EVALUATION SUBJECT:
ENDURAMAX WALL SYSTEM

REPORT HOLDER:
Oldcastle, Inc.
900 Ashwood Parkway, Suite 600
Atlanta, Georgia 30338
www.oldcastle.com

CSI Division: 07 Thermal and Moisture Protection
CSI Section: 07 42 43 Composite Wall Panels

CSI Division: 04 Masonry
CSI Section: 04 71 00 Manufactured Brick Masonry
CSI Section: 04 73 00 Manufactured Stone Masonry

1.0 SCOPE OF EVALUATION

1.1 Compliance to the following codes & regulations:

- 2015, 2012 and 2009 International Building Code® (IBC)
- 2015, 2012 and 2009 International Residential Code® (IRC)
- 2017 and 2014 Florida Building Code, Building (FBC, Building)-See attached Supplement
- 2017 and 2014 Florida Building Code, Residential (FBC, Residential)-See attached Supplement-See attached Supplement
- 2010 California Building Code (CBC)-See attached Supplement
- 2010 California Residential Code (CRC)-See attached Supplement

1.2 Evaluated in accordance with:

- IAPMO Uniform ES EC021, adopted December 2014

1.3 Properties assessed:

- Structural
- Durability

2.0 PRODUCT USE

The EnduraMax Wall System is used as a nonloadbearing exterior wall covering in accordance with Chapter 14 of the IBC and Chapter 7 of the IRC, as applicable. The EnduraMax Wall System may be installed on buildings of Type V construction under the IBC, and on all buildings constructed in accordance with the IRC, as applicable. Except as noted in Section 5.1.1 of this report, for use under the 2015 and 2012 IBC and IRC use in Type I, II, III or IV construction is limited to exterior walls that are not greater than 40 feet (12 192 mm) in height above grade plane when the wall contains a combustible water-resistive barrier, in accordance with Section 1403.5 of the 2015 and 2012 IBC.

The EnduraMax Wall System may be used in fire-resistance-rated construction under the IBC and IRC, and any construction type (IBC Types I through V), when installed in accordance with the applicable sections of this report.

3.0 PRODUCT DESCRIPTION

The EnduraMax Wall System consists of manufactured masonry units, EPS boards, wall ties, and mortared joints.

3.1 EnduraMax Masonry Units: EnduraMax masonry units are manufactured concrete masonry or clay brick veneer units in various sizes and shapes to match pre-molded configurations in the EPS boards. Figure 1 of this report illustrates typical veneer patterns. The EnduraMax masonry veneer units shall have an average thickness of 1-$^3/_4$ to 2 inches (44.4 to 50.8 mm) depending upon product texture. Concrete masonry veneer units comply with ASTM C1634. Clay masonry veneer units comply with ASTM C1088.

3.2 EPS Boards: Expanded polystyrene (EPS) boards are molded with pre-configured veneer patterns for insertion of matching veneer units. Figure 1 of this report shows typical veneer patterns. The EPS boards shall comply with ASTM C578 as Type I, with a minimum density of 0.9 pound per cubic foot (15 kg/m^3). The EPS boards shall have a flame-spread index not greater than 25 and a smoke-developed index not greater than 450 when tested in accordance with ASTM E84. EPS boards shall have a nominal thickness of 2 inches (51 mm) and include gaps and notches in the front molded veneer pattern as well as a vertically corrugated back face for water drainage.

3.3 EnduraMax Wall Ties: EnduraMax wall ties are formed from No. 22 gage (0.03-inch (0.76 mm)) Type 304 stainless steel complying with ASTM A240. Figure 1 of this report provides details. The wall ties are attached through the sheathing to the wood studs with No. 10 by 3-½ inch long (88.9 mm) flat or bugle head wood screw fasteners. Attachment to cold-formed steel framing shall be made using minimum No. 10, 0.190 inch (4.8 mm) nominal diameter, self-tapping screws. Self-tapping screw fasteners shall comply with ASTM C1513 or be evaluated to the IBC in an evaluation report by an approved and accredited evaluation agency. Self-tapping screw fasteners shall extend through the flange of the cold-formed steel framing a minimum of three exposed threads in accordance with AISI S100 General Provisions.

3.4 Mortar: Mortar for use with the EnduraMax wall system is a pre-blended proprietary mortar that complies with ASTM C270. The mortar is packaged in 60-pound (27 kg) bags and 3,000-pound (1,361 kg) supersacks.

4.0 DESIGN AND INSTALLATION

4.1 Design: The wall system is installed over minimum $^{7}/_{16}$-inch-thick (11 mm) Oriented Strand Board (OSB) sheathing panels complying with DOC PS 2 as specified

in Section 2303.1.5 of the 2015 IBC (Section 2303.1.4 of the 2012 and 2009 IBC) or Section R604 of the IRC, as applicable, or over ½-inch (12.7 mm) thick Dens-Glass Sheathing, a glass mat gypsum substrate complying with ASTM C1177 and currently recognized in ICC-ES ESR-3087. Supporting wood studs or steel framing shall be spaced at 16-inches (406 mm) on-center maximum. Foam plastic shall be separated from the interior of the building by an approved thermal barrier in accordance with Section 2603.4 of the IBC, or Section R316 of the IRC, as applicable.

The allowable transverse wind load, positive and negative, when installed over $^{7}/_{16}$-inch-thick (11 mm) OSB is 67 psf (3.2 kN/m^2) and when installed over ½-inch (12.7 mm) Dens-Glass Sheathing is 54 psf (2.6 kN/m^2). Wood framing shall have a minimum 0.50 specific gravity as set forth in the NDS and cold-formed steel framing shall be minimum No. 18 gage [43 mil (0.043 inch)] thick complying with ASTM A1003 with a minimum yield strength, F_y, of 33 ksi (227 MPa) and a minimum tensile strength, F_u, of 45 ksi (310 MPa). The maximum unsupported wall height, between horizontal supports, is 38-feet (11.6 m) in accordance with Section 12.2.2.3 of TMS 402-13 (Section 6.2.2.3 of TMS 402-11), as referenced by Section 1405.6 of the IBC.

Design wind loads shall be based on Section 1609 of the IBC, or Section 301.2.1 of the IRC, as applicable. Load combinations shall be in accordance with Section 1605 of the IBC.

4.2 Types I, II, III and IV Construction: The EnduraMax Wall System qualifies for use in Type I, II, III or IV Construction when installed over nominal 8 inch (194 mm actual) thick concrete masonry construction; or over 3-$^{5}/_{8}$ inch (92 mm), No. 20 gage [0.033 inch (0.84 mm)] steel studs, spaced 16 inches (406 mm) on-center, with $^{5}/_{8}$ inch (16 mm) thick Type X gypsum wallboard on the interior side and $^{5}/_{8}$ inch (16 mm) thick Dens-Glass Sheathing on the exterior side, each fastened to the steel studs with screws spaced 8 inches (203 mm) on-center around the perimeter and 12 inches (305 mm) on-center in the field, a layer of Tyvek Home wrap is installed over the Dens-Glass Sheathing as the water-resistive barrier, and 4 pcf (64 kg/m^3) density mineral wool is installed in each stud cavity at each floor line. Wall openings shall be framed with minimum No. 12 gage [0.104 inch (2.64 mm)] steel framing.

4.3 Fire-Resistance-Rated-Assemblies: The EnduraMax Wall System described in this report may be used over exterior fire-resistance-rated assemblies described in Table 721.1(2) of the 2015 and 2012 IBC (Table 720.1(2) of the 2009 IBC) without changing the assigned hourly rating of the assembly. The exterior wall shall have a minimum of 10-foot (3048 mm) separation distance from adjacent construction.

4.4 Installation: OSB structural sheathing shall be fastened to supporting wood studs or steel framing, spaced a maximum of 16-inches (406 mm) on-center, with minimum 6d common nails or No. 10 self-taping screws, as applicable, spaced 6-inches (152 mm) on-center maximum at the perimeter and 12-inches (305 mm) on-center maximum in the field of the panels. Larger fasteners and closer spacings shall be used when specified by the applicable code or the structural design for sheathing installation. Dens-Glass Sheathing shall be fastened to supporting studs with minimum No. 6 x 1¼ inch (32 mm) long bugle head screws at 8-inches (203 mm) on-center maximum along all framing members. A water-resistive barrier, in accordance with Section 1404.2 of the IBC, as applicable, or Section R703.2 of the IRC, as applicable, shall be applied over the structural sheathing. Flashing, in accordance with Section 1405.4 of the IBC, as applicable, or Section R703.8 of the IRC, as applicable, shall be installed to provide a continuous water-resistive barrier behind the EnduraMax Wall System. EPS boards shall be attached to the wood studs or steel framing using EnduraMax wall ties fastened with minimum No. 10 by 3½-inch-long (88.9 mm) coarse thread flat or bugle head wood screws or No. 10 self-tapping screws, as applicable, spaced maximum 19¼ inches (489 mm) vertically (2.14 ft^2 (0.199 m^2) per fastener). When the masonry units include a protruding lip, the lip should typically be installed in the joint above the unit. The head and bed joints are filled with EnduraMax mortar and tooled to compact the mortar into the joints. Figure No. 1 of this report provides details.

Weep holes shall be installed at the base of the wall, and above window and door openings, in accordance with Section 1405.4.2 of the IBC, as applicable. Weep holes shall be spaced no greater than 32 inches (813 mm) apart.

The manufacturer's published installation instructions and this report shall be strictly adhered to. A copy of the instructions and this report shall be available at all times on the jobsite during installation. Where conflicts between this report and the instructions occur, the more restrictive shall govern.

5.0 LIMITATIONS

The EnduraMax Wall System described in this report complies with the codes listed in Section 1.0 of this report subject to the following conditions:

5.1 The materials and components described in this report are limited to use in Type V construction under the IBC and on buildings constructed in accordance with the IRC, except as noted in Section 4.2 and 4.3 of this report.

5.1.1 EnduraMax walls constructed in accordance with this evaluation report using DuPont™ Tyvek® Homewrap®-Style 1055B water-resistive barrier, currently recognized in ICC-ES ESR-2375, over ½-inch (12.7 mm) thick Dens-Glass Sheathing supported by cold-formed steel framing, have been tested and comply with the acceptance criteria of NFPA 285, in accordance with Section 1403.5 of the 2015 and 2012 IBC, and may be used on buildings of Type I, II, III or IV construction.

5.1.2 Except as noted in Section 5.1.1 of this report, for use under the 2015 and 2012 IBC and IRC use in Type I, II, III or IV construction is limited to exterior walls that are not greater than 40 feet (12 192 mm) in height above grade plane when the wall contains a combustible water-resistive barrier, in accordance with Section 1403.5 of the 2015 and 2012 IBC.

5.2 The maximum allowable unsupported height of the EnduraMax Wall System is 38-feet (11.58 m).

5.3 The maximum allowable positive and negative wind pressure (transverse load) for the EnduraMax Wall System over $^{7}/_{16}$-inch (11 mm) OSB is 67 psf (3.2 kN/m^2); and when installed over ½-inch-thick (12.7 mm) Dens-Glass Sheathing is 54 psf (2.6 kN/m^2), when installed over 0.50 specific gravity wood framing or minimum 18 gage (43 mil) steel studs.

5.4 The deflection of supporting studs, due to transverse loading is limited to L/240 maximum.

5.5 When the weight of the veneer does not bear directly on the foundation, calculations for the supporting steel shelf angle and its connections to the supporting construction shall be designed to resist all loads.

5.6 Prior to installation, calculations and details demonstrating compliance with this report shall be submitted to the building official. The calculations and details shall be signed and sealed by a registered design professional when required by the statutes of the jurisdiction in which the project is to be constructed.

5.7 The EnduraMax Wall System, as described in this evaluation report, is limited to use on buildings in Seismic Design Categories A and B, except as provided in Sections 5.8 and 5.9 of this report, as applicable.

5.8 For use in Seismic Design Category (SDC) C the EnduraMax Wall System shall be isolated at the sides and top of the veneer sections from the structure so that vertical and lateral seismic forces resisted by the structure are not imparted to the veneer, in accordance with Section 12.2.2.10 of TMS 402-13 (Section 6.2.2.10 of TMS 402-11 and -08), as applicable, as referenced by Section 1405.6.2 of the IBC.

5.9 For use in SDC D, in addition to the requirements provided in Section 5.8 of this report, the maximum wall area of the EnduraMax Wall System supported by each anchor shall be reduced by 75 percent to 1.605 sf/fastener (e.g., studs spaced 16 inches on-center horizontally and fasteners spaced 14.4 inches on center vertically), in accordance with Section 12.2.2.10.2 of TMS 402-13 (Section 6.2.2.10.2 of TMS 402-11 and -08), as referenced by Section 1405.6.2 of the IBC.

5.10 When used on the exterior of the building, the EPS boards shall be separated from the interior of the building by an approved 15-minute thermal barrier complying with the requirements of Section 2603.4 of the IBC or Section R316.4 of the IRC, as applicable.

5.11 In areas where the probability of termite infestation is very heavy the clearance between the EPS boards installed above grade and exposed earth shall be at least 6 inches (152 mm), in accordance with IBC Sections 1403.7, 2114 and Section 2603.8 of the 2015 IBC (Section 2603.9 of the 2012 IBC, or Section 2603.8 of the 2009 IBC), as applicable.

5.12 EPS boards are manufactured by Plastiques Cellulaire Polyform, under a quality control program by Intertek's Warnock Hersey, and identified as EnduraMax/Suretouch EPS panels.

5.13 When the EnduraMax Wall System is installed over wood framed walls, structural sheathing, a water-resistive barrier and flashing complying with the applicable code are required.

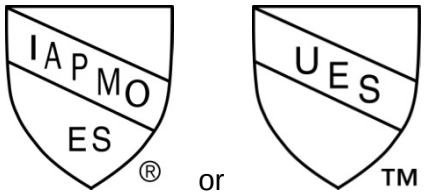
6.0 SUBSTANTIATING DATA

Data in accordance with IAPMO Uniform ES EC 021-2014, Evaluation Criteria for Anchored Masonry Veneer System with Polystyrene Foam Plastic Backing; manufacturer's descriptive literature and installation instructions. Test data in conformance with the Evaluation of Flammability Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components, NFPA 285. Engineering study for compliance with the 2012 IBC and 2012 IRC. Test reports are from laboratories in compliance with ISO/IEC 17025.

7.0 IDENTIFICATION

7.1 EPS boards, described in Section 3.2, shall bear the label of the approved inspection agency (Quality Control Consultants) showing the manufacture's name (Plastiques Cellulaire Polyform), product listing, product identification (EnduraMax/Suretouch EPS panels) and information sufficient to determine that the end use will comply with the code requirements.

7.2 EnduraMax Wall System components are packaged and labeled with the product name (EnduraMax), the name of the manufacturer (Oldcastle, Inc.), the UES Mark of conformity and evaluation report number. Either Mark of Conformity may be used as shown below:



IAPMO UES ER-315

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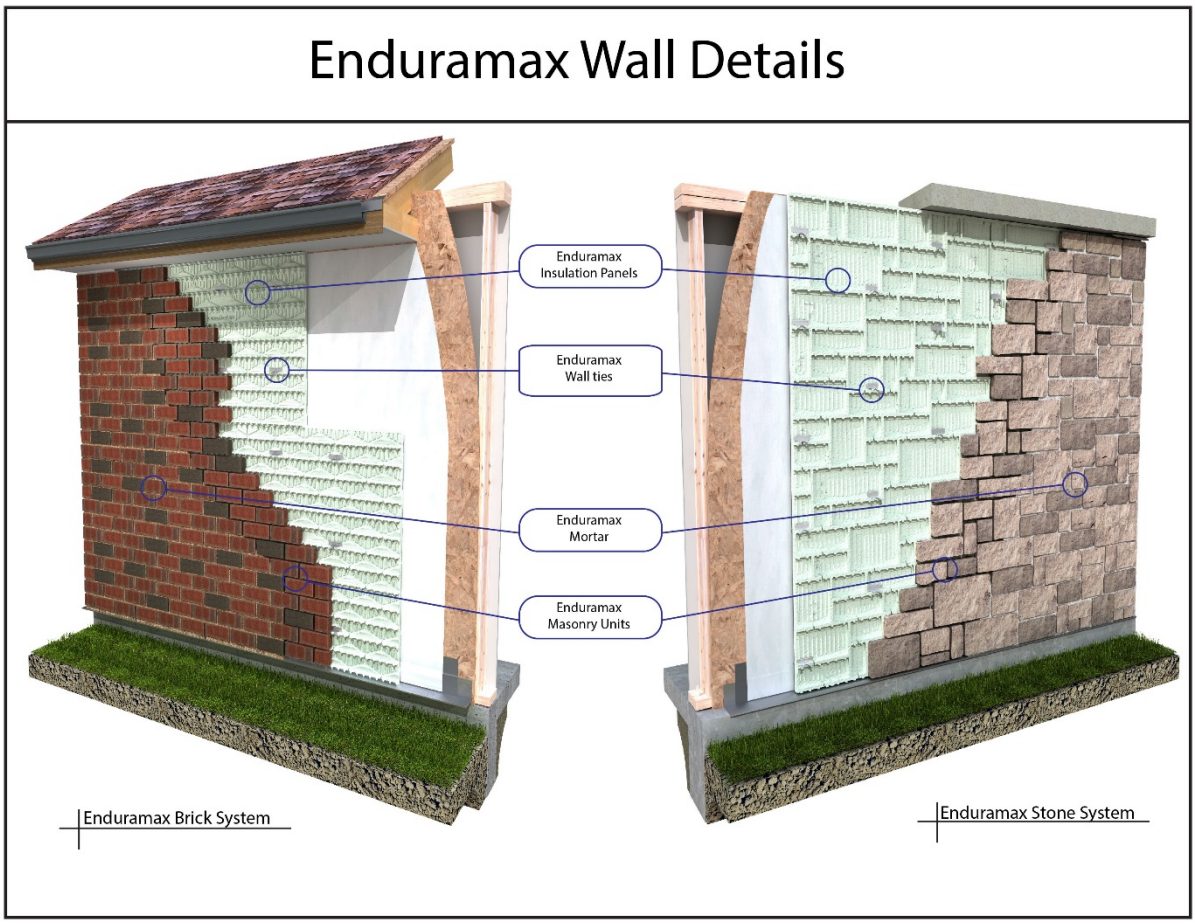
For additional information about this evaluation report please visit www.uniform-es.org or email at info@uniform-es.org

Figure 1 – EnduraMax Wall System



CALIFORNIA SUPPLEMENT

EVALUATION SUBJECT:
EnduraMax Wall System

REPORT HOLDER:
Oldcastle, Inc.
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CSI Division: 07 THERMAL AND MOISTURE PROTECTION
CSI Section: 07 42 43 Composite Wall Panels

CSI Division: 04 MASONRY
CSI Section: 04 71 00 Manufactured Brick Masonry
CSI Section: 04 73 00 Manufactured Stone Masonry

1.0 SCOPE OF EVALUATION

1.1 Compliance to the following codes & regulations:
- 2010 California Building Code (CBC)
- 2010 California Residential Code (CRC)

2.0 FINDINGS

The EnduraMax Wall System described in IAPMO UES Evaluation Report ER-315 complies with the 2010 CBC, and the 2010 CRC. Installation shall be in accordance with ER-315.

In areas where the probability of termite infestation is very heavy the clearance between the EPS boards installed above grade and exposed earth shall be at least 6 inches (152 mm), in accordance with Section 2603.8 of the CBC.

For design in accordance with Section 1409 of the CBC, the EnduraMax wall system shall not be considered as part of the backing in computing strength or deflection nor shall it be considered as part of the required thickness of the backing

EnduraMax EPS boards have not been evaluated under CBC Chapter 7A or CRC Section R327, for use in the exterior design and construction of new buildings located in a Fire Hazard Zone within a State Responsibility Area or any Wildland-Urban Interface Fire Area.

FLORIDA SUPPLEMENT

OLDCASTLE, INC.
ENDURAMAX WALL SYSTEM

CSI Sections: 07 42 43 Composite Wall Panels
04 71 00 Manufactured Brick Masonry
04 73 00 Manufactured Stone Masonry

For additional information about this evaluation report please visit www.uniform-es.org or email at info@uniform-es.org

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1.0 RECOGNITION

EnduraMax Wall System evaluated in IAPMO UES ER-315 is a satisfactory alternative to the following codes and regulations:

- 2017 and 2014 Florida Building Code, Building (FBC, Building)
- 2017 and 2014 Florida Building Code, Residential (FBC, Residential)

2.0 ADDITIONAL REQUIREMENTS

Installation shall be in accordance with ER-315. Load combinations shall be in accordance with Sections 1605.2 or 1605.3 of the FBC,Building, as applicable.

For installations in accordance with 2017 FBC, Building Sections 1403.8, 2114.2 and 2603.8 (Sections 1403.8, 2114.2 and 2603.9 of the 2014 FBC, Building) or FBC, Residential Section R704, as applicable, when the EnduraMax Wall System is supported by a shelf angle or lintel secured to the foundation sidewall there shall be at least 6-inches (152 mm) clear inspection space between veneer and the top of any soil, sod, mulch or other organic landscaping component deck, apron, porch, walk or any other work immediately adjacent to or adjoining the structure. For installations in accordance with FBC, Building, Section 2114.2 if the masonry veneer extends below grade, a termite protective treatment shall be applied to the cavity created between the veneer and the foundation in lieu of a physical barrier.

Use of the EnduraMax Wall System for compliance with the high-velocity hurricane zone provisions of the FBC, Building and FBC, Residential has not been evaluated and is outside the scope of this evaluation report.

3.0 QUALITY ASSURANCE

Verification shall be provided that a quality assurance agency audits the manufacturers quality assurance program and audits the production quality of products, in accordance with Section (5)(d) of Florida Rule 61G20-3.008. The quality assurance agency shall be approved by the Commission (or the building official when the report holder does not possess an approval by the Commission).