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RESEARCH REPORT: RR 26155
(CSI # 03 11 19)

REEVALUATION DUE
DATE: October 1, 2019
Issued Date: October 1, 2018
Code: 2017 LARC

GENERAL APPROVAL – The Perfect Block™ Insulated Composite Concrete Form (ICCF) Wall System

DETAILS

The Perfect Block™ Insulated Composite Concrete Form (ICCF) Wall System is classified as a screen-grid wall system as described in Section R608.3.3 of the 2017 LARC. Screen-grid wall systems shall comply with Table R608.3 and Figure R608.3(3) and shall have a minimum nominal thickness of 6 inches for the vertical and horizontal concrete members (cores).

The Perfect Block™ Insulated Composite Concrete Form (ICCF) Wall System consists of individual blocks that form a permanent formwork system for reinforced concrete beams, lintels, and walls. Walls constructed as described in this report are permitted to be used as load-bearing and non-load bearing walls and foundation and retaining walls. The forms remains in place and must be protected by an approved interior and exterior finish material as described below. The forms may be used in Type V construction and any construction permitted under the 2017 Los Angeles Residential Code (LARC). The forms may be used in Types I, II, III, and IV (noncombustible) construction when installed as described below. See Figures 1, 2, 3, and 4 for The Perfect Block™ ICCF Wall System construction and block details.

The Perfect Block™ Insulated Composite Concrete Form (ICCF) Wall System are hollow core forms of a lightweight mixture of recycled expanded polystyrene (EPS) ground into an aggregate, Portland cement, proprietary admixtures and water. The EPS blocks have a density between 20 and 24 pcf. The forms may be stacked horizontally or vertically. The forms are available in standard thicknesses of 6, 8, 10, and 12 inches and standard height 12 inches. Standard length is 48 inches. The hollow horizontal and vertical cores of the forms are filled with field-installed

RR 26155
Page 1 of 9

Eco Building Systems Corp.

RE: The Perfect Block™ Insulated Composite Concrete Form Wall System

concrete and reinforcing steel to construct a reinforced structural concrete wall with vertical and horizontal “post-and-beam” members. The concrete wall consists of steel reinforced vertical and horizontal members spaced 12 inches on center. The stay-in-place forms of the wall are not part of the structural element and will not contribute to the structural load carrying capacity of the finished wall.

The Perfect Block™ Insulated Composite Concrete Form (ICCF) Wall System consists of The Perfect Block™ ICCF blocks, concrete and reinforcing steel bars (rebar). Block cores shall be filled at the jobsite with normal-weight concrete having carbonate or siliceous aggregate with a 3/8-inch maximum aggregate size and an 8-inch slump. The concrete shall have 3,000 psi minimum compressive strength. The concrete must comply with Sections R404.1 and R608.5.1 of the LARC.

Reinforcement shall consist of No. 4 deformed steel reinforcement bars with a minimum yield strength of 60 ksi and No. 5 deformed steel reinforcement bars with a minimum yield strength of 60 ksi. Reinforcement must comply with Sections R404.1.2.3.7 and R608.5.2 of the 2017 LARC. Horizontal reinforcement is permitted to rest directly on the bottom of horizontal cores of the blocks.

Design: Insulated concrete members (cores) formed by Perfect Block composite concrete forms complying with Section R608.3.3 must be designed and constructed in accordance with Section R404.1.3 and R608, for screen-grid wall systems.

When Perfect Block insulated composite concrete forms are used to construct buildings that do not conform to the applicability limits of LARC Sections R404.1.2 and R608.2, construction must be in accordance with the Prescriptive Design of Concrete Walls (PCA 100), or the structural analysis and design of the concrete must be in accordance with ACI 318 and LABC Chapters 16, 18 and 19.

Interior Finish: The interior side of the forms must be covered with a thermal barrier consisting of minimum ½-inch thick regular gypsum wall board complying with ASTM C36 or ASTM C1396. The gypsum wallboard may be placed either vertically or horizontally. Other interior finish thermal barriers are acceptable, provided they are equivalent to minimum ½-inch thick regular gypsum wallboard, and applied in accordance with an a current evaluation report published by a Nationally Recognized Model Code Agency.

Exterior Finish:

Above Grade. The use of these forms shall be limited to installations provided with a weather-resistant exterior wall envelope as required by Section R703 of the 2017 LARC, justified to the satisfaction of the Department. The form wall system shall be able to distribute the out-of-plane wind loads and weight of wall coverings to the concrete cores within the forms, justified to the satisfaction of the Department.

Below Grade. Materials used to damp-proof below-grade walls shall be free of solvents, hydrocarbons, ketones and esters that will adversely affect the EPS foam plastic. Applicable damp proofing and waterproofing requirements are in Section R406 of the 2017 LARC.

Eco Building Systems Corp.

RE: The Perfect Block™ Insulated Composite Concrete Form Wall System

Drainage is required per Section R405.1 of the 2017 LARC. No backfill may be applied against the wall until the complete floor system is in place.

Type I, II, III, and IV (Noncombustible) Construction. The Perfect Block™ ICCF Wall System is also classified as a 4-hour fire-resistance rated, load-bearing wall when constructed in accordance with this general approval. The forms may be installed in types I, II, III, and IV (noncombustible) construction when installed as follows: The exterior side of forms shall be covered with a minimum ¾-inch thick cement plaster applied directly to the side of the forms. The interior face of the form shall be covered with a 5/8-inch thick, Type X gypsum wallboard. The gypsum wall board shall be attached to the face of the form with USG Sheetrock All-Purpose joint compound applied directly to the form face. The joints of the gypsum wallboard were taped with USG Sheetrock Brand paper joint tape and spackled with USG Sheetrock Brand joint compound.

Installation: Installation must be in accordance with this general approval, the manufacturer's published Technical Building Manual, and the 2017 Los Angeles Residential Code.

The wall system shall be supported on concrete footings complying with Chapter 4 of the LARC. Vertical reinforcement bars embedded into the footing must extend into the base of the wall system the minimum development length necessary for compliance with Chapter 12 of ACI 318. Vertical and horizontal reinforcement bars must have concrete protection in accordance with, and must be placed as required by, the design and the 2017 LARC.

The concrete quality, mixing and placement must comply with Sections R404.1.2.3 and R608.5.1 of the 2017 LARC, as applicable. Connections of concrete walls to footings, floors, ceilings, and roofs must be in accordance with Section 608.9. Anchor bolts used to connect wood ledgers and plates to the concrete must be cast in place with bolts sized and spaced as required by design and the 2017 LARC. Details must be prepared to accommodate the specific job, in accordance with this general approval and the 2017 LARC, subject to the approval of the Department.

Eco Building Systems Corp.

RE: The Perfect Block™ Insulated Composite Concrete Form Wall System

CONDITIONS OF USE:

1. Perfect Block Insulated Composite Concrete forms shall be manufactured, identified and installed in accordance with this general approval, the manufacturer published installation instructions and the 2017 LARC.
2. Perfect Block insulated composite concrete forms shall be separated from the building interior as described in this general approval, except for attic and crawl spaces per Sections R316.5.3 and R316.5.4 of the 2017 LARC, respectively.
3. The use of Perfect Block insulated composite concrete forms shall be limited to Type V, non-fire-resistance-rated construction except as described in this general approval for Type I, II, III and IV (noncombustible) construction.
4. Calculations and details shall be submitted to the Department, for the review and approval by the Structural Plan Check Section for each project. All calculations and details shall be signed and sealed by a licensed design professional registered in the State of California.
5. Special inspection is required for placement of reinforcing steel and concrete per Sections 1704 and 1705 and Table 1705.3 of the 2017 LABC.
6. The maximum allowable pour rate of the forms shall be 4 feet per hour.
7. Concrete must fill all voids of The Perfect Block™ ICCF Wall Systems forms. Concrete can be placed in lifts in compliance with manufacturer's installation instructions.
8. Wood members in contact with concrete for plates of window and door framing shall be treated with an approved wood preservative in accordance with the LARC and shall be attached with hot-dipped galvanized steel fasteners complying with Section R319.3 of the 2017 LARC as applicable.
9. Perfect Block insulated composite concrete forms shall be identified with a label on the packaging specifying the product name, manufacturer (Eco Building Systems, Inc.), address and date of manufacturing and Los Angeles Research Report Number, LARR 26155.

Eco Building Systems Corp.

RE: The Perfect Block™ Insulated Composite Concrete Form Wall System

DISCUSSION

The report is in compliance with the 2017 Los Angeles Residential Code.

The approval is based on test data on file with the Engineering Research Section.

Addressee to whom this Research Report is issued is responsible for providing copies of it, complete with any attachments indicated, to architects, engineers and builders using items approved herein in design or construction which must be approved by Department of Building and Safety Engineers and Inspectors.

This general approval of an equivalent alternate to the Code is only valid where an engineer and/or inspector of this Department has determined that all conditions of this Approval have been met in the project in which it is to be used.

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TYPICAL THE PERFECT BLOCK™ ICCF WALL SECTION

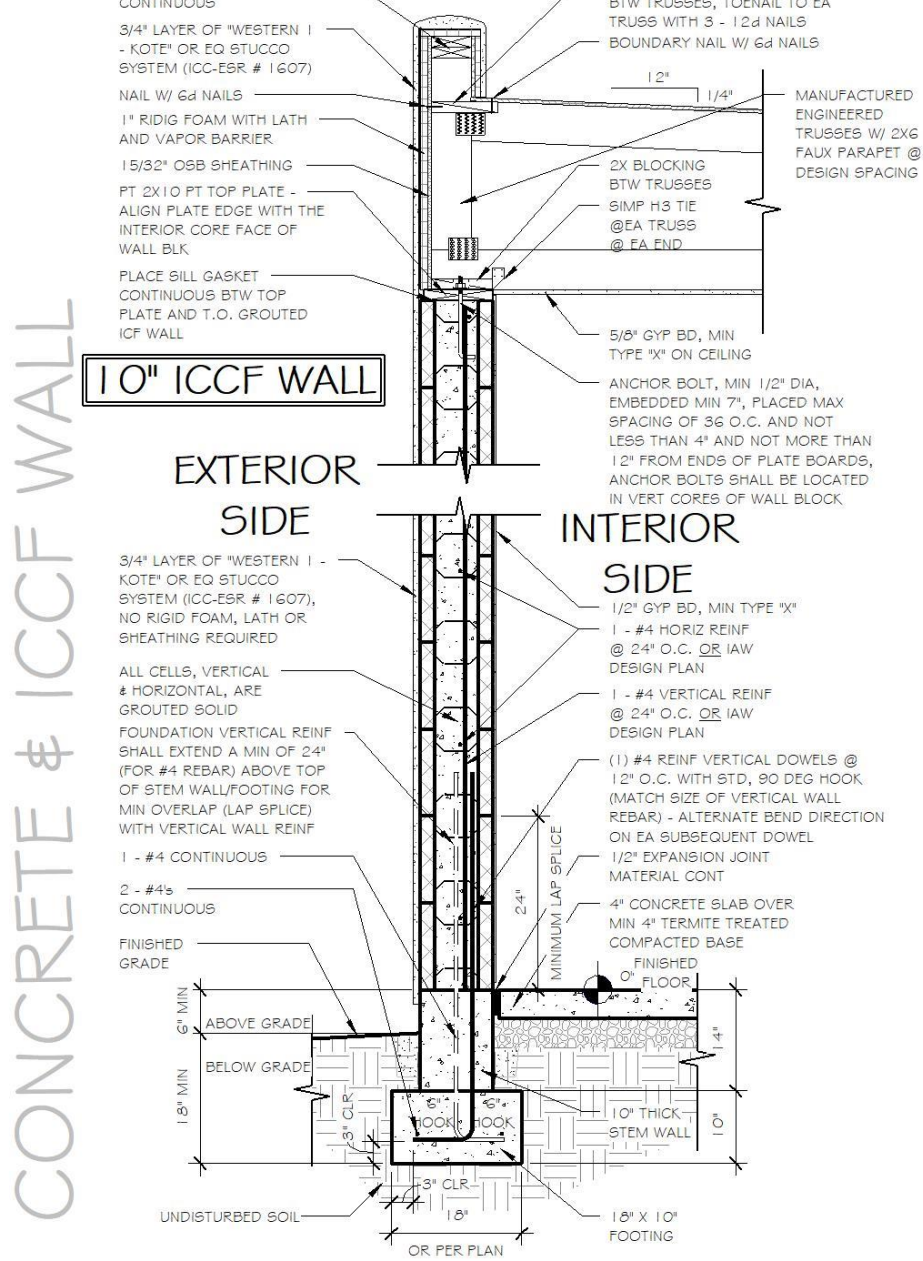


FIGURE 1

TYPICAL THE PERFECT BLOCK™ STEEL REINFORCEMENT PLACEMENT IN FOOTING STEM WALL @ 24" O.C.

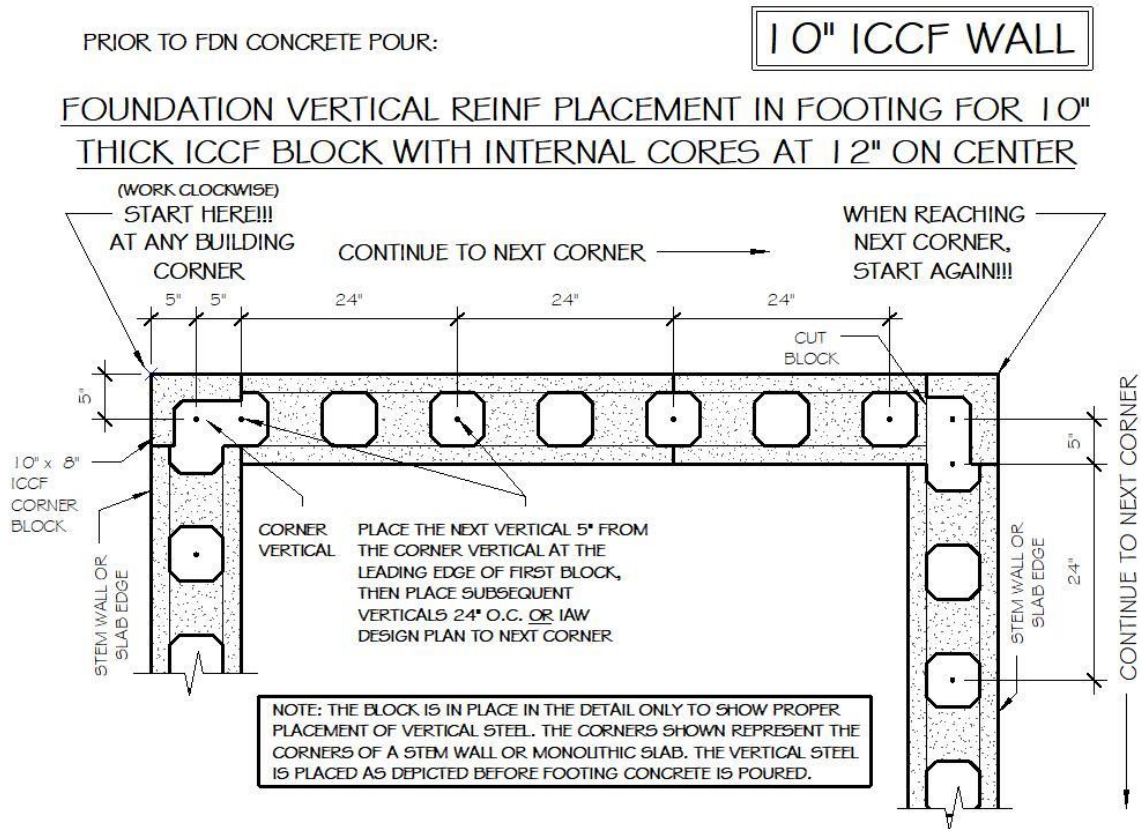


FIGURE 2

TYPICAL THE PERFECT BLOCK™ REINFORCING STEEL PLACEMENT

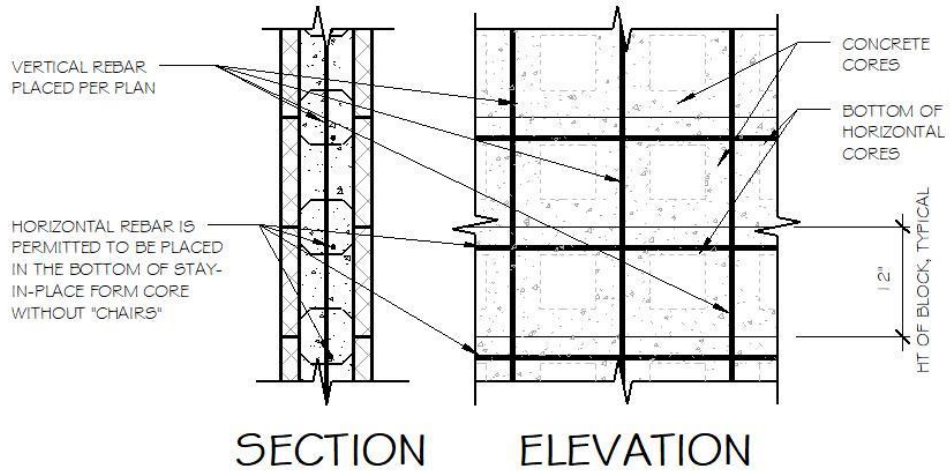


FIGURE 3

TYPICAL THE PERFECT BLOCK™

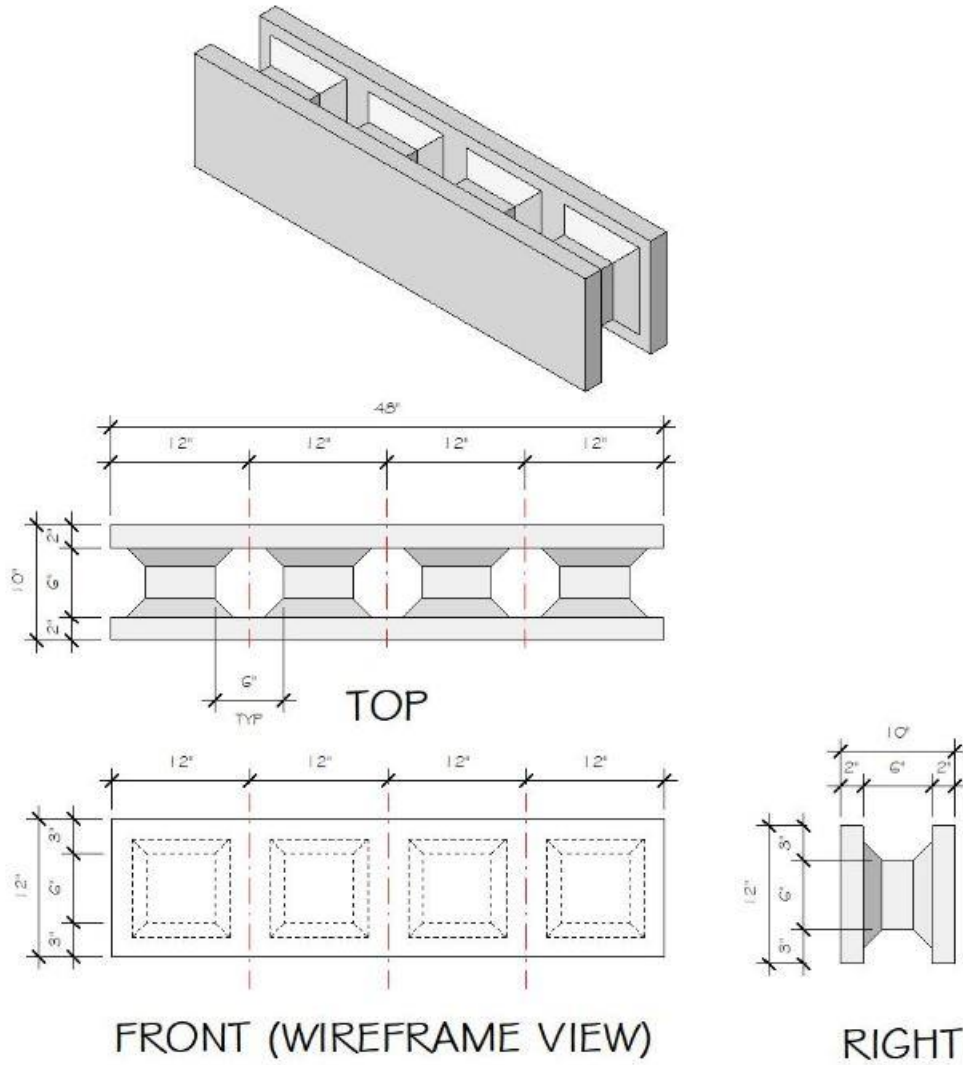


FIGURE 4