



STUCCO IN RESIDENTIAL CONSTRUCTION

2003 Minnesota State Building Code Update

Moisture Intrusion: Stucco problem or construction problem?

The “hole” is greater than the sum of the parts

“Stucco is only one small piece of a very complex puzzle. The composite of any construction relies on the synergism of all the pieces working together. The stucco is not the cause of a window or roof leak, or the reason the sheathing and studs are rotting in walls. We can prove these facts every time.” -**Steven Pedracine, Executive Director, Minnesota Lath & Plaster Bureau**

A Brief History Lesson

Portland cement plaster, otherwise known as stucco, has been used with great success in the Twin Cities for over 110 years! The history does not begin there, however. Long before the invention of portland cement, pozzolana stucco was used on

some of man’s oldest and most widely recognized wonders of the world: The Aqueducts in Rome, the Colosseum, and the Forum are just some examples. In Europe, lime stucco can be seen on almost everything. In the United States, Benjamin Henry Latrobe, at the behest of Thomas Jefferson, designed many important Washington landmarks with stucco as the cladding. In this century who can define modern architecture better than Frank Lloyd Wright who favored a smooth portland cement stucco finish on much of his prairie and contemporary style work.

Yes, stucco is as enduring as time itself. So why are so many fingers pointing at stucco as the reason for moisture intrusion issues? The answer is not a simple one, however we can state unequivocally that construction has evolved dramatically in just the past 10-20 years.

The Mc Mansion Phenomenon

(Continued on page 3)

A publication of the...

minnesota lath and plaster bureau

“Promoting the Industry Since 1953”



**UPDATED WITH NEW INFORMATION,
DETAILS AND CODE REFERENCES,
PULLOUT
CHECKLIST INCLUDED!**

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Disclaimer

The text, drawings and related notes contained herein are typical of stucco installations in Minnesota. Please see the 2003 Minnesota State Building Code for specific requirements. Examples illustrated are not called out in the code in all cases.

This guide contains general information on stucco installation and related materials. It is provided as a guide only and is not intended for any specific construction project. The Minnesota Lath and Plaster Bureau makes no express or implied warranty or guarantee of the techniques, construction methods, materials and details identified herein, nor does it assume any liability for the use of this information.

It is the sole responsibility of any architectural or construction industry professional to apply their professional knowledge in utilizing the information contained in this publication.

To the best of our knowledge, this information is correct and up to date as of the August 2004 printing. To ensure that you have the most current version please contact the Minnesota Lath & Plaster Bureau.

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The Minnesota Lath and Plaster Bureau has promoted the industry since 1953. It is recognized as an education and technical spokesman for the plastering industry. It provides services to architects, the construction community and the public on a variety of matters relating to the plastering trades.

[1] References to ASTM C 1063—97 *Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster*, extracted, with permission. Copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. A copy of the complete standard may be obtained from ASTM, phone: 610-832-9585, fax: 610-832-9555, email: service@astm.org, website: www.astm.org.

References to the 2003 Minnesota State Building Code, Rules Chapter 1309.0703, Section R703, *Exterior Wall Covering* are reprinted with permission of the Revisor of Statutes, State of Minnesota.

This booklet also makes reference, indirect or otherwise to the International Residential Code 2000. Copyright 2000. Falls Church, Virginia: International Code Council, Inc.

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How has construction evolved? Look around you; have you seen any conventional “Raised Ranches” or “Ramblers” going up lately? Good economic times bring bigger more expensive homes. “Mc Mansion” is the buzzword today, with multiple steeply pitched roofs and dormers, large expanses of glass, decks and impressive projecting facades with more angles than Isosceles ever thought about. This extends to the inside environment where we cannot live without our vaulted ceilings, skylights, garden tubs and indirect can lighting.

Buildings today are much more energy efficient. This has been a marked improvement in keeping us warm in the winter and cool in the summer. But these improvements in comfort seem to come at the cost of durability in the overall construction. Homes built today are much tighter. We use more insulation, more thermally efficient windows, more caulk, more glue, better vapor retarders, building wraps, air tight outlet boxes etc. The result is fewer holes and lower air exchange between the inside and the outside. Without adequate ventilation this has created an interior environment with more concentrated pollutants and elevated moisture levels. And, if improperly addressed, this often results in condensation problems, mold and decay growing in and on walls, ice dams and wood rot among other maladies.

The Tip of the Iceberg

The problems we are seeing are not confined to dwellings with stucco as the cladding. Brick, stone, vinyl, wood, wood composites, shakes, cement board, metal, have all been affected. Because stucco is monolithic (it has no seams) it appears the phenomenon has defined itself more quickly than in other claddings. Stucco is in fact better than many conventionally clad homes because it keeps the building more comfortable by slowing down air infiltration. This same benefit however, can create a wall that is slower to dry when it does become wet from condensation, leaking windows or improperly flashed details.

So why can't we build like we use to?

This is a frequently asked question. But we live in an age of enlightened concern for conserving our natural resources. We could go back to building inefficient, drafty homes, but it would be at the cost of higher energy consumption and less comfort. This would obviously be a step in the wrong direction.

Complex problem straightforward solution

Okay, so what really is the problem? What we are seeing is the beginning of a construction problem, not a stucco problem. What can we do? We can have a better understanding of how building materials integrate with one another. The answer is communication.

For it's small part in this complex puzzle, the Minnesota Lath and Plaster Bureau presents this handbook as a proactive approach to this end.

“If you can't figure out how to flash it, should you really be building it?”

Some of what has happened since we first published this document in July 2000...

- *August 30, 2001. Mold and Moisture Bankrupt Big Builder* (Cincinnati). Brick veneer on many of the effected homes was removed to determine the source of moisture. *Journal of Light Construction*.
- *June 22, 2002.* The preeminent building scientist in the country, Joe Lstiburek, defines polyethylene vapor retarders as really “drying retarders” in an errata piece to his *Moisture Control Handbook* originally published in 1993.
- *August 2002.* Tim Carter author of the syndicated column “Ask the Builder” states... “In my opinion there are quite possibly hundreds of thousands of brick veneer homes built in the past 15 or 20 years that are ticking time bombs.”
- *September 2002.* Plaintiffs claiming damages for mold...have filed an estimated 10,000 suits in U. S. Courts. *Corporate Legal Times* .
- *November 2003.* The Canadian Mortgage Housing Corp. reports that 35-45% of all new residential windows leak. In service it was determined that 100% will leak over time.
- *December 2003. Mold Changes dream house into nightmare.* *Indianapolis Star* reports mold problems associated with improper brick installation techniques.

Selecting Sheathing

Sheathing performs the function of substrate back-up to the stucco. When choosing a sheathing substrate for stucco, consideration should be given to the product's vapor permeability (ability to pass moisture in its gaseous state), its ability to withstand exposure to moisture and its structural characteristics. Each sheathing product has its own set of attributes and deficiencies. For this reason special considerations are necessary for the proper installation of each.

Types of Sheathings Available:

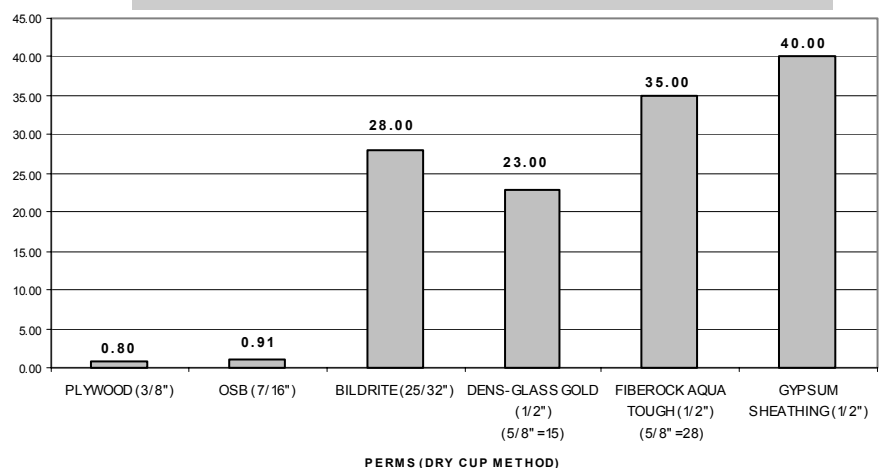
Ligno-Cellulosic Fiber Board a.k.a. **Bildrite** lists a vapor permeability rating of 28 U.S. perms [1]. **Exterior Gypsum Sheathing** (1/2") typically has a vapor permeance value of 40 Perms [2]. Another gypsum product often seen on commercial buildings is **Georgia-Pacific's Dens-Glass Gold**. This product offers superior moisture resistance with a glass mat surfacing and comes with a six month in-place open exposure warranty. **United States Gypsum** also promotes a similar product called **Fiberock Aqua-Tough** which comes with a one year in-place open exposure warranty .

Note: Gypsum sheathing is not a structural product. Do not use gypsum sheathing in lieu of structural wood panel products or bracing where required. Check with gypsum sheathing manufacturer for specific use requirements.

Wood sheathings available are **Exposure 1 Plywood, Exposure 1 Oriented Strand Board and Exterior Grade Plywood**. Structurally, wood sheathing panels are the preferred sheathing in the residential market because they provide the best shear value and racking resistance. Wood sheathing is semi-permeable. At 50% relative humidity levels, various plywood species (3/8") have a permeance range of 0.45-1.43 perms and OSB (7/16") 0.91 perms. However, the permeance increases by a factor of 10 when the humidity is increased to 90% [3].

Installation Comments: The Engineered Wood Association (APA) and International Bildrite, Inc recommend that their sheathings be spaced at all edges and ends 1/8" between adjacent panels. This is to minimize the effects of swelling of the sheathing due to moisture. For more information contact APA or Bildrite. Those phone numbers are listed on page 27.

COMPARING SHEATHING PERMEANCE



Sources: [1] International Bildrite (website 2004). [2] Georgia-Pacific (Gypsum Product Catalog). [3] The Engineered Wood Association, Technical Services Division, 1994.

“Wood structural panels used as wall sheathing are susceptible to fungal decay (rot) if exposed to moisture content, generally considered to be greater than 20% for an extended period of time. These panels are manufactured with adhesive systems that withstand extreme moisture conditions in uncovered conditions such as when fully exposed during construction. However when covered as they are in wall systems, moisture intrusion can lead to conditions where the panels cannot dry. Extended periods where the panels remain at excessive levels of moisture can lead to fungal deterioration of the wood itself. All untreated wood in such condition, panels and studs, is prone to decay... Therefore it is important to protect wood components from prolonged exposure to moisture. The correct use of building paper and flashing will help to provide protection from moisture.”

The Engineered Wood Association
Bulletin TB-202

Weather-resistive barriers: Minnesota Building Code Section R703.2 states “a minimum of one layer of No. 15 asphalt felt complying with ASTM D 226 for Type 1 felt or other approved weather-resistive material (shall) be applied over sheathing of all exterior walls.” There is, however, a caveat to this rule with respect to stucco over wood-based sheathings in Section R703.6.3.

MN Building Code Section R703.6.3 requirements: This amendment states that, “Weather-resistant barriers shall be installed as required in R703.2 and, where applied over wood-based sheathing, shall include a weather-resistive vapor permeable barrier with a performance at least equivalent to two layers of Grade D paper.”

Alternate weather-resistant barriers: A question that is often asked is whether other house wrap materials such as Tyvek, et. al. are acceptable alternates to the weather-resistive barriers required under the code. To meet the code requirement, these products must have what is called an ICC-ES Report that qualifies the product as an alternate to the building code. To find out simply ask your supplier if you can see a copy of the manufacturer’s ES Report. Then consult with the local building official for approval before using. Specific reports can also be

accessed online at www.icc-es.org.

Installation comments: Building paper can be applied over wood based substrates in double thickness rolls. There is no regulation that states two layers must be applied in consecutive applications. As required by Minnesota Code Section R703.2, “Such felt or material shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm). Where (vertical) joints occur, felt shall be lapped not less than 6 inches (152 mm).” The Minnesota Lath and Plaster Bureau also recommends that the building paper be wrapped continuously through both internal and external corners. Also, as per the MN Building Code Section R703.2, “Building paper or other approved material shall be continuous up to the underside of the rafter or truss top chord and terminated at penetrations and building appendages in such a manner to meet the requirements of the exterior wall envelope as described in Section R703.1.” See also the detail on soffits in this handbook page 13.

“No. 15 or 15# felt is not Grade D Building Paper”

Also, breaches in the building paper created by ducts, electrical service mud rings, pipes, etc., should be cut with a sharp knife to fit snugly, then weatherproofed with sealant or adhesive membrane tape before the lath and stucco is installed.

Metal Lath

2003 MN Building Code Section R 703.6

Metal Lath: Based upon local practice the Minnesota Lath & Plaster Bureau recommends 3.4# self furring galvanized metal lath.

Attachment: MN Building Code Section R703.6 requires that “all lath and lath attachments (shall) be of corrosion-resistant materials. Expanded metal...lath shall be attached with 1-1/2 inch long (38 mm), 11 gage nails having a 7/16-inch (11.1 mm) head, or 7/8-inch long (22.2 mm), 16 gage staples, spaced no more than 6 inches (152 mm) at supports.” ASTM C 1063 [see footnote 1 page 2], which is referenced by the Minnesota State Code, requires that all fasteners penetrate the wood framing members a minimum of 3/4-inch. The Minnesota Lath & Plaster Bureau concurs with this recommendation.

There has been much controversy about the impact of over fastening into the sheathing between wood framing. Theories include the belief that fasteners coming out the backside of the sheathing are magnets for frost in the winter months.

While we can appreciate the concern that this theory embraces, we must point out that frost is the result of condensation. Condensation occurs when water vapor reaches a saturation (dew) point within the wall. Moisture condenses on thermally conductive surfaces, so the inside surface of the sheathing is the likely place for this phenomenon to occur. This would happen re-

(Continued on page 6)

(Continued from page 5)

ardless as to whether fasteners are poking through the back side of the sheathing or not.

It is then the consensus among many plastering professionals and the Minnesota Lath and Plaster Bureau, that a few extra fasteners between the framing supports is not detrimental to the overall wall assembly. However, liberal use of fasteners should be avoided. As another option, additional fasteners can be used that do not penetrate the entire thickness of the sheathing. According to ASTM C 1063 (Standard Specification for Lathing), which is also referenced by the MN Building Code (section 7.8.2), "Metal Lath shall be lapped 1/2 inch at the sides"...and "1 inch at ends. Where end laps occur between the framing members, the ends of the sheets of all metal

plaster bases (lath) shall be laced or wire tied with 0.0475-in. galvanized, annealed steel wire." ASTM C 1063, also states (section 7.10.1.2 - 3) that "Lath shall be applied with the long dimension at right angles to the supports, unless otherwise specified. Ends of adjoining plaster bases (lath) shall be staggered."

Lath Inspections Are Required:

See MN Building Code Section 1300.0210 Subparagraph 6.

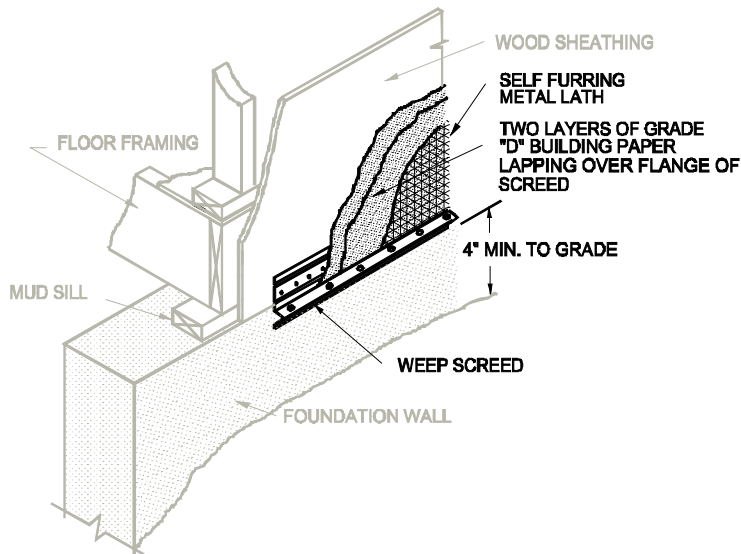
It is incumbent upon the contractor to notify the local building official that his work is ready for inspection. Lath inspections are to be made before any plastering is applied.

Corners: ASTM C 1063 (section 7.11.2) states "Corner beads shall be installed to protect all external corners and to establish grounds." Section 7.11.2.1 further states that "External corner reinforcement shall be

installed to reinforce all external corners where corner bead is not used. Where no external corner reinforcement or corner bead is used, lath shall be furred out and carried around corners at least one support on frame construction." To provide extra reinforcement and a straighter more uniform corner Stockton Wire Products, Corner Aid (or equivalent) is recommended at these locations.

Weep Screeds

2003 MN Building Code Section R703.6.4



According to the MN Building Code (section R703.6.4), "A minimum 0.019-inch (No. 26 galvanized sheet gage) corrosion - resistant weep screed with a minimum vertical attachment flange of 3-1/2 inches shall be provided at or below the foundation plate line on all exterior stud walls in accordance with ASTM C 926. The weep screed shall be placed a minimum of 4 inches above the earth or 2 inches above paved areas and shall be of a type that will allow trapped water to drain to the exterior of the building. The weather-resistant barrier shall lap the attachment flange. The exterior lath shall cover and terminate on the attachment flange of the weep screed."

For ease of installation, weep screeds are generally installed so that the back attachment flange is fastened through the sheathing and into the mud sill. For aesthetic reasons, some applications may require the stucco to continue down over an exposed foundation. In this situation building officials have expressly stated that the weather-resistant barrier must extend onto the foundation wall to prevent adhesion of the stucco. The weather-resistant barrier must then lap onto the attachment flange of the weep screed as previously mentioned. According to ASTM C1063 (section 6.3.2) the weep screed "shall have a sloped, solid or perforated ground or screed flange to facilitate the removal of moisture from the wall cavity..."

2003 MN Building Code Section
R703.6, ASTM C 1063 Sections
7.11.4 through 7.11.4.4

Control Joints

Cracking occurs because stress exceeds the restraint capacity of the stucco. Once this has happened the stress is relieved by splitting/ cracking open of the stucco membrane. Control joints are mechanical components that are introduced into stucco wall areas to artificially relieve these stresses.

As referenced by the MN Building Code, ASTM C 1063 requires that *“control joints be installed in walls to delineate areas not more than 144 ft²... The distance between control joints shall not exceed 18 ft in either direction or a length to width ratio of 2 ½ to 1...”*

In years past, the use of control joints in residential stucco applications has not been closely practiced. This is a matter of some controversy for commercial stucco installers who feel that there is a double standard that needs to be reformed.

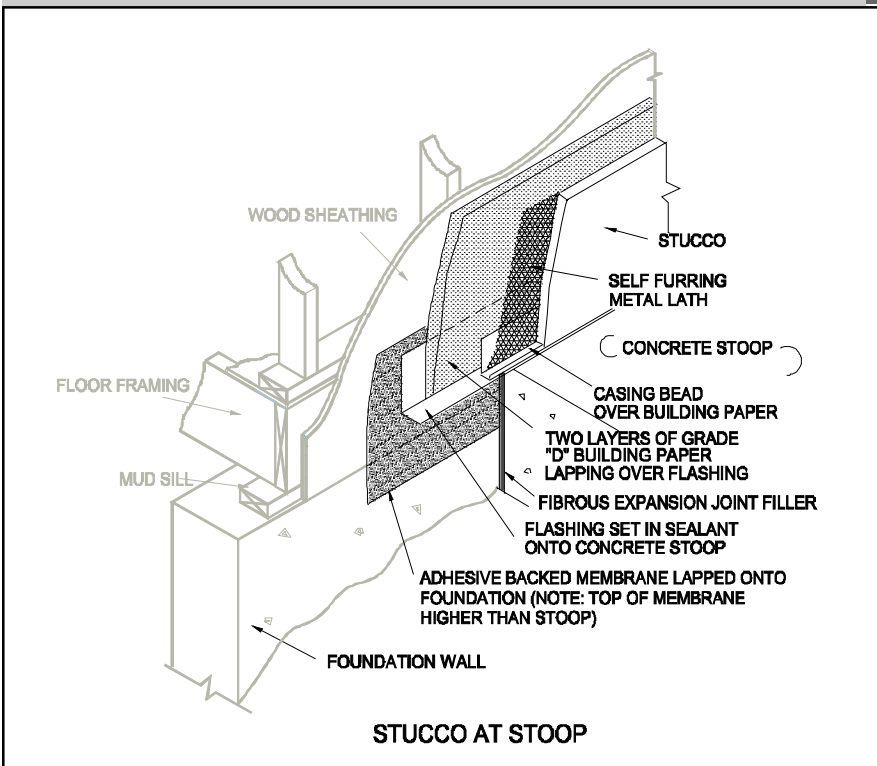
The main reason for their lack of use in residential applications is the simple fact that wall areas tend to be smaller than commercial installations. Stucco contractors are also reluctant to use them because they are aesthetically objectionable to homeowners.

With the growing trend of larger houses, comes the real concern that perhaps control joints should be introduced into larger wall areas. However, with their introduction into a wall area comes the added concern that these components open up another potential avenue for water entry into the wall assembly.

The MN Lath and Plaster Bureau suggests that the use of control joints be discussed with the homeowner or his representative. As in commercial construction their use should be judged by the size and complexity of the wall area(s).

Stucco at Concrete Stoop

2003 MN Building Code Section
R703.8, Subsection 5



This is a new detail that we have added to this handbook in response to a perceived need to address this condition.

What frequently happens in this scenario is that the concrete stoop is poured directly against the framing. This presents an awkward condition where the stoop is above the level of the plate line and the integrity of the drainage plane is lost. This issue is less of a problem in a situation where the stoop is part of a covered porch, however, this should not be a reason for ignoring this condition.

The easiest way to maintain the integrity of the drainage plane is to simply install a piece of adhesive backed membrane flashing that bridges the transition from the sheathing to the foundation wall.

To keep moisture out of the juncture between the framed wall and the concrete stoop we have suggested that a corrosion resistant metal flashing be set in a bed of sealant over the concrete pour. The building paper then laps over the flashing for positive drainage. In lieu of stopping the stucco with a casing bead as shown, a weep screed could also be used at this location. In that scenario, however, the building paper should lap over the back vertical flange of the weep screed instead of behind it as pictured in this detail.

This information was inspired by the fact that much precast stone veneer is adhered to a portland cement plaster base applied as part of the installation operation.

Mortar thickness behind veneer

According to MN Building Code Section R703.6.2 *“If the plaster surface is completely covered by veneer or other facing material or is completely concealed, plaster application need be only two coats, provided the total thickness is as set forth in Table R702.1(1).”* When measured from the back plane of expanded metal lath that thickness is 3/4 inch. This is at odds with procedures referenced in Figure R703.7 and Section R703.7.4.3 of the International Residential Code (IRC) which notes a 1-inch mortared space behind the veneer. In either event, in order to be code compliant you should anticipate that the combined thickness of the portland cement plaster base and the bedding mortar used to set the veneer be a minimum of 1-inch.

Weather-resistant membrane

While the issue of two layers of Grade D building paper is specific in the code with respect to stucco installation over wood based sheathing, this requirement is apparently overlooked relative to precast stone veneer. Considering the obvious correlation between the installation of both products, it is our suggestion that the requirement for two layers of Grade D building paper be observed for precast stone veneer as well.

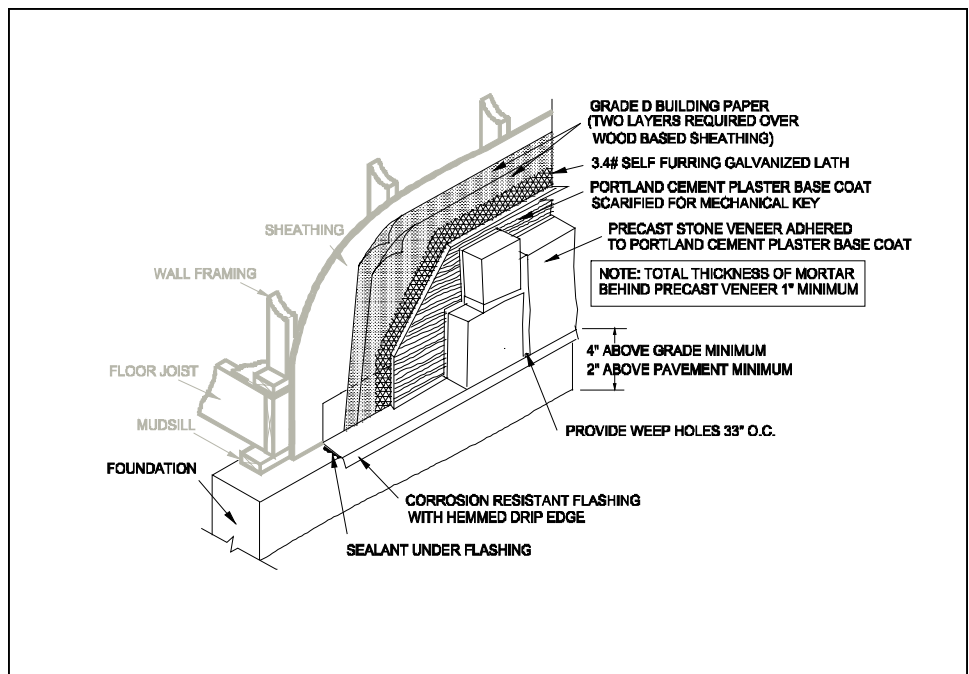
Fasteners

The weight of a portland cement plaster base and bedding mortar used in installing precast stone veneer is approximately 12 lbs. / SF. Combine this with the weight of the precast stone (approx. 11-15 lbs/ SF) and you are looking at 23 - 27 lbs. of weight attached to the wall surface. It is, therefore, critical that the lath and its fasteners to the supports be of the best quality. In this regard the Minnesota Lath and Plaster Bureau suggests 3.4 #/ sq. yd., self furring galvanized metal lath. Also strictly follow the precast stone manufacturers requirements for fasteners and lath attachment. At the time of this printing general requirements from precast stone manufacturer’s detail 6-inch spacing on 16-inch O.C. stud supports with nail penetration of 1-inch into the stud. Consideration should also be given to proper design which includes veneer support elements such as lintels and metal ties. Please consult the precast stone manufacturer and the building code for further information.

Termination at Grade

At the time of this printing some precast stone manufacturers require that the finished edge of the stone terminates 4” above grade as per code requirements for stucco. Some manufacturer’s actually recommend using stakes pounded into the ground with a horizontal 2” x 4” to prop up the veneer while the bedding mortar dries. Similar to stucco installations the drainage plane must be unencumbered to properly weep moisture that may find its way in back of the precast stone veneer.

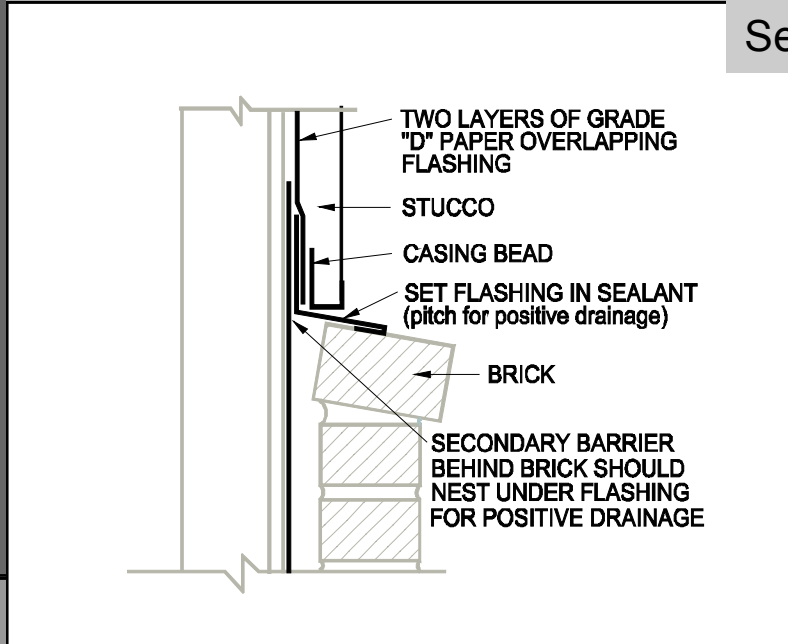
A common complaint about stone veneer is that it does not terminate cleanly but appears to simply be floating. In most cases aesthetics dictate that the stone dies into the ground, however, this is not practical or advisable, given code requirements. In this respect the illustration above is consis-



tent with the requirements described in figure R703.7 of the building code. Another option that may be considered is to step foundation walls as necessary to accommodate finished grade requirements. Still another option is to integrate brick seats (ledges) into foundation walls for a more aesthetically pleasing termination. A prudent suggestion is to consult the manufacturer’s requirements before proceeding. As far as weeping this type of construction, section R703.7.6 of the building code requires that 3/16-inch diameter minimum weeps be placed at a maximum spacing of 33-inches on center immediately above the flashing.

Other Common Terminations

Transition @ Brick 2003 MN Building Code Section R703.8, Subsection 8



Combining stucco with another cladding such as brick adds aesthetic interest. The transition between the two claddings can become awkward because the brick is generally offset from the stucco.

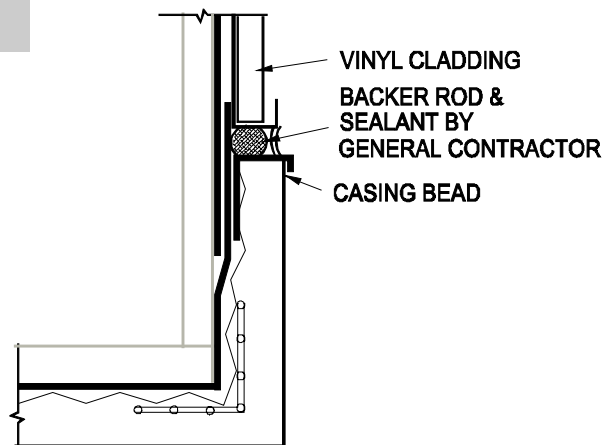
The best way to handle this transition is to provide a flashing that is set in place before the plasterer installs the stucco.

Note that the building paper laps over the back leg of the flashing for positive drainage

Vertical Transition @ Vinyl Siding

Stucco sometimes is used only on the front side of a home and another cladding used on the other three. In this detail vinyl siding is illustrated.

Section R703.2 of the Minnesota State Building Code now mandates that weather-resistant sheathing paper be installed behind all exterior coverings. With this transition in claddings, it is important that the weather-resistant barrier used behind the stucco and the vinyl overlaps a minimum of 6" for continuity. It is also important to seal the juncture between the stucco and vinyl with backer rod and low modulus elastomeric sealant. For more information on sealants see "Selecting Sealants" page 20.



Plan Section

Column on Concrete Stoop

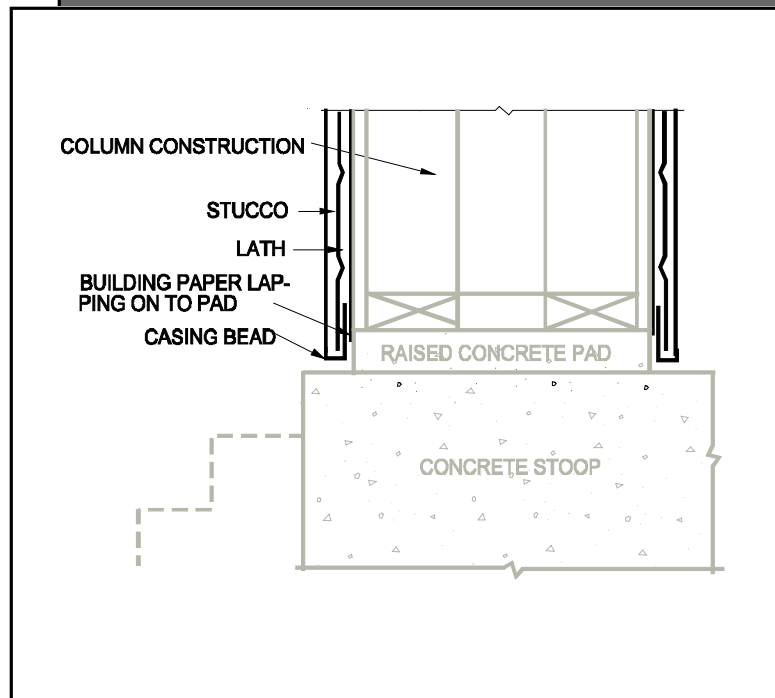
2003 MN Building Code
Section R703.8

A frequently seen detail on entries is stucco columns on top of concrete stoops.

With this type of construction comes the prospect of water finding it's way behind the interface where the column construction meets the concrete stoop.

One of the better ways to avoid water intrusion issues at these locations is simply to raise the construction above the level of the concrete stoop with a small concrete pad or curb.

The building paper is then lapped over the concrete pad for positive drainage and the stucco is terminated with a casing/ stop bead. A small gap is suggested between the casing bead and the concrete stoop for thermal movement, to minimize corrosion the stop bead and as a capillary break from standing water.



Local Material Suppliers

RESOURCE SUPPLY, INC.

8823 Zealand Ave. N, Suite "R"
Brooklyn Park, MN 55445
Tel: (763) 425-7863
(800) 238-1647
Fax: (763) 425-9286
E-Mail: Resourcesupply@aol.com

SNOW LARSON, INC.

1925 Oakcrest Avenue
Roseville, MN 55113
Tel: (651) 636-0630
Fax: (651) 636-4855
E-Mail: snowlarson@usinternet.com
Website: www.snowlarson.com

SIMPLEX

Construction Supplies, Inc.
9020 W 35W Service Dr. NE
Blaine, MN 55449
Phone: 763-398-0040
Fax: 763-398-0039
E-mail: simplexcon@aol.com

TAMARACK MATERIALS

9300 James Ave. S.
Bloomington, MN 55431
Tel: (952) 888-5556
Fax: (952) 888-4030
E-Mail: tambloom@aol.com

THE LUTZ COMPANY

8801 Xylon Avenue North
Brooklyn Park, MN 55445
Tel: (763) 315-5886
Fax: 763-315-5891

TK PRODUCTS

11400 W. 47th Street
Minnetonka, MN 55343
Tel: (952) 938-7223
(800) 441-2129
Fax: (952) 938-8084
E-Mail: tkproduct@aol.com

WINROC

5262 Glenbrook Ave. N.
Oakdale, MN 55128
Tel: (651) 777-8222
Fax: (651) 777-4375
Website: www.winroc.com

J. B. O'MEARA COMPANY

Dupont Tyvek StuccoWrap®
901 E. Cliff Rd.
Burnsville, MN 55337
Tel: (952) 882-2423
Toll Free: (800) 352-2832
Fax: (952) 890-2103

Brock White Company

2575 Kasota Ave.
Tel: (651) 647-0950
Fax: (651) 647-0403
Website: www.brockwhite.com

Roof Line Issues

Chimneys

2003 MN Building Code Section R703.8, Subsections 2 and 3

Stucco has often been used in the past to weatherproof and decorate concrete block chimneys. Appearance is deceiving in today's construction however, as the chimney is often composed of a fire rated metal flue with a framed chase enclosed with sheathing. The outward appearance is similar to what we have seen in the past, but the construction of these enclosures is a critical aspect to moisture infiltration into the assembly.

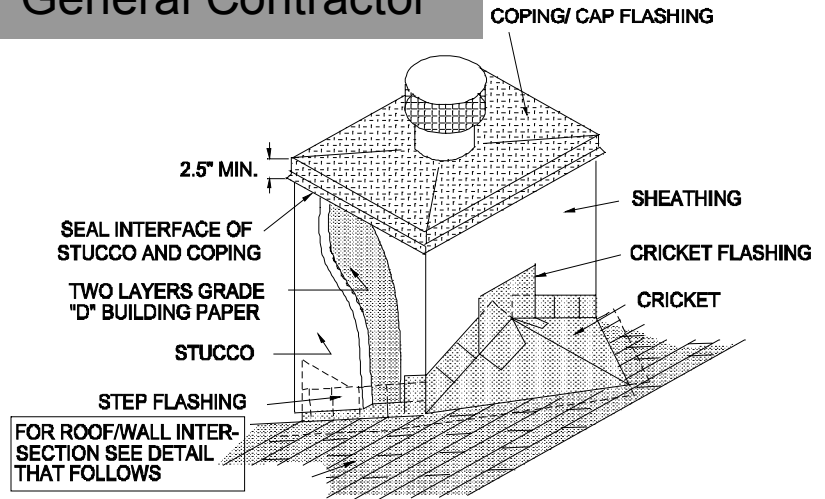
Chimney Cap: From the top of the chimney a metal cover is installed to cover the chase opening. This is the only defense of the enclosure to the elements. It

should be watertight and extend over the top edge of the stucco. Wind driven rain can find it's way between the interface of the stucco and the cap flashing, so it is suggested that this interface be sealed with a good quality elastomeric sealant. *Please note: Considering the vulnerability of this construction to the effects of wind driven rain we changed this detail to show a 2.5" overlap over the stucco.*

Cricket: Sometimes referred to as a saddle, a cricket is installed on the high side of the chimney to divert water away from the construction. Crickets are especially critical on today's homes where roof lines are steeply pitched. To perform optimally, they must be properly flashed and weather tight.

Note: The intent of any of these details is to keep water out. There are other options that may be equal or even more effective.

Sealant installed by General Contractor

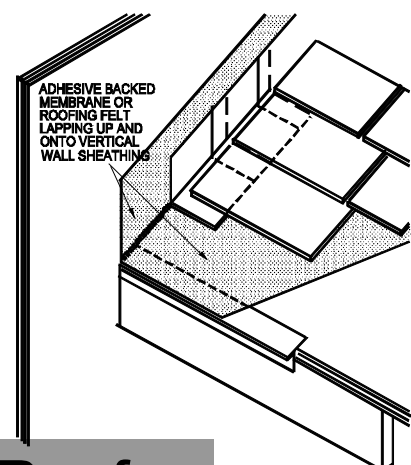


Roof / Wall Intersections

2003 MN Building Code Section R 703.8, Subsection 6

Roof rakes at stucco walls: Dormers and chimneys that extend up from roofs are not unusual challenges in today's homes built with multiple roof lines. However, attention must be paid to these locations.

Roofing Felt: It is good practice to base flash prior to the installation of metal flashing. This is accomplished by simply extending the felt or adhesive backed membrane slightly up the vertical wall (see illustration).



Installed by Roofer

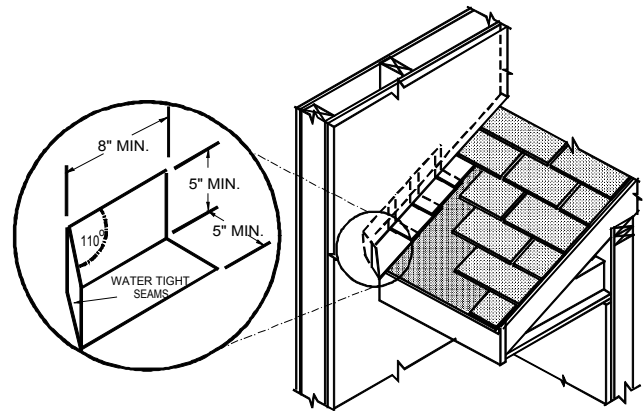
Kick-Out Flashing

2003 MN Building Code
Section R703.8, Subsection 6

Flashing: Step flashing is preferred over continuous flashing along a roof rake because it is interlaced with the shingles for positive drainage away from the wall / roof interface.

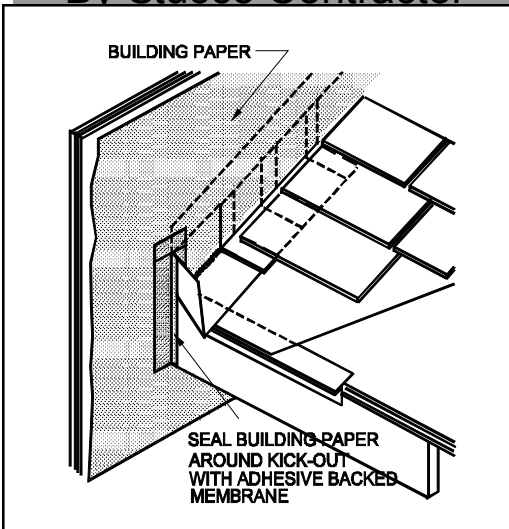
Kick-out Diverter (illustration right): A critical location where moisture entry can do considerable damage is where a lower roof overhang stops in the middle of a stucco wall. Kick-outs should be fabricated with watertight seams and be big and broad enough to handle water run-off from a variety of roof pitches. Another critical element is the use of gutters to evacuate the water away from these sensitive locations. There are

several local materials suppliers that offer these kick-outs in both a left and right hand version (contact one of the suppliers listed on page 10, for further information). Installing the kick-out after the installation of the shingles is a very difficult procedure for the lather or stucco contractor to perform. For this reason it should be coordinated so that the kick-out is installed by the roofer as the shingles are being laid up.



Installed by Roofer

By Stucco Contractor



Installing Building Paper: Proper building paper installation should be left to the stucco contractor. Building paper should be installed to lap over the back flange of the kick-out and the step flashings for positive drainage. Care should be taken to cut the paper tightly around the kick flange. The subsequent cut should be mended with adhesive backed membrane material, to lap onto the kick flange for a water tight seal (see illustration left).

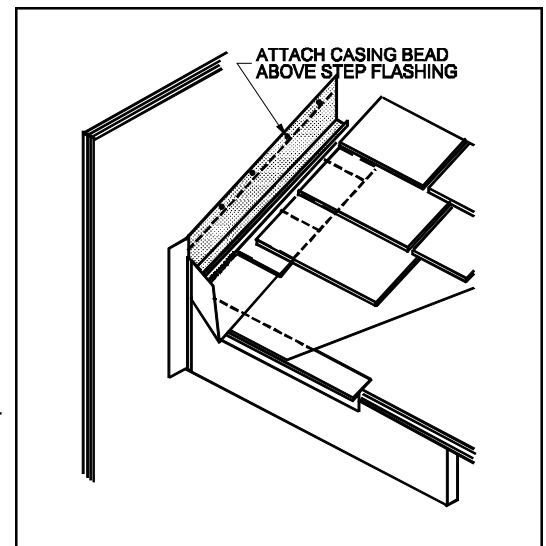
Stucco Termination: Over the years the preferred method of terminating the stucco above a roof was to simply die it into the shingles. Another option has been to provide a stop bead above the shingles. Either method has its advantages and draw backs.

Dying the stucco into the shingles: While this option is aesthetically a more pleasing termination it should be considered with an eye towards the future. Because when the shingles must be replaced, they will have to be cut out very carefully along the edge of the stucco. Some experts also caution against this approach because there is no

capillarity break between the stucco and the shingles.

Stopping the stucco with a casing bead: This termination will make it easy to remove and replace shingles at a later time, but it is often aesthetically objectionable because it exposes the flashing above the roof line. Caution must also be taken in positioning the attachment flange on the wall, so that no fasteners puncture the wall flashing (see illustration right).

Stopping the stucco with a weep screed: This method of termination has been the matter of some discussion. Although it is feasible, it presents some complications in making the kick-out flashing watertight with adhesive backed membranes. For this reason we would caution against using such a method. As illustrated, the fact that the building paper laps under the attachment flange of the casing bead should be sufficient for the passage of incidental moisture from behind the stucco.

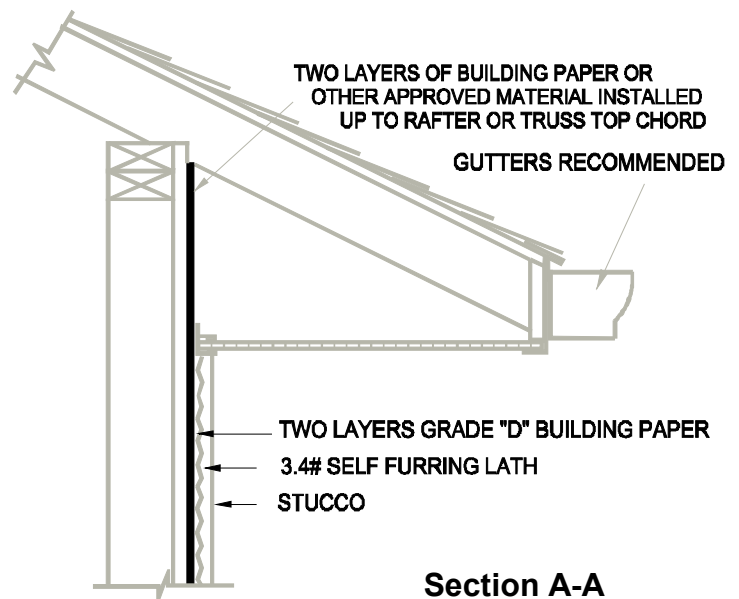


Eaves/ Soffit

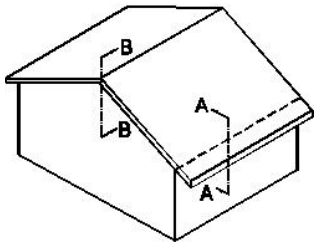
Soffits: 2003 MN Building-Code Section R703.2

Soffits: Section R703.2 of the Minnesota Building Code states that “Building paper or other approved material shall be continuous up to the underside of the rafter or truss top chord...” This issue is also addressed in the Minnesota Energy Code. See Section A-A.

Coordinating: Often times when the stucco contractor is scheduled to do his job, the soffit is already in place. If this is the case, the general contractor should coordinate this aspect of the job, so that this area has a weather-resistant barrier in place prior to the soffit installation. The stucco contractor should then be able to easily integrate his weather-resistant barrier installation into the one established by the general contractor above, for positive drainage.



Legend Section A-A and B-B

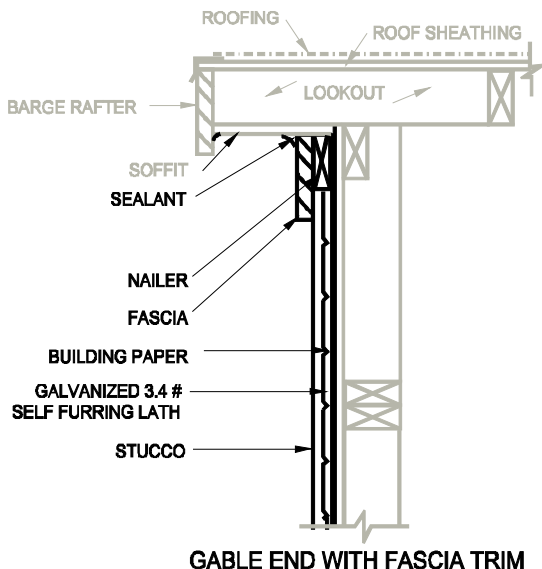


Gable Ends

The intention of making the building paper continuous up to the underside of the rafter in the previous detail is to prevent the accumulation of moisture from wind driven rain. While most contractors have begun to accept this detail, the same level of attention does not seem to always occur at the gable ends, where the stucco meets the soffit. For this reason we have included the detail (Section B-B) to the left.

Similar to the objective described above the intent of this detail is to limit its exposure to wind driven rain. Note the blocking used as a nailer is the same thickness as the stucco. The fascia is then cut wider to provide an acceptable overlap of the stucco. The fascia trim is then sealed along the solid soffit for another level of protection at this area.

As an added level of redundancy, the building paper could also be sealed at the soffit or adhesive backed membrane could be used.



Section B-B

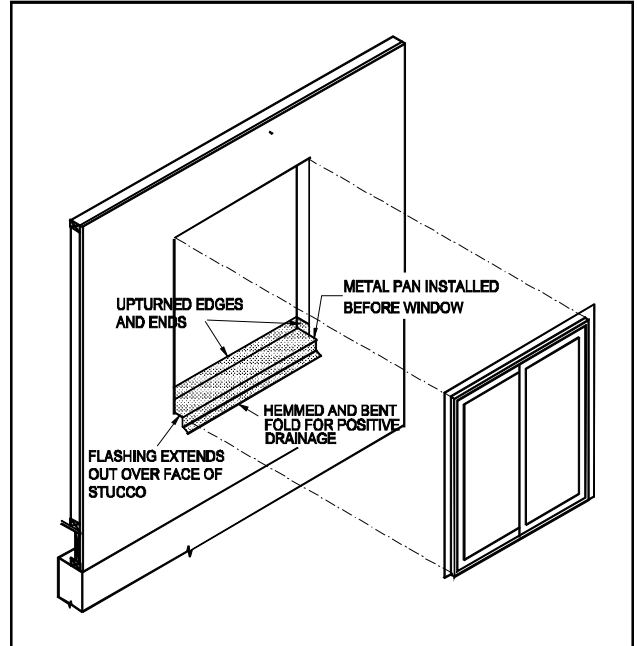
Windows

2003 MN Building Code Section R703.8

Section R703.8 Flashing. Approved corrosion-resistive flashing shall be provided in the exterior wall envelope in such a manner as to prevent entry of water into the wall cavity or penetration of water to the building structural framing components.

With respect to windows and doors, it is incumbent upon the general contractor to ensure that the rough openings are properly flashed before the window or door unit is installed. Failure to perform this task can result in moisture intrusion, mold, rot and ultimately structural damage.

Code section R703.8 specifically states that *“The flashing shall extend to the surface of the exterior wall finish (stucco) and be installed to prevent water from reentering the exterior wall envelope.”* In this context the Minnesota Lath & Plaster Bureau suggests that the best option for flashing a window is a pan flashing. Pan flashing is generally fabricated from break formed corrosion resistant sheet metal or PVC plastic. It is placed on the sill of the rough opening prior to the insertion of the window. Moisture that penetrates through the window construction is then safely exited over the exterior surface of the stucco.

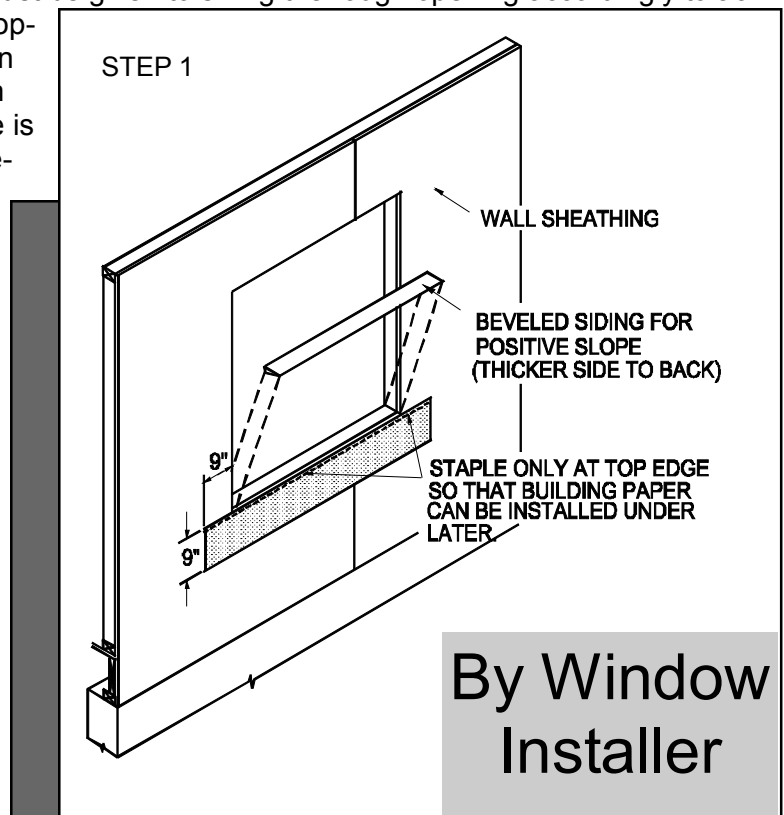


This type of construction is common practice on commercial projects but also would be effective in residential applications, especially if the window is suspect or has no slope for positive drainage at the sill (see detail upper right). The limitation to the practice, however, is the bottom nailing fin, which must be removed to accept the pan flashing. Removal of the bottom fin may result in the window manufacturer voiding any warranty that may come with the window. Other consideration must be given to sizing the rough opening accordingly to accommodate the extra build-up of materials. As an option a pan flashing can be installed prior to step 4 in the procedure that follows. Short of installing a pan flashing under the window the next best alternative is the procedure illustrated in the following pages. Before proceeding, please consult the window manufacturer for specific installation requirements.

Step 1

NOTE: Some window manufacturers are now recommending that a piece of beveled siding be inserted over the rough sill for positive drainage. Framing dimension should compensate for this additional material.

- Cut a 9" wide strip of Grade "D" Building Paper or Fortifiber Moistop® approximately 18" longer than the width of the rough window opening.
- Under the window sill, staple the building paper or Moistop along the top edge only. Allow approximately 9" to extend past the opening on either side as shown. See note next page.



By Window
Installer

Note: A common problem is curling and deterioration of building paper around window openings. The MN Lath and Plaster Bureau recommends Fortifiber Moistop because it resists this problem.

Step 2

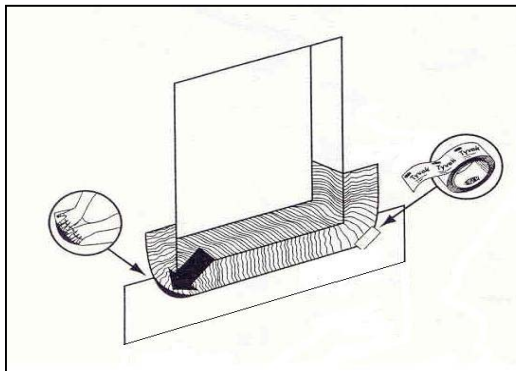
- Corners are exceptionally vulnerable to small holes that can allow moisture into the construction.
- Use either of the two methods shown to the right to completely encase the corner.

Note: Consult manufacturer of membrane material to determine if product is appropriate and durable for its intended use.

Step 3

- For 2" x 6" construction cut a piece of 8" adhesive backed membrane 8" longer than the window opening (lower right illustration).
- Make a 2" cut in the membrane, 4" in from the ends as shown.
- Peel backing off of membrane and install as shown. Note that 4" of the membrane rides up onto the rough jamb and folds out and over the face of the sheathing. The remaining 2" at the sill folds down and sticks over the previously installed building paper.
- As another method for steps 2 and 3, Dupont Tyvek FlexWrap™ or equivalent material can be installed (see illustration below). Be sure to secure the corners with staples or Tyvek Tape as shown.

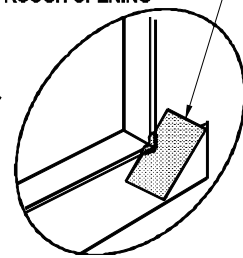
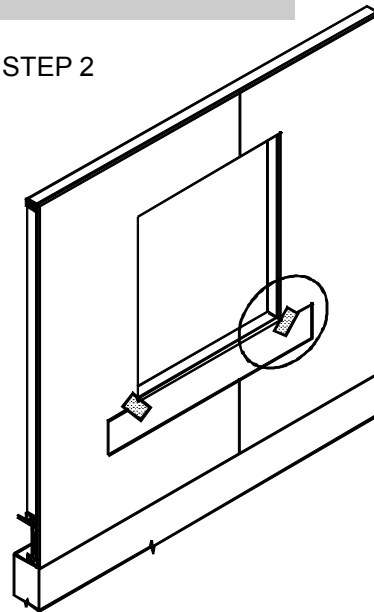
ALTERNATE METHOD TO STEPS 2 & 3



By Window Installer

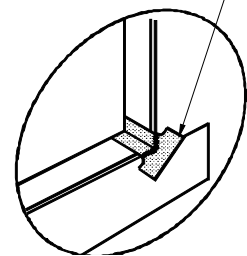
EXTEND EDGE OF SELF STICKING FLASHING MEMBRANE PAST THE CORNER AND TUCK INTO THE ROUGH OPENING

STEP 2

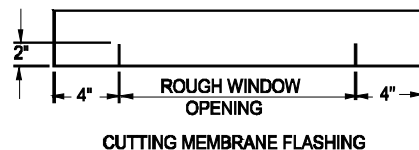


METHOD A

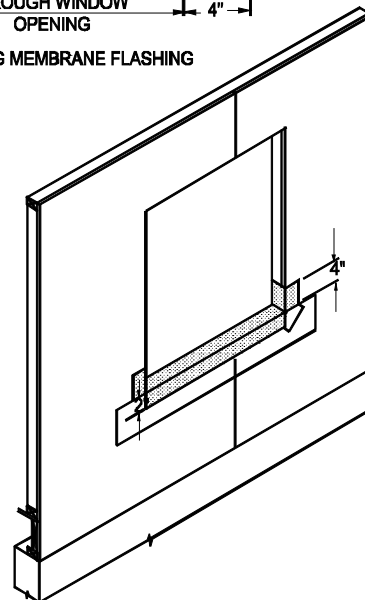
PRE-CUT SELF STICKING MEMBRANE TO APPROX. SHAPE AND INSTALL AT CORNER AS SHOWN



METHOD B



STEP 3

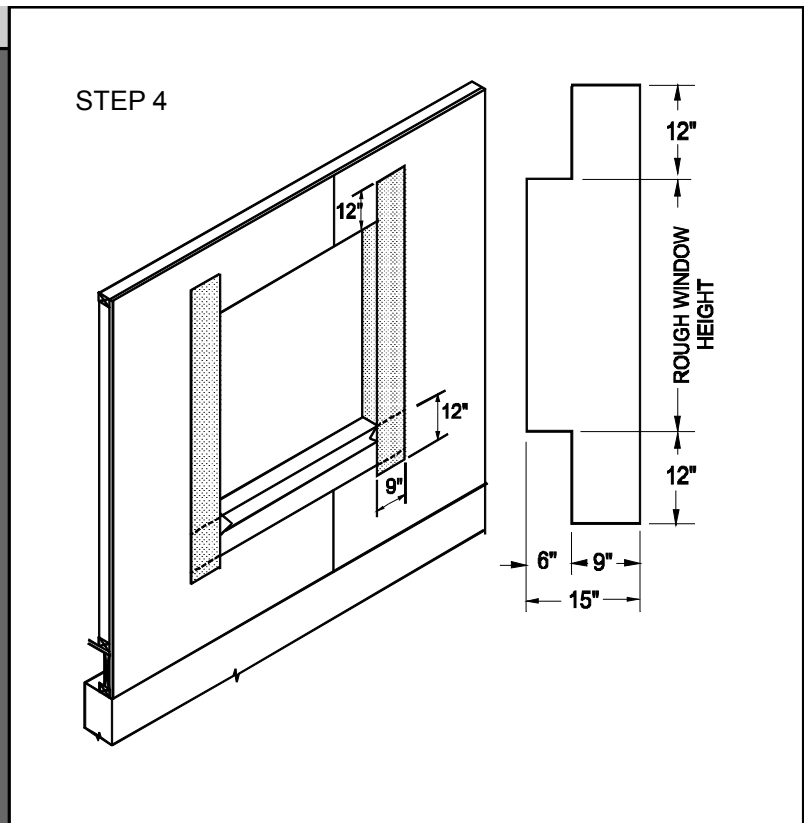


By Window Installer

Step 4

- NOTE: IF METAL OR PVC PAN FLASHING IS TO BE USED, INSTALL NOW.
- Cut Grade D Building Paper or Fortifiber Moistop® approximately 15" wide x 24" longer than the height of the window opening.
- Cut out corners of building paper or Moistop as shown.
- Fold and install building paper or Moistop to cover the rough jamb and fold out onto the face of the sheathing. Staple into place, except for the bottom 12".

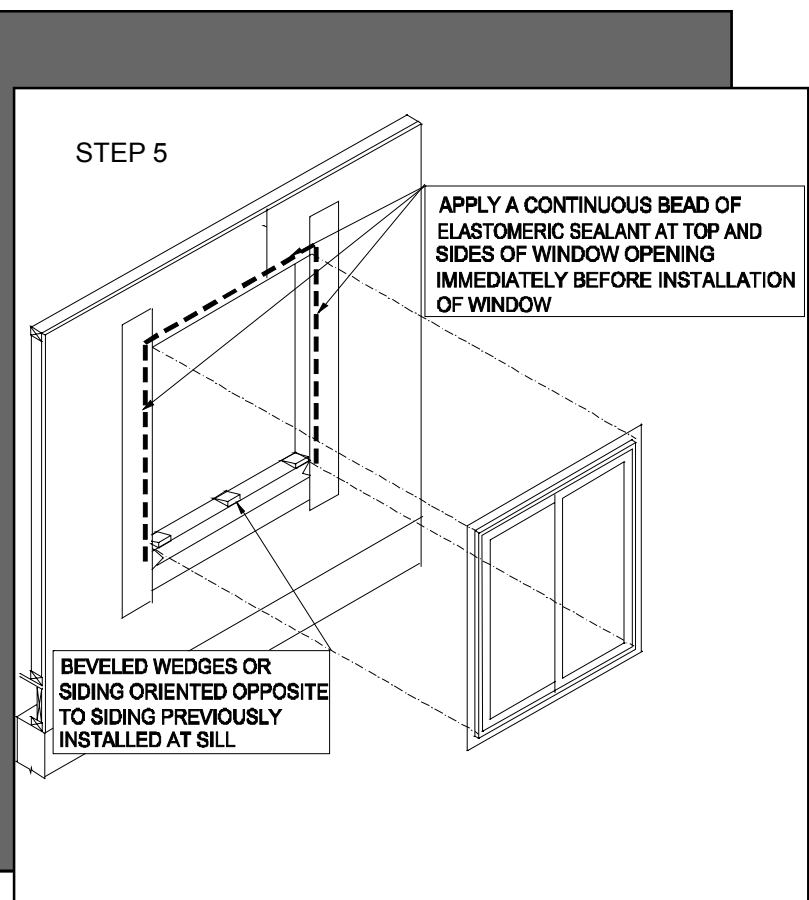
By Window
Installer



Step 5

- Install beveled wedges or siding at sill, oriented opposite to the siding previously installed in step 1. Do not nail into place.
- Per window manufacturers instructions, apply a continuous bead of compatible sealant at the top and sides of the window opening or along the back of the nailing fin immediately before the installation of the window.
- Install the window following window manufacturers fastening requirements.
- NOTE: Do not apply sealant to back of bottom nailing fin. This is to allow for positive drainage.

By Window
Installer

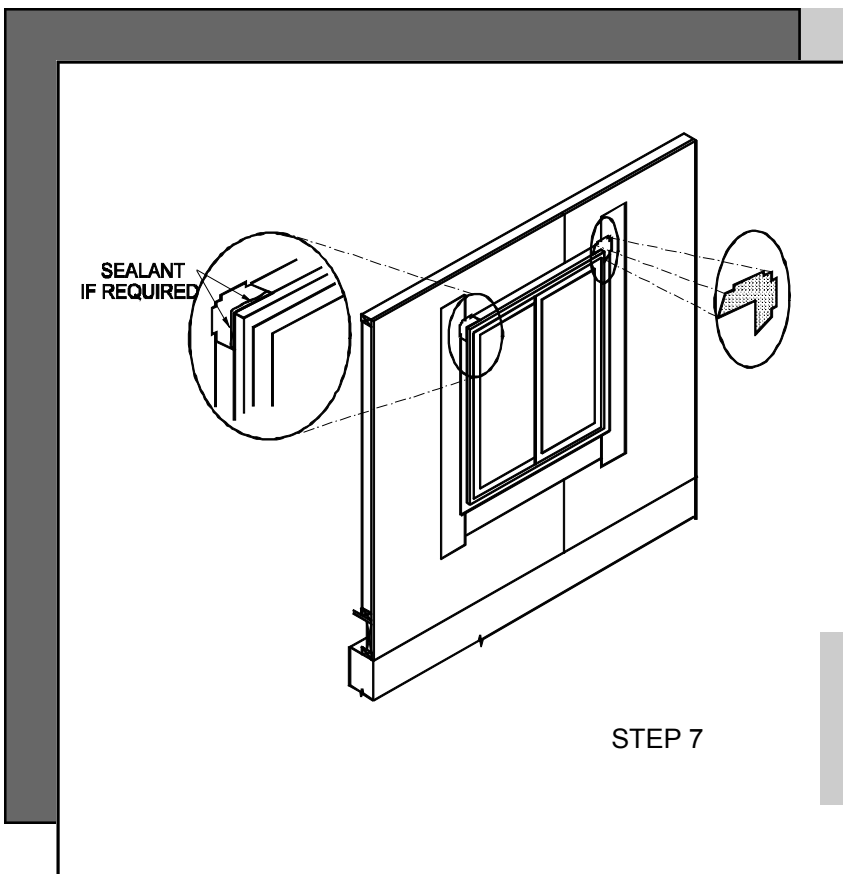


Step 6



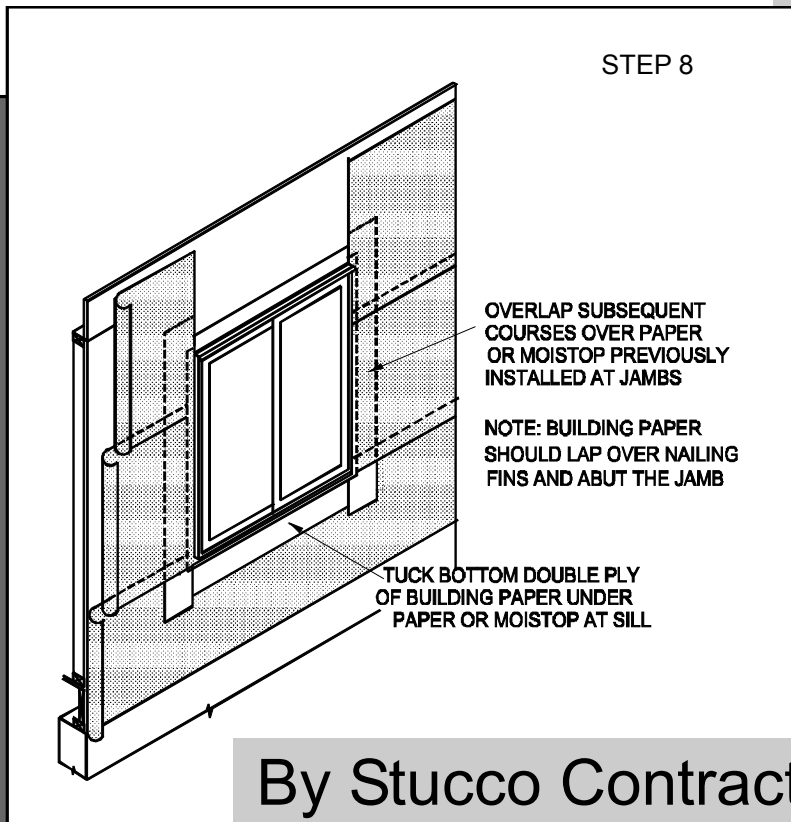
- If the joinery of the nailing fins on the window are not self sealing, install sealant at the flange/ window frame interface, as required by the window manufacturer.
- If the window does not come with an integral drip cap head flashing, one should be purchased from the manufacturer, or vendor as recommended by the manufacturer.
- Carefully follow window manufacturers instructions for installation of the drip cap flashing.
- Note: Some manufacturers require a continuous bead of sealant under both the vertical and horizontal legs of the drip cap flashing before installation.

Step 7



- If nailing fins do not have a continuous seal around the corners, install gaskets that come with the window.
- Carefully follow window manufacturer's instructions for the installation of any gasket materials or necessary sealants that must be applied for proper installation of the window unit.

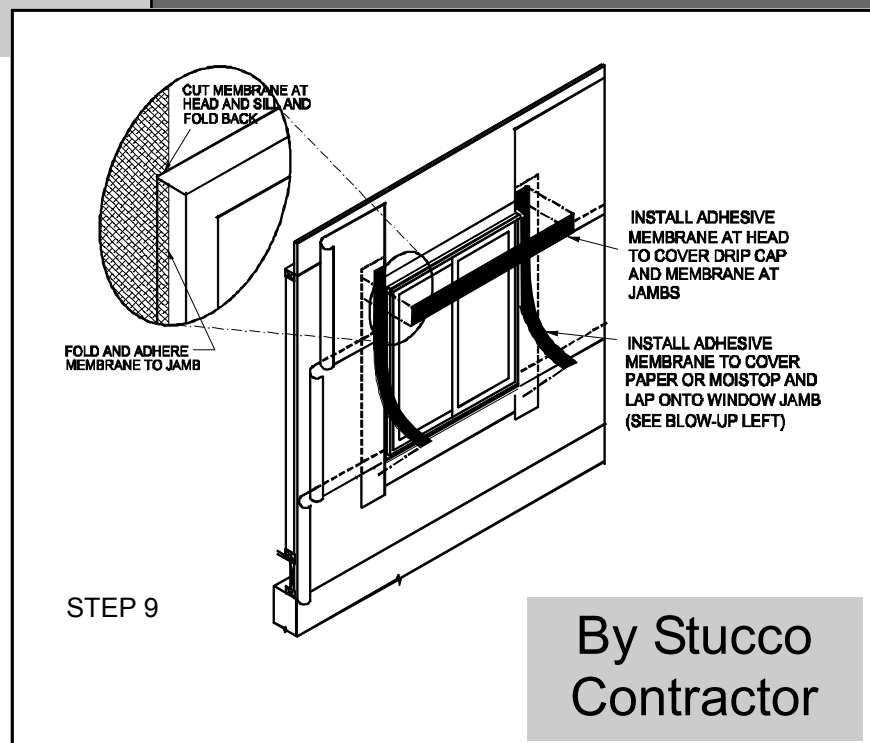
Step 8



- On wood sheathed construction the 2003 Minnesota State Building Code (Section R703.6.3) requires two layers of Grade D building paper. It is acceptable to apply the building paper in a double ply roll.
- According to code, the building paper must be installed shingle style so that each subsequent horizontal course overlaps the previous a minimum of 2". Vertical joints should be lapped 6".
- Note that the two plies of building paper below the sill are tucked under the building paper or Fortifiber Moistop installed before the window.
- At the jambs, install the double ply roll so that it laps over the nailing fin and abuts the window jamb.
- Continue installing courses beyond the height of the window unit as shown.

Step 9

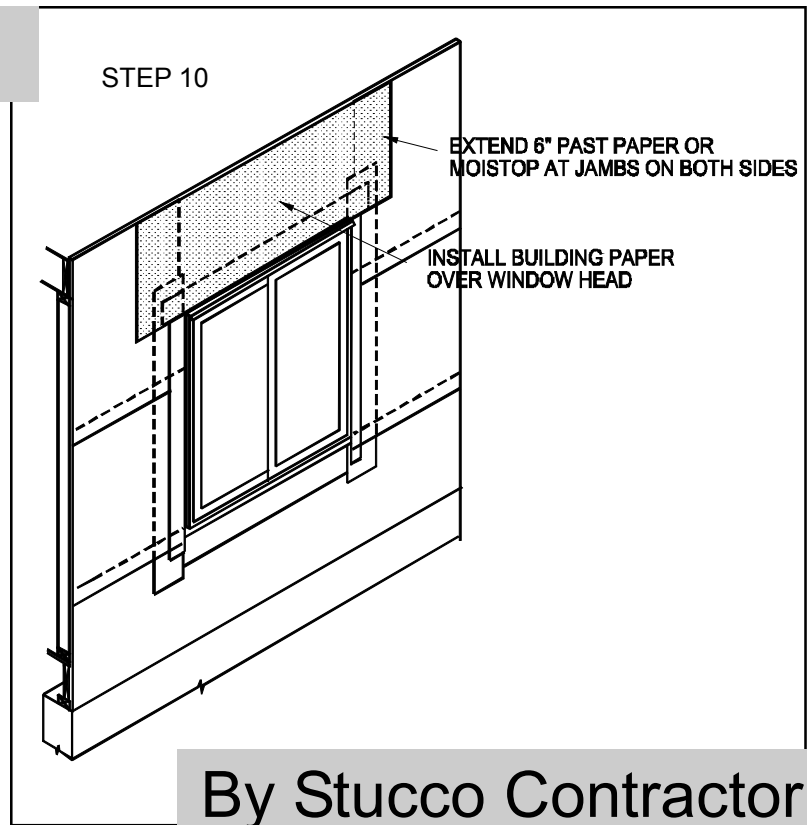
- Install vertical strips of adhesive membrane over the building paper and nailing fins to fold up and onto the window jamb (see blow-up right). Cut membrane and fold back as shown. Membrane should extend past the nailing fins at the head and sill.
- Install another layer of membrane flashing horizontally over the back flange of the drip cap. Membrane flashing at the head should extend and cover the membrane previously installed at the jambs.
- If the drip cap is integral to the window unit, apply the membrane flashing over the head similar to what has been described above.



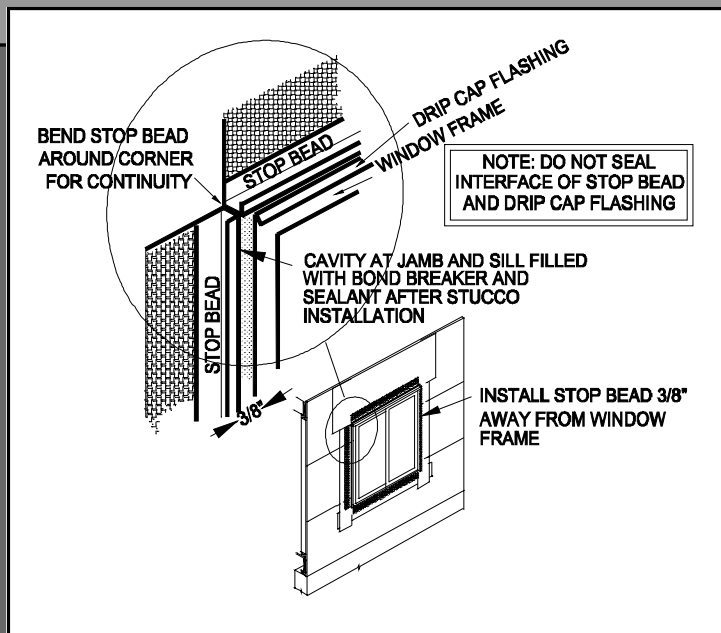
Step 10

- Size and cut the double roll of building paper to bridge over the opening between the building paper at the sides.
- Note that the building paper extends past the paper previously installed at the jambs by 6". This is to provide positive drainage and conform to MN Building Code requirements (Section R703.2).

Note: The intent of any of these details is to keep water out. There are other options that may be equal or even more effective.



Stopping Stucco Around Windows



Sealant by
General Contractor

2003 MN Building Code Section R703.6, ASTM C 1063, 7.11.3

The issue of stopping stucco around penetrations is addressed indirectly by reference to ASTM Standard Specification C 1063. Section 7.11.3 of this document states that *"Nonload-bearing members shall be isolated from load-bearing members, and all penetrating elements, with casing beads or other suitable means, to avoid transfer of structural loads, and to separate from dissimilar materials."*

Window Implications

- Window frames expand and contract due to temperature changes. Some, much more than others. This may result in significant cracking at the juncture between the window and the stucco leading to a water intrusion issue.
- To compensate for this expansion and contraction, a space between the cladding and the window frame is created by stopping the stucco approximately 3/8" away

(Continued on page 20)

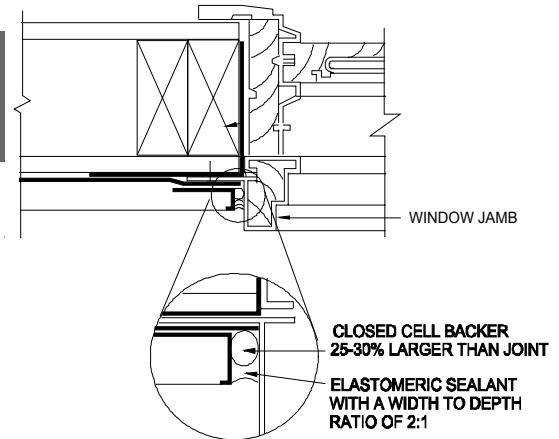
from the window frame with a component called a casing bead or stop bead..

- Care should be taken to avoid fastening the stop bead into the window nailing fin. Fastening into the nailing fin will cause cracking in the stucco.
- The subsequent joint between the window and stucco at the sill and the jambs are then filled with a closed cell bond breaker and low modulus elastomeric sealant.
- At the window head, the joint between the drip cap flashing and casing bead is not sealed with backer rod and sealant, but left open to weep incidental moisture.
- Care should be taken to ensure that the interface of the casing beads and the drip cap flashing at the jamb is properly sealed against moisture intrusion.

Selecting Sealants

When selecting sealants consideration should be given to the products movement capabilities, durability and compatibility with other materials. For these reasons the manufacturer of these products should be consulted.

Sealant is not a maintenance free material. Depending on the type, sealants may have to be checked regularly to ensure optimum performance. Generally, sealant manufacturers provide detailed written instruction for the proper installation of their materials. This often is quite involved in the description of mixing, use of bond breaker materials, primers, shape, thickness and size of the sealant bead. Failure to follow these instructions often will void any intended warranty.



There are several types of sealants currently available: Polyurethanes are perhaps the most adaptable product with respect to color matching, but they are not as elastic as others and sometimes require mixing multiple components on site. Silicones provide the best elasticity properties and are longer lasting but have a limited color palette. A more recent innovation in sealant technology is silyl-terminated sealants. For more information on sealants contact the manufacturers listed on page 27.

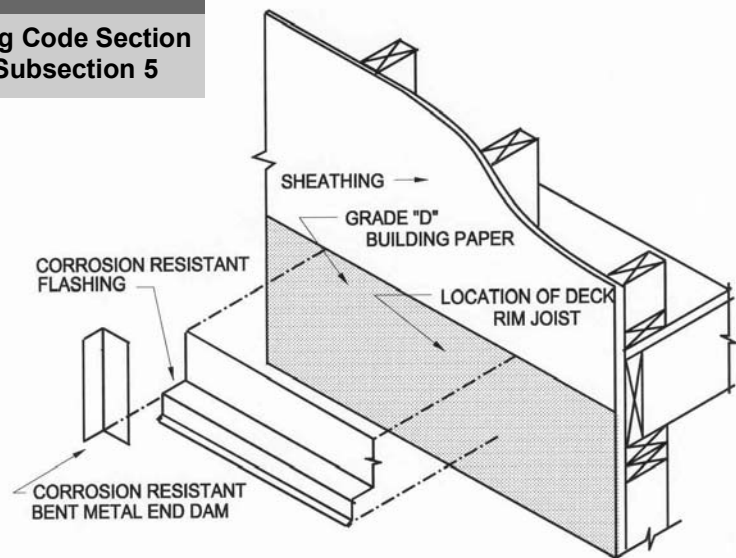
Deck Attachment

Step 1

This detail has been revised from the previous version due to comments from a variety of people. The major change is the addition of flashing at the top of the rim joist as well as under it as originally suggested.

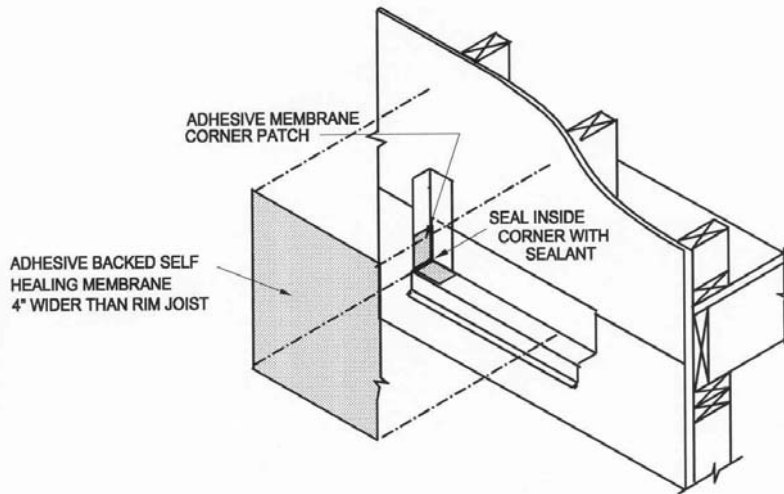
- Position and attach two layers of Grade D building paper at location where deck header will be attached.
- Position and attach corrosion resistant metal flashing so that horizontal leg aligns with final position of the bottom of the deck rim joist.
- Fabricate corrosion resistant end dam. Position and attach at the end of the flashing.

MN Building Code Section R703.8, Subsection 5



By General Contractor

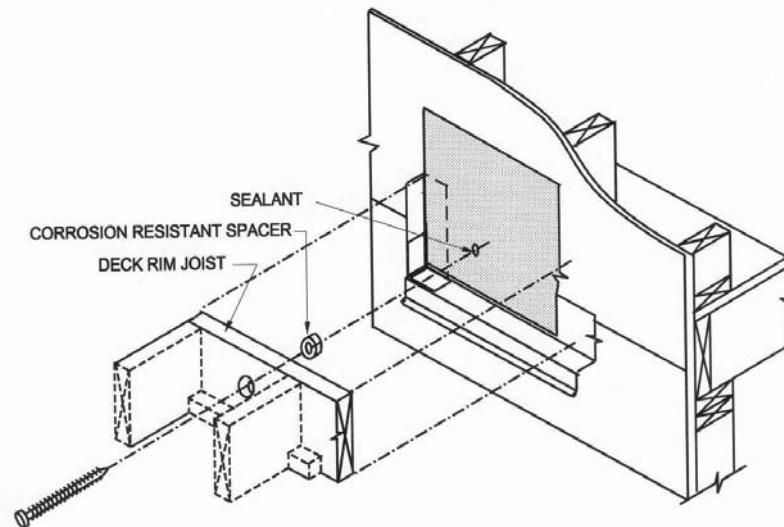
Step 2



By General Contractor

- Fabricate a corner patch from adhesive backed membrane and install at internal corner of end dam.
- Seal small hole in corner of end dam with elastomeric sealant for weather tight seal.
- Install adhesive backed self healing membrane over the metal flashing. Height of membrane should be the width of the rim joist plus 4 inches.

Step 3

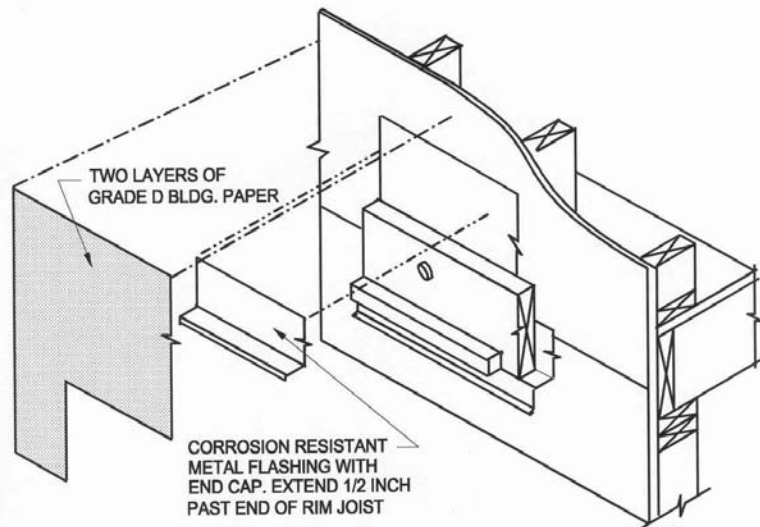


By General Contractor

- Deck rim joist can be installed now. Provide corrosion resistant washers or pipe sleeve spacer (no more than 1/2" long) between deck rim joist and wall construction for positive drainage and drying behind the deck. Be sure to seal the penetration of the fastener into the wall assembly.
- It is suggested that small saw kerfs (1/8" deep max. and perpendicular to its length) be put into the bottom of the rim joist to optimize positive drainage.

Step 4

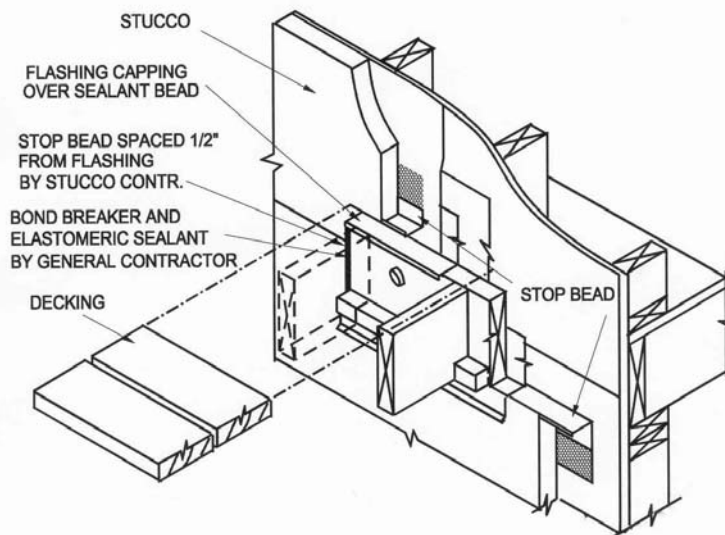
- Install corrosion resistant metal flashing with end cap over the rim joist (by General Contractor). Allow capped end of flashing to extend beyond the end of the joist approximately 1/2 inch.
- For added protection a bead of elastomeric sealant can be installed on the top edge of the rim joist prior to installing the flashing.
- For positive drainage, install two layers of Grade D Building paper to lap over the flashing and other building papers already installed.



Flashing by General Contractor,
Building Paper by Stucco Contractor

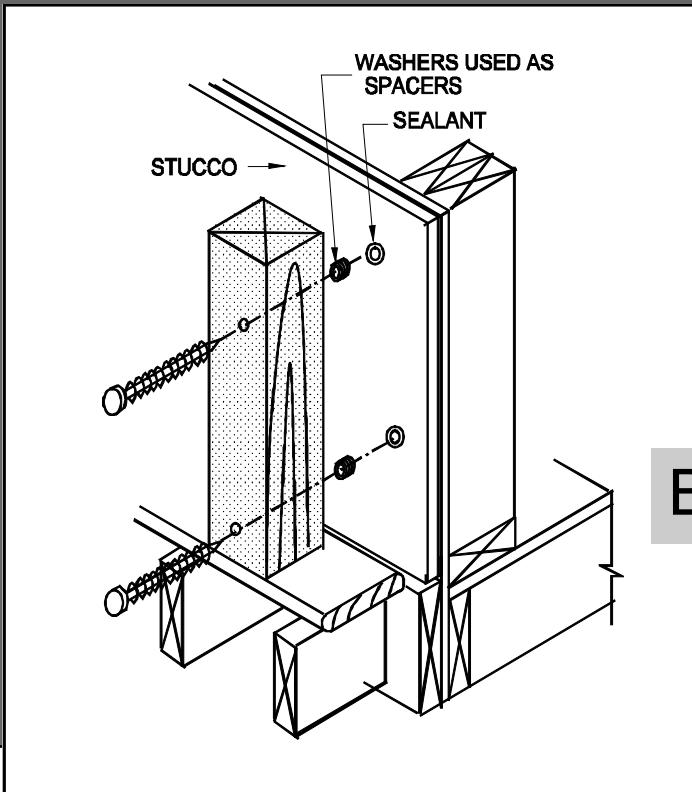
Step 5

- Install stop bead around perimeter of opening prior to installation of lath and stucco (by Stucco Contractor).
- Space and install stop bead approximately 3/8 inch away from end dam flashing. Note that this will provide a space for a weather tight seal using bond breaker and elastomeric sealant (by Stucco Contractor).
- Install closed cell backer and elastomeric sealant after stucco has been finished (by General Contractor).



Stop bead by Stucco Contractor,
Sealant by General Contractor

Deck Handrail Attachment



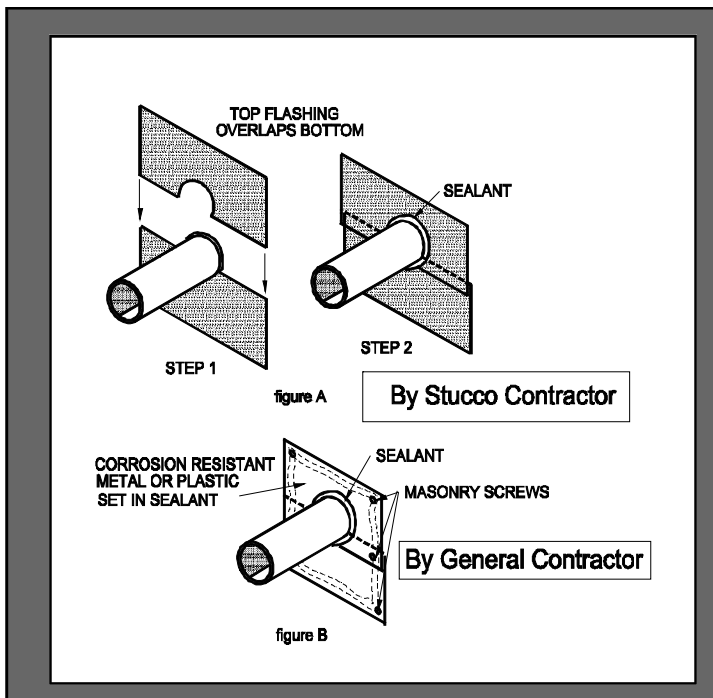
- Handrail newel posts should be attached through the previously installed stucco, into solid supporting framing.
- It is suggested that corrosion resistant washers be used between the post and the stucco to provide an air space. This will facilitate drying when the construction is wetted by driving rain.
- Be sure to bed the washer against the stucco into a bead of sealant to prevent water entry at these locations.

By General Contractor

Pipe and Vent Sleeves:

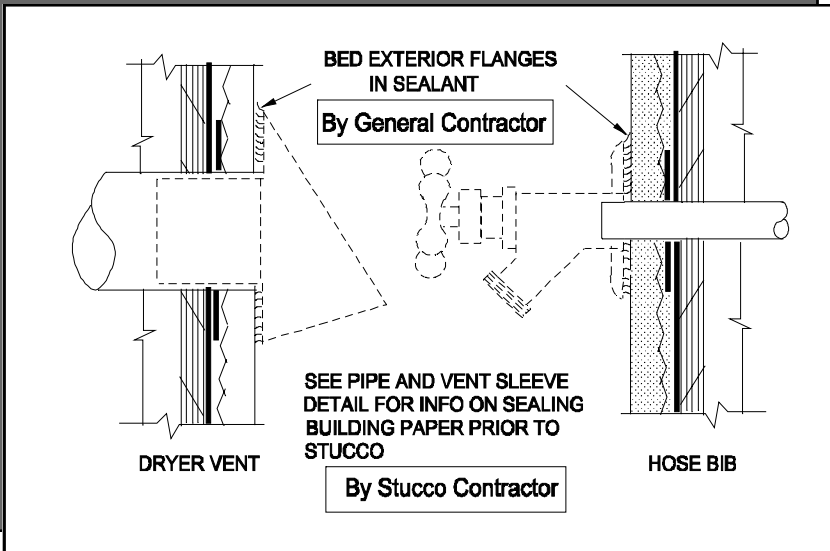
Pipe penetrations that are not well planned are areas of concern for moisture penetration, insects and even mice.

- Before stucco is installed, holes in the building paper around pipe penetrations and other openings can be secured by the installation of a manufactured boot sleeve or the method shown in figure A. Self sticking membrane flashing can be cut to closely frame around the pipe. Sealant can then be applied around the pipe for a secure opening prior to the stucco.
- In the event that the pipe is installed after the stucco, a similar approach can be taken (figure B) to make an escutcheon out of sheet metal or PVC that is bedded in sealant and attached to the stucco with masonry screws.



Note: There has been some concern about copper tubing penetrations through stucco. According to the Copper Development Association "When copper tube passes through an exterior wall of concrete or masonry, it should be protected by wrapping with an approved tape, installing through a plastic or steel sleeve, and then caulked on each side of the wall for a watertight seal." Although stucco is not considered either concrete or masonry, this is perhaps advice that should not go unheeded.

Hose Bibs and Dryer Vents:

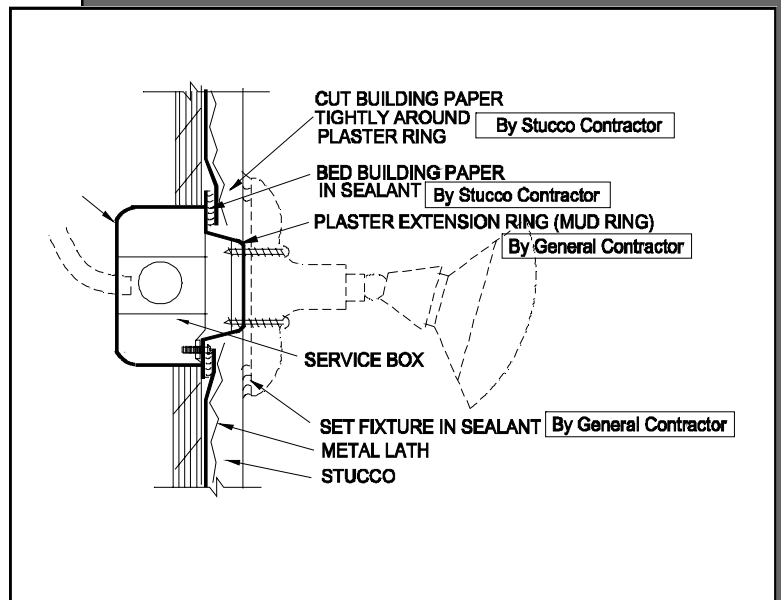


Hose bibs, dryer vents and other fixture attachments come with covers that naturally nest against the cladding. They are also likely places for moisture to find its way into the wall assembly.

- Many of these fixtures come with their own gasket material that should be installed between the cover and the stucco.
- If the fixture does not come with gasket, be sure to bed all covers, flanges and escutcheons in sealant before fastening them to the wall.

Light Fixtures and Outlets

- Often, very little consideration is given to how electrical service boxes interface with the finish cladding. In stucco applications plaster rings (a.k.a. mud rings) should be affixed over the service box, to bring the face of the box out flush with the finished stucco surface. This is the responsibility of the Electrician under the General Contractor.
- It is suggested that a bead of sealant be applied around the perimeter of the plaster ring prior to the installation of the building paper. This is the stucco contractor's responsibility.
- Building paper should be installed snugly around the plaster ring flange.
- The fixture should be sealed from the weather against the stucco with gasket material that may come with the fixture or sealant. This is the General Contractor's responsibility.

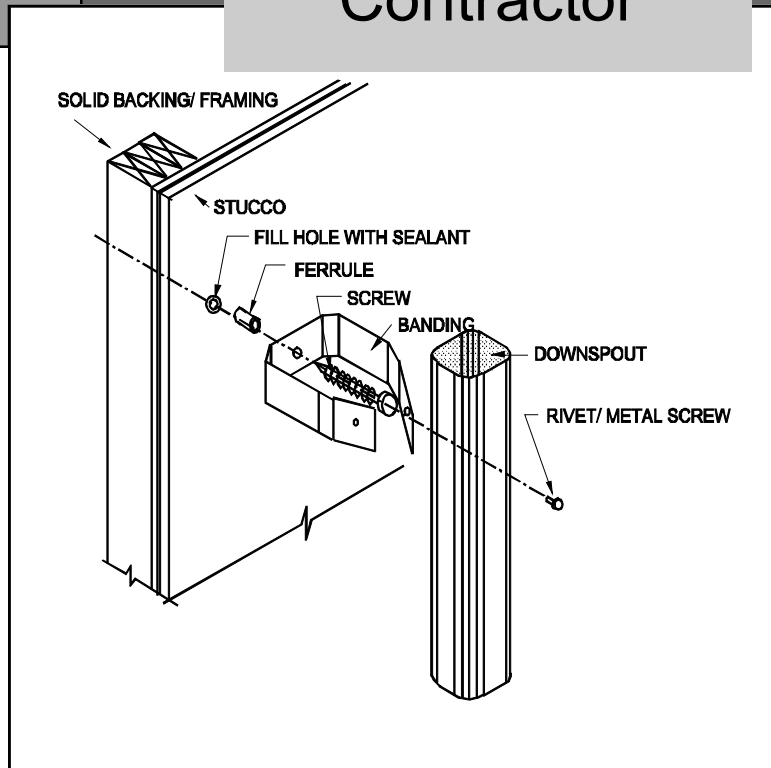


Downspouts

By General Contractor

Any opening in a wall cladding may provide a conduit for moisture intrusion. Even something as innocuous as screw used in a downspout attachment should not be overlooked.

- This detail is provided primarily to emphasize the fact that the hole drilled through the stucco should be carefully sealed at the time that the attachment of the downspout is affixed to the wall.
- Please also note that the Minnesota Lath and Plaster Bureau suggests that the downspout not be flush mounted, but rather positioned away from the stucco. This will permit cleaning, and other maintenance to proceed without disturbing the downspout.



Decorative Foam Quoins/ Bands

Expanded polystyrene decorative foam shapes are often used in conjunction with stucco to add aesthetic interest to an otherwise plain wall façade. It is suggested that these decorative shapes be added after the stucco brown coat has been installed.

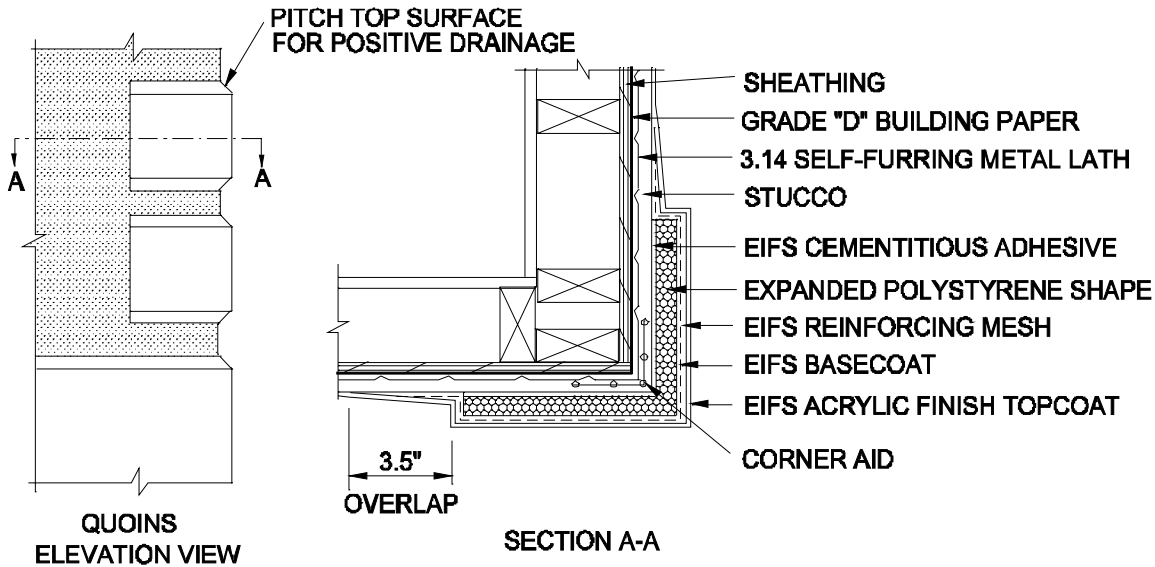
- EIFS cementitious basecoat/ adhesive should be used to adhere the decorative foam pieces to the brown coat (refer to drawing next page).
- After the EIFS adhesive has been given sufficient time to set-up (approximately 24 hours), the shapes can be encapsulated with EIFS mesh reinforced base coat. Note that the reinforcing mesh extends onto the stucco a minimum 3.5". The basecoat is then smoothed and feathered over the stucco to completely encapsulate the shape.
- The EIFS basecoat encapsulating the shapes

“The look of expensive stone quoins, keystones, bands and other entablature can be easily created using expanded polystyrene foam shapes.”

should be smooth with no visible pattern of the reinforcing mesh. If the mesh pattern is still visible, another coat of basecoat material should be applied.

- After the EIFS basecoat and the stucco have been given sufficient time to cure, primer and an EIFS acrylic finish topcoat can be applied.
- Another method often used to create decorative shapes is the use of screed guides. With this method wood strips are attached over the brown coat to form the pattern of the desired shape. Stucco is then trowelled into the form to effect the desired results. The stucco is then finished with conventional mineral stucco finishes or EIFS acrylic finish topcoats.

See Illustration next page



Manufactured Stucco Products

These products are considered to be alternates to the building code and they require approval from the local building official. The product should also have what is called an ICC-ES Report (International Code Conference—Evaluation Services). At the back of this report is an Installation Card which includes fill-in the blank information that must be completed by the stucco contractor and filed with the building official after completion of the work and before the final inspection.

2003 MN State Building Code Section R703.8

Flashing

The following information is referenced in several of the details illustrated in this handbook.

R703.8 Flashing. *Approved corrosion-resistive flashing shall be provided in the exterior wall envelope in such a manner as to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. The flashing shall extend to the surface of the exterior wall finish and shall be installed to prevent water from reentering the exterior wall envelope. Approved corrosion-resistant flashing shall be installed at all of the following locations:*

1. *At top of all exterior window and door openings in such a manner as to be leakproof.*
2. *At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.*
3. *Under and at the ends of masonry, wood, or metal copings and sills.*
4. *Continuously above all projecting wood trim.*
5. *Where exterior porches, decks, or stairs attach to a wall or floor assembly of wood-frame construction.*
6. *At wall and roof intersections.*
7. *At built-in gutters.*
8. *Where exterior material meets in other than a vertical line.*

Other Useful Contacts

Sheathing Associations/ Manufacturers

- International Bildrite: (218) 283-3900
www.bildrite.net
- Engineered Wood Association (Plywood, OSB): (253) 565-6600, www.apawood.org
- Structural Board Association (OSB): (416) 730-9090, www.osbguide.com
- Georgia-Pacific: (800) 284-5347
www.gp.com/build/
- United States Gypsum: (800) 874-4968
www.usg.com

Sealant Manufacturers

- Degussa Building Systems (Sealant) (800) 433-9517, www.degussa.com
- Dow Corning (Sealants) 800-441-4369, www.dowcorning.com
- Pecora (Sealant) 1-800-523-6688, www.pecora.com

The Minnesota Lath and Plaster Bureau is proud to represent the following highly qualified and trained lathing and plastering contractors...

**Advanced Contractors
Anderman Plaster & Stucco
Anderson Drywall
Brisson Stucco
Buetow Bros. Stucco
Commercial Drywall
A.E. Conrad Company
Custom Drywall, Inc.
Custom Rock
Stephen Donnelly Co.
Donn's Plastering Co.
Foley Stucco Co.
Franklin Drywall
Gausman Plaster & Stucco
Imperial Plastering, Inc.
JTW Company
Kelly Stucco
Kunz Stucco, Inc.
Lardani Drywall & Plaster
Lusian Stucco Co.
McClellan Stucco Co.
Midwest Commercial Exterior
Minuti-Ogle Co., Inc.
Mulcahy, Inc.**

This document is dedicated to the memory of Art Brisson (1948-2000), who's honesty and forthright concern about his industry provided the impetus for the original publication. We miss you Art.

**Olympic Wall Systems
Palmer Soderberg Inc.
Petersen-Parenteau Stucco
Brian Peterson Stucco
Queen City Construction, Inc.
R.G. Roach Specialties
RTL Construction
Schum Drywall Co.
Signature Stucco
A.J. Spanjers Company
A.G. Strobel Co.
Structural Applicators Inc.
Stucco 1 Inc. of MN
Sunset Construction
T & T Stucco
Themescapes
Torrini Plastering Co.
Wallen Lathing
Greg Zimmerman Stucco**

Postscript

Funny thing, since we wrote this document in the summer of 2000 we have been mostly flattered with your compliments, but we have also been admonished, criticized and even copied. It was with a little experience and perhaps some naiveté that we wrote the first edition of this publication. It was easy then, because we wrote what we knew about. To duplicate this publication from scratch today would be an effort in futility as new information and strategies seem to come out daily.

The Latest Strategies

As part of our responsibility, the MN Lath and Plaster Bureau is involved in several local and national committees. If there is one persistent theme that keeps popping up at these meetings, it is that wall assemblies now need to be vented and/or incorporate a drainage plane.

The fact of the matter is that stucco already has a drainage plane in two layers of building paper, however, some experts have suggested that more air space is better. One leading building scientist, Dr. Joe Lstiburek, has recommended using Dupont Tyvek® StuccoWrap® as the drainage medium behind stucco. What differentiates StuccoWrap from regular Tyvek is an accordion shaped drainage profile that provides a 1/8-inch air space when it is installed under a layer of Grade D building paper. The key to making this strategy work, however, is to integrate all of the flashing details to the StuccoWrap before installing the building paper and stucco. As far as the stucco contractor is concerned, this is not a bad way to go, because he no longer has to worry about the flashing issues. Those problems have already been thoughtfully integrated to the drainage plane (Tyvek) by somebody else.

Along these lines another manufacturer, Benjamin Obdyke, has developed a three dimensional nylon matrix product that they feel is better because it optimizes a ¼-inch drainage plane behind the cladding. In describing this product, you might think of it as a giant nylon “Brillo®” dish washing scouring pad that has been attached to the wall before you install the cladding. While the product seems to hold some promise, it does not come without some questions that the manufacturer has yet to resolve.

For our part, the Minnesota Lath and Plaster Bu-

reau has done some serious investigative work on its own and also partnered with the University of Minnesota Center for Sustainable Building Research on the issues before us. While it would be premature for us to expound on that collaboration, we will provide more insight as the information becomes more conclusive. Until then we will continue down a proactive path on these matters.

Over 9000 Served...

Since the first printing of this document over 9000 copies have been distributed statewide. Not surprisingly, many of the “stucco” details we have suggested have also been put to practice with other claddings. What seems to be clear after years of dealing with what is perceived as a “stucco” problem, is that these issues are not relegated to only stucco. As we foresaw in our opening introduction to this handbook four years ago, these issues are the “beginning of a construction problem, not a stucco problem.” As evidence continues to mount nationwide, our simple explanation seems almost prophetic.

“Education is what survives when what has been learned has been forgotten.” B.F. Skinner, 1964

Stucco is as natural a building product as brick, stone and wood. When we start to question the viability of such products in today’s construction, it is time to apply the brakes and take an

informed look at the direction our building practices are taking us. By reading this booklet you are staying informed. The stucco industry thanks you for your support —*Steve Pedracine, Executive Director*

The Minnesota Lath and Plaster Bureau would like to acknowledge these individuals and entities who reviewed this document before it was printed:

- * Don Lagerstrom, Fenestration Consultancy
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- * Dick Felber, Plasterers Local 265

We apologize for any omissions.