

# ICC-ES Evaluation Report

## ESR-2700

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**DIVISION: 09—FINISHES**  
**Section: 09220—Portland Cement Plaster**

### REPORT HOLDER:

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### EVALUATION SUBJECT:

#### UNICOAT FRS AND SANDED UFRS

#### 1.0 EVALUATION SCOPE

##### Compliance with the following codes:

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

##### Properties evaluated:

- Structural
- Weathering and durability
- Fire-resistance-rated construction

#### 2.0 USES

GrayStone Unicoat FRS and Sanded UFRS are alternative exterior wall coverings to what is specified in IBC Chapter 25 and IRC Section R703. The wall coverings may be used to construct one-hour fire-resistance-rated wall assemblies when installed in accordance with Section 4.4 of this report. The system may be applied over concrete or masonry walls with or without wire fabric or metal lath.

#### 3.0 DESCRIPTION

##### 3.1 General:

Unicoat FRS and Sanded UFRS systems are proprietary mixtures (blends) of portland cement, sand, fibers and proprietary ingredients reinforced with wire fabric or metal lath and applied to substrates of expanded polystyrene (EPS) insulation board, gypsum sheathing board, fiberboard or wood structural panel sheathing. The systems are installed on exterior walls of wood or steel stud construction.

##### 3.2 Materials:

**3.2.1 Unicoat FRS Stucco:** The stucco is a factory-prepared mixture (blend) of Type I or II portland cement complying with ASTM C 150, polypropylene fibers, and

proprietary additives. The mixture is packaged in 80-pound (36.3 kg) bags. Six gallons (23 L) of water and 200 to 240 pounds (91 to 109 kg) of sand are added to each bag in the field and mixed in accordance with the manufacturer's recommendations.

Alternatively, the mixture may be factory-blended with sand in packages labeled Sanded UFRS. The ratio of batched amounts must be 200 to 240 pounds (91 to 109 kg) of sand for every 80 pounds (36.3 kg) of Unicoat FRS concentrate, to which 6 gallons (23 L) of water are added in the field.

Approved color pigments may be added to the stucco mix in accordance with the manufacturer's instructions.

**3.2.2 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 897. Alternatively, the sand may be graded within the following limits:

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

**3.2.3 Insulation Board:** Expanded polystyrene (EPS) insulation board has a nominal density of 1.5 pounds per cubic foot (24 kg/m<sup>3</sup>), and a flame-spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E 84. Unbacked boards are 1 inch to 1½ inches (25.4 to 38.1 mm) thick and have 3⁄8-inch-high (9.5 mm) tongues with compatible grooves for horizontal joints. See Figure 2 for joint detail. All boards must be recognized in a current ICC-ES evaluation report.

When installed over solid sheathing, the insulation boards must have ¼-inch-wide-by-1⁄8-inch-deep (6.4 mm by 3.2 mm) vertical grooves spaced at 12 inches (305 mm) on the back face of the boards.

##### 3.2.4 Lath:

**3.2.4.1 Wire Fabric Lath:** Wire fabric lath must comply with the ICC-ES Acceptance Criteria for Metal Plaster Bases (Lath) (AC191). Minimum No. 20 gage [0.035 inch (0.89 mm)], 1-inch (25.4 mm) galvanized steel, woven-wire fabric must be used. Lath must be furred when applied

over all substrates except unbacked polystyrene board. Furring must comply with the following requirements:

1. When maximum total coating thickness is  $\frac{1}{2}$  inch (12.7 mm) or less, the body of the lath must be furred a minimum of  $\frac{1}{8}$  inch (3.2 mm) from the substrate after installation.
2. When total coating thickness is greater than  $\frac{1}{2}$  inch (12.7 mm), No. 17 gage [0.058 inch (1.5 mm)] woven-wire fabric lath must be used. The body of the lath must be furred a minimum of  $\frac{1}{4}$  inch (6.4 mm) from the substrate after installation.

**3.2.4.2 Metal Lath:** Metal lath must comply with AC191 and IBC Table 2507.2 or IRC Section R703.6. Furring requirements are as set forth in Section 3.2.4.1 for wire fabric lath.

**3.2.5 Gypsum Sheathing Board:** The gypsum sheathing board is water-resistant core gypsum sheathing complying with ASTM C 79. Gypsum wallboard complies with ASTM C 36.

**3.2.6 Fiberboard:** The fiberboard is minimum  $\frac{1}{2}$ -inch-thick (12.7 mm), asphalt-impregnated fiberboard complying with ASTM C 208 as Type IV wall sheathing in accordance with IBC Section 2303.1.5.

**3.2.7 Wood Structural Panel Sheathing:** The wood structural panels are a minimum of  $\frac{5}{16}$  inch thick (7.9 mm) for studs spaced 16 inches (406 mm) on center, and a minimum of  $\frac{3}{8}$  inch thick (9.5 mm) for studs spaced 24 inches (610 mm) on center. Panels must be exterior-grade or Exposure 1 complying with the applicable code.

**3.2.8 Caulking:** The caulking is acrylic latex caulking complying with ASTM C 834 or ASTM C 920.

### 3.2.9 Weather Protection:

**3.2.9.1 Water-resistive Barrier:** Application of the barrier must comply with IBC Section 1404.2 or IRC Section R703.2, as applicable. Except when installation is over wood-based sheathing, the water-resistive barrier must be either a minimum of one layer of No.15 asphalt felt complying with ASTM D 226, Type I, or a water-resistive barrier recognized as equivalent to ASTM D 226, Type I or better, in a current ICC-ES evaluation report.

When installation is over wood-based sheathing, the water-resistive barrier must be minimum Grade D kraft building paper, or a water-resistive barrier recognized as equivalent to Grade D or better in a current ICC-ES evaluation report.

When application is over any wood-based sheathing, the barrier must be one of the following:

1. A minimum of two layers of Grade D kraft building paper as set forth in IBC Section 2510.6.
2. One layer of insulation board having horizontal tongue-and-groove edges, as described in Section 3.2.3 of this report, over one layer of Grade D kraft building paper having a minimum water-resistance rating of 60 minutes; or an equivalent recognized in a current ICC-ES evaluation report.

**3.2.9.2 Vapor Retarder:** Under the IBC, protection against condensation must be provided in accordance with IBC Section 1403.2. Under the IRC, a vapor retarder complying with IRC Section R318.1 must be provided, unless its omission is permitted under the exceptions in IRC Section R318.1.

**3.2.9.3 Flashing:** Flashing complying with IBC Section 1405.3 or IRC Section R703.8, as applicable, must be

provided. Where membrane flashing is used, it must be a self-adhering, flexible rubberized asphalt and polyethylene material, 0.030 inch (0.76 mm) thick and shingle-lapped with the water-resistive barrier. Rigid flashing must be sloped toward the exterior, with an upturned leg on the interior side and at the ends. Flashing must extend beyond the surface of the exterior wall.

**3.2.10 Trim and Accessories:** All trim, screeds and corner reinforcement must be of galvanized steel or approved plastic.

## 4.0 INSTALLATION

### 4.1 General:

The exterior cementitious coating is applied by hand-troweling in one coat to a minimum  $\frac{3}{8}$ -inch (9.5 mm) thickness. The lath must be embedded in the minimum coating thickness and therefore cannot be exposed. Fasteners for lath must penetrate a minimum of 1 inch (25.4 mm) into wood studs. Flashing, corner reinforcement, metal trim and weep screeds must be installed as shown in Figure 2. The coating is applied at ambient air temperatures ranging from 40°F to 120°F (4.4°C to 48.9°C) by applicators approved by GrayStone of Florida, Inc. An installation card, as illustrated in Figure 1, 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.

### 4.2 Application over Open Framing: Insulation Board:

The water-resistive barrier is placed, as set forth in Section 3.2.9.1, over open wood framing having a specific gravity of 0.5 or greater, spaced a maximum of 24 inches (610 mm) on center. The EPS insulation board, described in Section 3.2.3, is then placed horizontally with tongues facing upward, and is temporarily held in place with galvanized staples or roofing nails. Vertical butt joints must be staggered a minimum of one stud space from adjacent courses and occur directly over studs. The lath is applied tightly, with  $\frac{1}{2}$ -inch (38 mm) end laps and side laps, over the EPS insulation board, and is fastened through the EPS insulation board and water-resistive barrier to wood studs, sills and plates. Fasteners are No. 11 gage galvanized roofing nails with  $\frac{1}{2}$ -inch-diameter (12.7 mm) heads, spaced 6 inches (152 mm) on center, or No. 16 gage [0.065-inch leg diameter (1.65 mm)] galvanized staples with a minimum crown width of  $\frac{15}{16}$  inch (23.8 mm), spaced 6 inches (152 mm) on center. Fasteners must penetrate wood framing at least 1 inch (25.4 mm). Care should be taken to avoid overdriving fasteners.

The Unicoat FRS and Sanded UFRS stucco systems may also be applied over minimum No. 20 gage [0.0396-inch base-metal thickness (1.01 mm)] steel studs spaced 16 inches (406 mm) on center. The wire fabric lath is applied tightly over the foam plastic board and is fastened through the board and water-resistive barrier to the metal studs, using minimum No. 8, corrosion-resistant, self-drilling, tapping screws having 0.40-inch-diameter (10.2 mm) wafer-heads, at 6 inches (152 mm) on center to all studs and track. Screws must penetrate the studs a minimum of  $\frac{1}{2}$  inch (12.7 mm).

Wall bracing in accordance with IBC Section 2308.9.3 or 2308.12, or IRC Section R602.10 or R602.11, is required. Outside wall corners and parapet corners are covered with extra metal corner reinforcement attached to the framing members with approved fasteners spaced a maximum of 18 inches (457 mm) on center. Weep screeds are installed at the bottom of the wall and are to comply with IBC Section 2512.1.2. Galvanized metal,  $\frac{1}{8}$ -inch (35 mm), J-shaped trim pieces are installed at other areas where

insulation board is exposed. At windows and doors, flashing described and installed in accordance with IBC Section 1405.3 or IRC Section R703.8, butting J-trim metal edges are to be caulked. Holes for hose bibs, electrical panels and other penetrations of substrate surfaces, except those caused by fasteners, must be caulked. The coating is applied as described in Section 4.1.

#### 4.3 Application over Solid Substrates:

**4.3.1 Fiberboard:** Fiberboard sheathing is installed directly over wood studs spaced a maximum of 24 inches (610 mm) on center. The fiberboard is temporarily held in place with corrosion-resistant staples or roofing nails. A water-resistive barrier, as set forth in Section 3.2.9.1, is applied over the fiberboard prior to installation of lath. When the optional EPS insulation board is installed, the grooves must face the water-resistive barrier. The vertical joints of EPS insulation boards are staggered from adjacent courses a minimum of 3 inches (76 mm). Insulation boards are attached to the framing, but the vertical joints of the insulation board are not required to align with the framing. The wire fabric or expanded metal lath and optional EPS insulation board are attached to studs, through the water-resistive barrier and sheathing, with fasteners and spacing as described for EPS insulation boards (Section 4.2), or as described for fiberboard in IBC Table 2304.9.1 or IRC Table R602.3(1), whichever is more restrictive.

Wall bracing in accordance with IBC Section 2308.9.3 is required. When the fiberboard is used as wall bracing, it is to be fastened to the framing in accordance with the requirements of the applicable code, prior to application of the optional EPS insulation board. The lath and optional EPS insulation board are to be fastened in accordance with Section 4.2 of this report. Outside wall corners and parapet corners must be covered with extra metal corner reinforcement attached to the framing members with approved fasteners spaced 18 inches (457 mm) on center. Weep screeds are installed at the bottom of the wall and are to comply with IBC Section 2512.1.2 or IRC Section R703.6.2.1. Galvanized steel,  $1\frac{3}{8}$ -inch (35 mm), J-shaped trim pieces must be installed in other areas where insulation board is exposed. See Figure 2 for typical installation details. At windows and doors, butting J-trim metal edges are caulked. Holes for hose bibs, electrical panels and other penetrations of substrate surfaces, except those caused by fasteners, are also caulked. The coating is applied as described in Sections 4.1 and 4.2.

**4.3.2 Gypsum Sheathing:** Water-resistant core gypsum sheathing is installed directly over wood studs spaced a maximum of 24 inches (610 mm) on center. Gypsum sheathing is fastened in accordance with ASTM C 1280 (IBC) or IRC Table R602.3.5. A water-resistive barrier is applied over the gypsum sheathing before application of lath. The lath is attached to studs through the sheathing, with fasteners and spacing as described for insulation board in Section 4.2 of this report. All walls are braced in accordance with the applicable code. Exposed sheathing edges are protected with screeds. Holes in the substrate surface are caulked, and the coating is applied as described in Sections 4.1 and 4.2.

The systems are applied to minimum No. 20 gage [0.0396-inch base-metal thickness (1.01 mm)] steel studs spaced at a maximum of 16 inches (406 mm) on center, using No. 8 by 0.420-inch-diameter-head (10.7 mm), minimum  $1\frac{3}{16}$ -inch-long (30.2 mm), self-drilling, tapping screws spaced at 6 inches (152 mm) on center to secure sheathing to studs. Lath is secured with No. 8 by 0.420-inch-diameter-head (10.7 mm), minimum  $1\frac{1}{4}$ -inch-long

(31.8 mm), self-drilling, tapping wafer-head screws spaced at 6 inches (152 mm) on center. Screws fastening sheathing, and screws fastening lath, are staggered from each other. Minimum screw penetration is  $\frac{1}{2}$  inch (12.7 mm) beyond the stud. The balance of the system installation must be in accordance with Section 4.2.

**4.3.3 Wood Structural Panel Sheathing:** Wood structural panel sheathing is applied directly to wood studs under the conditions set forth in Section 3.2.7 and either IBC Table 2308.9.3(3) or IRC Table R602.3(3). The water-resistive barrier, optional EPS insulation board, wire fabric lath, and coating are applied as described in Section 4.3.1 for fiberboard. The systems may also be installed over plywood attached to minimum No. 20 gage [0.0396-inch base-metal thickness (1.01mm)] steel studs spaced a maximum of 16 inches (406 mm) on center or wood stud framing as described in Section 4.3.1 for fiberboard.

#### 4.4 One-hour Fire-resistive Assemblies:

##### 4.4.1 First Assembly

**4.4.1.1 Interior Face:** One layer of  $\frac{5}{8}$ -inch-thick (16 mm), Type X gypsum wallboard, water-resistant backer-board or veneer base is applied parallel or at right angles to the interior face of nominally 2-by-4 Douglas fir-larch, No. 2 grade studs spaced a maximum of 16 inches (406 mm) on center. The wallboard is attached with 12 gage, galvanized, cup-head drywall nails,  $1\frac{5}{8}$  inches (41.3 mm) long with 0.30-inch-diameter (7.6 mm) heads, at 8 inches (203 mm) on center to studs, plates and blocking. All wallboard joints must be backed with minimum nominally 2-by-4 wood framing, taped and treated with joint compound. Fastener heads must also be treated with joint compound.

**4.4.1.2 Exterior Face:** One layer of minimum  $\frac{1}{2}$ -inch-thick (12.7 mm), water-resistant core-treated gypsum sheathing, 48 inches (1219 mm) wide, is applied perpendicular to studs with No. 12 gage, galvanized, cup-head drywall nails,  $1\frac{5}{8}$  inches (41.3 mm) long with 0.30-inch (7.6 mm) heads at 12 inches (305 mm) on center at board edges and 12 inches (305 mm) on center at intermediate studs. The stud cavities must be fully insulated with minimum R-11 fiberglass or mineral wool insulation, in the same thickness as the studs. The sheathing is nailed to top and bottom plates at 12 inches (305 mm) on center. A weather-resistive barrier is required over the sheathing. The wire fabric lath and wall coating are then applied as described in Section 4.3.1.

**4.4.1.3 Axial Load Design:** Axial loads applied to the wall assembly are limited by the lesser of the following:

1. The wood stud axial design stress for the wall assembly calculated in accordance with Sections 3.6 and 3.7 of ANSI AF&PA NDS-05, is limited to  $0.78 F_c'$ .
2. The maximum stress must not exceed  $0.78 F_c'$  at a maximum  $l_e/d$  ratio of 33.

##### 4.4.2 Second Assembly:

**4.4.2.1 Interior Face:** One layer of  $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum wallboard is applied to the interior face of nominally 2-by-4 Douglas fir-larch, No. 2 grade studs spaced a maximum of 16 inches (406 mm) on center. The wallboard is attached with 12 gage, galvanized, cup-head drywall nails,  $1\frac{5}{8}$  inches (41.3 mm) long with 0.30-inch-diameter (7.6 mm) heads, at 8 inches (203 mm) on center to studs, plates and blocking. All wallboard joints must be backed with minimum nominally 2-by-4 wood framing, and taped and treated with joint compound.

**4.4.2.2 Exterior Face:** One layer of minimum  $\frac{7}{16}$ -inch-thick (11.1 mm) oriented strand board (OSB) applied perpendicular to studs with 6d common nails,  $1\frac{7}{8}$  inches (47.6 mm) long, at 6 inches (152 mm) on center at board edges and 8 inches (203 mm) on center at intermediate studs. The stud cavities must be fully insulated with minimum R-11 fiberglass or mineral wool insulation, in the same thickness as the studs. A weather-resistive barrier is required over the sheathing. The wire fabric lath and wall coating are then applied as described in Section 4.3.1.

**4.4.2.3 Axial Load Design:** Axial loads applied to the wall assembly shall be limited by the least of the following:

1. 1,100 pounds (4900 N) per stud.
2. Design stress of  $0.78 F_c'$  calculated in accordance with Sections 3.6 and 3.7 of the ANSI/AF&PA NDS.
3. Design stress of  $0.78 F_c'$  at a maximum  $l_e/d$  of 33 calculated in accordance with Sections 3.6 and 3.7 of the ANSI/AF&PA NDS.

#### 4.5 Miscellaneous:

**4.5.1 Inspection Requirements:** Building department inspection is required on lath installation prior to application of the coatings, as noted in IBC Section 109.3.5.

**4.5.2 Control Joints:** Control joints must be installed as specified by the architect, designer, builder or exterior coating manufacturer, in that order. In the absence of other details, conventional one-coat plastering details must be used.

**4.5.3 Curing:** For proper curing where temperatures exceed 60°F (15°C), mortar sections must be water-sprayed within two to three hours after initial set has occurred. Water spraying must commence after seven hours or prior to end of day, whichever occurs first. A light water spray is required before and after the coat is applied. Additional water spray is applied within 48 hours of application.

**4.5.4 Soffits:** The systems may be applied to soffits, provided the coating is applied over expanded metal lath complying with ASTM C 847 in lieu of the coatings being applied over wire fabric lath. Metal lath fastening must comply with IBC Section 2510.3 or IRC Section R703.6, except the length of the fastener must be increased by the thickness of the substrate.

**4.5.5 Sills:** The systems may be applied to sills at locations such as windows and other similar areas. Sills with depths of 6 inches (152 mm) 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 section of this report. Sills with depths exceeding 6 inches (152 mm) must have substrates of solid wood or plywood. The substrate must be fastened in accordance with IBC Table 2304.9.1 or IRC Section R602.3, and a double layer of a code-complying Grade D water-resistive barrier must be applied over the substrate. The coating, lath, and optional EPS board must be applied in accordance with Section 4.2.

#### 5.0 CONDITIONS OF USE

The Unicoat FRS and Sanded UFRS 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 Materials and methods of installation must comply with this report and the manufacturer's published installation instructions. A copy of these instructions must be available at all times on the jobsite during installation. In the event of a conflict between the installation instructions and this report, this report governs. The manufacturer's published installation instructions must be available at the jobsite at all times during installation.
- 5.2 Installation is by contractors approved by GrayStone of Florida, Inc.
- 5.3 The systems are limited to Type V-B construction (IBC) or construction permitted by the IRC except as described in Section 4.4.
- 5.4 The interior of the building must be separated from the foam plastic boards by a thermal barrier complying with IBC Section 2603.4 or IRC Section R314.4 and IRC Table R702.3.5.
- 5.5 An installation card, such as that shown in Figure 1 of this report, must be completed and left at the jobsite for the owner, and a copy filed with the building department.
- 5.6 Inspections must be performed in accordance with Section 4.5.1 of this report.
- 5.7 In areas where the probability of termite infestation is very heavy in accordance with IBC Section 2603.8 or IRC Section R320.4, foam plastic insulation boards must not be placed on exterior walls located within 6 inches (152 mm) of the ground.
- 5.8 The allowable wind load on the systems with wood studs a maximum of 24 inches on center is 25 psf, positive or negative. The allowable wind load on the system with steel studs at a maximum of 16 inches on center is 60 psf, positive or negative. Supporting framing must be adequate to resist the required wind load.

#### 6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Cementitious Exterior Wall Coatings (AC11), dated June 2007.

#### 7.0 IDENTIFICATION

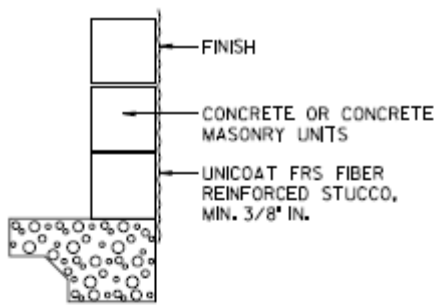
The factory-prepared mix is delivered to the jobsite in water-resistant bags with labels bearing the following information:

1. Name and address of the report holder (GrayStone of Florida, Inc.) and the manufacturer (Southern Color, LA, Inc.) and the evaluation report number (ESR-2700).
2. Identification of components.
3. Weight of packaged mix.
4. Storage instructions.
5. Maximum amount of water and other components that may be added, and conditions that must be considered in determining actual amount.
6. Curing instructions.

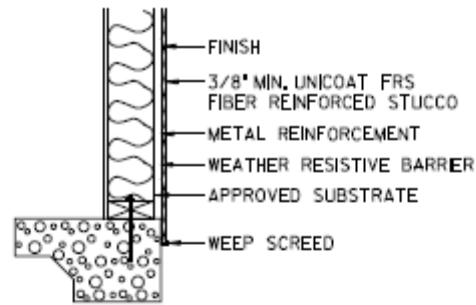
Polystyrene foam plastic insulation boards are identified in accordance with their respective ICC-ES evaluation reports. Additionally, the board density must be noted.

<p><b>INSTALLATION CARD</b>                  GrayStone Unicoat FRS and Sanded UFRS</p>	
Job Address _____ _____ _____	ICC-ES Evaluation Report Number ESR-2700  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 building exterior at the above address has been installed in accordance with the evaluation report specified above and the manufacturer's instructions.	
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.	

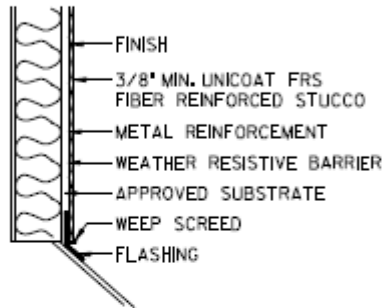
**FIGURE 1—SAMPLE INSTALLATION CARD**



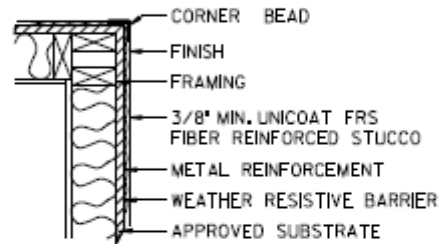
TYPICAL DIRECT APPLICATION TO CONCRETE OR CONCRETE MASONRY UNITS



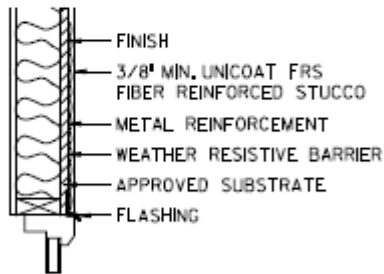
TYPICAL WEEP SCREED



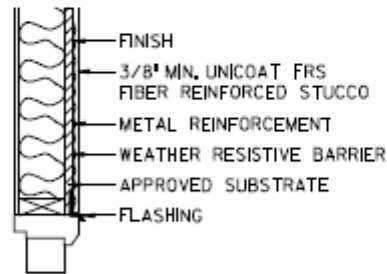
TYPICAL TERMINATION AT FLASHING ON ROOF



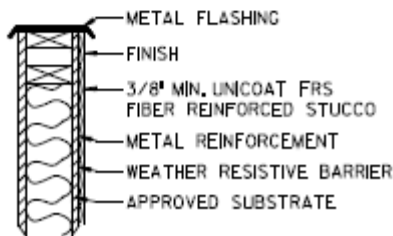
TYPICAL SQUARE CORNER



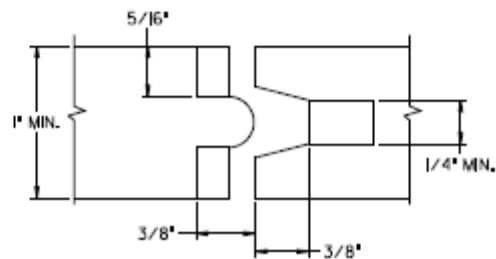
TYPICAL WINDOW



TYPICAL DOOR



TYPICAL PARAPET WITH METAL CAP



TYPICAL TONGUE AND GROOVE FOAM

For SI: 1 inch = 25.4 mm.

FIGURE 2—DETAILS