

# ICC-ES Evaluation Report


ESR-3720

Reissued September 2024

Subject to renewal September 2025

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<p><b>DIVISION: 09 00 00 - FINISHES</b></p> <p><b>Section: 09 24 00—Portland Cement Plastering</b></p>	<p><b>REPORT HOLDER:</b></p> <p><b>PROWALL BUILDING PRODUCTS, INC.</b></p>	<p><b>EVALUATION SUBJECT:</b></p> <p><b>PROWALL ONE-COAT STUCCO SYSTEM</b></p>	
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## 1.0 EVALUATION SCOPE

**Compliance with the following codes:**

- 2012, 2009 and 2006 [International Building Code® \(IBC\)](#)
- 2012, 2009 and 2006 [International Residential Code® \(IRC\)](#)

**Properties evaluated:**

- Structural
- Durability
- Fire-resistance-rated construction

## 2.0 USES

The Prowall One-Coat Stucco System is an alternative to exterior wall coverings specified in IBC Chapter 25 and IRC Section R703. The wall covering system may be used in one-hour fire-resistance-rated walls in accordance with Section 4.4 of this report and Type V construction.

## 3.0 DESCRIPTION

### 3.1 Stucco Systems:

The Prowall One-Coat Stucco system is a proprietary mixture of Portland cement, sand, fibers and proprietary ingredients, reinforced with wire fabric or metal lath and applied over substrates of expanded polystyrene (EPS) foam plastic insulation board, gypsum sheathing board, fiberboard, plywood, or oriented strand board (OSB).

### 3.2 Materials:

**3.2.1 Prowall One-Coat Stucco:** The stucco is factory-prepared mixtures of Type I or II Portland cement complying with ASTM C150, fibers and proprietary additives. The mixture is packaged in 80-pound (36 kg) bags. Three and one-half to five and one-half (13.2 to 20.8 L) of water and 220 to 240 pounds (100 to 109 kg) of sand are added to each bag, in the field, and the components must be mixed in accordance with the manufacturer’s recommendations. A premix may be blended at a batching plant and delivered with sand in a bulk mixer to the jobsite and field-mixed with water, under the following conditions:

1. The bulk-mixer bears an identification label stating the Prowall Building Products, Inc., name and address, the batch plant name and address, the product name and the ESR-3720 evaluation report number.

2. A signed certificate from the batching plant accompanies each batch, specifying the plant name, contractor's name, jobsite address, date, materials batched, quantity, and curing instructions. The ratio of batched amounts must be 220-240 pounds (100 to 109 kg) of sand to 80 pounds (36 kg) of stucco mixture.
3. Procedures are in place to prevent tampering in controlling the amount of stucco mixture and sand combined.

**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 C144 or ASTM C897 within the following limits:

RETAINED ON U.S. STANDARD SIEVE	PERCENT RETAINED BY WEIGHT $\pm$ 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:** EPS insulation board must have a nominal density of 1.5 pounds per cubic foot (24 kg/m<sup>3</sup>), respectively, a flame-spread index of 75 or less and a smoke-developed index of not more than 450 when tested in accordance with ASTM E84 (IBC Section 2603.3), and shall comply with ASTM C578 as Type II (EPS). All 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 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.

When installed over solid sheathing, the insulation boards must be a minimum of 1 inch (25.4 mm) thick and have ¼-inch-wide-by-⅛-inch-deep (64 mm by 3.2 mm) vertical grooves spaced at 12 inches (405 mm) on the back face of the boards. As an alternate to the vertical grooves on the foam plastic board, installation of flat-faced boards over a solid sheathing may incorporate the Tyvek® Stuccowrap® or Tyvek® DrainWrap™ water-resistive barrier recognized in [ESR-2375](#).

### 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 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 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. Furring requirements are as set forth in Section 3.2.4.1.

**3.2.5 Gypsum Board:** The gypsum sheathing board must be water-resistant core gypsum sheathing complying with ASTM C1396. Gypsum wallboard shall comply with ASTM C1396.

**3.2.6 Fiberboard:** The fiberboard must be a minimum ½-inch-thick (12.7 mm), asphalt-impregnated fiberboard complying with ASTM C208 as a Type IV, Grade 1 wall sheathing.

**3.2.7 Wood-based Structural Panels:** The panels are minimum 5/16-inch-thick (7.9 mm) exterior grade plywood or Exposure 1 oriented strand board (OSB) for studs spaced 16 inches (406 mm) on center. Plywood must comply with DOC PS-1, and OSB must comply with DOC PS-2.

**3.2.8 Caulking:** The caulking must be either acrylic latex caulking material complying with ASTM C834 or must be polyurethane, polyurethane modified, polysulfide or silyl-terminated polyether elastomeric sealant complying with ASTM C920.

### 3.2.9 Weather Protection:

**3.2.9.1 Water-resistive Barrier:** A water-resistive barrier is required and must comply with IBC Section 1404.2 or IRC Section 703.2, as applicable. Except when installation is over wood-based sheathing, the water-resistive barrier must be either a minimum of one layer of No. 15 asphalt felt, complying with ASTM D226 (IBC and IRC), Type I, or a water-resistive barrier recognized as equivalent to ASTM D226, Type I or better, in a current ICC-ES evaluation report.

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

- A minimum of two layers of Grade D building paper 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.
- One layer of EPS, having horizontal tongue-and-groove edges, as described in Section 3.2.3, over one layer of Grade D building paper having a minimum water-resistance rating of 60 minutes; or equivalent recognized in a current ICC-ES evaluation report.

**3.2.9.2 Vapor Retarder:** Protection against condensation must be provided in accordance with 2012 and 2009 IBC Section 1405.3 or 2006 IBC Section 1403.2, as applicable. Under the IRC, a vapor retarder must be provided in accordance with 2012 IRC Section R702.7, 2009 IRC Section R601.3 or 2006 R318.1, unless its omission is permitted under the exceptions in the IBC and IRC.

**3.2.9.3 Flashing:** Flashing complying with 2012 and 2009 IBC Section 1405.4, 2006 IBC Section 1405.3, or IRC Section R703.8, as applicable, must be provided. Where membrane flashing is used, it must be a self-adhering, flexible rubberized asphalt and polyethylene material, 0.030 inch (0.8 mm) thick, shingle-lapped with the water-resistive barrier. Rigid flashings shall be sloped towards the exterior, with an upturned leg on the interior side and at the ends.

**3.2.10 Finish Coat:** Finish coat, if any, must be installed in accordance with manufacturer's published installation instructions.

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

## 4.0 INSTALLATION

### 4.1 General:

The exterior cementitious coating is applied to wood- or steel-framed exterior walls with substrates of expanded polystyrene (EPS) insulation board, gypsum sheathing, fiberboard, plywood or oriented strand board (OSB). The exterior cementitious coating is applied, by hand-troweling or machine-spraying in one coat, to a minimum thickness of  $\frac{3}{8}$  inch (9.5 mm). The lath must be embedded in the minimum coating thickness, and therefore cannot be exposed. See [Figure 2](#) for wall details. The finish coat, if used, must be applied within 72 hours after the base coat, unless the latter is sprayed/brushed with an acrylic-bonding adhesive or a bonding treatment is added to the finish-coat stucco mix prior to application. Fasteners used to attach lath must penetrate a minimum of 1-inch (25.4 mm) into wood studs. Flashing, corner reinforcement, metal trim and weep screeds must be installed as shown in [Figure 2](#). The coating must be applied at an ambient air temperature range from 40°F to 120°F (4°C and 49°C) by Prowall Building Products, Inc. approved applicators. The water-resistive barrier must be applied as set forth in Section 3.2.9 of this report. An installation card, as shown in [Figure 3](#), must be on the jobsite bearing the name of the applicator and the product to be used, before any water-resistive barrier or exterior sheathing is installed. Also, see Section 5.5 of this report.

### 4.2 Application over Open Framing:

**Insulation Board:** The water-resistive barrier must be attached, as set forth in Section 3.2.9.1, to open wood studs spaced a maximum of 16 inches (406 mm) on center. The EPS board described in Section 3.2.3 must be placed horizontally with tongues faced upward, and must be 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 must occur directly over studs. The lath is then applied tightly over the EPS board and fastened through the board to wood studs with No. 11 gage galvanized roofing nails or No. 15 gage galvanized staples spacing 6 inches (152 mm) on center, with a minimum 1-inch penetration. Staples must have a minimum crown width of  $\frac{7}{16}$ -inch (11 mm). Fasteners must be installed in wood species with a specific gravity of 0.50 or greater. Care must be taken to avoid over-driving fasteners. Wall bracing in accordance with IBC Section 2308.9.3 or IRC Section R602.10, or an acceptable alternate, must be provided.

The Prowall One-Coat Stucco System may also be applied to minimum No. 20 gage steel studs spaced 16 inches (406 mm) on center. The lath is applied tightly over the polystyrene board and fastened through the board and water-resistive barrier to the metal studs with No. 6 Type S screws spaced 6 inches (152 mm) on center. Screw-head diameter is 0.435-inch (11 mm). The screws must be long enough to penetrate the studs and track ¼-inch (6.4 mm), with a 1¼-inch (32 mm) minimum length. The lath is applied with 1½-inch (38 mm) laps at all joints. Wall bracing in accordance with applicable code must be provided. Outside wall corners and parapet corners must be covered with additional metal corner reinforcement. Weep screeds must comply with, and be installed at the bottom of the wall in accordance with, IBC Section 2512.1.2 or IRC Section R703.6.2.1. Galvanized steel, 1<sup>3</sup>/<sub>8</sub>-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 after caulking as described in Section 4.1 of this report.

### 4.3 Application over Solid Substrates:

**4.3.1 Fiberboard:** Minimum ½-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 fastened in accordance with IBC Table 2304.9.1 or IRC Table R602.3(1), and is held in place with corrosion-resistant staples or roofing nails. A water-resistive barrier as set forth in Section 3.2.9 must be applied over the fiberboard prior to the installation of the optional insulation, and prior to installation of wire fabric or metal lath. When an optional layer of foam board is used, either Tyvek® StuccoWrap® or Tyvek® DrainWrap™, as recognized in [ESR-2375](#), must be used as the water-resistive barrier, or grooved foam as described in Section 3.2.3 of this report 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 studs through the water-resistive barrier and sheathing, with fasteners and spacings as described for insulation boards either in Section 4.2 of this report or IBC Table 2304.9.1 or IRC Table R602.3(1), whichever is most restrictive. Wood framing must be of a species having a specific gravity of 0.50 or greater, such as Douglas fir–larch. The system may also be applied to minimum No. 20 gage [0.036 inch thick (0.914 mm)] steel studs spaced a maximum of 16 inches (406 mm) on center. System application is similar to that for wood studs, except No. 7 S12-20, 0.435-inch-diameter head (11 mm), self-drilling, self-tapping screws secure the lath and sheathing. Screw penetration must be a minimum of ¼ inch (6.4 mm) beyond the steel stud. All walls must be braced in accordance with the applicable code. Exposed sheathing edges must be protected with screeds. Holes in the substrate surface must be caulked and the coating must be applied as described in Section 4.1.

**4.3.2 Wood-based Structural Sheathing:** Application of plywood or OSB must comply with IBC Tables 2308.9.3(3) and 2304.9.1 or IRC Tables R602.3(3) and R602.3(1), and must be applied directly to wood studs. The panels must be minimum 5/16-inch-thick (7.9 mm) exterior grade plywood or Exposure 1 OSB for studs spaced 16 inches (406 mm) on center. The water-resistive barrier, optional insulation board, lath and coating shall be applied as described in Section 4.3.1.

**4.3.3 Gypsum Sheathing:** Minimum ½-inch-thick (12.7 mm), water-resistant core gypsum sheathing may be installed directly on wood studs in a manner similar to that described in Section 4.3.1 of this report. The sheathing may also be installed on No. 20 gage [0.036 inch (0.914 mm) thick] steel studs. Gypsum sheathing must be fastened in accordance with IBC Table 2508.1 or IRC Table R702.3.5. A water-resistive barrier is required over the gypsum sheathing prior to installation of the lath and coating as described in Section 4.2. The water-resistive barrier, optional insulation board, lath and coating shall be applied as described in Section 4.3.1.

### 4.4 One-hour Fire-resistive-rated Wall Assembly:

**4.4.1 Interior Face:** One layer of 5/8-inch-thick (15.9 mm), Type X gypsum wallboard, water-resistant backerboard or veneer base must be applied parallel or at right angles to the interior face of 2-by-4 wood studs spaced a maximum of 24 inches (610 mm) on center. The gypsum boards must be attached using No. 13 gage, 15/8-inch-long (41 mm) gypsum wallboard nails with 19/64-inch (7.5 mm) diameter heads, at 6 inches (152 mm) on center to studs, plates and blocking. All gypsum board joints must be backed with wood framing and must be taped and, along with fastener heads, treated with joint compound.

**4.4.2 Exterior Face:** One layer of minimum  $5/8$ -inch-thick (15.9 mm), 48-inch-wide (1219 mm), Type X, water-resistant core gypsum sheathing is applied parallel to studs using No. 11 gage galvanized roofing nails,  $1\ 3/4$  inches (44.5 mm) long and with a  $7/16$ - or  $1/2$ -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 3.2.9 must be installed over the sheathing. The wire fabric lath and wall coating must be applied as described in Section 4.2.

**4.4.3 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 the ANSI AWC NDS (2012 IBC and IRC), Sections 3.6 and 3.7 of ANSI AF&PA NDS-0 5 (2009 and 2006 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.

#### 4.5 Miscellaneous for Stucco System:

**4.5.1 Inspection Requirements:** A building department inspection must be required on wire lath installation prior to application of the coating, in accordance with 2012 and 2009 IBC Section 110.3.5 or 2006 IBC Section 109.3.5, as applicable.

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

**4.5.3 Curing:** Moist curing must be provided for 24 hours after coating application.

**4.5.4 Soffits:** The system may be applied to soffits, provided the coating is applied over metal lath complying with ASTM C847 in lieu of applying the coating over wire fabric lath. Metal lath fastening must comply with IBC Section 2510.3 or IRC Section R703.6.1, except the length of the fastener must be increased by the thickness of the substrate.

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

## 5.0 CONDITIONS OF USE

The Prowall One-Coat Stucco System described in this report comply with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1** Materials and methods of installation must comply with this report and the manufacturer's published installation instructions. In the event of a conflict between the installation instructions and this report, this report governs. The manufacturer's published installation instructions must be available at the jobsite at all times during installation.
- 5.2** Installation must be by contractors approved by the manufacturer.
- 5.3** The system must be applied to walls of buildings where Type V construction is permitted under the IBC.
- 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, 2012 and 2009 IRC Section R316.4, or 2006 Section R314.1.2 and Table R702.3.5 of the IRC.
- 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 located within 6 inches (152 mm) of the ground where hazard of termite damage is very heavy, in accordance with 2012 IBC Section 2306.9, 2009 and 2006 IBC Section 2603.8, 2012 and 2009 IRC Section R318.4, and 2006 IRC Section R320.5.

- 5.7 The maximum allowable positive and negative wind load on the cementitious one-coat stucco systems with wood or steel studs a maximum of 16 inches (406 mm) on center is 32 psf (1.53 kPa). Support framing must be adequate to resist the design load, and must be designed for a maximum deflection of  $1/240$  of span.

## 6.0 EVIDENCE SUBMITTED

Data in accordance with [ICC-ES Acceptance Criteria for Cementitious Exterior Wall Coatings \(AC11\)](#), dated January 2013.

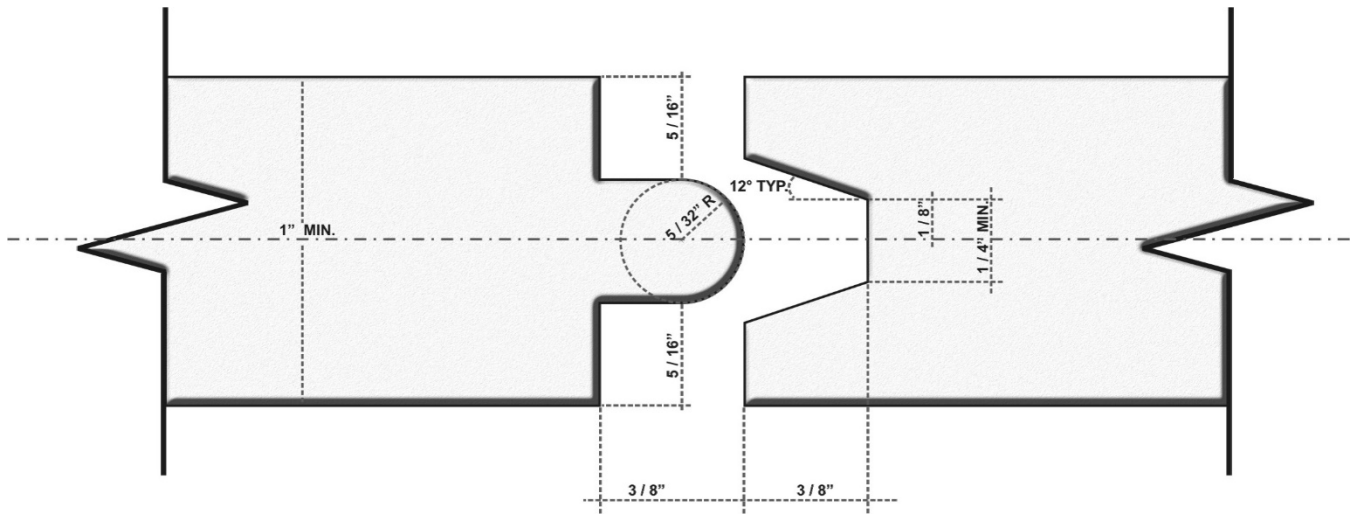
## 7.0 IDENTIFICATION

- 7.1 The factory-prepared mix is delivered to the jobsite in water-resistant bags that have labels bearing the following information:
- The name and address of Prowall Building Products, Inc. and the evaluation report number (ESR-3720).
  - Identification of components.
  - Weight of packaged mix.
  - Storage instructions.
  - Maximum amount of water and other components that may be added, and conditions that shall be considered in determining actual amounts.
  - Curing instructions.

The bulk mixer label shows information as noted in Section 3.2.1 of this report.

- 7.2 Polystyrene foam plastic insulation boards must be identified in accordance with their respective ICC-ES evaluation reports. Additionally, the board density must be noted.
- 7.3 The report holder's contact information is the following:

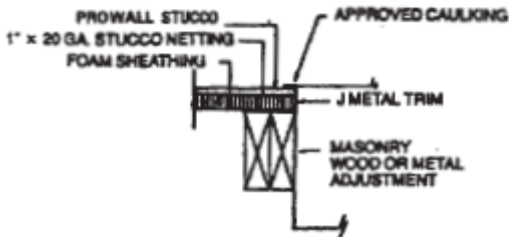
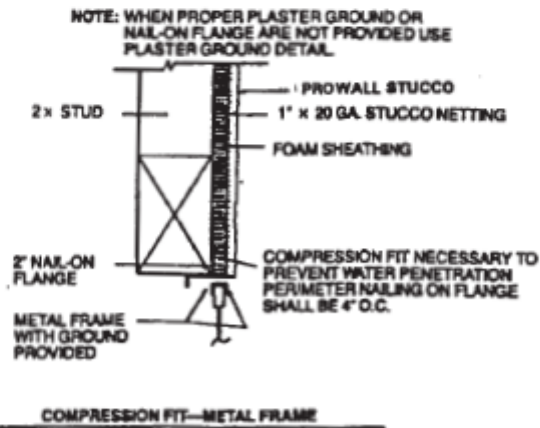
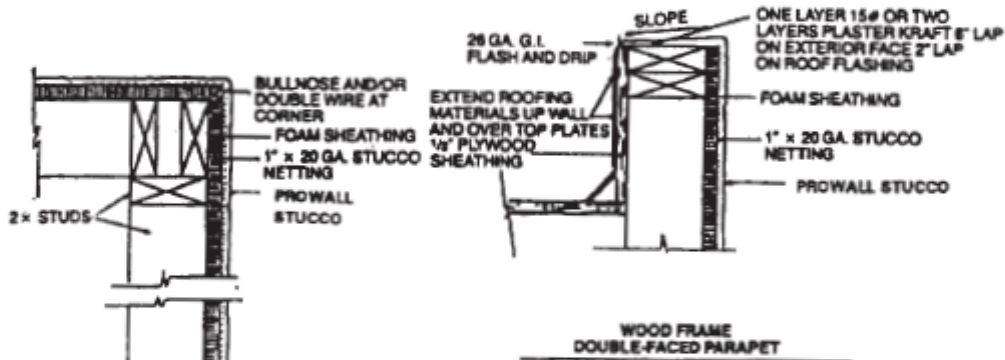
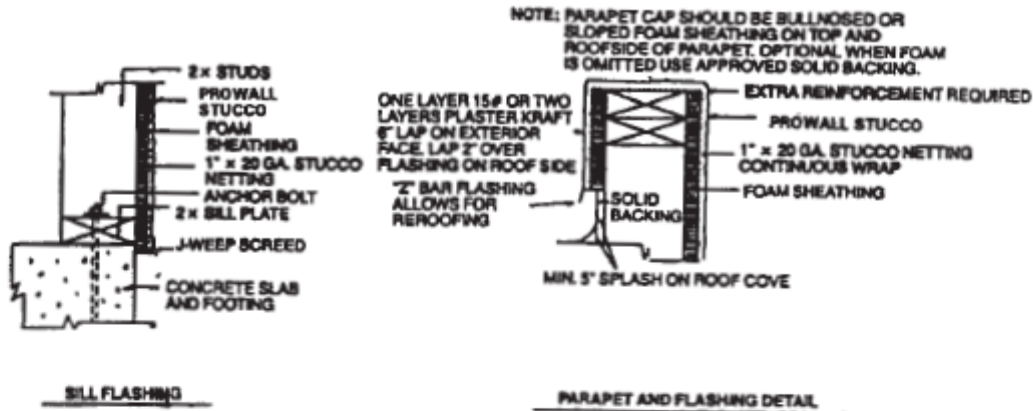
**PROWALL BUILDING PRODUCTS, INC.**  
**3652 EAST MIAMI AVENUE**  
**PHOENIX, ARIZONA 85040**  
**(602) 437-1976**  
[www.prowall.com](http://www.prowall.com)



For SI: 1 inch = 25.4 mm.

FIGURE 1—TONGUE AND GROOVE

DETAILS FOR PROWALL STUCCO



- NOTES: 1. WHEN USING SHEATHING OTHER THAN FOAM, THESE DETAILS SHALL APPLY. IF OTHER THAN 1-INCH THICK SUBSTRATES ARE USED, GROUNDS MUST BE ALTERED TO MAINTAIN PROPER PLASTER THICKNESS.  
 2. A WEATHER-RESISTIVE BARRIER IS REQUIRED BEHIND FOAM PLASTIC SUBSTRATES AND OVER OTHER SUBSTRATES.

FIGURE 2—TYPICAL INSTALLATION DETAILS



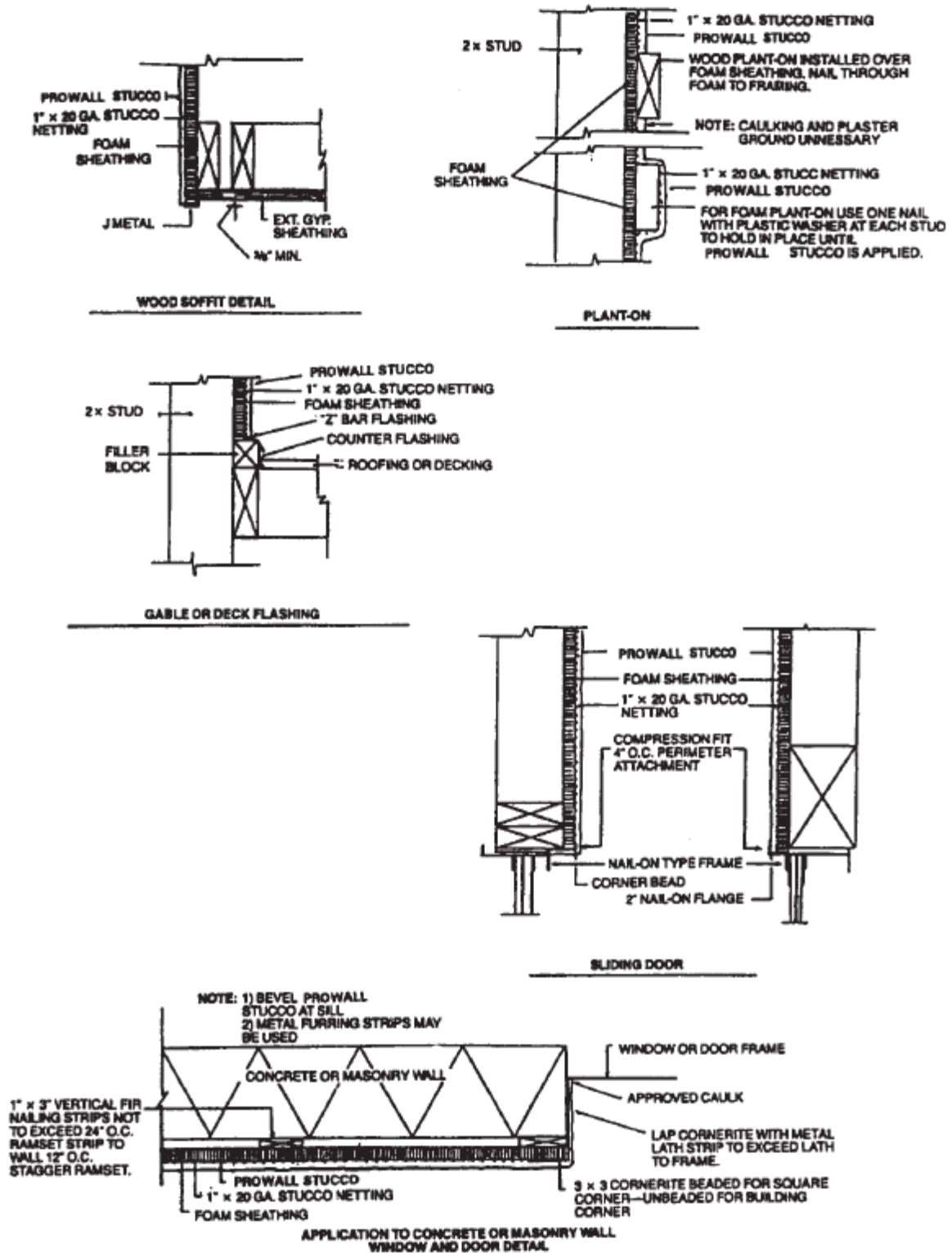


FIGURE 2—TYPICAL INSTALLATION DETAILS (Continued)

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

**Job Address**

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

ICC Evaluation Service, LLC  
ESR-\_\_\_\_\_

Date of Job Completion \_\_\_\_\_

**Plastering Contractor**

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone No. (     ) \_\_\_\_\_

Approved contractor 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