

# ICC-ES Evaluation Report

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**EVALUATION SUBJECT:**
**MAGNA WALL FIBER-REINFORCED STUCCO SYSTEM**
**1.0 EVALUATION SCOPE**
**Compliance with the following codes:**

- 2009 and 2006 *International Building Code*® (IBC)
- 2009 and 2006 *International Residential Code*® (IRC)
- 1997 *Uniform Building Code*™ (UBC)

**Properties evaluated:**

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

**2.0 USES**

The Magna Wall Fiber-reinforced Stucco system is an alternative exterior wall covering to that specified in IBC Chapter 25, IRC Section R703 and UBC Chapter 25. The system may be used in a one-hour fire-resistance-rated wall assembly and walls of Type V construction when installed in accordance with Section 4.4 of this report.

**3.0 DESCRIPTION**
**3.1 General:**

The Magna Wall Fiber-Reinforced Stucco System is a proprietary, exterior cementitious wall finish consisting of a mixture of portland cement, water, sand, synthetic fibers, and proprietary admixtures. The finish must be applied

onto wire fabric or metal lath that is mechanically fastened to the framing members. The system must be installed over foam plastic insulation boards, fiberboard, plywood, oriented strand board, gypsum sheathing or G-P Gypsum Dens-Glass Gold sheathing substrates attached to wood or steel-framed exterior wall construction. The Magna Wall Fiber-Reinforced Stucco System may be applied directly over concrete or unit masonry substrates with or without lath. When applied directly over concrete or masonry without lath, the minimum thickness of the product must be 1/4 inch (6.4mm).

**3.2 Material:**

**3.2.1 Magna Wall Fiber-Reinforced Stucco:** Magna Wall Fiber-Reinforced Stucco is a factory-prepared mixture of Type I, II or III portland cement complying with ASTM C 150, synthetic fibers and proprietary admixtures. The mixture is packaged in 80- and 94-pound (36.3 and 42.6 kg) bags. Approximately 4 to 6 gallons (15 to 23 L) of water and 180 to 240 pounds (82 to 109 kg) of sand must be mixed with each 80-pound bag in the field. Approximately 4.7 to 7 gallons (18 to 25.6 L) of water and 212 to 282 pounds (96 to 128 kg) of sand must be added to each 94-pound (42.6 kg) bag in the field. Alternately, the product is available in a factory-mixed pre-sanded form in 100-pound (45.5 kg) bags. Approximately 2 to 3 gallons (8 to 11.4 L) of water must be added to each bag. These components must be mixed in the field in accordance with the manufacturer's published installation instructions.

The product is also available in bulk containers. Bulk containers must bear the identification label information set forth in Section 7.1 of this report, and are subject to the following:

- a. A signed certificate from the manufacturing plant for each unit, stating the plant name and address, jobsite and address, date of manufacture, quantity and curing instructions. The amount of batched sand to be combined with each 80 and 94 pounds (36.3 and 42.6 kg) of stucco mixture must be stated in the certificate.
- b. Procedures must be provided to prevent tampering with the controls on the amount of product mixture and sand combined.
- c. The stucco, sand and water ratios set forth in Section 3.2.1 must be maintained and verified by Magna Wall.

**3.2.2 Sand:** Sand must be clean and free from deleterious amounts of loam, clay, silts, soluble salts, and organic matter. Sand gradation must comply with ASTM C 144 or ASTM C897, as stated in Table 1 and Table 2, respectively.

**TABLE 1—SAND GRADATION  
(TAKEN FROM ASTM C 144-92)**

RETAINED ON U.S. STANDARD SIEVE	PERCENT RETAINED BY WEIGHT			
	Natural Sand		Manufactured Sand	
No. 4	—	—	—	—
No. 8	0	5	0	5
No. 16	0	30	0	30
No. 30	25	60	25	60
No. 50	65	90	60	80
No. 100	85	98	75	90
No. 200	95	100	90	100

**TABLE 2—SAND GRADATION  
(TAKEN FROM ASTM C 897-96)**

RETAINED ON U.S. STANDARD SIEVE	PERCENT RETAINED BY WEIGHT			
	Natural Sand		Manufactured Sand	
	Minimum	Maximum	Minimum	Maximum
No. 4	—	—	—	—
No. 8	0	10	0	10
No. 16	10	40	10	40
No. 30	30	65	30	60
No. 50	70	90	60	80
No. 100	95	100	75	90
No. 200	97	100	90	100

**3.2.3 Lath**

**3.2.3.1 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 EPS insulation board. Furring must comply with the following requirements:

- a. When maximum total coating thickness is 1/2 inch (12.7 mm) or less, the body of the lath must be furred a minimum of 1/8 inch (3.2 mm) from the substrate after installation.
- b. When total coating thickness is greater than 1/2 inch (12.7 mm), No. 17 gage [0.058 inch (1.47 mm)] by 1 1/2-inch (38 mm) woven-wire fabric lath must be used. The body of the lath must be furred a minimum of 1/4 inch (6.4 mm) from the substrate after installation.

**3.2.3.2 Expanded Metal Lath:** Metal lath must comply with AC191 [the ICC-ES Acceptance Criteria for Metal Plaster Bases (Lath)], Furring requirements must be as set forth in Section 3.2.3.1 for wire fabric lath.

**3.2.4 Foam Plastic Insulation Board:** Foam plastic insulation formed from expanded polystyrene (EPS) resin, with a maximum flame spread index of 25 or less and a smoke-developed index not exceeding 450 when tested in accordance with ASTM E 84 in the thickness intended for use. The foam plastic insulation boards must have a minimum nominal density of 1.5 pounds per cubic foot (24.0 kg/m<sup>3</sup>). When installed over open stud framing, the boards must be a minimum of 1 inch (25.4 mm) thick and have 3/8-inch (9.5 mm) projecting tongues with compatible grooves for horizontal joints. See Figure 1 for joint detail. Foam plastic boards installed over solid substrates must have a minimum thickness of 3/4 inch (15.9 mm). The maximum board thickness must not exceed 4 inches (25.4 mm). All boards must be recognized in a current ICC-ES evaluation report. See Section 7.3 for board

identification. Installation of the EPS boards must incorporate Tyvek StuccoWrap or Tyvek DrainWrap water-resistant barrier, recognized in [ESR-2375](#), installed between the EPS board and the solid substrate.

**3.2.5 Exterior Gypsum Sheathing Board:** Water-resistant core gypsum sheathing complying with ASTM C 79 or C 1396, a minimum of 1/2 inch (12.7 mm) thick.

**3.2.6 Dens-Glass Gold Sheathing:** Noncombustible, resinous coated, glass-fiber mat faced, water-resistant sheathing a minimum of 1/2 inch (12.7 mm) thick, manufactured by G-P Gypsum Corporation (see [ER-4305](#)).

**3.2.7 Fiberboard:** Minimum 1/2-inch-thick asphalt-impregnated fiberboard must comply as ASTM C 208, Type IV, wall sheathing.

**3.2.8 Wood Structural Panels:** The panels must be minimum 5/16-inch-thick (7.9 mm) plywood or OSB for studs spaced 16 inches (406 mm) on center, and must be minimum 3/8-inch-thick (9.5 mm) plywood or 7/16-inch-thick (11.1 mm) OSB for studs spaced 24 inches (610 mm) on center. Plywood must be exterior-grade or Exposure 1 complying with U.S. Department of Commerce Product Standard PS-1 or UBC Standard 23-2, as applicable; and OSB must be Exposure 1 complying with U.S. Department of Commerce Product Standard PS-2 or UBC Standard 23-3, as applicable.

**3.2.9 Caulking:** The caulking must be acrylic latex sealant complying with ASTM C 834, or better.

**3.2.10 Weather Protection:**

**3.2.10.1 Water-resistant Barrier:** A water-resistant barrier is required and must comply with IBC Section 1404.2, IRC Section R703.2 or UBC Section 1402.1, as applicable. The barrier must be minimum No. 15 asphalt nonperforated felt complying as Type 1 in accordance with ASTM D 226 (IBC or IRC); minimum Grade D kraft building paper complying with UBC Standard 14-1; asphalt-saturated rag felt complying with UL standard 55A (UBC); or material recognized in a current evaluation report as complying with the ICC-ES Acceptance Criteria for Water-resistant Barriers (AC38).

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

- a. A minimum of two layers of Grade D kraft building paper as set forth in IBC Section 2510.6, IRC Section R703.6.3 or UBC Section 2506.4, or an equivalent recognized in a current evaluation report.
- b. One layer of EPS insulation board having horizontal tongue-and-groove edges as described in Section 3.2.4, over one layer of Grade D kraft building paper having a minimum water-resistance rating of 60 minutes, or a water-resistant barrier recognized in a current ICC-ES evaluation report as having a minimum water-resistance rating of 60 minutes.

**3.2.10.2 Vapor Retarder:** Protection against condensation must be provided in accordance with 2009 IBC Section 1405.3 or 2006 IBC Section 1403.2, as applicable. Under the 2009 IRC, a vapor retarder must be provided in accordance with 2009 IRC Section R601.3 unless its omission is permitted under the exceptions in 2009 IRC Section R601.3. Under the 2006 IRC, a vapor retarder must be provided in accordance with 2006 IRC Section R318.1 unless its omission is permitted under the exceptions in IRC Section R318.1.

**3.2.10.3 Flashing:** Flashing complying with IBC Table 1405.2 must be provided. For windows, self-adhered flashing complying with AAMA 711 must be provided.

**3.2.10.4 Trim and Accessories:** All flashing, trim, weep screeds and corner reinforcement must be of corrosion-resistant metal or approved plastic.

## 4.0 INSTALLATION

### 4.1 General:

The exterior cementitious coating must be applied by hand-troweling or machine-spraying in one or two coats to a minimum nominally  $\frac{3}{8}$ -inch (9.5 mm) overall thickness, except where self-furring wire lath is used (see Section 3.2.3.1). The coating must be applied at ambient air temperatures between 35°F and 120°F (2°C and 49°C) by applicators approved by Best Masonry. After application, the coating must be protected from freezing temperatures during the initial six hours of curing. The second coat, when provided, must be applied within seven days of the first coat. If the second coat is not installed within seven days, a bonding adhesive, complying with Military Specification MIL-B 19235, must be brushed or sprayed on the base coat, or a bonding treatment must be added to the mix of the second coat prior to application over the base coat. Flashing installation must comply with 2009 IBC Section 1405.4, 2006 IBC Section 1405.3, IRC Section R703.8 or UBC Section 1404.2.

Where the coating is job-mixed, an installation card, as noted in Figure 2 of this report, must be provided on the jobsite with the name of the applicator and the product to be used, before any weather-resistive barrier or exterior sheathing is installed. Also, see Section 5.8 of this report.

### 4.2 Application over Open Framing:

The water-resistive barrier described in Section 3.2.10.1 of this report must be placed over open wood or steel framing. The framing must be spaced a maximum of 24 inches (610 mm) on center. Wall bracing, in accordance with the applicable code, must be installed. The EPS insulation board described in Section 3.2.4 of this report must be placed horizontally, with the tongue facing upward, in 2-foot-by-8 foot (610 mm by 2438 mm) sections and temporarily held in place with galvanized staples or roofing nails. Self-tapping screws must be used to temporarily fasten the board to metal framing. Vertical butt joints of adjacent foam boards must be staggered a minimum of one framing space.

The lath must be installed over the EPS board and be fastened through the board to wood framing with minimum 2-inch-long (51 mm), No. 11 gage [0.148 inch (3.75 mm) shaft diameter,  $\frac{3}{8}$  inch (9.5 mm) head diameter] galvanized roofing nails or No. 16 gage [0.0625 inch (1.59 mm) shaft diameter, minimum  $\frac{1}{2}$  inch (12.7 mm) crown width] galvanized staples. Fasteners must be spaced a maximum of 6 inches (152 mm) on center and must be of sufficient length to achieve a minimum 1-inch (25.4 mm) penetration into the wood framing. The use of staples must be limited to installations where the wood species has a minimum specific gravity of 0.42. The lath must be fastened to steel framing members [minimum No. 20 gage [0.0359 inch (0.912 mm) thick] using No. 8-18, S-12, panhead, self-tapping screws spaced a maximum of 6 inches (152 mm) on center. The screws must be of sufficient length to penetrate the steel framing members a minimum of  $\frac{1}{4}$  inch (6.4 mm). The wire lath must be applied with a minimum overlap between sheets of 1 inch (25.4 mm) at both ends and sides. The metal lath must be applied with a minimum overlap of  $\frac{1}{2}$  inch (12.7 mm) at the sides and 1 inch (25.4 mm) at the ends.

The water-resistive barrier, lath and EPS board must lap over the nailing leg of the flashing as shown in the standard weep screed details in Figure 2 of this report.

Corrosion-resistant weep screeds must be installed at all locations where the horizontal edge of the EPS board is exposed after application of the stucco coating. Corrosion-resistant casing beads must be installed at all locations where the vertical edge of the EPS board is exposed after application of the stucco coating. The evaluation of the system is limited to use where penetrations through and terminations of the system are provided with flashing. The use of the system where sealant is the sole means of sealing penetrations is outside the scope of this report.

At penetration locations, such as windows and doors, the EPS board is permitted to be beveled at a 45-degree angle as shown in the details in Figure 2. At building corners, the stucco is permitted to be installed with either a square or rounded detail as shown in the details in Figure 2. When a rounded corner detail is provided, the EPS boards must be held back slightly at each corner and additional corner reinforcement is not required. Where square corners are provided, metal corner reinforcement must be installed.

### 4.3 Application over Solid Substrates:

**4.3.1 General:** All solid substrates, except for concrete and unit masonry, must be covered with a minimum of one layer of water-resistive barrier as described in Section 3.2.10.1 of this report and the metal lath described in Section 3.2.3 of this report. The installation of EPS boards over solid substrates is optional and must be governed by the conditions stated in this report. When EPS boards are installed over solid substrates, the EPS boards must incorporate Tyvek water-resistive barriers described in Section 3.2.4 of this report. Two layers of Tyvek are needed where wood-based substrates occur and the length of the fasteners used to attach the lath must be increased by the thickness of the EPS boards.

EPS boards installed prior to lath installation must be a minimum of  $\frac{1}{2}$  inch (12.7) thick.

At building corners, the stucco is permitted to be installed with either a square or rounded detail as shown in the details in Figure 2 of this report. Both square and rounded corners must be provided with metal corner reinforcement.

In applications where the EPS board abuts a solid substrate, the butt joints in the EPS boards must occur over a vertical framing member. The EPS board is permitted to be omitted where a solid substrate occurs. When the EPS boards are installed over a solid substrate, the vertical butt joints in the boards are not required to occur over vertical framing or to be staggered.

In addition to the requirements stated in this section, Sections 4.3.2 through 4.3.5 of this report contain requirements specific to the use of the coatings over specific substrate types.

**4.3.2 Exterior Gypsum Sheathing:** Minimum  $\frac{1}{2}$ -inch-thick (12.7mm) water-resistant core gypsum sheathing must be installed directly on wood studs spaced a maximum of 24 inches(610 mm) on center, in a manner similar to the installation of fiberboard as described in Section 4.3.3. Gypsum sheathing must be fastened in accordance with ASTM C 1280 (IBC), IRC Table R702.3.5 or UBC Table 25-G, as applicable. All walls must be braced in accordance with the applicable code. The water-resistive barrier, optional insulation board, wire fabric lath and coating must be applied as described for fiberboard in Section 4.3.3. Exposed sheathing edges must be protected.

**4.3.3 Dens-Glass Gold Sheathing:** Dens-Glass Gold sheathing, complying with Section 3.2.6 of this report, must be installed directly on wood or steel framing with studs



spaced a maximum of 24 inches (610 mm) on center. The sheathing must be fastened to wood or steel framing in accordance with the requirements of [ER-4305](#).

**4.3.4 Fiberboard:** Fiberboard sheathing, complying with Section 3.2.7 of this report, must be installed directly to wood or steel framing spaced a maximum of 24 inches (610 mm) on center. The walls must be braced in accordance with the requirements of the applicable code. The fiberboard must be temporarily held in place with corrosion-resistant staples, roofing nails, or self-tapping screws. For applications of the coatings over fiberboard attached to steel framing [minimum No. 20 gage, 0.0359-inch-thick (0.912 mm) studs], the lath must be secured to framing using No. 8-18, S-12, panhead, self-tapping screws spaced a maximum of 6 inches (152 mm) on center.

**4.3.5 Wood Structural Panel Sheathing:** Wood structural panel sheathing must be applied directly to wood studs under conditions as set forth in Section 3.2.7 of this report and IBC Table 2308.9.3 (3), IRC Table 602.3(3) or UBC Table 23-IV-D-1, as applicable. The sheathing must be installed with  $1/8$ -inch (3.2 mm) spacing between sheets at ends and sides. The sheathing must be attached in accordance with IBC Table 2304.9.1, IRC Table R602.3 (1) or UBC Table 23-II-B-1, as applicable. The water-resistive barrier, optional insulation board, lath and coating must be applied as described for fiberboard in Section 4.3.3.

**4.3.6 Concrete and Unit Masonry:** Uncoated concrete and unit masonry substrates must be prepared in accordance with IBC Section 2510.7 or UBC Section 2508.8, as applicable. The stucco and lath must be applied as described in Sections 4.1 and 4.2 of this report, except that the minimum coating thickness is permitted to be  $1/4$  inch (6.4 mm) when application is directly without lath. Additionally, the water-resistive barrier is not required for installation over concrete and unit masonry substrates. When the stucco is installed over lath on concrete or masonry substrates, the lath must be embedded in the coating and must be completely covered by the stucco coating.

#### 4.4 Fire-resistance-rated Assemblies:

The assemblies described in Sections 4.4.1 through 4.4.5 and shown in Figure 3 require specific substrates. Any of the following substrates is permitted to be used independently or in combination with one of the others in any of these assemblies:

- One layer of  $1/2$ -inch- or  $5/8$ -inch-thick (12.7 or 15.9 mm), water-resistant core gypsum sheathing complying with ASTM C 79 or C 1396
- One layer of 1-inch-thick (25.4 mm) EPS foam plastic insulation.
- One layer of  $7/16$ -inch-thick (11.1 mm) OSB complying with U.S. DOC PS-2.
- One layer of  $7/16$ -inch-thick (11.1 mm) plywood complying with U.S. DOC PS-1 or PS-2.

##### 4.4.1 One-hour Load-bearing Wall—Assembly 1:

**4.4.1.1 Interior Face:** One layer of  $5/8$ -inch-thick (15.9 mm) Type X gypsum wallboard, complying with ASTM C 36 or C 1396, must be attached with the long edge parallel to nominally 2-by-4 wood studs with  $15/8$ -inch-long (41 mm) galvanized steel, cup-head gypsum wallboard nails [0.30 inch (7.62 mm) head diameter, 0.010 inch (0.254 mm) shank diameter] spaced a maximum of 8 inches (203 mm) on center at all studs and plates. Stud spacing must be a maximum of 16 inches (410 mm) on center. The joints and

nail heads must be covered with paper tape and gypsum compound in accordance with ASTM C 840 or GA 216. The stud cavities must be filled with  $3/2$ -inch-thick (89 mm) rock wool batt insulation having a minimum density of 1.45 lb/ft<sup>3</sup> (23.2 kg/m<sup>3</sup>), or  $3/2$ -inch-thick (89 mm) fiberglass insulation having a minimum density of 0.5 lb/ft<sup>3</sup> (8.0 kg/m<sup>3</sup>).

**4.4.1.2 Exterior Face:** One layer of 1-inch-thick (25.4 mm) EPS insulation with the material properties described in Section 3.2.4 of this report. The EPS insulation must be installed on wood framing as described in Sections 4.1 and 4.2. The water-resistive barrier, flashings, lath and coating must be applied to the substrate as described in Sections 4.1 and 4.2.

**4.4.1.3 Design:** The wood stud axial stress is limited to  $0.78 F'_c$  and must not exceed  $0.78 F'_c$  at an  $le/d$  ratio of 33. The maximum allowable load on this system is 1,100 pounds (4895 N) per stud, where:

$F'_c$  = Allowable unit stress in compression parallel to the grain adjusted for  $le/d$  ratio, psi (Pa).

$le$  = Effective length of compression member, inches (mm).

$d$  = Least dimension, inches (mm).

##### 4.4.2 One-hour Load-bearing Wall—Assembly 2:

**4.4.2.1 Interior Face:** One layer of  $5/8$ -inch-thick (15.9 mm) Type X gypsum wallboard, complying with ASTM C 36 or C 1396, must be attached with the long edge parallel to nominally 2-by-4 wood studs with  $15/8$ -inch-long (41 mm) galvanized steel, cup-head gypsum wallboard nails [0.30 inch (7.62 mm) head diameter, 0.010 inch (0.254 mm) shank diameter] spaced a maximum of 8 inches (203 mm) on center at all studs and plates. Stud spacing must be a maximum of 16 inches (410 mm) on center. The joints and nail heads must be covered with paper tape and gypsum compound in accordance with ASTM C 840 or GA 216. The stud cavities must be filled with  $3/2$ -inch-thick (89 mm) rock wool batt insulation having a minimum density of 1.45 lb/ft<sup>3</sup> (23.2 kg/m<sup>3</sup>), or  $3/2$ -inch-thick (89 mm) fiberglass insulation having a minimum density of 0.5 lb/ft<sup>3</sup> (8.0 kg/m<sup>3</sup>).

**4.4.2.2 Exterior Face:** One layer of  $7/16$ -inch-thick (11.1 mm) OSB with the material properties described in Section 3.2.7. The OSB must be installed on wood framing as described in Sections 4.1 and 4.3. The water-resistive barrier, flashings, lath and coating must be applied to the substrate as described in Sections 4.1 and 4.3 of this report.

**4.4.2.3 Design:** The wood stud axial stress is limited to  $0.78 F'_c$  and must not exceed  $0.78 F'_c$  at an  $le/d$  ratio of 33. The maximum allowable load on this system is 1,100 pounds (4895 N) per stud, where:

$F'_c$  = Allowable unit stress in compression parallel to the grain adjusted for  $le/d$  ratio, psi (Pa).

$le$  = Effective length of compression member, inches (mm).

$d$  = Least dimension, inches (mm).

These design details are applicable only to the assembly described in Section 4.4.2.

##### 4.4.3 One-hour Load-bearing Wall—Assembly 3:

**4.4.3.1 Interior Face:** One layer of  $5/8$ -inch-thick (15.9 mm) Type X gypsum wallboard complying with ASTM C 36 or C 1396, must be attached with the long edge parallel to nominally 2-by-4 wood studs with  $15/8$ -inch-long (41 mm)

galvanized steel, cup-head gypsum wallboard nails [0.30 inch (7.62 mm) head diameter, 0.010 inch (0.254 mm) shank diameter] spaced a maximum of 8 inches (203 mm) on center at all studs and plates. Stud spacing must be a maximum of 16 inches (410 mm) on center. The joints and nail heads must be covered with paper tape and gypsum compound in accordance with ASTM C 840 or GA 216. The stud cavities must be filled with 3<sup>1</sup>/<sub>2</sub>-inch-thick (89mm) rock wool batt insulation having a minimum density of 1.45 lb/ft<sup>3</sup> (23.2 kg/m<sup>3</sup>), or 3<sup>1</sup>/<sub>2</sub>-inch-thick (89mm) fiberglass insulation having a minimum density of 0.5 lb/ft<sup>3</sup> (8.0 kg/m<sup>3</sup>).

**4.4.3.2 Exterior Face:** One layer of <sup>7</sup>/<sub>16</sub>-inch-thick (11.1 mm) plywood with the material properties described in Section 3.2.7 of this report. The plywood must be installed on wood framing as described in Sections 4.1 and 4.3. The water-resistive barrier, flashings, lath and coating must be applied to the substrate as described in Sections 4.1 and 4.3.

**4.4.3.3 Design:** The wood stud axial stress is limited to 0.78  $F'_c$  and must not exceed 0.78  $F'_c$  at an  $le/d$  ratio of 33. The maximum allowable load on this system is 1,100 pounds (4895 N) per stud, where:

$F'_c$  = Allowable unit stress in compression parallel to the grain adjusted for  $le/d$  ratio, psi (Pa).

$le$  = Effective length of compression member, inches (mm).

$d$  = Least dimension, inches (mm).

These design details are applicable only to the assembly described in Section 4.4.3.

#### 4.4.4 One-hour Load-bearing Wall—Assembly 4:

**4.4.4.1 Interior Face:** One layer of <sup>5</sup>/<sub>8</sub>-inch-thick (15.9 mm) Type X gypsum wallboard complying with ASTM C 36 or C 1396, must be attached with the long edge parallel to nominally 2-by-4 inch wood studs with <sup>5</sup>/<sub>8</sub>-inch-long (41 mm) galvanized steel, cup-head gypsum wallboard nails [0.30 inch (7.62 mm) head diameter, 0.010 inch (0.254 mm) shank diameter] spaced a maximum of 8 inches (203 mm) on center at all studs and plates. Stud spacing must be a maximum of 16 inches (410 mm) on center. The joints and nail heads must be covered with paper tape and gypsum compound in accordance with ASTM C 840 or GA 216. The stud cavities must be filled with 3<sup>1</sup>/<sub>2</sub>-inch-thick (89 mm) rock wool batt insulation having a minimum density of 1.45 lb/ft<sup>3</sup> (23.2 kg/m<sup>3</sup>).

**4.4.4.2 Exterior Face:** One layer of <sup>1</sup>/<sub>2</sub>-inch-thick (12.7 mm) water-resistant core gypsum sheathing with the material properties described in Section 3.2.5. The gypsum sheathing must be installed on wood framing as described in Sections 4.1 and 4.3. The water-resistive barrier, flashings, lath and coating must be applied to the substrate as described in Sections 4.1 and 4.3.

**4.4.4.3 Design:** The wood stud axial stress is limited to 0.78  $F'_c$  and shall not exceed 0.78  $F'_c$  at an  $le/d$  ratio of 33. The maximum load allowable on this system is 1,600 pounds (7117 N) per stud, where:

$F'_c$  = Allowable unit stress in compression parallel to the grain adjusted for  $le/d$  ratio, psi (Pa).

$le$  = Effective length of compression member, inches (mm).

$d$  = Least dimension, inches (mm).

#### 4.4.5 One-hour Non-load-bearing Wall Assembly:

**4.4.5.1 Interior Face:** One layer of <sup>5</sup>/<sub>8</sub>-inch-thick (15.9 mm) Type X gypsum wallboard, water-resistant gypsum backing board complying with ASTM C 630, or gypsum

veneer base complying with ASTM C 588, must be applied horizontally to the interior face of wood studs with nominal dimensions of 2-by-4, spaced a maximum of 24 inches (610 mm) on center. The wallboard must be attached with 6d coated nails complying with ASTM C 514 [<sup>1</sup>/<sub>8</sub> inches (48 mm) long, <sup>1</sup>/<sub>2</sub>-inch-diameter (6.4 mm) heads] spaced a maximum of 7 inches (178 mm) on center, at studs, plates and blocking. All fastener heads and wallboard joints must be backed with minimum nominally 2-by-4 wood framing, and must be taped and treated with joint compound in accordance with ASTM C 840 or GA 216.

**4.4.5.2 Exterior Face:** One layer of minimum <sup>5</sup>/<sub>8</sub>-inch-thick (15.9 mm), Type X, water-resistant core gypsum sheathing as described in Section 4.3.2 of this report, 48 inches (1219 mm) wide, must be applied parallel to studs and fastened with No. 11 gage [0.148 inch (3.75 mm) shaft diameter, 0.438 inch (11.1 mm) head diameter] galvanized roofing nails, <sup>3</sup>/<sub>4</sub> inches (45 mm) long with <sup>7</sup>/<sub>16</sub>-or <sup>1</sup>/<sub>2</sub>-inch-diameter (11.1 or 12.7 mm) heads, spaced a maximum of 4 inches (102 mm) on center at board edges and a maximum of 7 inches (178 mm) on center at intermediate studs and top and bottom plates. The nails must penetrate a minimum of 1 inch (25.4 mm) into studs. The water-resistive barrier, flashings, lath and coating must be applied to the substrate as described in Sections 4.1 and 4.3.

#### 4.5 Use on Shear Walls:

**4.5.1 Interior Face:** Minimum <sup>1</sup>/<sub>2</sub>-inch-thick (12.7 mm) gypsum wallboard, complying with ASTM C 36 or C 1396, fastened to nominally 2-by-4 wood studs at 16 inches (406.4 mm) on center. Fasteners must be <sup>5</sup>/<sub>8</sub>-inch framing at a maximum of 6 inches (152 mm) on center. Gypsum wallboard must be placed horizontally or vertically, with edges blocked.

**4.5.2 Exterior EPS:** The water-resistive barrier, maximum 1-inch-thick (25.4 mm) EPS foam plastic insulation, lath and coating must be applied in accordance with Sections 4.1 through 4.3 of this report.

**4.5.3 Shear Value:** Use of the system to resist seismic shear loads is limited to seismic design categories A and B only. The allowable shear value is 190 pounds per foot (2772 N/m) based on a 1:1 height-to-width ratio.

#### 4.6 Miscellaneous:

**4.6.1 Inspection Requirements:** Building department inspection must be conducted on lath installation prior to application of the coating, as noted in 2009 IBC Section 110.3.5, or 2006 IBC Section 109.3.5 in jurisdictions enforcing the IBC or IRC, or as noted in UBC Section 108.5.5 for jurisdictions enforcing the UBC.

**4.6.2 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 detail, conventional three-coat plastering details must be used.

**4.6.3 Curing:** Moisture curing by fogging the finished wall lightly with water must be provided for a minimum of 48 hours after coating application. The fogging must occur as often and as long as necessary to assure cement hydration.

**4.6.4 Soffits:** The system may be applied to soffits, provided the coating is applied over expanded metal lath complying with Section 3.2.3.2 in lieu of wire fabric lath. Expanded metal lath fastening must comply with IBC Section 2510.3, IRC Section R703.6.1.3-5 or UBC Table 25-C, except the length of the fastener must be increased by the thickness of the substrate.

**4.6.5 Sills:** The system may be applied to sills at locations such as windows and 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, IRC Table R602.3(1), or UBC Table 23-II-B-1, whichever code is applicable, and a double layer of Grade D water-resistive barrier applied over the substrate. The coating, lath, and optional EPS board must be applied in accordance with Sections 4.1 and 4.2 of this report.

**5.0 CONDITIONS OF USE**

The Magna Wall Fiber-Reinforced Stucco System 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 Materials and methods of installation must comply with this report and the manufacturer’s published installation instructions. 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 must be by contractors approved by Best Masonry.
- 5.3 The system is limited to Type V-B construction (IBC) Type V-N construction (UBC), or construction permitted by the IRC, except as permitted for fire-resistance-rated construction in Section 4.4 of this report.
- 5.4 The interior of the building must be separated from the foam plastic boards by a thermal barrier complying with 2009 and 2006 IBC Section 2603.4, 2009 IRC Section R3116.4, 2006 IRC Section R314.4 and Table R702.3.5, or UBC Section 2602.4 and Table 25-G.
- 5.5 An installation card, such as that shown in Figure 4 of this report, must be completed and left at the jobsite for the owner, and a copy must be filed with the building department.
- 5.6 Inspections must be performed in accordance with Section 4.7.1.

- 5.7 Where hazard of termite damage is very heavy in accordance with 2009 and 2006 IBC Section 2603.8, 2009 IRC R318.4, or 2006 IRC Section R320.5, foam plastic insulation board must not be placed on exterior walls of wood construction located within 6 inches (152 mm) of the ground.
- 5.8 The allowable wind load on the system applied to wood or steel studs a maximum of 24 inches (610 mm) on center is 35 psf (1.7 kpa) negative and 50 psf (2.4 kpa) positive. Support framing must be adequate to resist the required wind load, and must be designed for a maximum deflection of  $1/240$  of span.
- 5.9 When used as a shear wall as described in Section 4.5 of this report, the system is limited to Seismic Design Categories A and B.
- 5.10 The system is recognized as a one-hour fire-resistance-rated assembly when installed in accordance with Section 4.4.

**6.0 EVIDENCE SUBMITTED**

- 6.1 Data in accordance with the ICC-ES Acceptance Criteria for Cementitious Exterior Wall Coatings (AC11), dated March 2010.
- 6.2 Reports of tests in accordance with ASTM E 119 (UBC Standard 7-1).

**7.0 IDENTIFICATION**

- 7.1 The factory-prepared mix is deliverable to the jobsite in water-resistive bags with labels bearing the following information:
  - Name and address of the manufacturer, and the ICC-ES report number (ESR-2781).
  - Weight of packaged mix.
  - Storage instructions.
  - Maximum amount of water and other components permitted, and the conditions to be considered in determining the actual amounts added.
  - Curing instructions.
  - Concentrate or premix.
- 7.2 Polystyrene foam plastic insulation boards must be identified in accordance with their respective ICC-ES evaluation reports. Additionally, the EPS board density must be noted.

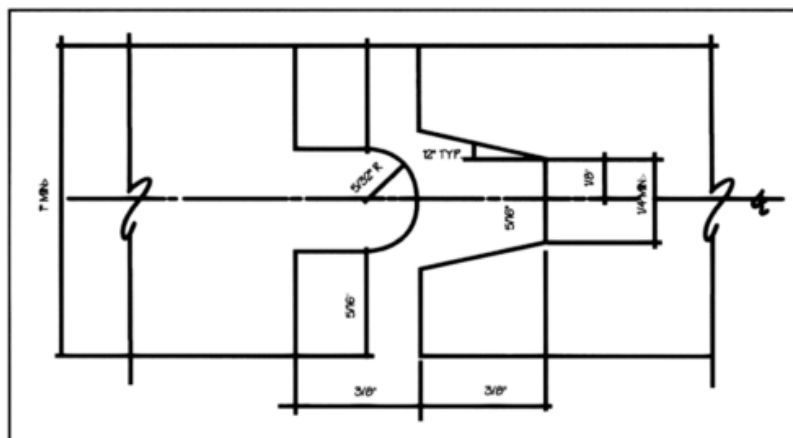


FIGURE 1—TONGUE-AND-GROOVE DETAIL

WEEP SCREED—FOAM SUBSTRATE

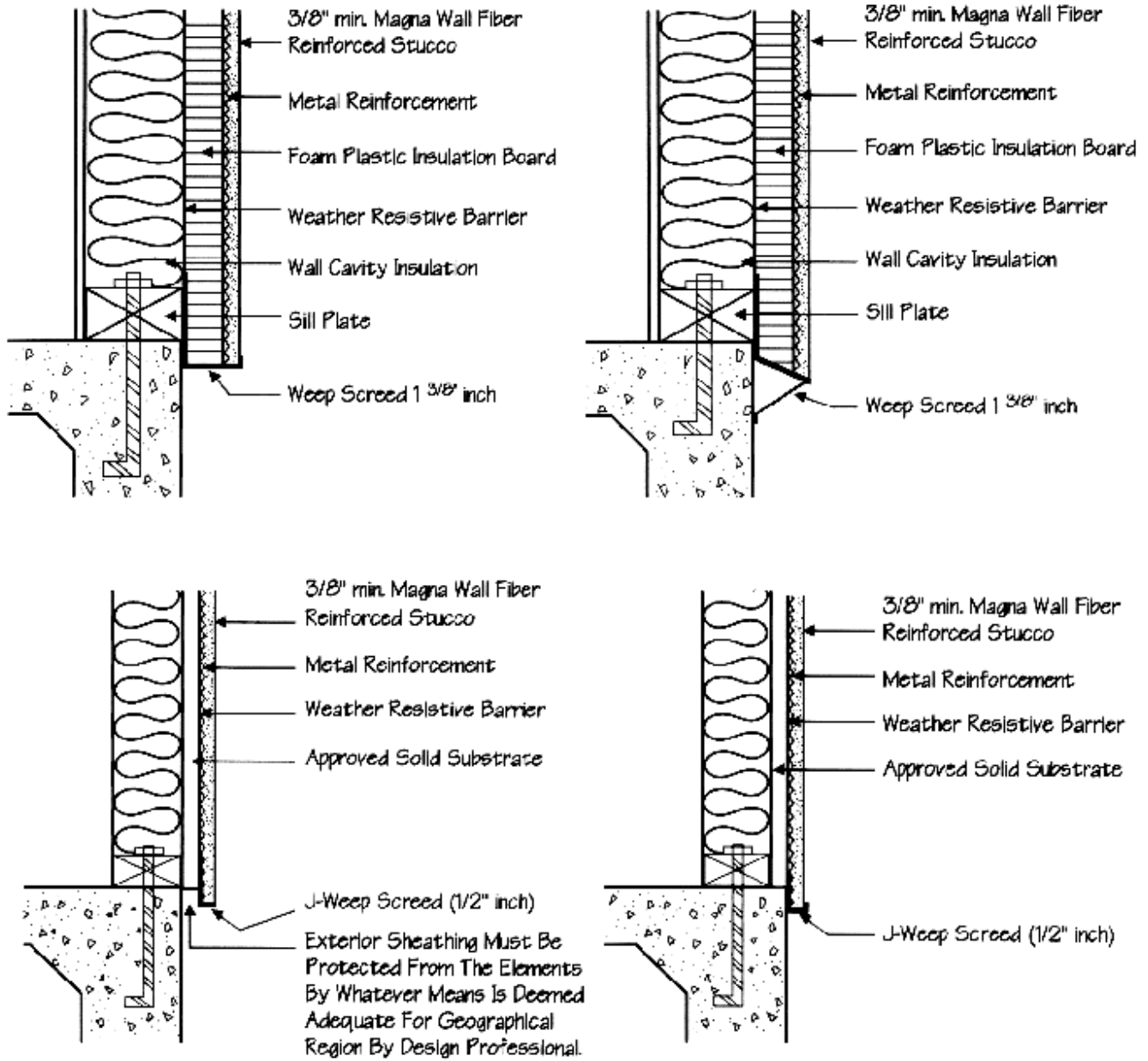
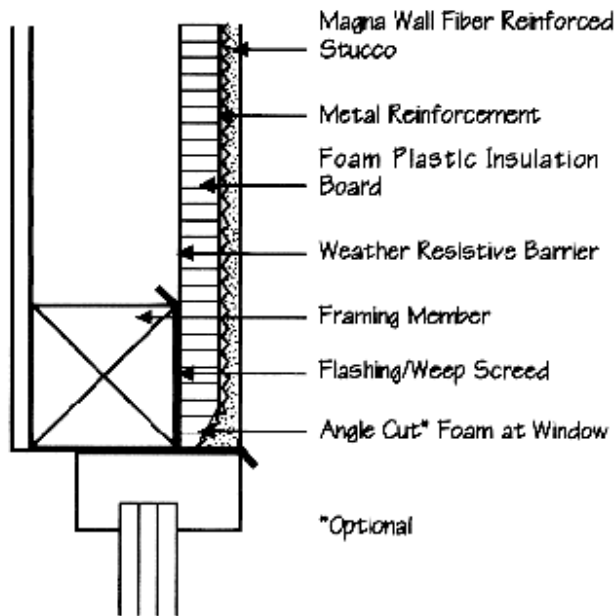


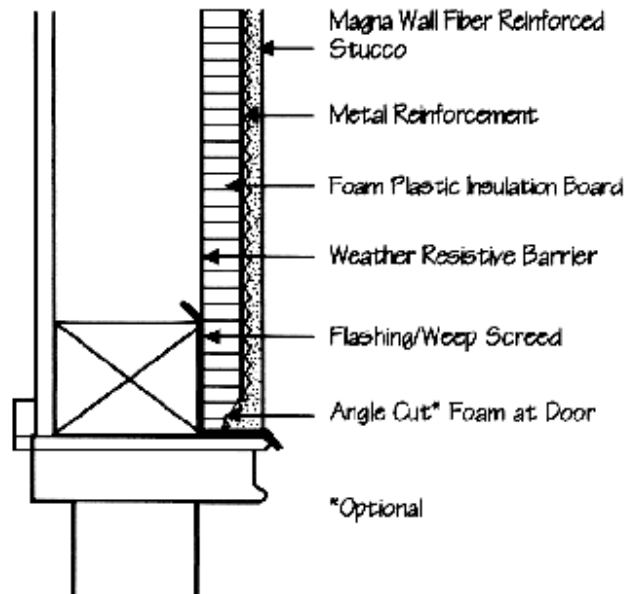
FIGURE 2—TYPICAL INSTALLATION DETAILS



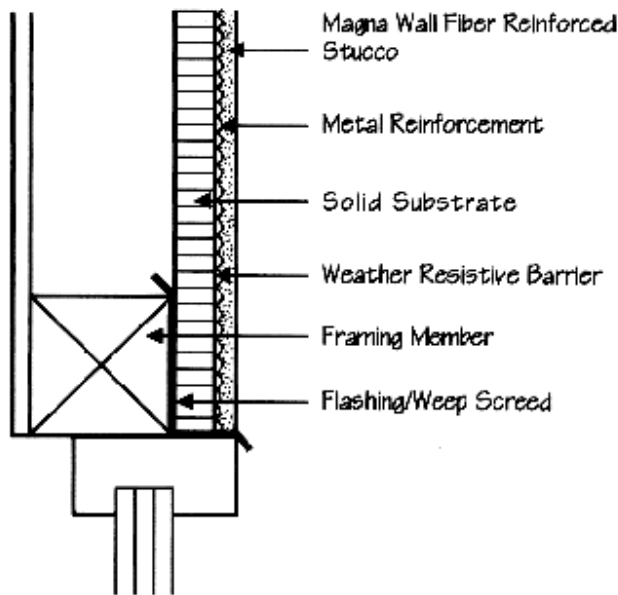
TYPICAL WINDOW—FOAM SUBSTRATE



TYPICAL DOOR—FORM SUBSTRATE



TYPICAL WINDOW—SOLID SUBSTRATE



TYPICAL DOOR—SOLID SUBSTRATE

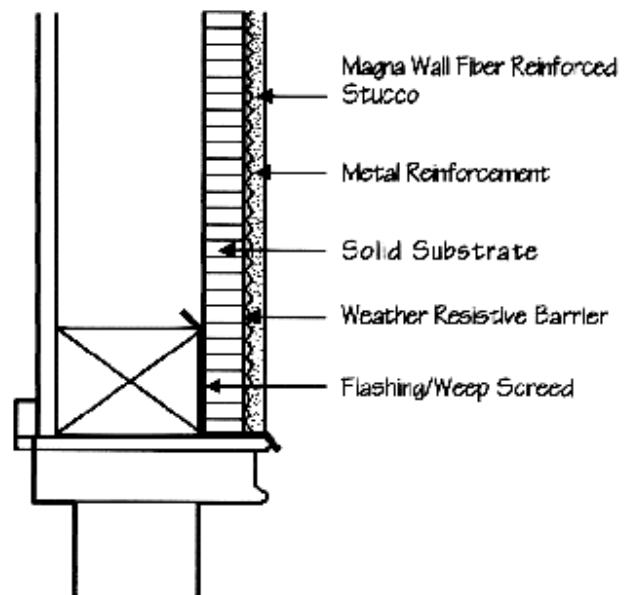
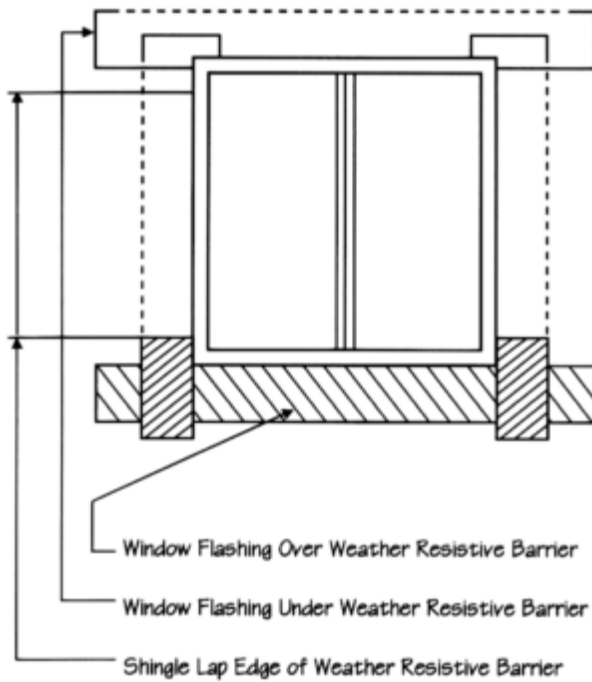


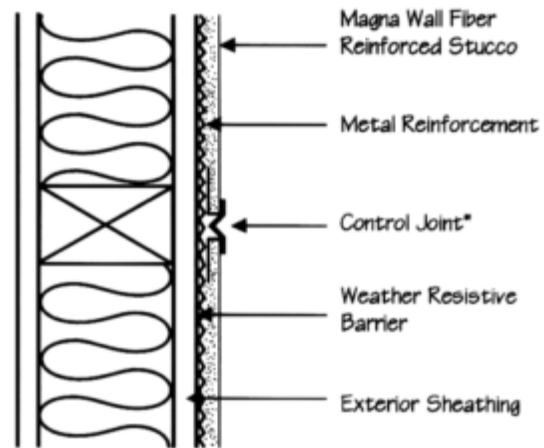
FIGURE 2—TYPICAL INSTALLATION DETAILS (Continued)



**WINDOW/DOOR FLASHING**

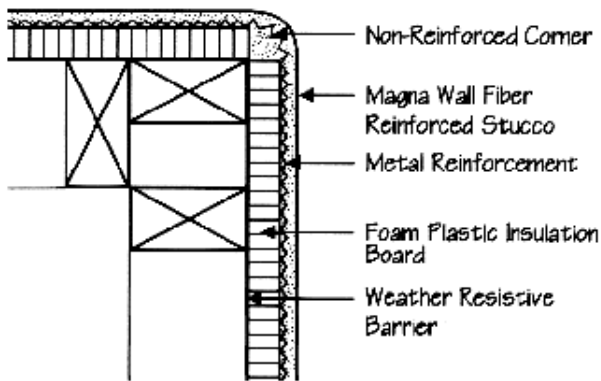


**CONTROL JOINT**

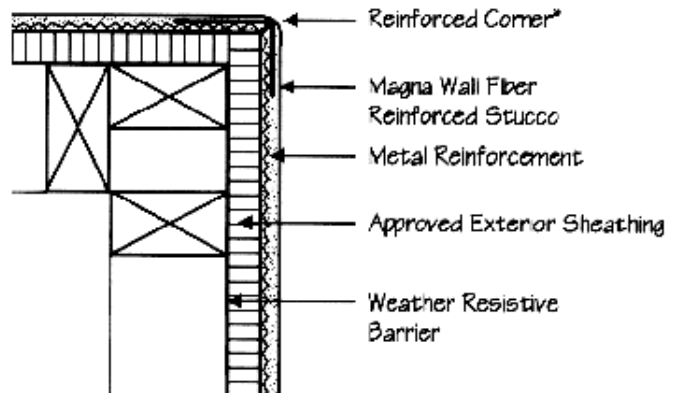


\*Control joint may be wired to metal reinforcement if attachment to framing member is not possible.

**NON-REINFORCED ROUNDED CORNERS—  
FOAM SUBSTRATE**



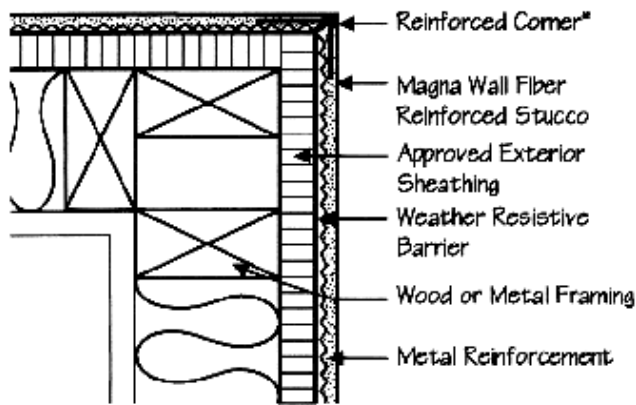
**REINFORCED ROUNDED CORNERS—  
FOAM OR SOLID SUBSTRATE**



\*Reinforced corner may be a second layer of woven wire lath or expanded metal lath with a two inch leg (min) or a galvanized metal or plastic corner bead.

**FIGURE 2—TYPICAL INSTALLATION DETAILS (Continued)**

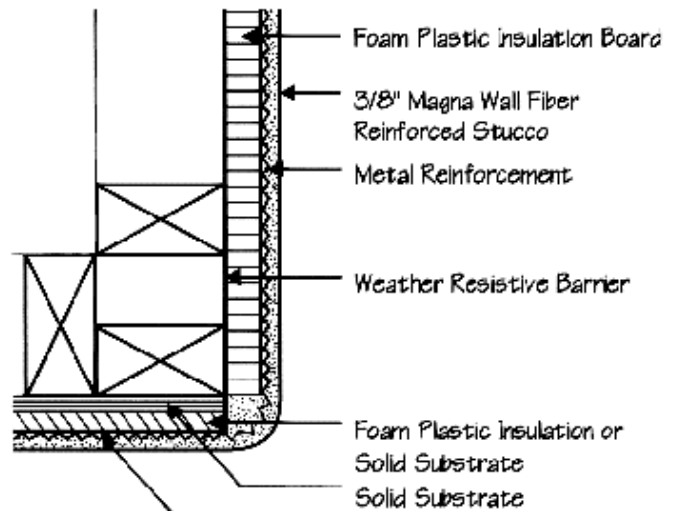
**SQUARE CORNER—FOAM OR SOLID SUBSTRATE**



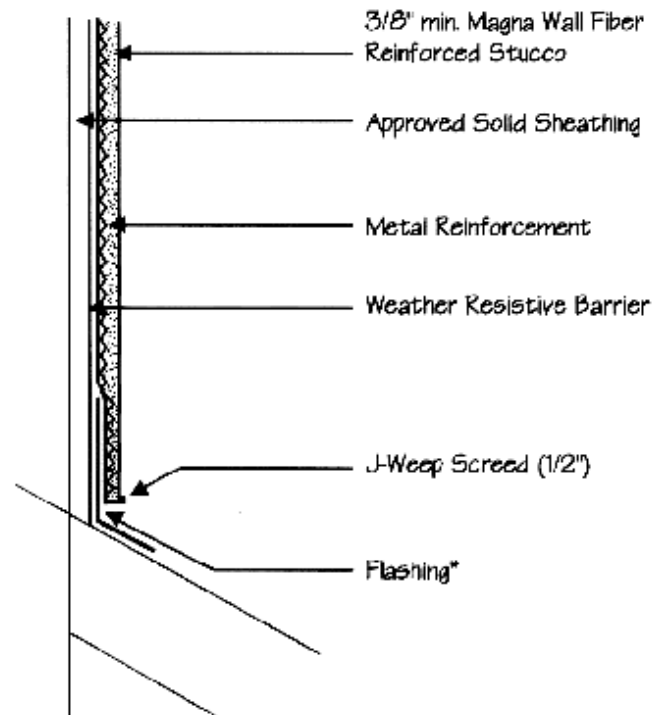
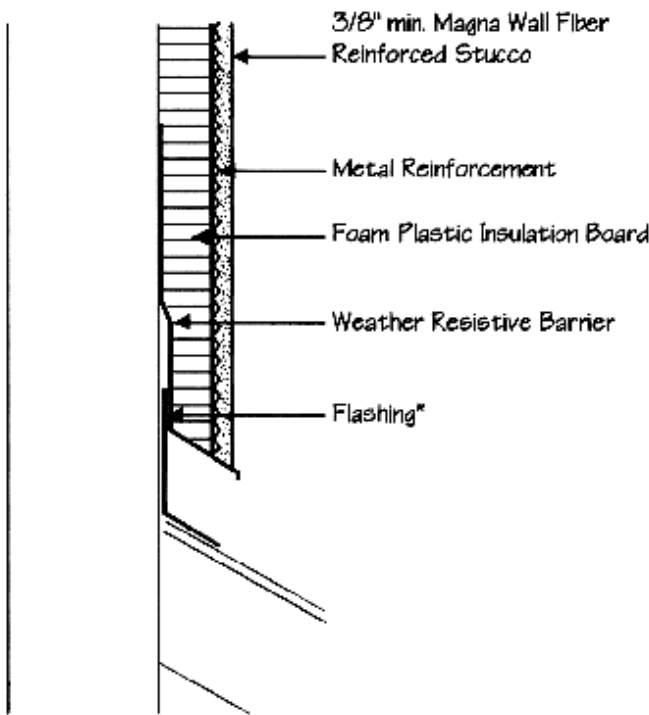
\*Reinforced corner may be a second layer of woven wire lath or expanded metal lath with a two inch leg (min) or a galvanized metal or plastic corner bead.

**TERMINATION AT FLASHING ON ROOF**

**NON-REINFORCED CORNER  
DETAIL AT TRANSITION FROM OPEN  
FRAMING TO SOLID SUBSTRATE**



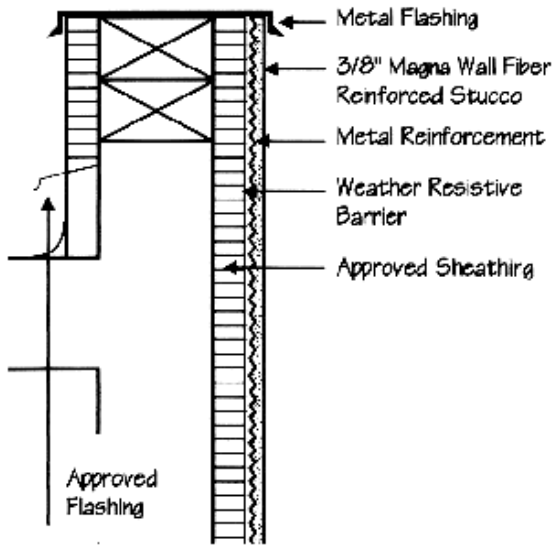
**TERMINATION AT FLASHING ON ROOF—  
SOLID SUBSTRATE**



\* Flashing is installed by others. Installation requires only single lap of the weather resistant barrier onto the approved flashing. Flashing materials and installation shall be in accordance with the code.

**FIGURE 2—TYPICAL INSTALLATION DETAILS (Continued)**

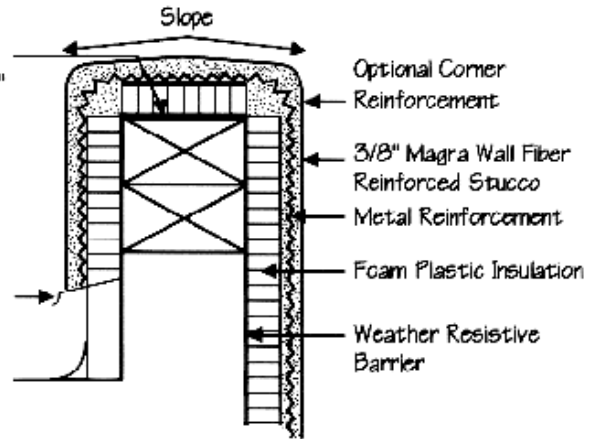
**PARAPET WITH METAL CAP  
FOAM OR SOLID SUBSTRATE**



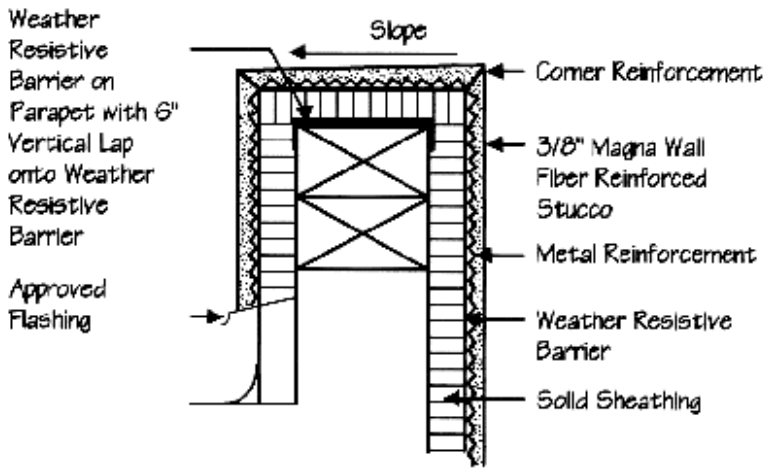
Weather Resistive Barrier on Parapet with 6" Vertical Lap onto Weather Resistive Barrier

Approved Flashing

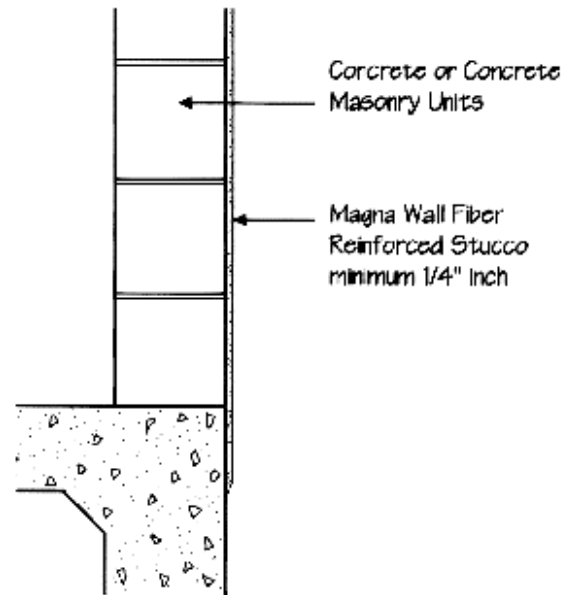
**PARAPET WITH METAL CAP  
FOAM OR SUBSTRATE**



**PARAPET WITHOUT METAL CAP  
SOLID SUBSTRATE**

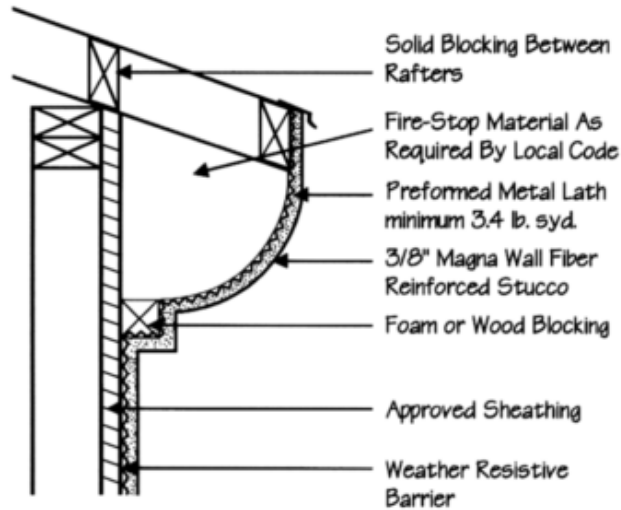


**DIRECT APPLICATION TO CONCRETE  
OR CONCRETE MASONRY UNITS**



**FIGURE 2—TYPICAL INSTALLATION DETAILS (Continued)**

### LATH BASKET



### A WEEP SYSTEM FOR ONE-COAT STUCCO INSTALLATIONS

Vinyl tubes  $\frac{1}{2}$ " in diameter are inserted into holes drilled through stucco finish to a keyway formed at edges of concrete slab as shown. Building paper is brought down over sill plates terminating at keyway. Water that may inadvertently find its way behind the plaster assembly is directed downward by building paper to keyway which serves as a receptacle for water. Water then finds its way to the exterior through vinyl tubes spaced 48" o.c. along the open keyway under stucco finish.

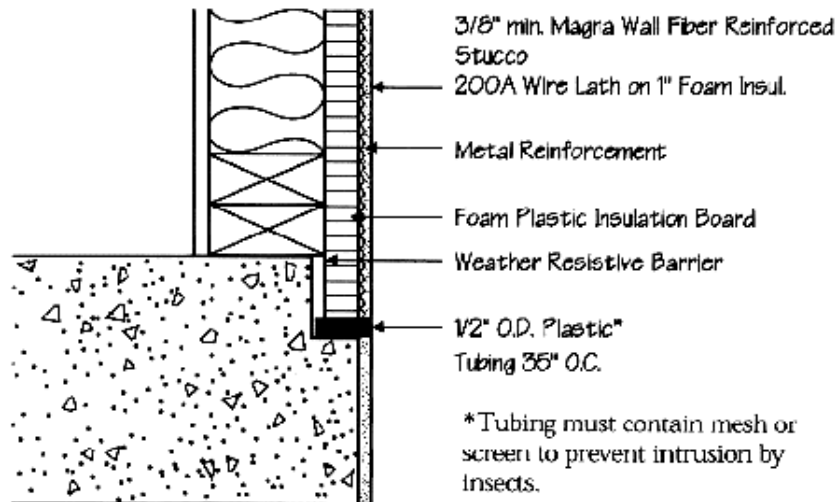
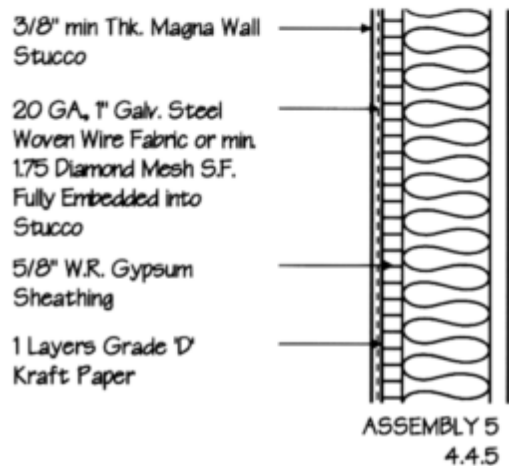
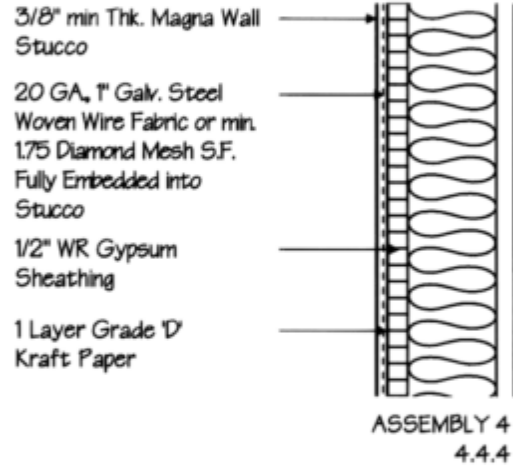
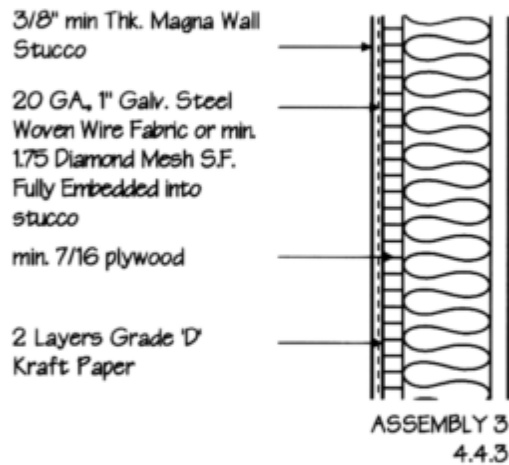
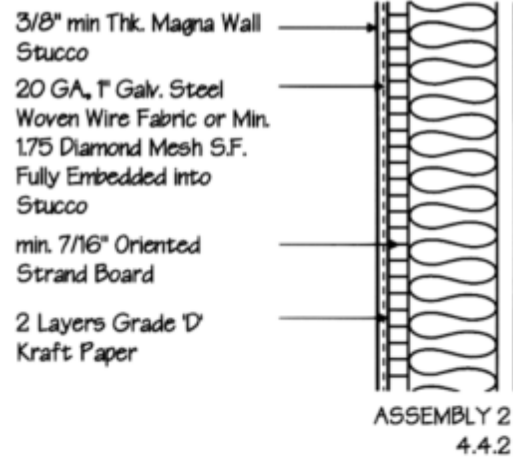
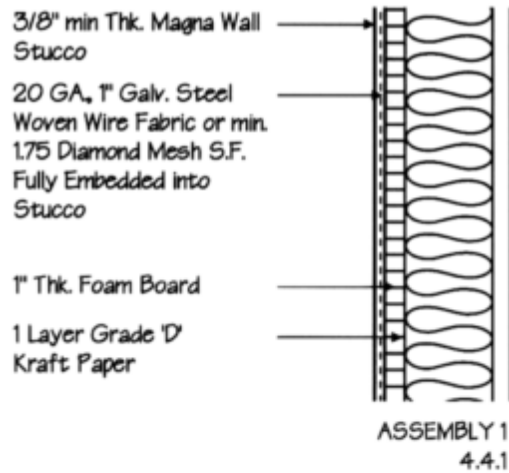


FIGURE 2—TYPICAL INSTALLATION DETAILS (Continued)





**Note:** For design limits, and other related information please refer to the section of this report listed on the individual assembly

FIGURE 3—ONE-HOUR BEARING WALL, FIRE-RESISTANCE-RATED ASSEMBLIES

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

**Job Address**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**ICC-ES Evaluation  
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 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 4—SAMPLE INSTALLATION CARD**