



ICC Evaluation Service, Inc.
www.icc-es.org

Business/Regional Office ■ 5360 Workman Mill Road, Whittier, California 90601 ■ (562) 699-0543
Regional Office ■ 900 Montclair Road, Suite A, Birmingham, Alabama 35213 ■ (205) 599-9800
Regional Office ■ 4051 West Flossmoor Road, Country Club Hills, Illinois 60478 ■ (708) 799-2305

Legacy report on the 1997 Uniform Building Code™

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

PERMA-WALL GLASS FIBER REINFORCED EXTERIOR STUCCO SYSTEM

E-Z HAUL READY-MIX INC.
1538 NORTH BLACKSTONE AVENUE
FRESNO, CALIFORNIA 93703

1.0 SUBJECT

Perma-Wall Glass Fiber Reinforced Exterior Stucco System.

2.0 DESCRIPTION

2.1 General:

The Perma-Wall Glass Fiber Reinforced Stucco System is a proprietary mixture of portland cement, sand, glass fibers, water and proprietary ingredients reinforced with wire fabric or metal lath and applied to substrates of expanded polystyrene (EPS) insulation board or gypsum sheathing. The system is installed on exterior walls of wood stud construction.

2.2 Materials:

2.2.1 Stucco Mixture: A factory-prepared mixture of Type I or Type II portland cement complying with ASTM C 150-94, Type E glass fibers, lime and proprietary additives. The mixture is packaged in 80-pound (36 kg) bags. Approximately 7 gallons (26.5 L) of water and 240 pounds (109 kg) of sand are added to each bag in the field and mixed in accordance with the manufacturer's recommendations.

2.2.2 Premix: A factory-prepared mixture, containing sand and stucco mixture, is available in 80- or 100-pound (36 or 45 kg) pound bags. Approximately 1 to 1 1/2 gallons (3.8 to 5.7 L) of water are added to each 80-pound (36 kg) bag and 2 to 2 1/2 gallons (7.6 to 9.5 L) of water are added to each 100-pound (45 kg) bag in the field and mixed in accordance with the manufacturer's instructions. Coloring oxides and bonding adhesives may be added in the field in accordance with the manufacturer's instructions.

2.2.3 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. Sand must be graded within the following limits:

Table with 3 columns: RETAINED ON U.S. STANDARD SIEVE, PERCENT BY WEIGHT ±2 PERCENT (Min., Max.), and rows for sieve sizes No. 4, 8, 16, 30, 50, 100.

2.2.4 EPS Insulation Board: Expanded, polystyrene (EPS) insulation board has a nominal density of 1.5 pounds per cubic foot (24 kg/m³), flame-spread rating of 25 or less and a smoke-developed rating not exceeding 450. Unbacked boards are 1 to 1 1/2 inches (25 to 38 mm) thick and have 3/8-inch-high (10 mm) tongues with compatible grooves for horizontal joints. See Figure 1 for joint detail. All boards must have recognition in an evaluation report issued by ICBO ES or the National Evaluation Service. See Section 2.8 for board identification.

2.2.5 Fome-Cor Board: Extruded polystyrene board is described in Evaluation Report ER-3335.

2.2.6 Lath:

2.2.6.1 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 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.
2. 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.

2.2.6.2 Metal Lath: Metal lath must comply with AC191 and UBC Table 25-B. Furring requirements are as set forth in Section 2.2.6.1.

2.2.7 Gypsum Sheathing Board: Water-resistant core gypsum sheathing complying with ASTM C 834.

*Revised July 2006

ICC-ES legacy reports are not to be construed as representing aesthetics or any other attributes not specifically addressed, nor are they to be construed as an endorsement of the subject of the report or a recommendation for its use. There is no warranty by ICC Evaluation Service, Inc., express or implied, as to any finding or other matter in this report, or as to any product covered by the report.



2.2.8 Fiberboard: Minimum $\frac{1}{2}$ -inch-thick (12.7 mm) asphalt-impregnated fiber-board complying with ANSI A 194.1-1985 as a regular density sheathing.

2.2.9 Plywood: Minimum $\frac{5}{16}$ -inch-thick (8 mm) plywood with exterior glue for studs spaced 16 inches (406 mm) on center and minimum $\frac{3}{8}$ -inch (10 mm) plywood with exterior glue for studs spaced 24 inches (610 mm) on center. Plywood complies with UBC Standard 23-2.

2.2.10 Caulking: Acrylic latex caulking material complying with ASTM C 834.

2.2.11 Weather-resistive Barrier: Minimum Grade D kraft building paper complying with UBC Standard 14-1 or asphalt-saturated rag felt complying with UL Standard 55-A is required. The weather-resistive barrier is placed over all substrates except for EPS board where the barrier may be behind the board. Application of the barrier must comply with Section 1402.1 of the code. When applied over any wood-based sheathing, the barrier must be a minimum two layers of Grade D building paper as set forth in Section 2506.4 of the code.

2.2.12 Fibers: Type E, $\frac{1}{2}$ -inch (12.7 mm) cut glass fibers for short-term benefits during initial curing.

2.2.13 Admixtures: Proprietary ingredients added to improve quality of mixture. Bonding adhesives must comply with Military Specification MIL-B-19235.

2.2.14 Miscellaneous: All trim, screeds and corner reinforcement must be galvanized steel or approved plastic.

2.3 Installation:

2.3.1 General: The exterior cementitious coating is applied by hand troweling or machine spraying in one coat to a minimum $\frac{3}{8}$ inch (9.5 mm) thickness. The lath must be embedded in the minimum coating thickness and cannot be exposed. Fasteners for lath must penetrate 1 inch (25.4 mm) minimum into wood studs. The finish coat, if used, must be applied within 24 hours of base coat application. Otherwise, an acrylic bonding adhesive complying with Military Specification MIL-B-19235 must be added to the finish coat stucco mix prior to application. Flashing, corner reinforcement, metal trim and weep screeds must be installed as shown in attached details. See Figure 2. The coating is applied at ambient air temperatures ranging from 35°F to 117°F (2°C to 47°C) by applicators approved by E-Z Haul Ready-Mix Inc. The weather-resistive barrier must be applied as set forth in Section 2.2.11. An installation card as noted in Figure 3 must be on the job with the name of the applicator and the product to be used before any weather-resistive barrier or exterior sheathing is installed.

2.3.2 Application Over Open Framing:

2.3.2.1 EPS Insulation Board: The weather-resistive barrier is placed over open wood or steel studs spaced 24 inches (610 mm) on center, maximum.

The EPS board described in Section 2.2.4 is then placed horizontally with tongues faced upward and is temporarily held in place with galvanized staples or roofing nails. Vertical butt joints must be staggered a minimum of one stud space from adjacent courses and occur directly over studs. The lath is then applied tightly over the polystyrene board and fastened through the board to wood studs with No. 11 gage galvanized roofing nails with a $\frac{1}{2}$ -inch-diameter (12.7 mm) head or No. 16 gage galvanized staples spaced 6 inches (152 mm) on center with a minimum 1 inch (25 mm) penetration into the studs. Staples must have a minimum crown width of $\frac{3}{4}$ inch (19 mm). Stapling is permitted only in Group II wood species. Care must be taken to avoid overdriving fasteners. Overdriving fasteners may damage insulation boards at

studs. Maximum air pressure for power-driven, pneumatic fastener installations is 85 psi (586 kPa). The lath is applied with $\frac{1}{2}$ -inch (38 mm) end and side laps. Perma-Wall Exterior Stucco System may also be applied to minimum No. 20 gage (0.036 inch thick) (0.9 mm) steel studs spaced 16 inches (406 mm) on center, maximum. The lath is applied tightly over the insulation board and fastened to the studs with No. 8 self-drilling waferhead screws with a 0.4 inch (10 mm) minimum head diameter. Screw penetration through the studs is $\frac{1}{2}$ inch (12.7 mm) minimum and screw spacing along framing is 6 inches (152 mm) on center, maximum. Wall bracing in accordance with Section 2320.11.3 or 2320.11.4 of the code or acceptable alternate is required. Outside wall corners and parapet corners are covered with metal corner reinforcement. Weep screeds are installed at the bottom of the wall in accordance with Section 2506.5 of the code. Galvanized steel $\frac{1}{8}$ -inch (35 mm) J-shaped trim pieces are 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 must also be caulked. The coating is applied after caulking as described in Section 2.3.1.

2.3.2.2 Fome-Cor Board: The Fome-Cor board is attached to wood framing spaced 24 inches (610 mm) on center maximum in accordance with Evaluation Report ER-3335. Minimum $\frac{1}{2}$ inch (38 mm) by No. 17 gage woven-wire fabric lath is attached through the board in accordance with Table 25-C of the code using the No. 11 gage nails described in the table or No. 16 gage staples with a 1-inch (25 mm) crown. All fasteners must penetrate 1 inch (25 mm) minimum into the framing. The Perma-Wall Coating is then applied to a minimum $\frac{1}{2}$ -inch (12.7 mm) thickness followed by a minimum $\frac{1}{8}$ -inch (3 mm) finish coat. Other installation details are described in Section 2.3.2.1.

2.3.3 Application over Solid Backing:

2.3.3.1 Fiberboard: Minimum $\frac{1}{2}$ -inch-thick (12.7 mm) fiberboard sheathing installed directly over wood studs spaced 24 inches (610 mm) on center, maximum. The fiberboard is temporarily held in place with corrosion-resistant staples or roofing nails. A weather-resistive barrier of two layers of Grade D building paper is applied over the fiberboard prior to the lath or optional insulation board. The lath is attached to studs through the sheathing with fasteners and spacing described for insulation board in Section 2.3.2 of this report or Table 23-II-B-1 of the code, whichever is more restrictive. The system may also be applied to minimum No. 20 gage (0.036 inch thick) (0.9 mm) studs spaced 16 inches (406 mm) on center maximum. The lath is applied over the weather-resistive barrier and the fiberboard sheathing as set forth in Section 2.3.2. As an option, the Fome-Cor board may be applied over the fiberboard prior to lath installation. All walls must be braced in accordance with the code. Exposed sheathing edges are protected with screeds. Holes in the substrate surface are caulked and coating applied as described in Section 2.3.1.

2.3.3.2 Gypsum Sheathing: Minimum $\frac{1}{2}$ -inch-thick (12.7 mm) water-resistant core gypsum sheathing may be installed directly on wood studs in a manner similar to fiberboard. The sheathing is fastened in accordance with Table 25-G of the code. A weather-resistive barrier is required over the gypsum sheathing prior to installation of the metal lath as described in Section 2.3.2. The system may also be applied to No. 20 gage (0.036 inch thick) (0.9 mm) steel studs spaced 16 inches (406 mm) on center, maximum. The lath is applied as set forth in Section 2.3.2. As an option, Fome-Cor insulation board may be installed over the gypsum sheathing prior to lath installation. The Fome-Cor board may substitute for the weather-resistive barrier.

2.3.3.3 Plywood: Plywood is applied directly to wood studs under conditions as set forth in Section 2.2.9 of this report and Table 23-IV-D-1 of the code. Two layers of weather-resistive barrier, wire fabric lath, and coating are applied as described for fiberboard. The system may also be installed over plywood attached to No. 20 gage (0.036 inch thick) (0.9 mm) steel studs spaced 16 inches (406 mm) on center maximum. The lath is applied over the plywood as set forth in Section 2.3.2. One layer of Fome-Cor insulation board may be applied over the plywood prior to lath installation in lieu of one layer of Grade D paper.

2.4 One-hour Fire-resistive Assembly:

2.4.1 Interior Face: One layer of $\frac{5}{8}$ -inch-thick (16 mm) Type X gypsum wallboard (ASTM C 79), water-resistant backerboard or veneer base is applied parallel or at right angles to the interior face of 2-inch-by-4-inch (51 by 102 mm) wood studs spaced 24 inches (610 mm) on center maximum. The wallboard is attached with 6d coated nails $\frac{1}{8}$ inches (48 mm) long with a $\frac{1}{4}$ -inch-diameter (6 mm) head, at 7 inches (178 mm) on center to studs, plates and blocking. All wallboard joints must be backed with minimum 2-inch-by-4-inch (51 by 102 mm) wood framing. Wallboard joints must be taped, and along with the fastener heads, treated with joint compound.

2.4.2 Exterior Face: One layer of minimum $\frac{5}{8}$ -inch-thick (16 mm) Type-X water-resistant core-treated gypsum sheathing, 48 inches (1219 mm) wide is applied parallel to studs with No. 11 gage galvanized roofing nails $\frac{3}{4}$ inches (44 mm) long with $\frac{7}{16}$ -inch- (11 mm) or $\frac{1}{4}$ -inch-diameter (6 mm) heads at 4 inches (102 mm) on center at board edges and 7 inches (178 mm) on center at intermediate studs. The sheathing is nailed to top and bottom plates at 7 inches (178 mm) on center. A weather-resistive barrier is required over the sheathing. The lath and wall coating are then applied as described in Section 2.3.3.

2.5 Noncombustible Construction:

The stucco system may be installed on exterior walls required to be noncombustible construction as follows:

2.5.1 Interior Finish: One layer of $\frac{5}{8}$ -inch-thick (16 mm) Type X gypsum wallboard complying with ASTM C 76 is applied vertically to steel framing with all edges blocked. Fasteners are No. 8 by $\frac{1}{4}$ -inch-long (32 mm) buglehead screws fastened to board joints at 8 inches (203 mm) on center and intermediate locations at 12 inches (305 mm) on center. All joints are taped and treated with joint compound. Intermediate fasteners are treated with compound.

2.5.2 Steel Framing: Minimum $\frac{3}{8}$ -inch-deep (92 mm) No. 20 gage steel studs (0.035 inch thick) (0.9 mm) spaced 16 inches (406 mm) on center maximum.

2.5.3 Openings: Wall openings are framed with minimum 0.125-inch-thick (3 mm) aluminum or steel framing.

2.5.4 Exterior Finish: One layer of minimum $\frac{1}{2}$ -inch-thick (12.7 mm) gypsum sheathing complying with ASTM C 79 is applied horizontally to steel framing with No. 8 by $\frac{1}{4}$ -inch-long (32 mm) buglehead screws spaced 8 inches (203 mm) on center at all framing locations.

2.5.5 Stud Cavity: Where studs continue past floor levels, stud cavities at each floor level must be blocked with Thermafiber insulation. The Thermafiber insulation (Evaluation Report ER-2331) is fit into each stud cavity at the floor. The insulation has a minimum 4-pcf (64 kg/m³) density, is 4 inches (102 mm) thick and 6 to 8 inches (152 to 203 mm) wide and must be long enough to friction fit between studs.

2.5.6 Stucco System: Where a weather-resistive barrier is required, the stucco system includes one layer of Pyro-Kure

600 vapor retarder manufactured by Fortifiber. Pyro-Kure vapor retarder has a maximum flame-spread rating of 25, a maximum smoke-developed rating of 30 and qualifies as a Type 1, Grade A weather-resistive barrier in accordance with UBC Standard 14-1. The vapor retarder is installed over the sheathing in accordance with Section 1402.1 of the code. Expanded polystyrene insulation boards with a nominal 1.5-pound-per-cubic-foot (24 kg/m³) density are installed at 1-inch (25 mm) thicknesses horizontally in running bond to the sheathing. Reinforcement consists of 1 inch (25 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 $\frac{1}{2}$ -inch-long (64 mm) waferhead self-drilling screws spaced 8 inches (203 mm) on center to all framing members. The stucco is applied at a $\frac{3}{8}$ -inch (10 mm) minimum thickness in accordance with Section 2.3 of this report.

2.6 Shear Wall:

A shear wall that also provides wall bracing required by Section 2320.11.3 or 2320.11.4 of the code may be constructed using the stucco system. The shear wall has a maximum height-to-length ratio in accordance with Section 2513.4 of the code. Wall framing is minimum 2-inch-by-4-inch (51 to 102 mm) studs spaced 16 or 24 inches (406 or 610 mm) on center. Fome-Cor sheathing recognized in Evaluation Report ER-3335 is applied to framing members with 3-inch (76 mm) horizontal weather laps and 6-inch (152 mm) vertical laps and spot fastened into place. One-and-one-half inch (38 mm) hexagonal opening No. 17 gage woven-wire lath is then applied over Fome-Cor and fastened to all framing members at 6 inches (152 mm) on center with No. 16 gage corrosion-resistant staples having a 1-inch (12.7 mm) crown. Staple legs must be at least $\frac{1}{4}$ inch (32 mm) and penetrate the framing at least 1 inch (25 mm). The lath is overlapped at least 3 inches (76 mm) and must be offset from Fome-Cor overlaps. The coating is applied in two coats in accordance with Section 2.3.1. The base coat is $\frac{1}{2}$ inch (12.7 mm) thick, minimum, and is cured in accordance with Section 2.7.3. The finish coat is $\frac{1}{8}$ inch (3 mm) thick, minimum, and is applied after properly curing the base coat in accordance with this report. The allowable racking shear is 170 plf (2480 N/m).

2.7 Miscellaneous:

2.7.1 Inspection Requirements: Building department inspection is required on lath installation prior to application of the coating as noted in Section 108.5.5 of the code.

2.7.2 Control Joints: Control joints must be installed as specified by the architect, designer, builder or E-Z Haul Ready-Mix Inc. in that order. In the absence of details, conventional three-coat plastering details must be used.

2.7.3 Curing: For proper curing, mortar section must be water sprayed two to three hours after initial set has occurred and sooner in hot dry climates. Water spraying must commence within seven hours of stucco application or prior to end of the work day, whichever occurs first. Before and after the finish coat is applied, a light water spray is required. Additional water spray is applied within 48 hours of stucco application.

2.7.4 Mixing: After all components are batched, mixing for 3 to 10 minutes is required. Overmixing is to be avoided.

2.7.5 Soffits: The system may be applied to soffits, provided the coating is applied over metal lath complying with Table 25-B of the code in lieu of wire fabric lath. Metal lath fastening must comply with Table 25-C, except the fastener length must be increased by the thickness of any substrate.

2.7.6 Sills: The system may be applied to sills at locations such as windows and other similar areas. Sill depths 6 inches

(152 mm) or less, may have the coating and lath applied to any substrate permitted in this report, provided the coating, lath, weather-resistive barrier and substrate are installed in accordance with the appropriate section of this report. Sill depths exceeding 6 inches (152 mm) must have substrates of solid wood or plywood. The substrate is fastened in accordance with Table 23-II-B-1 of the code, over which a double layer of a complying weather-resistive barrier is applied. The coating, lath, and optional EPS board are applied in accordance with Section 2.3.2 of this report.

2.8 Identification:

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

1. Product name, manufacturer's name and address and evaluation report number.
2. Identification of components.
3. Weight of packaged mix.
4. Storage instructions.
5. Maximum amount of water and other components that may be added and conditions that must be considered in determining actual amount added.
6. Curing instructions.

Polystyrene foam plastic insulation boards are identified in accordance with their respective ICBO ES evaluation report. Additionally, the board density must be noted. When applied to walls required to be noncombustible construction, each EPS board must be identified along one edge, and one board in each package must be identified on both faces with the foam plastic evaluation report number, the name Perma-Wall and Evaluation Report ER-5227.

3.0 EVIDENCE SUBMITTED

Data, in accordance with the ICBO ES Acceptance Criteria for Cementitious Exterior Wall Coatings (AC11), dated January 1997, reports of tests in accordance with UBC Standard 26-4, and of racking shear tests.

4.0 FINDINGS

That the Perma-Wall Glass Fiber Reinforced Exterior Stucco System described in this report complies with the 1997 Uniform Building Code™, subject to the following conditions:

- 4.1 The material and methods of installation comply with this report and the manufacturer's instructions.
- 4.2 Installation is by contractors approved by the manufacturer.
- 4.3 The system is confined to Type V construction except when the system is constructed as set forth in Section 2.5.
- 4.4 The system is recognized as a one-hour fire-resistive assembly when complying with Section 2.4 of this report. Design stress for the fire-resistive assembly is limited to $0.78 F'_c$ and the maximum stress cannot exceed $0.78 F'_c$ at an l/d ratio of 33 in accordance with Section 2307.3 of the code.
- 4.5 The interior of the building is separated from the EPS board with a thermal barrier complying with Section 2602 of the code such as $1/2$ -inch (12.7 mm) regular gypsum wallboard applied in accordance with Table 25-G of the code.
- 4.6 An installation card, as shown in Figure 3 is left at the jobsite for the owner and a copy filed with the building department.
- 4.7 The allowable wind load on the system with wood studs 24 inches (610 mm) on center and lath attached with nails is 25 pounds per square foot (1200 Pa), positive or negative. Attachment with staples permit a 35-pound-per-square-foot (1675 Pa) wind load. Supporting framing must be adequate to resist the required wind load.

This report is subject to re-examination in two years.

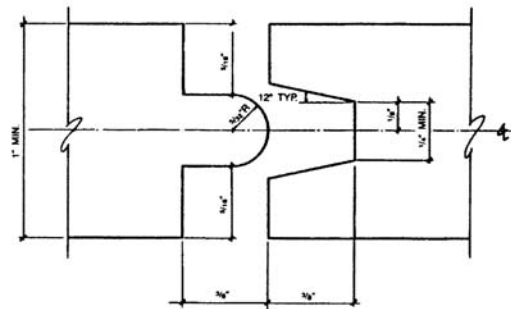


FIGURE 1



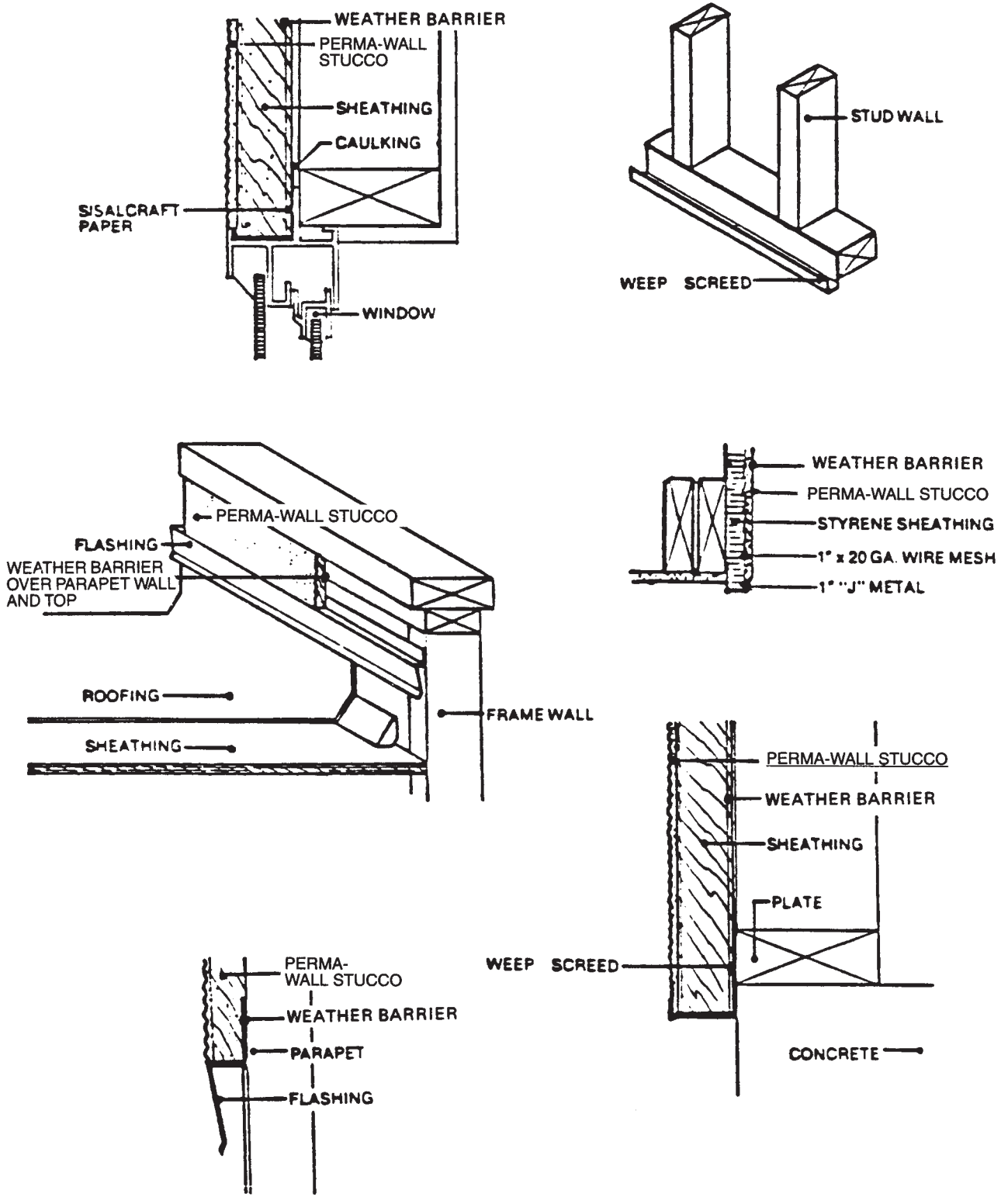
NECESSED WINDOW

DISSIMILAR MATERIALS

N.B. Self-furred Wire needed over all substrates except unbacked EPS board. Caulking required at hose bibs and other holes; window, door and abutting J-Trims.

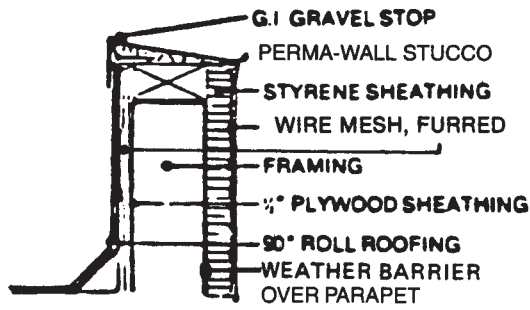
FIGURE 2

For SI: 1 inch = 25.4 mm.

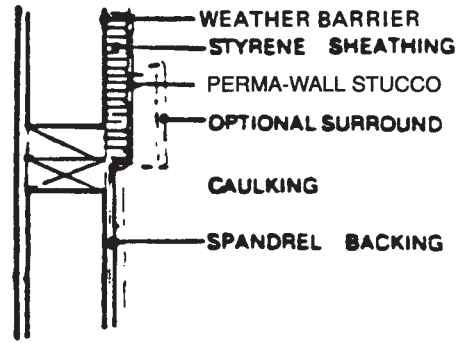


SOFFITS

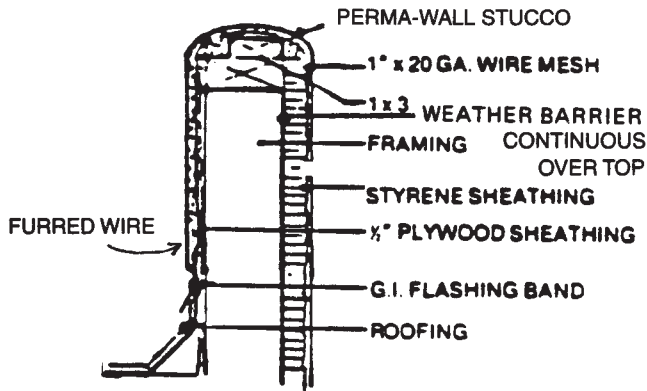
FIGURE 2—(Continued)



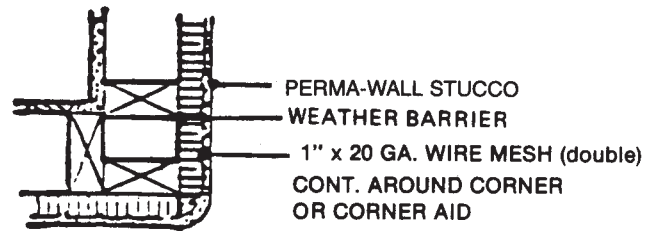
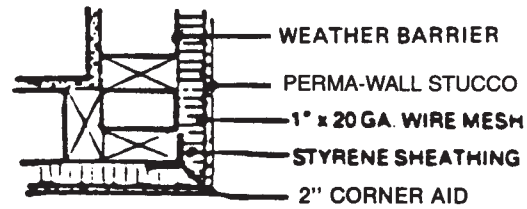
SINGLE-FACED PARAPET



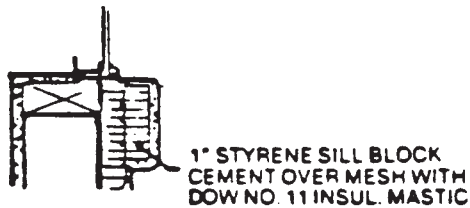
SPANDREL/INSERT



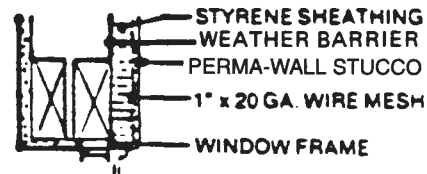
DOUBLE-FACED PARAPET



EXTERIOR CORNERS



SILL



HEAD—JAMB

WINDOW DETAILS

For SI: 1 inch = 25.4 mm.

FIGURE 2—(Continued)

INSTALLATION CARD

PERMA-WALL STUCCO
E-Z HAUL READY-MIX INC.

Job Address: ICBO Evaluation Service, Inc.,
Evaluation Report ER-_____

Date of Job Completion _____

Plastering Contractor

Name: _____

Address: _____

Telephone Number () _____

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