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ICC-ES Evaluation Report

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ESR-3675

Issued 02/2019

This report is subject to renewal 02/2020.

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION

SECTION: 07 42 43—COMPOSITE WALL PANELS

REPORT HOLDER:

TERRACORE PANELS, LLC

EVALUATION SUBJECT:

TERRACORE PANELS



“2014 Recipient of Prestigious Western States Seismic Policy Council (WSSPC) Award in Excellence”



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EVALUATION SUBJECT:

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1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2018, 2015 and 2012 *International Building Code*® (IBC)
- 2018, 2015 and 2012 *International Residential Code*® (IRC)

Property evaluated:

- Structural
- Durability
- Surface-burning Characteristics
- Types I, II, III and IV (noncombustible) construction

2.0 USES

The TerraCORE panels are used as a nonload-bearing, interior finish and exterior wall cladding, on the exterior of walls in buildings of Types I through V construction and construction permitted under the IRC. When installed in Types I through IV construction, the exterior wall assembly must be installed in accordance with Section 4.3 of this report.

3.0 DESCRIPTION

3.1 General: TerraCORE panels consist of a veneer of natural stone factory laminated to a prepreg faced aluminum honeycomb core. The back of the panels are laminated with a 0.039-inch-thick (1 mm) aluminum sheet. The back of the panels include factory-attached clips. The panels are nominally 1 inch (25.4 mm) thick and come in various widths and lengths. For interior use, the wall panels have a Class A finish in accordance with ASTM E84. See Figure 1 for typical depiction of TerraCORE panels.

3.2 Material:

3.2.1 Prepeg Facings: The prepreg facings are fiberglass sheets which have been impregnated with an

epoxy resin. These are factory-installed on the exterior side of the aluminum honeycomb.

3.2.2 Aluminum Honeycomb: The aluminum honeycomb cores are expanded from 3003 aluminum alloy.

3.2.3 Clips: The clips are made from 6063-T5 aluminum and have dimensions as shown in Figure 2 and 3 of this report. The clips are factory-attached to the back of the panels with four rivets.

3.2.4 Stone Veneer: The stone veneer is limestone ¼-inch-thick (6.4 mm).

3.2.5 Rails: The rails are made from extruded aluminum complying with 6063-T5 or 6063-T6. See Figure 2 and 3 for rail drawing. The rails are used to support the TerraCORE panels by engaging with the clips. The adequacy of the rails and their connections to the supporting structure must be verified for each installation by a registered design professional, and are outside scope of this report.

4.0 DESIGN AND INSTALLATION

4.1 General:

The panels must be installed in accordance with the manufacturer's published installation instructions and the approved plans. The panels are supplied to the jobsite with clips attached to the back of the panels at a spacing not to exceed 30 inches (762 mm) vertically or horizontally. A minimum of four clips per panel is required. The clips shall be located no less than 4½ inches (114 mm) from the edge of the panel measured horizontally and 5 inches (127 mm) from the edge of the panels measured vertically. Additional clips may be required for larger panels. The rails must be installed horizontally on the wall at a spacing not to exceed 30 inches (762 mm) measured vertically to match the spacing of the clips. The panel clips must engage with the rails by sliding them down over the rail, so the clips engage the rails on the wall. Attachment of the extrusion rails to the supporting structure must be designed by a registered design professional to resist applicable loads. Maximum out-of-plane of supporting structure must be limited to L/240. The allowable wind loads of the wall cladding system must comply with Section 4.2 of this report. For installations in Seismic Design Categories other than A and B, the design of the connections of the panels to the rails and the rails to the supporting structure must comply with Section 13.5.3 of ASCE 7.

A water-resistive barrier and flashing shall be installed in such a manner as to prevent the accumulation of water

within the wall assembly, as required by IBC Section 1403.2. Joints between the panels may be sealed in accordance with the manufacturer's installation instructions or be utilized in an open-joint rainscreen system.

4.2 Wind Resistance:

The panels, when installed in accordance with Section 4.1 of this report, have an allowable transverse wind load capacity of 49 psf (2.35 kPa) for positive load direction and 29 psf (1.39 kPa) for negative load direction.

Allowable negative wind load of 29 psf (1.39 kPa) is limited by clip pull-out capacity. Greater allowable negative wind pressure up to 49 psf (2.35 kPa) can be achieved with clip spacing less than the maximum allowed spacing of 30 inches (762 mm) vertically and horizontally. The allowable pull-out clip capacity must not exceed 180 lbf (801 N). The clip spacing must be determined by a registered design professional.

4.3 Use on Exterior Walls of Types I, II, III or IV Construction:

The TerraCORE panels when installed on the exterior side of exterior walls of buildings required to be of Types I, II, III or IV construction must comply with the following conditions:

The base wall assembly must be framed with minimum No. 16 gage by 6-inch (152 mm), C-channel studs at 24 inches (610 mm) on center. One layer of $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum wallboard complying with ASTM C1396 must be installed with the long edge perpendicular to the studs on the interior side of the studs. One layer of $\frac{1}{2}$ -inch-thick (12.7 mm), glass mat gypsum substrate sheathing complying with ASTM C1177 must be installed with the long edge perpendicular to the exterior face of the studs. Both gypsum layers must be installed using No. 6 by $1\frac{1}{4}$ -inch (32 mm) self-drilling screws complying with ASTM C1002 spaced at 8 inches (203 mm) on center around the perimeter and at 12 inches (305 mm) on center in the field. A minimum 4 inch-thick (102 mm), mineral wool insulation with a minimum 4-pound-per-cubic-foot (64 kg/m³) density must be placed (compression-fit) into each stud cavity at each floor line. Tyvek[®] CommercialWrap[®] water-resistive barrier recognized in [ESR-2375](#) must be applied over the glass-mat gypsum sheathing with 4-inch (102 mm) overlap at the horizontal joints.

Z-profile galvanized steel subgirts [1.5-inch-by-3-inch-by-1.5 inch-by-20-gage-thick] must be installed vertically at 24 inches (610 mm) on center and fastened through the exterior sheathing into the center of the studs with No. 12 by 1.5-inch-long (38 mm) self-drilling, hex-head screws at 16 inches (406 mm) on center. Three-inch-thick (76 mm) mineral wool insulation boards having a density of 4-pounds-per-cubic-foot (64 kg/m³) must be installed between each Z-profile subgirts. The rails, described in Section 3.2.5 of this report, were installed perpendicular to the Z-profile subgirts and secured to the subgirts using No. 14 by 2.5-inch-long (64 mm) self-drilling, hex head screws every 16 inches (406 mm) on center and 2 inches (51 mm) apart. The spacing of the rails must not exceed 30 inches (762 mm) measure vertically. The TerraCORE panels must be installed over the rails as indicated in Section 4.1 of this report. A one-inch (25.4 mm) air gap was created between the exterior insulation and the back of the panels. Panels installed around perimeter of window opening must have a 2-inch (51 mm) return leg attached. Panel joints were $\frac{1}{4}$ inch (6.4 mm) and were filled with $\frac{1}{2}$ -inch (12.7 mm) foam backer rod recessed into the joints and the remainder of the joint must be filled with H.B. Fuller

Firesound™ Sealant or Dow Corning 795 Silicone Building Sealant. Window and door openings must be flashed at headers, sills and jambs using minimum No. 20 gage thick galvanized steel flashing and the TerraCORE panels must be installed to line the opening perimeter including panel sections at the return of the perimeter.

5.0 CONDITIONS OF USE

The TerraCORE panels described in this report comply with, or are a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Installation complies with this report, the manufacturer's published installation instructions and the applicable code. If there is a conflict between the installation instructions and this report, the most restrictive governs.
- 5.2 The design and attachment of the panels and extrusion rails to the supporting structure must be justified to the satisfaction of the code official.
- 5.3 Drawings, design details, calculations and test data verifying compliance with this report and the adequacy of the connections and supporting framing must be submitted to the building official for approval. The drawings and calculations must be prepared by a registered design professional when required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.4 The out-of-plane deflection of the supporting wall framing must be limited to L/240.
- 5.5 Where exterior walls covered with the TerraCORE panels are required to have a fire-resistance rating, the rating must be justified to the code official.
- 5.6 The TerraCORE panels are manufactured in Guangdong Province, China, under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with the ICC-ES Acceptance Criteria for Sandwich Panels (AC04), dated February 2012 (editorially revised May 2018).
- 6.2 Reports of testing of panel supporting clips connection capacity.
- 6.3 Report of testing in accordance with ASTM E84.
- 6.4 Report of testing in accordance with NFPA 285 and fire analysis addressing installation in Types I, II, III, and IV construction.

7.0 IDENTIFICATION

- 7.1 Each panel is identified by labels bearing the manufacturer's name (TerraCORE Panels, LLC) and address, the product name, the project name, the panel code and the evaluation report number (ESR-3675). The rails are supplied by Terra TerraCORE Panels, LLC.
- 7.2 The report holder's contact information is the following:

TERRACORE PANELS, LLC
2030 IRVING BOULEVARD
DALLAS, TEXAS 85207
214-749-0999
www.terracorepanels.com



FIGURE 1—TERRACORE PANELS

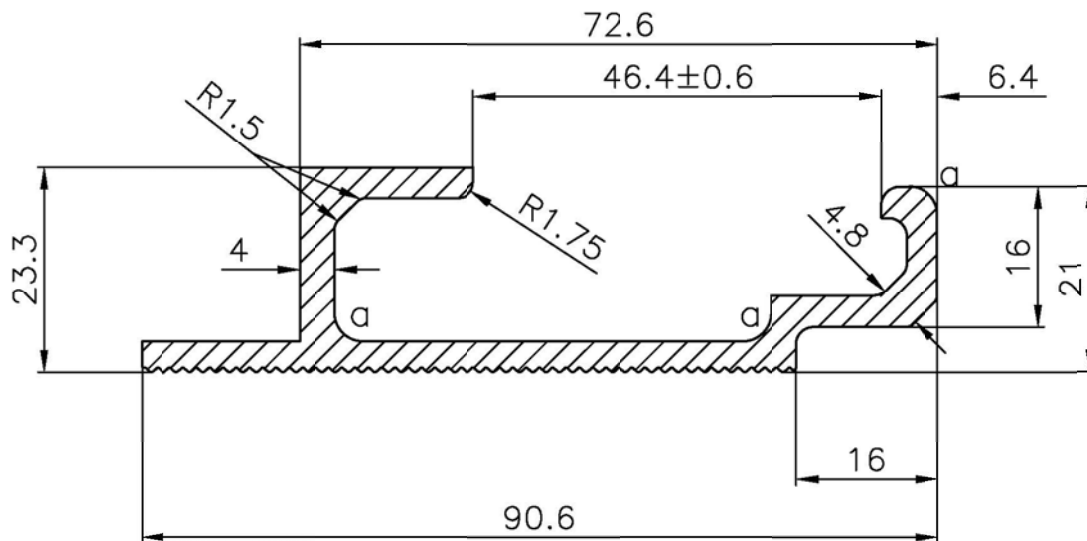


FIGURE 2—CLIP AND RAIL CROSS-SECTIONAL DIMENSIONS



FIGURE 3—CLIP AND RAIL

ICC-ES Evaluation Report

ESR-3675 CBC and CRC Supplement

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DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION

Section: 07 42 43—Composite Wall Panels

REPORT HOLDER:

TERRACORE PANELS, LLC

EVALUATION SUBJECT:

TERRACORE PANELS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that TerraCORE Panels, recognized in ICC-ES master evaluation report ESR-3675, have also been evaluated for compliance with the codes noted below.

Applicable code edition(s):

- 2016 *California Building Code*® (CBC)
- 2016 *California Residential Code*® (CRC)

2.0 CONCLUSIONS

2.1 CBC:

The TerraCORE Panels, described in Sections 2.0 through 7.0 of the master evaluation report ESR-3675, comply with CBC Chapters 8 and 14, provided the design and installation are in accordance with the 2015 *International Building Code*® (IBC) provisions noted in the master report and the additional requirements of CBC Chapters 16 and 17, as applicable.

The TerraCORE Panels have not been evaluated under CBC Chapter 7A for use in exterior design and construction of new buildings located in any Fire Hazard Severity Zone within State Responsibility Areas or any Wildland—Urban Interface Area.

2.2 CRC:

The TerraCORE Panels, described in Sections 2.0 through 7.0 of the master evaluation report ESR-3675, comply with CRC Chapter 7, provided the design and installation are in accordance with the 2015 *International Residential Code*® (IRC) provisions noted in the master report and the applicable provisions of the CRC.

The TerraCORE Panels have not been evaluated under CRC Section R327 for use in exterior design and construction of new buildings located in any Fire Hazard Severity Zone within State Responsibility Areas or any Wildland—Urban Interface Area.

The products recognized in this supplement have not been evaluated for compliance with the *International Wildland—Urban Interface Code*®.

This supplement expires concurrently with the master report, issued February 2019.

ICC-ES Evaluation Report

ESR-3675 FBC Supplement

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TERRACORE PANELS, LLC

EVALUATION SUBJECT:

TERRACORE PANELS

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the TerraCORE Panels, recognized in ICC-ES master evaluation report ESR-3675, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2017 *Florida Building Code—Building*
- 2017 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The TerraCORE Panels, described in Sections 2.0 through 7.0 of the master evaluation report ESR-3675, comply with the *Florida Building Code—Building* and *Florida Building Code—Residential*, provided the design and installation are in accordance with the 2015 *International Building Code*® (IBC) provisions noted in the master report under the following conditions:

Installation must meet the requirements of Section 1403.8 of the *Florida Building Code—Building* and Section R318.7 of the *Florida Building Code—Residential*, as applicable.

Use of the TerraCORE Panels for compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and the *Florida Building Code—Residential* has not been evaluated and is outside the scope of this evaluation report.

For products falling under Florida Rule 9N-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official, when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the master report, issued February 2019.