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Legacy report on the 2000 *International Building Code*[®], the 2000 *International Residential Code*[®], the 2001 *Supplement to the International Codes*[®], the BOCA[®] *National Building Code/1999*, the 1999 *Standard Building Code*[®], the 1997 *Uniform Building Code*[™] and the 1998 *International One- and Two-Family Dwelling Code*[®]

DIVISION 09—FINISHES Section 09220—Portland Cement Plaster

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1.0 SUBJECT

Magna Wall Fiber-reinforced Stucco System (Best One-Coat Stucco and Eldorado One-Coat Stucco)

2.0 PROPERTY FOR WHICH EVALUATION IS SOUGHT

- 2.1 Weather resistance
- 2.2 Exterior wall covering
- 2.3 Fire-resistance
- 2.4 Structural performance

3.0 DESCRIPTION

3.1 General

Magna Wall Fiber-Reinforced Stucco System is an exterior cementitious wall finish consisting of a proprietary mixture of Portland cement, water, sand, synthetic fibers, and proprietary admixtures. The products are applied onto wire fabric or metal lath, that is mechanically fastened to the framing members. The system is intended for application over foam plastic boards, fiber board, plywood, oriented strand board, gypsum sheathing or GP Gypsum Dens-Glass Gold Sheathing substrates and attached to wood- or steel-framed exterior wall construction. The Magna Wall Stucco system is also applied directly over concrete or unit masonry substrates with or without lath.

3.2 Materials

3.2.1 Magna Wall Fiber-Reinforced Stucco: 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 pound (36 kg) bags. Five to seven gallons (19 to 27 L) of water and 180 to 220 pounds (82 to 100 kg) of sand are mixed with each bag in the field. The product is also available in a factory-mixed pre-sanded form requiring only the addition of 2 to 4 gallons (8 to 15 L) of water. When required, colors may be added in accordance with the manufacturer's instructions.

As an alternative to 80 pound (36 kg) bags, the stucco mix is also available in bulk containers that are mixed at a manufacturing plant. The bulk products consist of two types, either the dry stucco mix pre-mixed with sand, or the dry stucco mix and sand contained in separate compartments within the bulk container and mixed at the site. The bulk container is delivered to the job site and field-mixed with water. The following conditions shall apply regarding the use of the stucco mix in bulk containers:

3.2.1.1 The bulk container shall bear an identification label information stated in **Section 5.0** of this report.

3.2.1.2 A signed certificate from the manufacturing plant for each unit, stating the plant name and address, job site and address, date of manufacture, quantity and curing instructions. The ratio of batched sand amount to be combined with each 80 pounds (37 kg) of stucco mixture shall be stated in the certificate.

3.2.1.3 Procedures shall be provided to prevent tampering with the controls on the amount of product mixture and sand combined.

3.2.1.4 The stucco, sand and water ratios stated in **Section 3.2.1** shall be maintained and verified by Magna Wall

3.2.2 Sand: Clean and free from deleterious amounts of loam, clay, silts, soluble salts, and organic matter. Sand gradation shall comply with ASTM C 144, as stated in **Table 1**.

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TABLE 1

RETAINED ON U.S. STANDARD SIEVE	PERCENT PASSING +/- 2 PERCENT	
	NATURAL SAND	MANUFACTURED SAND
4.75 mm (No. 4)	100	100
2.36 mm (No.8)	95 to 100	95 to 100
1.18 mm (No. 16)	70 to 100	70 to 100
600 mm (No. 30)	40 to 75	40 to 75
300 mm (No. 50)	10 to 35	20 to 40
150 mm (No. 100)	2 to 15	10 to 25
75 mm (No. 200)	0 to 5	0 to 10

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 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 (1.47 mm)] by $1\frac{1}{2}$ -inch (38 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.

3.2.3.2 Metal Lath: Metal lath must comply with AC191 and, when applicable, UBC Table 25-B. Furring requirements are as set forth in **Section 3.2.3.1**.

3.2.4 Substrates

3.2.4.1 Foam Plastic Board: Foam plastic formed from expanded polystyrene 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 boards shall have a minimum nominal density of 1.5 pounds per cubic foot (24.0 kg/m³). When used over open stud framing, the boards shall be a minimum of 1 inch (25.4 mm) thick and have a $\frac{3}{8}$ 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 are permitted to have a minimum thickness of $\frac{3}{4}$ inch (15.9 mm). The maximum board thickness shall not exceed 4 inches (25.4 mm). The insulation board shall be labeled in accordance with **Condition of Use 7.8** of this report.

3.2.4.2 Exterior Gypsum Sheathing Board: Water-resistant core gypsum sheathing complying with ASTM C 79, minimum $\frac{1}{2}$ inch (12.7 mm) thick.

3.2.4.3 Dens-Glass Gold Sheathing: Noncombustible, resinous coated, glass-fiber mat faced, water-resistant sheathing, minimum $\frac{1}{2}$ inch (12.7 mm) thick, manufactured by G-P Gypsum Corporation (see NER-574).

3.2.4.4 Fiberboard: Asphalt impregnated fiberboard complying with ANSI/AHA A194.1 for regular density sheathing, minimum $\frac{7}{16}$ inch (11.1 mm) thick.

3.2.4.5 Plywood: Exterior or Exposure 1 complying with US DOC PS 1. Minimum panel thickness shall be $\frac{5}{16}$ inch (7.9 mm) thick for studs spaced a maximum of 16 inches (406 mm) on center, and minimum $\frac{3}{8}$ inch (9.5 mm) thick with exterior glue for studs spaced a maximum of 24 inches (610

mm) on center. Plywood shall be installed in accordance with a nominal $\frac{1}{8}$ inch (3.2 mm) spacing between sheets at ends and sides.

3.2.4.6 Oriented Strand Board: Exposure 1, performance-rated panels, complying with US DOC PS 2, minimum $\frac{3}{8}$ inch (9.5 mm) thick. Panels shall be installed in accordance with a nominal $\frac{1}{8}$ inch (3.2 mm) spacing between sheets at ends and sides.

3.2.5 Sealants: Minimum of an acrylic latex sealant complying with ASTM C 834.

3.2.6 Weather-resistive Barrier: A minimum of one layer of a weather-resistive barrier complying with the requirements of Chapter 14 of the applicable Code (Chapter 7 of the *International Residential Code*). E.I. DuPont Tyvek StuccoWrap is also permitted for use as an alternative to the weather-resistive barrier prescribed by the applicable code.

3.2.7 Flashing, trim and accessories: All flashings, trim, weep screeds, and corner reinforcement shall be of corrosion-resistant metal or approved plastic. Flashings shall be designed and installed to direct moisture from behind the system to the exterior of the cladding. Flashings shall be installed at the perimeter of all penetrations of the system. The weather-resistive barrier shall be shingle lapped over the nailing leg of the flashing in a manner to shed water.

4.0 INSTALLATION

4.1 General

All substrates on which the stucco products are intended to be installed shall be covered with a minimum of one layer of the weather-resistive barrier stated in **Section 3.2.6** of this report. The weather-resistive barrier is permitted to be omitted when the stucco is installed directly over cast concrete or unit masonry substrates.

Flashing, corner reinforcement, metal trim and weep screeds shall be installed as shown in this report. Weep screeds are installed at the bottom of the wall a minimum of 1 inch (25.4 mm) below the plate line, and a minimum of 4 inches (102 mm) above grade. The screed shall comply with the applicable code requirements and shall allow trapped water to drain to the building exterior.

The weather-resistive barrier, lath, and foam plastic board (when used) shall lap over the nailing leg of flashings and weep screeds as shown in the standard details at the end of this report.

At building corners, the stucco is permitted to be installed with either a square or rounded detail as shown in the details at the end of this report.

Corrosion-resistant fasteners for lath attachment to wood framing members shall penetrate a minimum of 1 inch (25.4 mm) into framing members. When the substrate consists of plywood or oriented strand board as stated in **Section 3.2.4.5** or **Section 3.2.4.6** of this report, the thickness of the sheathing is permitted to be considered in determining the 1 inch (25.4 mm) fastener penetration requirement. Fasteners for lath attachment to steel framing shall penetrate a minimum of $\frac{1}{4}$ inch (6.4 mm) beyond the steel framing. The lath shall be embedded in the coating and shall be completely covered.

The exterior cementitious coating shall be applied by hand-troweling or machine spraying in one or two coats at minimum nominal $\frac{3}{8}$ inch (9.5 mm) overall thickness, except where self-furring wire lath is used (see **Section 3.2.3.1**). The coating shall be applied at ambient air temperatures between 35 and 120 degrees F (2 and 49°C) by applicators approved by Best Masonry and Tool Supply, LP. After application, the coating

shall be protected from freezing air temperatures during the initial six hours of curing. The second coat, when provided, shall be applied within seven days after the first coat. If the second coat is not installed within seven days, a bonding adhesive, complying with Military Specification MIL-B-19235, shall be brushed or sprayed on the base coat or a bonding treatment shall be added to the mix of the second coat prior to application over the base coat.

Where the coating is job-mixed, an installation card, as noted in **Figure 4** of this report, shall be provided on the job-site 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 7.6** of this report.

4.2 Application Over Open Framing

The weather-resistive barrier described in **Section 3.2.6** of this report shall be placed over open wood or steel framing. The framing shall be spaced a maximum of 24 inches (610 mm) on center. Wall bracing, in accordance with the applicable code, shall be installed. The foam plastic board described in **Section 3.2.4.1** of this report shall 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 shall be used to temporarily fasten the board to metal framing. Vertical butt joints of the foam boards shall be staggered a minimum of one framing space from the adjacent courses and occur directly over framing. In applications where the foam plastic board abuts a solid substrate, the butt joints in the foam plastic boards shall occur over a vertical framing member. The foam plastic board is permitted to be omitted where a solid substrate occurs. When the foam plastic boards are installed over a solid substrate, the vertical butt joints in the foam plastic are not required to occur over vertical framing or to be staggered.

The lath shall be installed over the foam plastic board and shall be fastened through the board to wood framing with minimum 2 inch (51 mm) long, No. 11 gage [0.148 inch (3.75 mm) shaft diameter], $\frac{3}{8}$ inch (9.5 mm) diameter head] 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 shall be spaced a maximum of 6 inches (152 mm) on center and shall be of sufficient length to achieve a minimum 1 inch (25.4 mm) penetration into the wood framing. The use of staples shall be limited to installations where the wood species has a minimum specific gravity of 0.42. The lath shall 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 shall be of sufficient length to penetrate the steel framing members a minimum of $\frac{1}{4}$ inch (6.4 mm). The wire lath shall be applied with a minimum overlap between sheets of 1 inch (25.4 mm) at both ends and sides. The metal lath shall 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 weather-resistive barrier, lath and foam plastic board shall lap over the nailing leg of the flashing as shown in the standard weep screed details at the end of this report. Corrosion-resistant weep screeds shall be installed at all locations where the horizontal edge of the foam plastic board is exposed after application of the stucco coating. Corrosion-resistant casing beads shall be installed at all locations where the vertical edge of the foam plastic board is exposed after application of the stucco coating. The evaluation of the this 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 foam plastic board is permitted to be beveled at a 45 degree

angle as shown in the details at the end of this report. At building corners, the stucco is permitted to be installed with either a square or rounded detail as shown in the details at the end of this report. When a rounded corner detail is provided, the foam plastic boards shall be held back slightly at each corner and additional corner reinforcement is not required. Where square corners are provided, metal corner reinforcement shall be installed.

4.3 Application Over Solid Substrates

All solid substrates, except for concrete and unit masonry, shall be covered with a minimum of one layer of weather-resistive barrier as described in **Section 3.2.6** of this report and the metal lath described in **Section 3.2.3** of this report. The installation of foam plastic boards over solid substrates is optional and shall be governed by the conditions stated in this report. When foam plastic boards are installed over solid substrates, the length of the fasteners used to attach the lath shall be increased by the thickness of the foam boards.

The weather-resistive barrier, flashings, accessories, metal lath and coating shall be installed as described in **Section 4.0** and **Section 4.3** of this report. Foam plastic insulation installed prior to lath installation shall be a minimum $\frac{1}{2}$ inch (12.7) thick. When the system is installed over a foam plastic substrate, the weather-resistive barrier shall be installed over the EPS, except in areas adopting the *Standard Building Code* or *Uniform Building Code*, where the barrier is permitted to be installed behind the foam. When Tyvek StuccoWrap is used as the weather-resistive barrier, the barrier is permitted to be installed behind the foam for all applications. The installation of the weather-resistive barrier shall be as stated in **Section 4.1** of this report.

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

In addition to the requirements stated in this section, **Sections 4.3.1** through **4.3.5** of this report contain requirements specific to the use of the coatings over specific substrate types.

4.3.1 Exterior Gypsum Sheathing: Water-resistant core gypsum sheathing, complying with **Section 3.2.4.2** of this report, shall be installed directly to wood or steel framing with studs spaced a maximum of 24 inches (610 mm) on center. The gypsum sheathing shall be fastened to wood framing with minimum $\frac{1}{2}$ inch (38 mm) long, No. 11 gage [0.148 inch (3.75 mm) shaft diameter, 0.438 inch (11.1 mm) head diameter] galvanized roofing nails or No. 16 gage [0.0625 inch (1.59 mm)] shaft diameter]] galvanized staples spaced a maximum of 6 inches (152 mm) on center at the edges and at intermediate supports. For steel framing, the sheathing shall be attached to No. 20 gage [0.0359 inch thick (0.91 mm)] steel studs with No. 8-18, S-12 panhead, 1 inch long (25.4 mm), self-tapping screws spaced a maximum of 10 inches (254 mm) on center to all framing members.

4.3.2 Dens-Glass Gold Sheathing: Dens-Glass Gold sheathing, complying with **Section 3.2.4.3** of this report, shall be installed directly on wood or steel framing with studs spaced a maximum of 24 inches (610 mm) on center. The sheathing shall be fastened to wood or steel framing in accordance with the requirements contained in NER-574.

4.3.3 Fiberboard: Fiberboard sheathing, complying with **Section 3.2.4.4** of this report, shall be installed directly to wood or steel framing spaced a maximum of 24 inches (610 mm) on center. The walls shall be braced in accordance with the requirements of the applicable code. The fiberboard shall 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 (0.912 mm) thick studs], the lath shall be secured to framing using No. 8-18, S-12, panhead, self-tapping screws spaced a maximum of 6 inches (152 mm) on center.

4.3.4 Plywood: Plywood, complying with **Section 3.2.4.5** of this report, shall be applied directly to wood or steel framing. The plywood shall be fastened to wood framing with minimum 6d common nails or minimum No. 16 gage [0.0625 inch (1.59 mm) shaft diameter] staples with $\frac{7}{16}$ inch (11.1 mm) outside-diameter crowns, spaced a maximum of 6 inches (152 mm) on center at the edges and a maximum of 12 inches (305 mm) on center at intermediate supports. The plywood shall be applied to steel framing [minimum No. 20 gage, 0.0359 inch (0.912 mm) thick] in accordance with the applicable code.

4.3.5 Oriented Strand Board (OSB): The oriented strand board, complying with **Section 3.2.4.4** of this report, shall be installed to wood or steel framing. The OSB shall be fastened to wood framing as described in **Section 4.3.4** of this report for plywood.

4.3.6 Concrete and unit masonry: Concrete and unit masonry substrates shall comply with the requirements of the applicable code. The stucco and lath shall be applied as stated in **Section 4.0** and **Section 4.2** of this report, except that the minimum coating thickness is permitted to be $\frac{1}{4}$ inch (6.4 mm). Additionally, the weather-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 shall be embedded in the coating and shall be completely covered by the stucco coating.

4.4 FIRE-RESISTANCE-RATED ASSEMBLIES

The assemblies listed in **Sections 4.4.1** through **4.4.5** and shown in **Figure 3** list specific substrates. Any of the following substrates are permitted to be used independently or in combination with each other in any of these assemblies:

- One layer of $\frac{1}{2}$ inch (12.7 mm) thick water-resistant core gypsum sheathing.
- One layer of 1 inch (25.4 mm) thick foam plastic insulation.
- One layer of $\frac{7}{16}$ inch (11.1 mm) thick oriented strand board (OSB).
- One layer of $\frac{7}{16}$ inch (11.1 mm) thick plywood.

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

4.4.1.1 Interior Face: One layer of $\frac{5}{8}$ inch (15.9 mm) thick Type X gypsum wallboard, complying with ASTM C 36, shall be attached with the long edge parallel to nominal 2 by 4 inch (51×102 mm) wood studs with $\frac{15}{8}$ inch (41 mm) long 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 shall be a maximum of 16 inches (410 mm) on center or less. The joints and nail heads shall be covered with paper tape and gypsum compound. The stud cavities shall be filled with R-11 rock wool batt insulation having a minimum density of 1.45 lb/ft³ (23.2 kg/m³), or R-11 fiberglass insulation having a minimum density of 0.5 lb/ft³ (8.0 kg/m³).

4.4.1.2 Exterior Face: One layer of 1 inch (25.4 mm) thick foam plastic insulation with the material properties described in **Section 3.2.4.1** of this report. The substrates shall be installed on wood framing as described in **Section 4.1** and

Section 4.2 of this report. The weather-resistive barrier, flashings, lath and coating shall be applied to the substrate as described in **Section 4.1** and **Section 4.2** of this report.

4.4.1.3 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 on this system shall be limited to 1,100 pounds (4895 N) per stud, where:

F'_c = Allowable unit stress in compression parallel to the grain adjusted for le/d ratio.

le = Effective length of compression member, inches.

d = Least dimension, inches.

These design details are applicable only to the assembly described in **Section 4.4.1**.

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

4.4.2.1 Interior Face: One layer of $\frac{5}{8}$ inch (15.9 mm) thick Type X gypsum wallboard, complying with ASTM C 36, shall be attached with the long edge parallel to nominal 2 inch by 4 inch (51×102 mm) wood studs with $\frac{15}{8}$ inch (41 mm) long 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 shall be a maximum of 16 inches (410 mm) on center or less. The joints and nail heads shall be covered with paper tape and gypsum compound. The stud cavities shall be filled with R-11 rock wool batt insulation having a minimum density of 1.45 lb/ft³ (23.2 kg/m³), or R-11 fiberglass insulation having a minimum density of 0.5 lb/ft³ (8.0 kg/m³).

4.4.2.2 Exterior Face: One layer of $\frac{7}{16}$ inch (11.1 mm) thick oriented strand board (OSB) with the material properties described in **Section 3.2.4.6** of this report. The substrates shall be installed on wood framing as described in **Section 4.1** and **Section 4.3** of this report. The weather-resistive barrier, flashings, lath and coating shall be applied to the substrate as described in **Section 4.1** and **Section 4.3** of this report.

4.4.2.3 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 on this system shall be limited to 1,100 pounds (4895 N) per stud, where:

F'_c = Allowable unit stress in compression parallel to the grain adjusted for le/d ratio.

le = Effective length of compression member, inches.

d = Least dimension, inches.

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 $\frac{5}{8}$ inch (15.9 mm) thick Type X gypsum wallboard, complying with ASTM C 36, shall be attached with the long edge parallel to nominal 2 inch by 4 inch (51×102 mm) wood studs with $\frac{15}{8}$ inch (41 mm) long 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 shall be a maximum of 16 inches (410 mm) on center or less. The joints and nail heads shall be covered with paper tape and gypsum compound. The stud cavities shall be filled with R-11 rock wool batt insulation having a minimum density of 1.45 lb/ft³ (23.2 kg/m³), or R-11 fiberglass insulation having a minimum density of 0.5 lb/ft³ (8.0 kg/m³).

4.4.3.2 Exterior Face: One layer of $\frac{7}{16}$ inch (11.1 mm) thick plywood with the material properties described in **Section 3.2.4.5** of this report. The substrates shall be installed on wood framing as described in **Section 4.1** and **Section 4.3** of this report. The weather-resistive barrier, flashings, lath and coating shall be applied to the substrate as described in **Section 4.1** and **Section 4.3** of this report.

4.4.3.3 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 on this system shall be limited to 1,100 pounds (4895 N) per stud, where:

- F'_c = Allowable unit stress in compression parallel to the grain adjusted for le/d ratio.
 le = Effective length of compression member, inches.
 d = Least dimension, inches.

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 $\frac{5}{8}$ inch (15.9 mm) thick Type X gypsum wallboard, complying with ASTM C 36, shall be attached with the long edge parallel to nominal 2 inch by 4 inch (51×102 mm) wood studs with $1\frac{5}{8}$ inch (41 mm) long 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 shall be a maximum of 16 inches (410 mm) on center or less. The joints and nail heads shall be covered with paper tape and gypsum compound. The stud cavities shall be filled with R-11 rock wool batt insulation having a minimum density of 1.45 lb/ft³ (23.2 kg/m³), or R-11 fiberglass insulation having a minimum density of 0.5 lb/ft³ (8.0 kg/m³).

4.4.4.2 Exterior Face: One layer of $\frac{1}{2}$ inch (12.7 mm) thick water-resistant core gypsum sheathing with the material properties described in **Section 3.2.4.2** of this report. The substrates shall be installed on wood framing as described in **Section 4.1** and **Section 4.3** of this report. The weather-resistive barrier, flashings, lath and coating shall be applied to the substrate as described in **Section 4.1** and **Section 4.3** of this report.

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 on this system shall be limited to 1,600 pounds (7117 N) per stud, where:

- F'_c = Allowable unit stress in compression parallel to the grain adjusted for le/d ratio.
 le = Effective length of compression member, inches.
 d = Least dimension, inches.

These design details are applicable only to the assembly described in **Section 4.4.4**.

4.4.5 One-hour Non-Load-bearing Wall Assembly:

4.4.5.1 Interior Face: One layer of $\frac{5}{8}$ inch (15.9 mm) thick Type X gypsum wallboard complying with ASTM C36, water-resistant gypsum backing board complying with ASTM C 630, or gypsum veneer base complying with ASTM C 588, shall be applied horizontally to the interior face of wood studs with nominal dimensions of 2 inches by 4 inches (51×102 mm), spaced a maximum of 24 inches (610 mm) on center. The wallboard shall be attached with 6d coated nails complying with ASTM C 514 [$1\frac{7}{8}$ inch (48 mm) long, $\frac{1}{4}$ inch (6.4 mm) diameter heads] spaced a maximum of 7 inches (178 mm) on

center, at studs, plates and blocking. All wallboard joints shall be backed with minimum nominal 2 inch by 4 inch (51×102 mm) wood framing, and shall be taped and treated with joint compound. Fastener heads shall also be treated with joint compound.

4.4.5.2 Exterior Face: One layer of minimum $\frac{5}{8}$ inch (15.9 mm) thick, Type X, water-resistant core gypsum sheathing as described in **Section 3.2.4.2** of this report, 48 inches (1219 mm) wide, shall be applied parallel to studs and shall be fastened with No. 11 gage [0.148 inch (3.75 mm) shaft diameter, 0.438 inch (11.1 mm) head diameter] galvanized roofing nails, $1\frac{3}{4}$ inches (45 mm) long with $\frac{7}{16}$ or $\frac{1}{2}$ inch (11.1 or 12.7 mm) diameter 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 shall penetrate a minimum of 1 inch (25.4 mm) into studs. The weather-resistive barrier, flashings, lath and coating shall be applied to the substrate as described in **Section 4.1** and **Section 4.3** of this report.

4.5 NONCOMBUSTIBLE CONSTRUCTION

The stucco system is permitted for use on walls required to be of noncombustible construction, when the walls are constructed as follows:

4.5.1 Interior Finish: One layer of $\frac{5}{8}$ inch (15.9 mm) thick Type X gypsum wallboard, complying with ASTM C 36, is vertically applied to steel framing with blocked edges. The wallboard shall be fastened to framing with minimum 1 inch (25.4 mm) long, No. 8-18, S-12, self-tapping screws spaced a maximum of 6 inches (152 mm) on center. All board joints shall be taped and treated with joint compound. Fastener heads shall be covered with joint compound.

4.5.2 Steel Framing: Minimum $3\frac{5}{8}$ inch (92 mm) deep, No. 20 gage [0.0359 inch (0.91 mm) thick] steel framing. Studs shall be spaced a maximum of 16 inches (410 mm) on center.

4.5.3 Openings: Wall openings shall be framed with minimum No. 20 gage [0.0359 inch (0.91 mm)] metal.

4.5.4 Exterior Finish: One layer of minimum $\frac{1}{2}$ inch (12.7 mm) thick gypsum sheathing, attached to the framing as described in **Section 4.3.1** of this report. Combustible sheathing shall not be permitted.

4.5.5 Stud Cavity: R-11 fiberglass or rock wool batt, $3\frac{5}{8}$ inch (92 mm) thick, sized to friction-fit between studs.

4.5.6 Stucco: One layer of Pyro-Kure 600 vapor retarder, manufactured by Fortifiber, shall be applied over the gypsum sheathing with minimum 2 inch (51 mm) horizontal weather laps and maximum 6 inch (152 mm) vertical laps. The lath and coating shall be applied as noted in **Section 4.1** and **Section 4.3** of this report.

4.6 USE ON SHEAR WALLS

4.6.1 Interior face: Minimum $\frac{1}{2}$ inch (12.7 mm) thick gypsum wallboard, complying with ASTM C 36, fastened to nominal 2 inch by 4 inch (51×102 mm) wood studs at 16 inches (406.4 mm) on center. Fasteners shall be $1\frac{5}{8}$ inch (41.3 mm) long barbed gypsum wallboard nails fastened to framing at a maximum of 6 inches (152 mm) on center. Gypsum wallboard shall be placed horizontally or vertically, with edges blocked.

4.6.2 Exterior Face: The weather-resistive barrier, 1 inch (25.4 mm) thick foam plastic, lath and coating shall be applied in accordance with **Section 4.1**, **Section 4.2** and **Section 4.3** of this report.

4.6.3 Shear Value: The allowable shear value is 190 pounds per foot (2773 N/m) based on a 1:1 height-to-width ratio. In areas utilizing the *Uniform Building Code*, for structures in Seismic Zones 3 and 4, the allowable shear is limited to 95 pounds per foot (1314 N/m).

4.7 MISCELLANEOUS

4.7.1 Inspection Requirements: Lath inspection shall be conducted in accordance with the requirements of the applicable code.

4.7.2 Control Joints: Control joints shall be installed as specified on the construction documents. In the absence of details, control joints shall be detailed and installed in accordance with ASTM C 1063 for three-coat plaster, or as required by the applicable code.

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

4.7.4 Soffits: When applied over soffits, the coating shall be reinforced with metal lath complying with Section 703.6 of the *International Residential Code* or the applicable code. Metal lath fastening shall comply with the applicable model building code, except the fastener length shall be increased by the thickness of the substrates.

4.7.5 Sills: For sill depths of 6 inches (152 mm) or less, the coating and lath are applied over any substrate, provided the coating, lath, weather-resistive barrier, and substrate are installed in accordance with this report. Sills with depths exceeding 6 inches (152 mm) shall have solid wood or plywood substrates. The substrate shall be fastened in accordance with the requirements of the applicable code, and a double layer of a weather-resistive barrier shall be applied over the sill substrate. The weather-resistive barrier, coating, lath and optional foam plastic board shall be applied in accordance with **Section 4.1**, **Section 4.2** and **Section 4.3** of this report.

5.0 IDENTIFICATION

5.1 The factory prepared mix is deliverable to the job site in water-resistive bags with labels bearing the following information:

5.1.1 Name and address of manufacturer and the ICC-ES legacy report number.

5.1.2 Identification of components.

5.1.3 Weight of packaged mix.

5.1.4 Storage instructions.

5.1.5 Maximum amount of water and other components permitted, and conditions to be considered in determining the actual amounts added.

5.1.6 Curing instructions.

5.1.7 Concentrate or premix.

5.2 Foam plastic insulation shall be identified in accordance with Condition of Use 7.8 of this report.

6.0 EVIDENCE SUBMITTED

6.1 Reports of test, performed by Testing Consultants, Inc.:

6.1.1 Report of racking load tests in accordance with ASTM E 72, Report No. 090-06-053, dated June 27, 1989.

6.1.2 Report of freeze-thaw tests, Report No. 09-06-041, dated June 1, 1989.

6.1.3 Report of accelerated weathering tests in accordance with ASTM G 53, Report No. 09-07-059, dated July 15, 1989.

6.1.4 Report of transverse load tests in accordance with ASTM E 72, Report No. 09-95-140, dated May 30, 1989.

6.1.5 Letter from Testing Consultants, Inc. signed by J. Patrick Callahan, dated September 11, 1996, regarding the specific gravity of the lumber and the type of fasteners used in the load tests.

6.2 Report of compressive strength tests in accordance with ASTM C 109, by Western Technologies, Inc., dated April 26, 1990.

6.3 Installation details and instructions, prepared by Magna Wall.

6.4 Report of tests, performed by Ramtech Laboratories, Inc.:

6.4.1 Report of carbon-arc weatherometer tests in accordance with ASTM G 23, Report No. 9275-91, issued November 11, 1991.

6.4.2 Report of fire tests, Report No. 9583A-92 dated December 14, 1992, and amended December 21, 1992.

6.4.3 Report of fire test, Report No. 9838-93, dated July 23, 1993.

6.4.4 Report of fire tests, Report No. 9979-93, dated December 10, 1993.

6.5 Reports of tests, performed by Omega Point Laboratories:

6.5.1 Report of full scale fire-resistance tests in accordance with ASTM E 119, Project No. 9071-99413, dated February 16, 1996.

6.5.2 Reports of full scale fire-resistance tests in accordance with ASTM E 119, Project No. 9071-99559, May 6, 1996.

6.5.3 Report of full scale fire-resistance tests in accordance with ASTM E 119, by Project No. 9071-90722, dated October 15, 1990.

6.5.4 Report of noncombustibility tests in accordance with ASTM E 136, by Project No. 9071-93222, dated March 17, 1992.

6.5.5 Reports of full scale fire-resistance tests in accordance with ASTM E 119, Project No. 9071-104916, July 27, 1999.

6.5.6 Letter from Omega Point Laboratories, signed by Deggary Priest, dated November 18, 1996, indicating that extruded or expanded polystyrene, polyurethane or polyisocyanurate insulation can be used with the fire-resistance-rated assemblies noted in **Section 4.4** of this report.

6.6 Report of water penetration tests of wall panels conducted in accordance with ASTM E 331, by Southwest Research Institute, SwRI Project 06-7536-229, dated February 1996.

7.0 CONDITIONS OF USE

The ICC-ES Subcommittee for the National Evaluation Service finds that Magna Wall Fiber-reinforced Stucco Systems as described in this report comply with or are suitable alternates to those specified in the 2000 *International Building Code*[®], the 2000 *International Residential Code*[®], the 2001 *Supplement to the International Codes*[®], the BOCA[®] *National Building Code/1999*, the 1999 *Standard Building Code*[®], the 1997 *Uniform Building Code*[™] and the 1998 *International One- and Two-Family Dwelling Code*[®], subject to the following conditions:

- 7.1 The material and methods of installation shall comply with this report.
- 7.2 Installation shall be by contractors approved by Best Masonry and Tool Supply, LP.
- 7.3 The system shall be limited to combustible construction except as noted under **Section 4.5** of this report.
- 7.4 The system is recognized as a component of a one-hour fire-resistive assembly when complying with the assemblies described in **Section 4.4** of this report. The fire-resistive assemblies are limited to use on exterior walls where the fire exposure is from the exterior only.
- 7.5 When foam plastic boards are used with these products, the foam plastic shall be separated from the building interior with a thermal barrier of $\frac{1}{2}$ inch (12.7 mm) thick gypsum wallboard, applied in accordance with applicable code.

7.6 An installation card, as shown in **Figure 4** of this report, shall be left at the job site for the owner and a copy filed with the building department.

7.7 The allowable wind load on the system with wood or steel studs spaced a maximum 24 inches (610 mm) on center is 35 lbf/ft² (1.7 kPa) negative and 50 lbf/ft² (2.4 kPa) positive. Support framing shall be designed to resist the required design wind loads.

7.8 Foam plastic boards used with these products shall be labeled on units or packaging with the manufacturer's name and address, product name, flame-spread and smoke-developed indices, nominal density, and the name of the listing agency.

7.9 Foam plastic shall 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 Section 324.4 of the *International Residential Code* Section 2603.3 of the *Standard Building Code*, or Section 323.4 of the *International One- and Two-Family Dwelling Code*.

7.10 In jurisdictions adopting the *International Building Code*, *International Residential Code* or *BOCA National Building Code*, the weather-resistive barrier shall be installed over the foam plastic substrate, except where the foam plastic is installed over open framing or when Tyvek StuccoWrap is used as the weather-resistive barrier.

7.11 This report is subject to periodic re-examination. For information on the current status of this report, contact the ICC-ES.

FOAM PLASTIC INSULATION BOARD

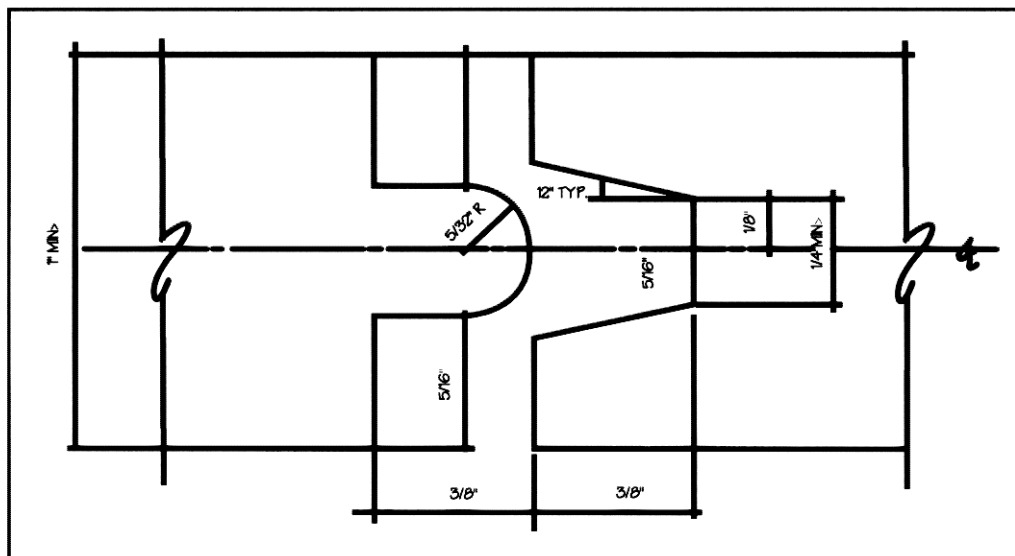
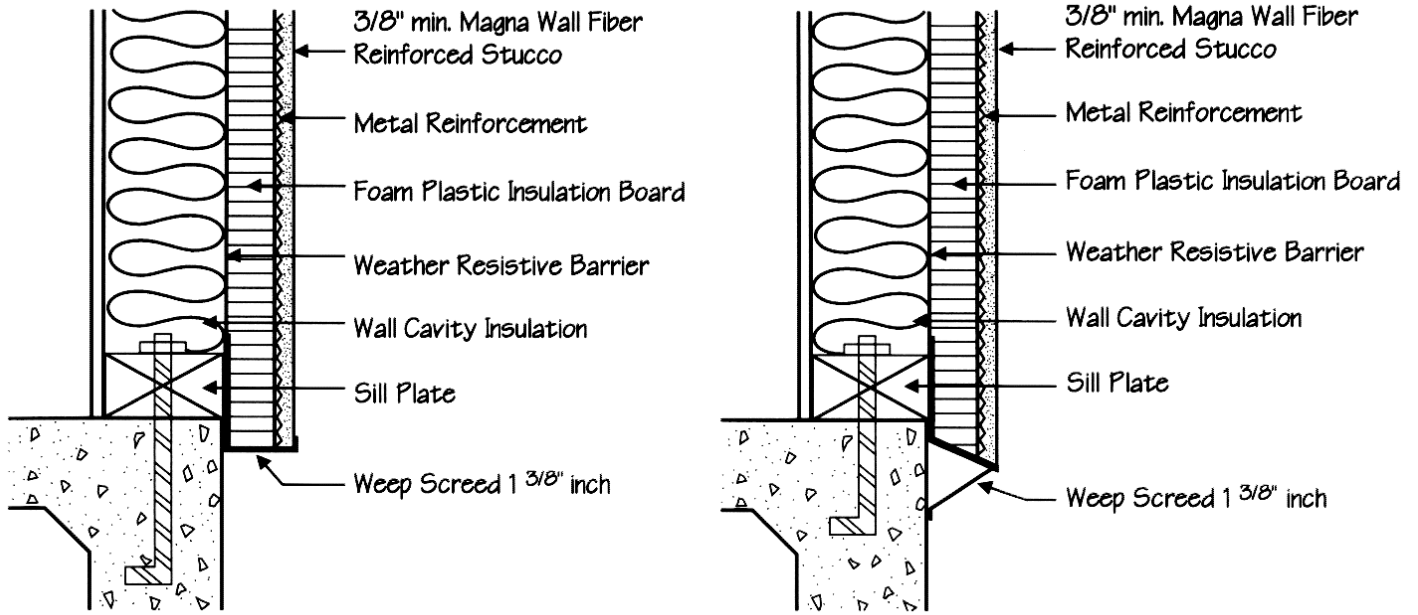


FIGURE 1*—TONGUE AND GROOVE DETAIL

WEEP SCREED — FOAM SUBSTRATE



WEEP SCREED — SOLID SUBSTRATE

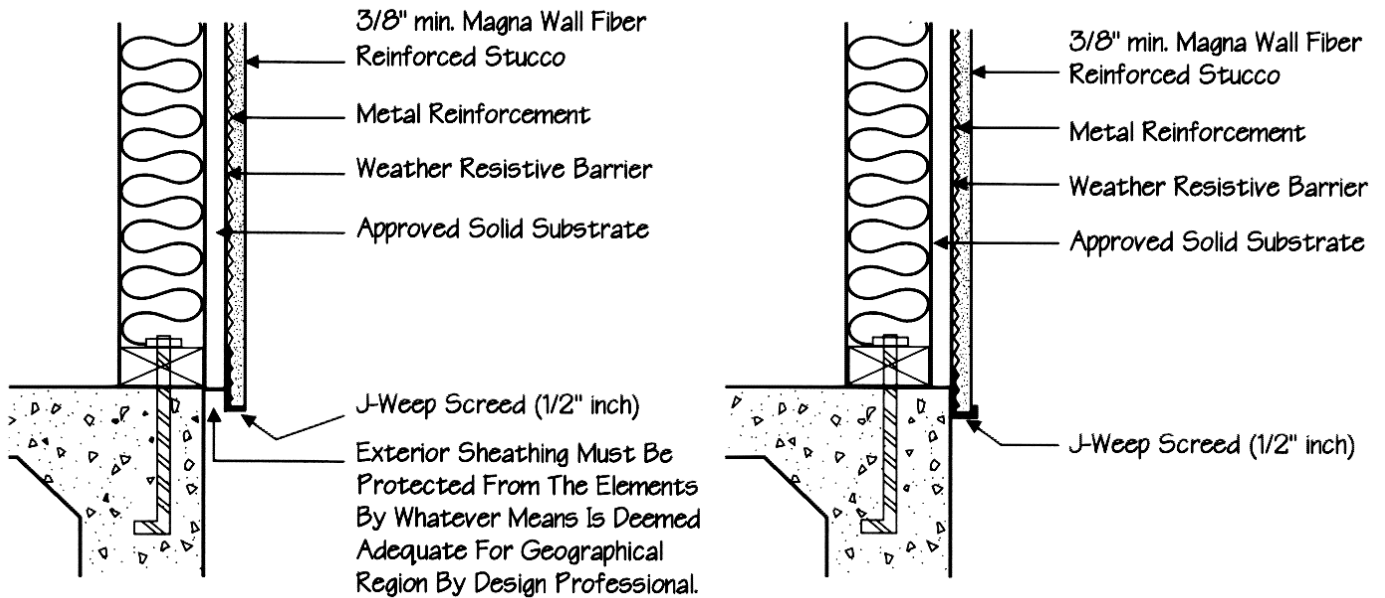
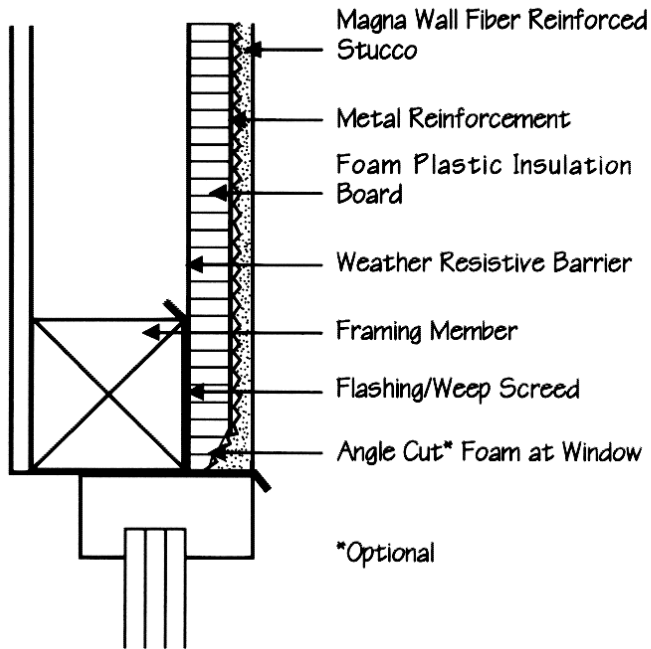
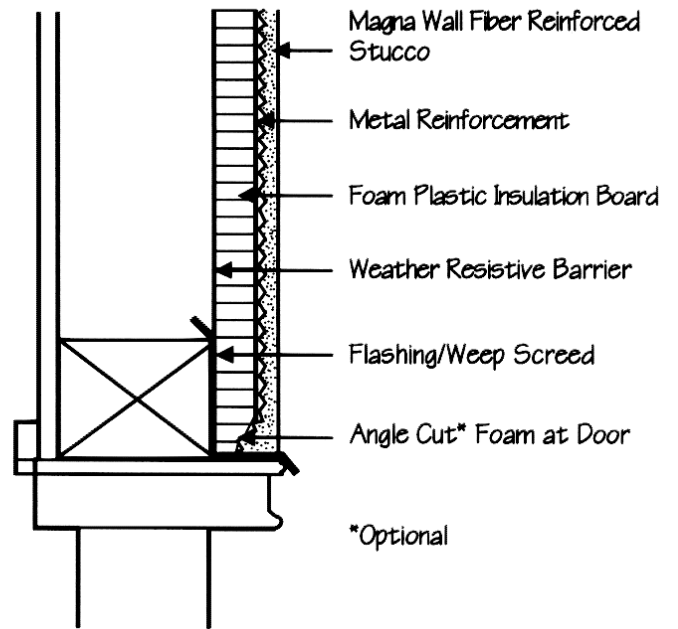


FIGURE 2*—TYPICAL INSTALLATION DETAILS

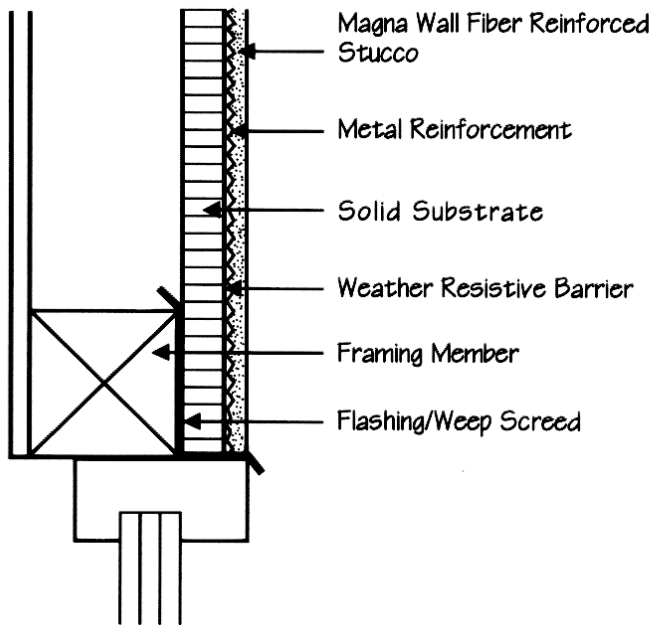
TYPICAL WINDOW — FOAM SUBSTRATE



TYPICAL DOOR — FOAM SUBSTRATE



TYPICAL WINDOW — SOLID SUBSTRATE



TYPICAL DOOR — SOLID SUBSTRATE

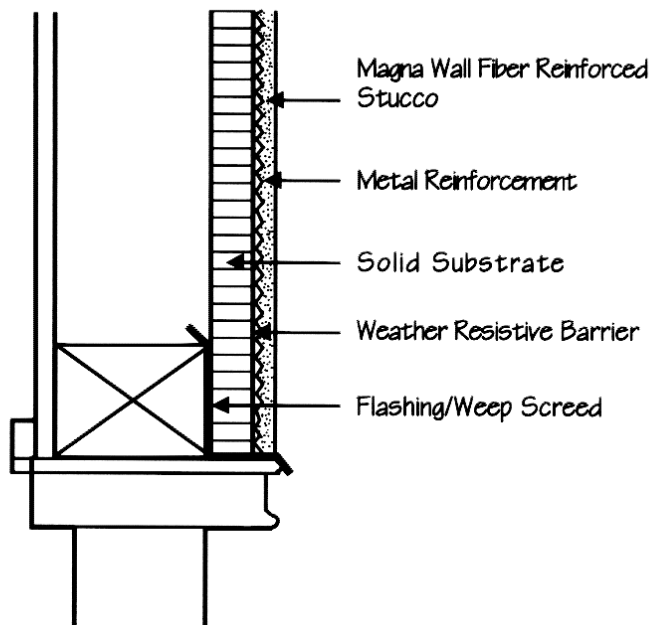


FIGURE 2*—TYPICAL INSTALLATION DETAILS (Continued)

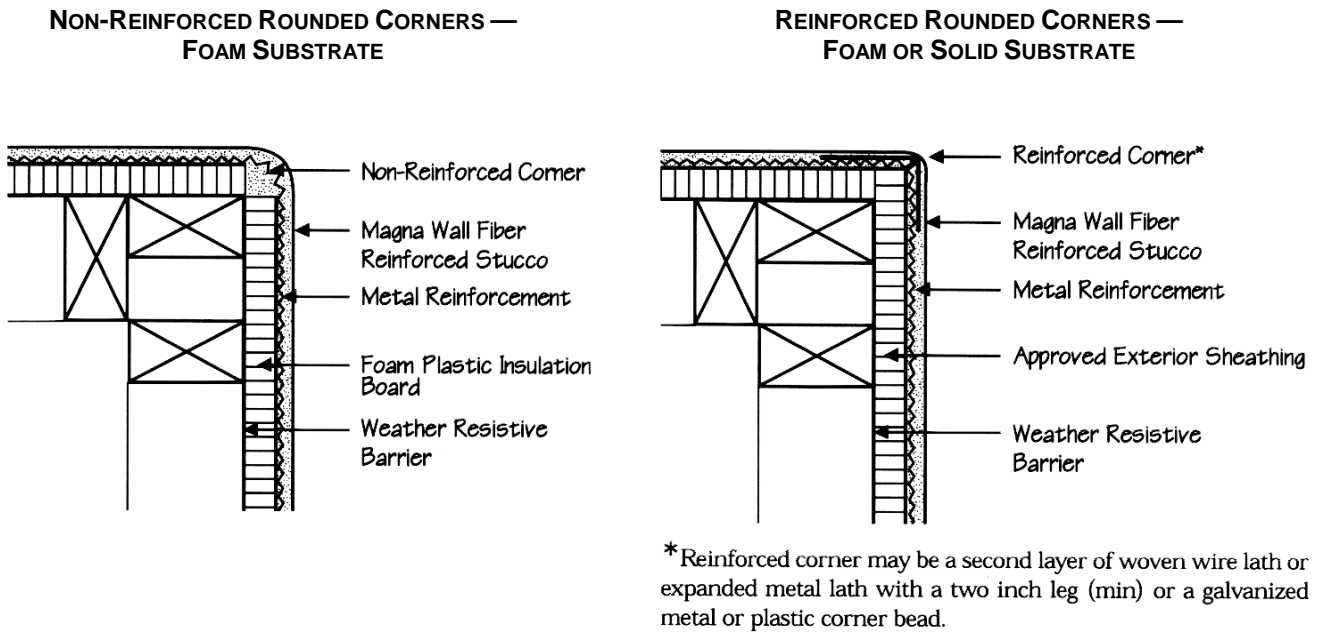
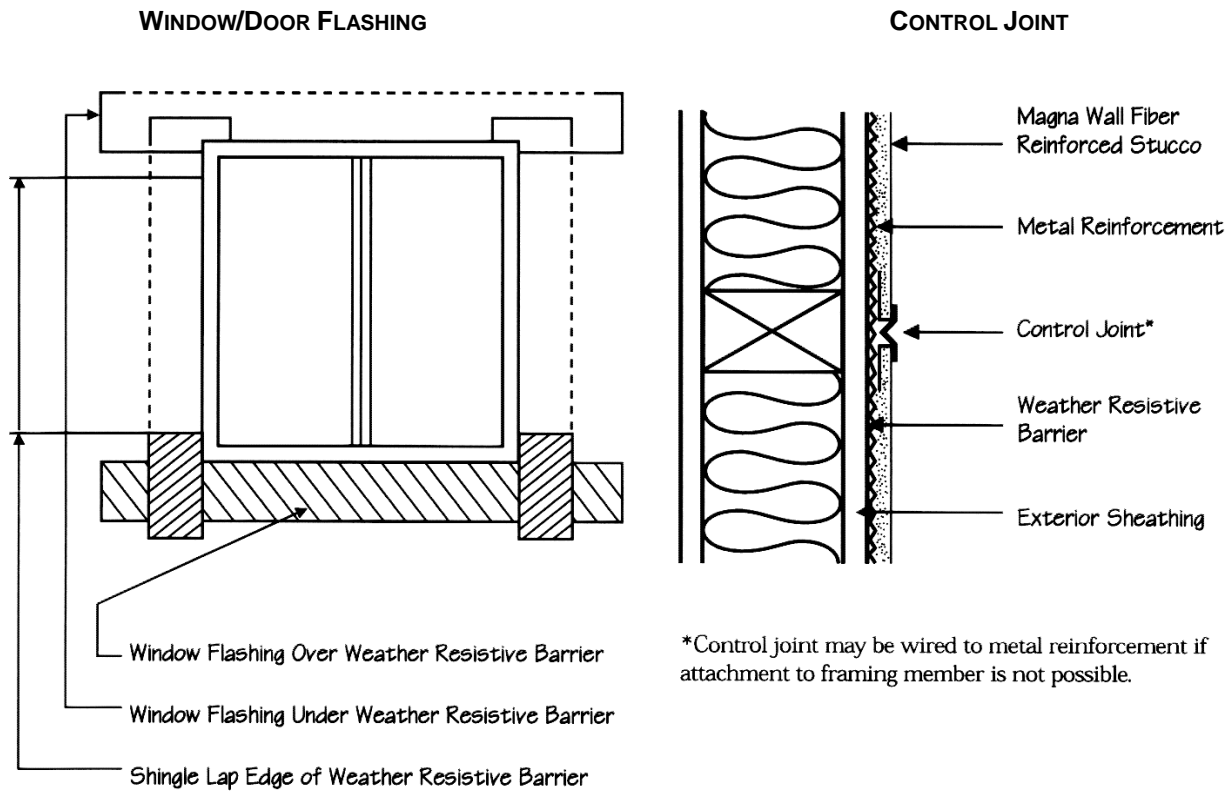
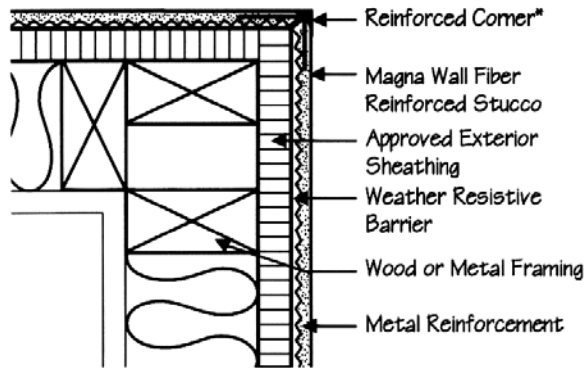


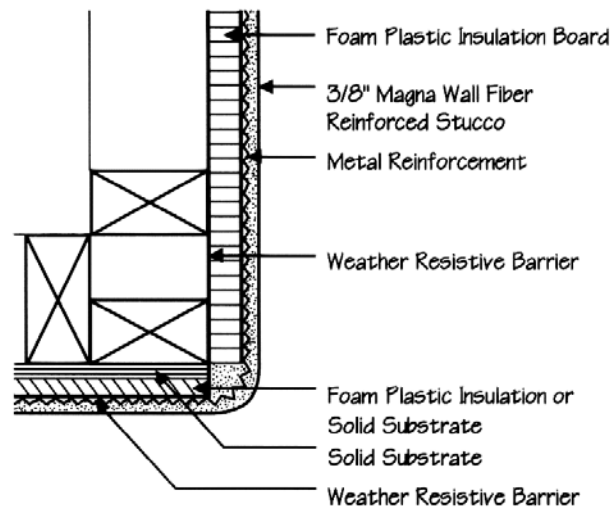
FIGURE 2*—TYPICAL INSTALLATION DETAILS (Continued)

SQUARE CORNER — FOAM OR SOLID SUBSTRATE

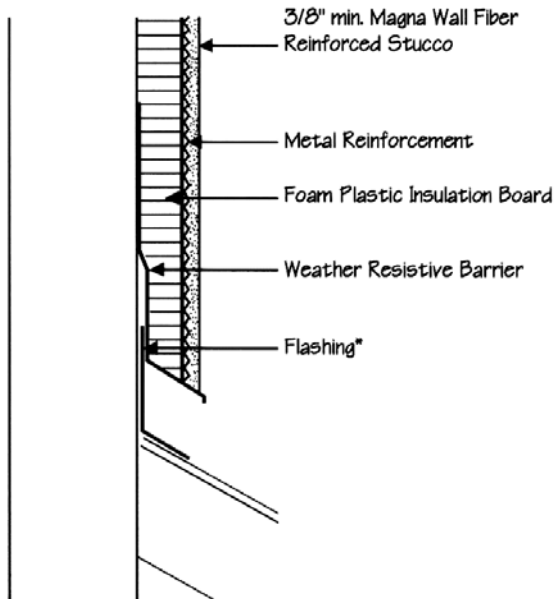


*Reinforced corner may be a second layer of woven wire lath or expanded metal lath with a two inch leg (min) or a galvanized metal or plastic corner bead.

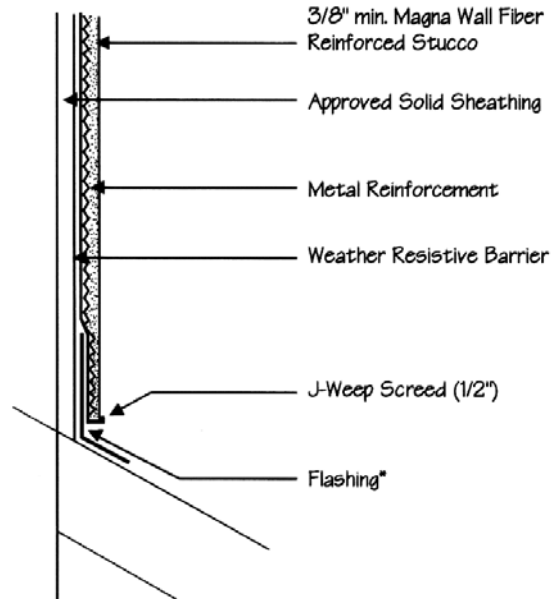
**NON-REINFORCED CORNER
DETAIL AT TRANSITION FROM OPEN
FRAMING TO SOLID SUBSTRATE**



TERMINATION AT FLASHING ON ROOF



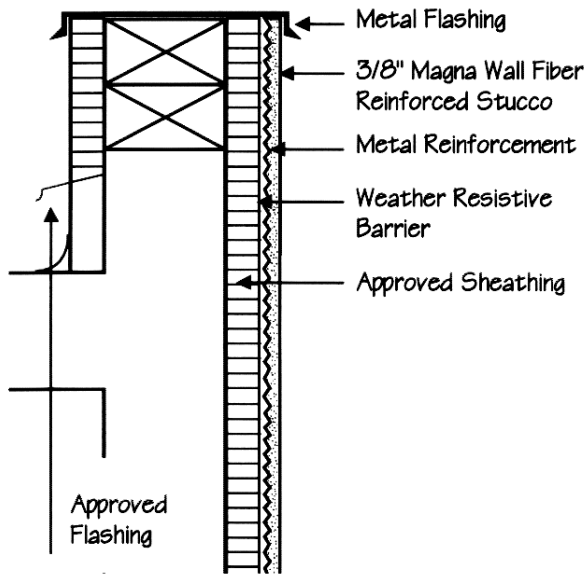
**TERMINATION AT FLASHING ON ROOF —
SOLID SUBSTRATE**



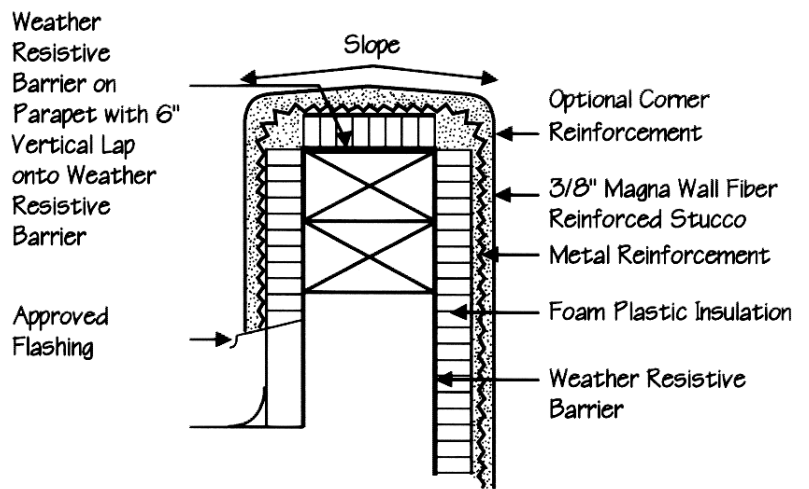
* Flashing is installed by others. Installation requires only shingle lap of the weather resistive barrier onto the approved flashing. Flashing materials and installation shall be in accordance with the code.

FIGURE 2*—TYPICAL INSTALLATION DETAILS (Continued)

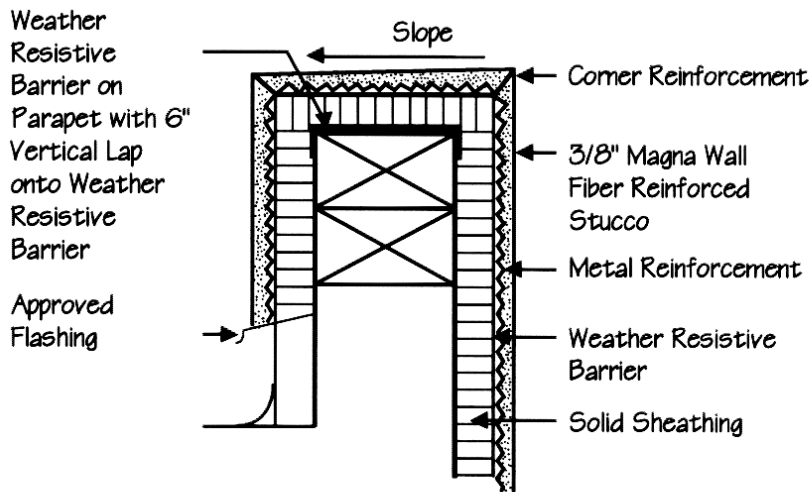
**PARAPET WITH METAL CAP
FOAM OR SOLID SUBSTRATE**



**PARAPET WITHOUT METAL
CAP FOAM OR SUBSTRATE**



**PARAPET WITHOUT METAL
CAP SOLID SUBSTRATE**



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

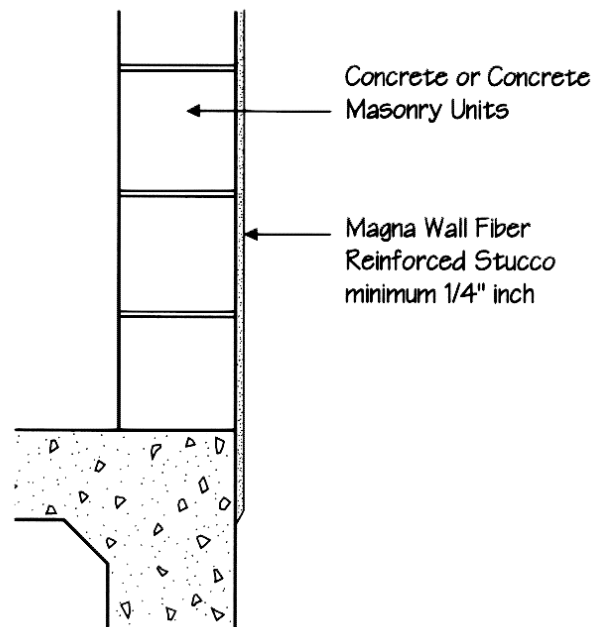
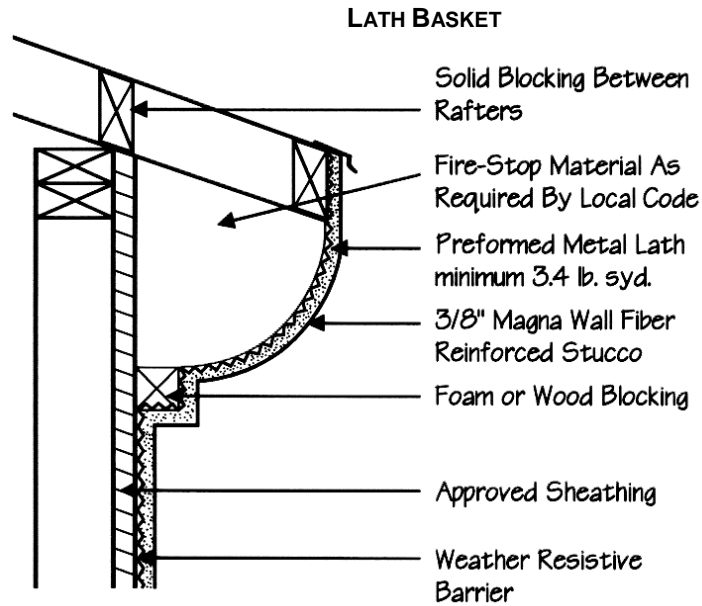


FIGURE 2*—TYPICAL INSTALLATION DETAILS (Continued)



Note: Shape and design of Lath Basket may vary

A WEEP SYSTEM FOR ONE-COAT STUCCO INSTALLATIONS

Vinyl tubes 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.

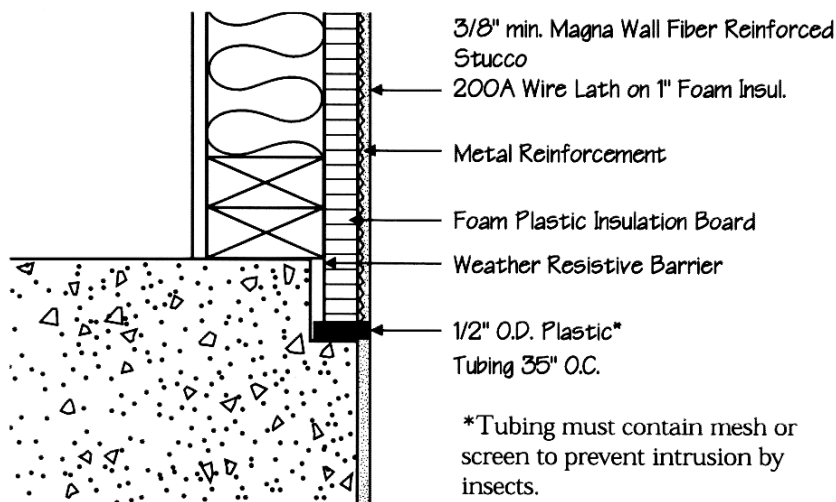
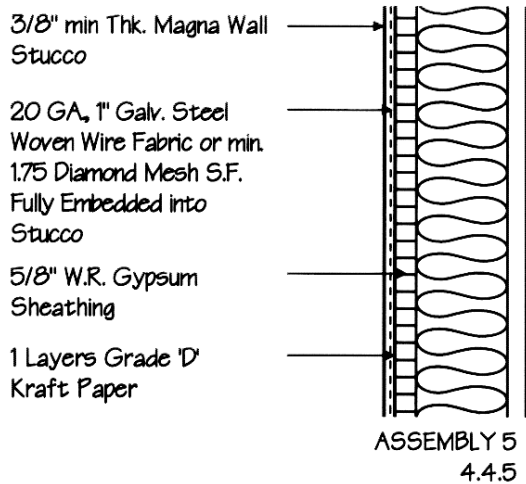
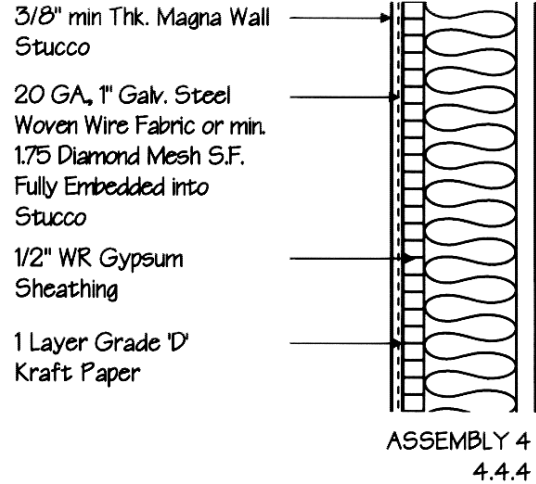
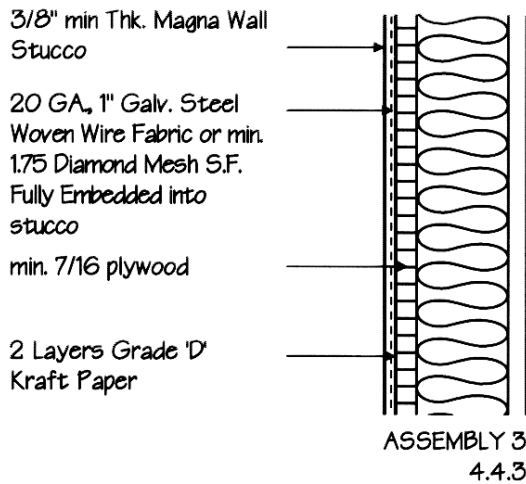
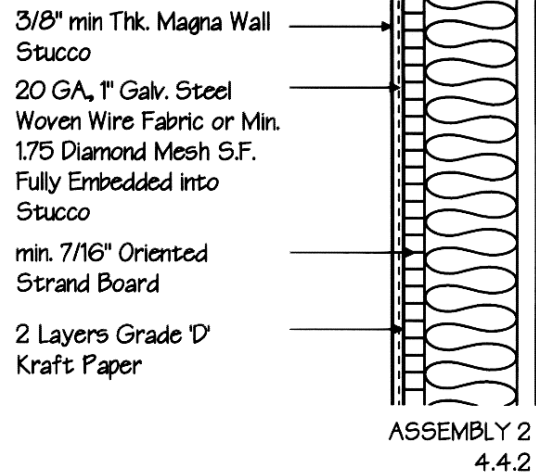
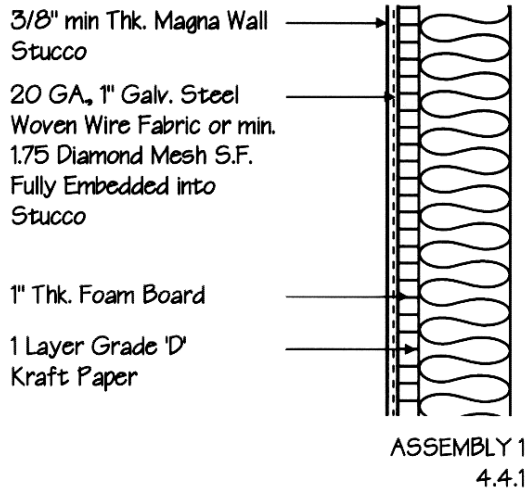


FIGURE 2*—TYPICAL INSTALLATION DETAILS (Continued)



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
MagnaWall Fiber Reinforced Stucco System
MagnaWall, Inc.

Job Address _____

National Evaluation Service
Report No. _____

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*

*THESE DRAWINGS ARE FOR ILLUSTRATION PURPOSES ONLY. THEY ARE NOT INTENDED FOR USE AS CONSTRUCTION DOCUMENTS FOR THE PURPOSE OF DESIGN, FABRICATION OR ERECTION.