ICC-ES Evaluation Report

ESR-1558*

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This report is subject to re-examination in two years.

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DIVISION: 04—MASONRY
Section: 04810—Unit Masonry Assemblies

REPORT HOLDER:

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EVALUATION SUBJECT:

ALLIANCE BRICK SYSTEM

1.0 EVALUATION SCOPE

Compliance with the following codes:

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

Properties evaluated:

- Weather resistance
- Transverse wind load resistance

2.0 USES

Alliance Brick System is nonstructural, concrete brick veneer mechanically fastened to the wood structural panel sheathing of buildings to provide weather protection as part of an approved building envelope. The dead loads of the concrete brick veneer units are supported at the base of the wall by either a brick ledge, timber ledge or steel angle.

3.0 DESCRIPTION

3.1 General:

The Alliance Brick System is a nonstructural, nonload-bearing, concrete brick veneer consisting of concrete brick units, galvanized steel brick ties, mortar and adhesive. The concrete brick veneer units are attached to exterior walls using galvanized steel Alliance Brick ties. The concrete brick units have grooves on the top that are designed to fit the brick ties. The bottom three rows and top three rows of the bricks are attached to the wood structural panels with Alliance Brick ties. The joints of the concrete bricks may be filled with mortar. The Alliance Brick ties provide transverse load resistance for the veneer. The dead load for the veneer is transferred to the base of the wall and supported on either a brick ledge, timber ledge or steel angle.

Use of the veneer is limited to Type V-B, nonfire-resistance-rated, building construction under the IBC and construction in accordance with the IRC.

3.2 Materials:

3.2.1 Alliance Brick Units: The Alliance Brick units are concrete brick units conforming to ASTM C 55 as Grade N concrete units, except:

a. The net minimum compressive strength is 2300 psi (16 MPa).

b. The maximum water absorption is 7 percent.

c. The minimum face shell and web thicknesses are not applicable, since the units have a proprietary shape.

The Alliance Brick units are nominally 3 inches high (76.20 mm) by 3.625 inches wide (92.08 mm) by 8 inches in length (203.20 mm), weigh 6.2 pounds (3.1 kg), and have a nominal surface area of 24 square inches (15 484 mm^2). The installed weight of the units is 37 pounds per square foot (1 776 Pa). Refer to Figure 1.

3.2.2 Alliance Brick Tie: The brick ties are fabricated from G90 Galvanized 30 gage steel, with a nominal thickness of 0.0130 inch (0.33 mm). Dimensional drawings of the brick ties are shown in Figure 1.

3.2.3 Fasteners: Fasteners used to attach the Alliance Brick ties to wood structural panels must be No. 8, corrosion-resistant, bugle head, coarse thread, drywall screws, $1^1/_2$ inches (38.1 mm) long with $^1/_4$-inch (6.35 mm) hex heads.

3.2.4 (Optional) Mortar: Mortar used to fill gaps in the concrete brick units is Type S complying with ASTM C 270.

3.2.5 Adhesive: The adhesive used to attach the top and bottom three rows of concrete brick to each other complies with ASTM C 557.

3.2.6 Water-resistive Barrier: The Alliance Brick system must be installed over a water-resistive barrier complying with IBC Section 1404.2 or IRC Section R703.1.

4.0 INSTALLATION AND DESIGN

4.1 Installation:

4.1.1 General: The Alliance Brick System must be installed in accordance with IBC Section 1404.5 or IRC Section R703.7, as applicable; this evaluation report; and the manufacturer's published installation instructions. Refer to Figure 1. A water-resistive barrier complying with Section 3.2.6 must be installed over the wood structural panels.

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Expansion or control joints must be provided to limit the effect of differential movement of supports and must be specified on the approved plans by a registered design professional or the veneer manufacturer, in that order. Consideration must be given to movement caused by temperature changes, creep and deflection.

4.1.2 Installation over Wood Structural Panels: The Alliance Brick System must be installed over wood structural panels complying with DOC PS 2 with a minimum thickness of $^{7}/_{16}$ inch (11.11 mm) and a span rating of 24/16. The Alliance Brick units are stacked in a running bond pattern beginning at the base of the wall. The Alliance Brick ties must be secured to the wood structural panels with screws and the ties must be spaced between every other course of bricks and every other brick, with ties at all corner bricks. The top and bottom three courses of bricks for each 8- foot (2.4 m) height of wall and all corner bricks must be adhered to each other. Installation of outside and inside corners, doors and windows and coping and flashing are included in the manufacturer's published installation instructions.

4.2 Design:

4.2.1 Design in Accordance with the IBC: Calculations and plans must be submitted to the code official for approval. The calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. The calculations must verify that the structural framing or wall substrate, lintels, connectors and fasteners supporting the veneer are adequate to resist the allowable design wind pressure loads imposed by the veneer as noted in Section 4.2.3. The dead load for the concrete brick veneer is transferred to the base of the wall and supported on either a brick ledge, timber ledge or steel angle, and calculations must be provided verifying that these structural members are adequate to resist the vertical dead load of the concrete brick veneer. Veneer dead load supported on wood members must be installed in accordance with Section 2304.12 of the IBC. Support requirements and related conditions must comply with Section 6.2.2.3 of ACI 530-05.

The concrete brick veneer must only be installed in areas designated as Seismic Design Category A, B or C. In areas designated as Seismic Design Category C, fastener design and installation requirements shall comply with Section 1405.5 of the IBC, and Section 6.2.2.10.1 of ACI 530/ASCE 5/TMS 402. The concrete brick veneer must only be installed in areas with a wind speed of less than 110 mph in accordance with Section 6.2.3.11 of ACI 530/ASCE 5/TMS 402.

4.2.2 Design in Accordance with the IRC: Calculations and plans must be submitted to the code official for approval. The calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed. The calculations must verify that the structural framing or wall substrate, lintels, connectors and fasteners supporting the veneer are adequate to resist the allowable design wind pressure loads imposed by the veneer as noted in Section 4.2.3. The dead load for the concrete brick veneer is transferred to the base of the wall and supported on either a brick ledge, timber ledge or steel angle and calculations must be provided verifying that these structural members are adequate to resist the vertical dead load of the concrete brick veneer. Veneer dead load supported on wood members must be installed in accordance with Section R703.7.2.

The concrete brick veneer must only be installed in areas designated as Seismic Design Category A, B, C, D_0, D_1, and D_2. Buildings constructed with the Alliance Brick system and designed in accordance with this section are subject to the wall bracing and height limitations noted in IRC Sections R301.2.2.3 and R703.7.

4.2.3 Maximum Allowable Design Wind Pressure: Installation of the Alliance Brick System is limited to areas where the design transverse wind pressure positive or negative, as calculated in accordance with Section 1609 of the IBC or Section R301.2.1 of the IRC, for components and cladding, does not exceed 42 lbf/ft^2 (3.5 kPa).

5.0 CONDITIONS OF USE

The Alliance Brick System described in this report complies with, or is 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 The materials, fabrication and installation must comply with this report and the manufacturer's instructions.

5.2 For design in accordance with the IBC, refer to Section 4.2.1.

5.3 For design in accordance with the IRC, refer to Section 4.2.2.

5.4 Transverse wind pressures must be in accordance with Section 4.2.3.

5.5 Use of the veneer is limited to Type V-B, nonfire-resistance-rated, building construction under the IBC and construction in accordance with the IRC.

5.6 Substrates, over which the veneer is installed, must be flat and solid and must comply with the applicable provisions of the IBC or IRC, and must be capable of supporting the loads imposed by the veneer. The stud wall must be designed to limit the out-of-plane deflection to maintain stability of the veneer.

6.0 EVIDENCE SUBMITTED

6.1 Test report on transverse load testing of wall assemblies in accordance with ASTM E 330.

6.2 Test report on strength testing of stone anchorages in accordance with ASTM C 1354-96 (2004).

6.3 Test report on physical properties under ASTM C 55; compressive strength under ASTM C 140; flexural strength under ASTM C 99-97 (2006); density under ASTM C 140; and absorption under ASTM C 140; and freeze-thaw under ASTM C 67.

6.4 Quality documentation.

7.0 IDENTIFICATION

Individual brick units and brick ties must be identified by their unique shapes (refer to Figure 1). Pallets of the brick units and packages of the brick ties must be labeled with the evaluation report number (ESR-1558), the name of the manufacturer (Rochester Concrete Products, LLC), and the product name (Alliance Brick).

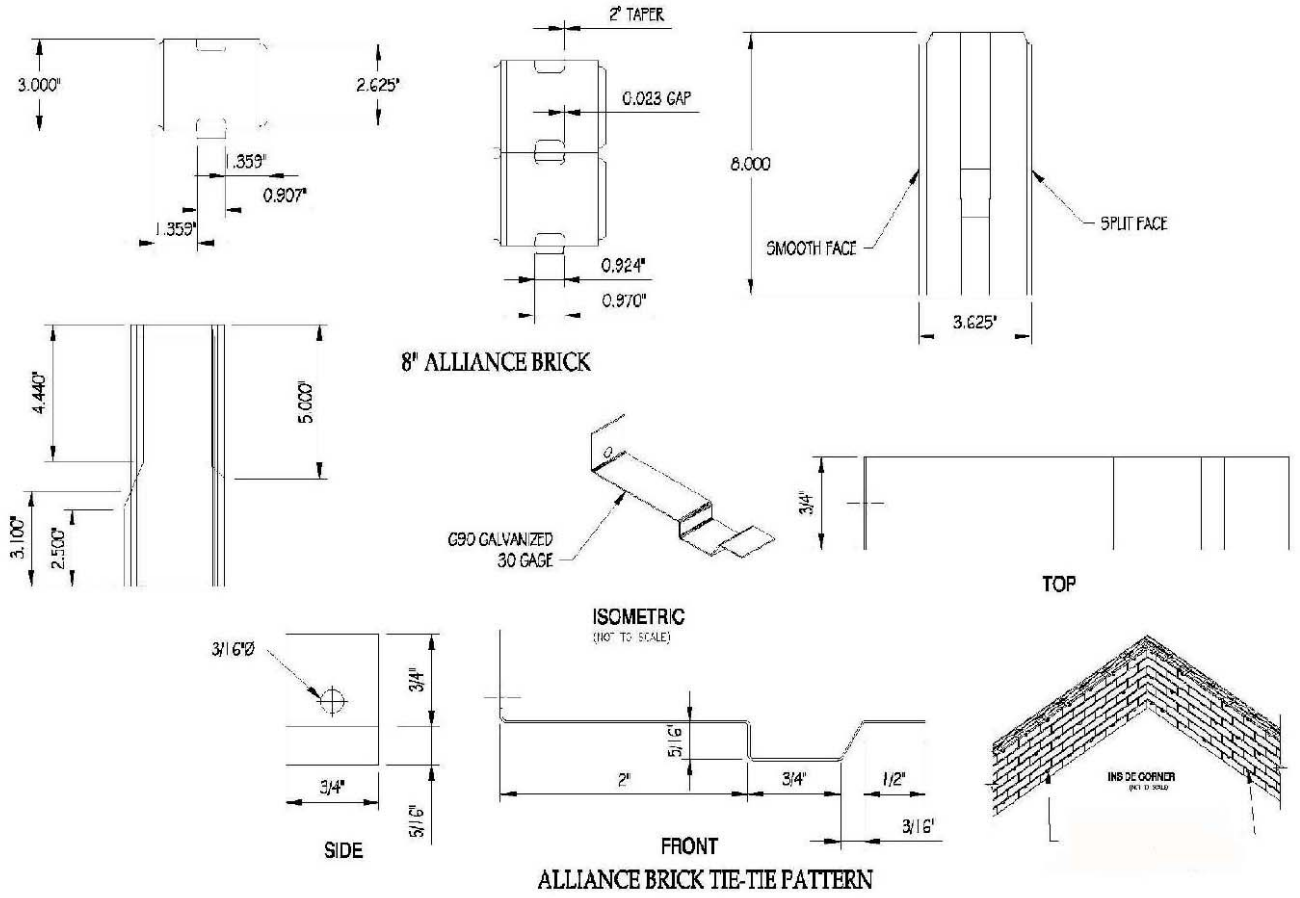

FIGURE 1—ALLIANCE BRICK UNITS, BRICK TIES AND TYPICAL WALL DETAILS