

Code Compliance Research Report CCRR-0230

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DIVISION: 09 00 00 - FINISHES

Section: 09 24 00 - Portland Cement Plastering

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REPORT SUBJECT:

STUCCOBASE CEMENTITIOUS EXTERIOR WALL COVERING

1.0 SCOPE OF EVALUATION

This research report addresses compliance with the following Codes:

- 2015 and 2012 International Building Code® (IBC)
- 2015 and 2012 International Residential Code® (IRC)
- 2014 Florida Building Code® (FBC) (Excluding High Velocity Hurricane Zone)

Properties evaluated:

- Structural (wind resistance)
- Durability
- Fire-resistance-rated construction
- Exterior walls of Types I, II, III and IV construction
- Weather protection

See Table 1 for code sections relevant to these properties.

2.0 USES

StuccoBase is a cementitious exterior wall covering system installed on exterior walls of wood or steel frame, concrete or masonry construction. The system may be used in fire-resistance-rated construction when constructed as described in Section 4.2. The system may be used in all Types of construction; see Section 4.3 for use on exterior walls of Types I, II, III and IV construction.

3.0 DESCRIPTION

3.1. Exterior Wall Covering Systems:

StuccoBase is a proprietary coating that is reinforced with wire fabric, metal lath or glass fiber lath and applied to substrates of expanded polystyrene (EPS) insulation board, gypsum sheathing board, fiberboard, plywood, or oriented strand board (OSB). StuccoBase may also applied over concrete or masonry units directly (without lath) or with lath.

The StuccoBase coating is used in the following systems:

Senergy:

Sentry Stucco
Sentry Stucco Plus
Sentry Stucco Ultra
Senergy Platinum CI Stucco
Senergy Platinum CI Stucco Plus
Senergy Platinum CI Stucco Ultra

Finestone:

Finestone Stucco
Finestone Stucco Plus
Finestone Stucco Ultra
Finestone Platinum CI Stucco
Finestone Platinum CI Stucco Plus
Finestone Platinum CI Stucco Ultra

Acrocrete:

Acrowall CP
Acrowall CP Plus
Acrowall CP Ultra
Acrocrete Platinum CI Stucco
Acrocrete Platinum CI Stucco Plus
Acrocrete Platinum CI Stucco Ultra

3.2. Materials:

3.2.1. StuccoBase Concentrate: A factory-prepared mixture of Type I, II or III Portland cement complying with ASTM C 150, chopped fibers and proprietary additives. The mixture is packaged in 80-pound bags. Five to 6 gallons of water and 200 to 240 pounds of sand are added to each bag in the field and mixed in accordance with the manufacturer's recommendations.







The mixture may be blended at a batching plant and delivered with sand in a bulk-mixer to the jobsite and field-mixed with water, under the following conditions:

- 1. The bulk-mixer bears an identification label showing the Senergy, Finestone or Acrocrete name and address, the batch plant name and address, the product name, and the evaluation report number (CCRR-0230).
- 2. A signed certificate from the batching plant accompanies each batch, specifying the plant name, contractor's name, jobsite address, date, materials batched, quantity, and curing instructions. The ratio of batched amounts must be 240 pounds of sand to 80 pounds of mixture.
- 3. Procedures are in place to prevent tampering in controlling the amount of mixture and sand combined.
- **3.2.2.** StuccoBase Premix: A factory-prepared mixture of sand and StuccoBase Concentrate, packaged in 80-pound bags. Two to 2-1/2 gallons of water is added to each bag in the field and mixed.
- **3.2.3. Sand:** Sand must be clean and free from deleterious amounts of loam, clay, silt, soluble salts and organic matter. Sampling and testing must comply with ASTM C 144 or C 897. Sand must be graded in accordance with ASTM C 144 or C 897 within the following limits:

RETAINED ON U.S. STANDARD	PERCENT MAINTAINED BY WEIGHT ± 2 PERCENT	
SIEVE	Minimum	Maximum
No. 4	-	0
No. 8	0	10
No. 16	10	40
No. 30	30	65
No. 50	70	90
No. 100	95	100

3.2.4. Insulation Board: Expanded polystyrene (EPS) insulation board must have a nominal density of 1.5 pcf or greater, a flame spread index of 25 or less, and a smoke-developed index of 450 or less, and must comply with ASTM C 578 as Type II. All boards must be recognized in a current Research Report acceptable to the code official. See Section 7.0 for board identification. Neopor® Rigid Foam Insulation is recognized in ICC-ES ESR-3463.

When insulation boards are unbacked, they must be 1 to 1-1/2 inches thick and have 3/8-inch-high tongues with compatible grooves for horizontal joints, as shown in Figure 1.

Grooved insulation boards are required over solid sheathing except when Tyvek® Stucco Wrap® or Tyvek® Drain Wrap are used for the water-resistive barrier. The boards must have 1/4-inch-wide-by-1/8-inch-deep vertical grooves spaced at 12 inches on the back face.

3.2.5. Lath:

- 3.2.5.1. Wire Fabric Lath: Wire fabric lath must comply with the ICC-ES Acceptance Criteria for Metal Plaster Bases (Lath) (AC191), and must be minimum No. 20 gage (0.035 inch), 1-inch galvanized steel, woven-wire fabric. Furring must comply with the following requirements:
- 1. When maximum total coating thickness is 1/2 inch or less, the body of the lath must be furred a minimum of 1/8 inch from the substrate after installation.
- 2. When total coating thickness is greater than 1/2 inch, No. 17 gage (0.058 inch) by 1-1/2-inch woven-wire fabric lath must be used. The body of the lath must be furred a minimum of 1/4 inch from the substrate after installation.
- 3.2.5.2. Metal Lath: Metal lath must comply with the ICC-ES Acceptance Criteria for Metal Plaster Bases (Lath) (AC191). Furring requirements are as set forth in Section 3.2.5.1.

3.2.6. Sheathing:

- 3.2.6.1. Gypsum Board: Gypsum board and water-resistant core gypsum sheathing must comply with ASTM C 1396.
- 3.2.6.2. Fiberboard: Minimum 1/2-inch-thick fiberboard must comply as ASTM C 208, Type IV, wall sheathing in accordance with IBC Section 2303.1.5.
- 3.2.6.3. Wood Structural Panels: The panels must be minimum 5/16-inch-thick plywood or OSB, for studs spaced 16 inches on center, and must be minimum 3/8-inch-thick plywood or 7/16-inch-thick OSB for studs spaced 24 inches on center. Plywood must be exterior







grade or Exposure 1 and comply with DOC PS-1, and OSB must be Exposure 1 and comply with DOC PS-2.

3.2.7. Caulking: Acrylic latex caulking materials must comply with ASTM C 834.

3.2.8. Weather Protection:

3.2.8.1. Water-resistive Barrier: Application of the water-resistive barrier must comply with IBC Section 1404.2 or IRC Section R703.2, as applicable. The water-resistive barrier must be (1) a minimum of one layer of No. 15 asphalt felt, complying with ASTM D 226, Type I, or (2) a water-resistive barrier recognized in a current Research Report as equivalent to ASTM D 226, Type I or better.

Tyvek® Stucco Wrap® or Tyvek® Drain Wrap (ICC-ES ESR-2375) may be used where required over solid substrates as described in Section 4.4.2.

When application is over any wood-based sheathing, the barrier must also be installed in accordance with IBC Section 2510.6 or IRC Section R703.6.3.

3.2.8.2. Vapor Retarder: A vapor retarder complying with IBC Section 1403 or IRC Section R318.1 must be provided, unless its omission is permitted under the exceptions noted in IBC Section 1403.2 or IRC Section R318.1.

3.2.8.3. Flashing, Trim and Accessories: All flashing, trim, weep screeds and corner reinforcement must be of corrosion-resistant metal or approved plastic. Flashing must be installed at the perimeter of all penetrations of the system in accordance with the applicable code. Membrane flashing must comply with ICC-ES AC148 and must be a self-adhering, flexible rubberized asphalt and polyethylene material, 0.030 inch thick, shingle-lapped over the water-resistive barrier. Rigid flashing must comply with Section 1405.3 of the IBC and must be sloped towards the exterior, with an upturned leg on the interior side and at the ends. Flashing must extend beyond the surface of the exterior wall.

4.0 INSTALLATION

4.1 Installation

4.1.1. General: StuccoBase coating must be applied in accordance with BASF published installation instructions. The coating must be applied to a minimum

3/8-inch thickness. The lath, when required, must be embedded in the minimum coating thickness and must not be exposed.

The coating must be applied by applicators approved by BASF Corporation. The water-resistive barrier may be omitted when the stucco is installed directly over concrete or unit masonry substrates.

An installation card, as noted in Figures 2 and 3 of this report, must be on the jobsite with the name of the applicator and the product to be used before any water-resistive barrier or exterior sheathing is installed.

The StuccoBase coating materials may be used with any of the systems identified in Section 3.1, when applied in accordance with the BASF Corporation published installation instructions and in accordance with the limitations stated in this Research Report. Use the following links to access the BASF installation details:

http://www.senergy.basf.com/en/wall_systems/stucco/ Pages/default.aspx

http://www.finestone.basf.com/en/wall_systems/stucco_wall_systems/Pages/default.aspx

http://www.acrocrete.basf.com/en/wall_systems_select or/stucco_wall_systems/Pages/default.aspx

http://www.acrocrete.basf.com/en/platinum-ci-and-platinum-ci-stucco/Pages/default.aspx

Where differences occur between this report and the manufacturer's installation instructions, this report shall govern.

This report recognizes use of the *StuccoBase* systems with metal lath. *StuccoBase* may be used with BASF PermaLath 1000 lath, when the construction is as described in CCRR-0249.

4.1.2. Application on Framed Walls: Insulated systems may be installed over open framing and over solid sheathing described in Section 3.2.6. Uninsulated systems must be installed over solid sheathing described in Section 3.2.6. Sheathing must be installed in accordance with the code unless more restrictive requirements are specified in Section 4.2 or 4.3. Wall framing must be designed in accordance with the applicable code. Metal lath must be installed as described in ASTM C1063.







See Table 2 for additional requirements for lath attachment and allowable wind loads.

4.1.3. Application Over Concrete and Masonry:

- 4.1.3.1. Application without Lath: Surface preparation of concrete and masonry must be in accordance with IBC Section 2510.7. The coating must be applied directly to the prepared surface at a minimum thickness of 3/8 inch in accordance with Section 4.1.1 of this report.
- 4.1.3.2. Application with Lath: Lathing and furring used to receive stucco must be installed and conform with ASTM C1063. Fasteners used to install the lath must be approved. The lath must be fastened in vertical rows, a maximum of 24 inches on center. Fastener spacing in each row must be a maximum of 6 inches. The coating must be applied in accordance with Section 4.1.1 of this report.

4.2. Fire-Resistance-Rated Wall Assemblies:

See Table 3.

4.3. Exterior Walls of Type I, II, III or IV Construction:

See Table 4.

4.4. Drainage:

- **4.4.1. Unbacked EPS:** A water-resistive barrier described in Section 3.2.8.1 is required and must be applied between the EPS and framing.
- **4.4.2. Solid Sheathing:** Drainage is provide either by using EPS insulation with grooves, as described in Section 3.2.8.1, together with a water-resistive barrier described in Section 3.2.8.1; or by using Tyvek® Stucco Wrap® or Tyvek® Drain Wrap, installed between the flat EPS boards and the sheathing.

4.5. Miscellaneous:

- **4.5.1. Inspection** Requirements: Building department inspection of lath installation must be required prior to application of the coating as noted in IBC Section 109.3.5, IRC Section R109.1.5.1.
- **4.5.2. Control Joints:** Control joints must be installed as specified by the registered design professional, designer, builder, or exterior coating manufacturer, in

that order. In the absence of details, conventional threecoat plastering details must be used.

- **4.5.3. Curing:** Moist curing must be required for a minimum of 24 hours after coating application.
- **4.5.4. Soffits:** The system may be applied to soffits, provided the coating is applied over metal lath complying with Section 3.2.5.2 of this report in lieu of wire fabric lath. Metal lath fastening must comply with ASTM C 926 or C 1063 or IRC Section R703.6 of the IRC, except the fastener length must be increased by the thickness of any substrate.
- **4.5.5. Sills:** The system may be applied to sills at locations such as windows and other similar areas. Sills with depths of 6 inches or less may have the coating and lath applied to any substrate permitted in this report, provided the coating, lath, water-resistive barrier and substrate are installed in accordance with the appropriate sections of this report. Sills with depths exceeding 6 inches must have substrates of solid wood or plywood. The substrate must be fastened in accordance with IBC Table 2304.9.1 or IRC Table R602.3(1), and then a double layer of an approved water-resistive barrier must be applied. The coating, lath, and optional EPS board must be applied in accordance with Section 4.1.2 of this report.

5.0 CONDITIONS OF USE

The *StuccoBase* cementitious exterior wall coating 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 and methods of installation must comply with this report and the manufacturer's published installation instructions. In the event of a conflict between this report and the manufacturer's published installation instructions, this report governs.
- **5.2.** Installation must be by contractors approved by BASF Corporation.
- **5.3.** For walls with foam plastic insulation, the interior of the building must be separated from the EPS board with a thermal barrier complying with IBC Section 2603.4 or IRC Section R314.4, such as 1/2-inch regular gypsum wallboard applied in accordance with the applicable code.







- **5.4.** An installation card, as shown in Figure 2, must be left at the jobsite for the owner, and a copy must be filed with the building department.
- **5.5.** Foam plastic must not be placed on exterior walls of wood construction located within 6 inches (152 mm) of the ground in areas where hazard of termite damage is very heavy in accordance with IBC Section 2603.9 [2603.8] or IRC Section R320.5 of the IRC.
- **5.6.** Documentation of an Intertek approved quality control system for the manufacturing of products recognized in this report.

6.0 SUPPORTING EVIDENCE

- **6.1.** Reports of tests in accordance with the ICC-ES Acceptance Criteria for Cementitious Exterior Wall Coatings (AC11), revised December 2015.
 - **6.2.** Reports of tests in accordance with ASTM E 119.
- **6.3.** Reports of tests in accordance with ASTM E 136.
- **6.4.** Reports of tests in accordance with NFPA 285, NFPA 259 and NFPA 268.

7.0 IDENTIFICATION

- **7.1.** The factory-prepared *StuccoBase* and *StuccoBase* Premix must be delivered to the jobsite in water-resistant bags with labels bearing the following information:
 - a. Company name and address, and the research report number (CCRR-0230).



- b. Identification of components.
- c. Weight of packaged mix.
- d. Storage instructions.
- e. Maximum amount of water and other components that may be added and conditions that must be considered in determining actual amount.
- f. Curing instructions.
- g. Product name.
- **7.2.** When delivered to the jobsite with sand in a bulk mixer, the bulk-mixer label must include the information noted in Section 3.2.1 of this report.
- **7.3.** Polystyrene foam plastic insulation boards must be identified in accordance with their respective research reports. Additionally, the board density must be noted.

8.0 OTHER CODES

Requirements for the Florida Building Code are addressed in Sections 1 through 7 of this report.

9.0 CODE COMPLIANCE RESEARCH REPORT USE

- **9.1.** Approval of building products and/or materials can only be granted by a building official having legal authority in the specific jurisdiction where approval is sought.
- **9.2.** Code Compliance Research Reports shall not be used in any manner that implies an endorsement of the product by Intertek.
- **9.3.** Reference to the Intertek website address at https://whdirectory.intertek.com/Pages/DLP Search.aspx is recommended to ascertain the current version and status of this report.

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TABLE 1 – CODE REFERENCES

Properties	2015 and 2012 International Building Code (IBC)	2015 and 2012 International Residential Code (IRC)	2014 Florida Building Code (FBC)
Wind resistance	1609	R301.2.1	1609
Installation	2512	R703.7	2512
Fire-resistance-rated construction	703.2	R302	703.2
Weather protection	1403.2 2510	R703.2 R703.7.3	1403.2 2510
Exterior walls of Types I, II, III and IV construction	2603.5	Not applicable	2603.5

TABLE 2 - ALLOWABLE WIND LOADS

Framing	Sheathing/Insulation	Lath	Allowable Wind Loads (psf)
Min. 2 x 4 wood with a maximum spacing of 24 in. o.c.	Insulation board only over open framing -OR- Fiberboard; gypsum board; or wood structural panels with or without insulation board	Min. No. 20 gage by 1- in. metal lath installed with No. 11 gage roofing nails or No. 16 gage staples, spaced as follows: 6 in. o.c. for framing with G=0.50 5 in. o.c., for framing with G=0.46 4 in. o.c., for framing with G=0.42	40 psf positive or negative
Min. 3-5/8 in. No. 20 gage steel studs with a maximum spacing of 24 in. o.c.	Insulation board only over open framing -OR- Fiberboard; gypsum board; or wood structural panels with or without insulation board	Min. No. 20 gage by 1- in. metal lath installed with No 7, S-12-20 self- drilling, self-tapping panhead screws, spaced at 6 in. o.c.	40 psf positive or negative
For application using BASF PermaLath 1000 Lath, see Intertek CCRR-0249			

- 1. Fasteners must penetrate a minimum of 1 in. into wood framing or 1/4 in. through steel framing.
 - a. G NDS Assigned Specific Gravity of wood
 - b. Staples shall have minimum crown width of ½ inch.
 - c. Screws shall have a minimum head diameter of 0.333 inch.
- 2. Framing must be adequate to resist the required load.
- 3. Wind design loads determined from nominal design wind speeds (Vasd) in accordance with the applicable code shall not exceed the maximum allowable wind loads (psf) given in Table 2.







TABLE 3 - ONE-HOUR FIRE-RESISTANCE-RATED ASSEMBLIES

Interior Finish	Framing	Exterior Finish			
interior Finish		Sheathing	Insulation	Coating	Axial Loads
5/8 inch Type X gypsum board, vertical or horizontal, attached with 1-7/8 inch, 6d cooler nails having 1/4 inch heads, spaced at 7 inches o.c.; joints and nail heads must be treated ⁴	Min. 2 x 4 wood framing a maximum of 24 inches on center; no insulation in stud cavity	5/8 inch Type X gypsum sheathing, vertical, attached with 1-3/4 in. long, No. 11 gage roofing nails having 7/16-inch heads, spaced at 4 inches o.c. on perimeter and 7 inches o.c. on intermediate framing; waterresistive barrier applied over sheathing	None	Min. 3/8" StuccoBase with metal lath attached per 4.1	See Note 1
5/8 inch Type X gypsum board, vertical, attached with 2 inch, No. 11 ga. roofing nails having 5/8 inch heads, spaced at 6 inches o.c., or with 1-7/8 inch, 6d cooler nails having 1/4 inch heads, spaced at 7 inches on center; joints and nail heads must be treated4	Min. 2 x 4 wood framing a maximum of 16 inches o.c.; R-11, 1.8 pcf Rockwool insulation in stud cavities	No sheathing; water-resistive barrier applied over open framing	1-in., nom. 1.5 pcf EPS	Min. 3/8 inch StuccoBase with metal lath attached per 4.1;	See Note 2
5/8 inch Type X gypsum board, vertical or horizontal, attached with 1-7/8 inch,0.100 inch cupped head drywall nails having 0.300 inch heads, spaced at 7 inches o.c.; joints and nail heads must be treated ⁴	Min. 2 x 4 wood framing a maximum of 24 inches o.c., R-11 fiberglass insulation in stud cavities	Min. 7/16 in OSB, or 15/32 in. plywood, or 1/2 in. gypsum sheathing, vertical, attached with 1-7/8 inch, 6d coated sinker nails, spaced at 8 in. o.c.; joints and nail heads must be treated; waterresistive barrier applied over sheathing	None	Min. 3/8 in. StuccoBase with metal lath attached with 1-1/4 in., No. 6 staples having 1- in. crowns spaced at 6 in. o.c.	See Note 3

Note 1: The wood stud axial design stress for the wall assembly, as calculated in accordance with Section 2306 of the IBC or FBC or, Section R602.3, whichever code is applicable, must be limited to 0.78 F'c, and the maximum stress must not exceed 0.78 F'c at a maximum slenderness ratio (le/d) of 33.

Note 2: Axial loads applied to the wall assembly must be limited by the lesser of the following:

- •1,200 pounds (5340 N) per stud.
- •A maximum of 50 percent of the load calculated in accordance with Sections 3.6 and 3.7 of the NDS.
- •Design stress of 0. 78 F'c calculated in accordance with Sections 3.6 and 3. 7 of the NDS.







•Design stress of 0.78 F'c at a maximum slenderness ratio (le/d) of 33 calculated in accordance with Sections 3.6 and 3.7 of the NDS.

Note 3: Axial loads applied to the system described in Section 4.2.3.2 of this report must be limited to the lesser of the following:

- 1. 1,100 pounds (4895 N) per stud.
- 2. A maximum of 47.5 percent of the load calculated in accordance with Sections 3.6 and 3.7 of the NDS.
- 3. Design stress of 0.78 F'c calculated in accordance with Sections 3.6 and 3.7 of the NDS.
- 4. Design stress of 0.78 F'c at a maximum slenderness ratio (le/d) of 33 calculated in accordance with Sections 3.6 and 3.7 of the NDS.

Note 4: All gypsum board joints must be taped and treated with joint compound in accordance with ASTM C 840. Fastener heads must be treated with joint compound in accordance with ASTM C 840.

TABLE 4 - NFPA 285-COMPLYING ASSEMBLIES - STUCCOBASE WITH METAL LATH

Interior Finish	Framing	Exterior Finish		
interior Finish		Sheathing	Insulation	Coating
5/8 in. Type X, vertical, edges blocked, attached with 1-1/4 in. No. 8 buglehead screws spaced at 8 in. on perimeter and 12 in. at intermediate framing; joints and nails must be treated1	Min. 3-5/8 in., No. 20 gage steel framing a maximum of 16 in. o.c.; openings must be framed with 1/8-in. tubular aluminum or steel framing	5/8-in., Type X gypsum sheathing, edges blocked, vertical, attached with 1-1/4-in., No. 8 buglehead screws spaced at 8 in. on perimeter and 12 in. at intermediate framing; joints and nails must be treated; water-resistive barrier applied over sheathing	None	Min. 3/8 in. StuccoBase with metal lath
5/8 in. Type X, edges blocked, vertical, attached with 1 in., No. 8 S-12 self-drilling screws spaced at 6 in. o.c.; joints and nail heads must be treated ¹	Min. 3-5/8 in., No. 20 gage steel framing a maximum of 16 in. oc.; openings must be framed with No. 20 gage metal	1/2 in. gypsum sheathing, vertical, attached per code; R- 11 fiberglass or rock wool insulation in stud cavities; water-resistive barrier applied over sheathing	None	Min. 3/8-in. StuccoBase with metal lath

¹Gypsum board joints must be taped and treated with joint compound, and fastener heads must be treated with joint compound, in accordance with ASTM C840.







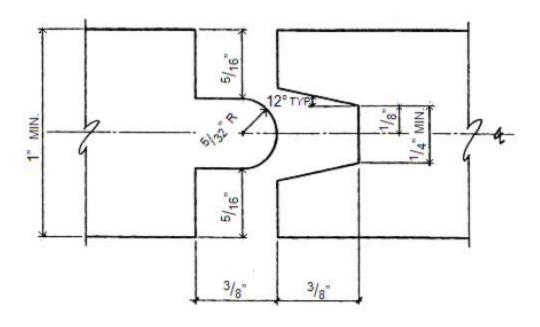


FIGURE 1—TONGUE AND GROOVE







INSTALLATION CARD (Coating system Trade Name) (Name of coating manufacturer)

Job Address	Intertek CCRR Report Number		
	Date of Job Completion		
Plastering Contractor	_		
Name:			
Address:			
Telephone No.: ()			
Approved contractor number as issued by the coating manufacturer			
This is to certify that the exterior coating system on the be evaluation report specified above and the manufacturer's in:	building exterior at the above address has been installed in accordance with the structions.		
Signature of authorized representative of plastering contractor	Date		

This installation card must be presented to the building inspector after completion of work and before final inspection.

FIGURE 2







(Company name of report holder) (Address and telephone number)

DECLARATION

*Signature required only if inspector is not an employee of evaluation report holder.

FIGURE 3



