

ICC-ES Evaluation Report

ESR-1607*

Reissued September 1, 2008

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DIVISION: 09—FINISHES
Section: 09220—Portland Cement Plaster**REPORT HOLDER:****SACRAMENTO STUCCO CO., INC.**
POST OFFICE BOX 1166
WEST SACRAMENTO, CALIFORNIA 95691
(916) 372-7442
www.sacstucco.com**EVALUATION SUBJECT****WESTERN 1-KOTE EXTERIOR STUCCO SYSTEM,
MASTER WALL ONE COAT STUCCO (OCS) SYSTEM,
STO POWERWALL STUCCO SYSTEM AND ASHGROVE
ONE-COAT STUCCO SYSTEM****ADDITIONAL LISTEES:****ASH GROVE PACKAGING**
10816 EXECUTIVE CENTER DRIVE, SUITE 100
LITTLE ROCK, ARKANSAS 72211
(501) 224-3372**MASTER WALL INC.**
POST OFFICE BOX 397
FORTSON, GEORGIA 31808
(800) 755-0825**STO CORP.**
3800 CAMP CREEK PARKWAY, BUILDING 1400
SUITE 120
ATLANTA, GEORGIA 30261
(404) 346-7055**1.0 EVALUATION SCOPE****Compliance with the following codes:**

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

Properties evaluated

- Structural
- Durability

- Fire-resistance-rated construction
- Noncombustible construction

2.0 USES

The Western 1-Kote Exterior Stucco System, Master Wall One-coat Stucco System, Ashgrove One-Coat Stucco System, and Sto Powerwall Stucco System are exterior cementitious one-coat stucco wall coating systems. The systems are alternatives to exterior wall coverings specified in IBC Chapter 25, IRC Section R703 and UBC Chapter 25. The systems may be used in one-hour fire-resistance-rated walls and Type I, II, III, or IV construction when installed in accordance with Sections 4.4 and 4.5 of this report, respectively.

3.0 DESCRIPTION**3.1 Stucco Systems:**

The systems consist of a proprietary stucco reinforced with wire fabric or metal lath and applied over substrates of expanded polystyrene (EPS) or extruded polystyrene (XEPS) foam plastic insulation board, gypsum sheathing board, fiberboard, plywood, or oriented strand board (OSB). See Table 1 for the company names, system names and product names.

3.2 Materials:

3.2.1 Western 1-Kote Stucco, Master Wall OCS Sto Powerwall Stucco and Ashgrove 1-Coat Premix Stucco and Ashgrove 1-coat Stucco Concentrate: The materials are factory-prepared mixtures of 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. Four and one half to 6 gallons (17 to 23 L) of water and 180 to 200 pounds (82 to 91 kg) of sand must be added for each bag, in the field, and the components must be mixed in accordance with the manufacturer's recommendations. Alternatively, the stucco product is premixed with sand and is packaged in 90-pound (40.8 kg) bags. The premixed stucco product is field-mixed with 3 gallons (11.5 L) of water per bag of stucco product. 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 within the following limits:

***Revised September 2009**

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 and XEPS insulation board must have nominal densities of 1.5 and 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 not more than 450 when tested in accordance with ASTM E 84 (UBC Standard 8-1), and shall comply with ASTM C 578 as Type II (EPS) or VII (XEPS). 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 ⅜-inch-high (9.5 mm) tongues with compatible grooves for horizontal joints. See Figure 1 for joint detail.

When installed over wood-based sheathing as part of a water-resistive barrier, as described in Sections 3.2.8 and 3.2.9, the boards must have tongue-and-grooves on the horizontal edges as detailed in Figure 1, with a minimum 1-inch-thick insulation board. When installed over solid sheathing, as described in Section 4.3, the boards must have a minimum thickness of ½ inch (12.7 mm).

When installed over solid sheathing, the insulation boards must 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 and, when applicable, UBC Table 25-B. 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 C 79 or C 1396. Gypsum wallboard shall comply with ASTM C 36 or 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 a Type IV, Grade 1 wall sheathing.

3.2.9 Wood-based Structural Panels: Plywood must comply with DOC PS-1 (UBC Standard 23-2), and OSB must comply with DOC PS-2 (UBC Standard 23-3).

3.2.10 Caulking: The caulking must be either acrylic latex caulking material complying with ASTM C 834 or must be 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. For jurisdictions adopting the IBC or IRC, 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 D 226, Type I, or a water-resistive barrier recognized as equivalent to ASTM D 226, Type I or better, in a current ICC-ES evaluation report.

For jurisdictions adopting the UBC, except when installation is over wood-based sheathing, weather-resistive barriers must be minimum Grade D building paper complying with UBC Standard 14-1, or must be a weather-resistive barrier recognized as equivalent to Grade D or better in a current ICC-ES evaluation report.

For jurisdictions adopting the IBC, IRC and UBC, 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 complying with UBC Standard 14-1 as set forth in IBC Section 2510.6, IRC Section R703.6.3 or UBC Section 2506.4; or an equivalent recognized in a current ICC-ES evaluation report.
- One layer of EPS or XEPS insulation board, 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.

3.2.11.2 Vapor Retarder: Protection against condensation shall be provided in accordance with IBC Section 1403.2. A vapor retarder complying with IRC Section R318.1 must be provided, unless its omission is permitted under the exceptions in IRC Section 1403.3 or IRC Section R318.1.

3.2.11.3 Flashing: Flashing complying with 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 shall be sloped towards the exterior, with an upturned leg on the interior side and at the ends.

3.2.12 Finish Coat: Portland cement color coat, paints, acrylic textured finishes and elastomeric coatings are finishes that are acceptable to Sacramento Stucco Co., Inc., or the additional listees in this report. The finish coat

manufacturer's recommendations must be followed regarding 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:

The systems are applied to wood- or steel-framed exterior walls with substrates of expanded polystyrene (EPS) or extruded polystyrene (XEPS) insulation board, gypsum sheathing, fiberboard, plywood, oriented strand board (OSB), or to concrete or masonry. The systems are installed on exterior walls of wood- or steel-stud construction. 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 embedded in the minimum coating thickness, and therefore cannot be exposed. See Figure 2 for wall details. An exterior stucco finish coat, if required, may be applied without a bonding agent if applied within 72 hours of base-coat application. After 72 hours, a bonding agent, applied directly to the base coat or added to the finish coat mix, must be required. Corner reinforcement must be installed as shown in Figure 2 of this report. Weep screeds must meet the requirements of the applicable code. The window manufacturer's instructions for installation and flashing of all windows must be followed. Typical flashing details with are shown in Figure 2. The ambient air temperature range for application of the coating must be between 40°F and 110°F (4 and 43°C). The coating must be applied by applicators approved by Sacramento Stucco Co., Inc., Master Wall Inc., Ash Grove Packaging or Sto Corp., as applicable. The water-resistive barrier must be applied as set forth in Section 3.2.11. An installation card, as shown in Figure 3, must include the name of the applicator and the product to be used, and must be on the jobsite before any water-resistive barrier or exterior sheathing is installed. Also, see Section 5.5.

4.2 Application over Open Framing:

4.2.1 Insulation Board: 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 or XEPS 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. Dow Styrofoam Stuccomate brand XEPS 1-inch-thick (25.4 mm) insulation boards, recognized in [ESR-2142](#), may be installed with vertical edges located between framing members, provided the vertical edges are tongue-and-groove and provided the joints between adjacent courses are staggered a minimum of one stud space. Fasteners are No. 11 gage galvanized roofing nails with $\frac{3}{8}$ -inch-diameter (9.5 mm) heads, spaced 6 inches (152 mm) on center, or No. 16 gage [0.065-inch leg diameter (1.65 mm)] galvanized staples with minimum crown widths of $\frac{7}{16}$ inch (11.1 mm), spaced 6 inches (152 mm) on center. Fasteners must penetrate wood framing at least 1 inch (25.4 mm). Wood species must have a specific gravity of 0.50 or greater, such as Douglas fir–larch. Care must be taken to avoid over-driving fasteners. Wall bracing in accordance with IBC Section 2308.9.3, IRC Section R602.10 or Section 2320.11.3 or 2320.11.4 of the UBC, or an

acceptable alternate, must be provided. Application to minimum No. 20 gage steel studs must be similar, except that No. 6, Type S screws must be installed 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. Outside wall corners and parapet corners must be covered with additional metal corner reinforcement as shown in Figure 2 of this report. 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. Dow Styrofoam Stuccomate brand XEPS four-sided T & G foam is approved for floated or unbacked vertical foam float joints. Unbacked or floated joints must be staggered from the joint above and below a minimum of 16 inches.

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 fastened in accordance with IBC Table 2304.9.1, IRC Table R602.3(1) or UBC Table 23-II-B-1, and is 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 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 weather-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 4.2.1 of this report or IBC Table 2304.9.1, IRC Table R602.3(1) or UBC Table 23-II-B-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 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. 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, IRC Tables R602.3(3) and R602.3(1) or

UBC Tables 23-IV-D-1 and 23-11-B-1, and must be applied directly to wood 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 shall 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 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, 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 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 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 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 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, along with fastener heads, treated with joint compound.

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 parallel 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 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 wallboard must be applied horizontally to wood studs spaced a maximum of 16 inches (406 mm) on center. The wallboard must be attached, using $1\frac{5}{8}$ -inch-long (41.3 mm), No. 13 gage, gypsum wallboard nails having $\frac{19}{64}$ -inch-diameter (7.5 mm) heads, at 6 inches (152 mm) on center around board edges and to studs and blocking. All wallboard joints must be backed by wood framing and taped and treated with joint compound. Fastener heads must be treated with joint compound.

4.4.2.2 Exterior Face: Three-and-a-half-inch-thick (92 mm), 15-inch-wide (381 mm), R-13, 1.72 pcf (27.6 kg/m³) density, mineral wool batts, having a vapor barrier on one face, must be stapled to one face of the framing members. One layer of $\frac{1}{2}$ -inch-thick (12.7 mm), water-resistant core gypsum sheathing must be fastened to the studs as described for gypsum wallboard in Section 4.4.2.1. A water-resistive barrier complying with the code must be applied over the sheathing in accordance with the applicable code. The 1-inch (25.4 mm) by No. 20 gage galvanized wire fabric lath and the wall coating must be applied over the sheathing and water-resistive barrier in accordance with Section 4.3.3. No foam plastic insulation is permitted.

4.4.2.3 Axial Load Design (2 by 4 Wood Construction): 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 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 ANSI/NFoPA NDS-91 (UBC).
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).
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).

4.4.2.4 Axial Load Design (2-by-6 Wood Construction): Axial loads applied to the wall assembly are limited to the least of the following:

1. 3,000 pounds (13 350 N) per stud up to 10 feet high or 1,100 pounds per stud for greater heights.
2. A maximum of 44.7 percent of the load calculated in accordance with Sections 3.6 and 3.7 of ANSI/AF & PA NDS-05 (IBC and IRC) or ANSI/HFoPA NDS-91 (UBC).
3. Design stress of $0.78 f_c$ 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).
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 ANSI/AF&PA NDS-05 (IBC and IRC) or ANSI/NFoPA NDS-91 (UBC).

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 wallboard must be applied to nominally 2-by-4 wood studs spaced a maximum of 24 inches (610 mm) on center, with the gypsum wallboard's long dimension horizontal. Horizontal solid blocking must be installed at the wall midheight. The wallboard must be attached with $1\frac{5}{8}$ -inch-long (41.3 mm), cupped-head gypsum wallboard nails with a 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 8 inches (203 mm) on all studs, plates and blocking. Wallboard joints must be covered with paper tape and gypsum joint compound. Fastener head must also be treated with joint compound. Kraft-paper-faced, $3\frac{1}{2}$ -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.

4.4.3.2 Exterior Face: Any of the following substrates may be used:

- 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 must be as described in Section 3.2.5 or 3.2.9, and shall 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 must be installed as described in this report. The lath and wall coating shall 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 for 2-by-4 construction.
2. 3,000 pounds (13350 N) for 2-by-6 construction up to 10 feet high (3048 mm) or 1100 pounds (4595 N) per stud for greater heights.
3. A maximum of 44.7 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).
4. 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).
5. 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).

4.4.4 Fourth Assembly:

4.4.4.1 Interior Face: One layer of $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum wallboard must be applied to nominally 2-by-4 wood studs spaced a maximum of 24 inches (610 mm) on center, with the gypsum wallboard's long dimension vertical. The wallboard must be attached with $1\frac{5}{8}$ -inch-long (41.3 mm), No. 13 gage, cupped-head gypsum wallboard nails having $\frac{19}{64}$ -inch-diameter (7.62 mm) heads, spaced at 8 inches on center on all studs and plates. Wallboard joints must be covered with paper tape and gypsum joint compound. Fastener heads must be also be treated with joint compound. Kraft-paper-faced, $3\frac{1}{2}$ -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.

4.4.4.2 Exterior Face: One layer of $\frac{7}{16}$ -inch-thick (11.1 mm) oriented strand board (OSB). The OSB must be as described in Section 3.2.9, and must be installed on the wood framing as described in Section 4.3.2. A weather-resistant barrier complying with and installed in accordance with Section 3.2.1.1 must be installed over the OSB. Foam plastic insulation complying with and installed in accordance with Sections 3.2.3 and 4.3.1 is installed over the weather-resistant barrier. The lath and wall coating must be installed as described in Section 4.0.

4.4.4.3 Axial Load Design (2-by-4 Wood Construction): 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 ANSI/AF&PA NDS-05 (IBC and IRC) or ANSI/NFoPA NDS-91 (UBC).
3. Design stress of $0.78 f_c$ 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).
4. Design stress $0.78 f_c$ at a maximum l_e/d of 33 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).

4.4.4.4 Axial Load Design (2-by-6 Wood Construction): Axial loads applied to the wall assembly are limited to the least of the following:

1. 3,000 pounds (13 350 N) per stud.
2. A maximum of 44.7 percent of the load 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).
3. Design stress of $0.78 f_c$ 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).
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 ANSI/AF&PA NDS-05 (IBC and IRC) or ANSI/NFoPA NDS-91 (UBC).

4.4.5 Fifth Assembly (Open Framing):

4.4.5.1 Interior Face: One layer of $\frac{5}{8}$ -inch-thick (15.9 mm), Type X gypsum wallboard must be applied to nominally 2-by-4 wood studs spaced a maximum of 24 inches (610 mm) on center, with the gypsum wallboard's long dimension vertical. The wallboard must be attached with $1\frac{5}{8}$ -inch-long (41.3 mm), No. 13 gage, cupped-head gypsum wallboard nails having $\frac{19}{64}$ -inch-diameter (7.62 mm) heads, spaced at 8 inches on center on all studs and plates. Wallboard joints must be covered with paper tape and gypsum joint compound. Fastener heads must also be treated with joint compound. Kraft-paper-faced, $3\frac{1}{2}$ -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.

4.4.5.2 Exterior Face: A weather-resistant barrier complying with and installed in accordance with Section 3.2.11.1 must be installed over the open framing. Foam plastic insulation complying with and installed in accordance with Section 3.2.3 is installed over the weather-resistant barrier. The lath and wall coating must be installed as described in this report.

4.4.5.3 Axial Load Design (2-by-4 Wood Construction): 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 ANSI/AF&PA NDS-05 (IBC and IRC) or ANSI/NFoPA NDS-91 (UBC).
3. Design stress of $0.78 f_c$ 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).

- 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 ANSI/AF&PA NDS-05 (IBC and IRC) or ANSI/NFoPA NDS-91 (UBC).

4.4.5.4 Axial Load Design (2-by-6 Wood Construction): Axial loads applied to the wall assembly are limited to the least of the following:

- 3,000 pounds (13 350 N) per stud up to 10 feet high or 1,100 pounds per stud for greater heights.
- A maximum of 44.7 percent of the load 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).
- Design stress of $0.78 f_c$ 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).
- Design stress of $0.78 f_c$ at a maximum of l_e/d of 33 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).

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 wallboard complying with ASTM C 36 must be applied vertically to steel framing with all edges blocked. Fasteners are No. 8 by $1/4$ -inch-long (31.7 mm) buglehead 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. Intermediate fasteners must be treated with compound.

4.5.2 Steel Framing: Minimum $3/8$ -inch-deep (92 mm), minimum No. 20 gage [0.036 inch (0.914 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 complying with ASTM C 79 must be applied horizontally to the steel framing using No. 8 by $1/4$ -inch-long (32 mm) buglehead 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 (ICC-ES legacy report ER-2331) must be fitted into each stud cavity. The insulation must have a minimum nominal density of 4 pcf (64.1 kg/m³), must be 4 inches (102 mm) thick, and must be approximately 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 a vapor retarder, having a maximum flame-spread index of 25 and a maximum smoke-developed index of 30, and qualifying as a Type 1, Grade A, water-resistive barrier in accordance with UBC standard 14-1. The vapor retarder must be installed over the sheathing and EPS in accordance with IBC Section 1403, IRC Section R703.2, or UBC Section 1402.1. One-inch-thick (25.4 mm) EPS insulation board with a nominal 1.5 pcf (24 kg/m³) density must be 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 must be fastened to the steel framing using No. 8 by $2 1/2$ -inch-long (63.5 mm), wafer-head, self-drilling screws spaced at 8 inches (203 mm) on center to all framing members. The stucco must be applied to a minimum thickness of $3/8$ inch (9.5 mm) in accordance with Section 4.1.

4.6 Miscellaneous for Stucco System:

4.6.1 Inspection Requirements: A building department inspection must be required on wire lath installation prior to application of the coating, in accordance with IBC Section 109.3.5 or UBC Section 108.5.5.

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

4.6.3 Curing: Moist curing must be provided for 48 hours after coating application.

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 Table 25-B of the UBC 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 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, IRC Section R602.3, and UBC Table 23-II-B-1, 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 Western 1-Kote Exterior Stucco System, MasterWall One Coat Stucco System Ashgrove One-coat Stucco System and Sto Powerwall Stucco System, described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 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.
- Installation must be by contractors approved by the manufacturer.
- The system is permitted to be applied to walls of Type I, II, III or IV construction, in accordance with Section 4.5 of this report.
- 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, Section R314.1.2 and Table R702.3.5 of the IRC, or Section 2602.4 and Table 25-G of the UBC.

- 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 IBC Section 2603.8 and IRC Section R320.5.
- 5.7 The maximum allowable wind load on the cementitious one-coat stucco systems with studs a maximum of 24 inches (610 mm) on center shall be 35 psf (1.68 kN/m²), except for gypsum sheathing substrates, for which the allowable wind load shall be 25 psf (1.20 kN/m²). Support framing must be adequate to resist the design load.

6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with ICC-ES Acceptance Criteria for Cementitious Exterior Wall Coatings (AC11), dated June 2007 (editorially revised April 2008).
- 6.2 Reports of tests in accordance with ASTM E 119 and NFPA 285.

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:

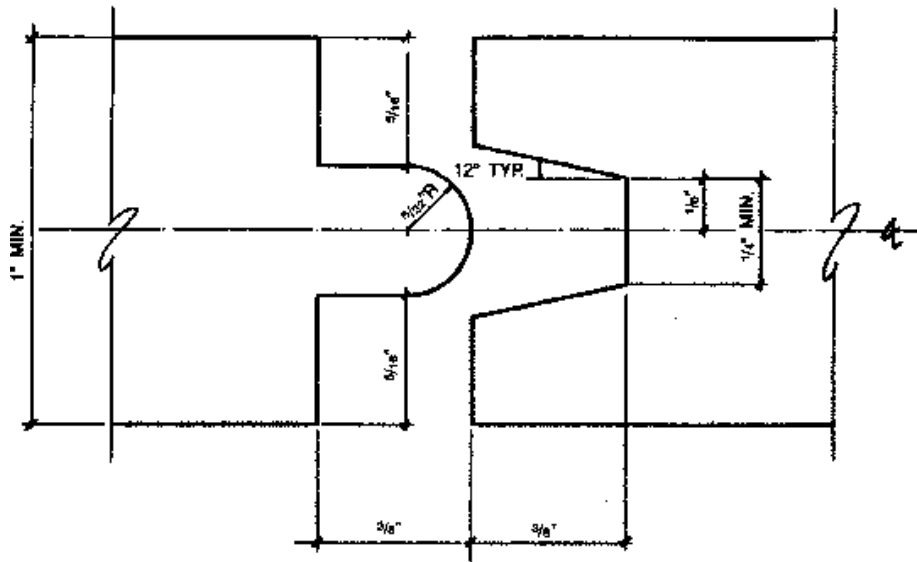
- The name and address of Sacramento Stucco Co., Inc.; or the name and address of one of the additional listees noted in this report and the logo of Western 1-Kote.
- The evaluation report number (ESR-1607).
- Identification of components.
- Weight of packaged mix.
- Storage instructions.
- Maximum amount of water and other components that may be added, and conditions that shall be considered in determining actual amounts.
- Curing instructions.

- 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 For insulation boards applied to walls required to be of Type I, II, III or IV construction, as noted in Section 4.5 of this report, 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-1607), the system name as stated in Table 1 of this report, and the ICC-ES evaluation report number for the foam plastic.

TABLE 1—CROSS REFERENCE INDEX

COMPANY NAME	SYSTEM NAME	PRODUCT NAME
Sacramento Stucco Co., Inc.	Western 1-Kote Exterior Stucco System	Western 1-Kote
Sto Corp.	Sto One-Coat Stucco System Powerwall	Sto Powerwall One-Coat Stucco
Master Wall Inc.	Master Wall One Coat Stucco System	OCS
Ash Grove Packaging	Ashgrove One-coat Stucco System	Ashgrove 1-coat Premix Stucco Ashgrove 1-coat Stucco Concentrate

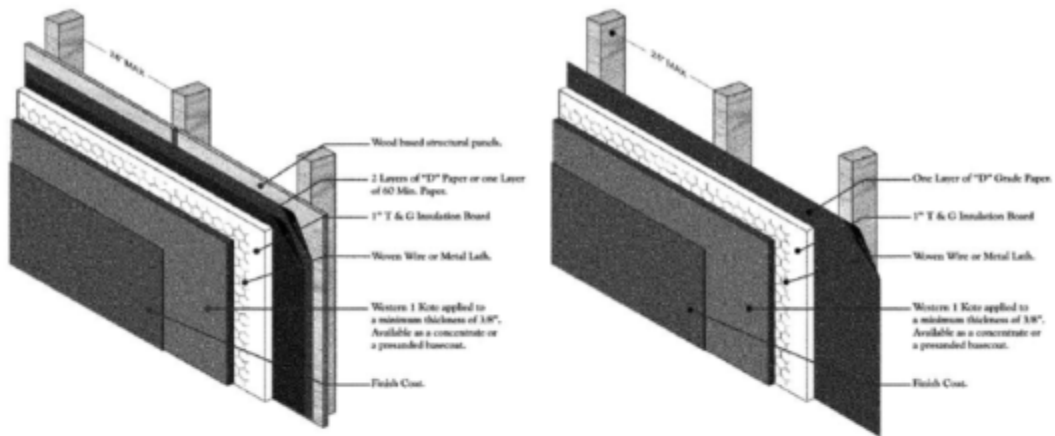


For SI: 1 inch = 25.4 mm.

FIGURE 1—TONGUE AND GROOVE

SYSTEM WITH FOAM AND WOOD SHEATHING

SYSTEM WITH FOAM OVER OPEN STUDS



TYPICAL PAPER AND FLASHING DETAIL AT WINDOW

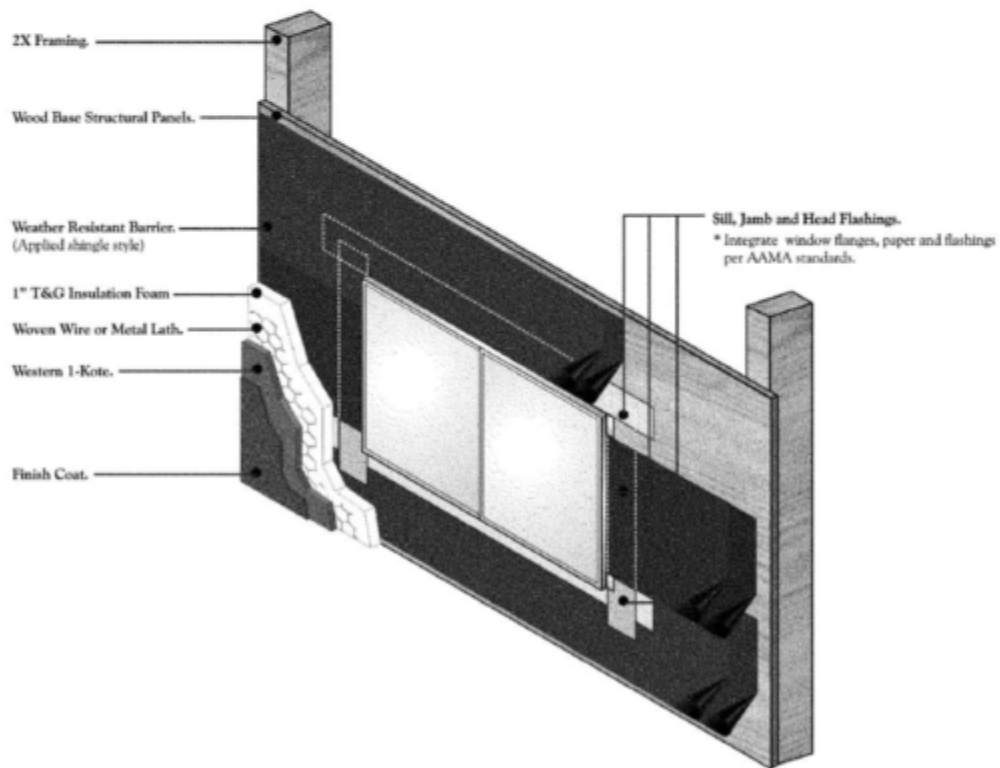
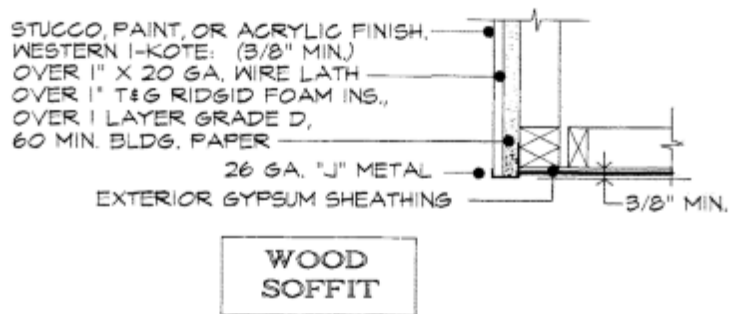
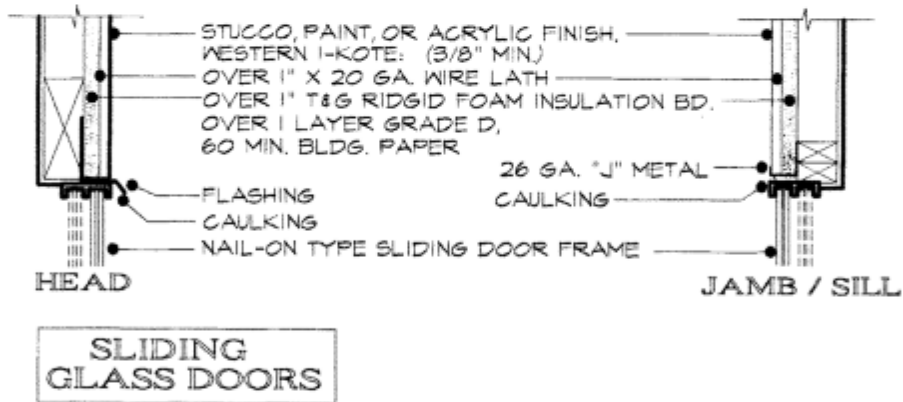
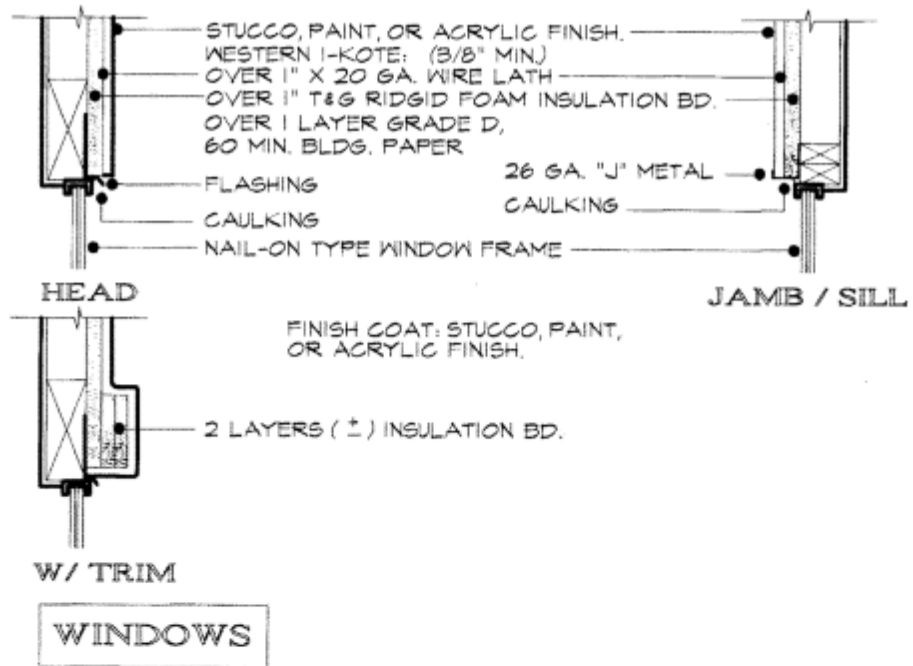


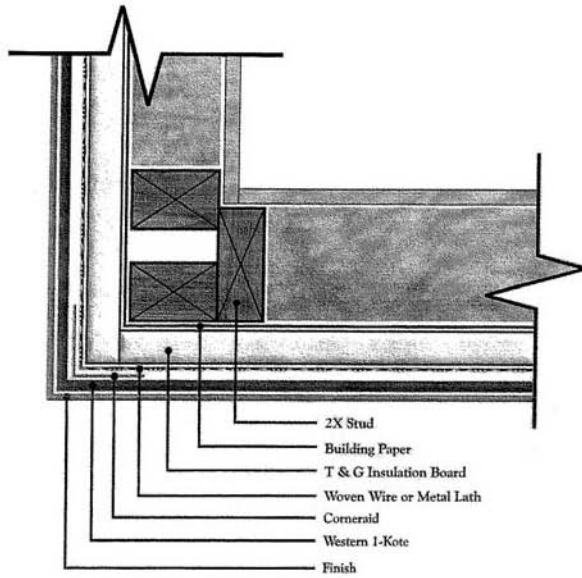
FIGURE 2—TYPICAL INSTALLATION DETAILS



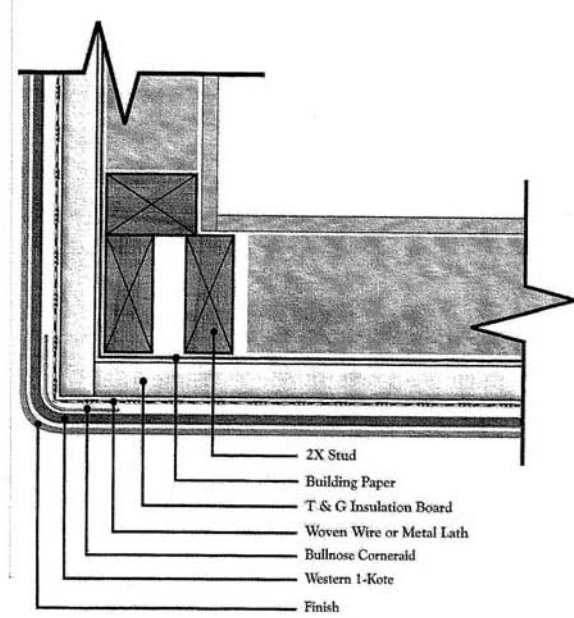
For SI: 1 inch = 25.4 mm.

FIGURE 2—TYPICAL INSTALLATION DETAILS (Continued)

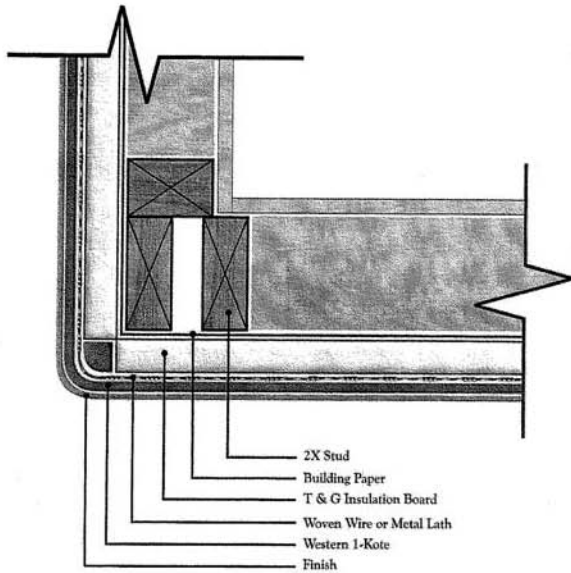
A **SQUARE CORNER
W/REINFORCEMENT**



B **BULLNOSE CORNER
W/REINFORCEMENT**



C **BULLNOSE CORNER
W/O REINFORCEMENT**



For SI: 1 inch = 25.4 mm.

FIGURE 2—TYPICAL INSTALLATION DETAILS (Continued)



	INSTALLATION CARD Western 1 Kote Exterior Stucco System Sacramento Stucco Company	
Job Address _____ _____ _____	ICC Evaluation Services, Inc. Evaluation Report ESR-1607	Date of Job Completion: _____
Plastering Contractor		
Name: _____		
Address: _____		
Telephone No.: _____		
Approved contractor number as issued by 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 or plastering contractor		_____ Date
This installation card must be presented to the building inspector after completion of work and before final inspection		

FIGURE 3—TYPICAL INSTALLATION CARD