li> <li>50) WR Meadows Air-Shield LSR</li> <li>51) Siga Majvest</li> <li>52) Siga Majvest 500 SA</li> <li>53) Tremco ExoAir 230</li> <li>54) Tremco ExoAir 130</li> <li>55) Tyvek Commercial Wrap</li> <li>56) Sto EmeraldCoat</li> <li>57) Sto Gold Seal</li> <li>58) Sto AirSeal</li> <li>59) Sto VaporSeal</li> <li>60) Masterwall Rollershield Water Barrier</li> </ul>
<p>Composite Cement Board-Faced Foam Panel</p>
<ul style="list-style-type: none"> <li>1) PermaBASE CI Insulated Cement Board unit (Type PBCI)</li> </ul>
<p>Water-Resistive Barrier over PermaBASE CI Insulated Cement Board Unit (Type PBCI)</p>
<ul style="list-style-type: none"> <li>1) UL Listed WRB included as part of an Exterior Wall System under UL Category Codes FWFx and FWFO.</li> </ul> <p style="margin-left: 40px;">Note - WRB shall be approved for use directly under cladding, or over combustible insulation.</p>
<p>Exterior Coverings</p>
<ul style="list-style-type: none"> <li>1) Manufactured stone</li> <li>2) Natural stone</li> <li>3) Noncombustible Tile (meeting ASTM E136)</li> <li>4) Thin Brick with noncombustible mortar</li> <li>5) Calcium Silicate stone</li> <li>6) EIFS or DEFS coatings for use on cement board substrate as follows:             <ul style="list-style-type: none"> <li>a. StoQuik Silver I Cement Board System</li> <li>b. StoQuik Silver II StoQuik Silver Next Cement Board Stucco System</li> <li>c. Senergy Cement Board Stucco 500 System</li> <li>d. Senergy Cement Board Stucco 1000 System</li> </ul> </li> </ul>

## 5. Production description

PermaBASE CI Insulated Cement board units (Type PBCI) consist of one layer of rigid polyisocyanurate foamed plastic core bonded to one layer of PermaBASE Cementitious Backer board. The PermaBASE Cementitious Backer boards are 5/16 in. thick and are made from cement, polystyrene beads and aggregates, and each board face is embedded with fiberglass mesh to provide a smooth finish on one side of the board and a coarse finish on the other side. The units are provided in a nominal 2 in. (50.8 mm), or 3 in. (76.2 mm) thickness in various widths and lengths.

## 6. Installation

### 6.1 General

The manufacturer's published installation instructions and this report must be strictly adhered to, and a copy of the instructions must be available at all times on the jobsite during installation.

PermaBASE CI Insulated Cement Board units (Type PBCI) shall be installed with the foam side facing the framing and over any sheet products such as gypsum board or plywood sheathing using corrosion-resistant wafer head screws for wood studs, or corrosion-resistant wafer head Type S-12 screws with steel studs. The S-12 screws must have a minimum 0.325 in. (8.3 mm) diameter head.

When installing PermaBASE CI Insulated Cement Board units (Type PBCI) over another sheet product such as gypsum board or plywood sheathing, the screw length shall be increased to sufficiently penetrate wood framing by 3/4 in. (19 mm) or steel framing by 3/8 in. (9.5 mm). The seams, edges, corners and all openings around fixtures shall be reinforced with alkali-resistant, fiberglass mesh tape. Exterior applications require the use of 4 in. (102 mm) wide alkali-resistant, fiberglass mesh tape. A coat of either modified dry set cement mortar complying with ANSI A118.4, improved modified dry set cement mortar complying with ANSI A118.15, dry-set cement mortar complying with ANSI A118.1, or basecoat, shall be used to bed the alkali-resistant fiberglass mesh tape. All fastener heads shall be treated with the same material used to treat the joints. PermaBASE CI Insulated Cement Board units (Type PBCI) shall not be used as a nailable base, and any mechanical attachment of exterior covering shall be made to framing.

When steel framing is used, it shall be a minimum of No. 20 gauge (0.0312 in (0.78 mm)) and provided with a corrosion-resistant coating as specified by the applicable code. Tiled or other surfaces prone to cracking must be protected from structural movements by the use of control or expansion joints in accordance with the manufacturer's recommendations.

A single layer of water-resistive barrier complying with IRC Section 703.2 shall be installed either over or under the PermaBASE CI Insulated Cement Board units (Type PBCI) as required for construction.

### 6.2 Exterior Walls

PermaBASE CI Insulated Cement Board units (Type PBCI) installed on exterior walls over steel or wood framing have been evaluated for wind resistance in accordance with the requirements of IRC Section R703.1.2.

#### 6.2.1 Wind Load Resistance (ASTM E330 – Procedure B)

PermaBASE CI Insulated Cement Board units (Type PBCI) have been evaluated for structural performance under uniform static air pressure differences and may be used in the following steel-framed or wood-framed constructions. Testing was conducted in accordance with ASTM E330, Procedure B with a modification eliminating the recovery and stabilization period following the applied incremental loads.

**6.2.1.1 Steel stud wall** - The metal framing was nominal 4 in. (102 mm) deep, 20 gauge, C-shaped metal studs, and were spaced at a maximum of 16 in. (406 mm) on center. The studs were attached to nominal 4 in. deep, 20 gauge, C-shaped metal track using 1/2 in. long pan head screws. The PermaBASE CI Insulated Cement Board units (Type PBCI) were installed vertically to the metal studs using 3 in. long pancake-head, self-drilling screws spaced 8 in. OC around the perimeter and in the field. A continuous sheet of 4 mil thick polyethylene sheathing was placed between the PermaBASE CI Insulated Cement Board units (Type PBCI) and the metal framing to reduce air leakage through the assembly.

A single layer of 5/8 in. thick type gypsum board was fastened to the opposite side of the assembly to assist with bracing the metal studs. Six holes were drilled into the gypsum panels to prevent it from affecting the results.

Applying a safety factor of 3, PermaBASE CI Insulated Cement Board units (Type PBCI) have a maximum allowable transverse load of 36 lb-f/ft<sup>2</sup> when installed directly to steel framing.

**6.2.1.2 Wood stud wall** - The wood framing was nominal 2 in. x 4 in. (51 mm x 102 mm) wood framing spaced at a maximum of 16 in. (406 mm) on center. The wood studs were attached to nominal 2 in. by 4 in. thick top and bottom plates with two 16d common nails on each end. The PermaBASE CI Insulated Cement Board units (Type PBCI) were attached vertically to the wood studs with a horizontal butt joint located 8 ft from the bottom. The panels were attached to the wood stud with 3 in. or 4 in. long pancake head, self-drilling screws spaced 8 in. OC along the intermediate framing for the nominal 2 in. and 3 in. thick panels, respectively.

A single layer of 5/8 in. thick type gypsum board was fastened to the opposite side of the assembly to assist with bracing the metal studs. Six holes were drilled into the gypsum panels to prevent it from affecting the results.

Applying a safety factor of 3, PermaBASE CI Insulated Cement Board units (Type PBCI) have a maximum allowable transverse load of 40.8 lb-f/ft<sup>2</sup> when installed directly to wood framing.

### 6.3 Fire-Resistance-Rated Assemblies

The products described in this section have been evaluated in accordance with Section 703 of the IBC.

Refer to the UL Fire Resistance Certification information for File R22158 (BZXX) for applicable design coverage and details of the UL Certified fire-resistance-rated assemblies covered under this report. Fire resistance ratings are only applicable when the assemblies are constructed in accordance with the published designs. Refer to UL's Product iQ™ for the most current version of UL fire resistive assemblies.

## 7. Conditions of use

- 7.1 The PermaBASE CI Insulated Cement Board units (Type PBCI) described in this report comply with, or are suitable alternatives to what is specified in those codes listed in Section 2 of this report, subject to the following conditions shown below.
- 7.2 PermaBASE CI Insulated Cement Board units (Type PBCI) must be manufactured, identified, and installed in accordance with the manufacturer's published installation instructions. If there is a conflict between this report and the manufacturer's instructions this report governs.
- 7.3 Use of the PermaBASE CI Insulated Cement Board units (Type PBCI) over exterior walls as a backer board base for adherence of manufactured stone, natural stone, slate, marble, ceramic, tile, brick, and stucco shall be determined by the Authority Having Jurisdiction (AHJ).

#### 7.4 Manufacturing Locations:

The products are manufactured and labelled at Atlas Roofing Corp., Diboll, TX under the UL LLC Classification and Follow-Up Service Program, which includes audits in accordance with ICC-ES Acceptance Criteria for Quality Documentation, AC10. The products are shipped to the locations described below for distribution.

DISTRIBUTOR	LOCATION	PLANT ID NO.
PermaBASE Building Products, LLC	Clinton, IN	CIN
PermaBASE Building Products, LLC	Cleburne, TX	CLE
PermaBASE Building Products, LLC	Green Cove Springs, FL	GCS

#### 8. Supporting evidence

- 8.1 Reports in accordance with ASTM E84.
- 8.2 Reports in accordance with NFPA 285.
- 8.3 Reports in accordance with NFPA 268.
- 8.4 Reports in accordance with NFPA 259.
- 8.5 Reports in accordance with ASTM E330.
- 8.6 Reports in accordance with UL 263.
- 8.7 Documentation of quality system elements described in AC10.

#### 9. Identification

The PermaBASE CI Insulated Cement boards (Type PBCI) described in this evaluation report are identified by a marking bearing the report holder's name (National Gypsum Services Company, dba National Gypsum Company), the product name, the UL Classification Mark, and the evaluation report number, UL ER22158-02. The validity of the evaluation report is contingent upon this identification appearing on the product/packaging or UL Classification Mark certificate.

#### 10. Use of UL Evaluation Report

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