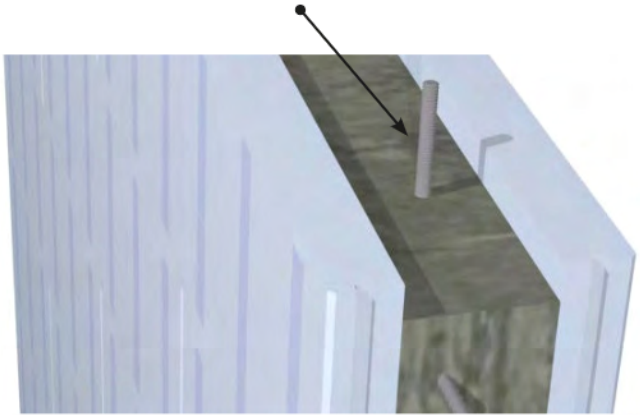
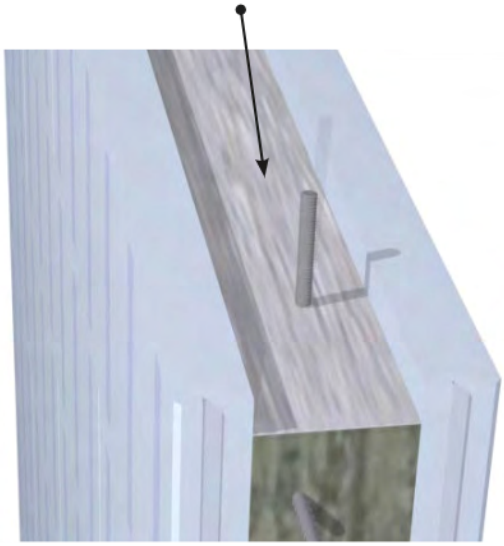
Step 1: Set anchor bolts (not less than 12.7 mm in diameter) spaced at not more that 1200 mm o.c.. Setting depth is to be no less than 100 mm into the concrete. Finish concrete below the top of the ICF forms to accomodate the flush installation of the top plate in Step 4.



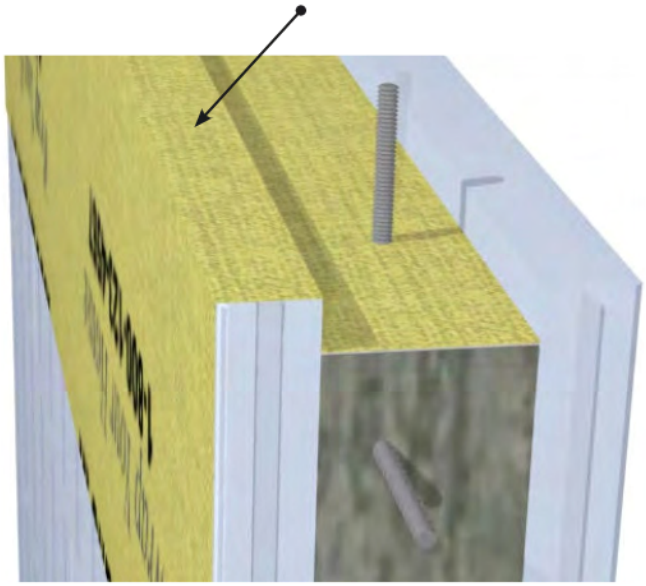
Step 2: A barrier, such as a closed cell polyethylene sill gasket must be installed over the top of the ICF wall to protect the wood plate.



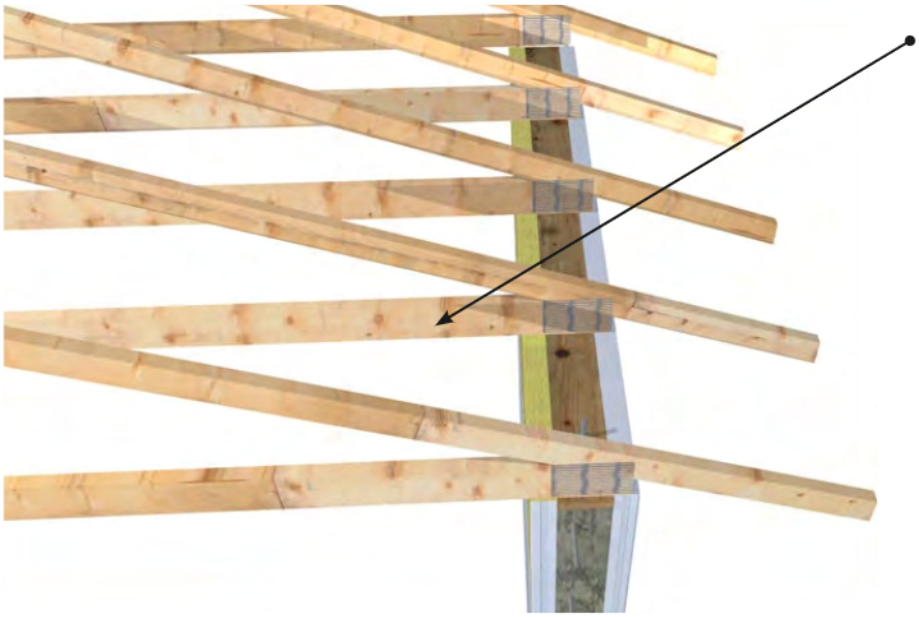
Best Practice Note:

This illustrated method of insetting the top plate, although not required by code, allows for the continuity of insulation from the walls to the attic.

Step 3: Drape a strip of synthetic sheathing membrane (SSM) over the sill gasket and down the interior wall.

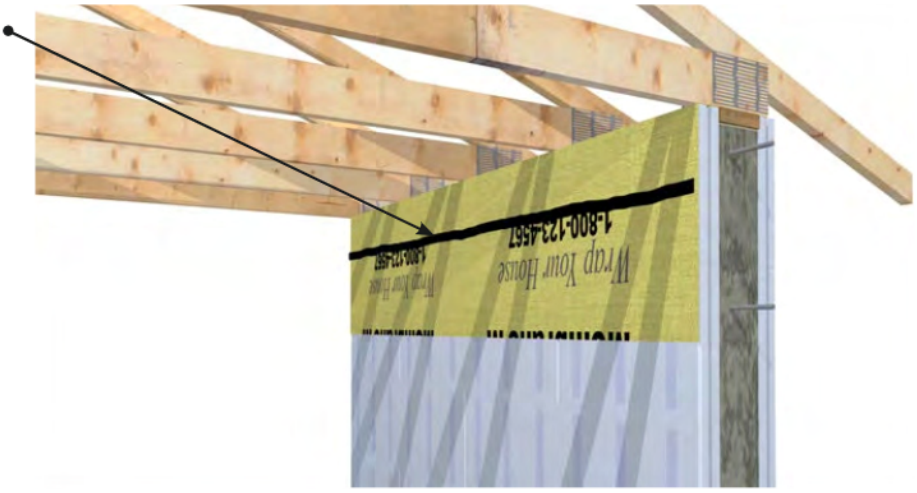


Step 4: Attach the top plate of the wall to the foundation by installing washers and nuts to the anchor bolts.



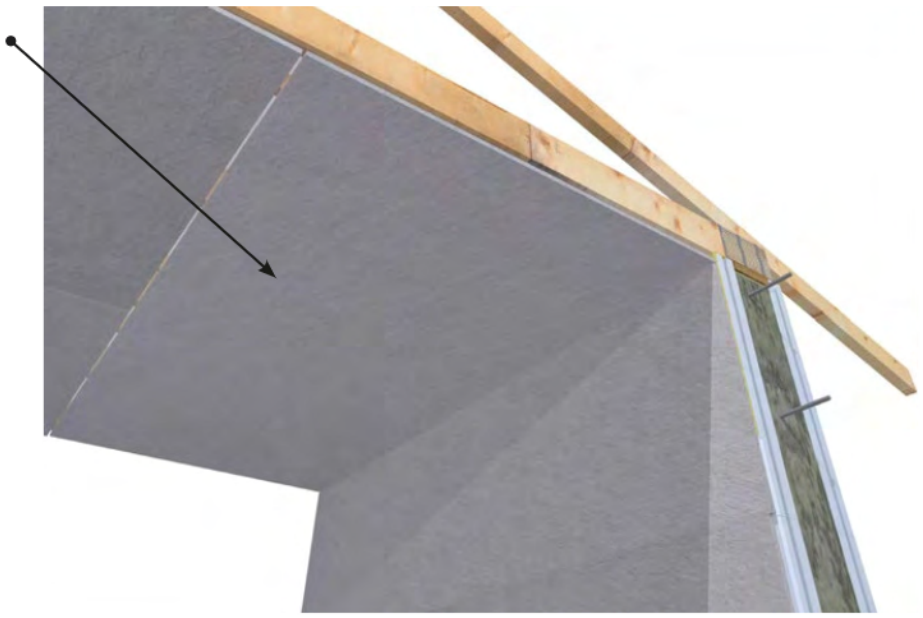
Step 5: Install trusses with approved fasteners and nailing pattern as in BC Building Code 9.23.3.4 Nailing for framing "Roof Rafter, Roof Truss or Roof Joist to plate - toe nail 2 x 82mm nails".

Step 6: Apply a continuous bead of acoustic sealant to the SSM to receive an overlap of the ceiling polyethylene.



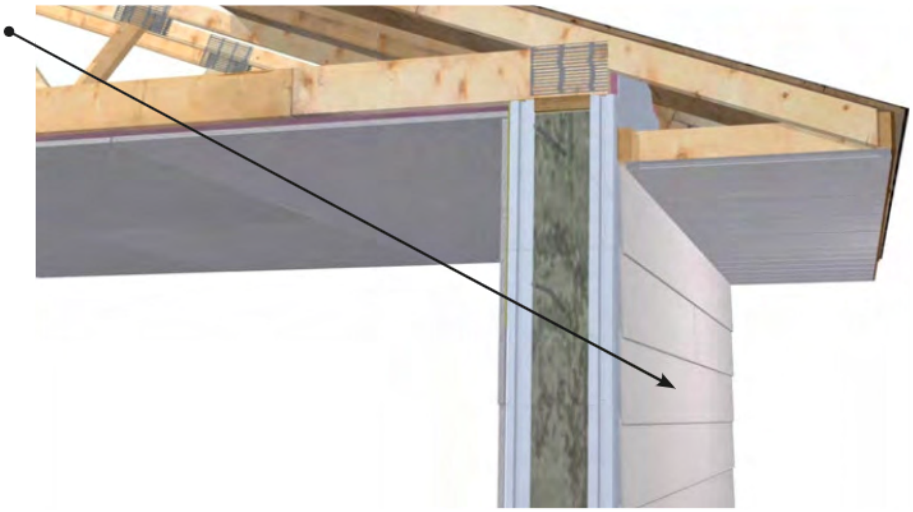
Step 7: Install the ceiling sealed polyethylene air and vapour barrier, overlapping onto the SSM and apply fasteners through the acoustic sealant to ensure an airtight seal after the installation of the drywall and finishes.

Step 8: Apply drywall and finishes to the walls and ceiling.



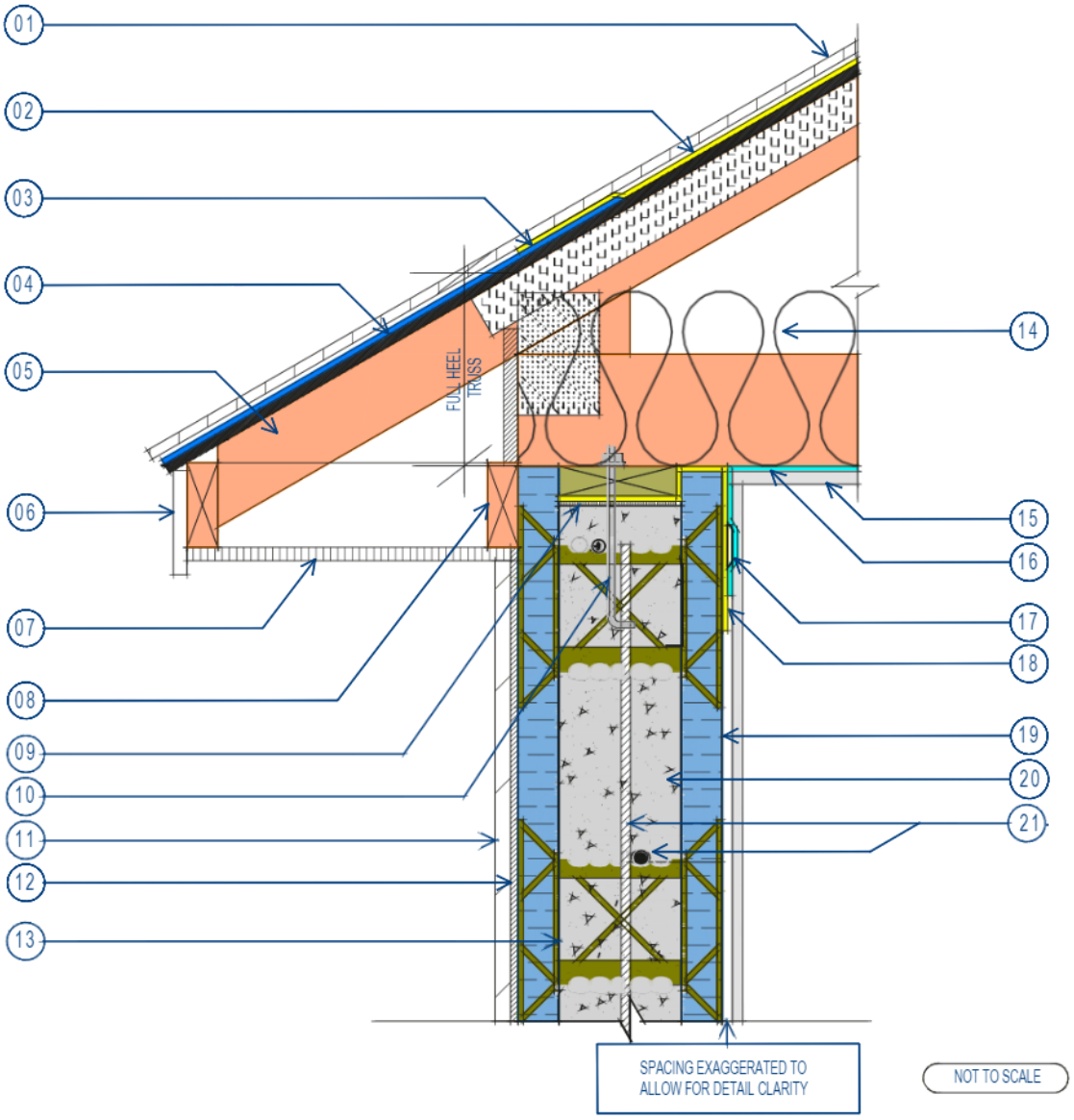
Step 9: Install roof finishes and selected insulation.

Step 10: Install the selected cladding and trim using corrosion-resistant fasteners.



FLAT INSULATING CONCRETE FORM WALLS (ICF)

Wall / Ceiling Transition



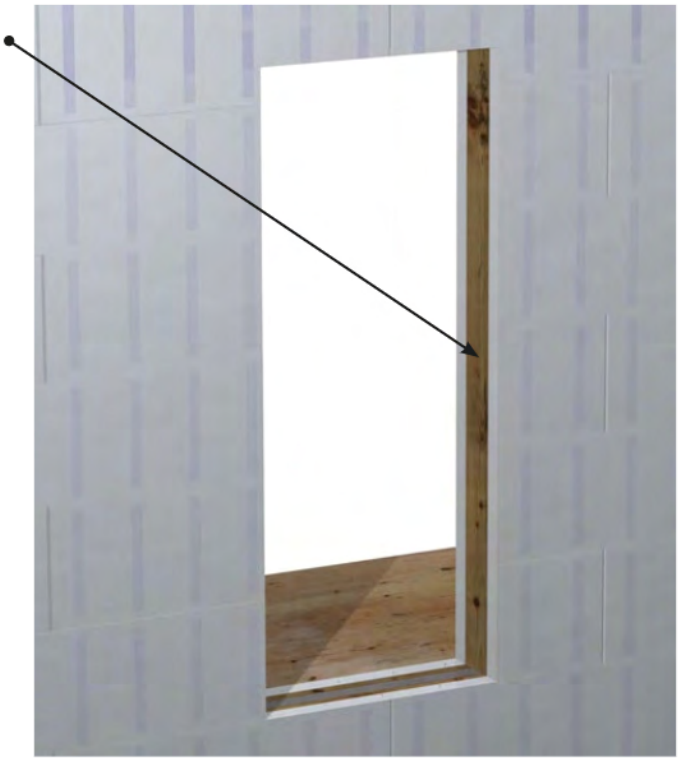
LEGEND

01. ROOF CLADDING
02. ROOF SHEATHING MEMBRANE
03. ICE DAM PROTECTION MEMBRANE
04. ROOF SHEATHING
05. ENGINEERED TRUSS
06. FASCIA
07. VENTED SOFFIT
08. SOFFIT LEDGER
09. CLOSED CELL POLYETHYLENE SILL GASKET
10. ANCHOR BOLTS - AS PER CODE
11. EXTERIOR CLADDING
12. TREATED FURRING STRIPS (OR CODE COMPLIANT DRAINAGE MAT) IF REQUIRED
13. ICF WEB
14. INSULATION
15. GYPSUM WALL BOARD
16. 6 MIL POLYETHYLENE - TAPED AND SEALED
17. COMPATIBLE SEALANT
18. SYNTHETIC SHEATHING MEMBRANE
19. ICF FORMS
20. CONCRETE
21. REBAR - AS PER CODE

FLAT INSULATING CONCRETE FORM WALLS (ICF) DETAIL 3.6.01
WALL/CEILING TRANSITION

FOR ILLUSTRATION PURPOSES ONLY - NOT FOR CONSTRUCTION

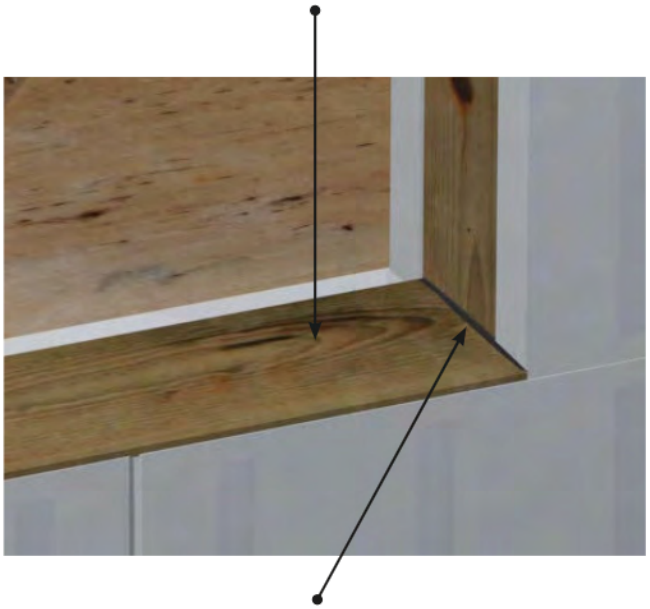
Step 1: Complete the rough buck framing for the door opening. Leave an allowance for the sloped sub-sill when sizing for the doors.



Note:

Ensure adequate space is provided between the rough opening between the framing and the door to accommodate polyethylene backer rod and sealants and to facilitate drainage of the sub-sill region. Also leave an allowance for the sloped sub-sill (shown in Step 2) when sizing for the doors.

Step 2: Install a sloped sub-sill to create a drainage slope.



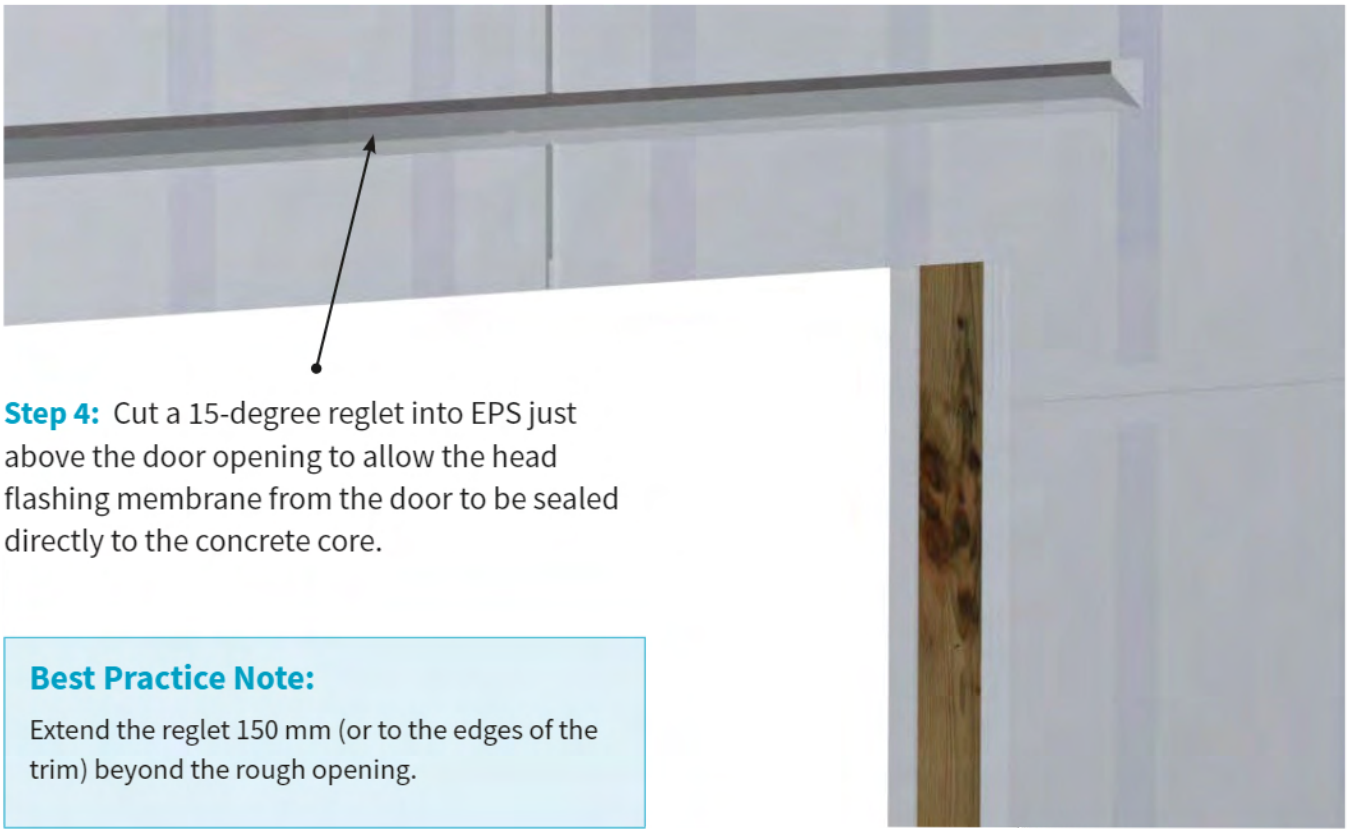
Step 3: Apply compatible sealant to framing connections between the sloped sub-sill and the jamb, as well as the framing connections where the jamb meets the head.

Best Practice Note:

The installation of a sloped sub-sill in the rough framing can be constructed to improve drainage of the sub-sill region created under the door to the exterior.

With or without a slope, the installation of a self-adhering membrane flashing on the sub-sill framing intercepts all rain and snow that gets past the first plane of protection (in this case, the door and the joint between the door and the cladding).

Where there is a capillary break behind the cladding, the membrane on the sub-sill can discharge into the cavity, which then drains to the exterior at the next cross cavity flashing. Doors installed in a wall assembly where no capillary break exists behind the cladding must incorporate an exteriorly draining door sill or other means of dissipating moisture from the sub-sill area to the exterior. Refer to Section 2.0 in this guide for sill drainage strategies.

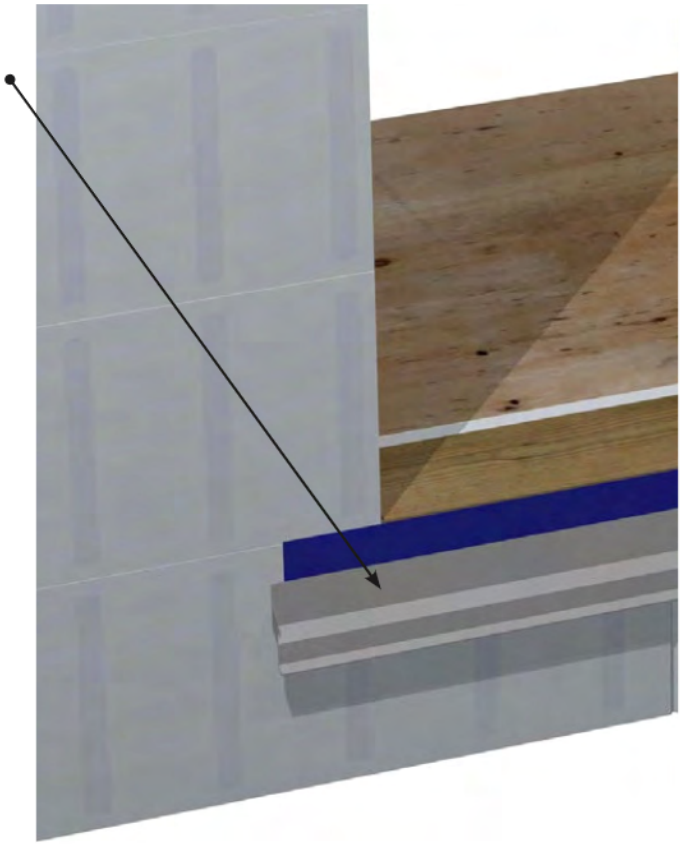


Step 4: Cut a 15-degree reglet into EPS just above the door opening to allow the head flashing membrane from the door to be sealed directly to the concrete core.

Best Practice Note:

Extend the reglet 150 mm (or to the edges of the trim) beyond the rough opening.

Step 5: Install a strip of self-adhering membrane (SAM) below the door sill and install a pre-finished metal flashing with minimum 25 mm end dams.



Construction Note:

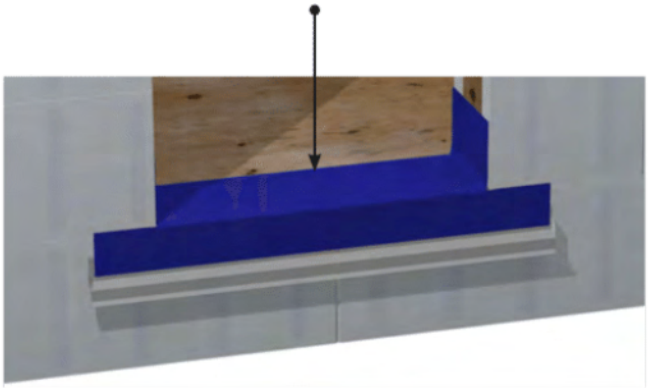
Typically, a water-based primer is applied to EPS prior to the application of SAM. Prepare surface in accordance with the manufacturers' application instructions.

Best Practice Note:

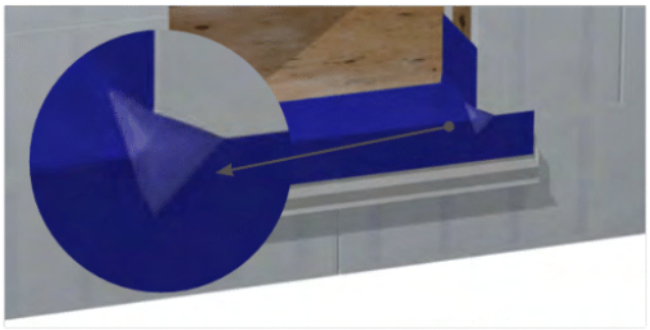
Reference the SAM sill-flashing process on the following page.

Sam Sill Wrapping Sequence

Step 6: Install a ply of compatible SAM to the sub-sill, continuous up the rough framing and overlapping the sub-sill flashing to provide exterior drainage.



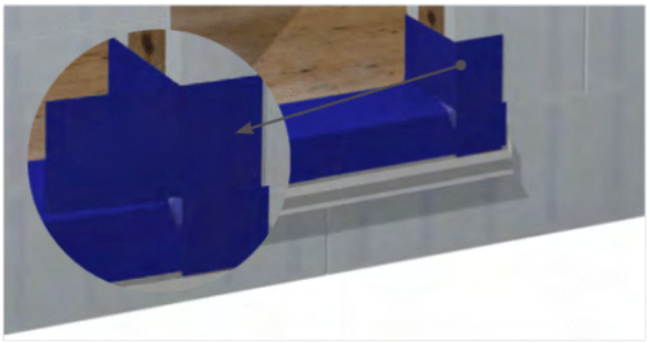
Step 7: Install SAM darts on the seams at the jamb/sill transition.



Best Practice Note:

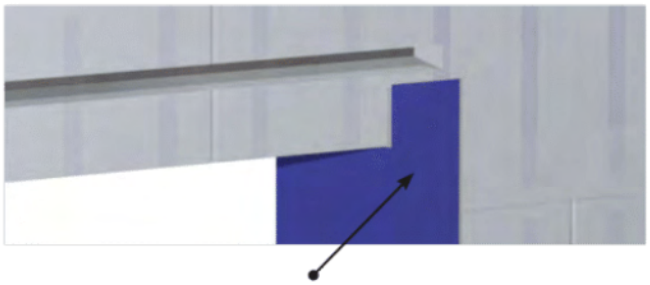
If a back dam is used, seal the sill/back dam/jamb wrap transition with mastic sealant.

Step 8: Install a vertical section of self-adhering membrane 200 mm up the jamb of the rough opening.

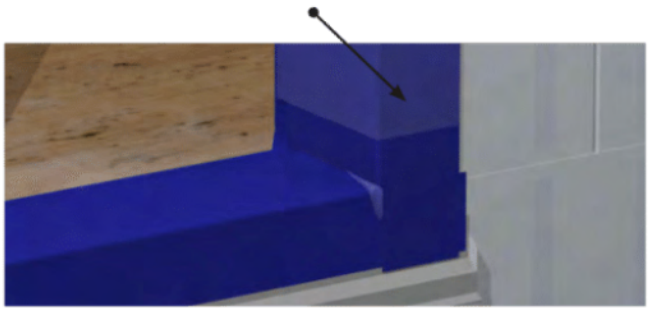


Note:

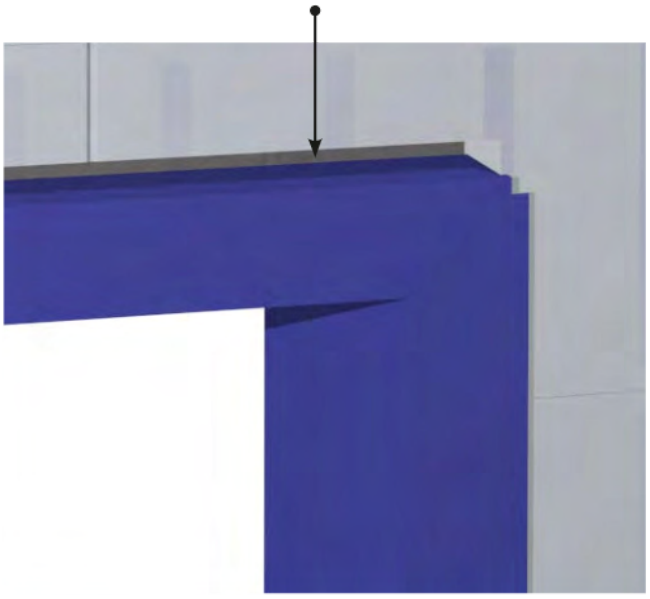
At the upper part of the jambs, extend the SAM 250 mm beyond the opening to allow for overlap by the SAM head flashing membrane



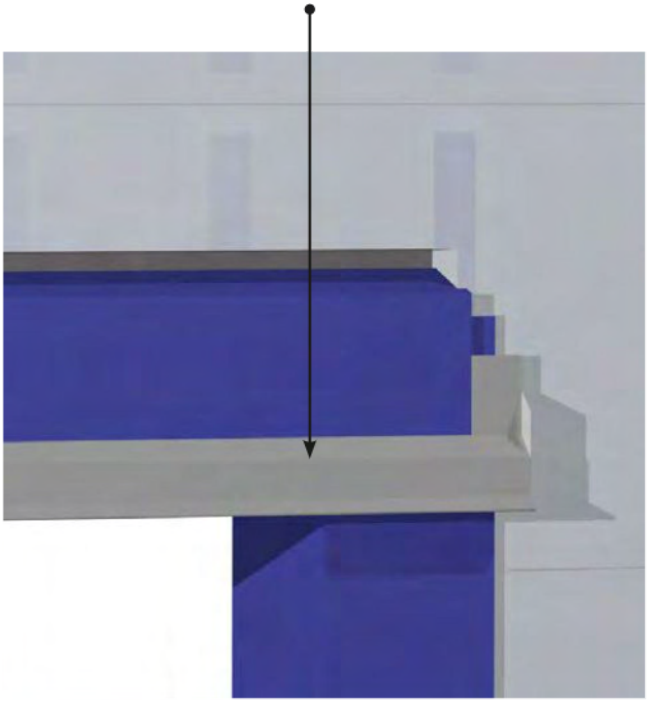
Step 9: Install a back wrap of SAM to full height of both jambs at the rough opening. The SAM should be continuous from the interior of the rough opening to a minimum of 250 mm onto the exterior face of the ICF forms.



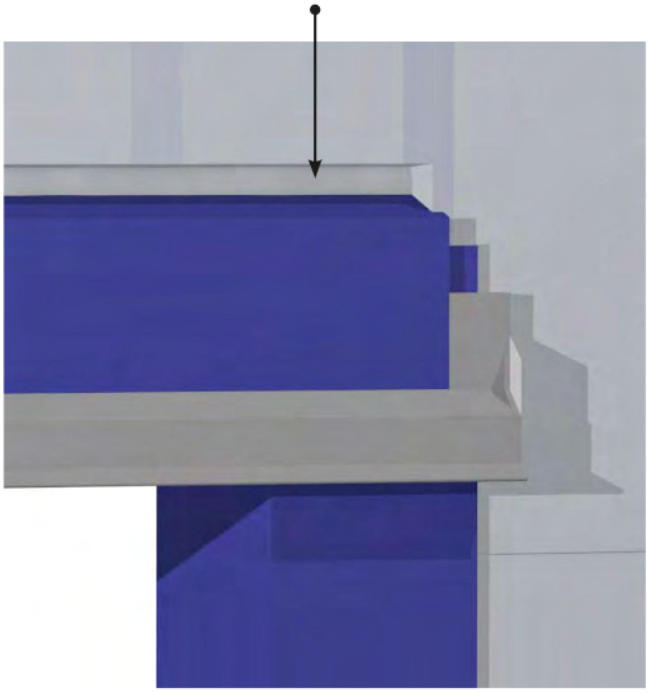
Step 10: Install SAM head flashing at the head of the rough opening and allow the SAM at the door head to return into the concrete. The SAM should be continuous from the interior of the rough opening to a minimum of 250 mm onto the exterior face of the ICF forms.



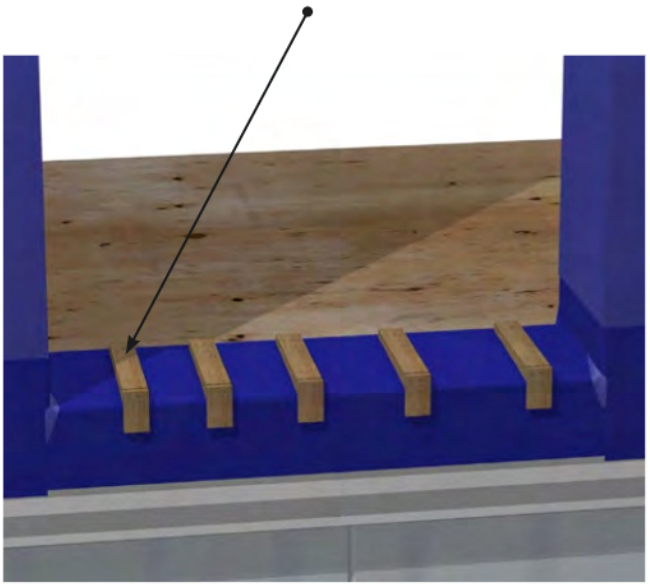
Step 11: Install a head flashing with minimum 25 mm end dams. A best practice detail includes an additional layer of SAM into the head flashing to improve drainage.



Step 12: The SAM is terminated at the concrete with a mastic sealant.



Step 13: Install treated wood strapping and shims onto the sill. If wood furring is not used, an alternate method of draining the door sub-sill is required. The corners must be left open for drainage.



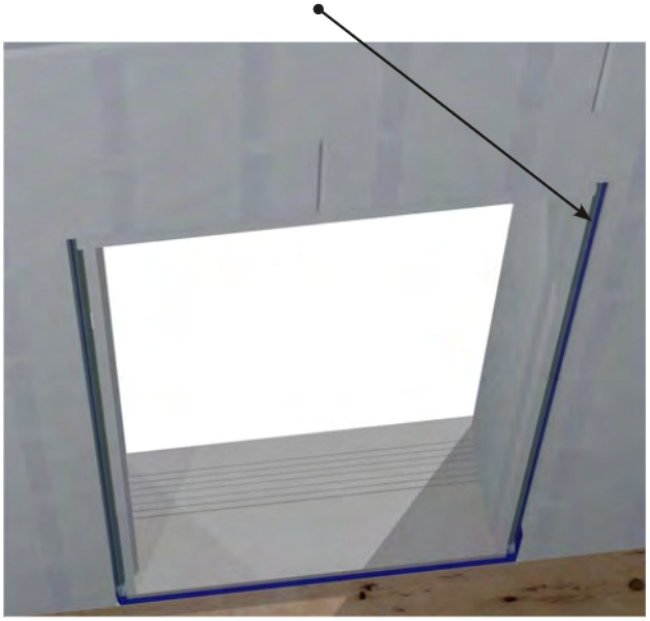
Step 14: Install the door frame using corrosion-resistant fasteners in accordance with the manufacturers' instructions.

Step 15: Complete the installation of the NAFS conforming door.

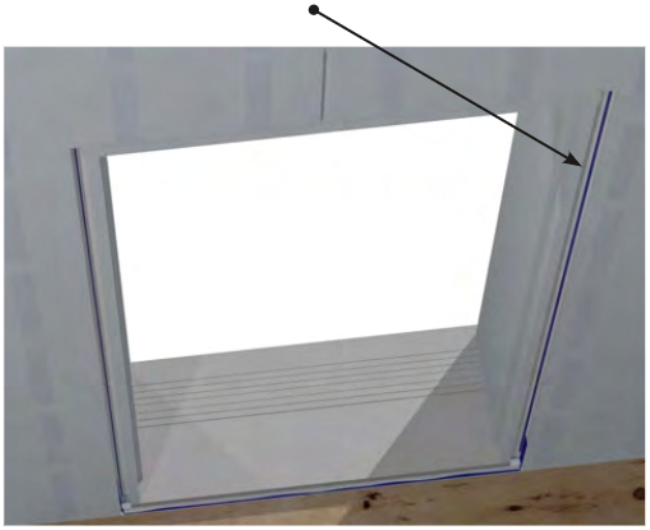
Step 16: Inspect the SAM, insuring that is correctly lapped and adhered at all points to provide airtight continuation of the air barrier.

Step 17: Install furring strips to support trim (if used) and provided a drainage path.

Step 18: Install closed cell polyethylene backer rod between the interior jamb, head and sill gap to complete the air barrier system.



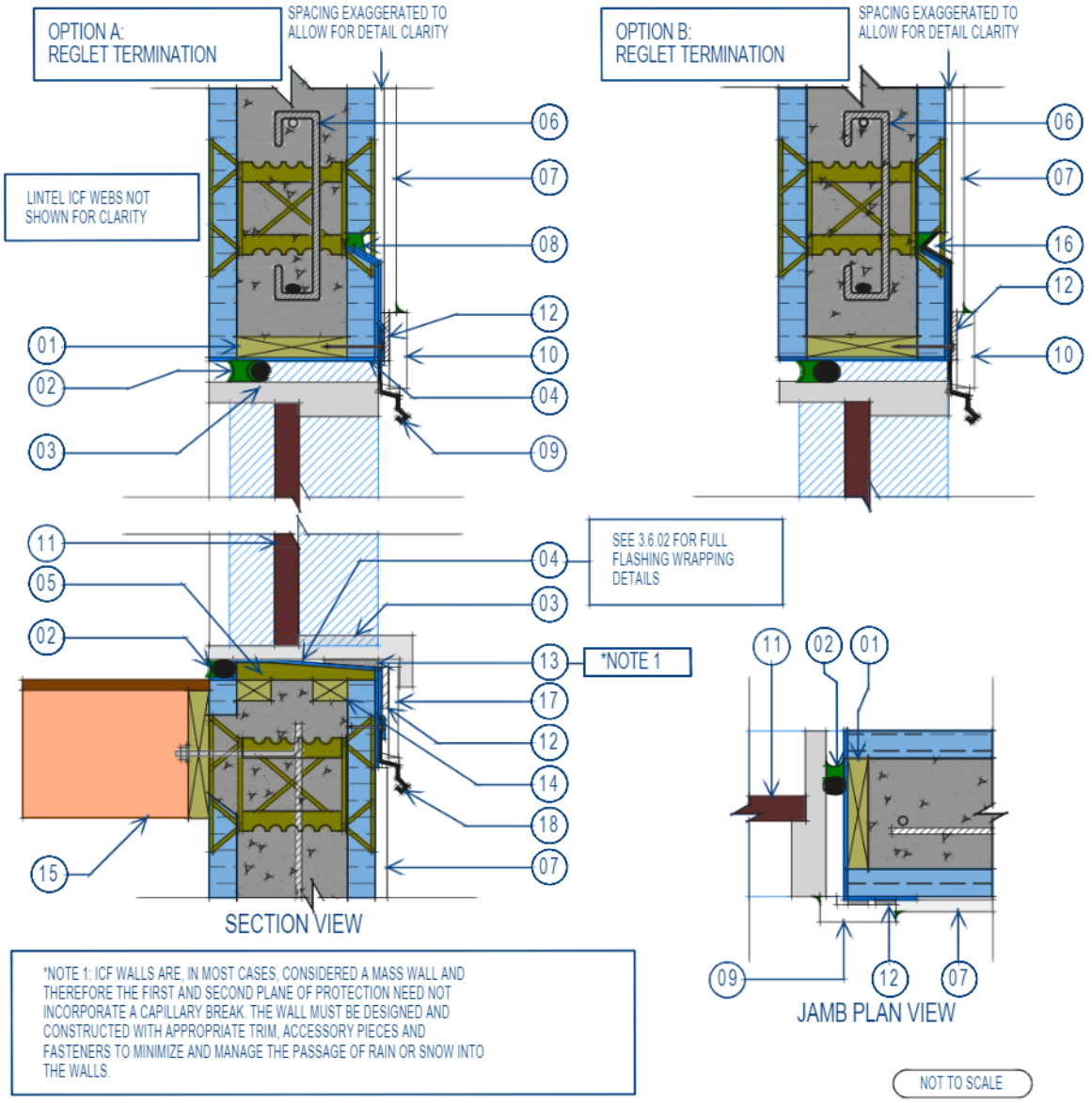
Step 19: Apply a compatible sealant around the entire interior perimeter of the door. This seal is the required continuation of the second plane of protection, as well as the continuation of the air barrier into the door assembly.



Step 20: Install the selected trim with corrosion-resistant fasteners.

Step 21: Install the selected cladding with corrosion-resistant fasteners.

Step 22: Apply compatible sealants around the door, trim, and flashing end dams to complete the first plane of protection.



*NOTE 1: ICF WALLS ARE, IN MOST CASES, CONSIDERED A MASS WALL AND THEREFORE THE FIRST AND SECOND PLANE OF PROTECTION NEED NOT INCORPORATE A CAPILLARY BREAK. THE WALL MUST BE DESIGNED AND CONSTRUCTED WITH APPROPRIATE TRIM, ACCESSORY PIECES AND FASTENERS TO MINIMIZE AND MANAGE THE PASSAGE OF RAIN OR SNOW INTO THE WALLS.

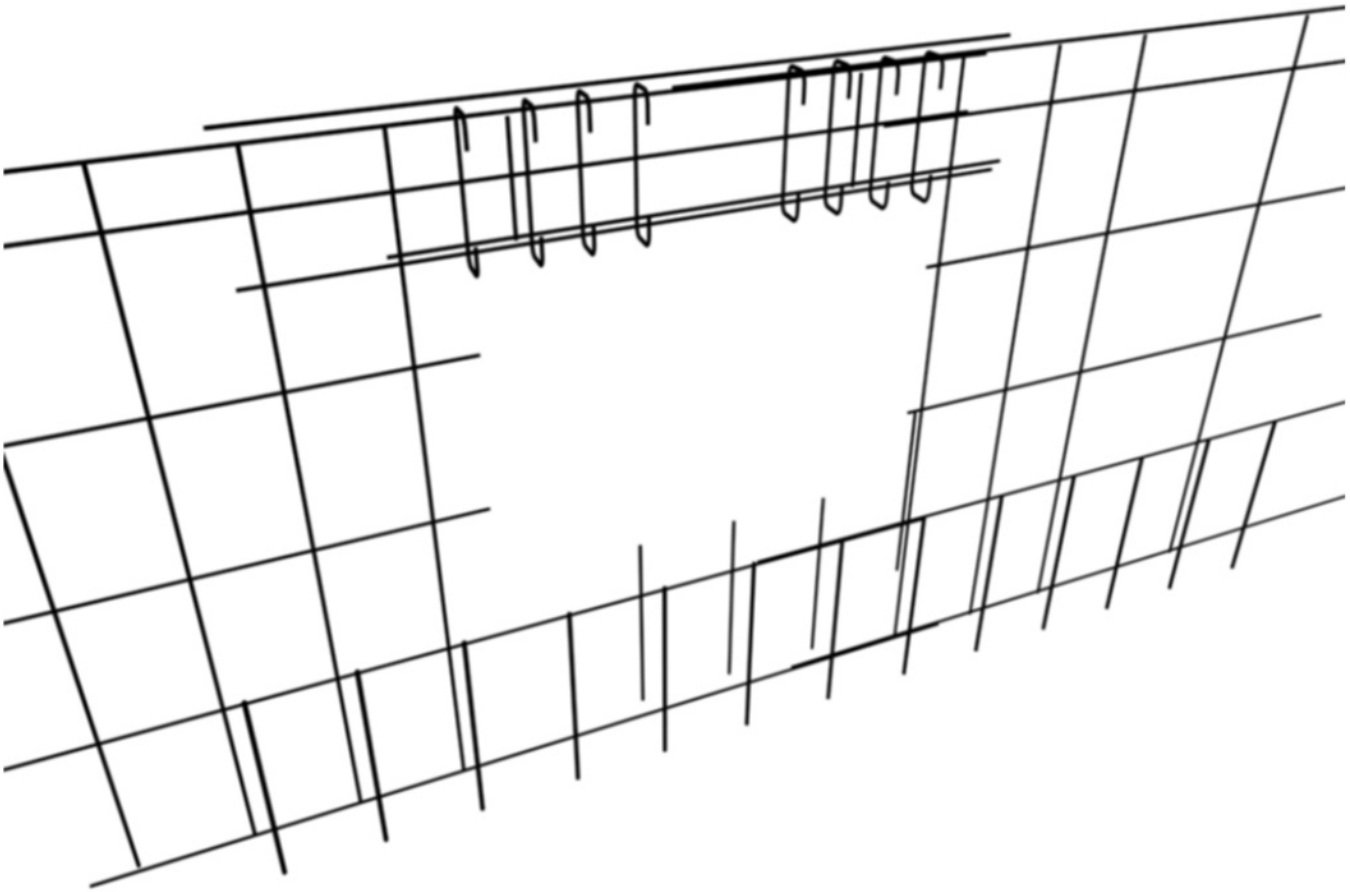
LEGEND

01. TREATED WOOD OR PROPRIETARY BUCK
02. CLOSED CELL POLYETHYLENE BACKER ROD & COMPATIBLE SEALANT
03. DOOR FRAME
04. SELF-ADHERING MEMBRANE - SEE NOTE
05. SLOPED SILL - TREATED
06 REBAR - AS PER CODE & MANUFACTURER
07. EXTERIOR CLADDING (AND TREATED FURRING STRIPS IF DESIRED)
08. SELF-ADHEING MEMBRANE FOLDED INTO REGLET TERMINATED AT CONCRETE WITH COMPATIBLE MASTIC SEALANT
09. PRE-FINISHED METAL FLASHING WITH 25mm END DAM
10. EXTERIOR TRIM (SEALED)
11. NAFS CONFORMING DOOR
12. VERTICAL FURRING
13. INTERMITTENT SHIMS
14. SPLIT WOOD BUCKS - TREATED
15. FLOOR SYSTEM
16. FLASHING - SPRING FIT WITH SEALANT
17. FASCIA TRIM OVER TREATED FURRING FOR SUB SILL DRAINAGE
18. SUB SILL FLASHING

FLAT INSULATED CONCRETE FORM WALLS — DETAIL 3.6.02
EXTERIOR DOOR

FOR ILLUSTRATION PURPOSES ONLY - NOT FOR CONSTRUCTION

Step 1: Install lintel reinforcement around openings in compliance with Article 9.20.17.3 or 9.20.17.4 of the BCBC. In loadbearing flat insulating concrete form walls, lintels shall be provided over all openings wider than 900 mm in accordance with Tables A-17., A-18, or A-19. Lintels over openings greater than 1200 mm shall be reinforced with 10M stirrups at a maximum d/2 spacing where "d" is the distance from the top of the lintel to the level of the bottom reinforcing bar in the lintel. The reinforcing bars at the top and bottom shall extend 600 mm beyond the edges of the opening. The centre of the lintel may have a zone where no stirrups are required dependent on span and structural load. Stirrup requirements will be specified in tables provided by the manufacturer or by the project engineer.

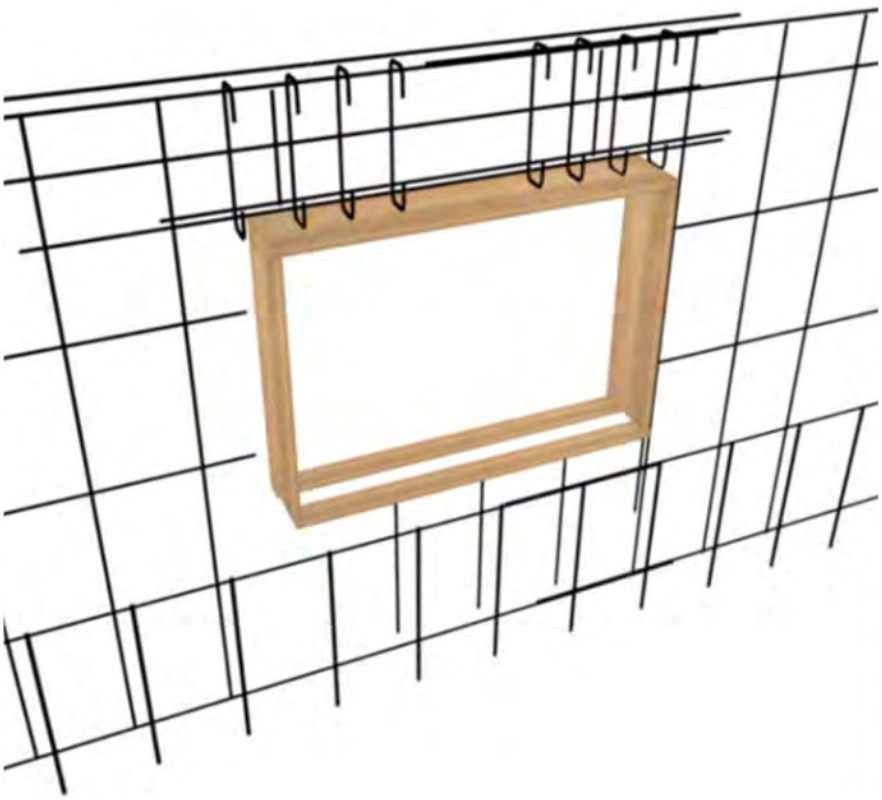


Construction Note:

The minimum horizontal reinforcing required for an ICF foundation wall is 10 M bars at 600 mm o.c. with one 10 M bar within the top 300 mm of the foundation wall. The requirements for the vertical reinforcing vary according to the width of the concrete and the height of the backfill and can be found in 9.15.4.5 of the BCBC. For ICF construction above the ICF foundation wall, lap ends of the vertical reinforcing must extend beyond the finished height of the foundation by at least the minimum overlap requirement of the bar (40 times the diameter of the bar). All reinforcing steel in the foundation must be located on the interior side of the centre line of the concrete and must allow for a minimum of 30 mm of concrete cover for protection from corrosion.

FLAT INSULATING CONCRETE FORM WALLS (ICF)

Window Lintel



Step 2: Install window buck. Allow for a minimum of 30 mm of concrete cover over reinforcing steel for protection from corrosion.

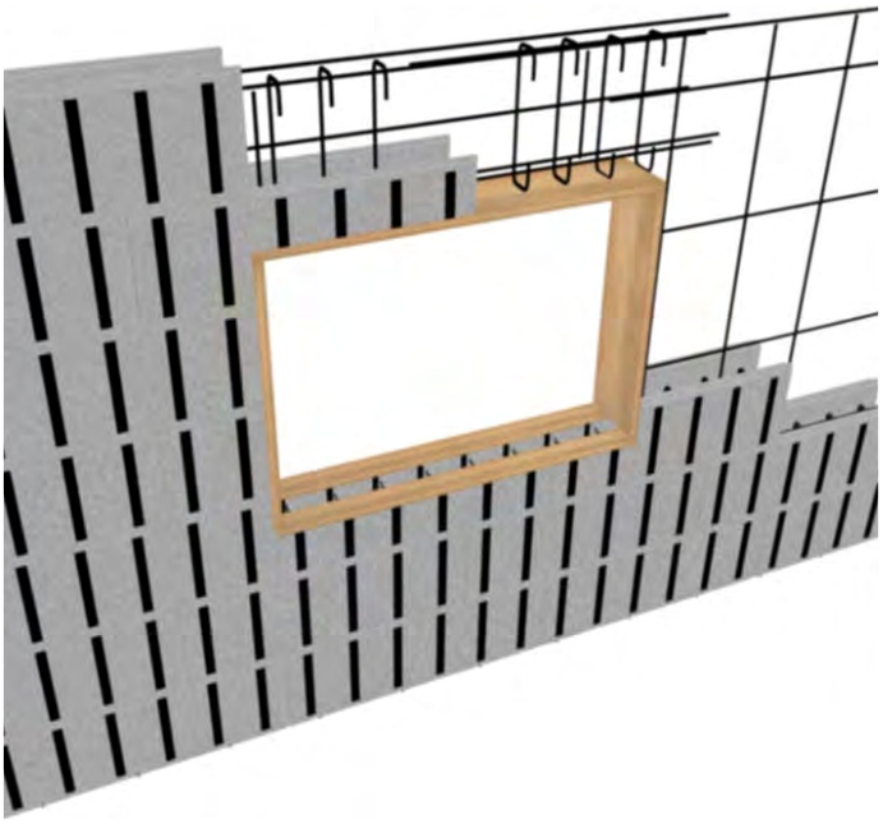
Note:

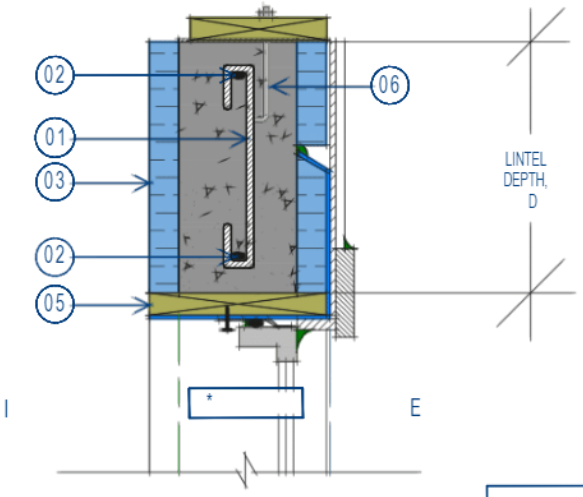
This is a view of the rebar, lintel and buck configuration with the polystyrene removed for clarity. The lintel reinforcing bars shall extend 600 mm beyond the edge of the concrete opening exclusive of the window bucks and the stirrups configured as per the lintel tables as per the BCBC, the manufacturer, or engineer's specifications.

Notes:

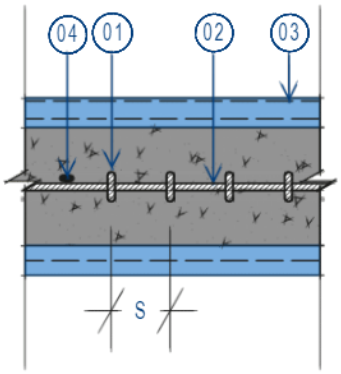
While a full buck is illustrated here, it is for reference only. Preferred buck configurations can be found in Section 3.6.04 of this Guide.

The fastening strips are exaggerated for clarity in this illustration. In actual practice, they are fully embedded beneath the surface of the ICF EPS form material.





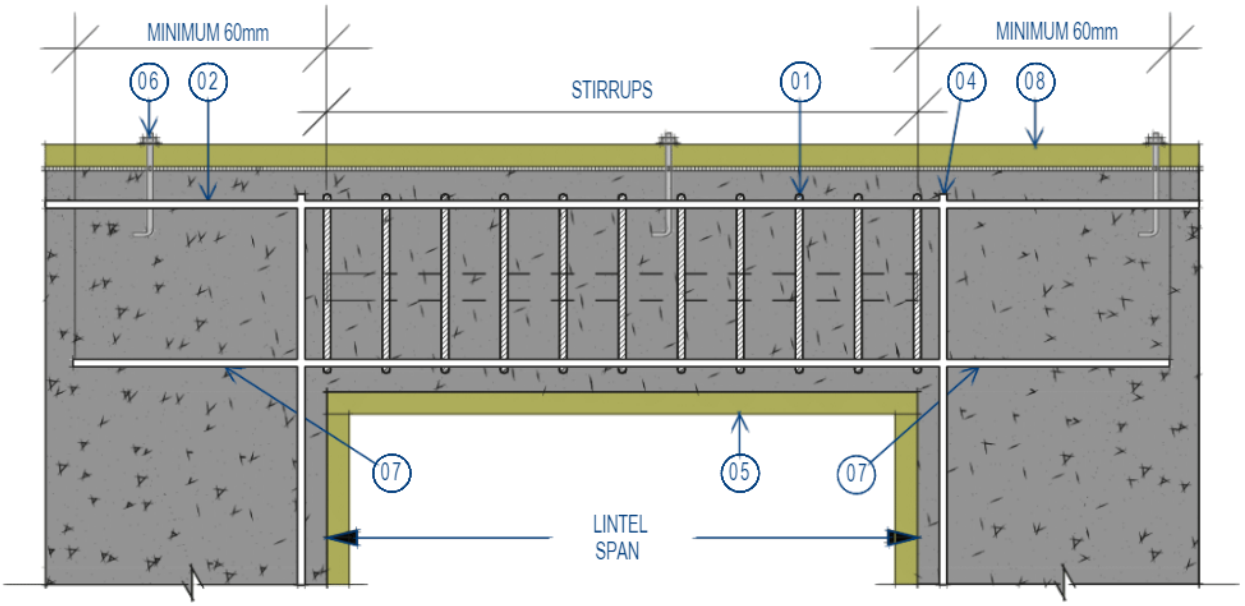
SECTION VIEW



PLAN VIEW

STIRRUP SPACING, S
D/2

LINTEL ICF WEBS NOT SHOWN FOR CLARITY



LINTEL OPENING - ELEVATION

NOT TO SCALE

LEGEND

01. STIRRUP SPACING (S) = LINTEL DEPTH (D) / 2
02. REBAR TOP & BOTTOM AS PER 9.20.17.3 & 9.20.17.4
03. ICF FORM
04. WALL VERTICAL REBAR
05. TREATED WOODEN BUCKS, OR PROPRIETARY BUCKS
06. ANCHOR BOLTS - AS PER CODE
07. LINTEL REBAR MIN. PROJECTION, 600mm / 24", BEYOND OPENING
08. SILL PLATE W/ CLOSED CELL GASKET

*NOTE 1: SHOWN WITH WINDOW. ALSO APPLICABLE TO DOOR OPENINGS.

FLAT INSULATING CONCRETE FORM WALLS (ICF) DETAIL 3.6.03
WINDOWS - LINTEL ASSEMBLY

FOR ILLUSTRATION PURPOSES ONLY - NOT FOR CONSTRUCTION

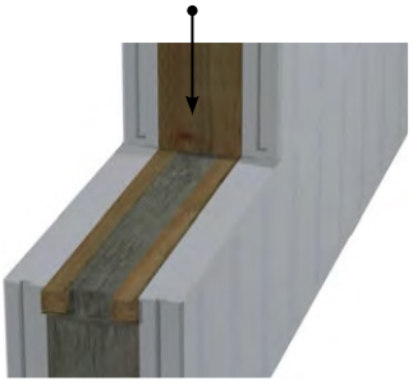
METHOD 1: INTERNAL BOX-FRAMED WINDOW

This method uses a recessed wood buck that is left in place following pouring of concrete. The airtight detail is carried directly from the window to a self-adhering membrane.

Construction Note:

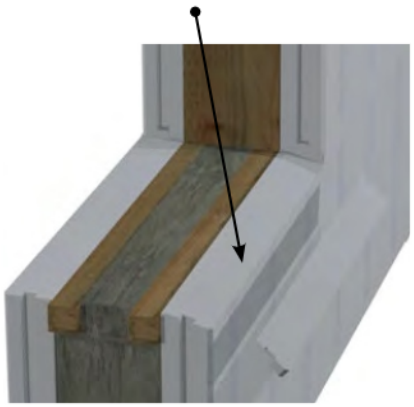
ICF walls are, in most cases, considered a mass wall and therefore the first and second plane of protection need not incorporate a capillary break. The wall must be designed and constructed with appropriate trim, accessory pieces and fasteners to minimize and manage the passage of rain or snow into the walls. The exception to this is in the case of a masonary veneer cladding where a cavity is required.

Step 1a: Install the rough buck for the window opening.

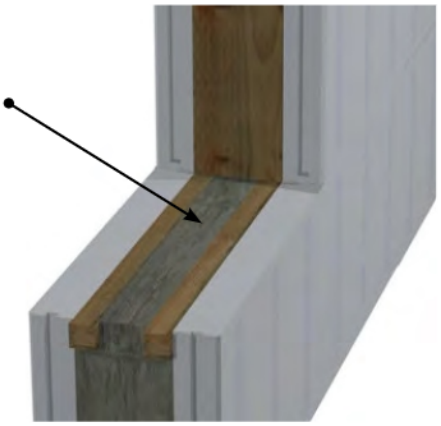


Best Practice Note:

Cut a slight slope into the outer ICF to help drain water from the sill.



Step 2a: Ensure adequate space is provided between the window buck and the window to accommodate backer rod and sealants and to facilitate drainage into the rough opening.



Best Practice Note:

The installation of a sloped sub-sill in the rough framing can be constructed to improve drainage of the sub-sill region created under the window to the exterior.

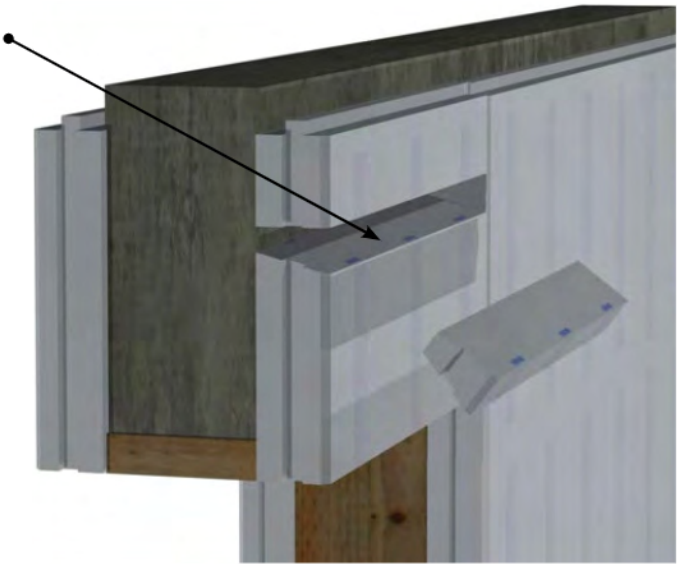
With or without a slope, the installation of a self-adhering membrane on the sub-sill framing intercepts all rain and snow that gets past the first plane of protection (in this case, the window and the joint between the window and the cladding).

Where there is an optional capillary break behind the cladding, the membrane on the sub-sill can discharge into the cavity which then drains to the exterior at the next cross cavity flashing. Windows installed in a wall assembly where no capillary break exists behind the cladding must incorporate an exteriorly draining window sill or other means of dissipating moisture from the sub-sill area to the exterior. Refer to Section 2.0, for sub-sill moisture drainage options.

FLAT INSULATING CONCRETE FORM WALLS (ICF)

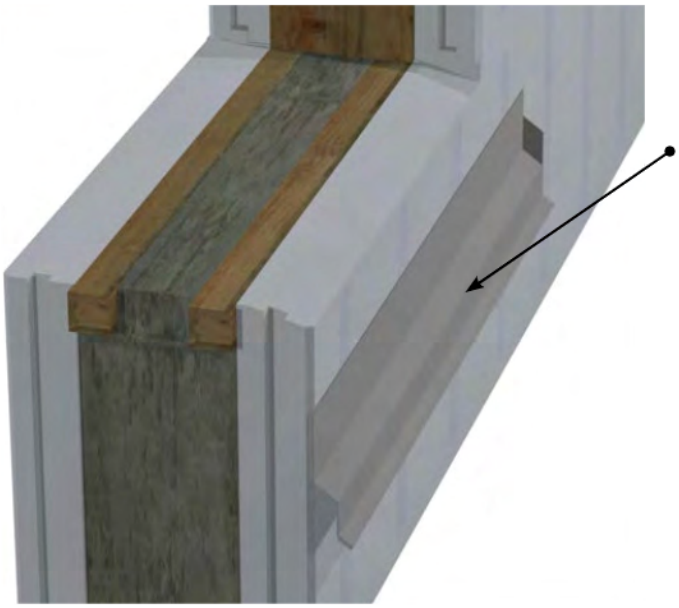
Window - Internal, Box-Framed

Step 3a: Cut a 15 degree reglet into the EPS above the window opening, to allow the head flashing from the window to be sealed directly to the concrete core.

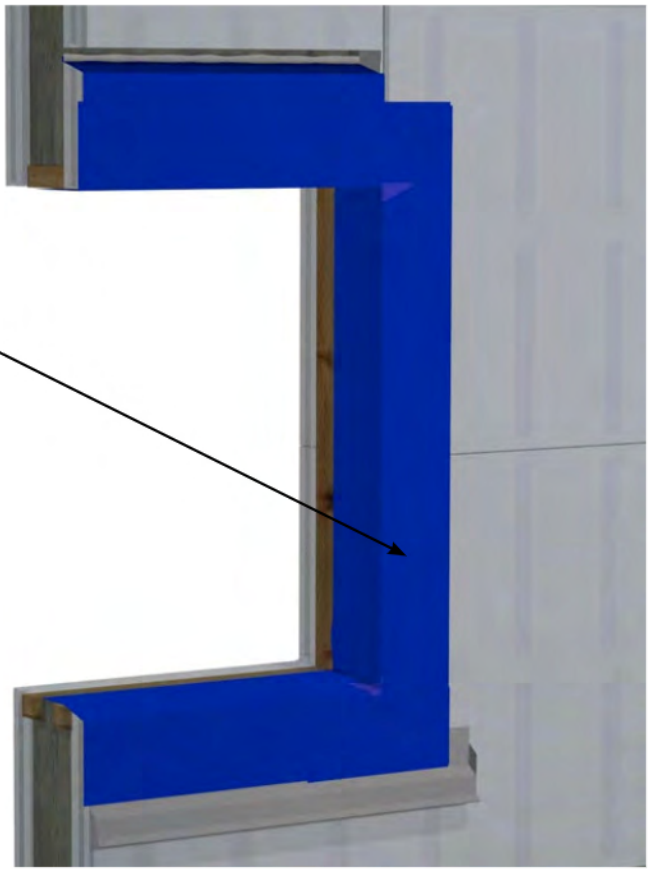


Best Practice Note:

Extend the reglet 150 mm (or to the edges of the trim) beyond the rough opening.



Step 4a: Install a pre-finished metal flashing below the window opening for exterior drainage of the sub sill (if a capillary break is not installed behind the cladding).



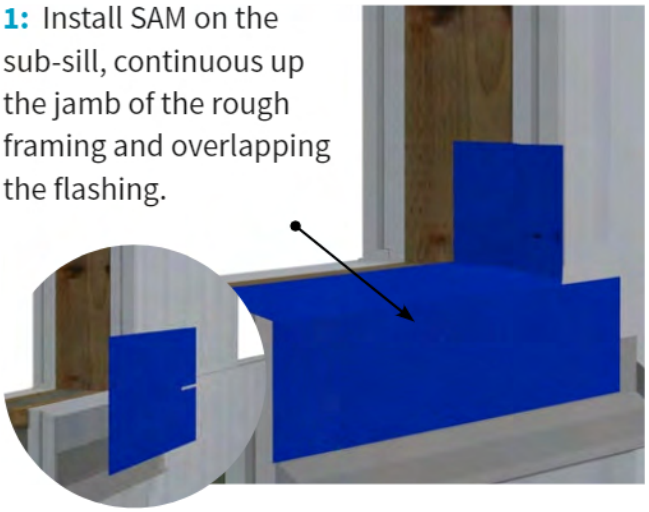
Step 5a: Install SAM (Self-Adhering Membrane) opening wrap, overlapping in shingle-fashion, starting with the sill. The SAM should be continuous from the interior of the rough opening to a minimum of 250 mm onto the exterior face of the ICF forms. (See next page for installation sequence.)

Construction Note:

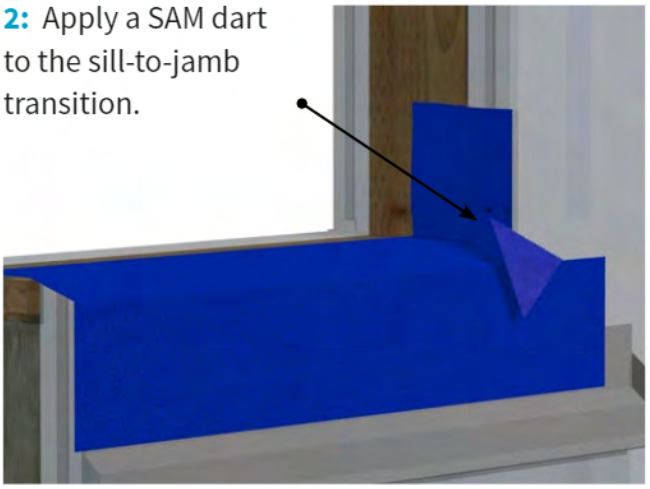
Prepare EPS surface in accordance with the SAM manufacturers' application instructions.

Steps For Self-Adhering Membrane (SAM) Wrap of an ICF Window Opening

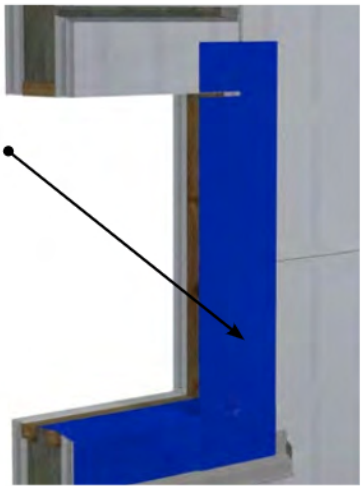
1: Install SAM on the sub-sill, continuous up the jamb of the rough framing and overlapping the flashing.



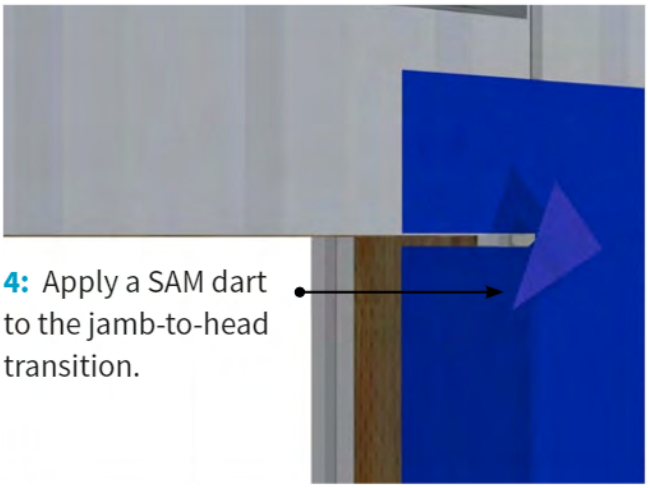
2: Apply a SAM dart to the sill-to-jamb transition.

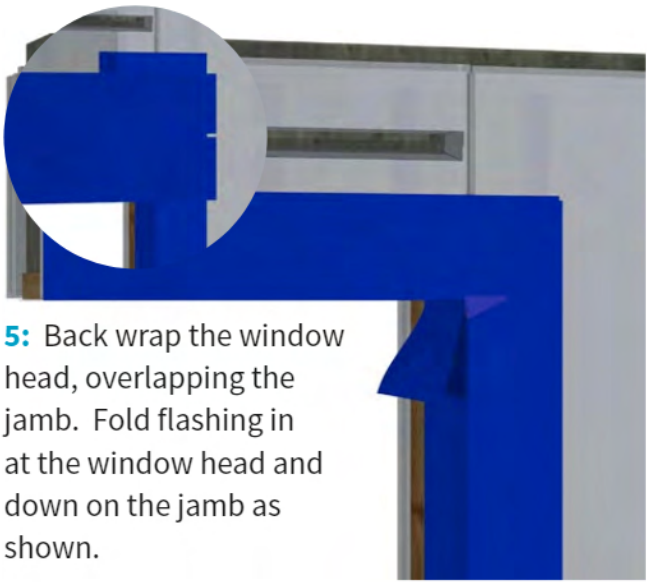


3: Back wrap SAM into the jamb as shown, extending 200 mm above the window head, and overlapping the sill flash upturn.

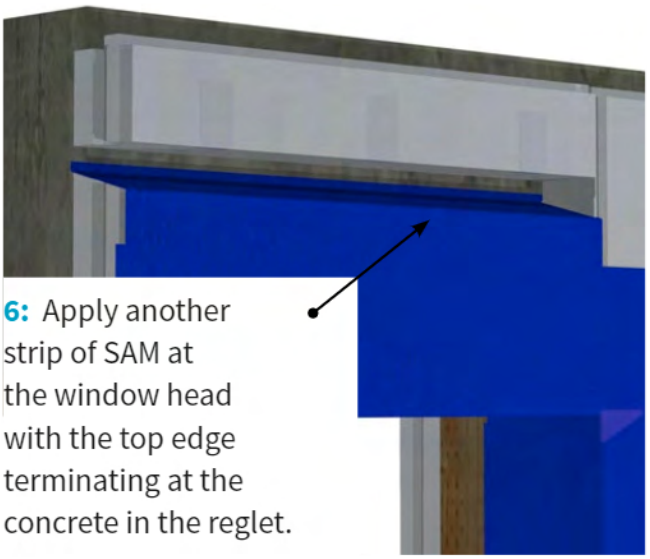


4: Apply a SAM dart to the jamb-to-head transition.





5: Back wrap the window head, overlapping the jamb. Fold flashing in at the window head and down on the jamb as shown.

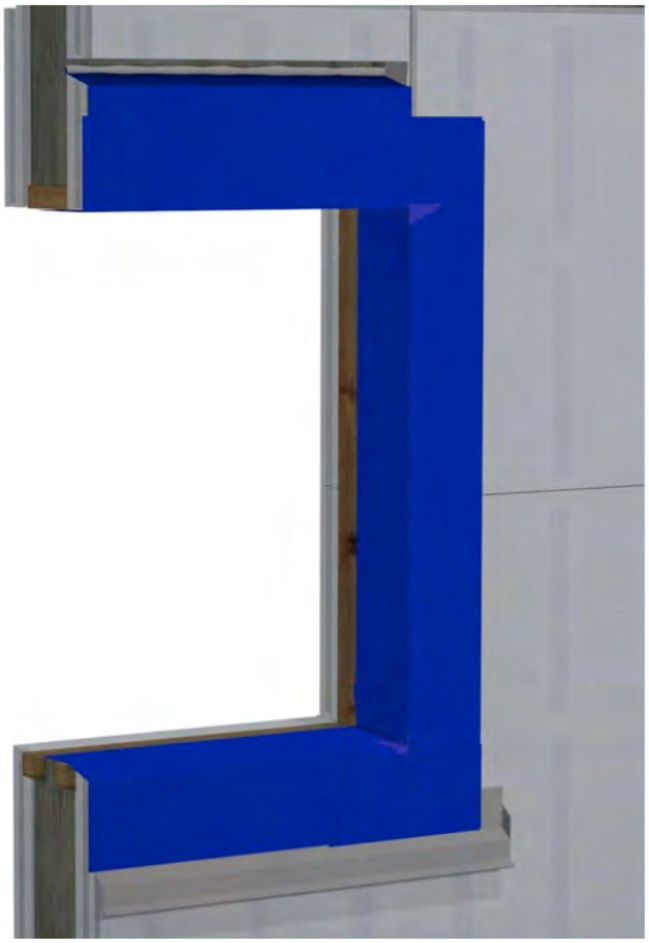


6: Apply another strip of SAM at the window head with the top edge terminating at the concrete in the reglet.

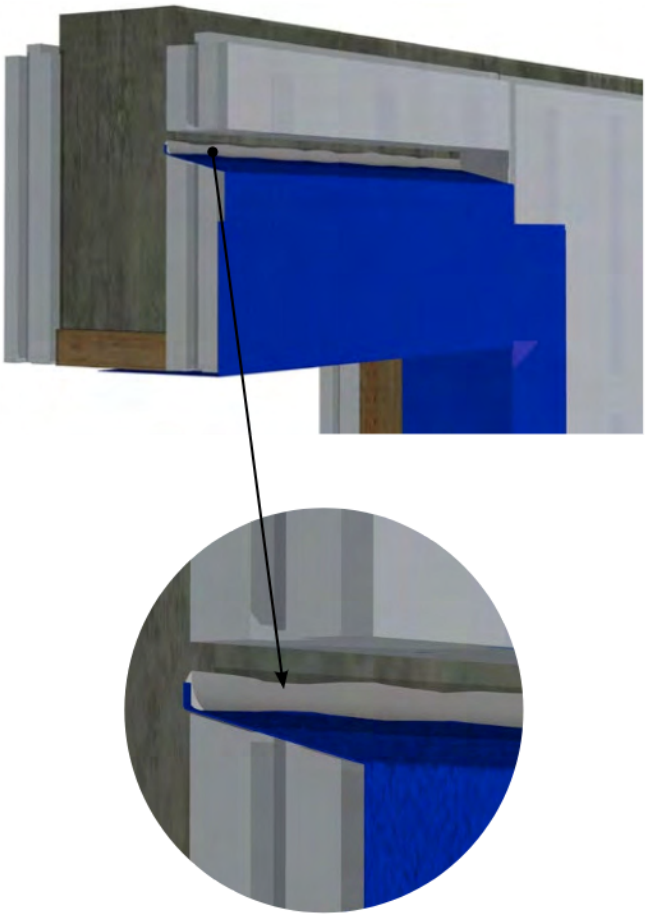
FLAT INSULATING CONCRETE FORM WALLS (ICF)

Window - Internal, Box-Framed

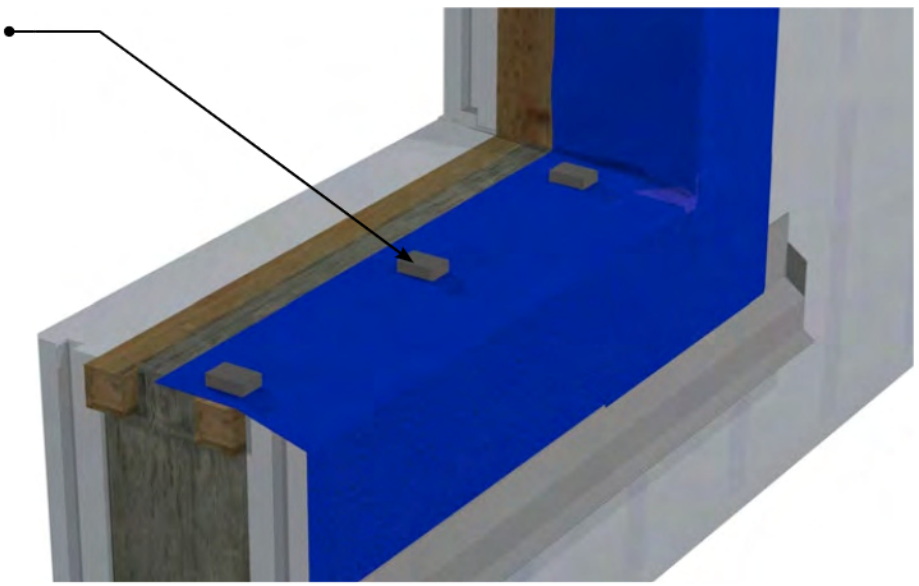
Step 6a: Confirm proper lapping of the self-adhering membrane at all seams.

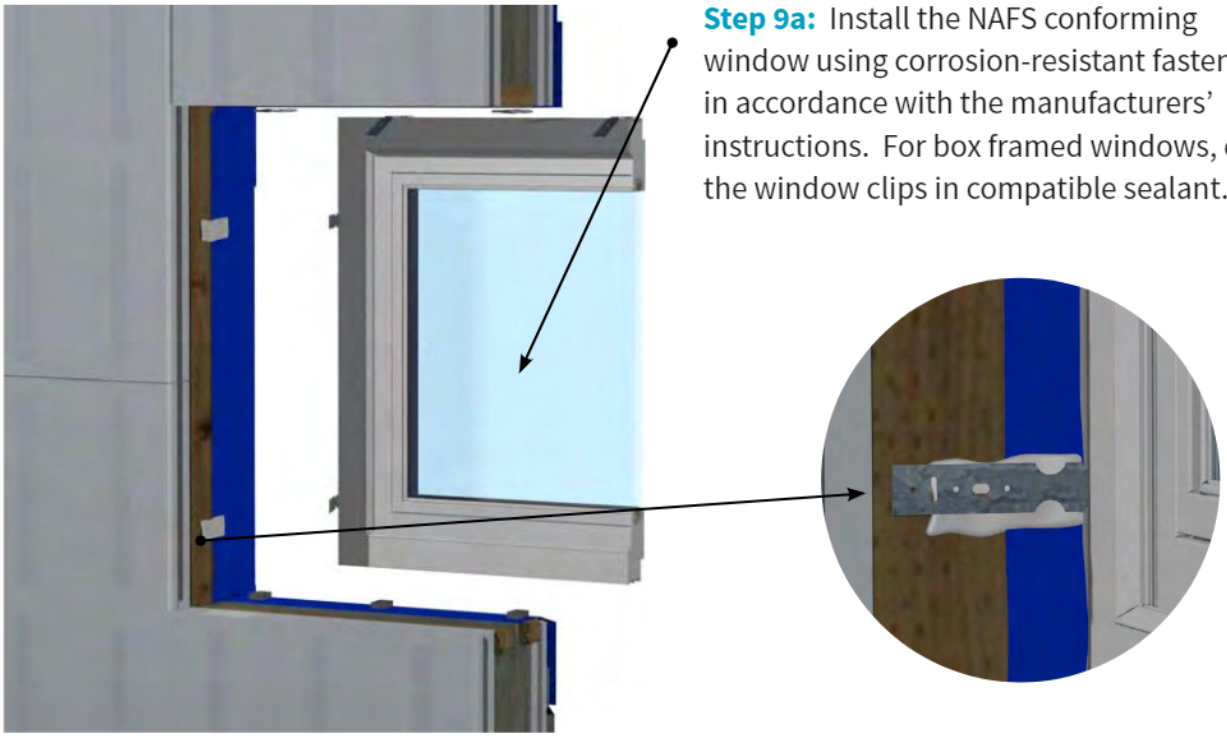


Step 7a: Terminate the SAM at the concrete and seal direct to concrete with a mastic sealant.



Step 8a: Install treated wood shims onto the sill. If wood furring is not used, an alternate method of draining the window sub-sill is required. The corners must be left open for drainage.

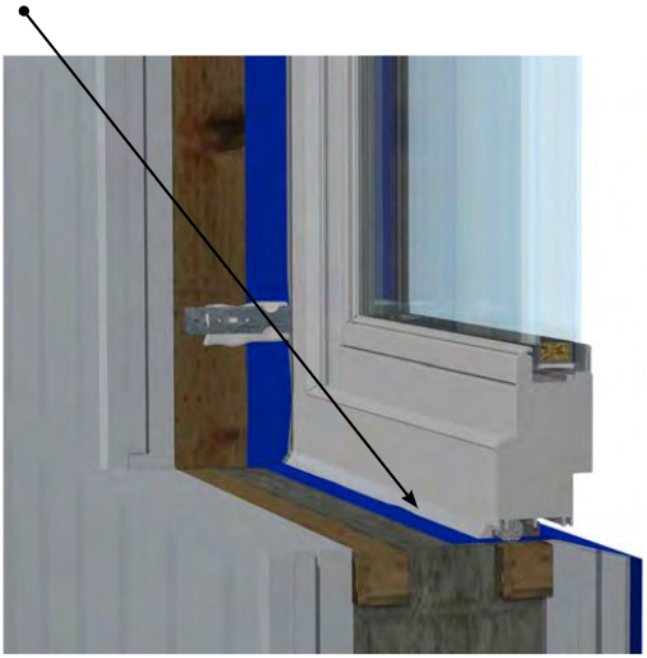




Step 9a: Install the NAFS conforming window using corrosion-resistant fasteners in accordance with the manufacturers' instructions. For box framed windows, embed the window clips in compatible sealant.

Step 10a: Install closed cell polyethylene backer rod between the window and the rough framing at the interior head, jamb, and sill gaps.

Step 11a: Apply a compatible sealant around the entire interior perimeter of the window to complete the 'rod and caulk' technique. This seal is the required continuation of the second plane of protection as well as the continuation of the air barrier into the window assembly.



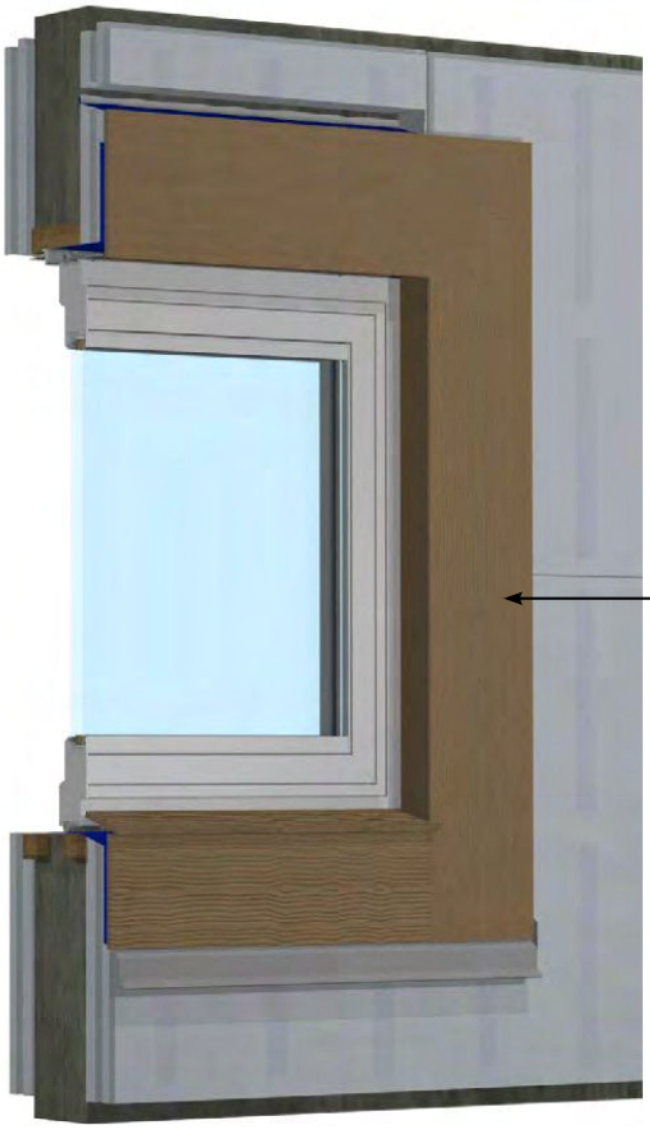
FLAT INSULATING CONCRETE FORM WALLS (ICF)

Window - Internal, Box-Framed

Step 12a: Install treated wood strips to furr out the trim and allow for drainage of incidental moisture via the sub sill flashing (if a capillary break is not installed behind the cladding).

Best Practice Note:

Advantages of furring out the exterior trim include the ability to replace the windows with the simple removal of the surrounding window trim and the provision of a clear drainage path at the sill.



Step 13a: Install trim using corrosion-resistant fasteners.

Step 14a: Install cladding using corrosion-resistant fasteners.

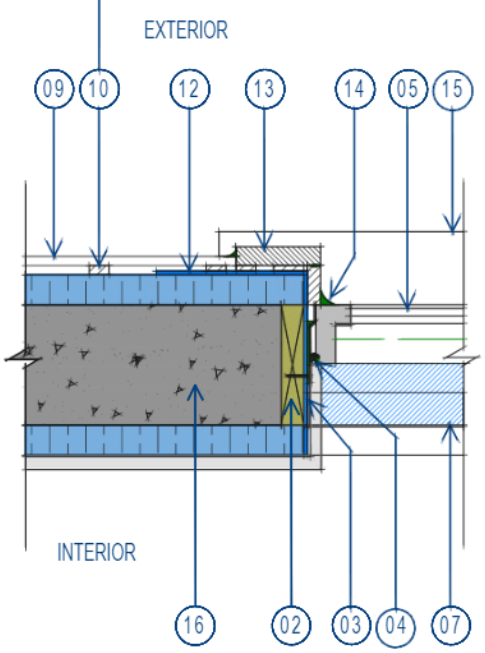
Step 15a: Apply compatible sealant to all transitions between the window, trim, cladding, and end dams.

Step 16a: Install drywall to the walls and the returns (or alternate mill work) into the window jambs and head.

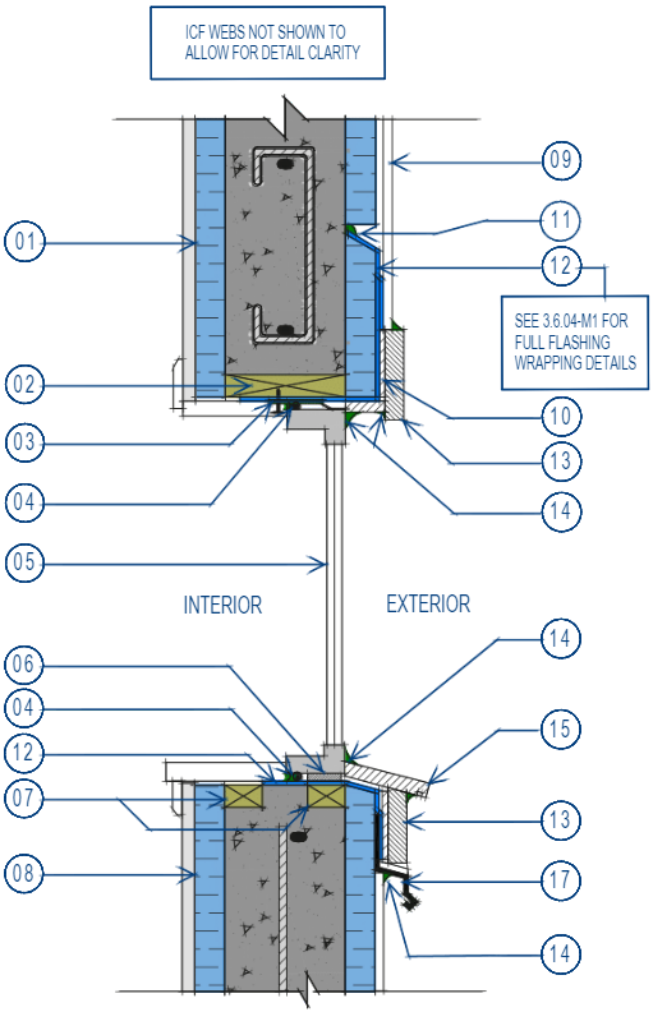
FLAT INSULATING CONCRETE FORM WALLS (ICF)

Window - Internal, Box-Framed

*NOTE 1: ICF WALLS ARE, IN MOST CASES, CONSIDERED A MASS WALL AND THEREFORE THE FIRST AND SECOND PLANE OF PROTECTION NEED NOT INCORPORATE A CAPILLARY BREAK. THE WALL MUST BE DESIGNED AND CONSTRUCTED WITH APPROPRIATE TRIM, ACCESSORY PIECES AND FASTENERS TO MINIMIZE AND MANAGE THE PASSAGE OF RAIN OR SNOW INTO THE WALLS.



JAMB PLAN VIEW



SECTION PLAN VIEW

NOT TO SCALE

LEGEND

01. ICF LINTEL
02. TREATED WOODEN BUCK
03. WINDOW FASTENING CLIPS EMBEDDED IN SEALANT
04. CLOSED CELL POLYETHYLENE BACKER ROD & COMPATIBLE SEALANT
05. NAFS CONFORMING WINDOW W/ FASTENERS SPECIFIED BY MANUF
06. SHIMS
07. SPLIT TREATED WOODEN BUCK
08. ICF FORMS
09. EXTERIOR CLADDING
10. FURRING STRIPS - SEE NOTE 1
11. REGLET W/ COMPATIBLE MASTIC SEALANT
12. SELF-ADHERING MEMBRANE
13. EXTERIOR TRIM
14. COMPATIBLE SEALANT AT ALL TRIM & CLADDING TRANSITIONS
15. SLOPED WINDOW SILL (6 TO 15 DEGREES) W/ KERFED DRIP EDGE
16. CONCRETE (ICF WEBS NOT SHOWN)
17. PRE-FINISHED METAL SILL FLASHING W/ MIN. 25mm END DAM

FLAT INSULATING CONCRETE FORM WALLS(ICF) DETAIL 3.6.04-M1

WINDOWS - METHOD 1 - INTERNAL BOX FRAME

FOR ILLUSTRATION PURPOSES ONLY - NOT FOR CONSTRUCTION

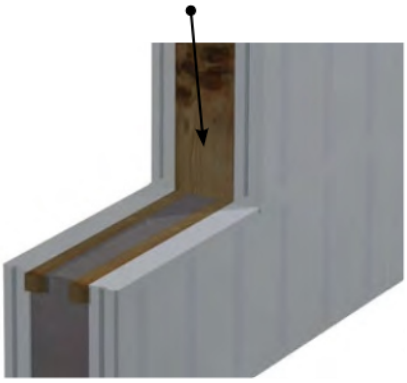
METHOD 2: EIFS BASE COAT & MESH

This method uses a recessed wood buck that is left in place following pouring of concrete. The airtight detail is carried directly from the window to an EIFS coated window rough opening.

Construction Note:

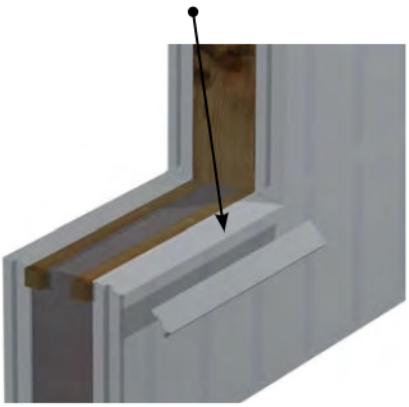
ICF walls are, in most cases, considered a mass wall and therefore the first and second plane of protection need not incorporate a capillary break. The wall must be designed and constructed with appropriate trim, accessory pieces and fasteners to minimize and manage the passage of rain or snow into the walls. The exception to this is in the case of a masonary veneer cladding where a cavity is required.

Step 1b: Install the rough buck for the window opening.

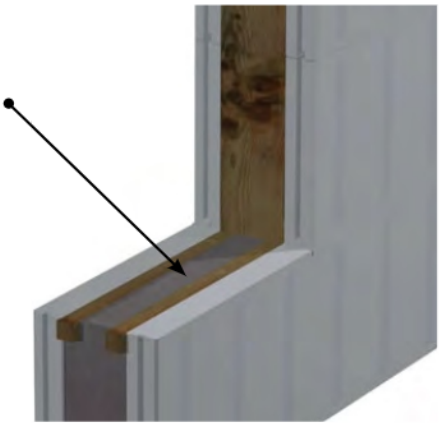


Best Practice Note:

Cut a slight slope into the outer ICF to help drain water from the sill.



Step 2b: Ensure adequate space is provided between the window buck and the window to accommodate backer rod and sealants and to facilitate drainage of the sub-sill region.



Best Practice Note:

The installation of a sloped sub-sill in the rough framing can be constructed to improve drainage of the sub-sill region created under the window to the exterior.

With or without a slope, the installation of EIFS base coat with mesh intercepts all rain and snow that gets past the first plane of protection (in this case, the window and the joint between the window and the cladding).

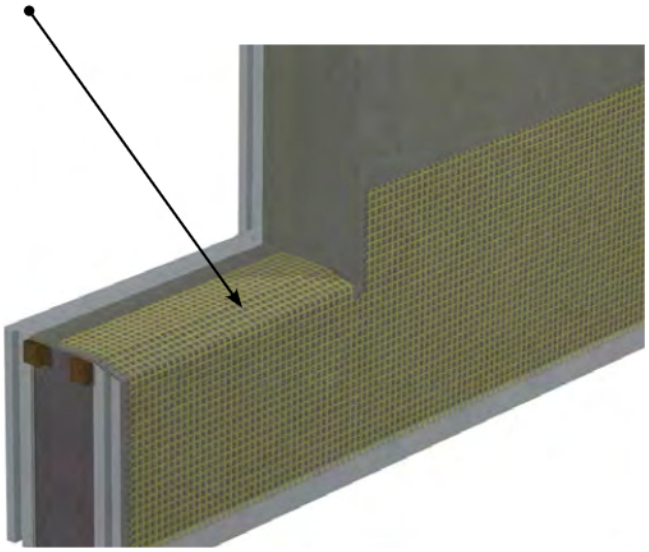
Where there is a capillary break behind the cladding, the membrane on the sub-sill can discharge into the cavity which then drains to the exterior at the next cross cavity flashing. Windows installed in a wall assembly where no capillary break exists behind the cladding must incorporate an exteriorly draining window sill or other means of dissipating moisture from the sub-sill area to the exterior. Refer to Section 2.0, for sub-sill moisture drainage options.

FLAT INSULATING CONCRETE FORM WALLS (ICF)

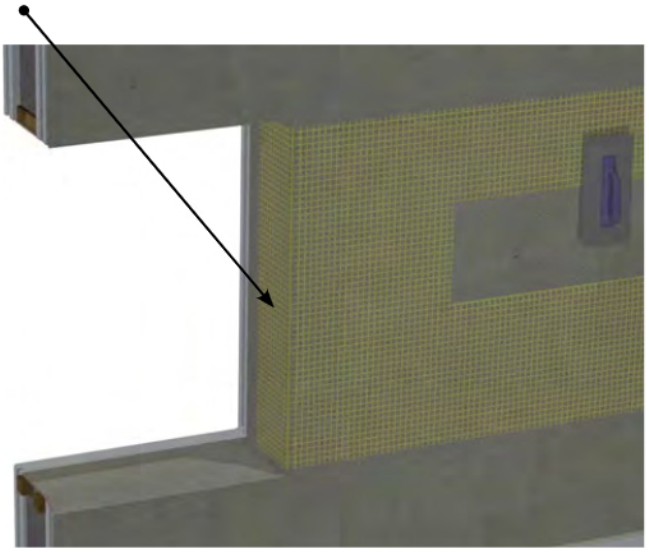
Window - EIFS Base Coat and Mesh

Step 3b: Apply an EIFS base coat layer and embed with fiber wrapped from a minimum of 250 mm from the exterior face of the ICF back into the window opening, past the position of the window in the following sequence:

1: Wrap sill. Overlap mesh onto ICF by a minimum of 250 mm.

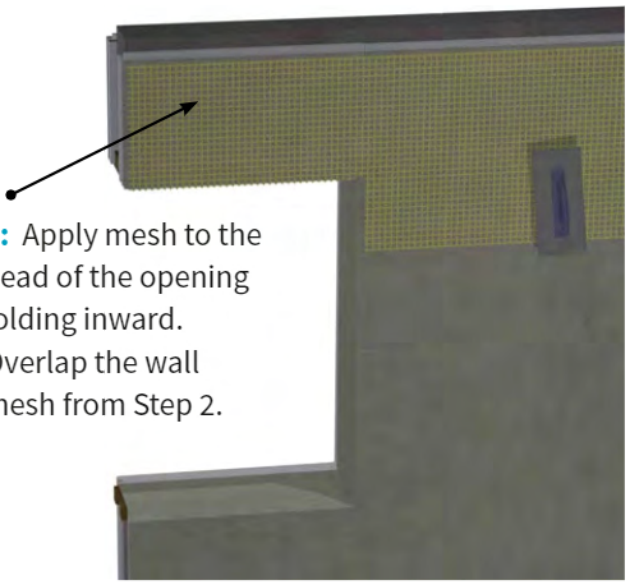


2: Wrap mesh into the jamb, overlapping the sill mesh from Step 1.



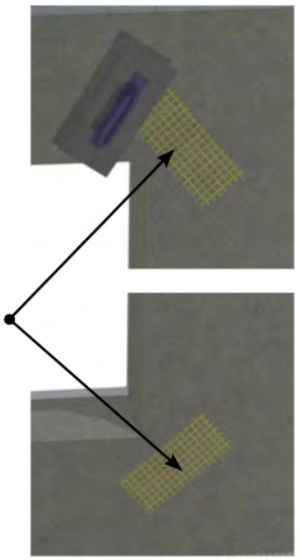
Note:

The EIFS should be continuous from the interior of the rough opening to a minimum of 250 mm onto the exterior face of the ICF forms (but is more likely to be continued as cladding for the walls).

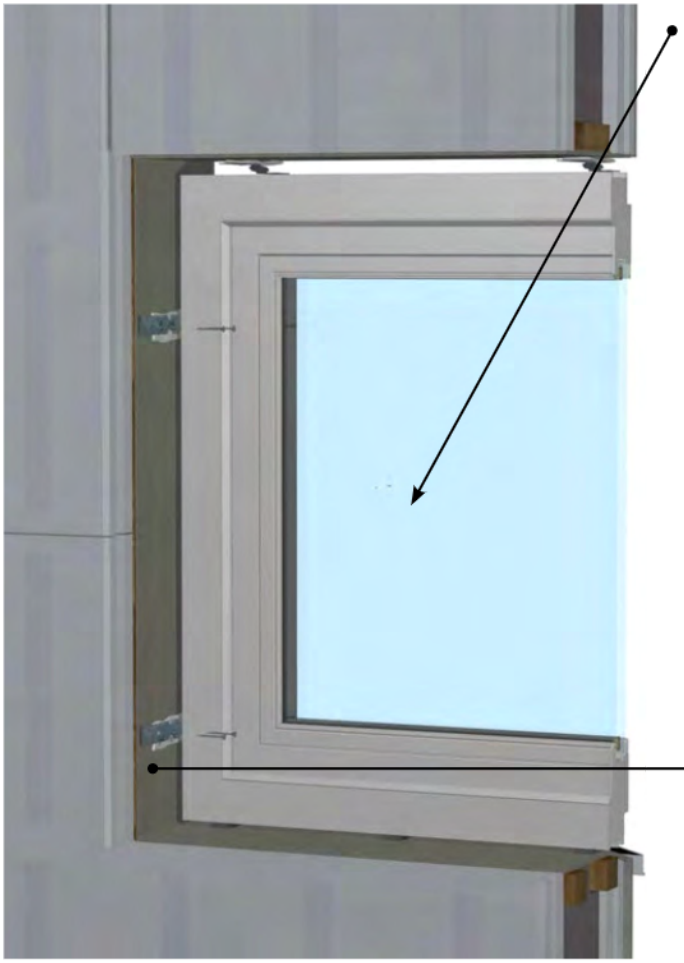


3: Apply mesh to the head of the opening folding inward. Overlap the wall mesh from Step 2.

4: Apply mesh "butterflies" to reinforce the corners and embed into the EIFS base coat.



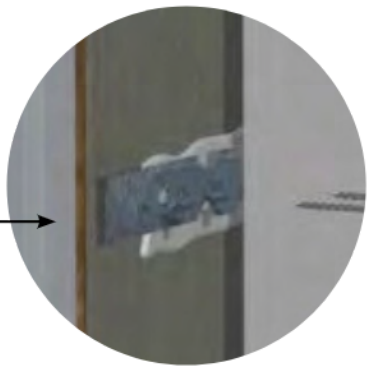
Step 4b: Install treated wood shims onto the sill. If wood furring is not used, an alternate method of draining the window sub-sill is required. The corners must be left open for drainage.



Step 5b: Install the NAFS conforming window using corrosion-resistant fasteners in accordance with the manufacturers' instructions. Embed the window clips in compatible sealant during installation.

Note:

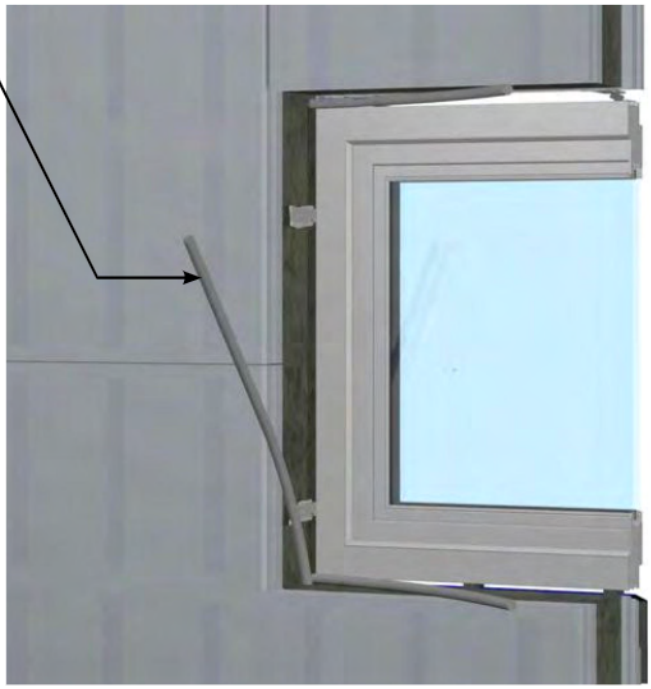
The window used in this example has an integrated flashing.(See 8b)

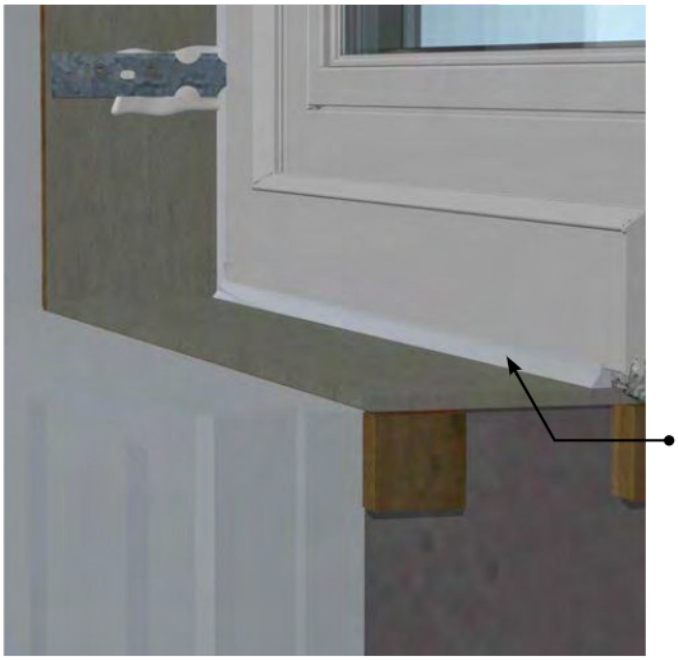


FLAT INSULATING CONCRETE FORM WALLS (ICF)

Window - EIFS Base Coat and Mesh

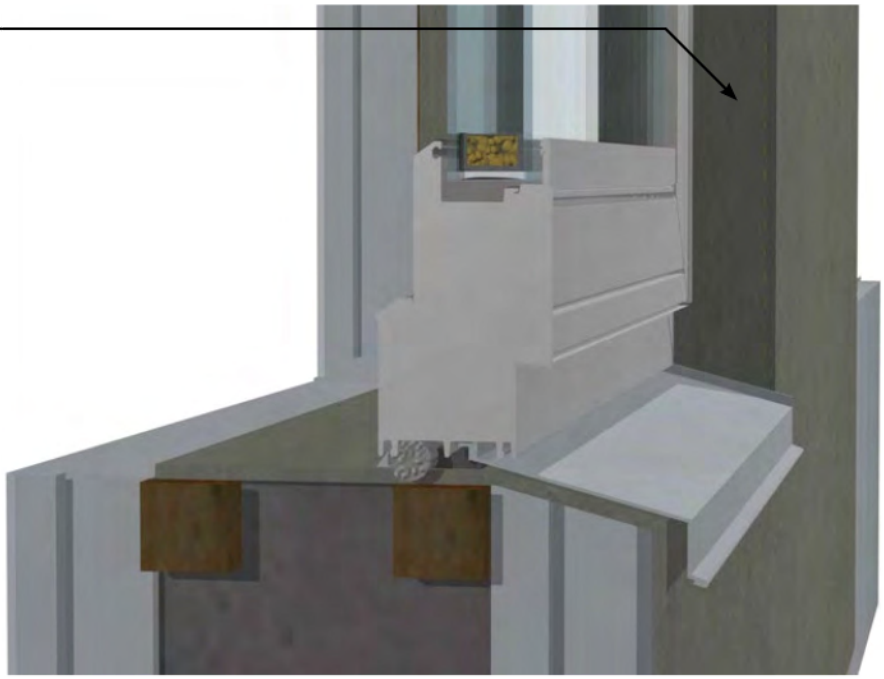
Step 6b: Install closed cell polyethylene backer rod between the window and the rough framing at the interior head, jamb, and sill gaps.



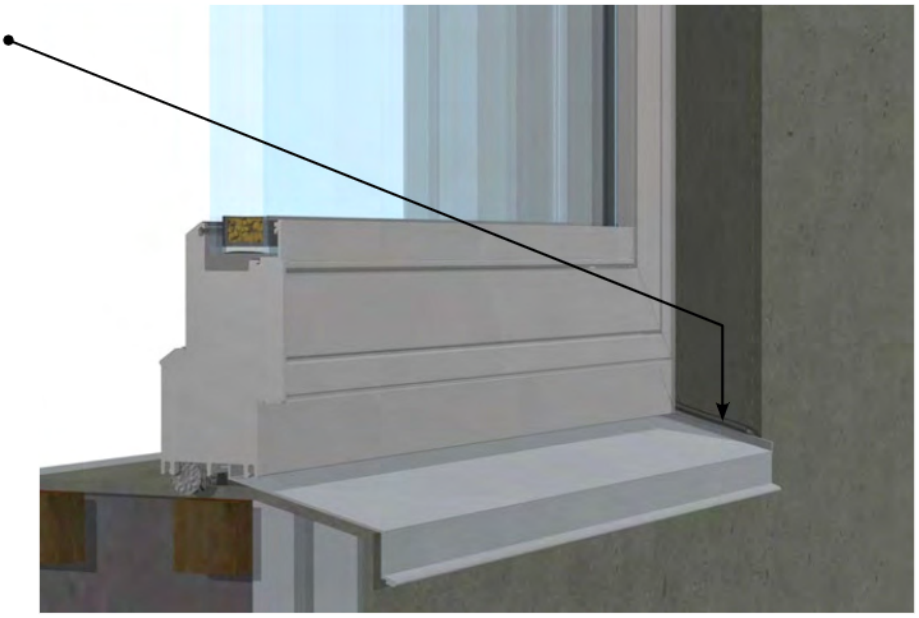


Step 7b: Apply a compatible sealant around the entire interior perimeter of the window to complete the 'rod and caulk' technique. This seal is the required continuation of the second plane of protection as well as the continuation of the air barrier into the window assembly.

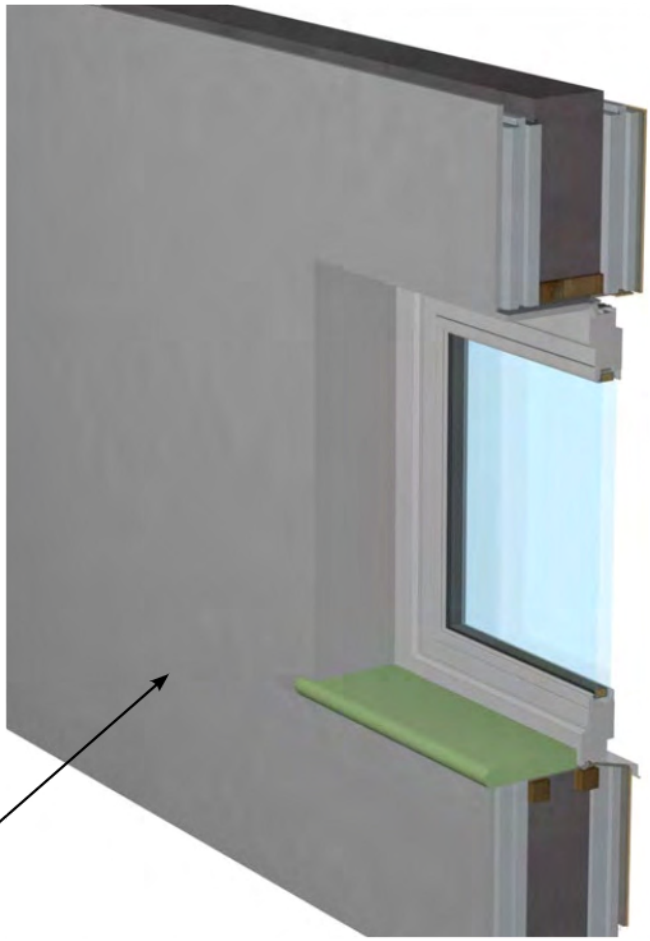
Step 8b: Complete the installation of the EIFS base coat.



Step 9b: Apply compatible sealant to the transitions between the window, trim, cladding and end dams.



Step 10b: Install the EIFS finish coat.

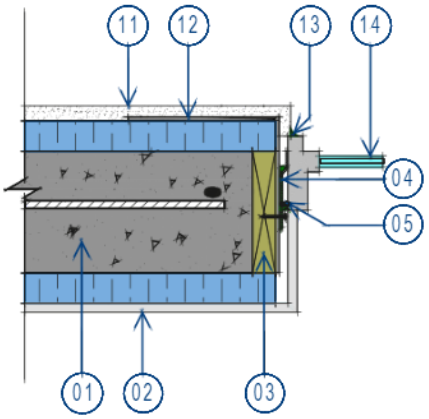


Step 11b: Install drywall to the walls and the returns (or alternate mill work) into the window jambs and head.

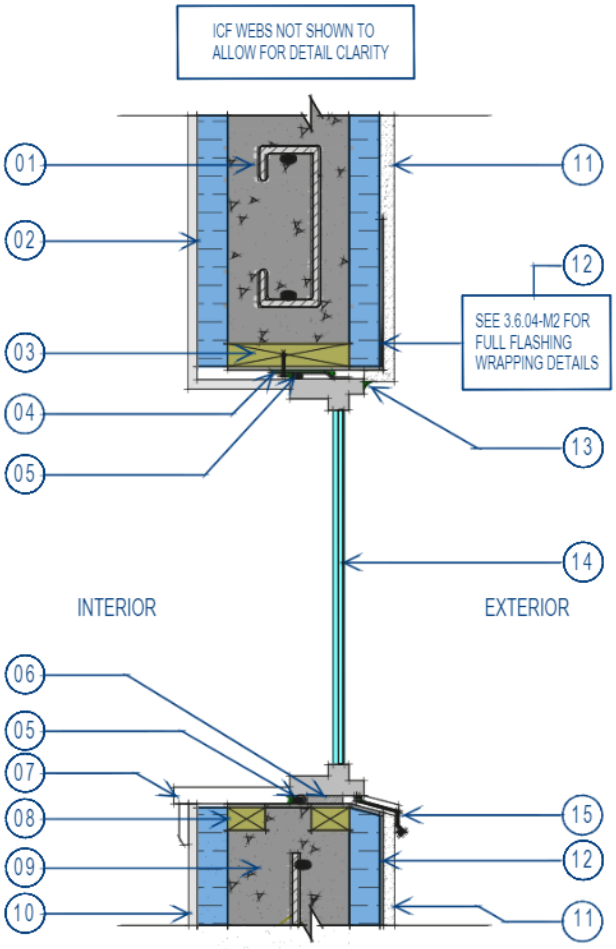
FLAT INSULATING CONCRETE FORM WALLS (ICF)

Window - EIFS Base Coat and Mesh

*NOTE 1: ICF WALLS ARE, IN MOST CASES, CONSIDERED A MASS WALL AND THEREFORE THE FIRST AND SECOND PLANE OF PROTECTION NEED NOT INCORPORATE A CAPILLARY BREAK. THE WALL MUST BE DESIGNED AND CONSTRUCTED WITH APPROPRIATE TRIM, ACCESSORY PIECES AND FASTENERS TO MINIMIZE AND MANAGE THE PASSAGE OF RAIN OR SNOW INTO THE WALLS.



PLAN VIEW



SECTION VIEW

NOT TO SCALE

LEGEND

01. ICF LINTEL
02. ICF FORM (WEBS NOT SHOWN)
03. TREATED WOODEN BUCK
04. WINDOW FASTENING CLIPS EMBEDDED IN SEALANT
05. CLOSED CELL POLYETHYLENE BACKER ROD & COMPATIBLE SEALANT
06. SHIMS
07. INTERIOR TRIM
08. SPLIT TREATED WOODEN BUCK
09. CONCRETE CORE
10. GYPSUM WALL BOARD
11. EXTERIOR CLADDING (STUCCO SHOWN)
12. EIFS BASE COAT & FIBRE MESH - EXTENDING 250mm BEYOND R.O. ONTO ICF FORM
13. COMPATIBLE SEALANT
14. NAFS CONFORMING WINDOW W/ FASTENERS SPECIFIED BY MANUF
15. SUB-SILL DRIP EDGE ATTACHED TO WINDOW FRAME WITH FASTENER AND COMPATIBLE SEALANT

FLAT INSULATING CONCRETE FORM WALLS (ICF) DETAIL 3.6.04-M2

WINDOWS - METHOD 2 - EIFS BASECOAT & MESH

FOR ILLUSTRATION PURPOSES ONLY - NOT FOR CONSTRUCTION

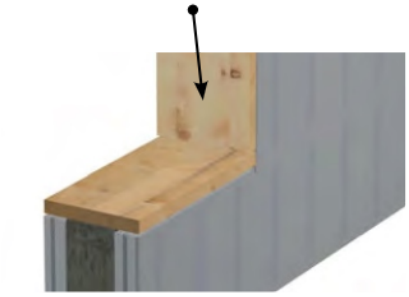
METHOD 3: DIRECT TO CONCRETE

This method uses a temporary wood buck that is stripped after the concrete cures. The airtight detail is carried directly from the window to the concrete core.

Construction Note:

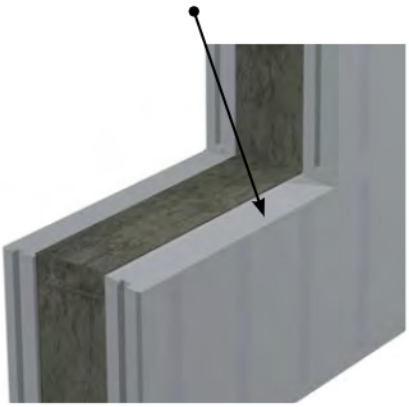
ICF walls are, in most cases, considered a mass wall and therefore the first and second plane of protection need not incorporate a capillary break. The wall must be designed and constructed with appropriate trim, accessory pieces and fasteners to minimize and manage the passage of rain or snow into the walls. The exception to this is in the case of a masonary veneer cladding where a cavity is required.

Step 1c: Install the window buck which will be stripped after the concrete cures, leaving the concrete core exposed.

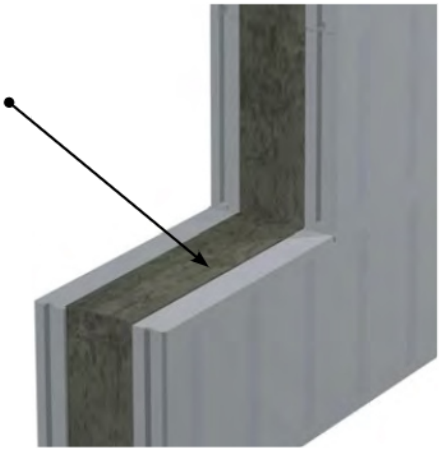


Best Practice Note:

Cut a slight slope into the outer ICF to help drain water from the sill.



Step 2c: Ensure adequate space is provided between the window buck and the window to accommodate backer rod and sealants and to facilitate drainage of the sub-sill region.



Best Practice Note:

The installation of a sloped sub-sill in the rough framing can be constructed to improve drainage of the sub-sill region created under the window to the exterior.

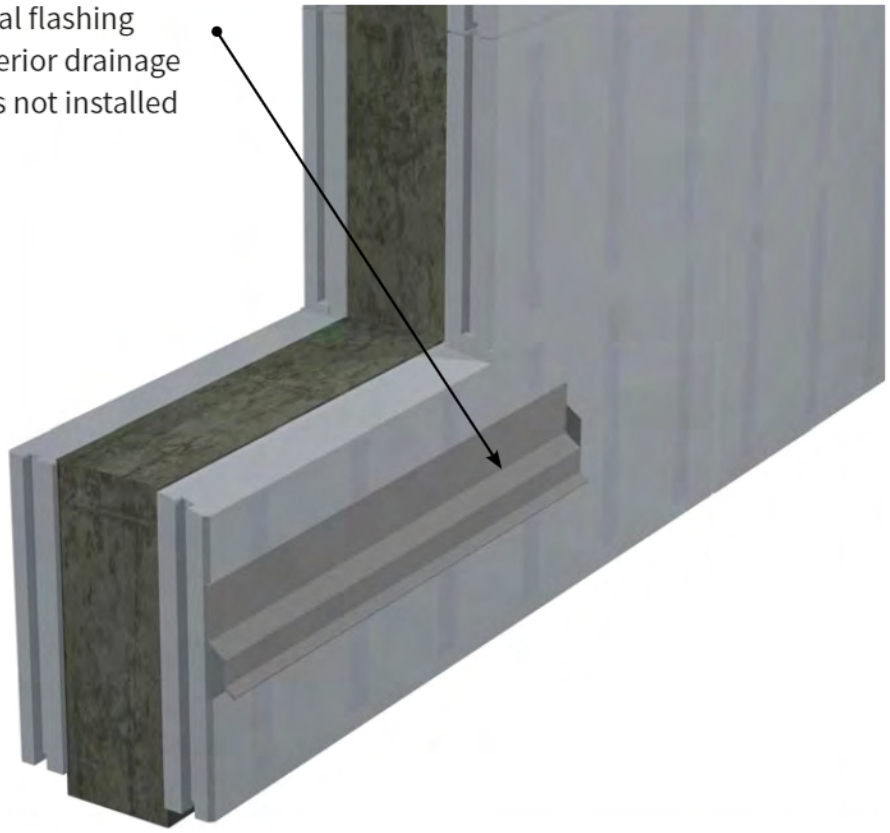
With or without a slope, the installation of a waterproof membrane on the sub-sill framing intercepts all rain and snow that gets past the first plane of protection (in this case, the window and the joint between the window and the cladding).

Where there is a capillary break behind the cladding, the membrane on the sub-sill can discharge into the cavity which then drains to the exterior at the next cross cavity flashing. Windows installed in a wall assembly where no capillary break exists behind the cladding must incorporate an exteriorly draining window sill or other means of dissipating moisture from the sub-sill area to the exterior. Refer to Section 2.0, for sub-sill moisture drainage options.

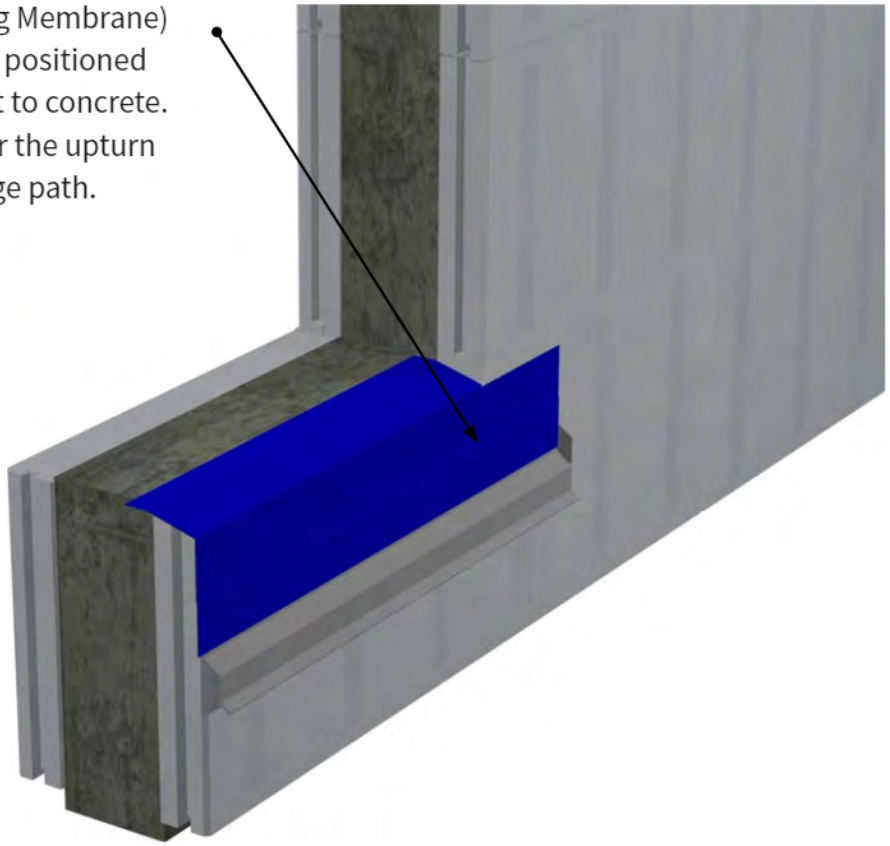
FLAT INSULATING CONCRETE FORM WALLS (ICF)

Window - Direct to Concrete

Step 3c: Install a pre-finished metal flashing below the window opening for exterior drainage of the sub sill (if a capillary break is not installed behind the cladding).



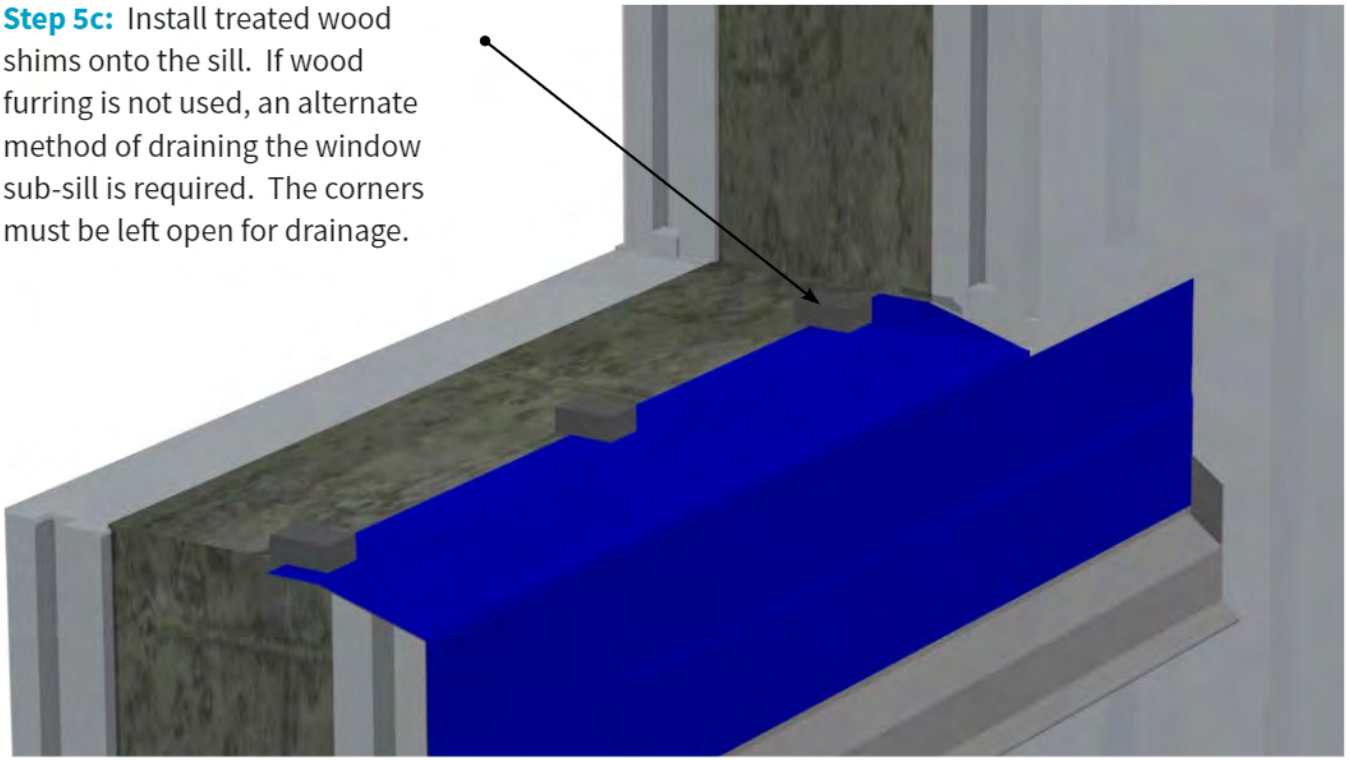
Step 4c: Install SAM (Self-Adhering Membrane) to the sill with the horizontal wrap positioned to allow Step 8c to be sealed direct to concrete. Lap the vertical leg of the SAM over the upturn of the flashing to provide a drainage path.

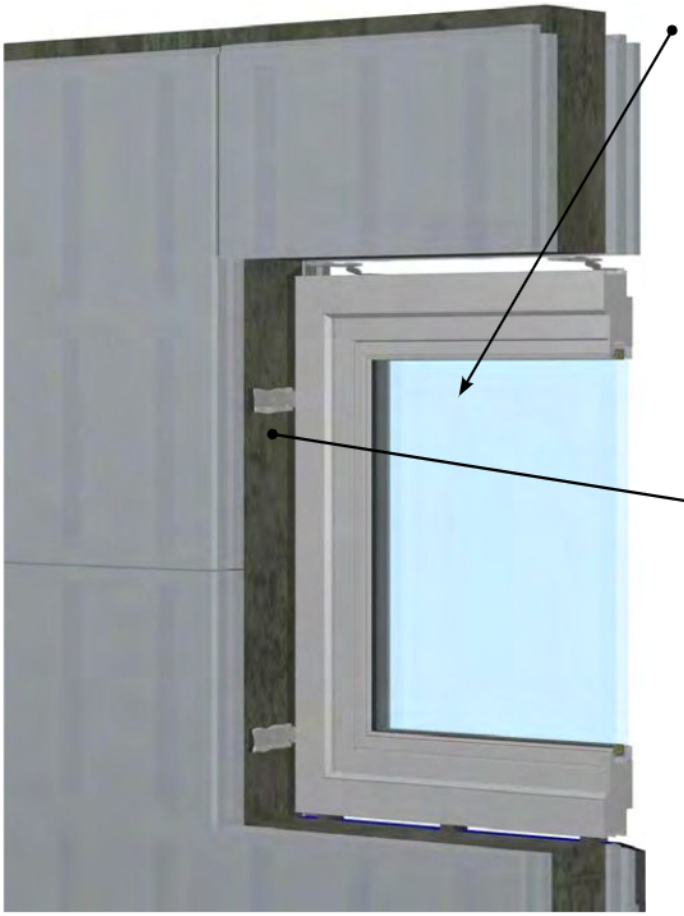


Construction Note:

Prepare EPS surface in accordance with the SAM manufacturers' application instructions.

Step 5c: Install treated wood shims onto the sill. If wood furring is not used, an alternate method of drainage the window sub-sill is required. The corners must be left open for drainage.





Step 6c: Install the NAFS conforming window using corrosion-resistant fasteners in accordance with the manufacturers' instructions. Embed the window clips in compatible sealant during installation.

FLAT INSULATING CONCRETE FORM WALLS (ICF)

Window - Direct to Concrete

Step 7c: Install closed cell polyethylene backer rod between the window and the rough framing at the interior head, jamb, and sill gaps.

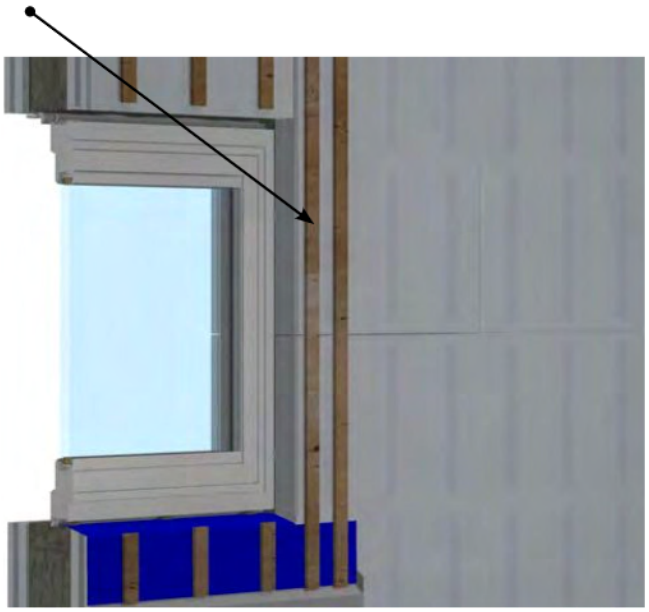
Construction Notes:

The airtight detail is achieved in this assembly by sealing direct to concrete. Careful positioning of the backer rod and sealant is required.

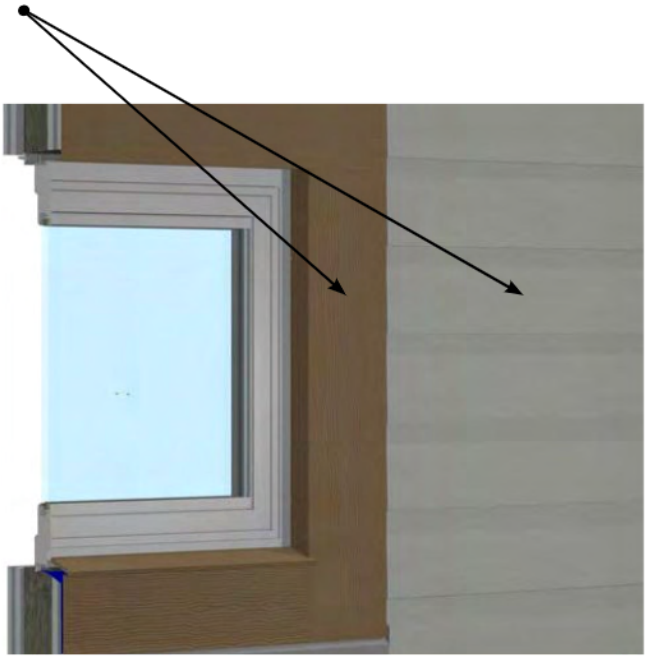
Also, concrete should be primed (if required) in accordance with the sealant manufacturer's instructions.

Step 8c: Apply a compatible sealant around the entire interior perimeter of the window to complete the 'rod and caulk' technique. This seal is the required continuation of the second plane of protection as well as the continuation of the air barrier into the window assembly.

Step 9c: Install treated wood strips to furr out the trim and allow for drainage of incidental moisture via the sub sill flashing (if a capillary break is not installed behind the cladding).



Step 10c: Install trim and cladding to wall surrounding the window using corrosion-resistant fasteners.

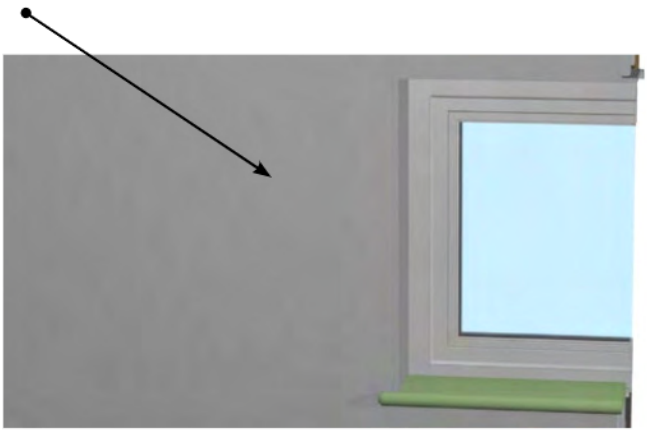


Step 11c: Apply compatible sealant to the transitions between the window, trim, cladding and end dams.

Best Practice Note:

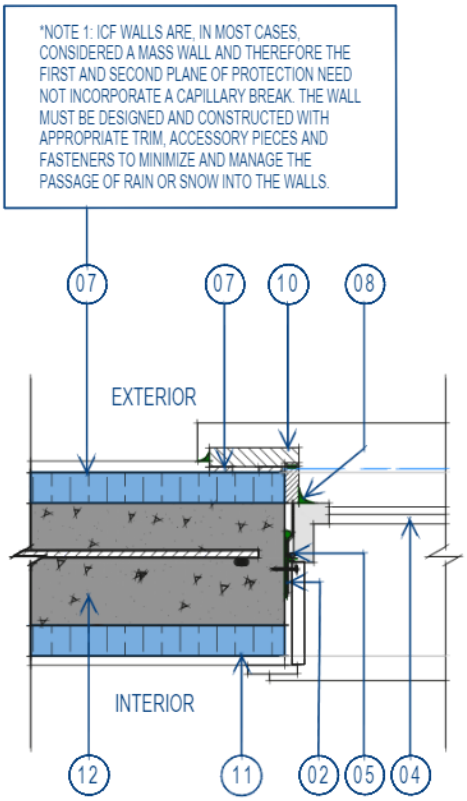
Advantages of this installation include the ability to replace the windows with the simple removal of the surrounding window trim.

Step 12c: Install drywall to the walls and the returns (or alternate mill work) into the window jambs and head.

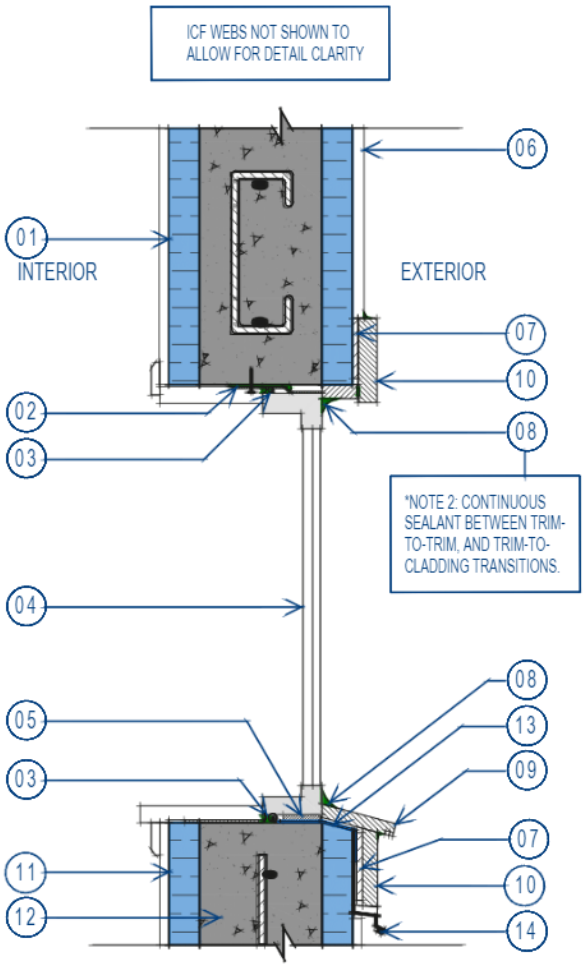


FLAT INSULATING CONCRETE FORM WALLS (ICF)

Window - Direct to Concrete



PLAN VIEW



SECTION VIEW

NOT TO SCALE

LEGEND

01. ICF LINTEL
02. WINDOW FASTENING CLIPS EMBEDDED IN SEALANT
03. CLOSED CELL POLYETHYLENE BACKER ROD & SEALANT
04. NAFS CONFORMING WINDOW W/ FASTENERS SPECIFIED BY MANUF
05. SHIMS
06. EXTERIOR CLADDING
07. TREATED FURRING STRIPS (OR CODE COMPLIANT DRAINAGE MAT) IF DESIRED - SEE NOTE 1
08. COMPATIBLE SEALANT - SEE *NOTE 2
09. SLOPED BTM SILL (6 TO 15 DEGREES)
10. EXTERIOR TRIM
11. ICF FORMS
12. CONCRETE (ICF WEBS NOT SHOWN) & FORMING BUCKS REMOVED
13. SELF-ADHERING MEMBRANE
14. PRE-FINISHED METAL FLASHING W/ 25mm END DAMS

FLAT INSULATING CONCRETE FORM WALLS (ICF) — DETAIL 3.6.04-M3

WINDOWS - METHOD 3 - DIRECT TO CONCRETE

FOR ILLUSTRATION PURPOSES ONLY - NOT FOR CONSTRUCTION

METHOD 4: HYBRID BUCK WITH FLANGED WINDOW

This method uses a half-recessed wood buck that is left in place following pouring of concrete. The airtight detail is carried directly from the flanged window to a self-adhering membrane.

Construction Note:

ICF walls are, in most cases, considered a mass wall and therefore the first and second plane of protection need not incorporate a capillary break. The wall must be designed and constructed with appropriate trim, accessory pieces and fasteners to minimize and manage the passage of rain or snow into the walls. The exception to this is in the case of a masonary veneer cladding where a cavity is required.

Step 1d: Install the hybrid window buck flush with the interior ICF form and overlapping the exterior form to allow for a nailing surface for flanged window installation.

Step 2d: Ensure adequate space is provided between the rough framing and the window to accommodate sealants between the window and the rough opening, and to facilitate drainage of the sub-sill region.

Construction Note:

Install a self-adhering expandable polyurethane gasket to the interior head and jambs of the buck just prior to installation.

Best Practice Note:

The installation of a sloped sub-sill in the rough framing can be constructed to improve drainage of the sub-sill region created under the window to the exterior.

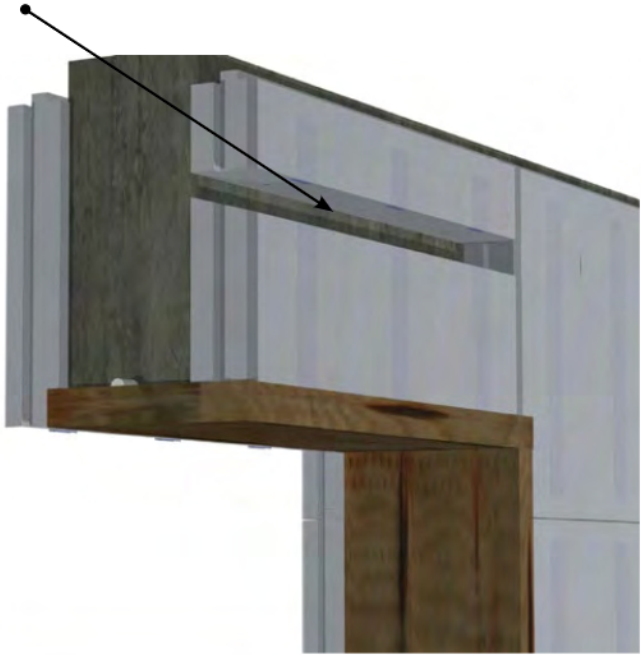
With or without a slope, the installation of a waterproof membrane on the sub-sill framing intercepts all rain and snow that gets past the first plane of protection (in this case, the window and the joint between the window and the cladding).

Where there is a capillary break behind the cladding, the membrane on the sub-sill can discharge into the cavity which then drains to the exterior at the next cross cavity flashing. Windows installed in a wall assembly where no capillary break exists behind the cladding must incorporate an exteriorly draining window sill or other means of dissipating moisture from the sub-sill area to the exterior. Refer to Section 2.0, for sub-sill moisture drainage options.

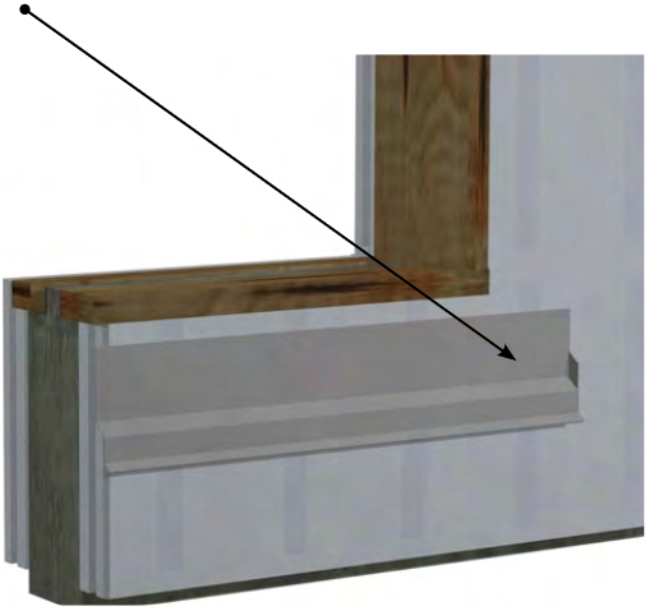
FLAT INSULATING CONCRETE FORM WALLS (ICF)

Window - Hybrid Buck with Flange Window

Step 3d: Cut a 15 degree reglet into the EPS above the window opening, to allow the head flashing from the window to be sealed directly to the concrete core.



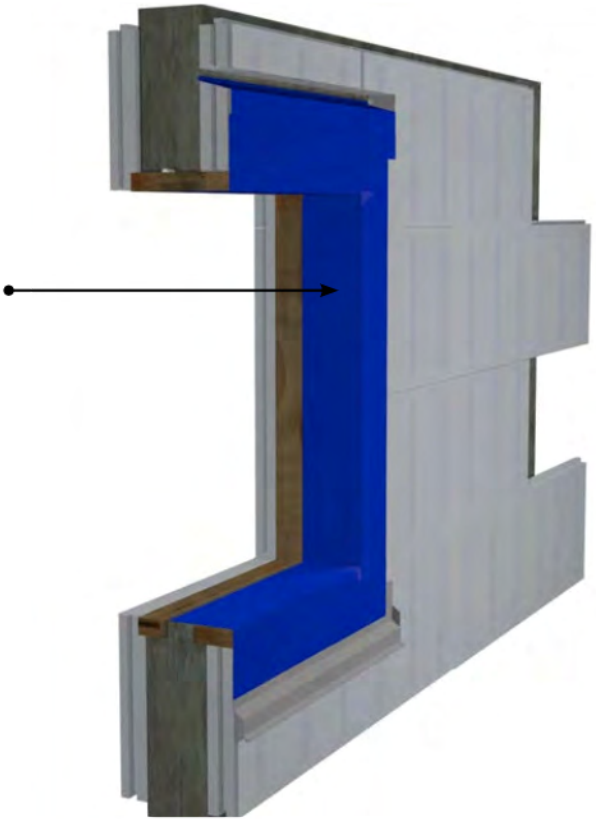
Step 4d: Install a pre-finished metal flashing with minimum 25 mm end dams below the window opening for exterior drainage of the sub-sill (if a capillary break is not installed behind the cladding).



Best Practice Note:

Extend the reglet 150 mm (or to the edges of the trim) beyond the rough opening.

Step 5d: Install SAM (Self-Adhering Membrane) opening wrap in overlapping shingle-fashion, starting with the sill. The SAM should be continuous from the interior of the rough opening to a minimum of 250 mm onto the exterior face of the ICF forms. (See next page for installation sequence.)

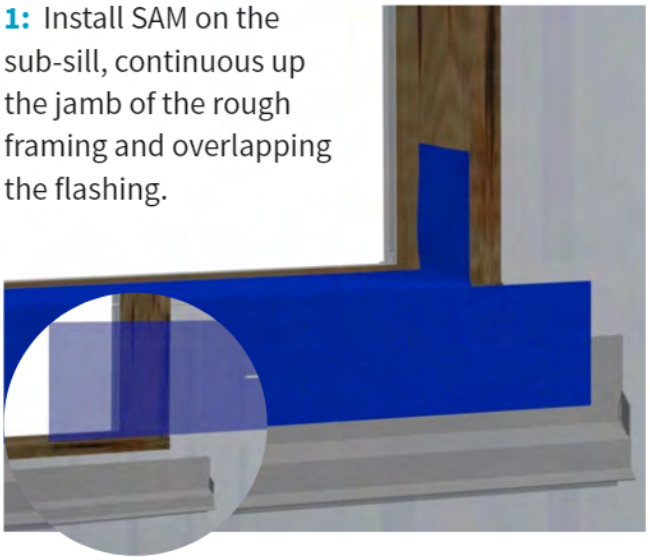


Construction Note:

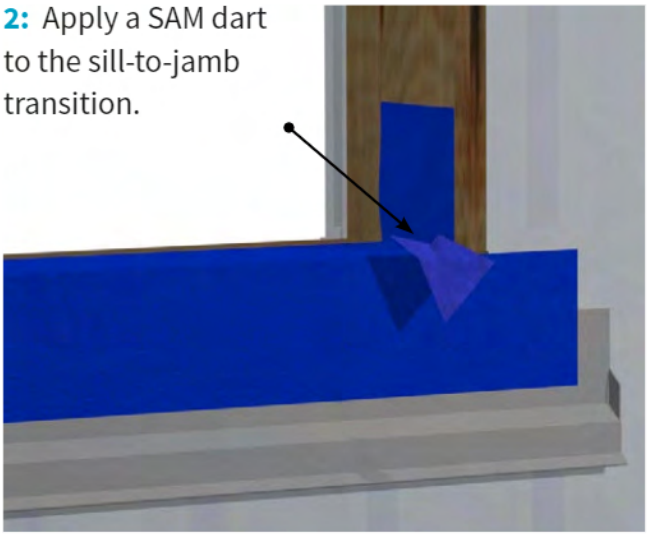
Prepare EPS surface in accordance with the SAM manufacturers' application instructions.

Steps For Self-Adhering Membrane (SAM) Wrap of an ICF Window Opening

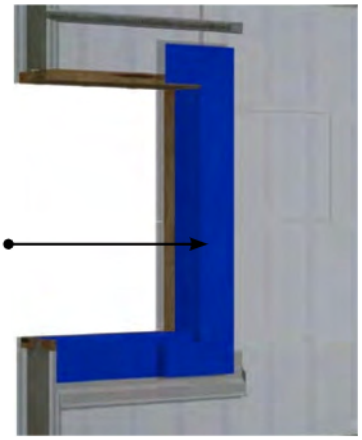
1: Install SAM on the sub-sill, continuous up the jamb of the rough framing and overlapping the flashing.

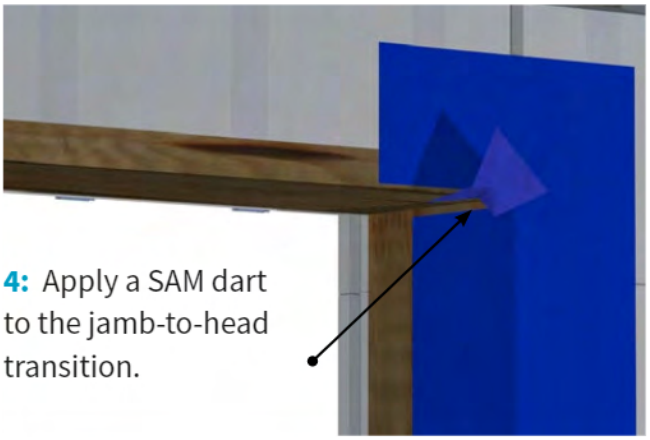


2: Apply a SAM dart to the sill-to-jamb transition.

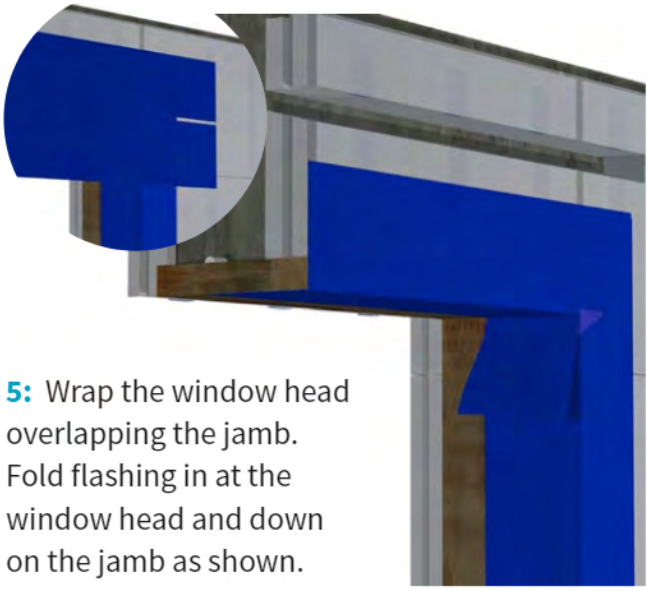


3: Back wrap SAM into the jamb, overlapping the sill flash upturn and 200 mm above the window head.

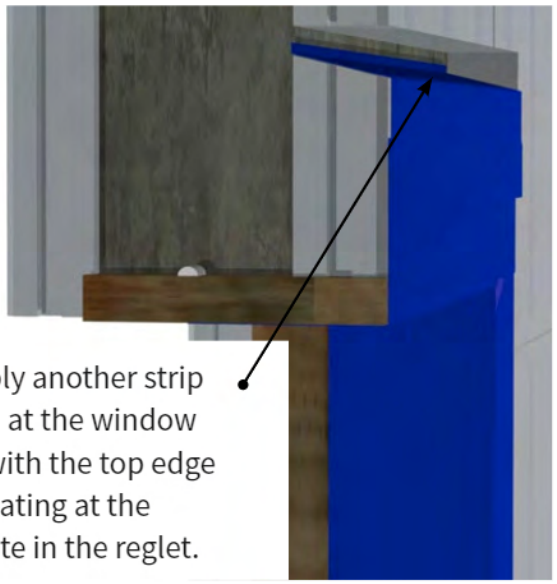




4: Apply a SAM dart to the jamb-to-head transition.



5: Wrap the window head overlapping the jamb. Fold flashing in at the window head and down on the jamb as shown.



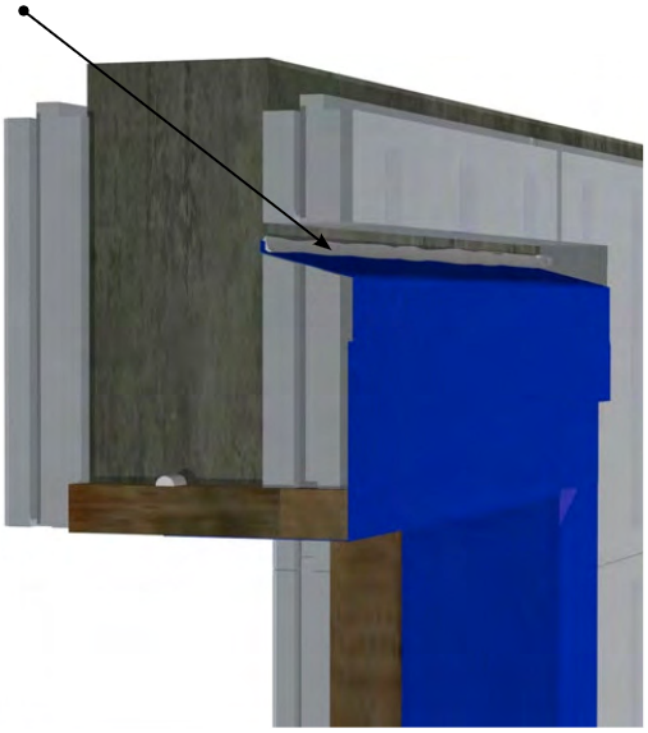
6: Apply another strip of SAM at the window head with the top edge terminating at the concrete in the reglet.

FLAT INSULATING CONCRETE FORM WALLS (ICF)

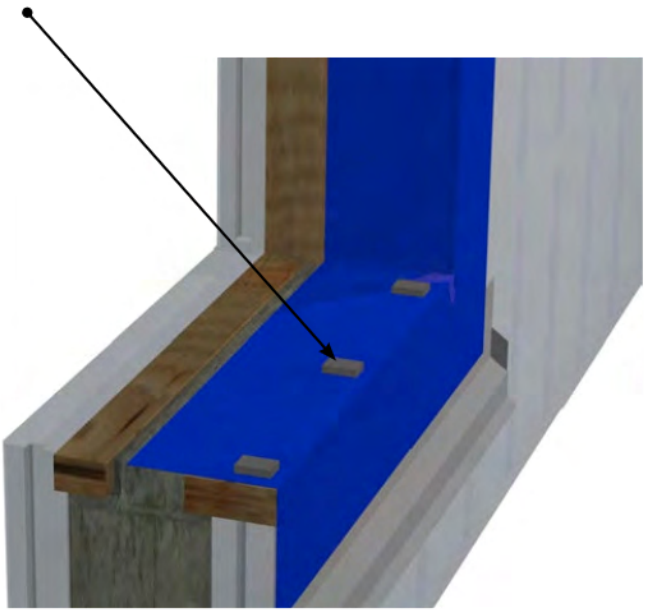
Window - Hybrid Buck with Flange Window

Step 6d: Confirm proper lapping of the self-adhering membrane at all seams.

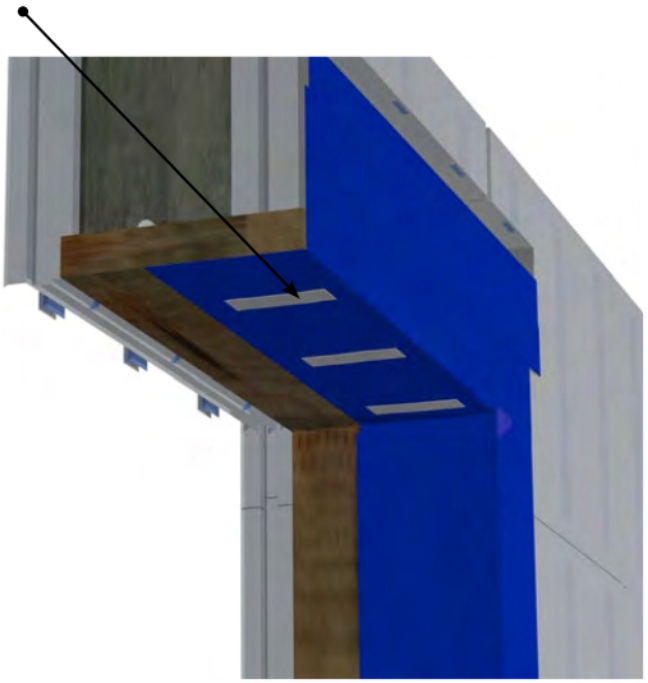
Step 7d: The SAM is terminated at the concrete and sealed to the core with a mastic sealant.



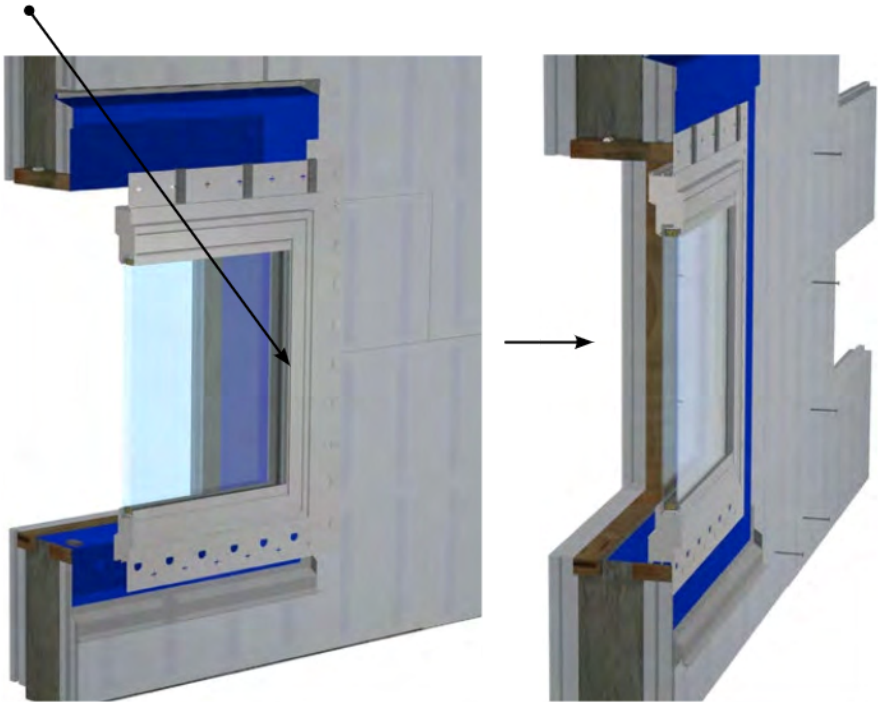
Step 8d: Install treated wood strapping and shims onto the sill. If wood furring is not used, an alternate method of draining the window sub-sill is required. The corners must be left open for drainage.



Step 9d: Install compatible sealant at the window head where window clips will be installed to allow embedding of the clips.



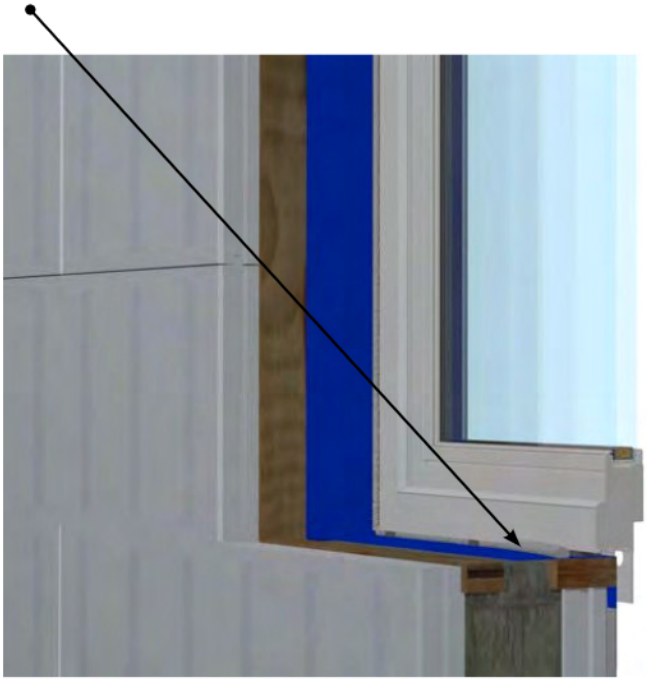
Step 10d: Install the NAFS conforming window using corrosion-resistant fasteners in accordance with the manufacturers' instructions. Embed the window clips in sealant.



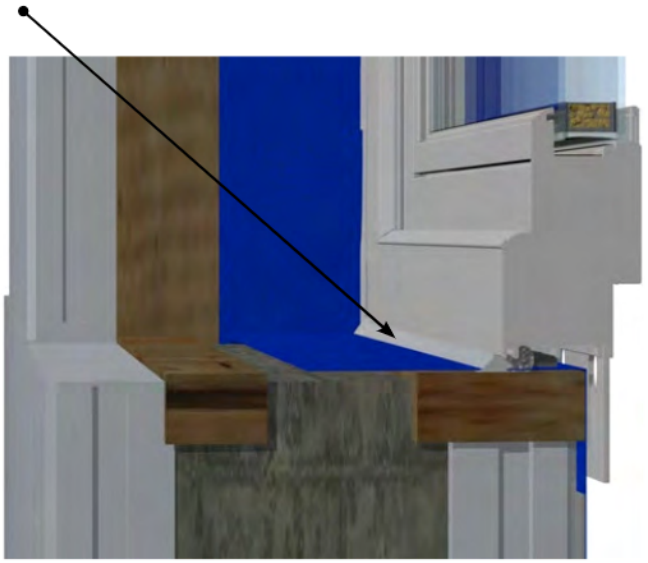
Best Practice Note:

If the sub-sill window flange does not allow for ready drainage of the sub-sill, it may be necessary to cut or drill drainage channels. It is important to confirm that this modification does not affect the manufacturer's warranty.

Step 11d: Install closed cell polyethylene backer rod between the window and the rough framing at the interior head, jamb, and sill gaps.



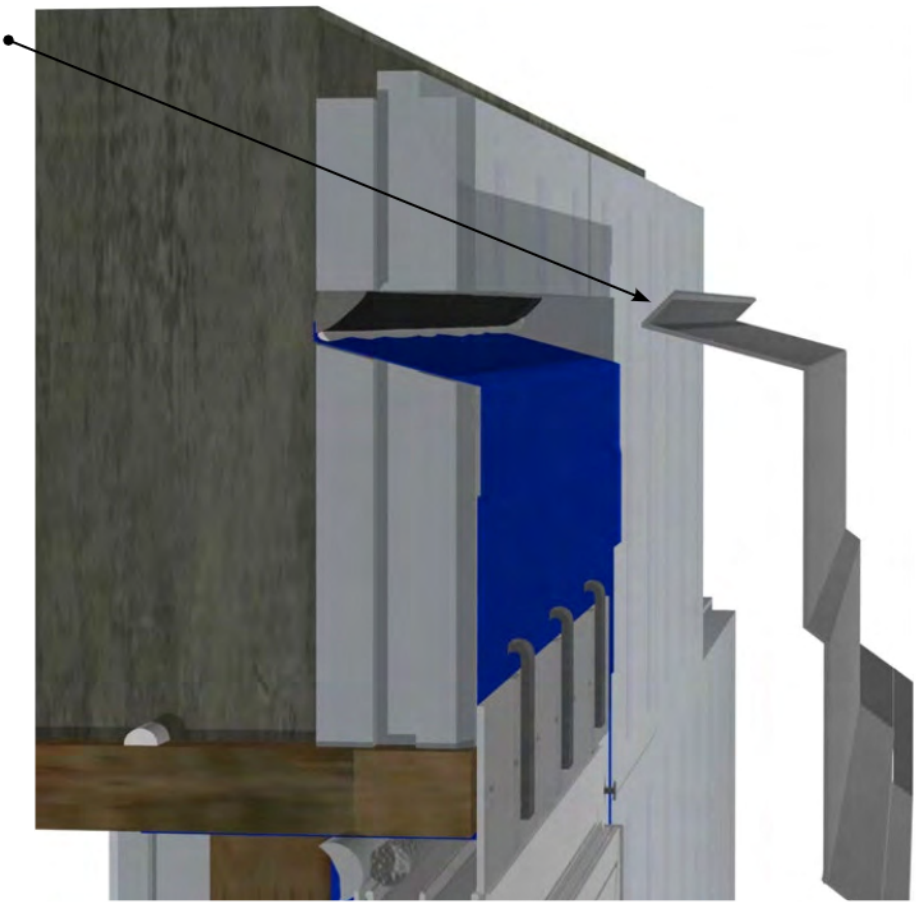
Step 12d: Apply a compatible sealant around the entire interior perimeter of the window to complete the 'rod and caulk' technique. This seal is the required continuation of the second plane of protection as well as the continuation of the air barrier into the window assembly.



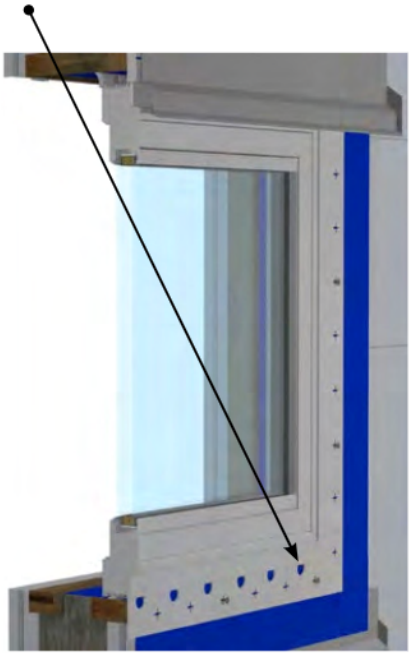
FLAT INSULATING CONCRETE FORM WALLS (ICF)

Window - Hybrid Buck with Flange Window

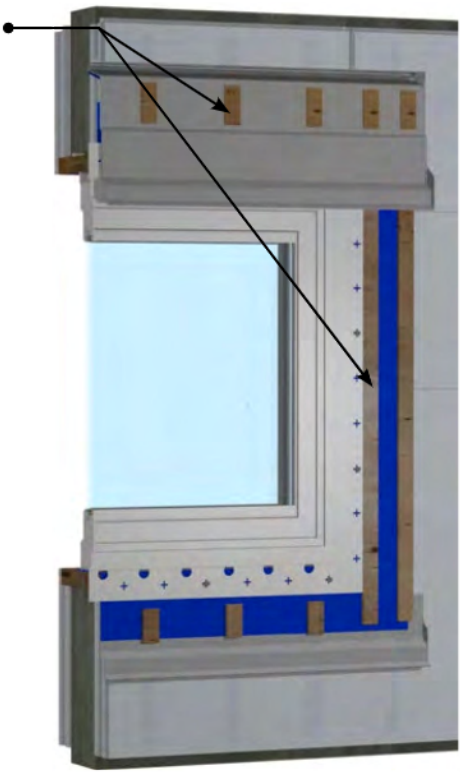
Step 13d: Install the head flashing with spring clip and minimum 25 mm end dams.



Step 14d: Verify clear drainage path of the sub-sill.



Step 15d: Install treated wood strips to furr out the trim and provide a drainage path into the head flashing and sub-sill flashing (if a capillary break is not installed behind the cladding). Do not align furring strips under drainage channels.

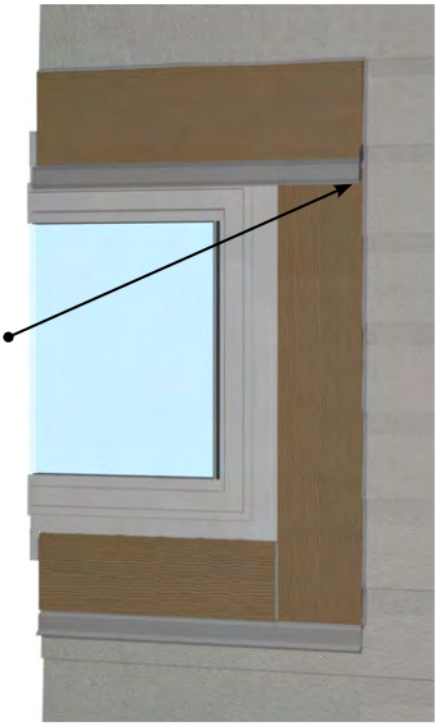


Best Practice Note:

Advantages of this installation include the ability to replace the window with the simple removal of the surrounding window trim.

Step 16d: Install trim using corrosion-resistant fasteners.

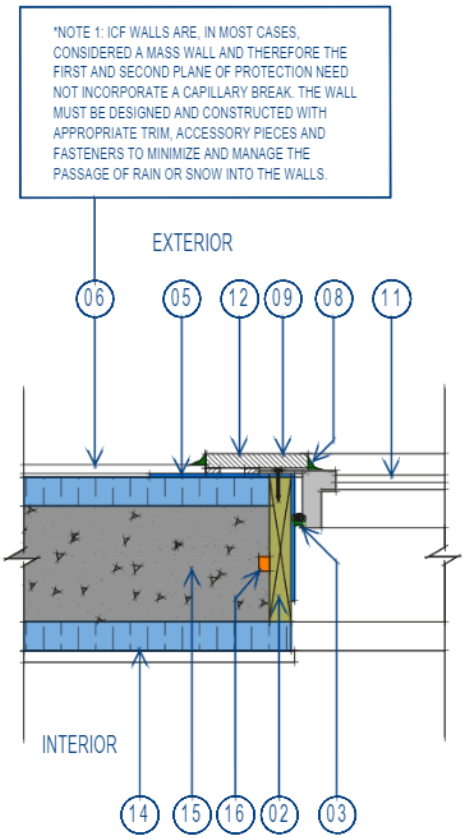
Step 17d: Install cladding using corrosion-resistant fasteners.



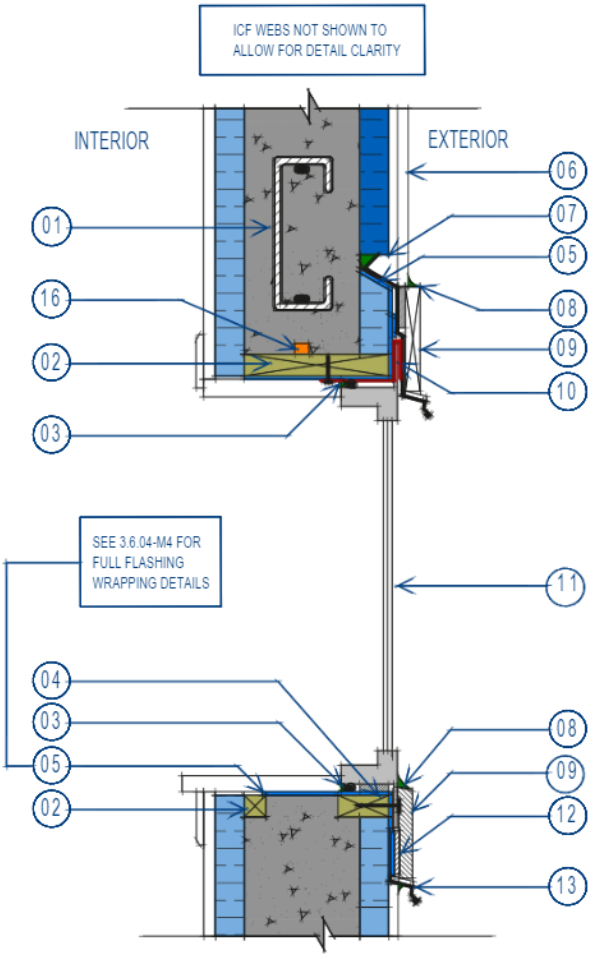
Step 19d: Apply compatible sealant to the transitions between the window, trim, cladding and end dams.

FLAT INSULATING CONCRETE FORM WALLS (ICF)

Window - Hybrid Buck with Flange Window



PLAN VIEW



SECTION VIEW

NOT TO SCALE

LEGEND

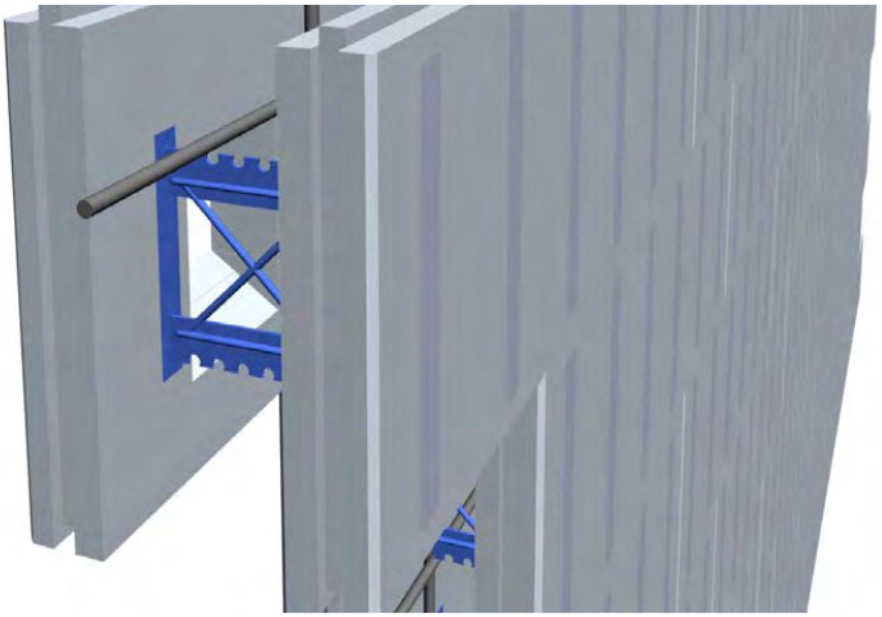
01. ICF LINTEL
02. TREATED WOODEN BUCK
03. CLOSED CELL POLYETHYLENE BACKER ROD & COMPATIBLE SEALANT
04. SHIMS
05. SELF-ADHERING MEMBRANE
06. EXTERIOR CLADDING (AND TREATED FURRING STRIPS IF DESIRED) SEE NOTE 1
07. SELF-ADHERED MEMBRANE FOLDED INTO REGLET TERMINATED AT CONCRETE W/ COMPATIBLE MASTIC SEALANT
08. COMPATIBLE SEALANT
09. EXTERIOR TRIM
10. WINDOW CLIPS
11. NAFS CONFORMING WINDOW W/ FASTENERS SPECIFIED BY MANUF
12. VERTICAL FURRING STRIPS AROUND WINDOW PERIMETER
13. PRE-FINISHED METAL FLASHING WITH MIN. 25mm END DAMS
14. ICF FORMS
15. CONCRETE (ICF WEBS NOT SHOWN FOR CLARITY)
16. POLYURETHANE SEAL CONTINUOUS AT HEAD & JAMBS

FLAT INSULATING CONCRETE FORM WALLS (ICF) — DETAIL 3.6.04-M4

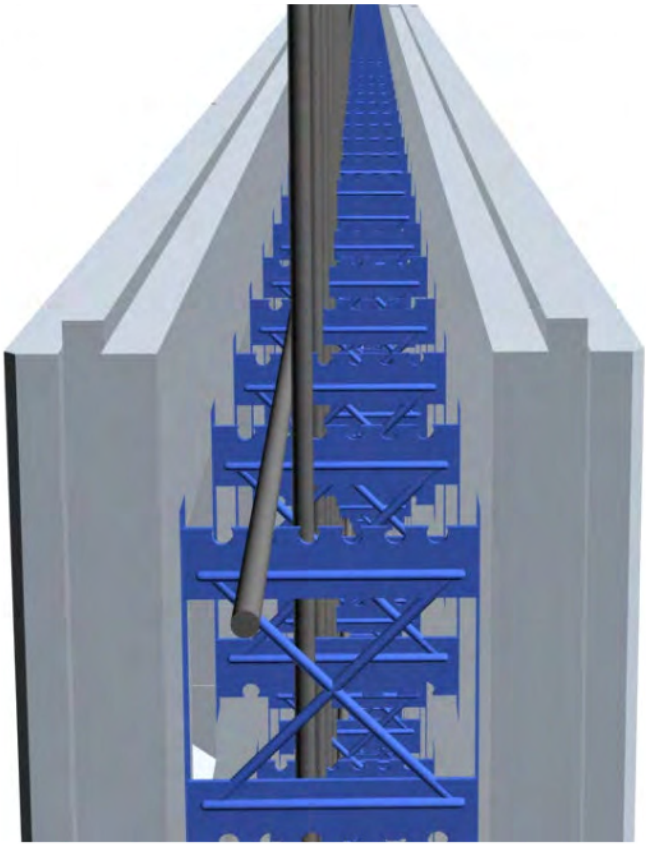
WINDOWS - METHOD 4 - HYBRID WOOD BUCK W/ FLANGED WINDOW

FOR ILLUSTRATION PURPOSES ONLY - NOT FOR CONSTRUCTION

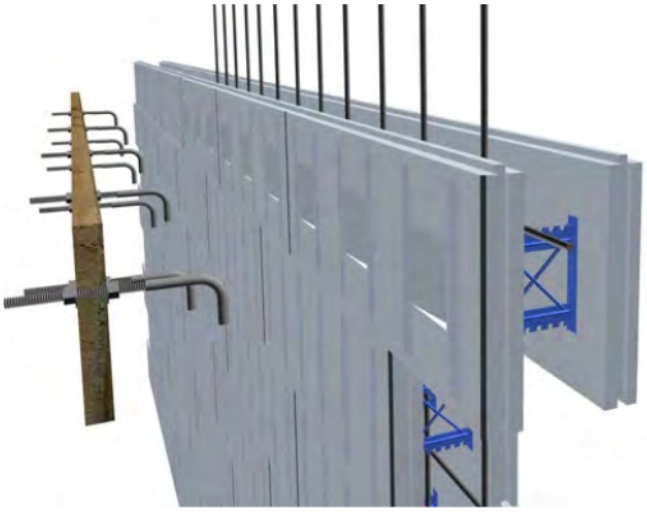
Step 1: Cut out ICF to the side the ledger is to be installed. The bottom shelf of the cut through the EPS foam should slope inward into the form at approximately 45 degrees.



Step 2: Place horizontal and vertical reinforcing steel as per manufacturer's or engineer's specifications.



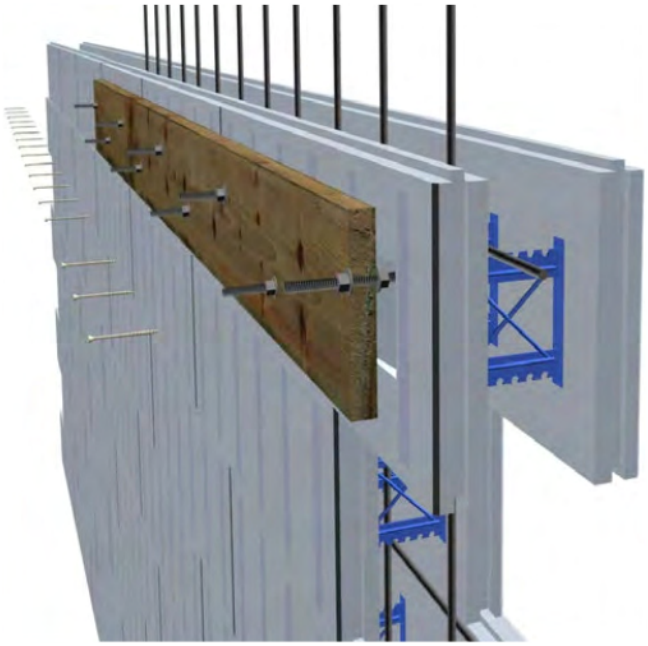
Step 3: Pre-assemble ledger with fasteners. Install foundation anchors through holes drilled into treated wood ledger. Hold the anchor bolts in place with corrosion-resistant washers and nuts.

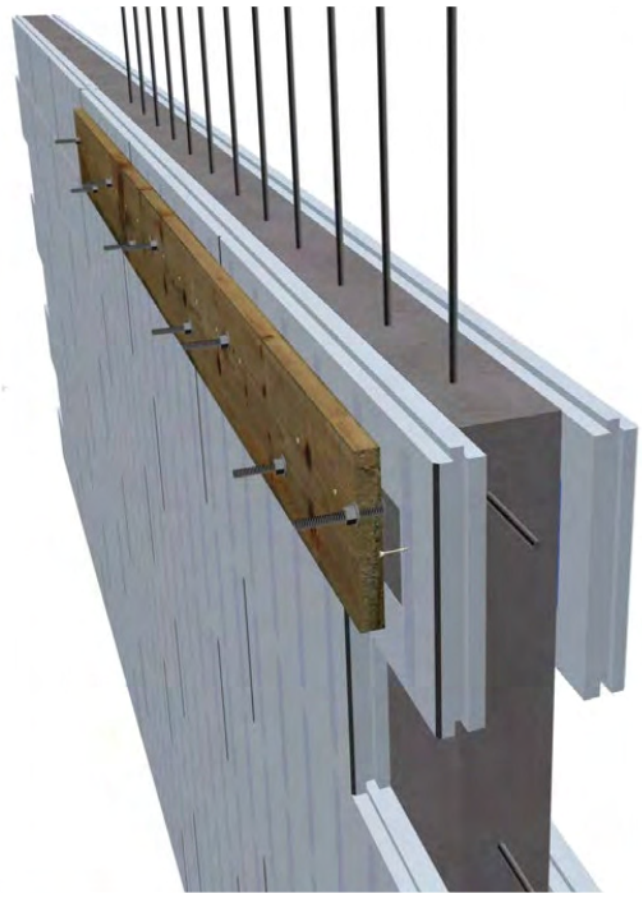


Best Practice Note:

Stagger the anchor bolts between the top and bottom 1/3 of ledger to resist overturn. Ensure cut-outs are sufficient to accomodate anchor bolt lay-out and orientation.

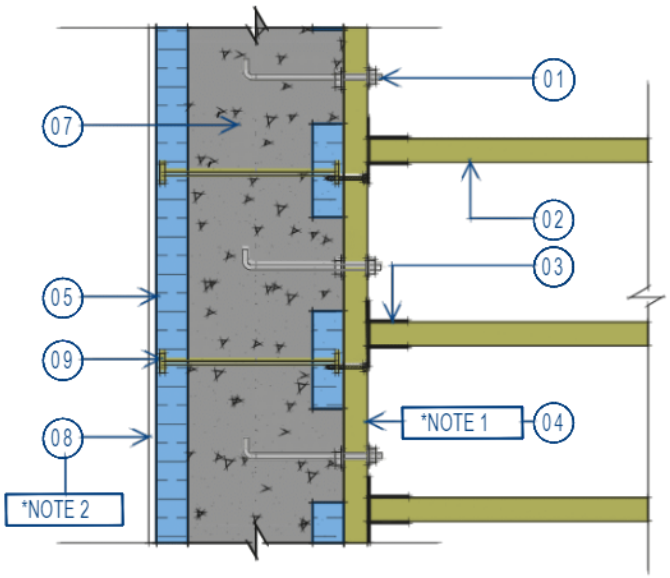
Step 4: Insert the ledger assembly into the form openings and hold the ledger in place with screws driven through the ledger and into the ICF web fastening strips. The anchor bolts are to be embedded in the wall to a depth of no less than 100 mm.



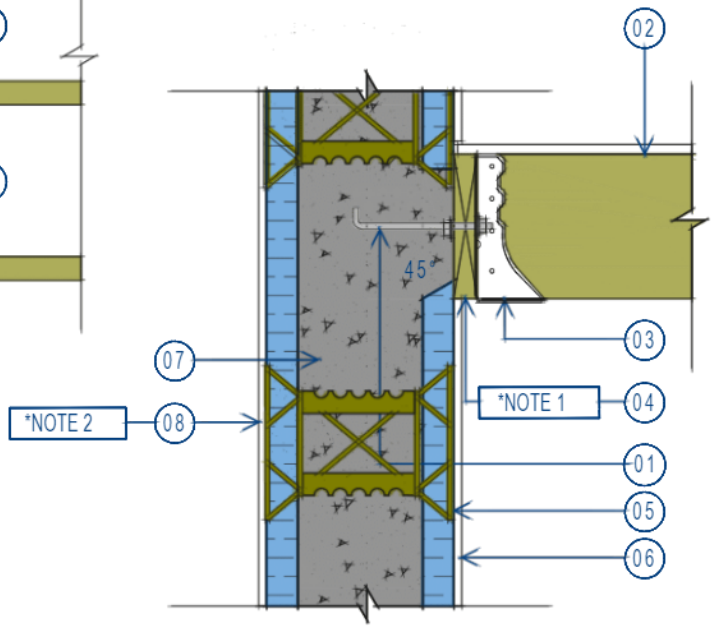


Step 5: Place and consolidate the concrete into the forms. Use pencil vibrators, target mix, and super plasticizers to ensure good flow and consolidation around the anchors, and into the cut-outs.

Step 6: After suitable cure time, continue with the installation of joist hangers and complete joist construction.



PLAN VIEW



SECTION VIEW

NOT TO SCALE

LEGEND

01. ANCHOR BOLTS - AS PER CODE
02. JOISTS - AS PER CODE
03. JOIST HANGERS - AS PER CODE
04. TREATED LEDGER BOARD - SEE NOTE 1
05. ICF FORM
06. GYPSUM WALL BOARD
07. CONCRETE CORE
08. EXTERIOR CLADDING (W/ TREATED FURRING STRIPS IF DESIRED) - SEE NOTE 2
09. ICF WEBS

*NOTE 1: LEDGERS ARE PRE-ASSEMBLED W/ ANCHOR BOLTS & HARDWARE & FASTENED TO THE ICF WEB FLANGES W/ SCREWS PRIOR TO CONCRETE POUR.

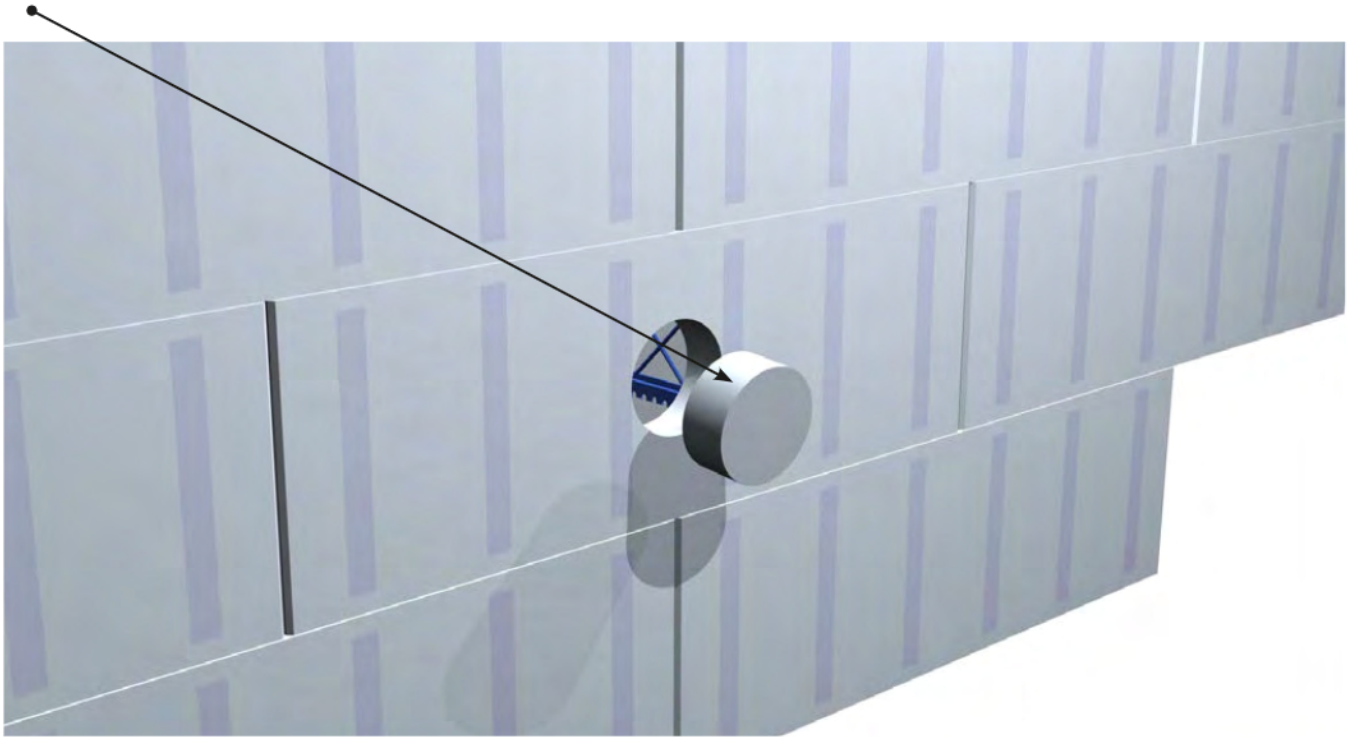
*NOTE 2: ICF WALLS ARE, IN MOST CASES, CONSIDERED A MASS WALL AND THEREFORE THE FIRST AND SECOND PLANE OF PROTECTION NEED NOT INCORPORATE A CAPILLARY BREAK. THE WALL MUST BE DESIGNED AND CONSTRUCTED WITH APPROPRIATE TRIM, ACCESSORY PIECES AND FASTENERS TO MINIMIZE AND MANAGE THE PASSAGE OF RAIN OR SNOW INTO THE WALLS.

FLAT INSULATING CONCRETE FORM WALLS(ICF) DETAIL 3.6.05

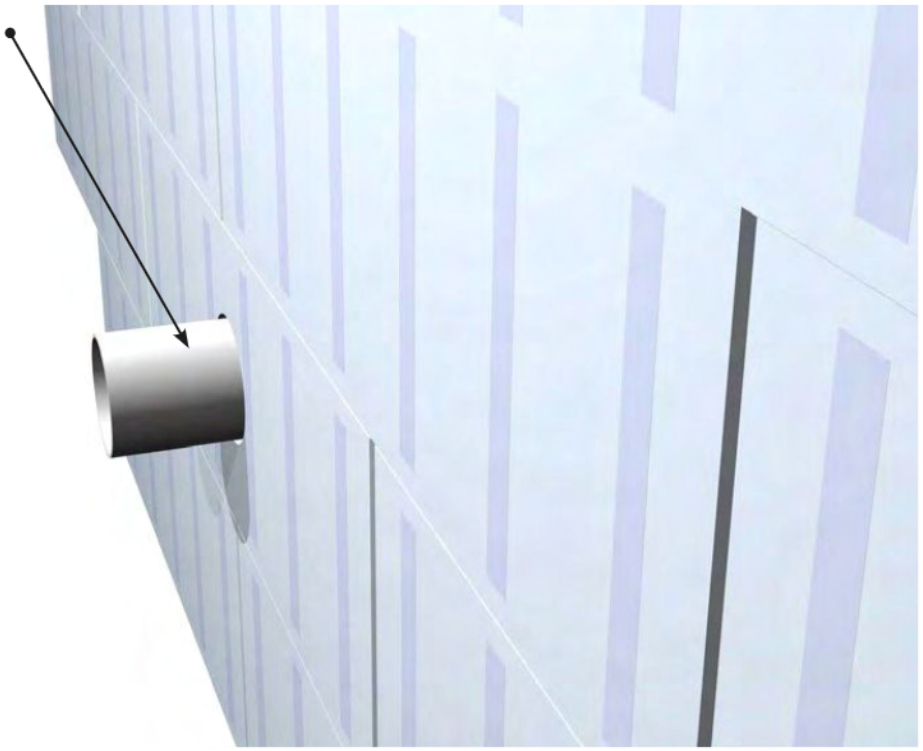
LEDGER CONNECTION

FOR ILLUSTRATION PURPOSES ONLY - NOT FOR CONSTRUCTION

Step 1: Cut an opening through the interior and exterior ICF panel at the location of the penetration. Openings can be formed with hot-wire tools or a hole-saw. Ensure that the openings are aligned so that the penetrating object does not back-slope into the building and that the penetrating object will not interfere with any required reinforcing.



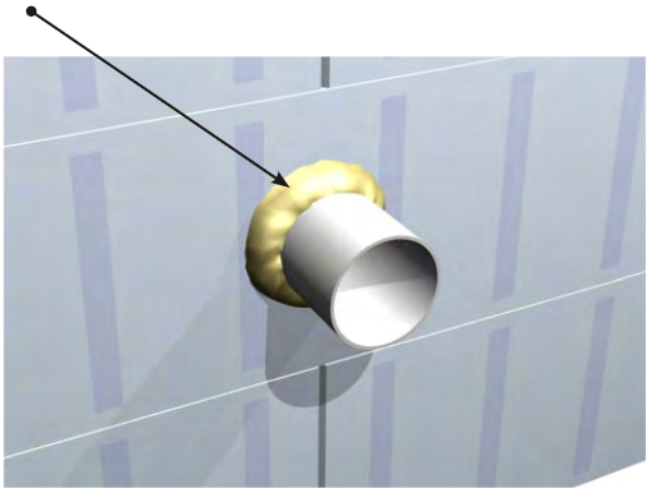
Step 2: Insert penetrating object through the openings.



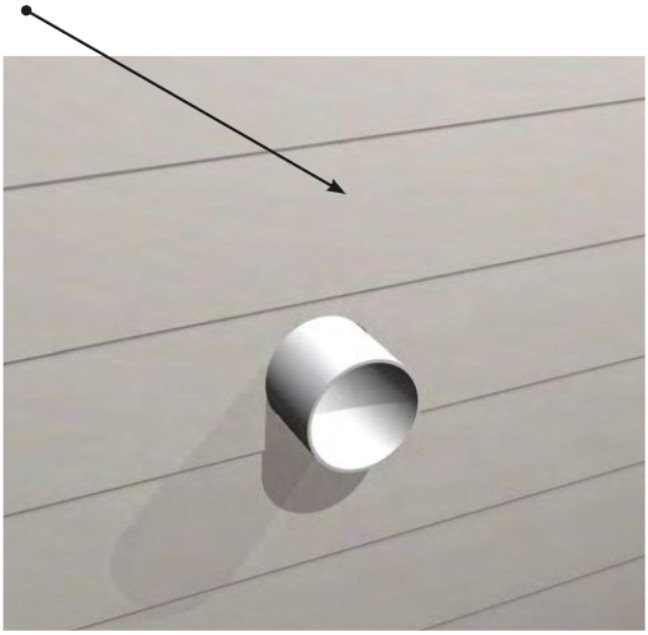
Construction Note:

If the penetrating object might be damaged by the concrete placement, a durable sleeve escutcheon should be inserted first for protection.

Step 3: Use a compatible, expanding spray foam to secure the penetrating object in place (interior and exterior) and to prevent concrete fromm leaking at the penetration during placement.

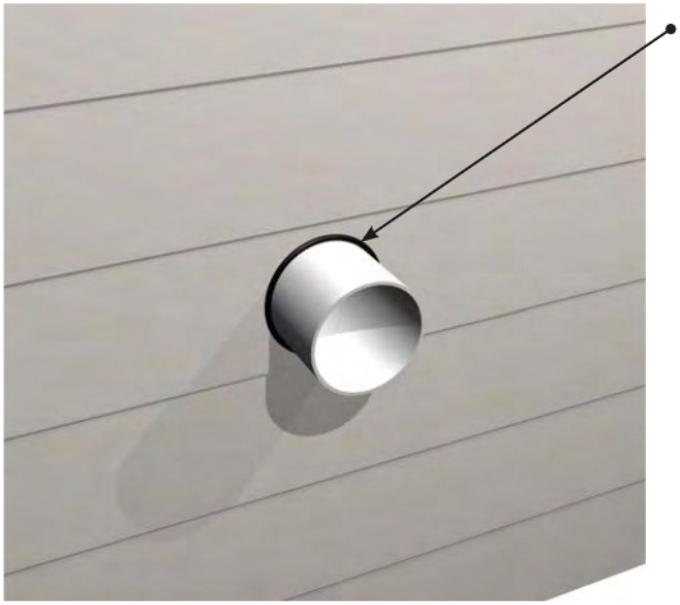


Step 4: Install the selected cladding using corrosion-resistant fasteners.



Best Practice Note:

Expanding spray foam is typical in ICF construction. It provides a field-formed seal at gaps which may occur at penetrations and footing transitions. It is important that the foam is approved by the ICF manufacturer. Care should be taken when using spray foam that excess foam does not interfere with the installation of interior or exterior finishes.

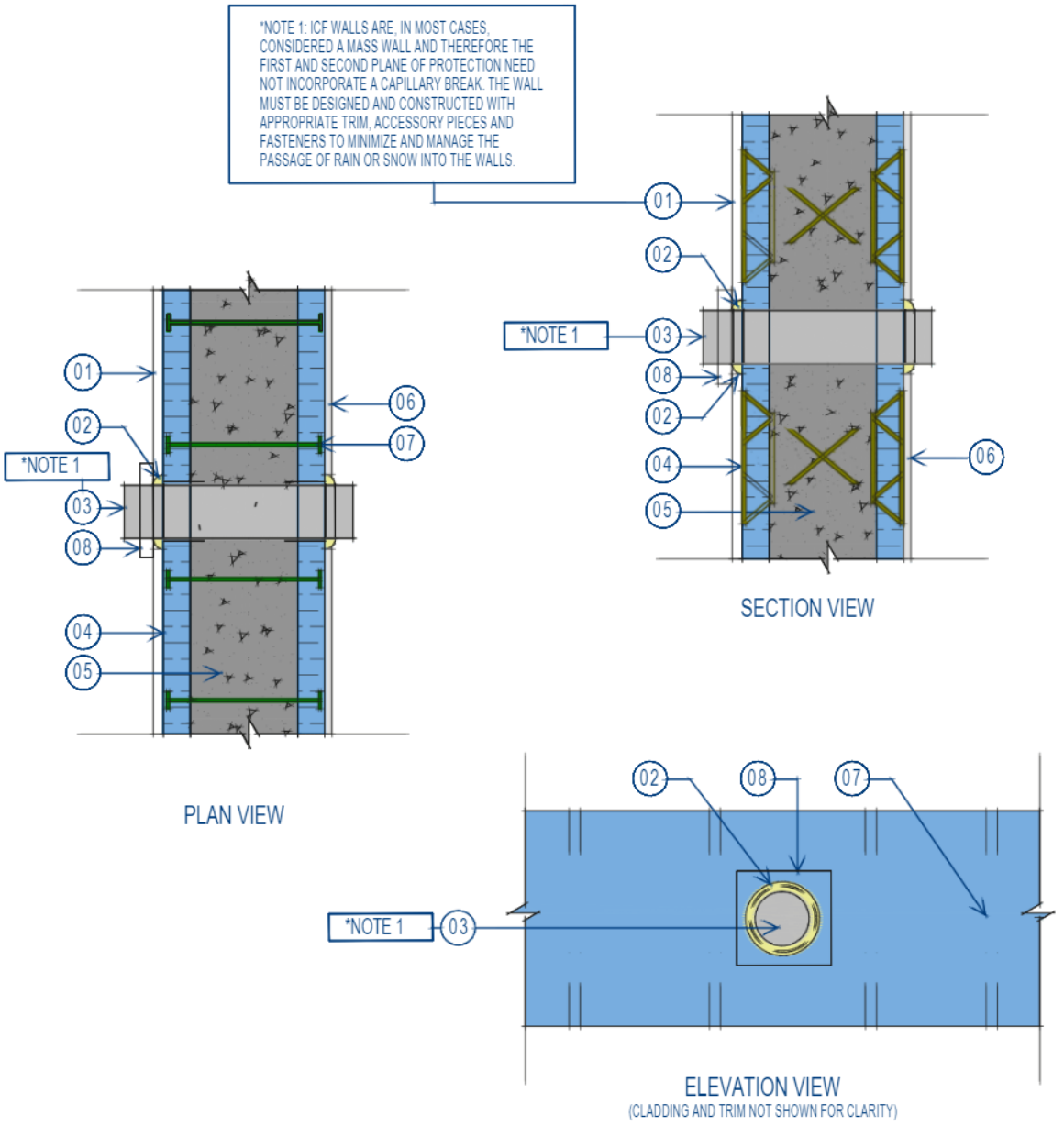


Step 5: Install sealant around the penetration to complete the first plane of protection.

Best Practice Note:

Some mechanical ducting and pipe features may include trim and escutcheon kits for weather resistance and cosmetic finish. These features may require modification of the spray foam at the penetration locations.

An alternative is to custom-mill a trim piece and seal the channel around the trim with polystyrene foam backer rod and sealant.



LEGEND

01. EXTERIOR CLADDING
02. SPRAY FOAM SEAL
03. PENETRATING PIPE - SEE NOTE 1
04. ICF FORM
05. CONCRETE CORE
06. GYPSUM WALL BOARD
07. ICF WEBS
08. APPROPRIATE TRIM / ACCESSORY OR FLASHING FOR PROTECTION FROM PRECIPITATION

NOTE 1: - IF THE OBJECT MIGHT BE DAMAGED BY CONCRETE PLACEMENT, A DURABLE SLEEVE SHOULD BE INSERTED FIRST FOR PROTECTION.

FLAT INSULATING CONCRETE FORM WALLS (ICF) DETAIL 3.6.06
PENETRATIONS

FOR ILLUSTRATION PURPOSES ONLY - NOT FOR CONSTRUCTION