

WeatherSmart® Air Barrier Installation Guide



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The intent of this document is to provide a guide for the installation of WeatherSmart as both a Weather Resistive Barrier (W.R.B.) and an Air Barrier Material (A.B.M.) in residential and light commercial construction. It is not meant to be a comprehensive procedure for an Air Barrier System. The purpose is to identify critical interfaces that need to be addressed when a membrane material is installed on residential and light commercial walls as one element of an Air Barrier System.

REFERENCE INFORMATION

DEFINITIONS:

AIR BARRIER ACCESSORY – products designated to maintain air tightness between air barrier materials, air barrier assemblies and air barrier components, to fasten them to the structure of the building, or both (e.g., sealants, tapes, backer rods, transition membranes, fasteners, strapping, primers).

AIR BARRIER ASSEMBLY – the combination of air barrier materials and air barrier accessories that are designated and designed within the environmental separator to act as a continuous barrier to the movement of air through the environmental separator.

AIR BARRIER COMPONENT – pre-manufactured elements such as windows, doors and service elements that are installed in the environmental separator.

AIR BARRIER MATERIAL (A.B.M.) – a building material that is designed and constructed to provide the primary resistance to airflow through an air barrier assembly.

AIR BARRIER MEMBRANE – Polymeric housewraps that qualify, liquid applied barriers or self adhesive air barriers.

AIR BARRIER SYSTEM – the combination of air barrier assemblies and air barrier components, connected by air barrier accessories that are designed to provide a continuous barrier to the movement of air through an environmental separator.

SELF-ADHESIVE MEMBRANE (S.A.M.) – also known as self-adhesive flashing such as FortiFlash®, FortiFlash® 40 or FortiFlash® Butyl.

WEATHER RESISTIVE BARRIER (W.R.B.) – A barrier material that protects the wall system from water damage – while allowing moisture vapor to escape. Some W.R.B.s also can act as an air barrier.

GENERAL INSTALLATION INSTRUCTIONS

Air barrier membranes, such as WeatherSmart Housewrap/Air Barrier, are only one element of a total air barrier system. As such, the placement of the air barrier membrane in the building envelope must be determined prior to construction to insure that it is installed in the proper position and integrated properly to all air barrier components and accessories in the envelope.

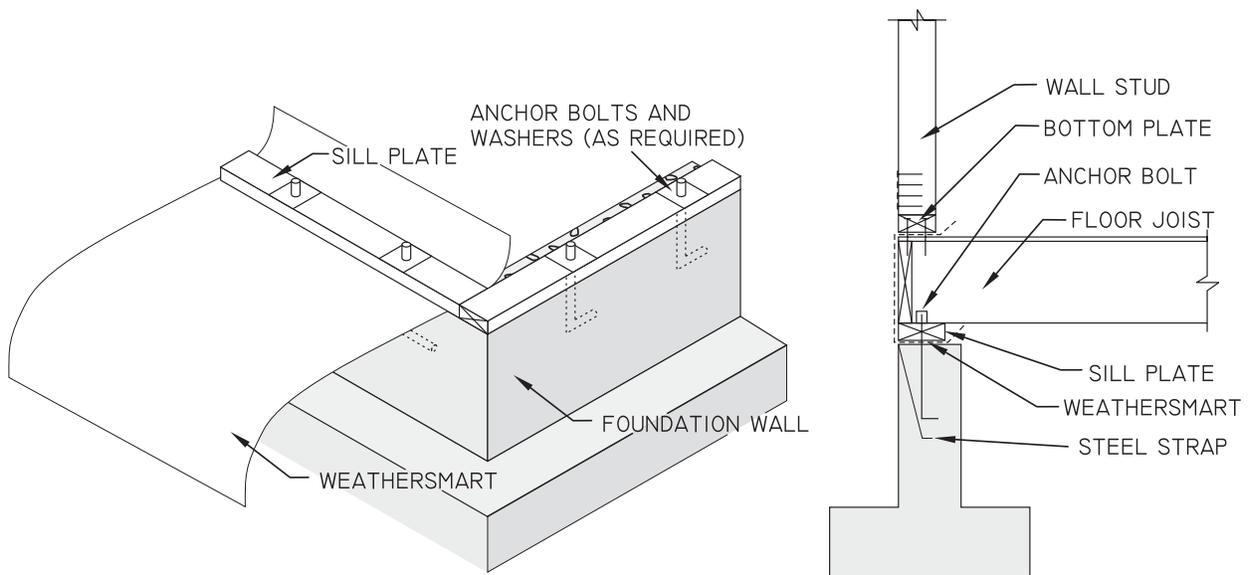
Because the various elements of the air barrier system are typically installed by multiple trades it is essential that the contractor take the lead in coordinating all installation activities. A pre-construction meeting with all parties involved is highly critical. The contractor can then ensure that the intent of constructing the building enclosure with a continuous air barrier system to control air leakage into, or out of, the conditioned space is achieved.

To be most effective, air barriers should be installed in an integrated sequence during wall construction BEFORE windows and doors are placed and with particular attention to sequencing with step flashings and kick out flashings. If the air barrier membrane is installed AFTER windows and doors are placed, the perimeter of all openings must be air sealed – while still providing drainage for windows and doors, especially at sill locations. To seal use Fortifiber® Sheathing Tape, FortiFlash, FortiFlash 40, Fortiflash Butyl, or a bead of Moistop® Sealant under the air barrier membrane.

AIR BARRIER MEMBRANE INSTALLATION SEQUENCE

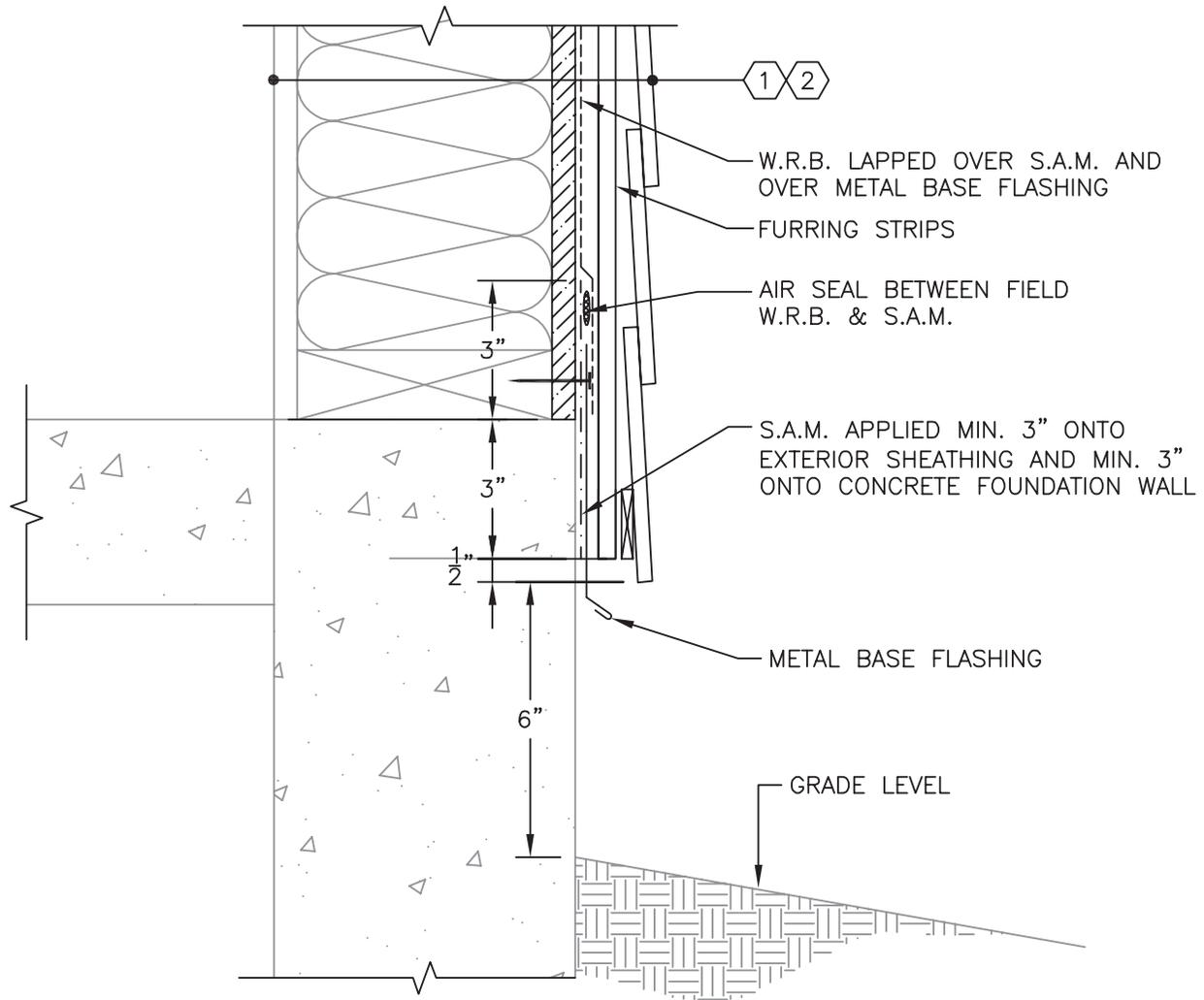
STEP 1 - FOUNDATION / FLOOR RIM JOIST CONNECTION

This connection must be sealed as part of the air barrier system by either wrapping the bottom of the wall, sealing the membrane to the foundation or other method. For the wrapping method install WeatherSmart on the sill gasket and foundation wall using 20" (508 mm) wide rolls. Attach WeatherSmart onto the inside wall to hold it in place. Build the floor structure and wrap WeatherSmart up and around the floor rim joist as shown below. WeatherSmart must be shingled over flashing and properly taped to allow drainage of any liquid water that penetrates the cladding. The architect is responsible for detailing how both air barrier and drainage performance are to occur simultaneously. (See Drawing 1 below)



Drawing 1

For the sealing method, appropriate self-adhesive membrane (S.A.M.), mastic or sealant can be used to seal the bottom edge of the air barrier membrane directly to the foundation. The S.A.M., mastic or sealant adheres to the bottom edge of the membrane, bridges the critical sheathing/rim joist/foundation interface and adheres to the concrete below the rim joist forming an air tight seal. Typically a primer will be needed on the concrete surface for S.A.M. to attain proper adhesion. Mastics and sealants may not need a primer if designed for application to concrete. Follow the manufacturer's instructions in either case. (See Drawing 2 on following page)



Drawing 2

STEP 2 - START THE FIRST COURSE

As with all building wraps, start wrapping at the bottom of one end of the wall overlapping the corner by a minimum of 12" (305 mm), place the membrane roll horizontally and roll out the first course evenly. To ensure proper shingling with the wrapped rim joist method, the bottom edge of the membrane should extend over the sill wrap by at least 6" (152 mm) and sealed using Fortifiber Sheathing Tape. When sealing to the foundation wall extend the membrane at least 2" (51 mm) below the sill plate and seal to the concrete with an appropriate S.A.M., sealant, or mastic. For slab on grade foundations extend the membrane to the bottom of the sill plate and seal it to the concrete with an appropriate below grade S.A.M., sealant, or mastic. For stucco exteriors, integrate the membrane with the weep screed to form a continuous air seal while maintaining proper drainage. The architect is responsible for detailing how both air barrier and drainage performance are to occur simultaneously.

AIR BARRIER MEMBRANE INSTALLATION SEQUENCE

STEP 3 – WRAP THE FIRST COURSE

Continue to wrap the perimeter of the building covering rough openings or pre-installed windows and doors. Overlap the starting point vertically by 6" (152 mm) to 12" (305 mm). Stud marks are printed on WeatherSmart at 8" (203 mm) intervals to aid in alignment with the studs. (See Step 5 – Attaching the Membrane)

STEP 4 – WRAP ADDITIONAL COURSES

To wrap a second course repeat step 2 with a horizontal overlap of at least 6" (152 mm) over the first course. To start using a new roll of WeatherSmart a vertical overlap of at least 6" (152 mm) is required. Repeat for additional courses using the 6" (152 mm) overlaps in both directions. To provide for proper water shedding, work from the bottom of the wall up, using the weatherboard methodology.

STEP 5 – ATTACHING THE MEMBRANE

As with all air barriers, WeatherSmart can be secured to the exterior sheathing by either of the following methods.

Method 1: Continuous furring strips installed vertically along stud lines to reduce the risk of failures.

Method 2: Cap-nails installed along stud lines with a nailing pattern sufficient to prevent damage to the membrane from wind during construction. Suggested spacing is 16" (406 mm) O.C. for normal wind loads and 8" (203 mm) O.C. for wind loads greater than 60 mph (97 kph). Additional cap-nails should be installed to support WeatherSmart bridging across any opening in the sheathing board.

Brick ties can be substituted for cap-nails in masonry veneer construction.

Note: Do not fasten closer than 9" (229 mm) at the head of a rough opening.

STEP 6 – INTEGRATION OF WINDOW AND DOOR FLASHING

As mentioned in Step 3, rough openings or pre-installed windows and doors are covered by the air barrier membrane during installation. The flashing must now be integrated into the Air Barrier System.

The following table is a guide to choosing the proper flashing installation method for various installation sequences and additional details needed for air barrier performance:

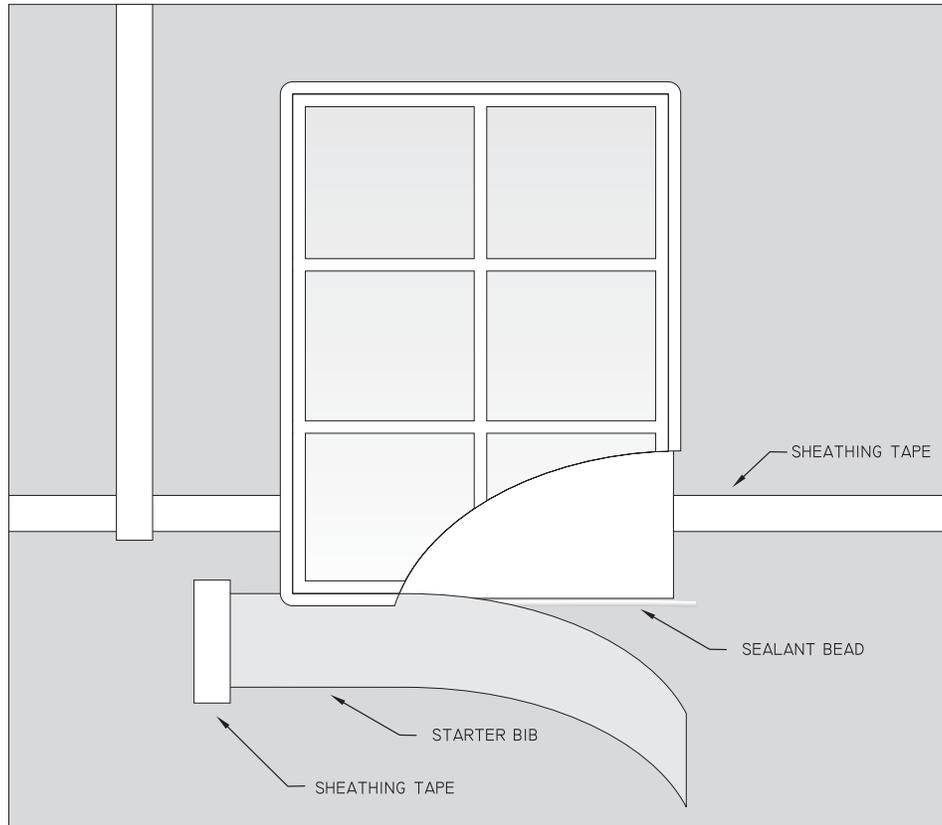
AIR BARRIER MEMBRANE INSTALLED BEFORE WINDOWS AND DOORS

Type of Window or Door	Recommended Flashing Type	Additional Details
Flanged	Self-Adhesive	<p><u>Non-Sill pan:</u> Apply a continuous bead of sealant to all flanges of the perimeter.</p> <p><u>For Sill pans:</u> Ensure air sealing at back dam and full perimeter with sill pans.</p>
Non-flanged/Brick Mold	Self-Adhesive - Head & Sill Mechanical or S.A.M. - Jambs	<p><u>Non-sill pan:</u> When a sill starter bib is used under S.A.M. apply a bead of sealant under the top edge to prevent air leakage. Apply a bead of sealant under all mechanically attached flashing at the perimeter of the rough opening.</p> <p><u>For sill pans:</u> Use sealant or S.A.M. to prevent air leakage under the sill pan. Ensure that air sealing is provided at the back dam and full perimeter, and that drainage is promoted at the front of the pan.</p>

AIR BARRIER MEMBRANE INSTALLED AFTER WINDOWS AND DOORS

Type of Window or Door	Recommended Flashing Type	Additional Details
Flanged	Self-Adhesive	<p>Tuck the air barrier membrane under the starter bib at the sill.</p> <ul style="list-style-type: none"> For mechanically attached bibs apply sealant in an inverted U pattern and tape at the jamb sides. <p>(See Drawing 3 on following page)</p> <ul style="list-style-type: none"> For a self-adhesive bib a split release liner is needed for a 2-step installation sequence. <p><u>For barrier flashing systems</u> apply sealant to the underside of the flange on the entire perimeter of the window.</p> <p><u>For sill pans</u> ensure that air sealing is provided at the back dam and full perimeter, and that drainage is allowed at the front.</p>
	Mechanical	
	Self Adhesive - Head & Sill Mechanical or S.A.M. - Jambs	
Non-flanged/Brick Mold	Self Adhesive - Head & Sill Mechanical or S.A.M. - Jambs	Apply an additional bead of sealant under the top edge of the starter bib.

AIR BARRIER MEMBRANE INSTALLATION SEQUENCE



Drawing 3

STEP 7 - TAPING OF SEAMS

All vertical and horizontal seams shall be taped with approved sheathing tape. Taping all vertical and horizontal seams is part of the requirement. Tape must be applied in weatherboard fashion, from bottom to top.

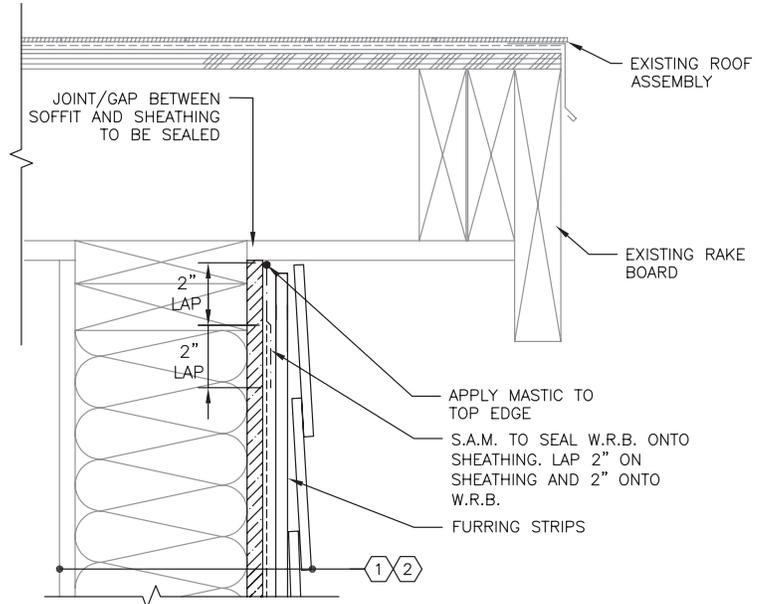
STEP 8 - INTEGRATING ADDITIONAL CONNECTIONS FOR CONTINUITY

Top of Wall Connection - Sloped Roof

This is the most common discontinuity in residential air barrier construction.

Option I: Seal at top plate. (Drawing 4)

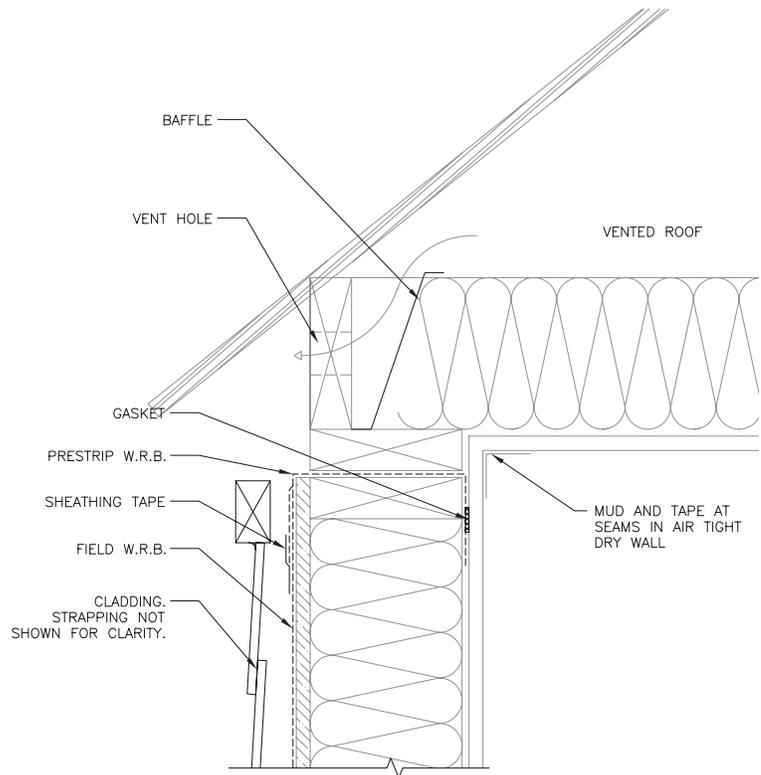
- A common practice is to seal the air barrier membrane to the exterior sheathing at the level of the top plate.
- Note location of the S.A.M. with a minimum of a 2" (51 mm) lap onto the membrane and the sheathing.
- Use mastic along the top edge of the self-adhesive flashing as added protection against water and air intrusion.



Drawing 4

Option II: Membrane overlap and seal to interior and wall membranes. (Drawing 5)

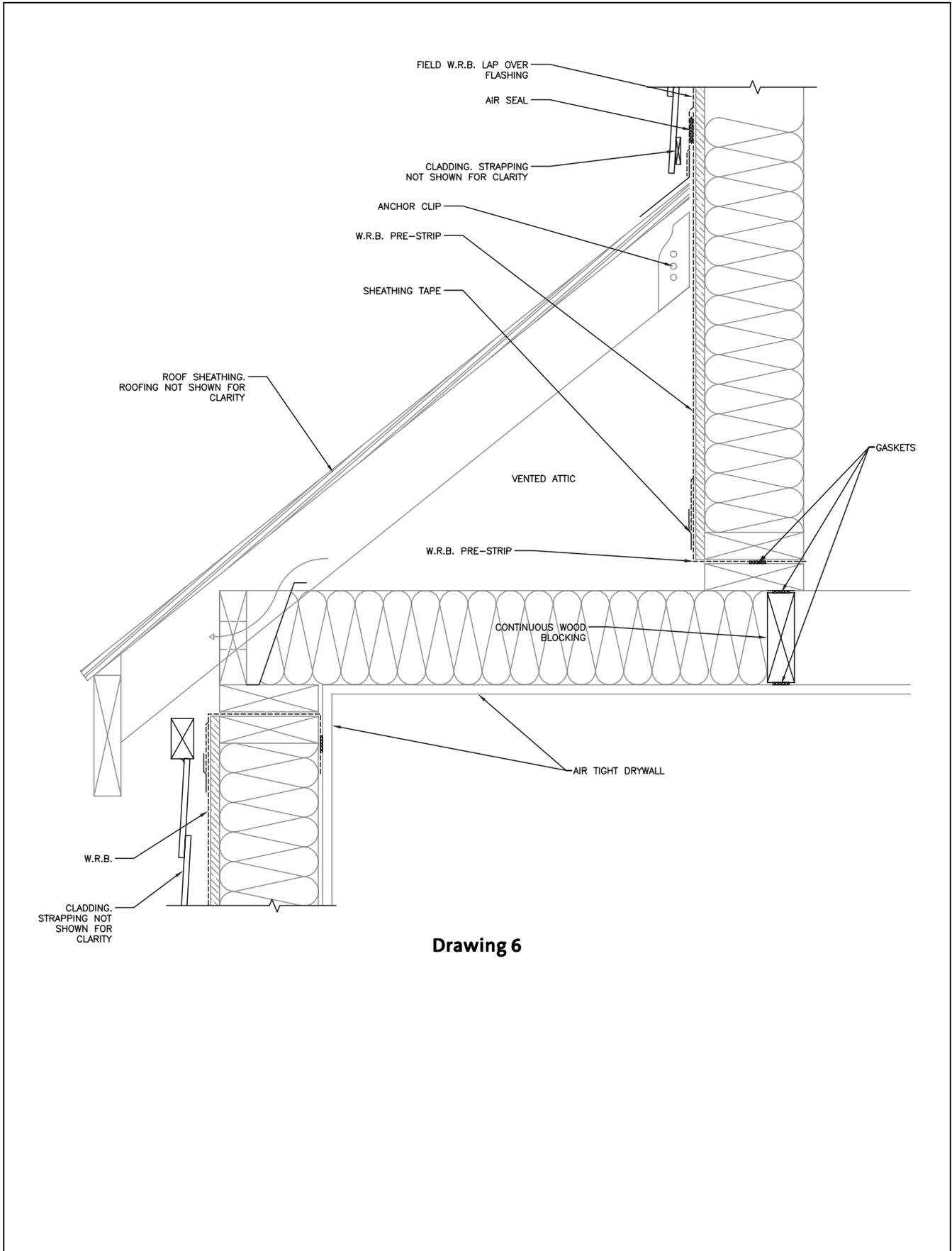
- To ensure continuity of the air barrier membrane, install WeatherSmart as shown in the drawing.
- Overlap the ceiling and wall air barrier membranes and seal with a continuous strip of sheathing tape or self-adhesive membrane.



Drawing 5

Option III: Vented attics – Integrate wall membrane to air tight drywall ceiling or air tight spray foam. (See Drawing 6 on following page)

AIR BARRIER MEMBRANE INSTALLATION SEQUENCE



Drawing 6

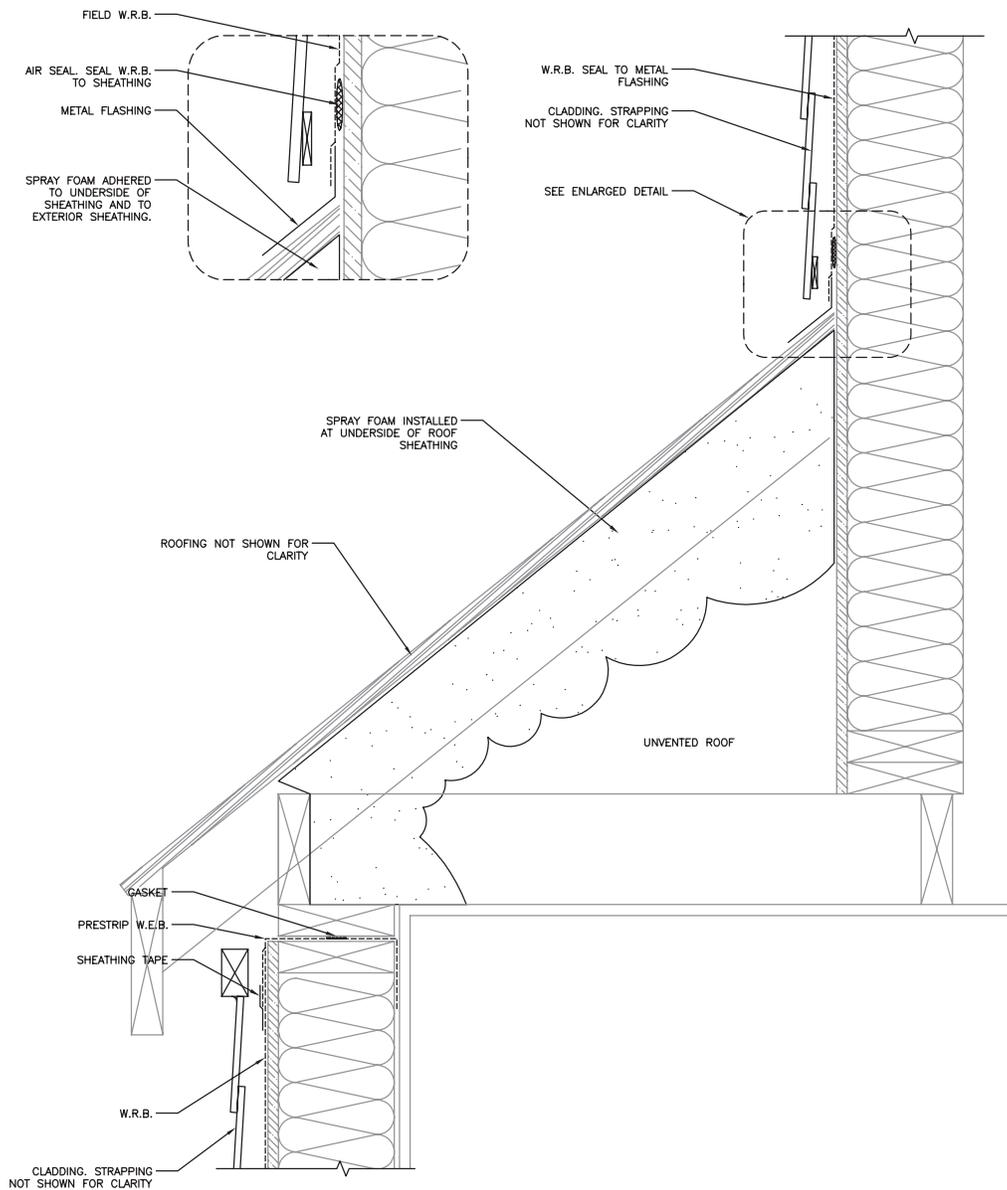
Knee-wall

Coordination of roof and knee-wall construction is important to ensure continuity of the air barrier.

Option I: Support and fasten WeatherSmart over lower floor ceiling area. Tape all seams.

Option II: Integrate with airtight drywall .

Option III: Integrate with spray foam. (Drawing 7)



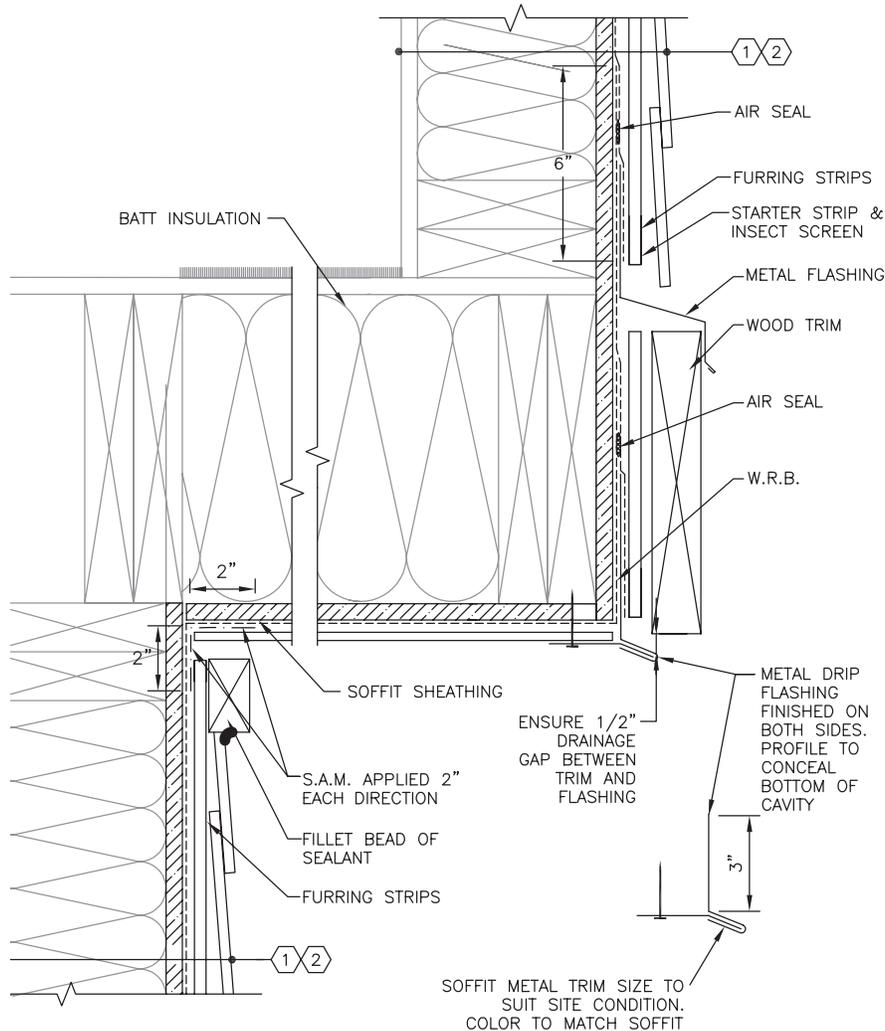
Drawing 7

Cantilever Floor (Drawing 8)

Wrap WeatherSmart under and up the cantilever floor and fold the WeatherSmart up the sides of the cantilever wall a minimum of 6" (150 mm). Tape all corners and seams. Use proper shingling by ensuring that the top layer of the air barrier goes over the bottom layer by a minimum of 6" (150 mm).

Properly insulate the floor joist cavities to provide airtightness. Recommendation is spray foam or rigid foam with edges sealed with spray foam or compatible sealant.

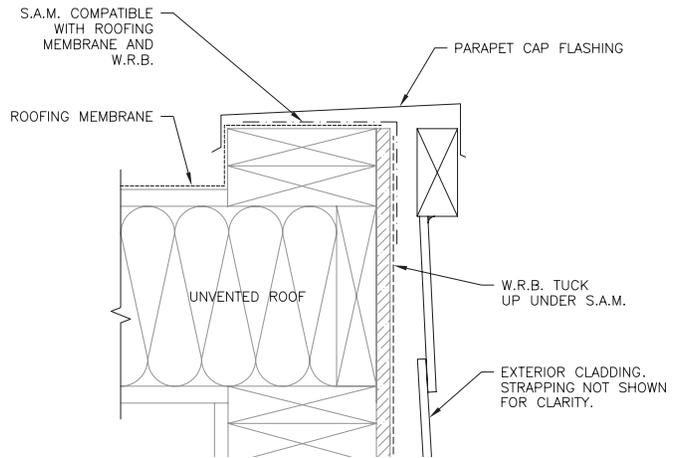
Note: Get the inside corner as tight as possible using a piece of lumber 1x4 (25 x 100 mm) or similar.



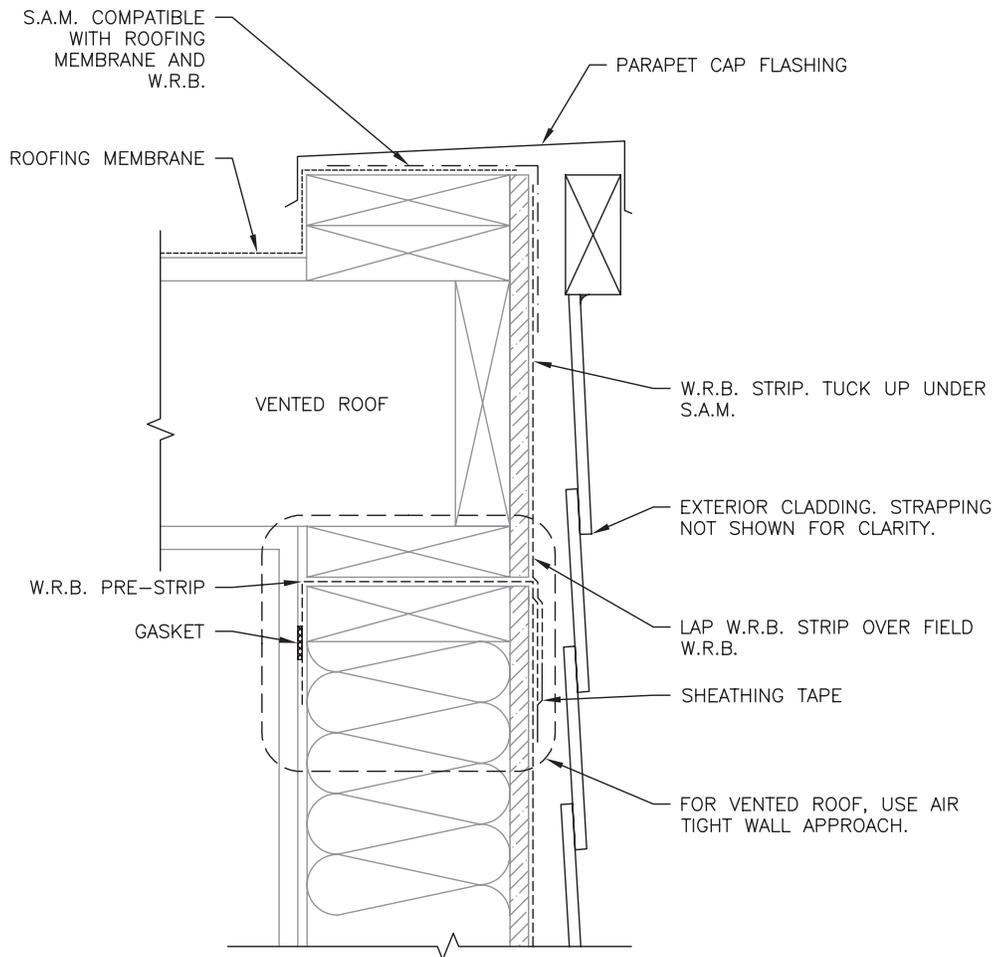
Drawing 8

Roof-Wall Interface - Low Slope (Drawing 9)

Lap WeatherSmart over all flashing at roof-wall interfaces and adhere WeatherSmart to the flashing with sheathing tape or one of Fortifiber's S.A.M. products. Ensure that the WeatherSmart and tape or flashing is protected by cladding.



To prevent creating a reversed lap at the parapet; where feasible, lap the roof membrane flashing over the W.R.B./A.B.M.



Drawing 9

AIR BARRIER MEMBRANE INSTALLATION SEQUENCE

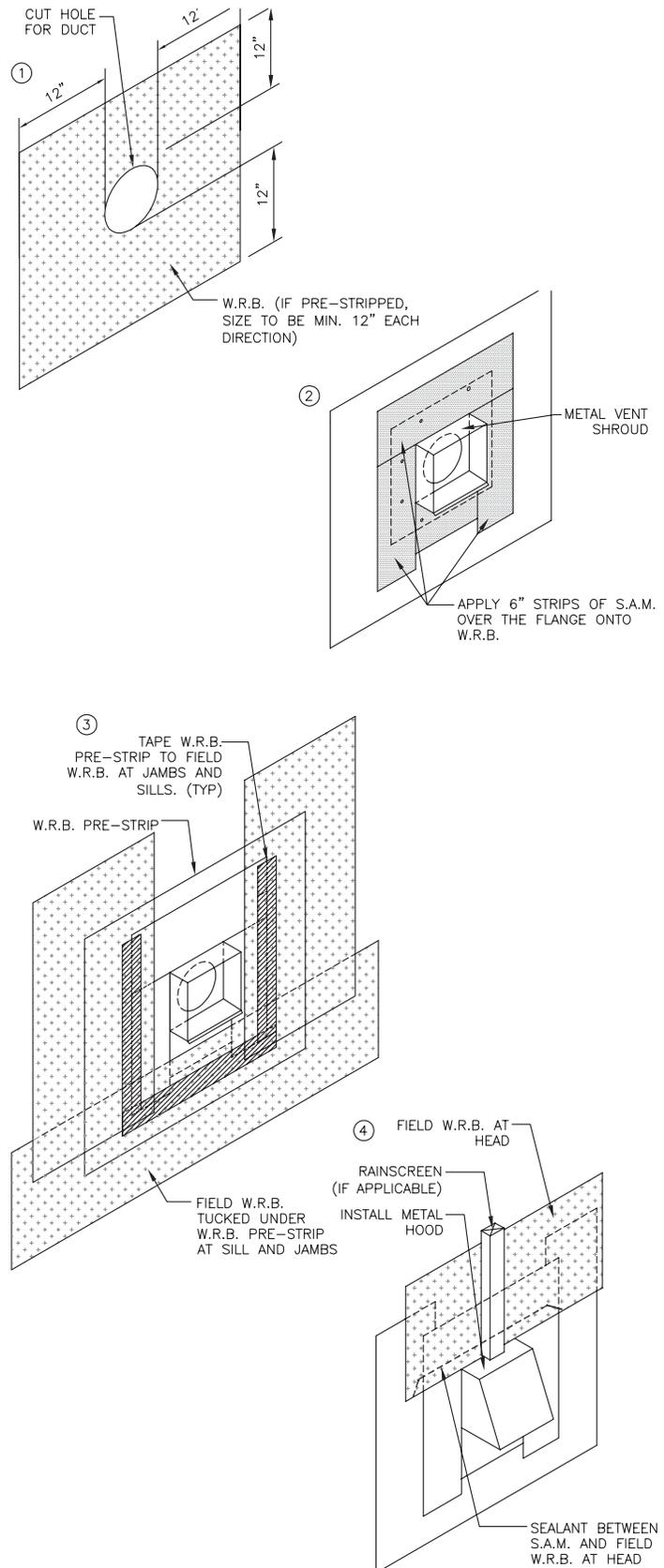
Penetrations

There are multiple penetrations in exterior walls due to dryer vents, bathroom exhaust fans, exterior electrical outlets, exterior lights, gas lines, etc. All of these “holes” need to be sealed to attain the performance of the air barrier system.

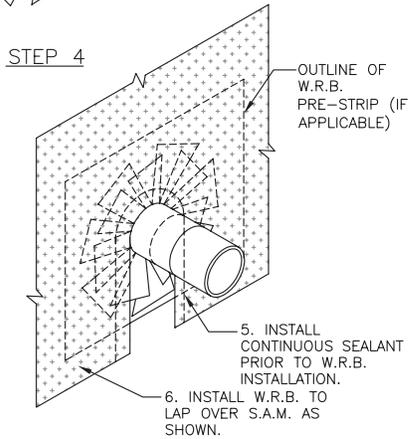
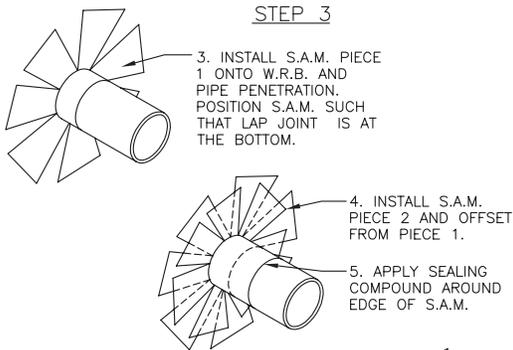
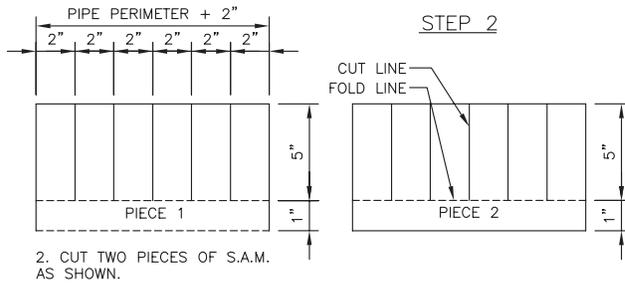
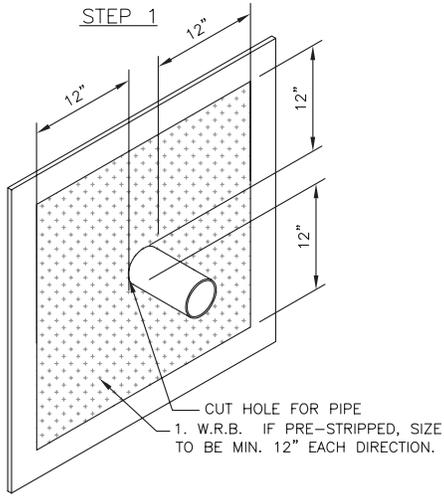
To seal the WeatherSmart around all electrical, HVAC, plumbing or other penetrations:

1. Fill open gaps with low expansion foam sealant.
2. After the foam sealant has hardened, trim off any excess material.
3. Flash around the penetration with an approved sealant, Fortifiber’s S.A.M. products or preformed accessories made for this purpose.
 - a. When using tape or flashing start at the bottom of each penetration.
 - b. After the first layer, apply sealant over the slit in the flashing.
 - c. Shingle another layer of flashing over the bottom layers for proper drainage.
4. Apply the weather-resistive barrier over the flashed penetration.

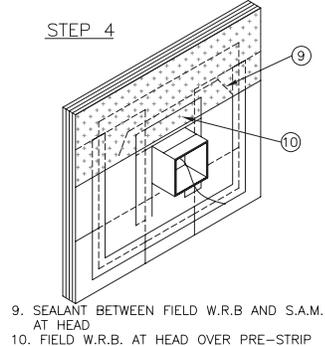
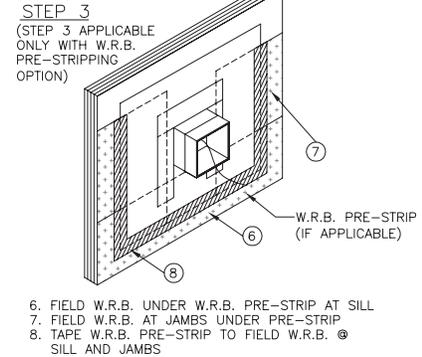
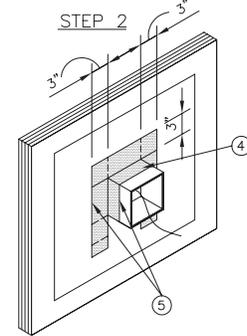
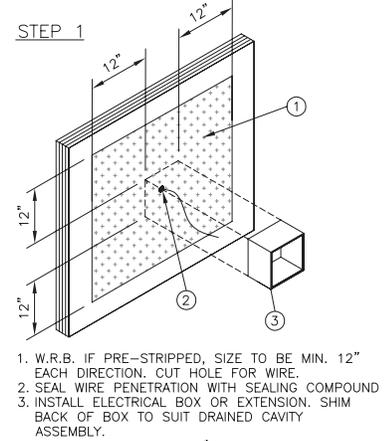
Products with flanges should be integrated into the air barrier system using Fortifiber’s S.A.M. products. Follow shingle lapping procedures and sequencing as in a window installation.



NOTE(S):
THIS DETAIL IS CONCEPTUAL & DESCRIBES DESIGN INTENT. IT DOES NOT PURPORT TO SHOW ALL CONDITIONS



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Handling Tears and Holes

During the course of installing the air barrier, minor tears may occur that must be repaired. Tears can easily be repaired with approved sheathing tape or one of Fortifiber's S.A.M. products.

Larger holes (greater than 1" or 25 mm) may require a cut piece of WeatherSmart to cover the hole. Use methods that maintain proper shingling of layers that form the patch.

1. Make a cut 2" (50 mm) above the hole and extending a minimum of 2" (50 mm) on each side of the hole.
2. Measure and cut a piece of WeatherSmart as a patch large enough to cover the hole. Tuck the WeatherSmart patch into the cut. Tape along the perimeter by starting at bottom of the patch, shingling the side tapes over the bottom tape and ending with a top tape covering the cut and shingled over the side tapes.

APPENDIX A

The Air Barrier Association of America (ABAA) provides useful information in defining the critical elements of an Air Barrier System. See http://www.airbarrier.org/resistive/specifications_e.php

ABAA Master Specification Section – 01410 offers the following guidance.

1. The Air Barrier System shall have the following characteristics:
 - a. It must be continuous, with all joints sealed.
 - b. It must be structurally supported to withstand positive and negative air pressures applied to the building enclosure.
 - c. Connection shall be made between:
 - 1) Foundation and walls.
 - 2) Walls and windows and/or doors.
 - 3) Different wall systems.
 - 4) Wall and roof.
 - 5) Wall and roof over unconditioned space.
 - 6) Walls, floor and roof across construction, control and expansion joints.
 - 7) Walls, floors and roof to utility, pipe and duct penetrations.In addition:
 - 8) Balcony decks and decks over living spaces.
 - 9) Soffits at cantilevered floors.
2. Air Barrier Penetrations: All penetrations of the air barrier and paths of air infiltration / exfiltration shall be sealed.



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