

ICC-ES Evaluation Report

ESR-2706

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DIVISION: 09 00 00—FINISHES
Section: 09 24 00—Portland Cement Plaster

REPORT HOLDER:

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EVALUATION SUBJECT:

EXPO FIBREWall FIBER REINFORCED STUCCO SYSTEM

1.0 EVALUATION SCOPE
Compliance with the following codes:

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

Properties evaluated:

- Structural
- Durability
- Fire-resistance-rated construction
- Noncombustible construction

2.0 USES

The Expo FibreWall Fiber Reinforced Stucco System is an exterior cementitious one-coat stucco wall covering that is an alternative to exterior wall coverings 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 required to be Type I, II, III, or IV construction when installed in accordance with Sections 4.4 and 4.5, respectively.

3.0 DESCRIPTION
3.1 General:

The Expo FibreWall Fiber Reinforced Stucco System consists of a proprietary stucco mixture reinforced with wire fabric or metal lath applied over substrates of expanded polystyrene (EPS) or extruded polystyrene (XEPS) foam plastic insulation board, polyisocyanurate foam plastic board, gypsum sheathing board, fiberboard,

plywood, oriented strand board (OSB), concrete or masonry. The system may be installed on exterior walls of wood-framed or steel-framed construction.

3.2 Materials:

3.2.1 Expo FibreWall Fiber Reinforced Stucco: The stucco is supplied in factory-prepared mixtures of Type I or Type II portland cement complying with ASTM C 150, lime, chopped fibers, and proprietary additives. The dry cementitious mixture is packaged in 80-pound (36 kg) bags. Approximately 4½ to 6 gallons (17 to 23 L) of water and approximately 240 pounds (105 kg) of sand complying with Section 3.2.2 must be added to each bag and mixed in the field in accordance with the manufacturer's published installation instructions.

Alternatively, the stucco is supplied premixed with sand in 80-pound (36 kg) bags which are to be field-mixed with 1 to 1½ gallons (4 to 6 L) of water per bag or bulk-blended at a batching plant, delivered in a bulk-mixer to the jobsite and field-mixed with water. Bulk deliveries require the following:

1. The bulk-mixers must bear identification labels containing the Expo Stucco products name and address, the product name, and the evaluation report number (ESR-2706).
2. A signed certificate from the batching plant must accompany each batch and must state the plant name, jobsite address, date of manufacture, materials batched, quantity, and curing instructions. The ratio of batched amounts must be a nominal 240 pounds (108 kg) of sand to 80 pounds (36 kg) of mixture.
3. Procedures must be in place to prevent tampering with controls of the amount of mixture and sand combined.

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

3.2.2 Sand: Sand must be clean and free from deleterious amounts of loam, clay, silt, soluble salts and organic matter. Sampling and testing must comply with ASTM C 144 or ASTM C 897 or be within the following limits:

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

3.2.3 Insulation Board:

3.2.3.1 EPS and XEPS Board: EPS and XEPS insulation board must have nominal densities of 1.5 or 2.5 pounds per cubic foot (24 or 40 kg/m³), respectively, a flame-spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E 84 (UBC Standard 8-1), and must comply with ASTM C 578 as Type VII. Boards must be recognized in a current ICC-ES evaluation report. See Sections 7.2 and 7.3 for board identification.

Boards installed without sheathing, over open framing, must have a thickness ranging from 1 inch to 1½ inches (25 to 38 mm) and have ¾-inch-high (9.5 mm) tongues with compatible grooves for horizontal joints. See Figure 1 for joint detail.

Boards installed over wood-based sheathing as part of a water-resistive barrier, as described in Section 3.2.11.1, must have tongue-and-grooves on the horizontal edges as detailed in Figure 1, with a minimum thickness of 1 inch (25.4 mm). When installed over gypsum sheathing, as described in Section 4.3.3, the boards must have a minimum thickness of ½ inch (12.7 mm).

When foam plastic insulation boards are used over solid substrates as described in Section 4.3, the boards must have ¼-inch-wide-by-⅛-inch-deep (6.4 mm by 3.2 mm) channels spaced 12 inches (305 mm) on center on the back face of the boards.

As an alternative to the vertical channels on the foam plastic board, installation of flat-faced boards over a solid sheathing may incorporate the Tyvek StuccoWrap water-resistive barrier recognized in [ESR-2375](#).

3.2.3.2 Polyisocyanurate Foam Plastic Board: Polyisocyanurate foam plastic board must have a minimum nominal density of 2 pounds per cubic foot (32 kg/m³), and a flame-spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E 84 (UBC Standard 8-1). The foam plastic board must have a thickness ranging from 1 inch to 1½ inches (25 to 38 mm) and have ¾-inch-high (9.5 mm) tongues with compatible grooves for horizontal joints, and is limited to nonfire-rated and combustible constructions. See Figure 1 for joint details. All polyisocyanurate foam plastic boards must be recognized in a current evaluation report as complying with ASTM C 1289 Type 11, and are limited to use over solid sheathing with Tyvek Stucco Wrap.

3.2.4 Lath:

3.2.4.1 Wire Fabric Lath: Wire fabric lath must comply with the ICC-ES Acceptance Criteria for Metal Plaster Bases (Lath) (AC191). Minimum No. 20 gage [0.035 inch (0.89 mm)], 1-inch (25.4 mm) galvanized steel, woven-wire fabric must be used. Lath must be furred when applied over all substrates except unbacked EPS insulation board. Furring must comply with the following requirements:

1. When maximum total coating thickness is ½ inch (12.7 mm) or less, the body of the lath must be furred a minimum of ⅛ inch (3.2 mm) from the substrate after installation.
2. When total coating thickness is greater than ½ inch (12.7 mm), No. 17 gage [0.058 inch (1.47 mm)] by 1½-inch (38 mm) woven-wire fabric lath must be used. The body of the lath must be furred a minimum of ¼ inch (6.4 mm) from the substrate after installation.

3.2.4.2 Metal Lath: Metal lath must comply with AC191 and either IBC Table 2507.2, IRC Section R703.6 or UBC Table 25-B. Furring requirements are as set forth in Section 3.2.4.1.

3.2.4.3 No. 19 by 20 Gage Structural SF CR: This lath is permitted as an alternative to the No. 20 gage [0.035

inch (0.89 mm)] 1-inch (25.4 mm) galvanized steel, woven wire fabric lath.

3.2.5 Gypsum Board: The gypsum sheathing must be water-resistant core-treated gypsum sheathing complying with ASTM C 79 or ASTM C 1396. Gypsum wallboard must comply with ASTM C 36 or ASTM C 1396.

3.2.6 Backerboard: The backerboard must be water-resistant gypsum backerboard complying with ASTM C 630.

3.2.7 Veneer Base: The veneer base must be gypsum veneer base complying with ASTM C 588.

3.2.8 Fiberboard: The fiberboard must be a minimum ½-inch-thick (12.7 mm), asphalt-impregnated fiberboard complying with ASTM C 208 as Type IV wall sheathing.

3.2.9 Wood-based Structural Panels: The panels must be a minimum of 5/16 inch thick (7.9 mm) for studs spaced 16 inches (406 mm) on center, and a minimum of 3/8 inch thick (9.5 mm) for studs spaced 24 inches (610 mm) on center. Plywood is exterior-grade or Exposure 1 complying with DOC PS-1 or UBC Standard 23-2, as applicable. OSB must comply as Exposure 1 with DOC PS-2 or UBC Standard 23-3, as applicable.

3.2.10 Caulking: The caulking must be either acrylic latex caulking material complying with ASTM C 834 or polyurethane, polyurethane modified, polysulfide or silyl-terminated polyether elastomeric sealant complying with ASTM C 920.

3.2.11 Weather Protection:

3.2.11.1 Water-resistive Barrier: A water-resistive barrier is required and must comply with IBC Section 1404.2, IRC Section 703.2 or UBC Section 1402.1, as applicable. Minimum No. 15 asphalt nonperforated felt (IBC or IRC); minimum Grade D Kraft building paper complying with UBC Standard 14.1, asphalt-saturated felt complying with UL Standard 55 A (UBC) or material recognized in a current ICC-ES evaluation report as complying with the ICC-ES Acceptance Criteria for Water-resistive Barriers (AC38), is required.

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

1. A minimum of two layers of Grade D Kraft building paper complying with UBC Standard 14-1 as set forth in IBC Section 2510.6 or IRC Section R703.6.3; or an equivalent recognized in a current ICC-ES evaluation report.
2. One layer of EPS or XEPS insulation board having horizontal tongue-and groove edges, as described in Section 3.2.3 of this report, over one layer of Grade D kraft building paper, recognized in a current ICC-ES evaluation report, with a minimum water-resistance rating of 60 minutes.

When Tyvek StuccoWrap, recognized in [ESR-2375](#), is used as the water-resistive barrier, grooved insulation boards as described in Section 3.2.3.1 are not required. The Tyvek StuccoWrap must be installed as described in [ESR-2375](#).

3.2.11.2 Vapor Retarder: A vapor retarder must be provided in accordance with 2009 IBC Section 1405.3, 2009 IRC Section R601.3, or 2006 IRC Section 318.1 unless its omission is permitted under the exceptions in 2009 IBC Section 1405.3, 2009 IRC Section R601.3 or 2006 IRC Section R318.1.

3.2.11.3 Flashing: Flashing complying with 2009 IBC Section 1405.4, 2006 IBC Section 1405.3, IRC Section R703.8 or UBC Section 1404.2, as applicable, must be provided. Where membrane flashing is used, it must be a self-adhering, flexible rubberized asphalt and polyethylene

material, 0.030 inch (0.8 mm) thick, shingle-lapped with the water-resistive barrier. Rigid flashings must be sloped towards the exterior, with an upturned leg on the interior side and at the ends. Flashing must extend beyond the surface of the exterior wall.

3.2.12 Finish Coat: Portland cement color coat, paints, acrylic textured finishes and elastomeric coatings are finishes that are acceptable to Expo Stucco Products. The finish coat manufacturer's published recommendations must be followed regarding the base-coat preparations, bonding, application and curing.

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

4.0 INSTALLATION

4.1 General:

Installation of Expo Fibrewall Fiber Reinforced Stucco Systems must comply with this report and the manufacturer's published installation instructions. The manufacturer's published installation instructions must be available at the jobsite at all times during installation.

The exterior cementitious coating must be applied, by hand-troweling or machine-spraying in one or two coats, to a minimum thickness of $\frac{3}{8}$ inch (9.5 mm). The lath must be fully embedded in the nominal coating thickness and unexposed. An exterior stucco finish coat, if required, may be applied within 72 hours of base-coat application. The ambient air temperature range for application of the coating must be between 40°F and 110°F (4°C and 43°C). The coating must be applied by applicators approved by Expo Stucco Products. An installation card, as shown in Figure 3, must be completed and signed by the applicator, and must be on the jobsite before any water-resistive barrier or exterior sheathing is installed.

4.2 Application over Open Framing:

The water-resistive barrier must be attached, as set forth in Section 3.2.11.1, to open wood studs spaced a maximum of 24 inches (610 mm) on center. The EPS board or polyisocyanurate foam plastic described in Section 3.2.3 must be placed horizontally with tongues faced upward, and be temporarily held in place with galvanized staples or roofing nails. Vertical butt joints staggered a minimum of one stud space from adjacent courses must occur directly over studs. The lath must be applied tightly, with $1\frac{1}{2}$ -inch (38 mm) end and side laps, over the insulation board and fastened through the insulation board and water-resistive board to wood studs, sills and plates. For staple spacing for various wood species and staple gages, see Table 1. Care must be taken to avoid over-driving fasteners. Fasteners must penetrate wood framing at least 1 inch (25.4 mm). Wall bracing in accordance with IBC Section 2308.9.3 or 2308.12, 2009 IRC Section R602.10, 2006 IRC Section R602.10 or R602.11 or UBC Section 2320.11.3 or 2320.11.4, or an alternate approved by the code official, must be provided. Outside wall corners and parapet corners must be covered with additional metal corner reinforcement as shown in Figure 2. Weep screeds must comply with, and be installed at the bottom of the wall in accordance with, IBC Section 2512.1.2, IRC Section R703.6.2.1 or UBC Section 2506.5. Galvanized steel, $1\frac{3}{8}$ -inch (35 mm), J-shaped trim pieces must be installed at other areas where foam is exposed. At windows and doors, butting J-trim metal edges must be caulked. Holes for hose bibbs, electrical panels and other penetrations of substrate surfaces, except those caused by fasteners, must also be caulked. The coating must be applied as described in Section 4.1.

Application to minimum No. 20 gage [0.035 inch (0.89 mm)] steel studs is similar, except the lath must be fastened with No. 6, Type S screws at 6 inches (152 mm) on center. Screws must penetrate studs a minimum of $\frac{1}{4}$ inch (6.4 mm). Steel stud spacing must not exceed 24 inches (610 mm) on center.

4.3 Application over Solid Substrates:

4.3.1 Fiberboard: Minimum $\frac{1}{2}$ -inch-thick (12.7 mm) fiberboard sheathing must be installed directly over wood studs spaced a maximum of 16 inches (406 mm) on center. The fiberboard must be temporarily held in place with corrosion-resistant staples or roofing nails. A water-resistive barrier as set forth in Section 3.2.11 must be applied over the fiberboard prior to installation of the optional insulation board and wire fabric or metal lath.

When an optional layer of foam plastic insulation board is used, either Tyvek StuccoWrap or Tyvek DrainWrap, as recognized in [ESR-2375](#), must be used as a water-resistive barrier, or grooved foam plastic insulation board as described in Section 3.2.3 may be used. The grooves in the foam plastic insulation must face the water-resistive barrier and be aligned vertically, but grooves may be offset a maximum of 6 inches (152 mm) from adjacent boards.

The vertical joints of the insulation board must be staggered from adjacent courses a minimum of 3 inches (76 mm). Insulation board must be attached to the framing, but the vertical joints of the insulation board are not required to align with the framing. The wire fabric or metal lath must be attached to the studs through the water-resistive barrier and sheathing, with the more restrictive fastener and spacing requirements as described for insulation boards in Section 4.2.1 or the code-applicable requirements indicated in IBC Table 2304.9.1, IRC Table R602.3 (1) or UBC Table 23-II-B-1. Wood framing must be of a species having a specific gravity of 0.50 or greater, such as Douglas fir-larch. All walls must be braced in accordance with the applicable code. Outside wall corners and parapet corners must be covered with additional metal corner reinforcement as shown in Figure 2. Weep screeds must comply with, and be installed at the bottom of the wall in accordance with, IBC Section 2512.1.2, IRC Section R703.6.2.1 or UBC Section 2506.5. Galvanized steel, $1\frac{3}{8}$ -inch (35 mm), J-shaped trim pieces must be installed at other areas where foam is exposed. At windows and doors, butting J-trim metal edges must be caulked. Holes for hose bibbs, electrical panels and other penetrations of substrate surfaces, except those caused by fasteners, must also be caulked. The coating must be applied as described in Section 4.1.

The system may also be applied to minimum No. 20 gage [0.036 inch thick (0.914 mm)] steel studs spaced a maximum of 24 inches (610 mm) on center. System application is similar to that for wood studs, except No. 8, 0.161-inch-diameter-shank (0.41 mm), 0.420-inch-diameter head (10.7 mm), minimum $1\frac{3}{4}$ -inch-long (44.5 mm), self-tapping screws secure the lath and sheathing. Screw penetration must be a minimum of $\frac{1}{4}$ inch (6.4 mm) beyond the steel stud.

4.3.2 Wood-based Structural Sheathing: Application of plywood or OSB must comply with IBC Tables 2304.9.1 and 2308.9.3(3), IRC Tables R602.3(1) and R602.3 (3) or UBC Table 23-IV-D-1, and the material must be applied directly to wood or steel studs. The panels must be minimum $\frac{3}{8}$ -inch-thick (9.5 mm) plywood or OSB with exterior glue, for studs spaced 16 inches (406 mm) on center, and must be minimum $\frac{5}{8}$ -inch-thick (15.9 mm) plywood for studs spaced 24 inches (610 mm) on center. The water-resistive barrier, optional insulation board, lath and coating must be applied as described in Section 4.3.1.

4.3.3 Gypsum Sheathing: Minimum $\frac{1}{2}$ -inch-thick (12.7 mm), water-resistant core-treated gypsum sheathing may be installed directly on wood or steel studs in a manner similar to that described in Section 4.3.1. The sheathing may also be installed on No. 20 gage [0.036 inch (0.914 mm) thick] steel studs and fastened in accordance with IBC Table 2508.1, IRC Table R702.3.5 or UBC Table 25-G. A water-resistive barrier is required over the gypsum sheathing prior to installation of the optional foam board, lath and coating as described in Section 4.3.1.

4.3.4 Concrete and Masonry: Surface preparation must be in accordance with the applicable code, and the surface must be clean and free of dust, oil, or other contaminants. Surfaces must have good surface absorption and surface roughness to ensure proper bonding. The Fibrewall coating must be applied directly to the prepared surface at a minimum thickness of $\frac{3}{8}$ inch (9.5 mm) in accordance with applicable provisions of Section 4.2.

4.4 One-hour Fire-resistance-rated Wall Assemblies:

4.4.1 First Assembly:

4.4.1.1 Interior Face: One layer of $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum board, water-resistant backerboard or veneer base must be applied parallel or at right angles to the interior face of 2-by-4 wood studs (minimum 0.36 specific gravity) spaced a maximum of 24 inches (610 mm) on center. The gypsum boards must be attached using 6d coated nails, $1\frac{7}{8}$ inches (48 mm) long and with $\frac{1}{4}$ -inch-diameter (6.4 mm) heads, at 7 inches (178 mm) on center to studs, plates and blocking. All gypsum board joints must be backed with wood framing and must be taped and treated with joint compound in accordance with ASTM C 840 or GA216. Fastener heads must be treated with joint compound in accordance with ASTM C 840 or GA216.

4.4.1.2 Exterior Face: One layer of minimum $\frac{5}{8}$ -inch-thick (15.9 mm), 48-inch-wide (1219 mm), Type X, water-resistant core gypsum sheathing is applied vertically to studs using No. 11 gage galvanized roofing nails, $1\frac{3}{4}$ inches (44.5 mm) long and with a $\frac{7}{16}$ - or $\frac{1}{2}$ -inch-diameter (11.1 or 12.7 mm) heads, at 4 inches (102 mm) on center at board edges and 7 inches (178 mm) on center at intermediate studs. The sheathing must be nailed to top and bottom plates at 7 inches (178 mm) on center. A water-resistive barrier complying with Section 3.2.11 must be installed over the sheathing. The wire fabric lath and wall coating must be applied without insulation board as described in Section 4.2.

4.4.1.3 Axial Load Design: Axial loads applied to the wall assembly must be limited to the lesser of the following:

1. The wood stud axial design stress for the wall assembly calculated in accordance with Sections 3.6 and 3.7 of ANSI AF&PA NDS-05 (IBC and IRC) or ANSI/NFoPA NDS-91 (UBC) is limited to $0.78 F'_c$.
2. The maximum stress must not exceed $0.78 F'_c$ at a maximum l_e/d ratio of 33.

4.4.2 Second Assembly:

4.4.2.1 Interior Face: One layer of $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum board must be applied horizontally to wood studs (minimum 0.50 specific gravity) spaced a maximum of 16 inches (406 mm) on center. The board must be attached, using 5d coated nails, $1\frac{7}{8}$ inches long (48 mm), and having $1\frac{5}{64}$ -inch-diameter (6 mm) heads, at 6 inches (152 mm) on center at board edges and at studs and blocking. All board joints must be backed by wood framing and taped and treated with joint compound in accordance with ASTM C 840 or GA216. Friction-fitted between the studs is either minimum R13 rock wool insulation batts, $3\frac{1}{2}$ inches (93 mm) thick and with a

minimum 1.3-pound-per-cubic-foot (23 kg/m³) density, or R11 fiberglass insulation having a minimum density of 0.5 pound per cubic foot (8 kg/m³). Fastener heads and sheathing joints must be treated with joint compound in accordance with ASTM C 840 or GA216.

4.4.2.2 Exterior Face: A water-resistive barrier complying with Section 3.2.11.1 is applied over the stud face, followed by 1-inch-thick (25.4 mm), 1.5 pcf density (24kg/m³) EPS board applied as described in Section 3.2.1. The No. 20 gage woven-wire mesh is then fastened through the EPS board to the wood framing with No.11 galvanized nails, 2 inches (51 mm) long and with $\frac{3}{8}$ -inch-diameter (9.5 mm) heads. Nail spacing must be 6 inches (152 mm) on center for studs and plates. Lath must be lapped a minimum of 2 inches (51 mm). The Expo Fibrewall coating is applied in accordance with Section 3.2.1.

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

1. 1,150 pounds (5115 N) per stud.
2. A maximum of 54 percent of the load calculated in accordance with Sections 3.6 and 3.7 of the ANSI/AF&PA NDS-05 (IBC and IRC) or a maximum of 44 percent of the load calculated in accordance with ANSI/NFoPA NDS-91 (UBC), as applicable.
3. Design stress of $0.78 F'_c$ calculated in accordance with Sections 3.6 and 3.7 of the ANSI/AF&PA NDS-05 (IBC and IRC) or ANSI/NFoPA NDS-91 (UBC), as applicable.
4. Design stress of $0.78 F'_c$ at a maximum l_e/d of 33 calculated in accordance with Sections 3.6 and 3.7 of the ANSI/AF&PA NDS-05 (IBC and IRC) or ANSI/NFoPA NDS-91 (UBC), as applicable.

4.4.3 Third Assembly

4.4.3.1 Interior Face: One layer of $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum board must be applied to nominally 2-by-4 wood studs spaced a maximum of 24 inches (610 mm) on center, horizontally with the board's long dimension. Horizontal solid blocking must be installed at the wall mid-height. The board must be attached with $1\frac{7}{8}$ -inch-long (48 mm) cupped-head gypsum board nails with 0.30-inch-diameter (7.62 mm) heads and 0.10-inch-diameter (0.254 mm) shanks. The fasteners must be spaced a maximum of 7 inches (178 mm) on all studs, plates and blocking. Board joints must be covered with paper tape and gypsum joint compound in accordance with ASTM C 840 or GA216. Fastener heads must also be treated with joint compound in accordance with ASTM C 840 or GA216. Kraft-paper-faced, minimum $3\frac{1}{2}$ -inch-thick (89 mm), R-11, fiberglass batt insulation complying with IBC Section 719, IRC Section R316, or UBC Section 707.3 must be installed in the cavity of the wall. Insulation must have a minimum density of 0.65 pound per cubic foot (10.41 kg/m³). Fastener heads must also be treated with joint compound in accordance with ASTM C 840 or GA216.

4.4.3.2 Exterior Face: Any of the following substrates are permitted for use:

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

The substrates are as described in Section 3.2.5 or 3.2.9, and must be installed on the wood framing as described in Section 4.3.2 or 4.3.3, as applicable. Horizontal joints in the exterior face sheathing must be

offset 24 inches (610 mm) from horizontal joints of the gypsum wallboard on the opposite wall face. A water-resistant barrier complying with the applicable code and the lath and wall coating must be installed as described in this report.

4.4.3.3 Axial Load Design: Axial loads applied to the wall assembly are limited to the least of the following:

1. 1,100 pounds (4895 N) per stud.
2. A maximum of 47.5 percent of the load calculated in accordance with Sections 3.6 and 3.7 of the ANSI/AF&PA NDS-05 (IBC and IRC) or ANSI/NFoPA NDS-91 (UBC), as applicable.
3. Design stress of $0.78 F'_c$ calculated in accordance with Sections 3.6 and 3.7 of the ANSI/AF&PA NDS-05 (IBC and IRC) or ANSI/NFoPA NDS-91 (UBC), as applicable.
4. Design stress of $0.78 F'_c$ at a maximum l_e/d of 33 calculated in accordance with Sections 3.6 and 3.7 of the ANSI/AF&PA NDS-05 (IBC and IRC) or ANSI/NFoPA NDS-91 (UBC), as applicable

4.5 Noncombustible Construction:

When installed in accordance with Sections 4.5.1 through 4.5.6, the stucco system is recognized for use on exterior walls required to be of Type I, II, III or IV construction.

4.5.1 Interior Finish: One layer of $5/8$ -inch-thick (15.9 mm), Type X gypsum board complying with ASTM C 36 must be applied vertically to steel framing with all edges blocked. Fasteners must be No. 8 by $1\frac{1}{4}$ -inch-long (31.7 mm), buglehead Type S screws fastened to board joints at 8 inches (203 mm) on center and to intermediate locations at 12 inches (305 mm) on center. All joints must be taped and treated with joint compound in accordance with ASTM C 840 or GA216. Intermediate fasteners must be treated with compound.

4.5.2 Steel Framing: Minimum $3\frac{5}{8}$ -inch-deep (92 mm), minimum No. 20 gage [0.035 inch (0.889 mm)] steel studs spaced a maximum of 16 inches (406 mm) on center.

4.5.3 Openings: Wall openings must be framed with minimum 0.125-inch-thick (3.2 mm) tubular aluminum or steel framing.

4.5.4 Exterior Finish: One layer of minimum $1/2$ -inch-thick (12.7 mm) gypsum sheathing must be applied horizontally to the steel framing using No. 8 by $1\frac{1}{4}$ -inch-long (32 mm), buglehead Type S screws spaced 8 inches (203 mm) on center at all framing locations.

4.5.5 Fire Stopping at Floor Level: At floor levels, Thermafiber insulation must be fitted into each stud cavity. The insulation must have a minimum nominal density of 4 pcf (64.1 kg/m³) and must be 4 inches (102 mm) thick, and 6 to 8 inches (152 to 203 mm) wide. To fit within a stud cavity, it must be long enough to achieve a friction fit.

4.5.6 Stucco System: The stucco system includes application of one layer of vapor retarder that has a maximum flame spread index of 25 and a maximum smoke-developed index of 30, and that qualifies as a Type 1, Grade A, water-resistant barrier in accordance with UBC Standard 14-1. The vapor retarder must be installed over the sheathing and EPS in accordance with the requirements of the applicable code. One-inch-thick (25.4 mm) EPS insulation board with a nominal 1.5 pcf (24 kg/m³) density is installed horizontally, in running bond, to the sheathing. Reinforcement consists of 1-inch (25.4 mm) by No. 20 gage, galvanized steel, self-furring, woven-wire fabric lath. The lath, insulation board, and vapor retarder are fastened to the steel framing using No. 8 by $2\frac{1}{2}$ -inch-long (63.5 mm), wafer-head, self-drilling

screws spaced at 8 inches (203 mm) on center to all framing members. The stucco is applied to a minimum thickness of $3/8$ inch (9.5 mm) in accordance with Section 4.1.

4.6 Miscellaneous:

4.6.1 Inspection Requirements: Building department inspection is required on metal lath installation prior to application of the coating, in accordance with IBC Section 109.3.5 in jurisdictions enforcing the IBC or IRC, or UBC Section 108.5.5 for jurisdictions enforcing the UBC.

4.6.2 Control Joints: Control joints must be installed as specified by a licensed design professional, designer, builder or exterior coating manufacturer, in that order. In the absence of other details, conventional three-coat plastering details must be used.

4.6.3 Curing: Moist curing must be provided for a minimum 24 hours after coating applications. The length of time and most effective procedure for curing will depend on climatic and job conditions.

4.6.4 Soffits: The system may be applied to soffits, provided the coating is applied over metal lath complying with ASTM C 847 or UBC Table 25-B in lieu of applying the coating over wire fabric lath. Metal lath fastening must comply with IBC Section 2510.3, IRC Section R703.6.1 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-resistant 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 Section R602.3, and UBC Table 23-II-B-1, and a double layer of a code-complying Grade D water-resistant barrier must be applied over the substrate. The coating, lath, and optional EPS board must be applied in accordance with Section 4.2.

4.7 Exterior Cement Plaster:

4.7.1 Concrete or Masonry Substrates: The concrete or masonry surface must be prepared in accordance with the IBC Section 2510.7 and UBC Section 2508.8. The application of the stucco mix must be in accordance with IBC Section 2512, IRC Section 703.6 or UBC Table 25-D and Section 4.1.

4.7.2 Wood or Steel Stud Wall Framing: Lath, water-resistant barrier and plaster must be installed as described in IBC Section 2512, IRC Section 703.6 or UBC Section 2508.

5.0 CONDITIONS OF USE

The Expo Fiberwall Fiber Reinforced Stucco Systems described in this report comply with, or are suitable alternates to what is specified in, those codes listed in Section 1.0, 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 manufacturer's published installation instructions and this report, this report governs.
- 5.2 Installation must be by contractors approved by Expo Stucco Products.
- 5.3 The system may be applied to walls of Type I, II, III or IV construction, when installed in accordance with Section 4.5.

- 5.4 The interior of the building must be separated from the foam plastic boards by a thermal barrier complying with IBC Section 2603.4 and ASTM C 840, 2009 IRC Section R316.4 or 2006 IRC Section R314.1.2 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 3, must be completed and left at the jobsite for the owner, and a copy must be filed with the building department.
- 5.6 Foam plastic insulation board must not be placed on exterior walls of wood construction located within 6 inches (152 mm) of the ground where hazard of termite damage is very heavy, in accordance with IBC Section 2603.8 or IRC Section R320.4, as applicable.
- 5.7 The maximum allowable wind load on the cementitious one-coat stucco systems with wood studs a maximum of 24 inches (610 mm) on center is 35 psf (1.68 kN/m²). Systems installed over No. 20 gage (0.0359 inch (0.91 mm) metal studs spaced 24 inches (610 mm) on center have a maximum allowable wind load of 41 psf (1.96 kN/m²). Support framing must be designed to resist the design load.
- 5.8 Maximum allowable deflection of structural wall or framing must be specified and must be limited to a maximum $1/240$ of the span.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Cementitious Exterior Wall Coatings (AC11), dated March 2010.

7.0 IDENTIFICATION

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

- The name, address and logo of Expo Stucco Products.
- The evaluation report number (ESR-2706).
- Identification of components.
- Weight of packaged mix.
- Storage instructions.
- Maximum amount of water and sand to be added, as applicable in accordance with Section 3.2.1, and conditions that must be considered in determining actual amounts.
- Batching and mixing instructions, as applicable in accordance with Section 3.2.1.
- Curing instructions.

7.2 Foam plastic insulation boards must be identified in accordance with their current ICC-ES evaluation reports. Additionally, the board density must be noted.

For insulation boards applied to walls required to be of Type I, II, III or IV construction, as noted in Section 4.5, each board must be identified along one edge, and one board from each insulation package must be identified on both faces, with the evaluation report number (ESR-2706) and the ICC-ES evaluation report number for the foam plastic.

TABLE 1—STAPLE SPACING FOR LATH ATTACHMENT TO OPEN WOOD FRAMING (inches)

WOOD SPECIES	SPECIFIC GRAVITY	STAPLE GAGE ¹				
		16	15	14	13	12
Douglas fir—larch	0.50	6	6	6	6	6
Douglas fir—South	0.46	5	5	6	6	6
Western hemlock	0.47	5	6	6	6	6
Western hemlock—South	0.47	5	6	6	6	6
Hem-fir—South	0.46	5	5	6	6	6
Hem-fir	0.43	4	4	5	6	6
Spruce-pine-fir	0.42	4	4	5	5	6
Western woods	0.36	3	3	3	4	4

For SI: 1 inch = 25.4 mm.

¹Staples must have sufficient length to penetrate a minimum of 1 inch into studs.

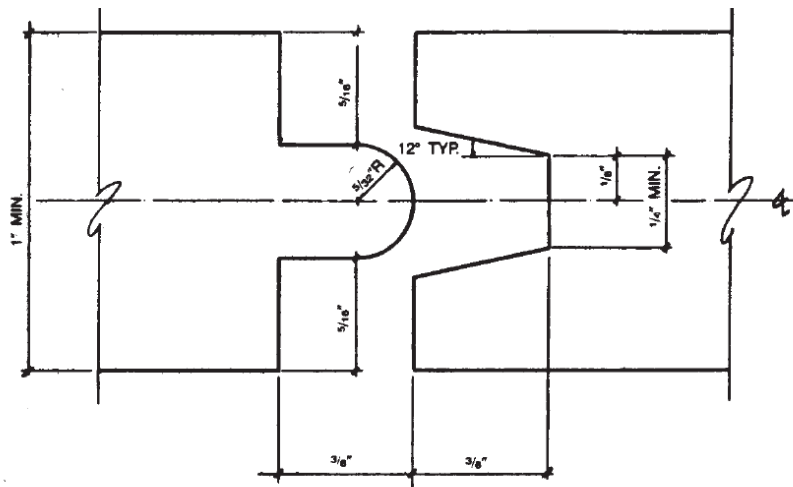
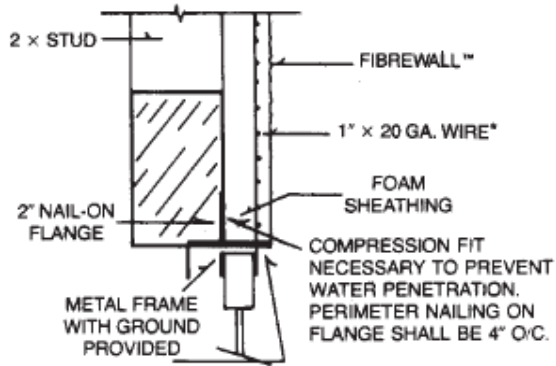
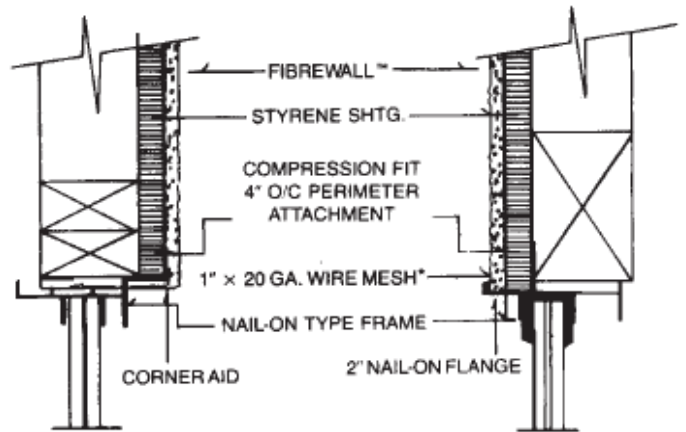


FIGURE 1—TONGUE-AND-GROOVE JOINT DETAILS

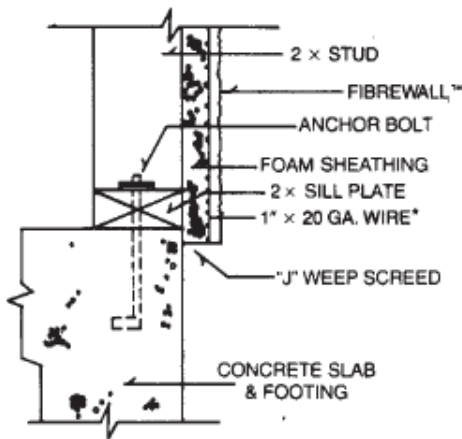
NOTE: When Proper Plaster Ground or Nail-on Flange Are Not Provided Use Plaster Ground Detail.



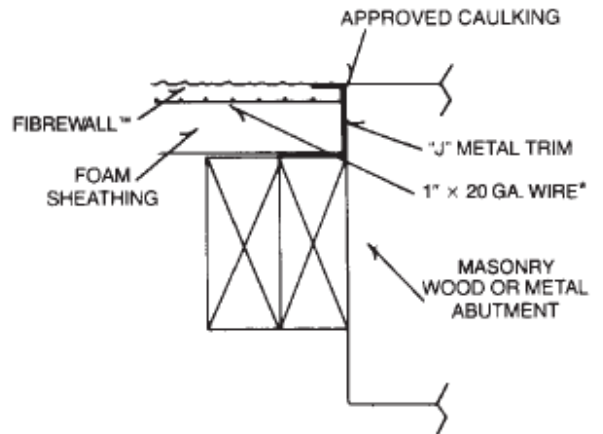
COMPRESSION FIT-METAL FRAME



SLIDING DOOR



SILL FLASHING

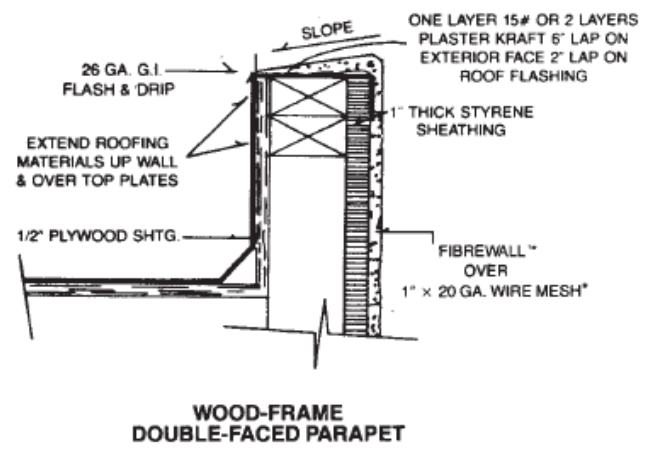
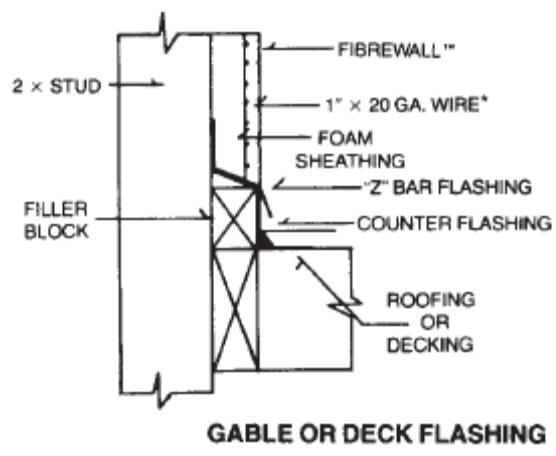
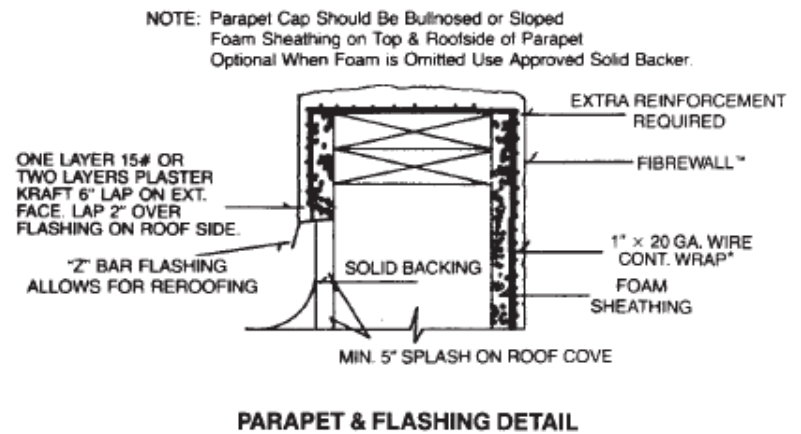
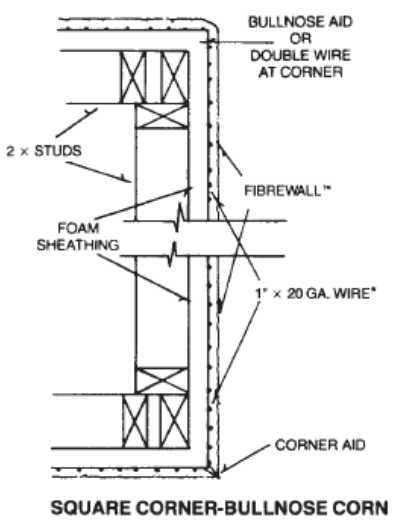
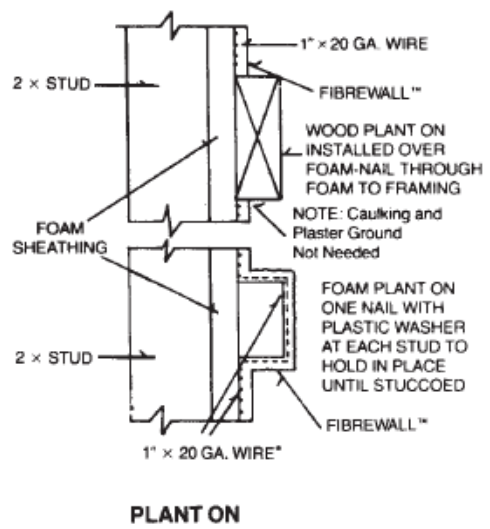
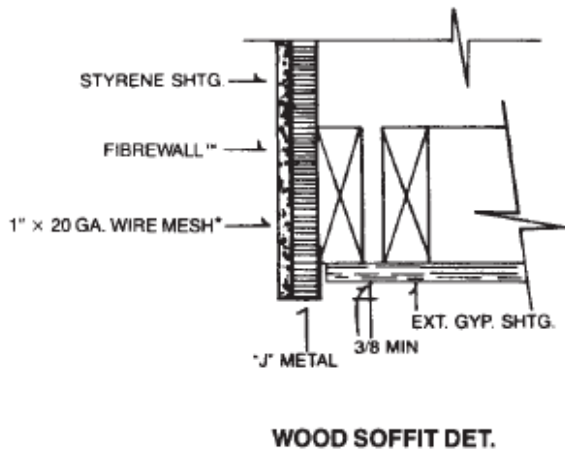


PLASTER GROUND

* A WEATHER-RESISTIVE BARRIER IS REQUIRED UNDER THE WIRE MESH.

NOTE: A WEATHER BARRIER IS REQUIRED BEHIND FOAM PLASTIC SHEATHING.

FIGURE 2—DETAILS



* A WEATHER-RESISTIVE BARRIER IS REQUIRED UNDER THE WIRE MESH.

FIGURE 2—DETAILS (Continued)

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 3—INSTALLATION CARD