

2012 IRC & IBC Exterior Finishes

Instructor
Jody Hilton
Sunrise Engineering
801-557-6843 or
801-523-0100



EXTERIOR FINISHES INCLUDING CONVENTIONAL EXTERIOR PLASTER, ONE COAT STUCCO & EIFS SYSTEMS, CULTURED STONE & STONE VENEER AND EXTERIOR WALL FLASHINGS

- We will be discussing six systems
- Conventional plaster or three coat stucco
- One coat stucco systems the most common installed system in Utah
- EIFS systems

EXTERIOR FINISHES

- Cultured stone
- Natural stone
- Flashings

QUESTION

- What is the difference between leaks found in exterior walls of homes built 30 years ago and leaks found in newer constructed houses ?

ANSWER

- Leaks in new homes are taking longer to find because of stucco installations and advanced building techniques and improvements in construction .

EXTERIOR COVERING

- R 703.1, IBC 1403.2 Exterior walls shall provide the building with a weather-resistant exterior wall envelope
- R703.1.1 Water Resistance IBC 1403.2 Weather protection The exterior wall envelope shall be designed and constructed in a manner that prevents the accumulation of water within the wall assembly by providing a water-resistant barrier behind the exterior veneer as required by R 703.2, IBC 1404.2 and a means of draining to the exterior, water that enters the assembly. Protection against condensation in the exterior wall assembly shall be provided in accordance with R 702.7, IBC 1405.3



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DRAINAGE OR MEANS OF WATER ESCAPE

- Exceptions When a means for drainage is not required
- Over concrete or masonry wall
- Means of drainage, water resistive barrier and flashing not required for tested exterior wall envelope assemblies

DRAINAGE OR MEANS OF WATER ESCAPE

- A means for water escape or drainage is required for all exterior coverings How is it being done in the following applications
- Aluminum & vinyl siding
- Anchored or adhered brick, concrete, masonry or stone
- Wood, hardboard, vertical or horizontal lap siding
- Wood structural panel siding, steel, particle board panels
- Wood shingles or shakes used on exterior walls
- Shiplap, bevel or butt tip siding
- Fiber cement panel and lap siding









PROTECTION AGAINST CONDENSATION - R 702.7

- The exterior covering section in addition to requiring a means for of water escape or water drainage also requires that the exterior wall assembly be protected against condensation within the wall
- Vapor retarders Class I or II vapor retarders are required on the interior side of frame walls in Climate Zones 5, 6, 7, 8, & Marine 4
- Exceptions Basement walls, below grade portions of any wall and construction where moisture or its freezing will not damage materials

PROTECTION AGAINST CONDENSATION

R 702.7

- The following materials are deemed to meet the class vapor retarder class specified
- Class I Aluminum foil or plastic sheets or
- Class II Kraft faced fiber glass bats or
- Class III Latex or Enamel paint on the interior or
- Other materials with a vapor retarder class based on the manufactures certified testing or tested assembly
- With the exception of Washington County, most of Utah is climate zone 5 B and 6B
- This requires Class I or Class II vapor retarders unless vented cladding or insulated sheathing is and then only is Class III allowed

PROTECTION AGAINST CONDENSATION R702.7

- Class III vapor retarder is limited to
- Vented cladding over wood structural panels, fiber board or gypsum
- Vented cladding over wood structural panels is not allowed in Climate Zone 6
- 2 x 4 exterior walls with R-5 or greater insulated sheathing (R-7.5 in Climate Zone 6)
- 2 x 6 exterior walls with R-7.5 or greater insulated sheathing (R 11.25 in Climate Zone 6

PROTECTION AGAINST CONDENSATION R702.7

- Vinyl lap or horizontal aluminum siding applied over a weather resistive barrier
- Brick veneer with a clear air space
- Other approved vented claddings

PROTECTION AGAINST CONDENSATION

IBC 1405.3

- The only difference between the IRC and IBC section 1405.3 is
- Class II vapor barrier may be Kraft-faced fiberglass batts or interior paint with a perm rating greater than 0.1 and less than or equal to 1.0
- Interior paint is not allowed as a Type II vapor retarder under the IRC

WATER-RESISTIVE BARRIER R 703.2 & IBC 1404.2

- One layer of No. 15 asphalt felt
- Or other approved material
- Applied horizontally with the upper layer lapped over the lower layer not less than 2 inches
- Vertical joints require a 6 inch lap
- Must be continuous to the top of wall and properly terminated
- Not required in detached accessory structures, where not required in Table 703.4 (all require) and when paper (water-resistive)backed stucco lath is installed







ATTACHMENTS R703.4

- All wall coverings shall be securely fastened in accordance with Table R 703.4 or
- with other approved aluminum, stainless steel, zinc-coated or other approved corrosion-resistive fasteners
- Where the basic wind speeds are 110 miles per hour or higher the attachment of wall coverings shall be designed to resist the component and cladding loads in Table R 301.2 (2) and adjusted for height and exposure with table R 301.2 (3)

ATTACHMENTS

IBC 1609.6.4.4.1

- Each components and cladding element shall be designed for wind pressure from Table 1609.6.2

R 703.6 EXTERIOR PLASTER

- R 703.6 All lath and attachments shall be corrosion-resistant materials.
- R 703.6.1 Expanded metal or woven wire lath shall be attached with 1 ½ inch long 11 gauge nails having a 7/16 head or 7/8 inch long 16 gauge staples spaced no more than 6 inches or as otherwise approved.
- R 703.6.2 Portland cement plaster shall be not less than 3 coats and must be 7/8 minimum thickness over wire lath and 5/8 thickness over expanded metal lath
- Two coats allowed when plaster is covered by veneer

R 703.6 EXTERIOR PLASTER

- R 703.6.2 3 ½ inch weep screed required and placed 4 inches above the earth or 2 inches above paved areas
- R 703.6.2 The water resistive barrier shall lap the attachment flange
- R 703.6.2 Exterior lath shall terminate at the attachment flange of the weep screed
- IBC 2510 .3 Exterior cement plaster and expanded metal and woven wire lath shall be installed as per ASTM C 926 and ASTM C 1063

WATER-RESISTIVE BARRIERS FOR EXTERIOR PLASTER R703.6.3 & IBC 2510.6

- Water resistive barriers shall be installed as required over wood based sheathing and shall include a water resistive vapor permeable barrier with a performance at least equal to two layers of grade D paper The individual layers shall be installed independently such that each layer provides a separate continuous pane and any flashing intended to drain to the water resistive barrier is directed between layers

WATER RESISTIVE BARRIER

- Exception Where the water resistive barrier (single layer) is applied over wood based sheathing and has a water resistance equal to or greater than 60 minute grade D paper and is separated from the stucco by an intervening, substantially non water –absorbing layer or designed drainage space

EXTERIOR PLASTER APPLICATION & CURING R 703.6.4 & 703.6.5

- Each coat shall be kept in a moist condition for at least 48 hours prior to the application of the next coat
- The finish coat for a two coat system shall not be applied sooner than 7 days
- For a three coat system the second coat shall not be applied sooner than 48 hours
- The finish coat for a three coat system shall not be applied sooner than 7 days after the application of the second coat
- The first and second coats of cement plaster shall moist cured as set forth in ASTM 926 (Twice a day)

COLD WEATHER INSTALLATION REQUIREMENTS

- Nothing in the 2012 IRC but referenced ASTM C 926 12.3.2 Plaster shall be applied when the ambient temperature is higher than 40 degrees unless work is enclosed and heat is provided
- When the work area is enclosed, the heater shall be located to prevent concentration of heat on un-cured plaster
- 2012 IBC 2512.4 Plaster coats shall be protected from freezing for a period of not less than 24 hours after set has occurred
- Plaster shall be applied when the ambient temperature is higher than 40 degrees unless provisions are made to keep cement plaster work above 40 degrees during application and 48 hours thereafter

COLD WEATHER INSTALLATION REQUIREMENTS

- Never allow cement plaster to be applied without heating and tenting at temperatures of 32 degrees or below
- Cement plaster has be applied below 40 degrees and above 32 degrees if allowed by the building official when the following precautions to prevent freezing are done
- Plastering is started in the mourning and stopped or finished in the afternoon to allow plaster to set before nightfall
- An accelerator (not calcium chloride) is added per bag of stucco cement max, as this will cause the plaster to set more quickly
- Warm or heat the sand and water used to mix plaster
- Avoid the use of too much mix water

HOT WEATHER REQUIREMENTS

ASTM C 926

- Cement plaster shall be protected from uneven and excessive evaporation during dry (hot) weather and from strong blasts of air (strong winds)
- Moist curing required generally twice a day
- Severe drying conditions require additional wetting
- Plastic film taped and weighted down can help retain moisture
- Canvas, cloth or sheet material can be erected to deflect sunlight and wind or both to reduce the rate of evaporation

FLASHING

- Everything is flashed but is it flashed correctly ?
- Sloped to drain over foundation or brick /stone half walls
- Cuts, angles and seams in flashing are caulked and sealed to allow for proper drainage ?
- Flashing caulked or sealed to foundation, wall or whatever to prevent water entering below or under flashing ?

FLASHING CONTINUED

- Is flashing being installed horizontally and vertically at at intersection of wall coverings at stepped foundations
- Self adhered membranes used as flashing shall comply with AAMA 711
- Exterior doors and windows as per fenestration manufactures installation details or when not addressed by the manufacture in accordance with the flashing manufactures instructions
- Where flashing instruction are not provided pan flashing is required at the sill of the window Flashing shall also be provided at the head and sides of the opening

FLASHING CONTINUED

- With a flashing design by a design professional
- By other approved methods
- All exterior windows and doors such as garage doors, exterior doors and windows without attachment flanges or without manufactures flashing instructions must be flashed (pan or L flashed) at the sill, head and sides
- Continuously above all projecting wood trim
- Above the connection of all exterior porches, decks or stairs to a wood wall or floor assembly

















FLASHING CONTINUED

- Are exterior door sill pan flashings being installed as required ?
- Kick out flashings at roof /stucco or other wall intersection
- Is flashing or caulking being installed at intersection of dissimilar materials ?

WATER RESISTANT BARRIERS

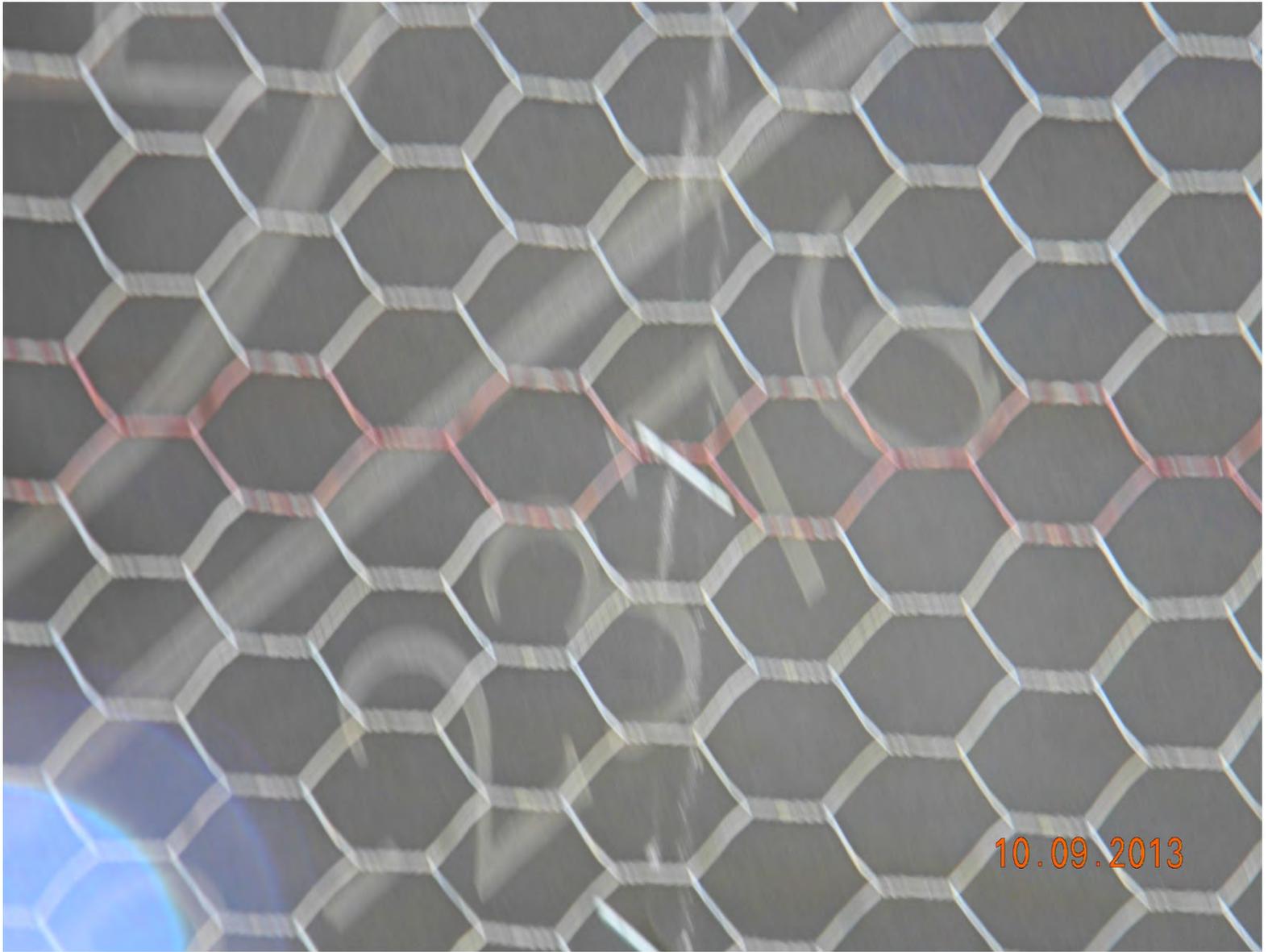
- Approved water resistant barrier being applied`
- One layer of # 15 felt or
- Two layers of grade D felt required over wood based sheathing where stucco is to be applied
- Tyvec or other approved and tested water resistant barriers

WATER RESISTANT BARRIERS

- Liquid- applied (limited use)
- Applied by roller or trowel (liquid membrane)
- Reinforcement mesh or tape or both required at corners and joints
- This should only be allowed when described and permitted by an current ICC Evaluation Report and special inspection is required

WATER RESISTANT BARRIERS

- Taped or sealed joints now required
- Lap 2 inches horizontal and 6 inches vertical
- Holes, tears, punctures by staples, screws or fasteners must be caulked and sealed
- In all cases water resistant barriers must continue and extend the full height of the exterior wall.



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WATER RESISTANT BARRIERS

- Installed from the bottom plate to the top plate of the wall (including that portion of the wall between the soffit line and top plate
- Tyvec or specialty water resistant barriers have specific whole house installation instruction including windows doors etc. Taped joints
- All penetrations gas lines, A/C lines, hose bibs, air grilles, attic vents located in walls, dryer vents, horizontal flues etc. must flashed and caulked to create permanent condition that will not allow water penetration.



ONE COAT STUCCO INSTALLATIONS

- These one coat stucco systems are alternatives to exterior wall coverings (exterior plaster) specified in the IBC Chapter 25 and IRC R 703
- The systems may be used in one hour fire resistance rated walls (with restrictions) and in Type I, II, III or IV & V construction
- May be applied over substrates of EPS, XPS foam insulation boards, gyp sheathing fiberboard, OSB or plywood
- Factory prepared in bags of cement mix only or alternatively pre-mixed with sand 80 lb bags
- Components cannot be interchanged with other systems unless stated in report

ONE COAT STUCCO INSTALLATIONS

- Insulation boards
- EPS insulation boards must be recognized in the current ICC-ES report
- Must be $\frac{1}{2}$ inch thick minimum when applied over solid sheathing and must have vertical grooves $\frac{1}{4}$ inch wide by $\frac{1}{8}$ inch deep on the back face of the board
- When installed as part of the water resistive barrier the insulation boards must have tongue and groove on the horizontal edges, 1 inch thickness and vertical drainage channels
- As an alternative to vertical grooves Tyvek stucco wrap or Drain wrap may be installed over the solid sheathing
- Metal lath 20 gauge x 1 inch galvanized woven wire fabric must be used

ONE COAT STUCCO INSTALLATIONS

- Wire Fabric lath
- Metal lath 20 gauge x 1 inch galvanized woven wire fabric must be used and must be furred when over all substrates
- Furred out 1/8 for 1/2 plaster thickness or less
- Plaster thickness greater than 1/2 inch require 17 gauge 1 1/2 inch galvanized steel woven wire fabric furred 1/4 from solid sheathing
- Fasteners No 11 gauge galvanized roofing nails with 3/8 head spaced 6 inches on center or No 16 gauge galvanized staples with a minimum crown width of 7/16 of an inch Spaced 6 inches on center
- Fasteners must penetrate wood framing at least 1 inch
- OSB, plywood or other sheathing is not considered wood framing
- Fasteners must be increased in length for the thickness of sheathing weather barrier, lath and if installed insulation boards

16 GA. Staples

P17

WIDE CROW

1-1/2" x 1" CROWN GALVANIZED
To Fit Senco and Standard 1"
Wide Crown Staplers



10,000 PCS.

Case Weight: 28 Lbs.



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ONE COAT STUCCO INSTALLATIONS

- Water-resistive barrier
- Two layers of grade D building paper as set forth in IRC R 703.6.3 & IBC 2510.6 or equivalent with an ICC-ES evaluation report when installation is over wood based sheathing
- One layer of EPS or XPS with tongue and groove horizontal edges over one layer of Grade D felt or equivalent recognized in a current ICC-ES evaluation report

ONE COAT STUCCO INSTALLATIONS

- Vapor retarder required
- Flashings required
- Finish coats cement plaster paints acrylic textured finishes and elastomeric coatings are acceptable All must be installed as per manufactures recommendations
- Hybrid finishes ?
- Wire lath inspection is required by report
- Control joints must be installed as specified or as required for conventional plaster
- ASTM 7.11.4.1 Control joints shall be installed to delineate areas to not more than 144 square feet



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ONE COAT STUCCO INSTALLATIONS

- The distance between control joints shall not exceed 18 feet in either direction or a length to width ratio
- A control joint is required where framing or furring changes direction
- Wall or partition height door frames shall be considered as control joints
- Casing beads or other suitable means shall be used to isolate penetrating elements and separate dissimilar materials
- Caulk, flash and seal all penetrations of water resistive barrier



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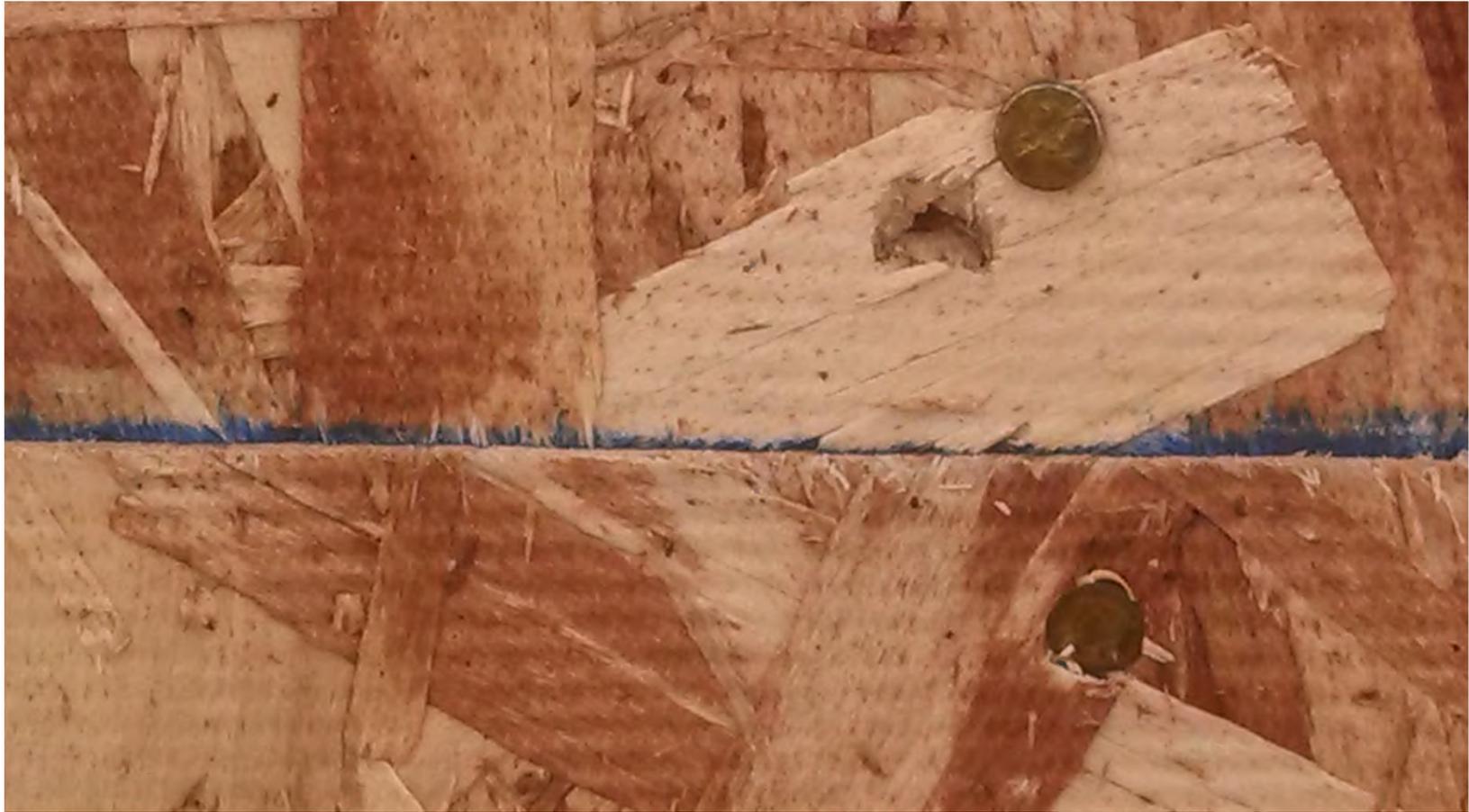
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ONE COAT STUCCO INSTALLATIONS

- Curing Moist curing must be provided for 48 hours after coating application
- Soffits The system may be applied to soffits but metal lath and proper sized fasteners must be used
- Sills The system may be applied to sills at windows or similar areas
- Sills with depths less than 6 inches may have coating and lath applied to any substrate
- Sills with depths greater than 6 inches must have substrates of solid wood or plywood
- Substrate must be installed over a double layer of Grade D paper

STUCCO PRE-INSPECTIONS THAT SHOULD BE DONE BEFORE LATHING & PLASTERING BEGINS

- Framing should be complete and the building should be carrying 90% or more of the final dead load
- Cutting lath behind vertical control joints will require additional backing
- All fasteners for lath must penetrate in to a framing member a minimum of 1 inch
- Inspect decorative trim and all other trim accessories and components for proper attachment to framing members
- OSB or plywood sheathing must be installed as per manufactures installation instructions with 1/8 gaps provided at ends and sides





- Roof flashings in most cases is provided by others.
- Provide kick out flashing at intersection of walls and roofs
- Seams, joints and similar openings must be caulked and sealed to properly shed water to the exterior of the building
- Flashing or weep screed must be provided at the base of all framed walls
- Exterior windows and doors to must be flashed as per NWCB or AMMA standards.
- Pan or head flashings are required above doors and windows without nailing fins and or with manufactures installation and flashing instructions
- Provide exterior door sill pan flashing as required by door manufacture
- All flashing and water resistance barriers shall be installed weatherboard fashion



MANUFACTURED STONE VENEER

- These systems are pre-cast concrete products and are alternative material to natural stone applications
- Installation must comply with ICC-ES evaluation report and manufactures installation instructions
- Must be used as an adhered (non-load-bearing) wall veneer
- Limited to wood-frame, light gauge steel frame or concrete masonry walls
- The veneer may be applied over backings of cement plaster, concrete or concrete masonry
- When installed over sheathing 2 layers or grade D felt as per R 703.6.3 or IBC 2510.6 is required



MANUFACTURED STONE VENEER

- Flashings must be installed as per IBC 1405.4 and 1405.10.1.2 and or IRC 703.8
- Weep screeds must be installed at the bottom of the wall and at all horizontal terminations in accordance with IBC 1405.10.2 & IRC R 703.2.2
- In addition the weep screeds must have 3/16 diameter holes spaced a maximum of 33 inches apart holes
- Lath is a specified by manufacture but in most cases 2.5lb diamond mesh metal lath , 3.4 lb rib lath or self furring metal lath or 17 gauge hexagonal woven wire mesh







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MANUFACTURED STONE VENEER

- Fastened to each wall stud at 6 inches OC vertically
- Fasteners as per manufactures report in general
Galvanized nails must penetrate from 1 3/8 to 1 1/4 inch depending on nail diameter and stud gravity or 16 gauge galvanized staples of sufficient length to penetrate the stud 1 3/8 inch or per ASTM 1063 or IRC 703.6.1 1 11/2 nails 7/8 long staples
- As per report A scratch coat of type N or S mortar (cement plaster) ASTM C 926 a minimum thickness of 3/8 inch . or Type S mortar 1/2 thick scratch coat
- Must be scored horizontally



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MANUFACTURED STONE VENEER

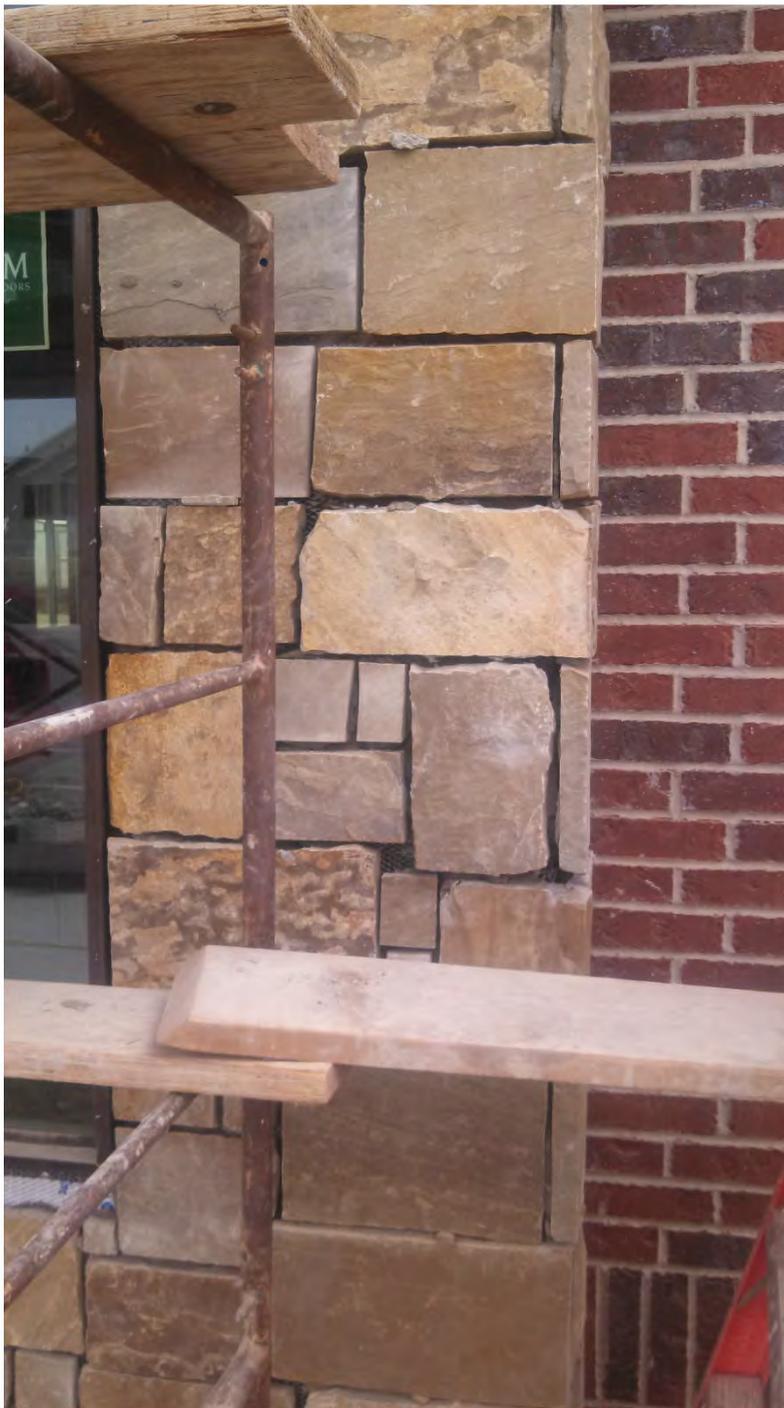
- The stone units must be installed in $\frac{3}{4}$ thick mortar setting bed or alternatively the setting bed is applied to the back of each stone and pressed into place
- IBC The supporting wall must be designed to support the weight of the veneer system and at openings supporting members must be designed to deflect to $\frac{1}{600}$ of the span
- IRC In seismic zones D thru E The weight of the wall must be determined and when this weight exceeds the limit the wall must be engineered as per R 301.1.3

NATURAL STONE (MASONRY) VENEER (ADHERED)

- 2012 IRC R 703.12 States must be installed in accordance with manufacturer's instructions
- 2012 IBC 1405.10 Installed in accordance with 1405.10 and manufactures instructions
- Water resistive barriers as 2510.6
- Flashing at foundation weep screed or flashing 3 ½ inches and extend 1 below the foundation plate line
- Clearances 4 inches above earth and 2 inches above paved areas and ½ above walking surfaces

NATURAL STONE (MASONRY) VENEER (ADHERED)

- No installation required found in the IBC or IRC
- References 6.1 & 6.3 TMS 402 and ACI 530
- ACI 530 Limits units to 2 5/8 max thickness, 36 max length and not more than 5 feet of total face Max weight 15 lbs. per square feet









STONE VENEER (STACKED) INSTALLATION

R 703.7

- Stone veneer limited to 5 inch maximum thickness and limited to the first story above grade plane.
- Seismic zones D-0, D-1 and D-2 stone veneer is limited 20 feet + 8 feet for the gable ends, above foundation and 4 inch maximum thickness
- Are higher heights and thickness's allowed if designed by an engineer





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EIFS SYSTEMS

- History on EIFS systems
- There are many EIFS systems that can be installed on a project
- In most cases construction specifications lists more than one system which may be chosen after permit issuance and then installed
- Most EIFS systems are classified into two categories
- EIFS system without drainage &
- EIFS systems with drainage
- Most EIFS manufactures have systems of both types with many sub systems

EIFS SYSTEMS

- Dryvit 7 ES Reports
- Parex 6 ES Reports
- Senergy 3 ES Reports
- Sto wall 4 ES Reports
- BSAF including Senergy, Finestone, Sonowall, Acrocrete-Acrowall 12 ES Reports
- How does the architect, designer, construction superintendent or plans examiner know which system will be installed ?
- How do you know if it is the correct system for the type of construction or type of building

EIFS SYSTEMS WITHOUT DRAINAGE

- Question Can an EIFS systems be installed on conventional pre-manufactured metal buildings
- EIFS systems without drainage are limited to fire resistant-rate construction and any construction type (1 through V) with the exception of framed walls of type V construction in R-1, R-2, R-3, or R-4 occupancy group
- Limited to concrete or masonry walls in dwellings 2 family dwellings and townhomes constructed under the IRC

EIFS SYSTEMS WITHOUT DRAINAGE

- Insulation boards have a current ICC ES report , or produced by manufacture with 3rd party quality control inspections or EPS Board or Staccato EIFS boards or other approved insulation boards
- Are large shaped foam insulation products such as cornices, fascia & soffit and decorative bands code compliant with ASTM C 578, Type 1 and ASTM E 2430
- Cultured stone, masonry, natural stone and cast foam products of different shapes and sizes are desired to be installed with EIFS systems
- What is a cast foam product
- Can these products be installed as EPS insulation boards in compliance with the ES report

EIFS SYSTEMS WITHOUT DRAINAGE

- Substrates Gyp sheathing, fiber cement panels, concrete masonry, concrete, exterior plaster, Exposure 1 wood structural panels or brick masonry
- Sealants Must comply with ASTM C 920, Type S or M minimum grade NS Class 25 and Use 0

EIFS SYSTEMS WITHOUT DRAINAGE

- Manufactures application instructions require
- Store at below 100 degrees and above 40 degrees
- Application shall not take place during inclement weather unless protected
- Air and surface temperatures must be 40 degrees and remain for 24 hours or until dry at next application
- Specific system components may require temperatures of 45 and 50 degrees
- Inspection of substrate (1/8 gap between wood based sheathing

EIFS SYSTEMS WITHOUT DRAINAGE

- Ensure flashing is installed in accordance with code and contract documents
- Transition at roof lines Hold system 8 inches above flat roofs and 2 inches above sloped roof
- Openings to be flashed
- Windows and doors with integral flashing shall have field applied flashing by others
- Individual windows that are ganged to make multiple units require the heads to be continuously flashed and joints sealed
- Wood decks shall be properly flashed

EIFS SYSTEMS WITHOUT DRAINAGE

- System shall terminate above poured decks, patios and landings that are properly sloped and waterproofed to direct water away from the walls
- System must be properly terminated at light fixtures outlets hose bibs dryer vents etc
- Hold system 8 inches above finished grade
- Only specific system materials are allowed
- Reinforcement mesh colored for product identification
- Portland cement Type I or II is allowed (by system)
- Install reinforcement mesh at all openings penetrations and at all system terminations

EIFS SYSTEMS WITHOUT DRAINAGE

- Insulation boards are 2ft x 4ft with a minimum thickness of $\frac{3}{4}$ inch
- Insulation boards are installed by applying the adhesive to the back of the insulation board with a notched trowel and so that the ribbons run vertical when the board is placed on the wall
- Adhesive material is not allowed to remain in board joints
- Insulation board joints are butted tightly Joints greater than $\frac{1}{6}$ inch require to be filled in
- After insulation boards are installed wait 24 hours before mesh and base coat are installed

EIFS SYSTEMS WITHOUT DRAINAGE

- The basecoat shall be applied in a manner to fully embed the reinforcing mesh The recommended method is apply the basecoat in two passes

EIFS SYSTEMS WITHOUT DRAINAGE

- Wind Design Table 3 of ES report will have specific assemblies with test data for wind design
- Use in Types of Construction I thru IV Table 4 describes assemblies for use in types of construction
- Fire-resistance rated construction Table 5 describes the assemblies for use in nonload-bearing-fire resistance-rated construction in Const. Types I thru IV

EIFS SYSTEMS WITHOUT DRAINAGE

- Type V construction
- May be installed to the surface of any bearing or non bearing combustible exterior fire resistance-rated assemblies in Table 720.1 (2) without affect on fire rating of assembly
- The exterior wall must be a minimum of 10 feet from adjacent construction
- Special inspection For recognition under the IBC third party special inspection is required
- Insulation boards must be separated from the building interior by a thermal barrier

EIFS WITHOUT DRAINAGE

- Must be installed by listed applicators
- Systems shall terminate 6 inches above finished grade

EIFS SYSTEMS WITH DRAINAGE

- These systems may be adhesively or mechanically attached
- These systems comply as EIFS with drainage
- It is imperative that each system or sub system be evaluated for proper application with type of construction
- Depending on specific system May be allowed in fire- resistance-rated construction, construction types 1 thru V and structures built under the IRC
- May be limited to buildings of Type V construction under the IBC and dwellings under the IRC

EIFS SYSTEMS WITH DRAINAGE

- Substrates Gyp sheathing, glass-matt-faced gyp substrate, fiber cement panels, concrete masonry, concrete, exterior plaster, Exposure 1 wood structural wood panels or brick masonry
- Insulation boards have a current ICC ES report , or produced by manufacture with 3rd party quality control inspections or EPS Board or Staccato EIFS boards or other approved insulation boards
- Are large shaped foam insulation products such as cornices, fascia & soffit and decorative bands code compliant with ASTM C 578, Type 1 and ASTM E 2430

EIFS SYSTEMS WITH DRAINAGE

- Cultured stone, masonry, natural stone and cast foam products of different shapes and sizes are desired to be installed with EIFS systems
- What is a cast foam product
- Can these be installed as EPS insulation boards in compliance with the ES report
- Sealants Must comply with ASTM C 920, Type S or M minimum grade NS Class 25 and Use 0
- Water-resistive Barrier As specifically required and or code complying water resistive barrier including

EIFS SYSTEM WITH DRAINAGE

- No # 15 asphalt felt
- Grade D building paper with a 60 minute water resistance rating
- Tyvek StuccoWrap
- Specifically listed liquid applied water resistive coatings manufactured by the system manufacture or when permitted any liquid applied coating with a current ICC Evaluation report specific .

PROBLEMS WITH STUCCO

- In a wet stucco mix, about 1/5 of the water is absorbed in the reaction. The balance of the water forms tiny droplets and must find their way out of the mix
- The excess water exits the wet stucco mix by forming tiny capillaries and pores.
- The stucco paste cures with capillaries in tact into a “hard sponge”. The loss of water causes shrinkage

PROBLEMS WITH STUCCO

- Keeping the stucco moist by damp fogging or wetting will increase the strength and reduces cracking
- Problems with wetting
- Days above 80 degrees
- Windy days
- How long do I have to wet the walls to be affective

PROBLEMS WITH STUCCO

- Cracks in stucco can be caused by Angular stresses cracks at corners of windows and door due to combined stress generated at these type of corners
- Difference in size walls or portions of wall means movement which means cracks
- Settlement or movement can also be from improperly fastened sheathing

PROBLEMS WITH STUCCO

- Stress relief and differential movement can be relieved by control joints that limit wall panel sizes and at stress areas
- Window sill extensions created by window pop outs must be sloped to allow for drainage
- Gap between J weep channel and base flashings on brick and stone wainscot or at J channel terminations at sidewalks or stair landings is always covered with finish coat and no allowing for drainage

PROBLEMS WITH STUCCO

- Gaps or voids at the intersection of stucco walls and low roofs or patio roofs framed into such walls
- Decks at their connection to stucco walls

PROBLEMS WITH CULTURED STONE

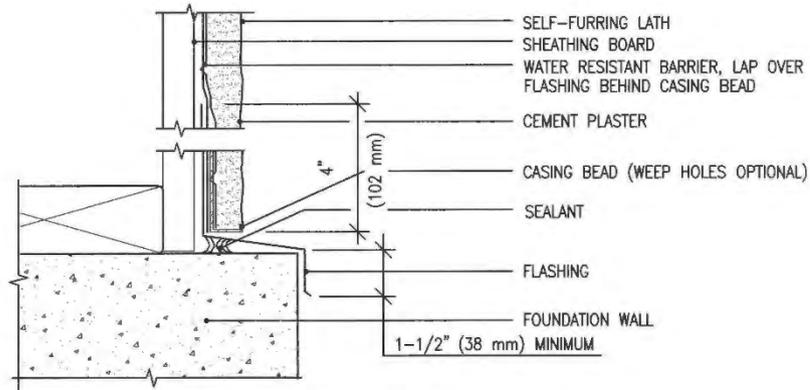
- Weep screed and weep holes must be provided
- Metal lath or 17 gauge woven wire is required (20 gauge one coat stucco woven wire is not allowed as plaster basecoat for cultured stone
- 1/2" minimum thickness required for conventional plaster or motar
- Flash or caulk intersections with dissimilar materials

PROBLEMS WITH EIFS INSTALLATIONS

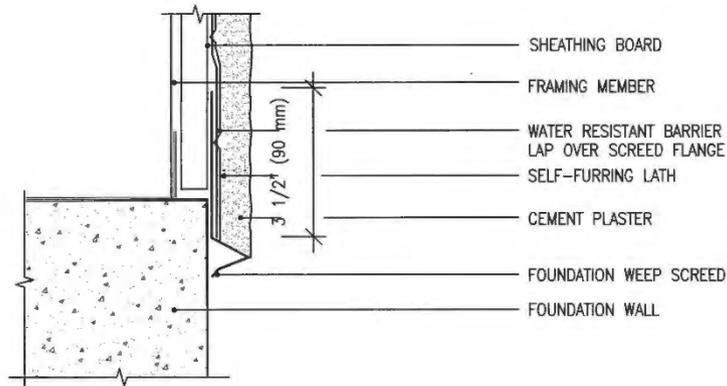
- Special inspection may or may not be required
- Special inspection required for liquid applied water resistant barrier
- All horizontal termination must occur in an approved drainage track or have a means for water drainage.

PROBLEMS WITH EIFS INSTALLATIONS

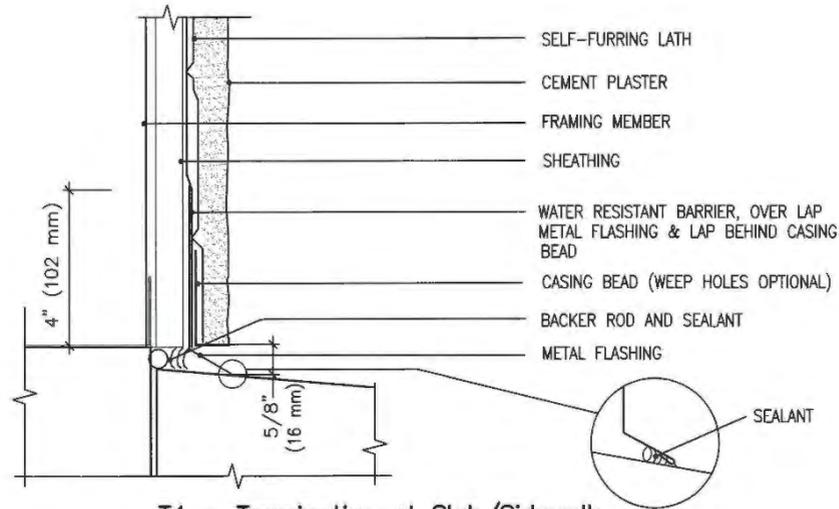
- This drainage track must be provided at all horizontal terminations including floor overhangs and cantilevers, bay windows and similar projections
- Must be tented and heated when installed in weather temperatures below 49 degrees
- Joints at windows doors and similar locations must have backer rods and 30 year caulk



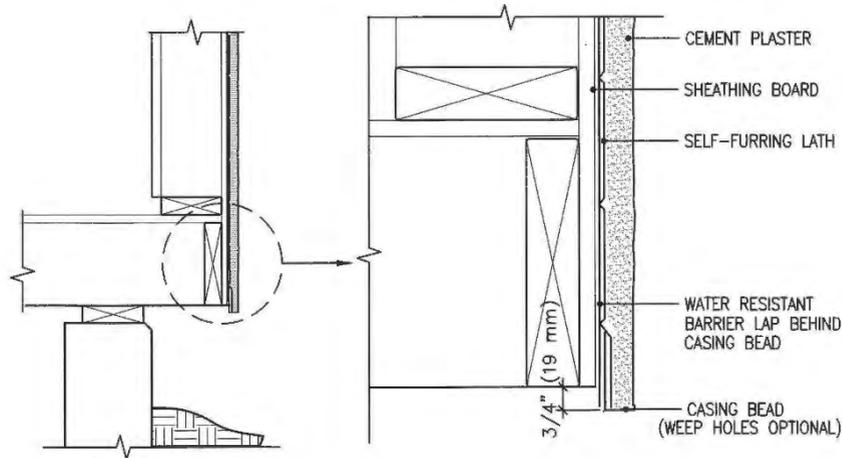
T1 – Casing Bead at Concrete Foundation



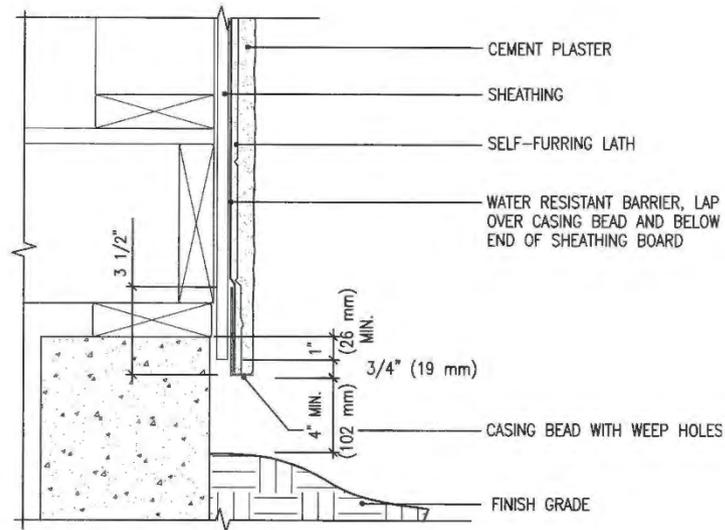
T2 – Weep Screed at Concrete Foundation



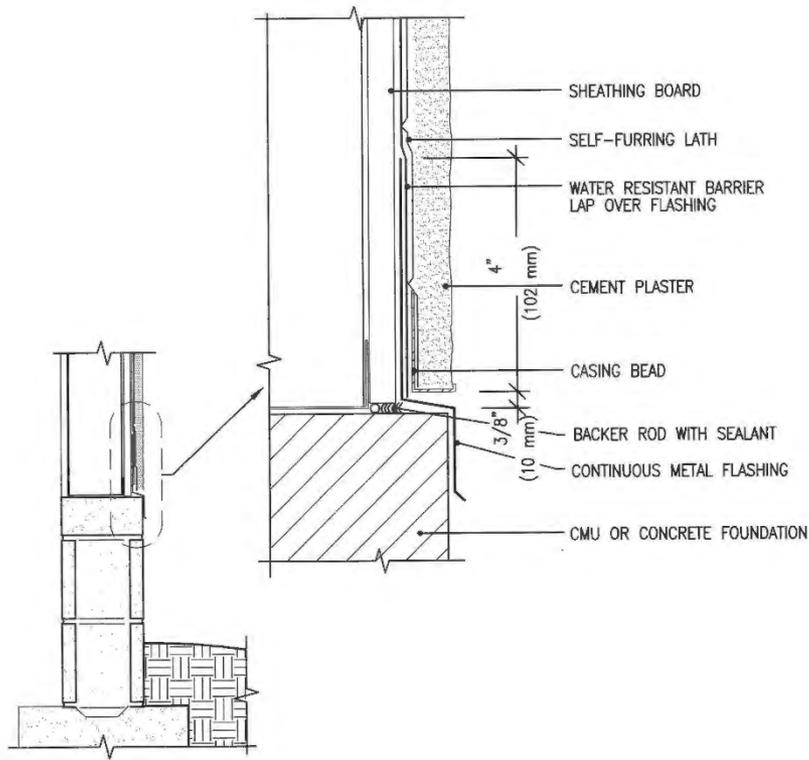
T4 - Termination at Slab/Sidewalk



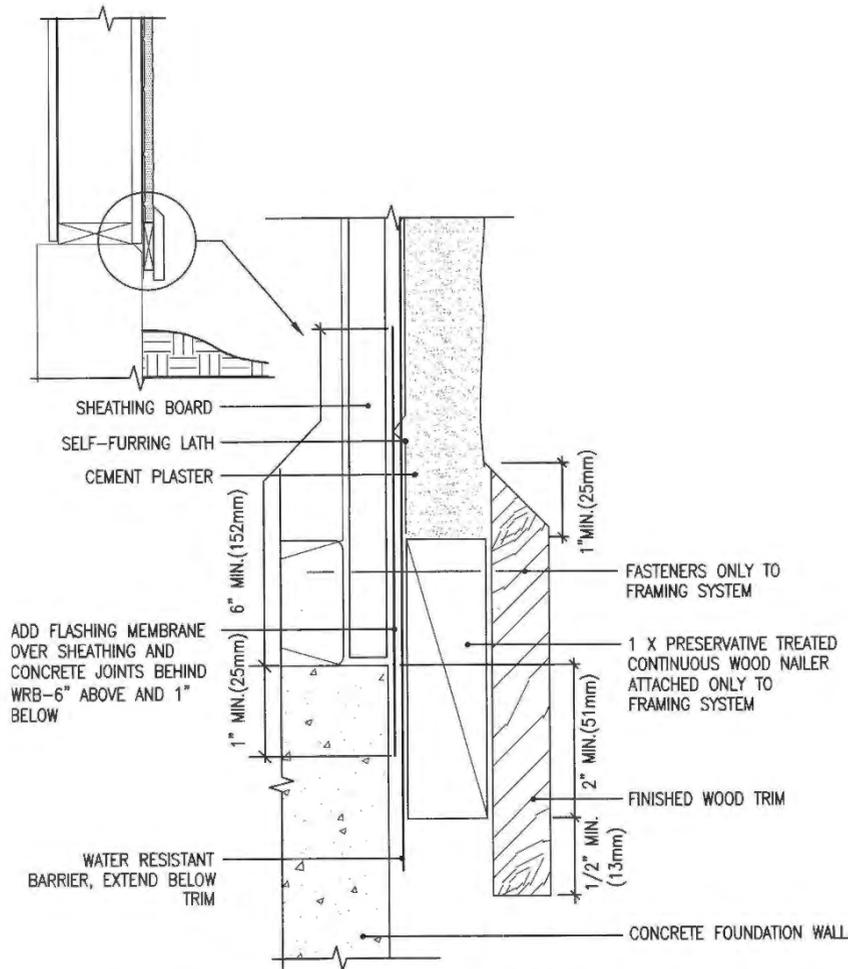
T5 - Termination at Cantilevered Wall



T7 - Termination at Foundation/Finished Grade

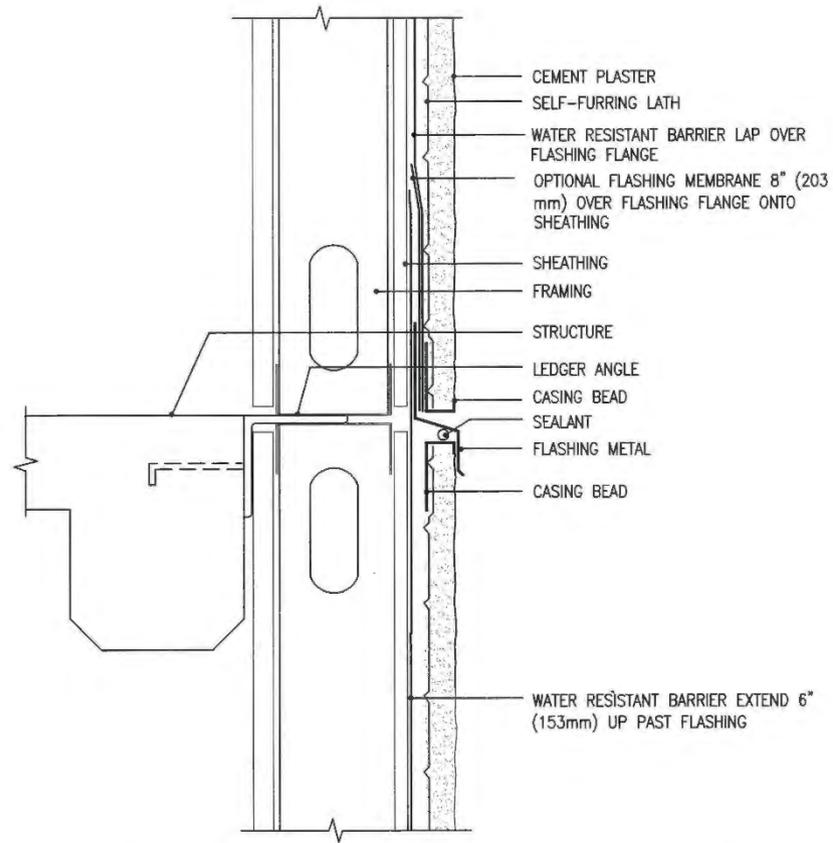


T6 – Termination at Foundation

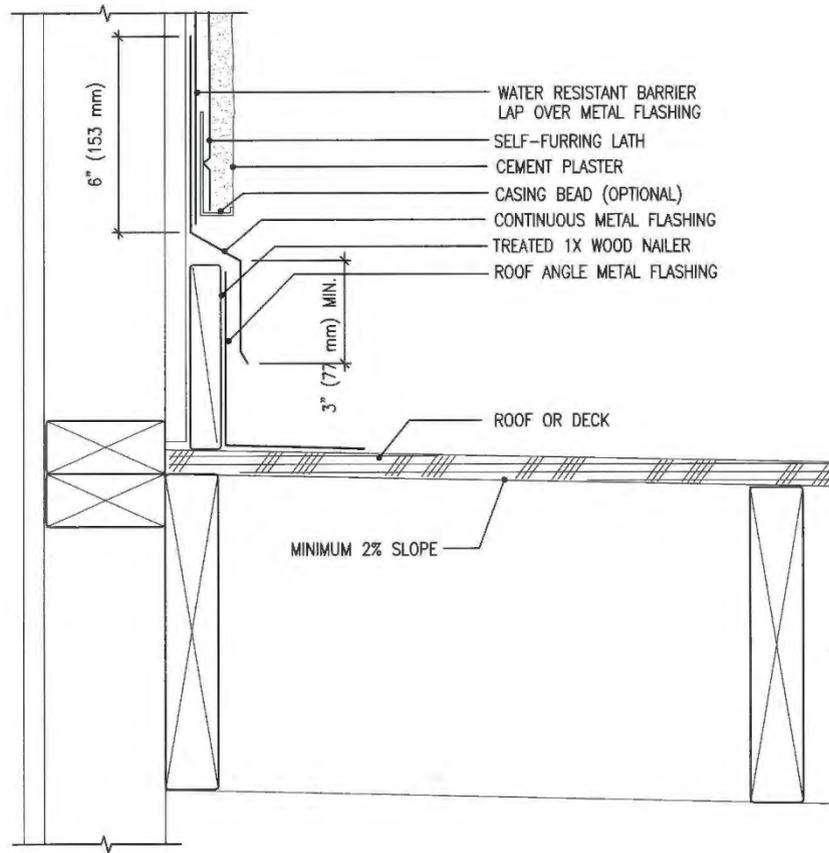


NOTE: WATER RESISTANT BARRIER CONTINUES PAST JOINT LINE OF FOUNDATION AND FRAMING SYSTEM, PLUS APPROXIMATELY 3/8" (10 mm) BEYOND END OF WOOD NAILER

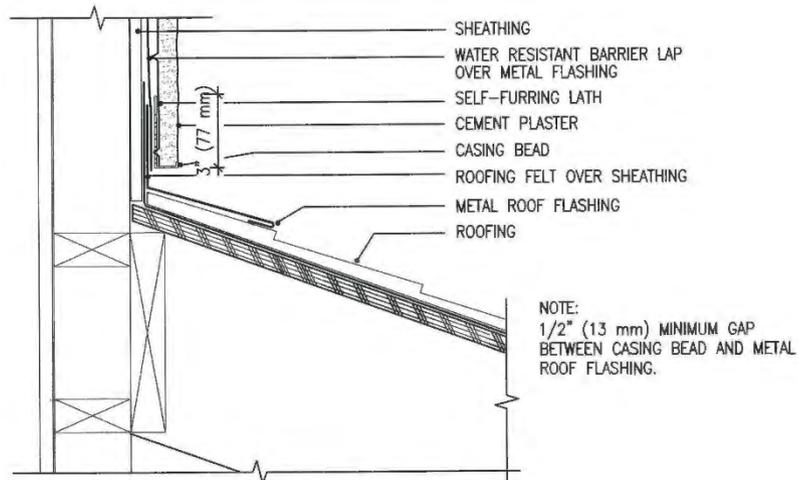
T3 - Wood Trim at Concrete Foundation



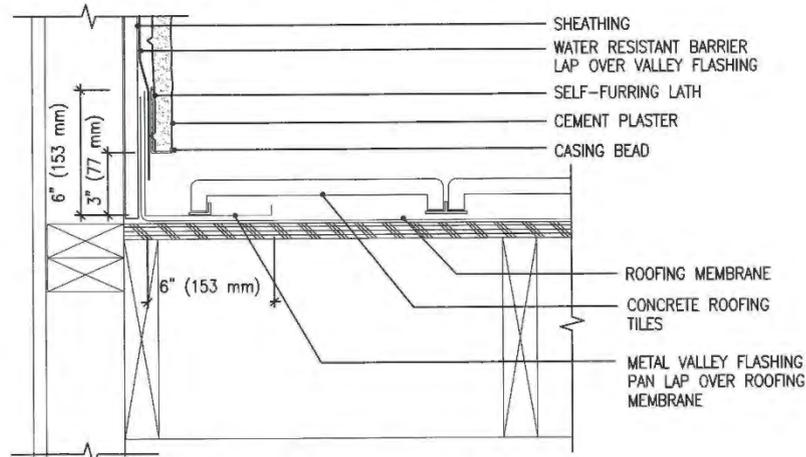
F2 – Horizontal Flashing and Expansion Joint Detail



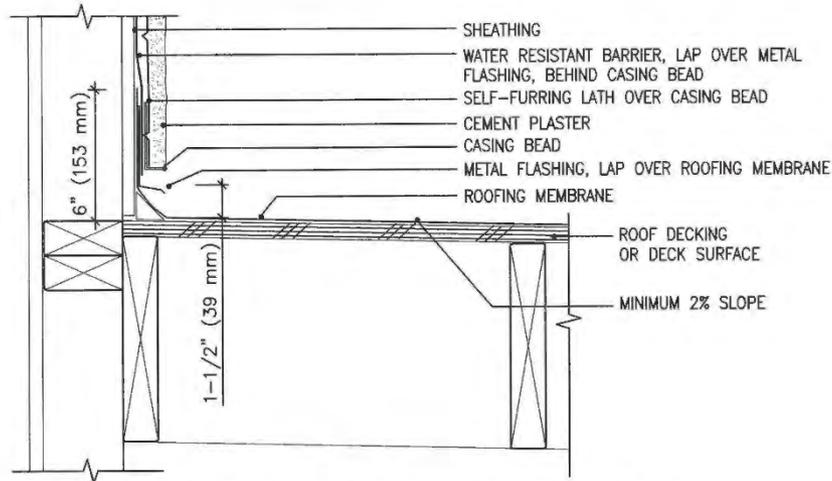
F4 – Counter Flashing at Roof or Deck Curb



F8 - Flashing/Termination at Roof

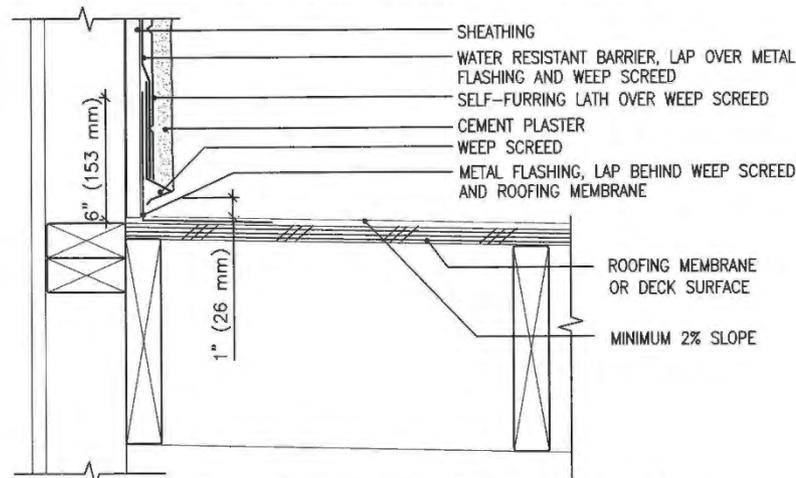


F9 - Flashing/Termination at Roof



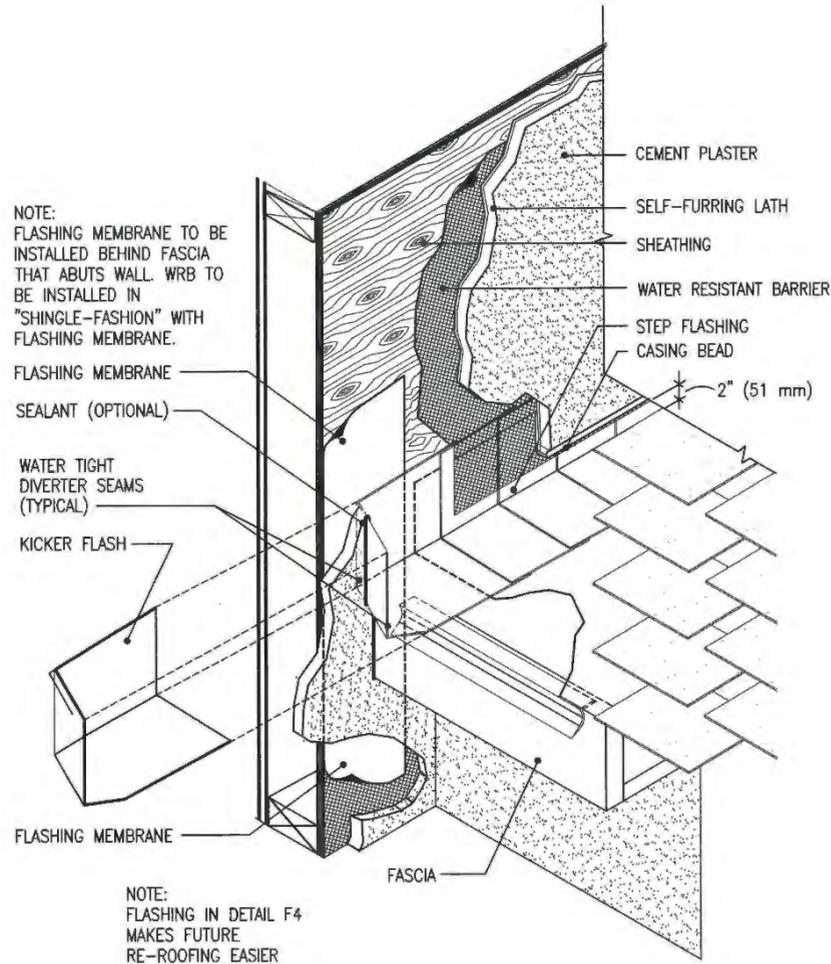
F6 – Counter Flashing at Roofing/Deck Membrane

NOTE: THIS OPTION MAKES IT DIFFICULT TO RE-ROOF OR DECK

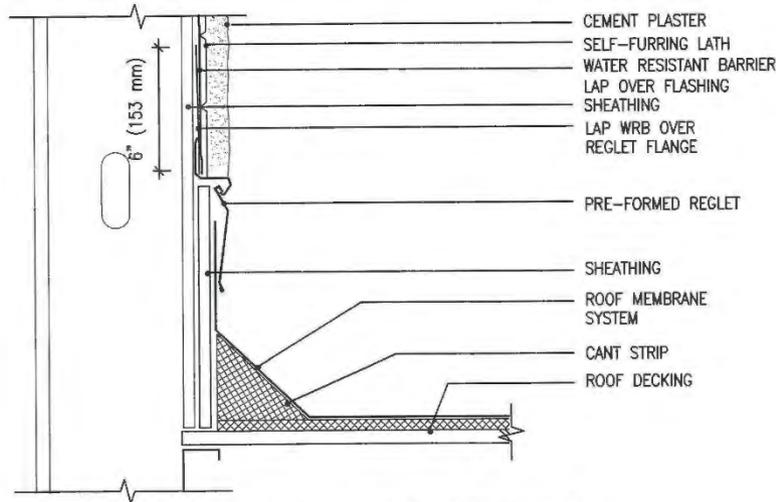


F7 – Weep Screed at Roofing/Deck Membrane

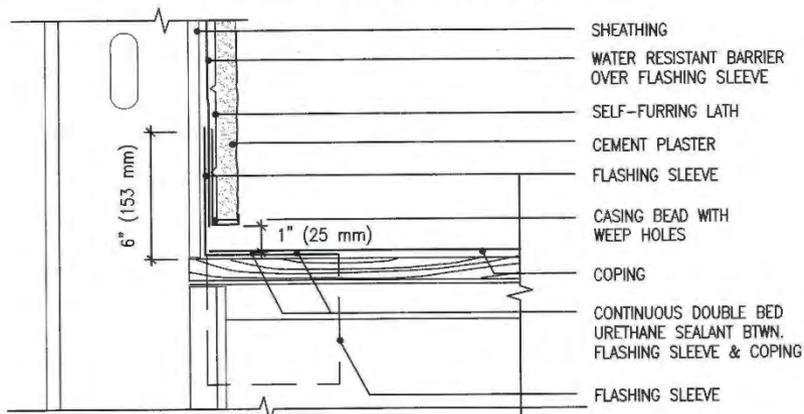
NOTE: THIS OPTION MAKES IT DIFFICULT TO RE-ROOF OR DECK



F10 – Roof/Kicker Flashing Axonometric

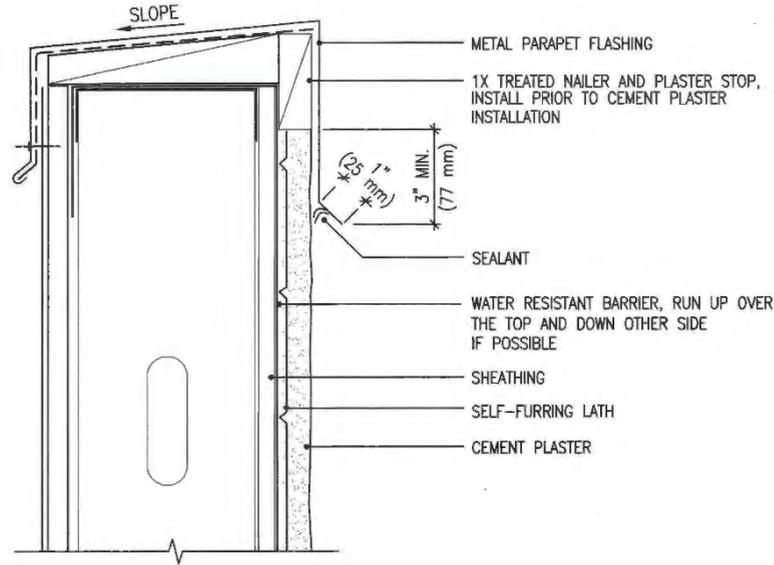


F13 – Flashing Reglet Detail



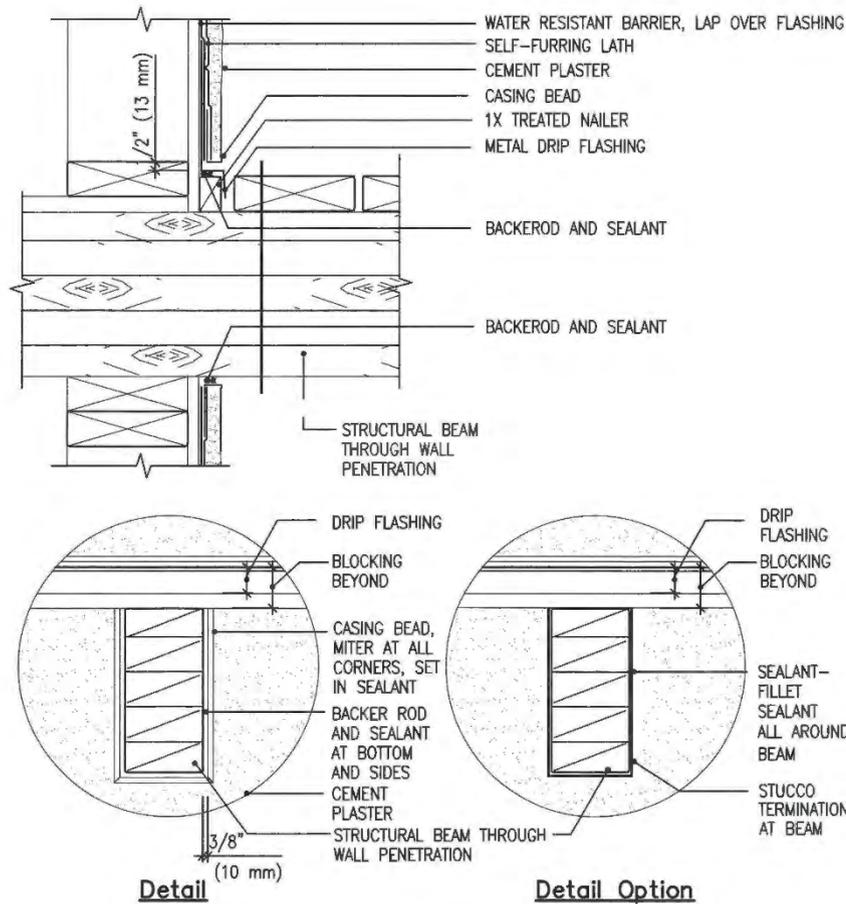
F14 – Flashing/Top of Parapet at Vertical Wall Detail

NOTE: FOR ADDITIONAL CAP FLASHING DETAILS REFER TO NRCA AND/OR SMACNA STANDARDS.

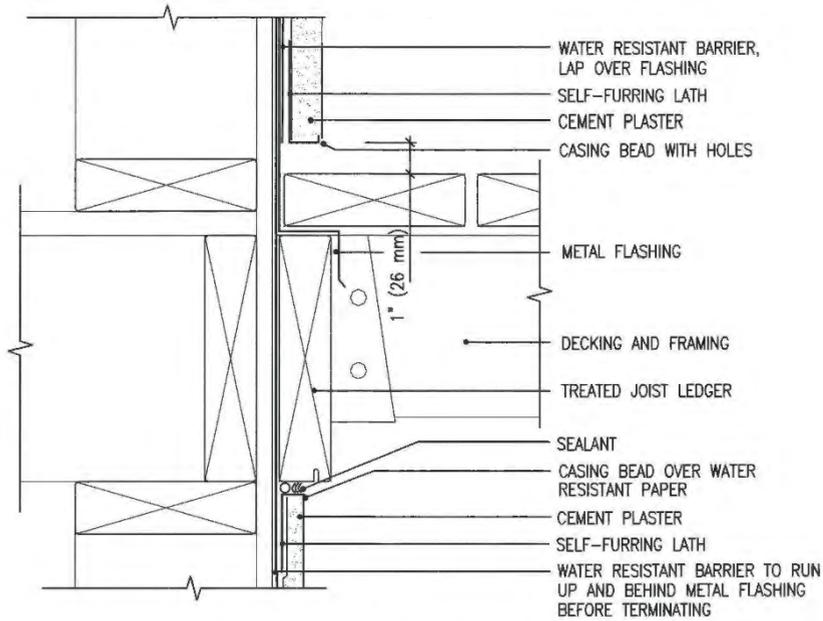


NOTE: FOR ADDITIONAL PROTECTION, A SELF-SEALING MEMBRANE SHALL BE ADDED OVER PARAPET FRAMING AND EXTENDED DOWN OVER THE WATER RESISTANT BARRIER

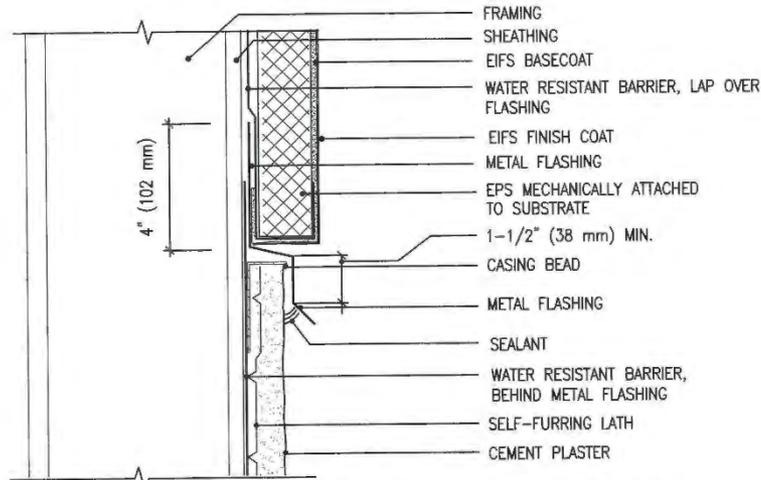
F12 – Parapet Coping Detail



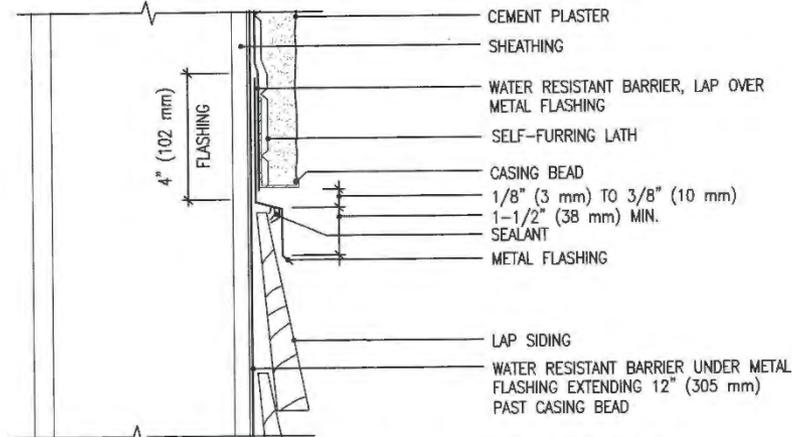
F5 – Flashing at Deck and Beam



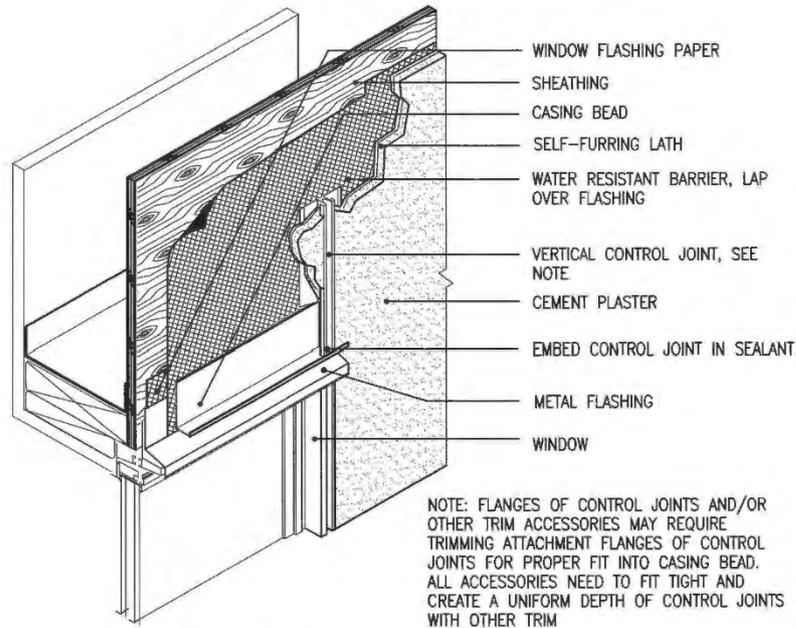
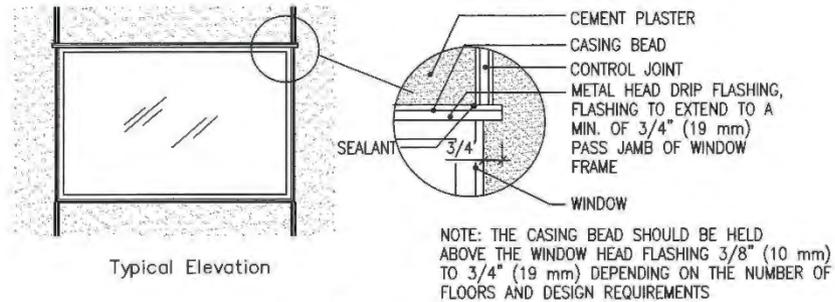
F3 – Deck Flashing



J21 - Stucco/EIFS Horizontal Flashing Joint



J22 - Stucco/Wood Siding Horizontal Joint



J8- Flashing/Control Joint at Window Head

Trim Accessory Joints

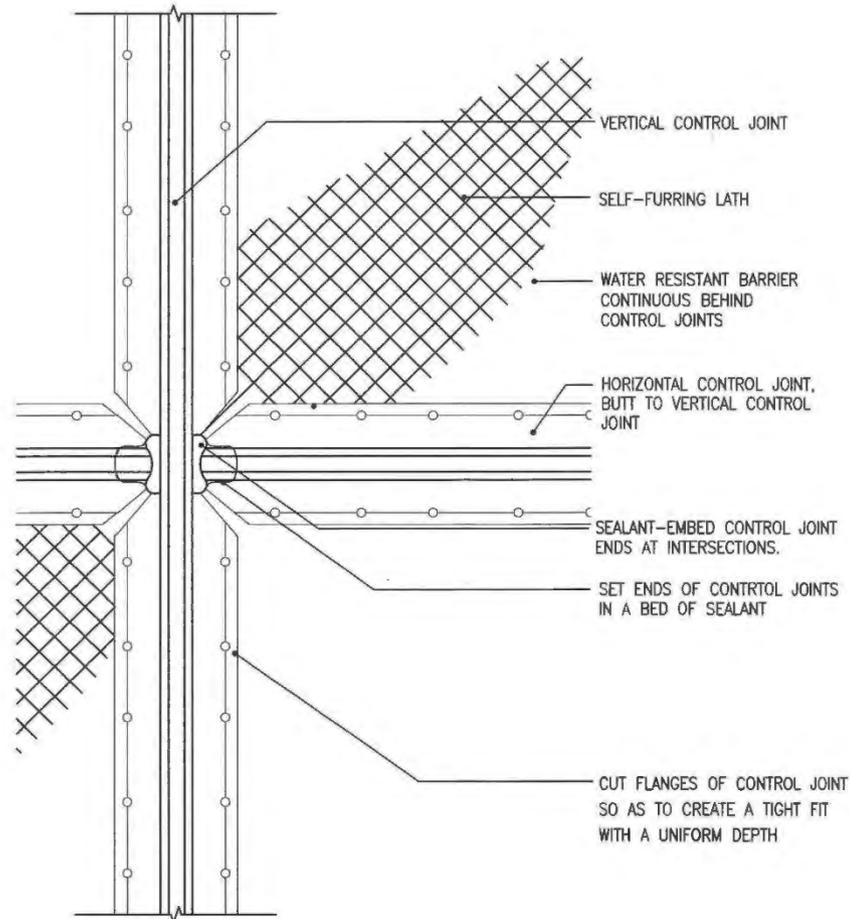
1. *Trim accessory joints refer to various types of control joints, expansion joints, reveals and/or any other devices or systems that divide (break) the stucco membrane surface and/or stucco assembly.*
2. *Architect is to select the type of joint and indicate on drawing the location of joints.*
3. *It is recommended that control joints be installed for the purpose of controlling the location and the amount of cracking that might occur.*
4. *Trim accessory joints provide aesthetic value to the stucco surface.*
5. *The installation of control joints is not an assurance that there will be no cracking in the stucco, nor is it an assurance that cracking will occur only at the control joint locations.*
6. *The type of building, the design of the exterior walls and the entire stucco system dictate whether control joints should be used and the number involved.*
7. *Trim accessory joints provide relief of stresses from the structure.*
8. *Trim accessory joints provide for a plaster stop, a screed for the stucco and stress relief point for the stucco.*
9. *Trim accessory joints accommodate expansion and contraction to relieve the stress present in the cement plaster membrane during curing.*
10. *Locate joints strategically at points where building movement is anticipated, such as wall penetrations, structural plate lines, junctures of dissimilar substrates, existing construction joints in structure, cantilevered areas and where columns or beams join the walls or soffits.*
11. *Expansion joints govern over control joints. The expansion joints to be continuous and the control joints abutt.*

22. *It is recommended that trim accessory joints be weather-sealed by embedment in caulking at intersections, when placed end-to-end, abutting one another and at terminations.*
23. *It is recommended to install vertical joints continuously and to abut horizontal joints to vertical. The use of horizontal reveals, flashing designs and/or other horizontal surface breaks may prevent continuous vertical joints.*
24. *Install longest possible lengths continuously. No termination of a section within 24 inches (600 mm) of an intersection, with the exception of pre-manufactured trim accessory joint intersections.*
25. *Aluminum and/or PVC reveals require that when the lath is installed over the flange, it totally covers it. The welded wire and woven wire lath shall be installed so as the crotch of the lath is over the flange.*
26. *Sheathed framed construction with vertical trim accessory joints that require the lath to be terminated (cut) and installed on top of the flanges shall be placed at framing member locations. Lath shall be attached with appropriate fasteners through the trim accessory flange, sheathing and into the framing member. The lath/flange on each side of the trim accessory joint is recommended to be attached to a framing member. Double framing supports may be required at these locations. This condition does not pertain to control joints installed over continuous lath.*
27. *Select the expansion joint that relates to the movement of the substrate to which it is attached. Standard manufactured expansion joints have a limited movement. The selection of the proper expansion joint is not the responsibility of the stucco contractor.*

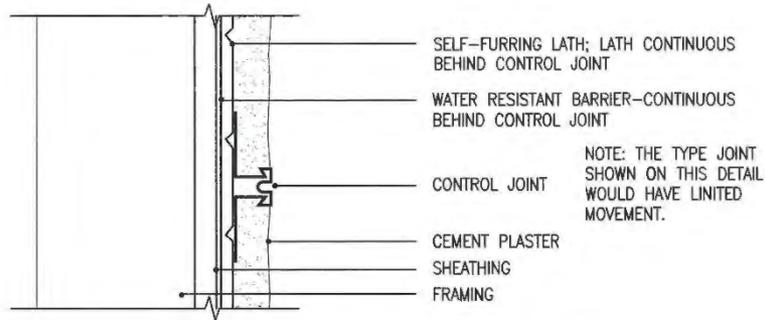
NOTE:

Sections of flashing or trim accessories that butt each other (at corners or another condition) need to be lapped, caulked, or have a strip of self-adhering membrane over the joints. This is to prevent moisture from getting to the building structure.

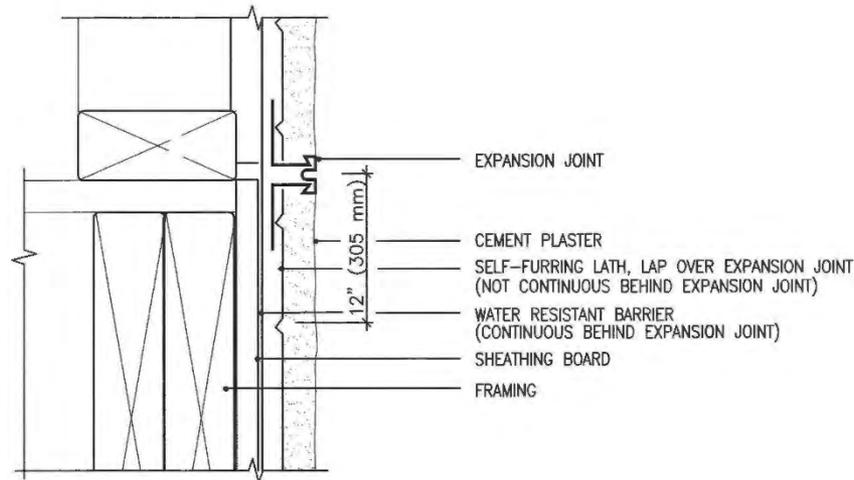
Details in this *Stucco Resource Guide* may show a single layer of water-resistant barrier for drawing clarity only. Refer to the Guide Specification section 3.38-B. The recommendation is for two layers.



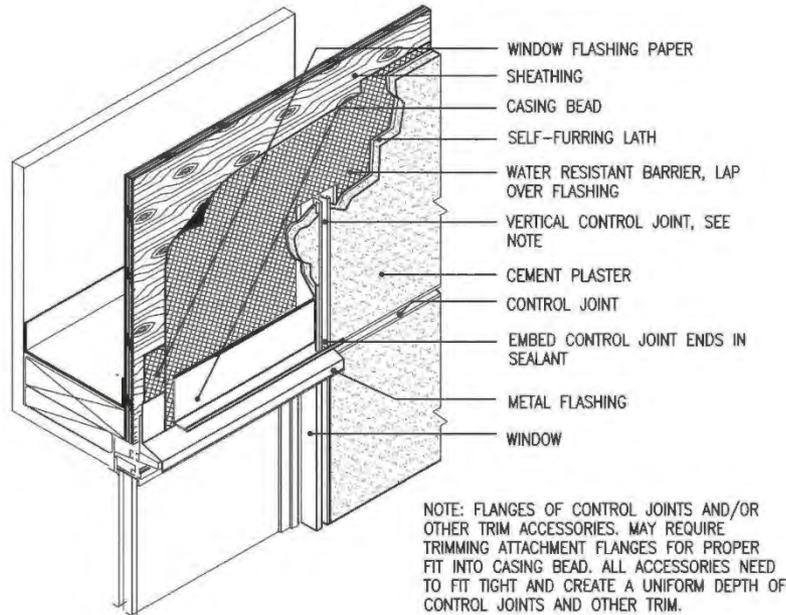
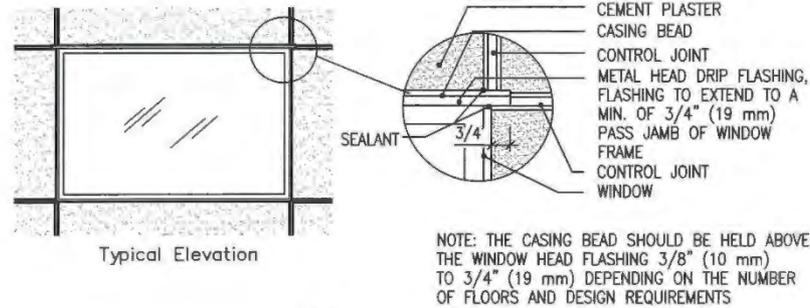
J2 - Control Joint Intersection Sealant Detail



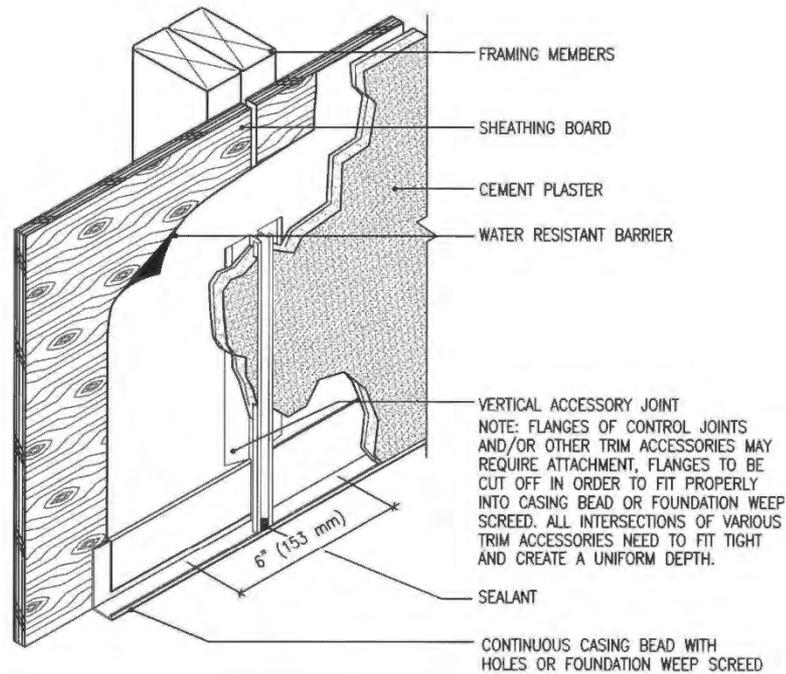
J4 – Horizontal or Vertical Control Joint



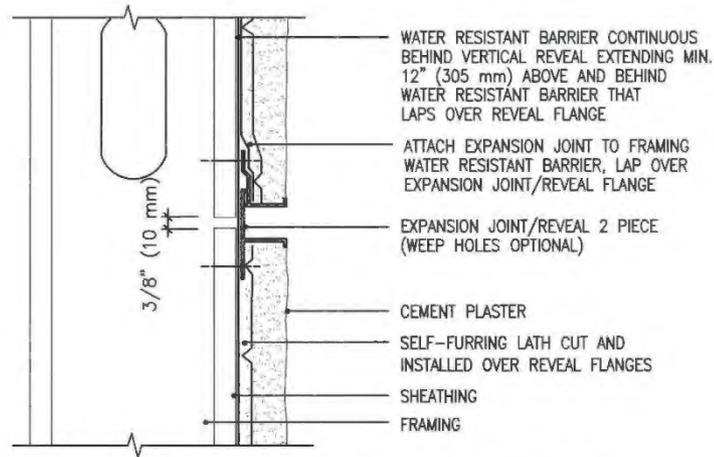
J5 – Horizontal or Vertical One-Piece Expansion Joint



J7 – Flashing/Control Joint at Window Head

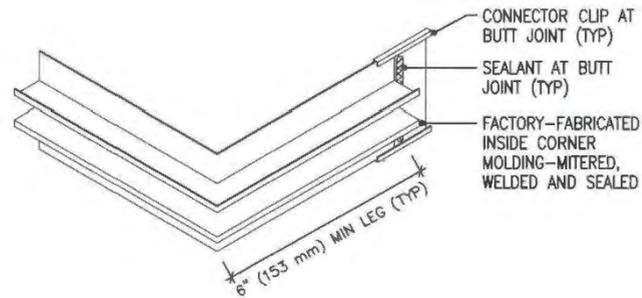
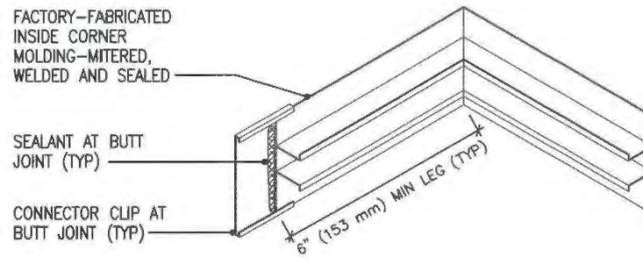


J9— Control Joint at Casing Bead
or Foundation Weep Screed

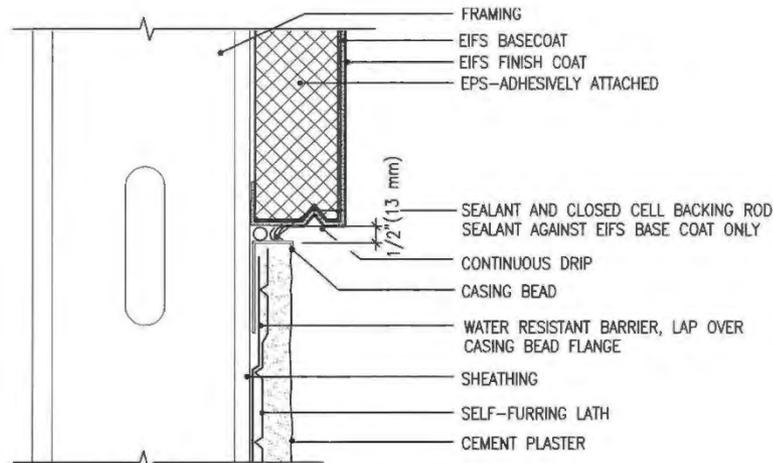


NOTE: FOR WALLS WITH SIGNIFICANT WIND-DRIVEN RAIN EXPOSURE USE DETAIL F1.

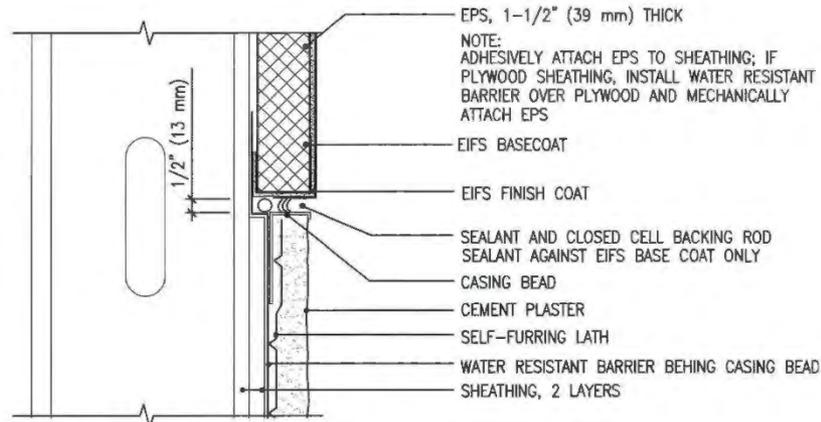
J12 – Expansion Joint/Horizontal Reveal



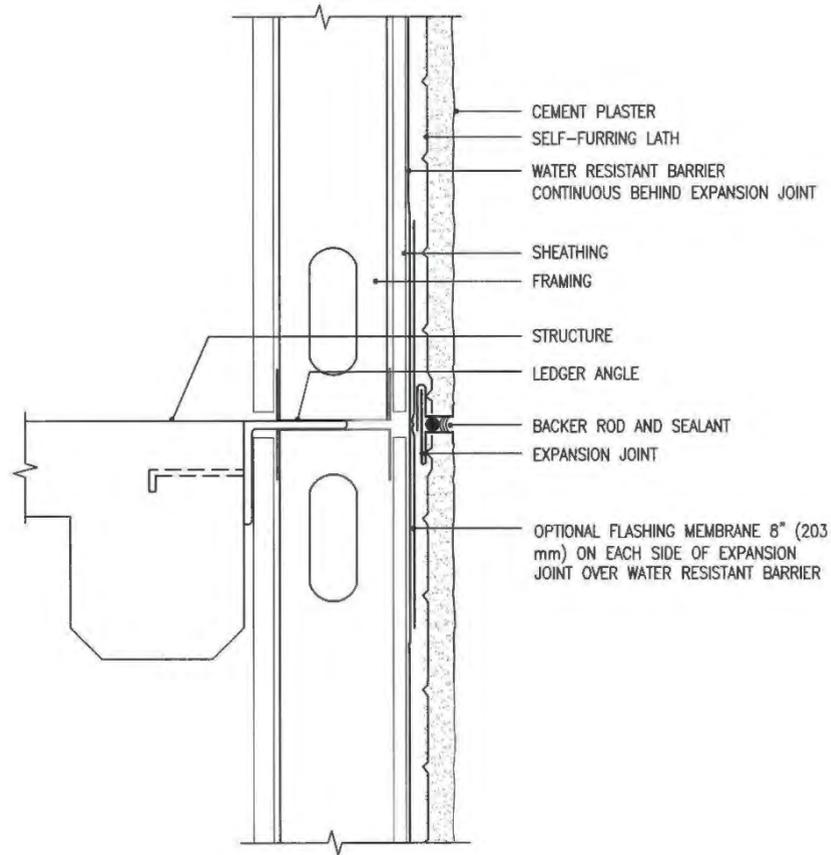
J16 – Inside Corner and
Outside Corner Horizontal Reveal



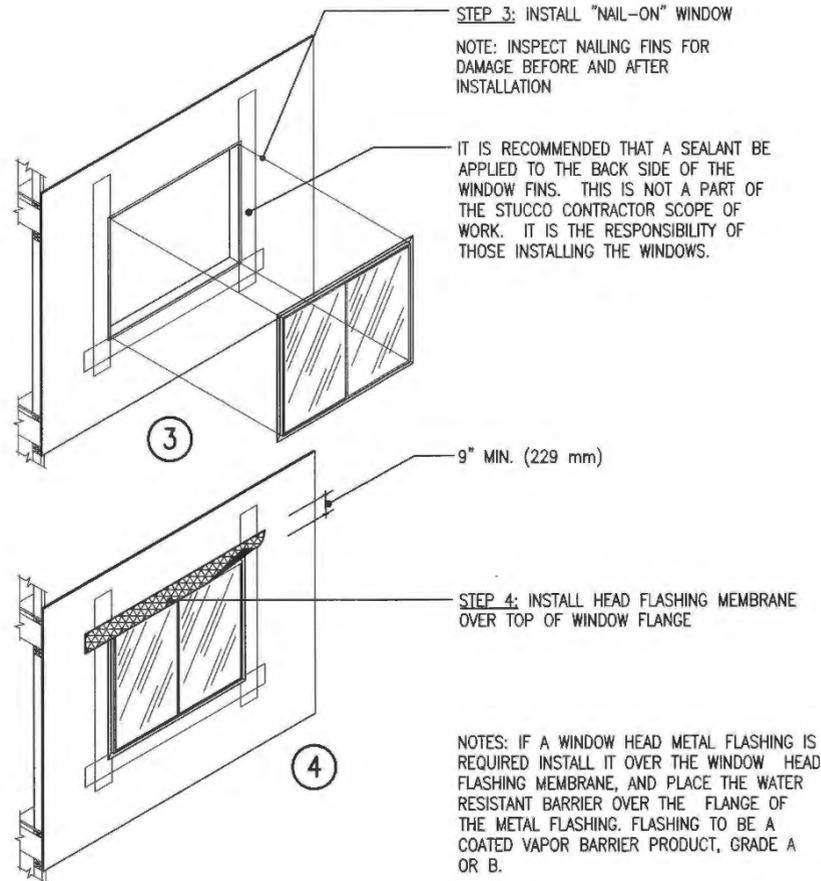
J19 - Stucco/EIFS Horizontal Joint



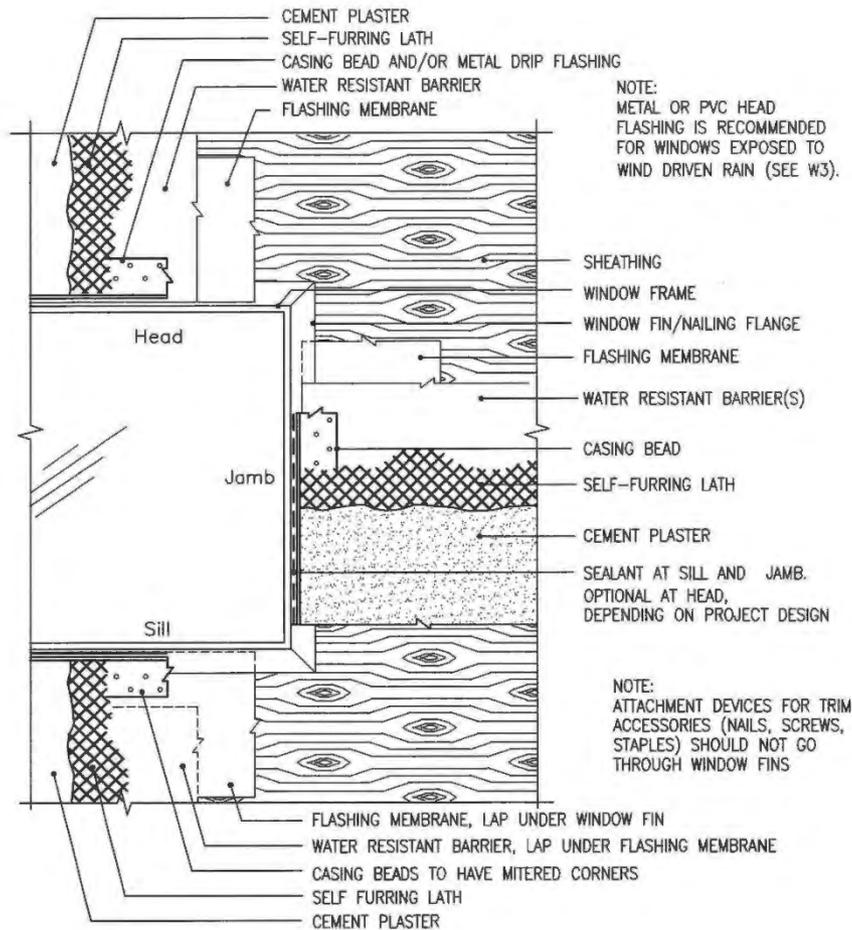
J20 - Stucco/EIFS Horiz/Vert Joint



J23 – Horizontal Expansion Joint

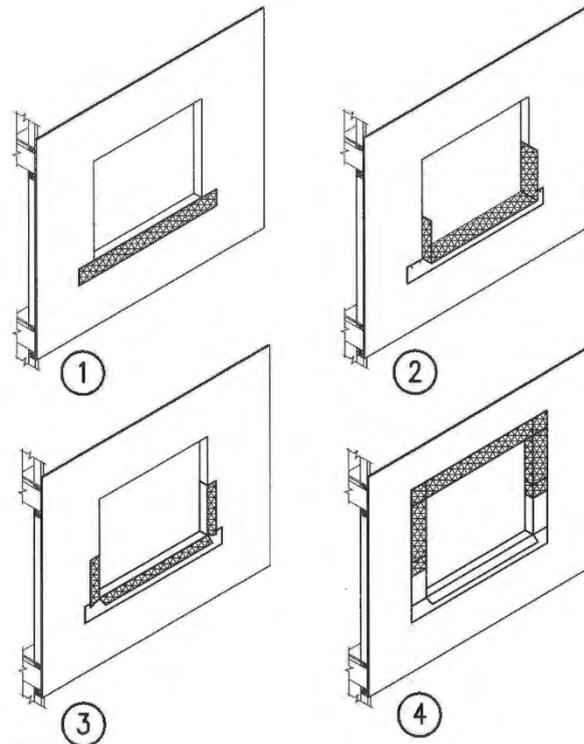


**FWB2 – Flashing Membrane and Water
Resistant Barrier Application Sequence**



FWB8 – Exploded Window Elevation

THIS EXPLODED VIEW IS ONE OF THE OPTIONS OF TERMINATING STUCCO AROUND A WINDOW
SEE WINDOW SECTION IN THIS GUIDE FOR DETAILS



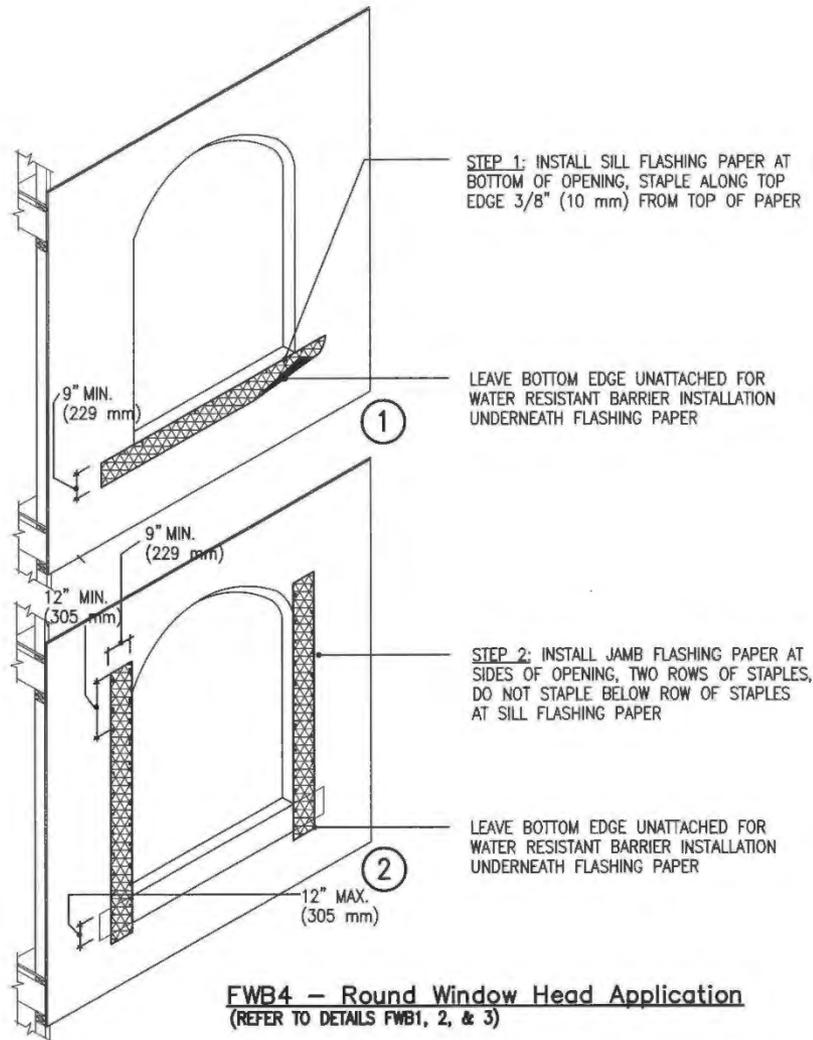
NOTES:

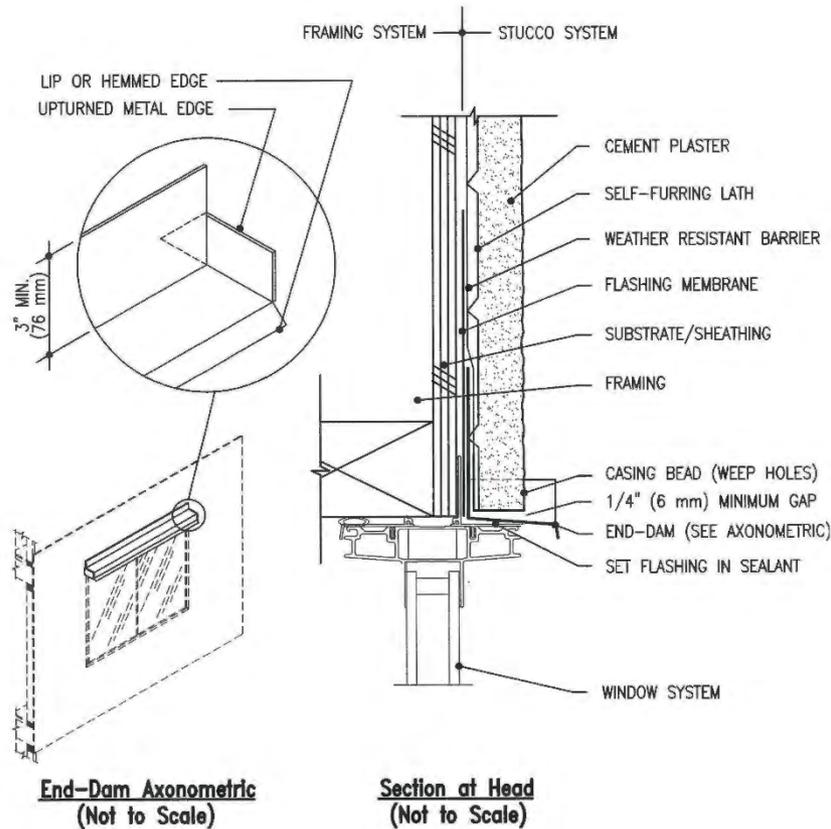
FLASH THE WINDOW OPENING BY INSTALLING MOISTURE BARRIER MEMBRANE AS SHOWN ABOVE BY WRAPPING THE ROUGH INSIDE SURFACE OPENING.

A NAIL ON WINDOW WOULD BE INSTALLED OVER THE FLASHING SYSTEM, AND THEN THE STUCCO WATER RESISTANT BARRIER WOULD BE INSTALLED PER DETAIL FWB3

OPTION: INSTALL A SILL PAN WITH UPTURNS.

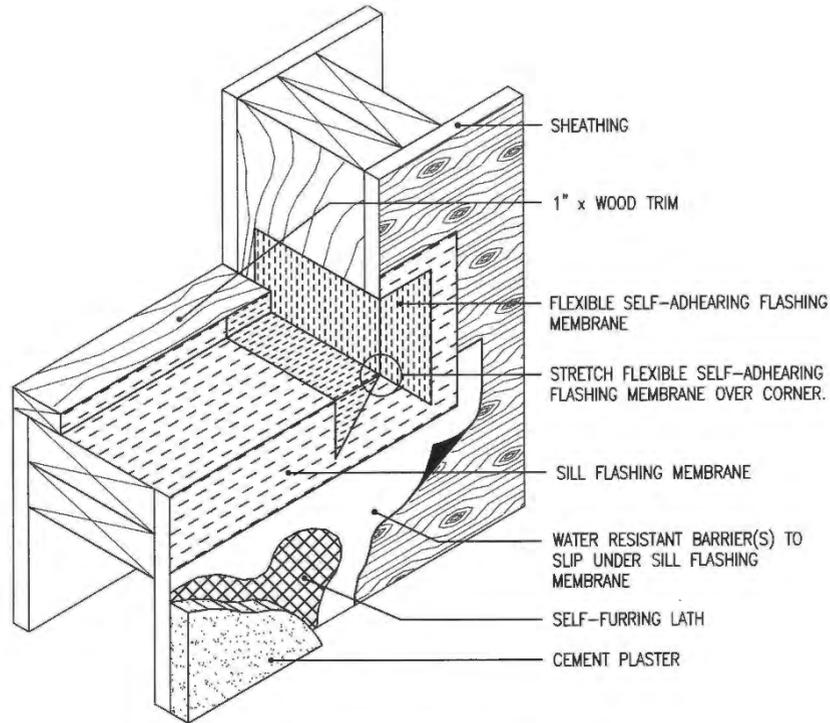
FWB6 – Flashing Wrapping Rough Inside Opening Application
ALTERATE METHOD FOR FLASHING ROUGH OPENING AREAS





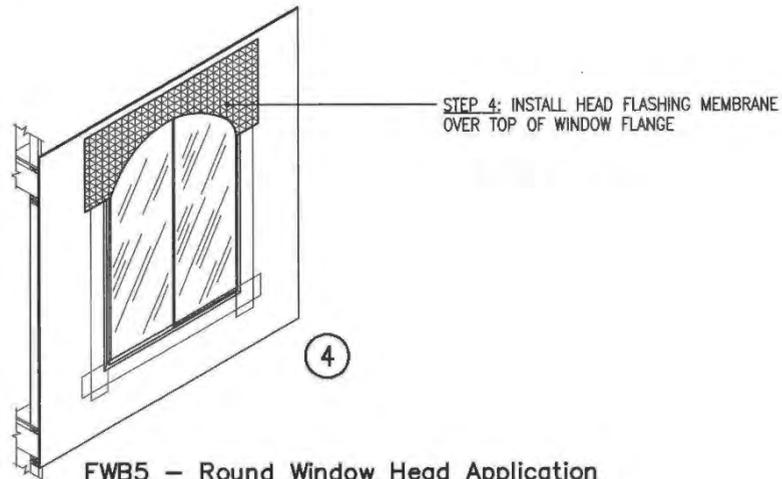
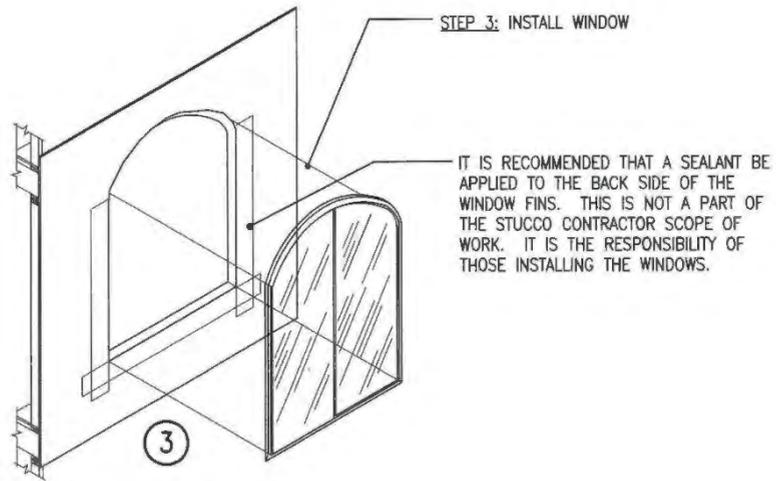
NOTE:
END-DAMS ARE RECOMMENDED ON HEAD FLASHINGS TO PREVENT MOISTURE FROM ENTERING THE STUCCO AT JAMB AREA. END-DAMS SHALL BE COMPATIBLE WITH THE HEAD FLASHING MATERIAL. THIS EXAMPLE IS AN END-DAM AS AN UPTURNED METAL EDGE.

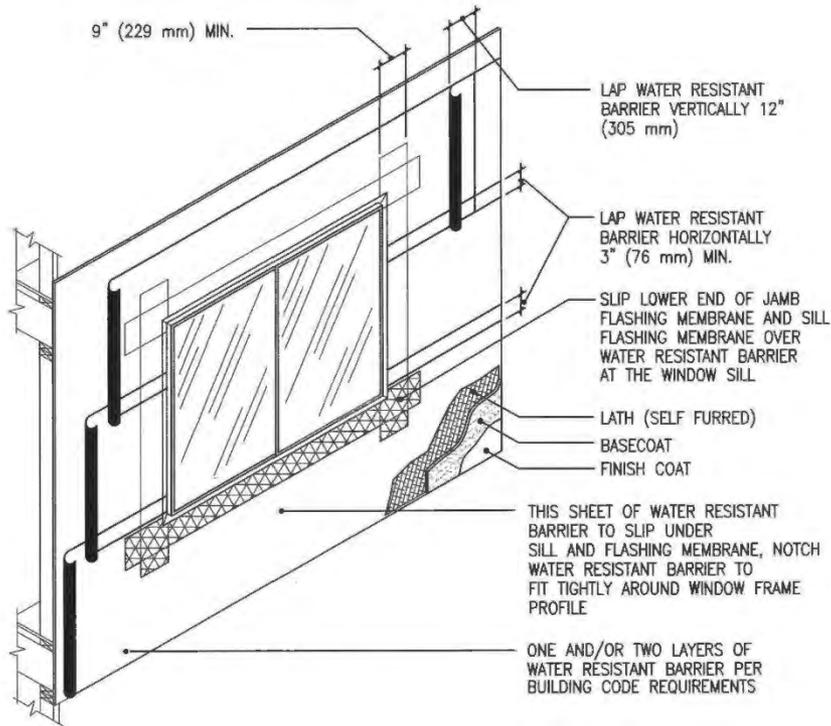
FWB9 – Window Head Flashing Assembly



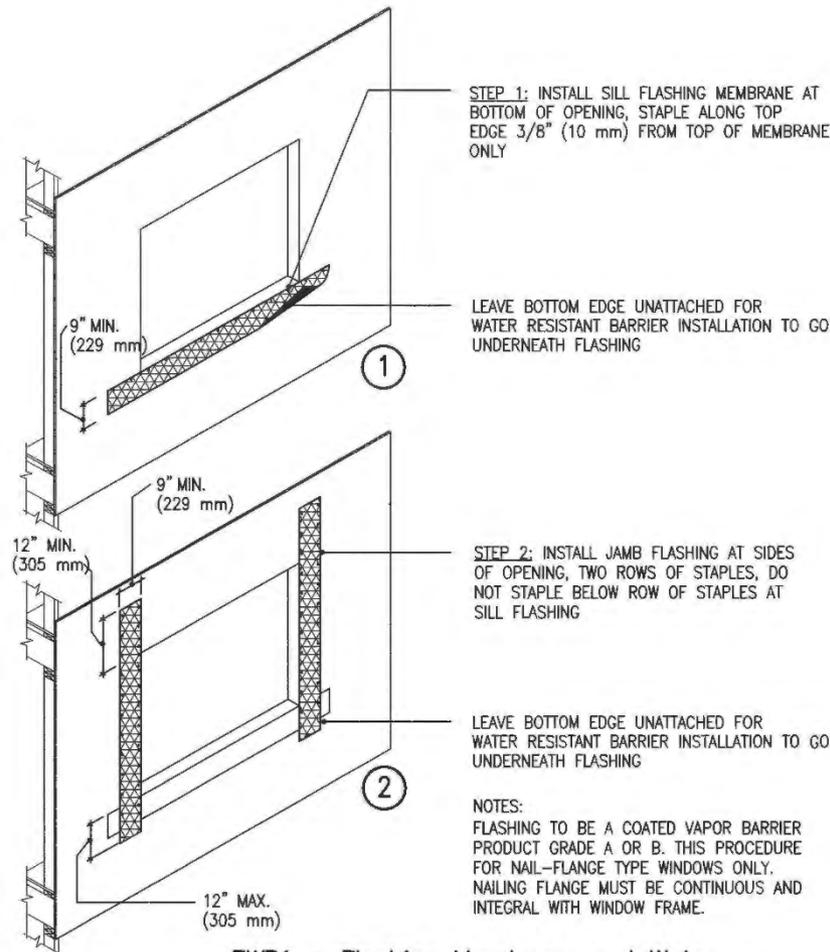
NOTE: DETAIL INTENDED FOR NAIL-FLANGE TYPE WINDOWS.
CONTINUE TO FOLLOW STEPS 2-4 BEGINNING ON FWB1. DO NOT
APPLY SEALANT TO BACK SIDE OF WINDOW BOTTOM NAILING FIN.

FWB7 – Field Installed Sill Pan Flashing





FWB3 – Flashing Membrane and Water Resistant Barrier Application Sequence



FWB1 – Flashing Membrane and Water Resistant Barrier Application Sequence

One Coat Stucco Systems

- **All one coat stucco systems must have a current ICC Evaluation Report and should be on site or filed with the local building department**
- **Installation must be performed by approved contractors and an installation card as shown in ICC Evaluation Reports must be left at the jobsite and with the local building department.**
- **No substitutions or use of materials other than those listed in the Evaluation Report is allowed**
- **Factory stucco pre-mix with sand cannot be used or mixed with a factory mixed stucco concentrate with cement only**

- **Stucco mix must be mixed in accordance with directions and or Evaluation Report**
- **Clean sand must be used for mixing**
- **System approved EPS insulation boards may be installed and are limited to 1/2 minimum to 1 1/2 maximum thickness. When installed as part of the water resistive barrier such boards must have tongue and grooves on the horizontal edges**
- **Wire fabric lath shall be a minimum of No 20 gauge 1 inch galvanized steel wire woven fabric. Lath must be furred except when installed over un-backed polystyrene insulation boards**

- Lath must be furred $1/8$ of an inch from the substrate for a plaster thickness or $1/2$ inch or less.
- When a total coating thickness (including finish coat) is greater than $1/2$ inch, 17 gauge wire woven fabric lath must be used and such lath must be furred $1/4$ from the substrate
- The water resistive barrier shall be two layers of Grade D (30 minute) Paper or two layers of an equivalent recognized in a current ICC Evaluation Report.

- **When EPS boards with tongue and groove edges are installed as part of the water resistive barrier only on layer of Grade D (60 minute) Paper or ICC equivalent is required**
- **If other than grade D felt is desired as a water resistive barrier it is recommended that the outer layer or the layer against the plaster be of Grade D felt.**
- **Flashings shall be installed and must have an upturned leg on the interior side and at the ends**

- **All exterior windows and doors must be flashed as per AMMA**
- **Doors and windows without flanges must have head and side flashings installed**
- **Opening for garage overhead doors shall also be flashed**
- **Gable end vents, dryer vent terminations and exhaust fan terminations shall also be flashed**

- **Trim, screeds, corner reinforcement, control or expansion joints must be galvanized steel or an approved plastic**
- **Plywood sheathing or OSB wood based sheathing must be installed as per the IBC and must be a minimum of 3/8 inches thick for studs spaced at 16 inches OC and 5/8 inches thick for studs at 24 inches OC**
- **One hour fire rated wall assemblies are possible and are limited to restrictions and construction requirements of the ICC Evaluation Report**

- **Some systems are not approved for non combustible construction and those that are have specific requirements for non combustible construction .**
- **Control joints must be installed as specified by the architect, designer, builder, or stucco system manufacture in that order.**
- **Curing Moist curing must be provided for 48 hours after coating application**
- **The system may be used for soffit but must be applied to metal lath**

- **The system may be applied to sills such as windows and other similar areas Sills under 6 inches in depth may use any substrate permitted by the report and sills over 6 inches in depth must have substrates of solid wood or plywood**
- **Foam plastic insulation boards when installed in the system must be at least 6 inches above the grade or ground**

- **Stucco termination methods at**
- **Windows Installing a casing bead $3/8$ to $1/2$ inch from the window frame opening and filling the space with backer rod and sealant**
- **Abutting the stucco directly to the window frame (using it as a screed and termination) and if the window extends beyond the finished stucco provide a $1/4$ inch fillet sealant application**
- **Concrete decks and tops of masonry wainscot walls
A base flashing is required to direct water away from the building**

- The weep screed or j channel (with drainage holes) is then installed on top of the flashing. A minimum of 3/8 to 1/2 gap is required between the screed or J channel and the flashing to allow from water escape

EIFS Systems

- EIFS systems are thermal and moisture protection systems consisting of exterior insulation and finish systems
- All EIFS systems must have a current ICC Evaluation Report and must be installed exactly as specified in the report
- Materials are limited to those listed within the report
- Each system is limited to the type of construction as per the IBC and as permitted in the IRC

- EIFS systems components consist of water – resistive barrier, a drainage medium, rigid expanded foam boards, drainage strips or a drainage track , a glass fiber reinforcement mesh, fasteners or adhesive, a basecoat and a finish coat
- Substrates include wood or steel framed walls with exterior gypsum sheathing, plywood or OSB wood based sheathing, brick, concrete or masonry walls
- Systems may be mechanically fastened or adhered
- The water resistive barrier may be a sheet type grade D or equivalent or

- May be a report recognized liquid applied water resistive coating
- A drainage mat or drainage medium is required and may vary from system to system but the purpose is to provide a positive drainage way
- Adhesive must be as specified in the report as well as fasteners
- Fabric mesh with back wrap and base coat is applied after water barrier and drainage medium
- Synthetic finish coat is then applied

- **All window, doors must be provided with backer rod and sealant as required by installation details**
- **All penetrations must be sealed and calked**
- **Special inspection is required by the IBC sections 1704.1 and 1704.12 if applicable and by specific reports**
- **EIFS systems shall only be installed by approved contractors**
- **Installation cards must be presented to the code official**