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ICC-ES Evaluation Report

ESR-2164

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DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 24 00—Exterior Insulation and Finish Systems
Section: 07 24 19—Water-Drainage Exterior Insulation and Finish Systems

REPORT HOLDER:

BASF CORPORATION
3550 ST. JOHNS BLUFF ROAD SOUTH
JACKSONVILLE, FLORIDA 32224
(904) 996-6000
www.wallsystems.basf.com

EVALUATION SUBJECT:

ACROCRETE ACROWALL-ES SYSTEM, ACROWALL-ESV OPTION 1, 2 AND 3, ACROWALL-PM SYSTEM, ACROWALL-PM-WB AND ACROWALL-PM PLUS EXTERIOR INSULATION AND FINISH SYSTEMS (EIFS)

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2009 *International Building Code*® (IBC)
- 2009 *International Residential Code*® (IRC)

Properties evaluated:

PROPERTY	IBC CHAPTER	IRC CHAPTER
Weather resistance	14	R7
Structural—transverse wind load resistance	16	R6
Fire-resistance-rated construction	7	R3
Types I–IV (noncombustible) construction	26	NA
Ignition resistance	26	NA
Special inspections	17	NA
Exterior insulation and finish systems (EIFS)	14	R7
Surface burning characteristics	26	R3

2.0 USES

The Acrocrete Acrowall-ES Wall System and Acrowall-PM System are exterior insulation and finish systems (EIFS) complying with IBC Section 1408 and IRC Section R703.9. The systems may be used in fire-resistance-rated construction and any construction type (IBC Types I through V) with the exception of framed walls in a Group R1, R2, R3 or R4 Occupancy Group, when installed in accordance with this report. Under the IRC, the systems are limited to use on concrete or masonry walls.

The Acrocrete Acrowall-ESV Option 1, 2 and 3 Systems and Acrowall-PM-WB and Acrowall-PM Plus Systems are EIFS complying with IBC Section 1408 and IRC Section R703.9. The systems comply with the requirements of IBC Section 1408.4.1 and IRC Section R703.9 as EIFS with drainage. The systems 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 this report.

3.0 DESCRIPTION

3.1 System Components:

The Acrowall-ES Wall System consists of an optional water-resistive barrier coating, adhesively applied expanded polystyrene (EPS), reinforcing mesh, base coat and finish coat. The Acrowall-ESV Option 1, 2 and 3 Systems consist of a water-resistive barrier, mechanically attached EPS, reinforcing mesh, base coat and finish coat. The Acrowall-PM system consists of an optional water-resistive barrier, mechanically attached extruded polystyrene (XEPS), reinforcing mesh, base coat and finish coat. The Acrowall-PM-WB and Acrowall-PM Plus CD Systems consist of a water-resistive barrier, mechanically attached XEPS, reinforcing mesh, base coat and finish coat. See Table 1 for system components.

3.2 Insulation Board:

3.2.1 Acrowall-ES and Acrowall-ESV: For the Acrowall-ES and Acrowall-ESV Systems, the insulation board must be one of the following:

a. Acrocrete Acrowall-ES and Acrowall-ESV insulation board is expanded polystyrene (EPS) complying with ASTM C 578, Type I, and ASTM E 2430; has a flame spread of 25 or less and a smoke developed index of 450 or less when tested in accordance with ASTM E 84 or UL 723; is produced by a molder who participates in an approved third-party quality assurance program; and is labeled in accordance with Section 7.0 of this report. Acrowall-ESV Option 2 insulation board is a channeled insulation board with vertical channels $1^1/_4$ inches wide by $^1/_4$ inch deep (32 mm by 6.4 mm) spaced $^1/_2$ inch (12.7 mm) apart.

b. EPS insulation board must comply with ASTM C 578, Type I, and ASTM E 2430, and must be produced by a molder with a current evaluation report.

c. EPS insulation board may be produced by a molder who participates in an approved third-party quality

assurance program. The board must comply with ASTM C 578, Type I and ASTM E 2430; demonstrate a flame spread index of 25 or less and a smoke developed index of 450 or less when tested in accordance with ASTM E84 or UL 723; and be labeled in accordance with Section 7.0 of this report.

3.2.2 Acrowall-PM, Acrowall-PM-WB and Acrowall-PM Plus Systems: For the Acrowall-PM System, Acrowall-PM-WB and Acrowall-PM Plus Systems, the insulation board must be Acrocrete Acrowall-PM extruded polystyrene (XEPS) insulation board complying with ASTM C 578, Type IV, which has a maximum density of 2 pcf (32 kg/m^3); has a flame spread of 25 or less and a smoke developed index of 450 or less when tested in accordance with ASTM E 84 or UL 723; is produced by a molder that participates in an approved third-party quality assurance program; and which is labeled in accordance with Section 7.0 of this report.

3.3 Substrates:

- Gypsum sheathing complying with ASTM C 1396 or ASTM C 1177
- Fiber cement panels complying with the ICC-ES Acceptance Criteria for Fiber Cement Siding Used as Exterior Wall Siding (AC90), and ASTM C 1186
- Fiber cement panels complying with the ICC-ES Acceptance Criteria for Reinforced Cementitious Sheets Used as Wall and Ceiling Sheathing and Floor Underlayment (AC376), and ASTM C 1325
- Concrete masonry complying with the code
- Concrete complying with the code
- Exterior plaster complying with the code
- Exterior or Exposure 1 wood structural panels complying with DOC PS1 or PS-2
- Brick masonry complying with the code

3.4 Sealants:

Sealants must comply with ASTM C 920, Type S or M, minimum Grade NS, minimum Class 25 and Use O.

3.5 Water-resistive Barriers

For the Acrowall-ESV Option 1, 2 and 3, Acrowall-PM-WB and Acrowall-PM Plus, the barrier must be one of the following:

3.5.1 Water-resistive Barrier: No.15 asphalt felt complying with IBC Section 1404.2, IRC Section 703.2 or other material complying with the ICC-ES Acceptance Criteria for Water-resistive Barriers (AC38). For wood-based sheathing, two layers of Grade D building paper, one layer of Grade D building paper with 60-minute water resistance, or other material complying with AC38, is required.

3.5.2 Tyvek StuccoWrap, DrainWrap or CommercialWrap D: One layer of Tyvek StuccoWrap, DrainWrap or CommercialWrap D is equivalent to Grade D building paper having a 60-minute water-resistance rating (see ESR-2375).

3.5.3 Acrocrete Acrostop T or Acrostop R: Liquid-applied water-resistive barrier coatings complying with AC212.

4.0 DESIGN AND INSTALLATION

4.1 General:

The EIFS must be installed in accordance with the manufacturer's installation instructions, specifications and details available at www.acrocrete.basf.com.

4.2 Drainage Options:

- Acrocrete Acrowall-ESV Option 1 and Acrowall-PM-WB systems: flat insulation board over Tyvek StuccoWrap, DrainWrap or CommercialWrap D-Style (see ESR-2375)
- Acrocrete Acrowall-ESV Option 2: channeled insulation board over Grade D building paper
- Acrocrete Acrowall-ESV Option 3 and Acrowall-PM Plus: flat insulation board over a drainage mat and Grade D building paper

4.3 Wind Design:

Tables 2, 2.1 and 2.2 describe specific assemblies for which test data has been submitted. Other assemblies may be considered for approval by local officials based on testing and/or calculations of a qualified design professional.

4.4 Weather Protection:

The Acrocrete Acrowall-ES, Acrowall-ESV Option 1, 2, 3, Acrowall-PM, Acrowall-PM-WB and Acrowall-PM Plus systems comply with IBC Section 1403.2 and IRC Section R703.1.1.

4.5 Use in Types I through IV (Noncombustible) Construction:

Table 3 describes the assemblies qualified for use in Types I through IV construction (IBC).

4.6 Fire-resistance-rated Construction:

Table 4 describes the assemblies qualified for use in nonload-bearing fire-resistance-rated construction. In addition, in Type V construction, the Acrocrete Acrowall-ES, Acrowall-ESV Option 1, 2, 3, Acrowall-PM, Acrowall-PM-WB and Acrowall-PM Plus systems may be attached to the surface of combustible exterior fire-resistance-rated assemblies described in IBC Table 720.1(2) without changing the assigned hourly rating of the assembly. The exterior wall must have a minimum 10-foot (3048 mm) separation distance from adjacent construction.

4.7 Special Inspections:

For recognition under the IBC, special inspections of the Acrowall-ES Wall System, the Acrowall-PM System, and application of the water-resistive barrier coating when used as described in Table 1, must be conducted in accordance with Section 1704.14 of the IBC.

5.0 CONDITIONS OF USE

The Acrocrete Acrowall-ES, Acrowall-ESV Option 1, 2, 3, Acrowall-PM, Acrowall-PM-WB and Acrowall-PM Plus Systems described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Installation must comply with this report, the manufacturer's published installation instructions and the applicable code. In the event of a conflict between the manufacturer's instructions and this report, this report governs.

5.2 The insulation board must be separated from the building interior by a thermal barrier complying with the applicable code.

5.3 Installation must be by applicators listed by BASF Corporation.

5.4 Termination of the systems must not be less than 6 inches (152 mm) above finished grade in accordance with IBC Section 2603.8 and IRC Section R320.5.

5.5 The Acrocrete Acrowall-ES and Acrowall-PM systems have not been qualified as EIFS with drainage as described in IBC Section 1408.4.1 and IRC Section R703.9.2.

5.6 Adequacy of fasteners for concrete, masonry, brick or portland cement plaster substrates must be demonstrated to the satisfaction of the code official by a proof-load test program consisting of fastener withdrawal from the wall. The average withdrawal strength, in pounds, must be six times the required fastener load.

5.7 The Acrowall-ES base coat and finish coat comply with IBC Chapter 8 and IRC Chapter 3 as a Class A (Class 1) interior finish, when applied to concrete, concrete masonry, gypsum plaster, gypsum wallboard and Portland cement plaster.

6.0 EVIDENCE SUBMITTED

6.1 Reports of tests in accordance with ASTM E 2568 and ASTM E 2273.

6.2 Data in accordance with the ICC-ES Acceptance Criteria for EIFS Clad Drainage Wall Assemblies (AC235), dated October 2009.

6.3 Data in accordance with the ICC-ES Acceptance Criteria for Water-resistive Coatings Used as Water-resistive Barriers over Exterior Sheathing (AC212), dated October 2009.

6.4 Data in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2009.

6.5 Data in accordance with the ICC-ES Acceptance Criteria for Exterior Insulation and Finish Systems (AC219), dated October 2009.

7.0 IDENTIFICATION

Each container or package of the coating or reinforcing mesh used as part of the Acrocrete Acrowall-ES, Acrowall-ESV Option 1, 2, 3, Acrowall-PM, Acrowall-PM-WB and Acrowall-PM Plus CD Systems must be labeled with the manufacturer's name (BASF Corporation) and address; the product name; lot or batch number; quantity of material; storage instructions; pot life, expiration date; and the evaluation report number (ESR-2164).

Acrocrete Acrowall-ES and Acrowall-ESV insulation board must be labeled on the edge of each board with the BASF Corporation name, the plant identification number, the name of the inspection agency (RADCO) and the evaluation number (ESR-2164).

Other foam plastic insulation must be labeled in accordance with the current ICC-ES evaluation report in which it is recognized, or in accordance with IBC Section 2603.2 or IRC Section 316.2, as applicable.

TABLE 1—SYSTEM COMPONENTS

<table>
<tr><th>System</th><th>Water-Resistive Barrier[3]</th><th>Adhesive</th><th>Base Coat</th><th>Reinforcing Mesh</th><th>Finish</th></tr>
<tr><td>Acrowall-ES</td><td>Described in Section 3.5.3 (optional)</td><td>Acrobase 60
Acrodry Base
Acrohesive
Acrobase NC
Sheath-Prime[4]</td><td rowspan="2">Acrobase 60
Acrodry Base
Acrobase NC</td><td rowspan="2">Acromesh 4, 4.2 oz/yd^2, minimum[1]</td><td rowspan="8">Acrotex
Acrotexsil
Acroflex
Acroflexsil
Acrocote T[2]</td></tr>
<tr><td>Acrowall-ESV Option 1</td><td>Described in Section 3.5.2</td><td rowspan="7">N/A</td></tr>
<tr><td>Acrowall-ESV Option 2</td><td>Described in Section 3.5.1, 3.5.2 or 3.5.3</td><td rowspan="2">Acrowall-PM Base Coat</td><td rowspan="3">Acowall-PM Mesh,
4 oz/yd^2</td></tr>
<tr><td>Acrowall-ESV Option 3</td><td>Described in Section 3.5.1, 3.5.2 or 3.5.3 with Drainage Mat</td></tr>
<tr><td>Acrowall-PM</td><td>Described in Section 3.5.1, 3.5.2, or 3.5.3 (optional)</td></tr>
<tr><td>Acrowall-PM-WB</td><td>Described in Section 3.5.2</td><td colspan="2"></td></tr>
<tr><td>Acrowall-PM Plus</td><td>Described in Section 3.5.1, 3.5.2 or 3.5.3 with Drainage Mat</td><td colspan="2"></td></tr>
</table>

[1]Higher weight meshes are allowable
[2]For aesthetic conditions, Acrocote T is applied over dry base coat at joints before installation of sealant
[3]The water-resistive barrier is optional on concrete or masonry under the IBC or IRC or framed walls other than Type V, Group R1, R2, R3 & R4 under the IBC
[4] Sheath-Prime is used as an intermediary adhesive between wood-based sheathing substrates and Acrobase 60 and Acrodry Base Coats when used as an adhesive for adhering insulation boards.

TABLE 2.1—WIND LOAD DESIGN - ACROWALL-ES SYSTEM

Framing[3]		Substrate	Insulation		
Type	**Maximum spacing (inch)**		**EPS min thickness (inch)**	**Attachment**	**Allowable Wind Load (psf)**
2x4 Wood[1]	24	Min $^{7}/_{16}$ inch wood structural panel, attached in accordance with the code or ASTM C1396 gypsum sheathing or ASTM C1177 glass-mat gypsum sheathing, attached with #8 x $1^{1}/_{4}$ inch bugle head screws at 8 inches on center	$^{3}/_{4}$"	System described in Table 1	30 positive 30 negative
$3^{5}/_{8}$-inch-by No. 20 gage steel		Min $^{7}/_{16}$ inch wood structural panel, attached in accordance with the code or ASTM C1396 gypsum sheathing or ASTM C1177 glass-mat gypsum sheathing, attached with #8 x $1^{1}/_{4}$ inch bugle head screws at 8 inches on center on edges and 12 inches on center in the field			30 positive 23 negative
$3^{5}/_{8}$-inch-by No. 18 gage steel		Min $^{7}/_{16}$ inch wood structural panel, attached in accordance with the code or ASTM C1396 gypsum sheathing or ASTM C1177 glass-mat gypsum sheathing, attached with #8 x $1^{1}/_{4}$ inch bugle head screws at 8 inches on center on edges and 12 inches on center in the field			30 positive 30 negative
$3^{5}/_{8}$-inch-by No. 18 gage steel	16	3.4 lb/yd[2] metal lath fastened through ASTM C1396 gypsum sheathing or ASTM C1177 glass-mat gypsum sheathing, attached with #8 x $1^{1}/_{4}$ inch bugle head screws at 8 inches on center			54 positive 54 negative
N/A	N/A	Concrete or masonry			Positive – see note 2 30 negative

For **SI:** 1 inch = 25.4 mm; 1 psf = 0.0479 kPa.

[1]Minimum 2 x 4 wood framing, minimum specific gravity 0.42
[2]Maximum positive pressure is limited to the capacity of the concrete or concrete masonry substrate, determined in accordance with the applicable code.
[3]The framing members must be designed to resist all positive and negative transverse loads with a maximum allowable deflection of 1/240 of the span.

TABLE 2.2—WIND LOAD DESIGN - ACROWALL-ESV SYSTEMS

Framing[2]		Substrate	Insulation		
Type	**Maximum spacing (inch)**		**EPS min thickness (inch)**	**Attachment**	**Allowable Wind Load (psf)**
2x4 Wood[1]	16	Min $^{7}/_{16}$ inch wood structural panel, attached in accordance with the code	1	2-inch diameter Wind-Devil 2 plates; W series fasteners with $^{5}/_{8}$" penetration through sheathing, 8 fasteners per board spaced 12 inches on center vertically and horizontally	27 positive 35 negative
			2		28 positive 41 negative
			$1^{1}/_{2}$ (channeled)		52 positive 28 negative
	24		1		19 positive 33 negative
			2		19 positive 36 negative
$3^{5}/_{8}$-inch-by No. 20 gage steel	16	Any sheathing described in Section 3.3, attached per code	1	2-inch diameter Wind-Devil 2 plates; wood sheathing W series fasteners with $^{5}/_{8}$" penetration through sheathing, 8 fasteners per board spaced 12 inches on center vertically and horizontally; gypsum or cement board sheathing S series fasteners with $^{5}/_{8}$" penetration through studs, 12 fasteners per board spaced 8 inches on center vertically	21 positive 29 negative
			2		21 positive 29 negative
	24		1	2-inch diameter Wind-Devil 2 plates; wood sheathing W series fasteners with $^{5}/_{8}$" penetration through sheathing, 8 fasteners per board spaced 12 inches on center vertically and horizontally; gypsum or cement board sheathing S series fasteners with $^{5}/_{8}$" penetration through studs, 9 fasteners per board spaced 8 inches on center vertically	10 positive 21 negative
			2		12 positive 21 negative

For **SI:** 1 inch = 25.4 mm; 1 psf = 0.0479 kPa.

[1]Minimum 2 x 4 wood framing, minimum specific gravity 0.42
[2]The framing members must be designed to resist all positive and negative transverse loads with a maximum allowable deflection of 1/240 of the span.

TABLE 2.3—WIND LOAD DESIGN - ACROWALL-PM SYSTEMS

Framing[3]		Substrate	Insulation		
Type	**Maximum spacing (inch)**		**XEPS min thickness (inch)**	**Attachment**	**Allowable Wind Load (psf)**
2x4 Wood[1]	16	ASTM C1396 gypsum sheathing or ASTM C1177 glass-mat gypsum sheathing, attached with per ASTM C 1280 and ASTM C840 with a maximum fastener spacing of 8 inches on center	1	2-inch diameter ULP-302 plates; W series fasteners or 12d nails with 1" penetration into framing, spaced 12 inches on center vertically to framing at edges and intermediate locations	35 positive 28 negative
	24				30 positive 19 negative
$3^{5}/_{8}$-inch-by No. 16 gage steel	16	ASTM C1396 gypsum sheathing or ASTM C1177 glass-mat gypsum sheathing, attached with #6 x $1^{1}/_{4}$ inch bugle head screws at 8 inches on center on edges and 12 inches on center in the field		2-inch diameter ULP-302 plates; S series fasteners with $^{5}/_{8}$" penetration through studs, spaced 12 inches on center vertically to framing	35 positive 50 negative
	24				30 positive 35 negative
N/A	N/A	Concrete or masonry		2-inch diameter ULP-302 plates; $^{1}/_{4}$" diameter shank fasteners with $^{1}/_{2}$" diameter steel washer spaced 12 inches on center vertically in rows 16 inches on center. A proof-load test program consisting of fastener withdrawal from the wall must be conducted by test lab approved by the code official. The average withdrawal strength, in pounds, must be eight times the required fastener load.	Positive – see Note 2 50 negative

For **SI:** 1 inch = 25.4 mm; 1 psf = 0.0479 kPa.

[1]Minimum 2 x 4 wood framing, minimum specific gravity 0.49
[2]Maximum positive pressure is limited to the capacity of the concrete or concrete masonry substrate, determined in accordance with the applicable code.
[3]The framing members must be designed to resist all positive and negative transverse loads with a maximum allowable deflection of 1/360 of the span.

TABLE 3—ASSEMBLIES[2,3] FOR USE IN TYPES I THROUGH IV CONSTRUCTION

Framing Members			Interior Sheathing			Exterior Sheathing			Insulation Board Thickness Maximum (inches)
Steel		Max Spacing (inches)	Type[1]	Min Thickness (inch)	Max Fastener Spacing (inches)	Type[1]	Min Thickness (inch)	Max Fastener Spacing (inches)	
Min Depth (inches)	Min Gage								
ACROWALL-ES SYSTEM									
$3^5/_8$	20	16 oc	ASTM C36 or ASTM C1396	$^1/_2$	8 oc on joints 12 oc in field	ASTM C79 or ASTM C1396	$^1/_2$	8 oc	13
ACROWALL-ESV OPTION 1, 2 and 3									
$3^5/_8$	20	16 oc	ASTM C36 or ASTM C1396	$^1/_2$	8 oc on joints 12 oc in field	ASTM C79 or ASTM C1396	$^1/_2$	8 oc	4
ACROWALL-PM, ACROWALL-PM-WB and ACROWALL-PM PLUS SYSTEMS									
$3^5/_8$	16	24 oc	ASTM C36 or ASTM C1396	$^1/_2$	12 oc	ASTM C79 or ASTM C1396	$^5/_8$	8 oc	2

For **SI:** 1 inch = 25.4 mm.

[1]The fasteners are #6 x $1^1/_4$ inch long bugle head screws.
[2]Coating system is as described in Table 1.
[3]When applied directly to concrete or masonry, the walls may be considered noncombustible construction.

TABLE 4—ONE-HOUR FIRE-RESISTANCE RATED ASSEMBLIES[2, 3]

Framing Members			Interior Sheathing			Exterior Sheathing			Insulation Board Thickness Maximum (inches)
Steel		Max Spacing (inches)	Type[1]	Min Thickness (inch)	Max Fastener Spacing (inches)	Type[1]	Min Thickness (inch)	Max Fastener Spacing (inches)	
Min Depth (inches)	Min Gage								
ACROWALL-ES and ACROWALL-ESV OPTION 1, 2 and 3									
$3^5/_8$	18	16 oc	ASTM C36 or ASTM C1396 Type X	$^5/_8$	8 oc on joints 12 oc in field	ASTM C79 or ASTM C1396 Type X	$^5/_8$	8 oc on joints 12 oc in field	4
ACROWALL-PM, ACROWALL-PM-WB and ACROWALL-PM PLUS SYSTEMS									
$3^5/_8$	16	24 oc	ASTM C36 or ASTM C1396 Type X	$^1/_2$	12 oc	ASTM C79 or ASTM C1396 Type X	$^5/_8$	8 oc on joints	2

For **SI:** 1 inch = 25.4 mm.

[1]The fasteners are #6 x $1^5/_8$ inch long bugle head screws.
[2]Coating system is as described in Table 1.
[3]Rated from both sides.