

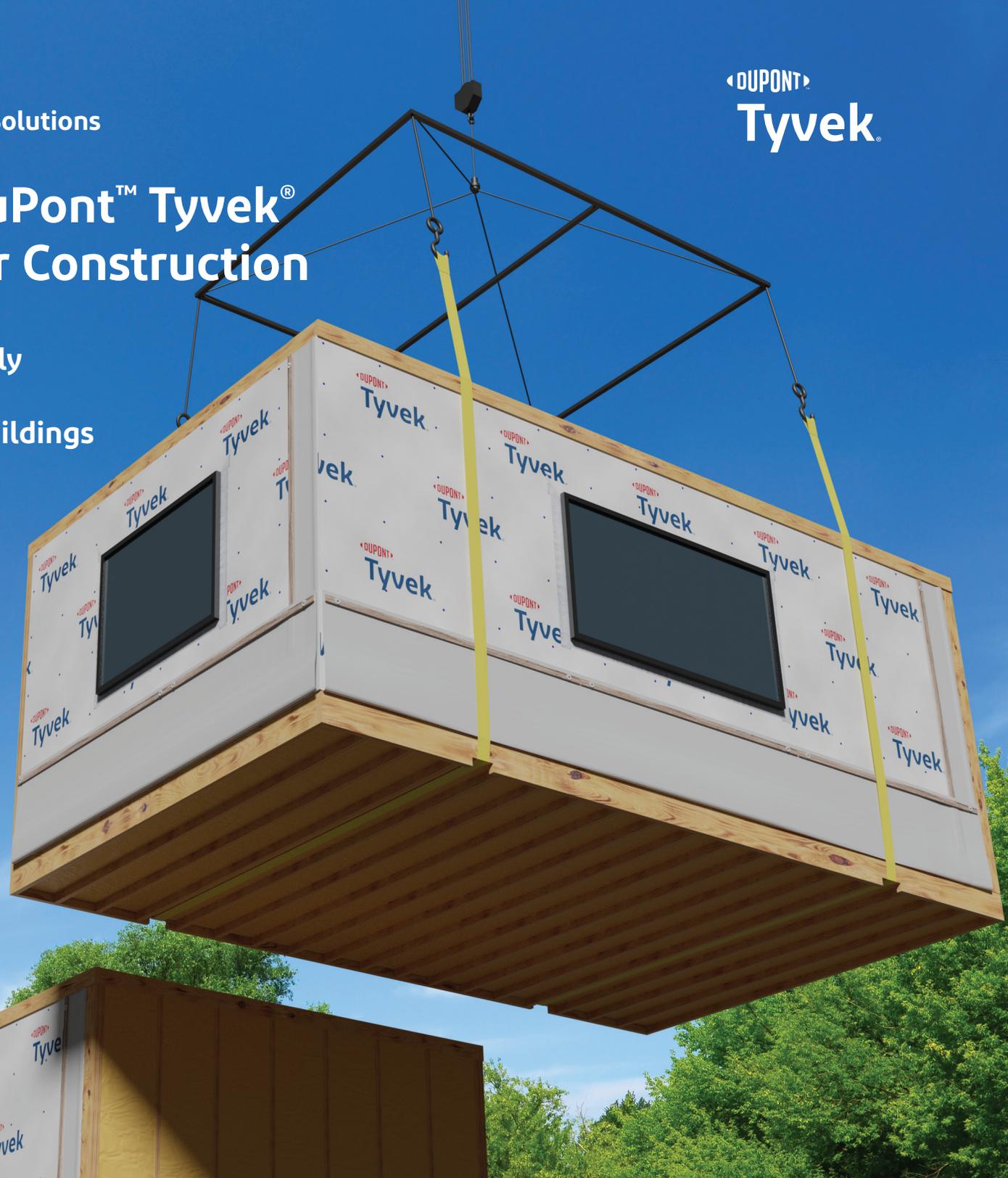


DuPont Performance Building Solutions

# Installation of DuPont™ Tyvek® WRB for Modular Construction

For Residential Single-Family Homes and Wood-Framed Multi-Family Residential Buildings

November 2019



## Introduction

Modules built off site may include the exterior wall envelope with windows, doors, and other components installed and integrated with the envelope at the manufacturing site. Ensuring continuity of the wall envelope after modules are set has proved to be challenging. In addition, it is often necessary to access the mate line areas during construction which can disturb the continuity and potentially damage the wall envelope. These installation guidelines provide instructions for installing **DuPont™ Tyvek® WRB** with flaps that can be easily secured to the module during transport, unfolded after setting the module, then folded and unfolded as necessary during the construction process for access to the mate line area.

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## Applicable Products

### Water-Resistive Barriers (WRB)

Product	Dimensions	Area
<b>DuPont™ Tyvek® HomeWrap®</b>	3 ft x 100 ft	300 sq ft
	3 ft x 165 ft	495 sq ft
	5 ft x 200 ft	1,000 sq ft
	9 ft x 100 ft	900 sq ft
	9 ft x 150 ft	1,350 sq ft
	10 ft x 100 ft	1,000 sq ft
	10 ft x 150 ft	1,500 sq ft
<b>DuPont™ Tyvek® StuccoWrap®</b>	5 ft x 200 ft	1,000 sq ft
<b>DuPont™ Tyvek® DrainWrap™</b>	9 ft x 125 ft	1,125 sq ft
	10 ft x 125 ft	1,250 sq ft
<b>DuPont™ Tyvek® ThermaWrap™ LE</b>	5 ft x 150 ft	750 sq
	9 ft x 100 ft ft	900 sq ft
<b>DuPont™ Tyvek® CommercialWrap®</b>	5 ft x 200 ft	1,000 sq ft
	10 ft x 125 ft	1,250 sq ft
<b>DuPont™ Tyvek® CommercialWrap® D</b>	5 ft x 200 ft	1,000 sq ft
	10 ft x 125 ft	1,250 sq ft

### Self-Adhered Flashing Products

Product	Width
<b>DuPont™ FlexWrap™ EZ</b>	2.75 in
<b>DuPont™ FlexWrap™</b>	6 in
	9 in
<b>DuPont™ StraightFlash™</b>	4 in
	9 in
<b>DuPont™ StraightFlash™ VF</b>	6 in
<b>DuPont™ Flashing Tape</b>	4 in
	6 in
	9 in
	12 in

### Installation Accessories

Product	Type	Quantity
<b>DuPont™ Tyvek® Tape</b>	2" Bulk Pack	36 rolls/case
	3" Bulk Pack	24 rolls/case
<b>DuPont™ Tyvek® Metallized Tape</b>	2" x 100' Rolls	12 rolls/case
<b>DuPont™ Tyvek® Wrap Cap staples</b> or other cap staples for Stinger™ Cap Stapler	7/8", 1-1/4", and 1-1/2" lengths	2,000/box
	3/8" and 5/8" lengths	2,016/box
<b>DuPont™ Tyvek® Wrap Cap nails</b>	1" electro-galvanized ring shank nail	2,000/box
<b>DuPont™ Tyvek® Wrap Cap screws</b>	2" dia. plastic cap, 1-3/4" screw length	1,000/box
<b>DuPont™ Adhesive/Primer</b>		
<b>DuPont™ Residential Sealant</b>		
<b>DuPont™ RainVent™ Battens</b>	5/8 in x 3/8 in x 8 ft	40/pack

## Warranty

Please refer to the *DuPont Weatherization Products 10-Year Limited Warranty for Buildings Less Than 5 Stories* and *Low-Rise Multi-Family Buildings Less Than 6 Stories*. For buildings greater than 4 stories, please refer to the *DuPont Weatherization Products 10-Year Limited Warranty for Buildings Greater Than 4 Stories*. For more information about DuPont Performance Building Solutions warranties, please call 1-800-448-9835 or visit us at [building.dupont.com](http://building.dupont.com)

## Water-Resistive Barrier (WRB) Code Requirements

The 2015 International Residential Code (Section R703.1.1 Water Resistance) requires that "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 Section R703.2 and a means of draining to the exterior water that enters the assembly." Section R703.2 (Water-resistive barrier) states that "one layer of No. 15 asphalt felt, free from holes and breaks, complying with ASTM D 226 for Type 1 felt or other approved water-resistive barrier shall be applied over studs or sheathing of all exterior walls. Such felt or material shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm). Where joints occur, felt shall be lapped not less than 6 inches (152 mm). The felt or other approved material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section R703.1."

The 2015 International Building Code (Section 1403.2 Weather Protection) requires that “exterior walls shall provide the building with a weather resistant exterior wall envelope. The exterior wall envelope shall include flashing, as described in Section 1405.4. The exterior wall envelope shall be designed and constructed in such a manner as to prevent the accumulation of water within the wall assembly by providing a water-resistive barrier behind the exterior veneer, as described in Section 1404.2, and a means for draining water that enters the assembly to the exterior. Section 1404.2 (Water-resistive barrier) states that “not fewer than one layer of No. 15 asphalt felt, complying with ASTM D 226 for Type 1 felt or other approved materials, shall be attached to the studs or sheathing, with flashing as described in Section 1405.4, in such a manner as to provide a continuous water-resistive barrier behind the exterior veneer.

The **DuPont™ Tyvek® WRBs** listed below qualify as approved water-resistive barriers based on ICC-ES AC38 Acceptance Criteria according to the associated Evaluation Reports:

- ICC-ES Evaluation Report ESR 2375
  - **DuPont™ Tyvek® HomeWrap®**
  - **DuPont™ Tyvek® StuccoWrap®**
  - **DuPont™ Tyvek® DrainWrap™**
  - **DuPont™ Tyvek® CommercialWrap®**
  - **DuPont™ Tyvek® CommercialWrap® D**
- ICC-ESR-1993: **DuPont™ Tyvek® ThermaWrap™ LE**

And Industry Standard ASTM E 2556 Type II Standard Specification for Vapor Permeable Flexible Sheet Water-Resistive Barriers Intended for Mechanical Attachment

Air leakage control and air barriers are required in the IECC-2015 Sections R402.4 and C402.4. Specifically, Section C402.5 identifies three compliance options for air barriers. **DuPont™ Tyvek® WRBs** comply with the option detailed in Section C402.5.1.2.1: “C402.5.1.2.1 Materials. Materials with an air permeability no greater than 0.004 cfm/ft<sup>2</sup> (0.02 L/s x m<sup>2</sup>) under a pressure differential of 0.3 inches water gauge (75 Pa) when tested in accordance with ASTM E 2178 shall comply with this section.” **Tyvek® WRBs** have been tested in accordance with ASTM E2178 and have air permeability less than 0.02 L/s x m<sup>2</sup>.

**DuPont™ Tyvek® WRBs** have been tested to the following standards:

- ASTM E 1677 Standard Specification for an Air Retarder (AR) Material or System for Low-Rise Framed Building Walls
- ASTM E 2178 Standard Test Method for Air Permeance of Building Materials
- ASTM E96-05 Standard Test Methods for Water Vapor Transmission of Materials
- AATCC 127 Water Resistance: Hydrostatic Pressure Test
- ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials

The application of **DuPont™ Tyvek® WRBs** is governed by the code adopted and enforced by the local jurisdiction. Consult your jurisdiction to assure compliance with the local building code.

## Special Considerations

Wall assemblies using equivalent fasteners must meet or exceed ASTM E1677 performance requirements of 65 mph equivalent structural load resistance and 15 mph equivalent wind-driven rain water infiltration resistance.

When performance requirements exceed ASTM E1677, 65 mph equivalent structural load and 15 mph equivalent wind-driven rain water infiltration for buildings less than 5 stories, it is recommended to install a high pressure skirt to help prevent water intrusion at the sill or threshold and follow the *DuPont™ Tyvek® Mechanically Fastened Air and Water Barrier Installation Guidelines For Buildings Greater Than 4 Stories* and *High Performance Installations of Any Height* and the *DuPont Self-Adhered Flashing Systems Installation Guidelines For Buildings Greater Than 4 Stories and High Performance Installations of Any Height*.

**DuPont™ Self-Adhered Flashing products** are not intended for through-wall flashing applications.

**DuPont™ Tyvek® StuccoWrap®** and **DuPont™ Tyvek® DrainWrap™** must be installed with drainage grooves vertical, going up and down. No surface preparation is needed for the installation of **DuPont™ Tyvek® WRBs**.

**DuPont™ Tyvek® ThermaWrap™ LE** must be installed with shiny, metallic side facing towards a clear ¾ inch minimum air space to obtain the installed R-Value benefits. **ThermaWrap™ LE** will still act as a water-resistive barrier without an air space. Refer to the *DuPont™ Tyvek® ThermaWrap™ LE Fact Sheet* for more information.

DuPont requires that **DuPont™ Tyvek® HomeWrap®**, **DuPont™ Tyvek® StuccoWrap®**, **DuPont™ Tyvek® DrainWrap™** and **DuPont™ Tyvek® ThermaWrap™ LE** be covered within 4 months (120 days) of installation. **DuPont™ Tyvek® CommercialWrap®** and **DuPont™ Tyvek® CommercialWrap® D** must be covered within 9 months (270 days) of installation.

DuPont requires that **DuPont™ FlexWrap™ EZ**, **FlexWrap™**, **StraightFlash™** and **StraightFlash™ VF** be covered within nine months (270 days) of installation. DuPont requires that **DuPont™ Flashing Tape** be covered within four months (120 days) of installation.

**DuPont™ Self-Adhered Flashing products** perform best when installed at temperatures above 25°F (-4°C).

**DuPont™ Self-Adhered Flashing products** should be installed on clean, dry surfaces that are free of frost. Wipe surfaces to remove moisture, dirt, grease and other debris that could interfere with adhesion.

Adverse weather conditions or cold temperatures may require use of a primer to promote adhesion of **DuPont™ Self-Adhered Flashing products** to most common building materials.

Concrete, masonry, and fiber-faced exterior gypsum board require the use of a compatible adhesive or primer.

Remove all wrinkles and bubbles that may allow for water intrusion by smoothing surface and repositioning as necessary during installation of **DuPont™ Self-Adhered Flashing products**. Apply pressure along entire surface of flashing for a good bond using firm hand pressure, J-roller, or alternate tool without sharp edges (such as a plastic carpet tuck tool) to assist with application of uniform pressure.

## Note

When installed in conjunction with other building materials, **DuPont™ Self-Adhered Flashing products** must be properly shingled with these materials such that water is diverted to the exterior of the wall system. **DuPont™ Tyvek® WRBs** are air and water barriers and not the primary water barrier. The outer facade is the primary barrier. You must follow facade manufacturer's installation and maintenance requirements for all facade systems in order to maintain water holdout properties and ensure performance of **Tyvek® WRBs**. Use of additives, coatings or cleansers on or in the facade system may impact the performance of **Tyvek® WRBs**. DuPont products are to be used as outlined in this installation guideline. **DuPont™ Self-Adhered Flashing products** should only be used to seal penetrations and flash openings in houses or buildings. **DuPont™ Self-Adhered Flashing products** are not to be used in roofing applications. For superior protection against bulk water penetration, DuPont suggests a system combining a quality exterior facade, a good secondary WRB and exterior sheathing, high quality windows and doors, and appropriate flashing materials paying attention to proper installation of each component.

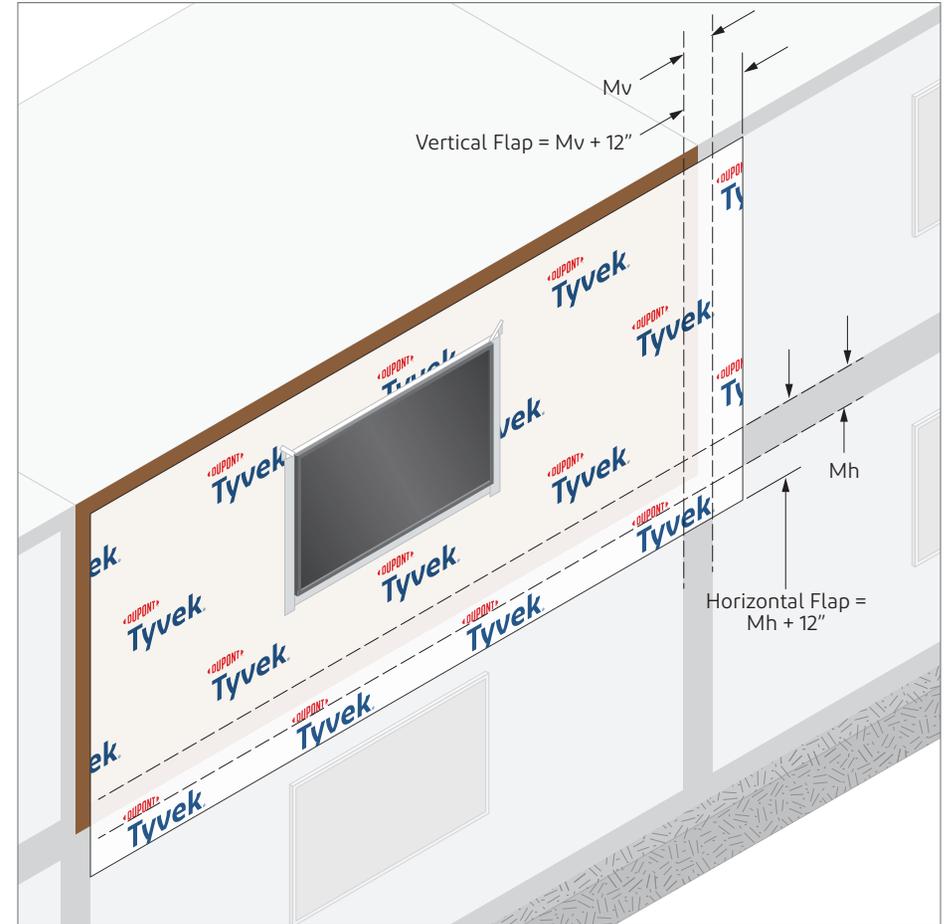
## Part 1: Installing DuPont™ Tyvek® WRB with Flaps to Overlap Mate Line Areas and Integrate with Adjacent Modules

Part 1 provides instructions for installing the **DuPont™ Tyvek® WRB** onto the exterior surface of an individual module at the factory prior to setting with adjacent modules at the job site. The **Tyvek® WRB** is installed and cut flush with the left and top edges of the module sheathing for each individual module. Unsecured flaps are created along both the right and bottom sides of the module to accommodate vertical and horizontal mate line areas,  $M_v$  and  $M_h$ , respectively after setting the modules. Furring strips are attached to the edges of the flaps for securing flaps during module transport and to provide rigidity during opening and closing of flaps at the job site. The dimensions of the flaps will also provide additional material to overlap the **Tyvek® WRB** of the adjacent module by a minimum of 12" when the furring strips are removed and the final installation of the **Tyvek® WRB** is completed. Therefore, it is necessary to know the width of all mate line areas prior to installing the **Tyvek® WRB**. Placement of module and overlap of the **Tyvek® WRB** flaps relative to adjacent modules is shown after setting and trimming of flaps.

Instructions for folding and securing flaps to the module for shipping, opening and securing flaps over mate line areas during module setting, and trimming flaps during final building envelope sealing is included in subsequent Parts.

Finally, alternate steps are included to address installation of the **Tyvek® WRB** on modules that are set at outside building corners. In such cases, the **Tyvek® WRB** will be installed on two faces of the module. When adjacent modules are set to create an inside corner, the dimensions of the **Tyvek®** flap will be adjusted to accommodate the corresponding mate line area, if applicable, plus 16" as overlap onto the adjacent module.

Overlap of **Tyvek® WRB** flaps onto mate line areas and adjacent modules after setting and trimming of flaps



## STEP 1

### Installing DuPont™ Tyvek® WRB with Flaps to Overlap Mate Line Areas

A. Begin installing the **Tyvek® WRB** so it is aligned with the top edge of the module sheathing.

The **Tyvek® WRB** should extend beyond the right edge of the module sheathing to create a flap that will overlap the vertical mate line area,  $M_v$ , and the **Tyvek® WRB** on the adjacent module, if applicable at the job site. The flap should be wide enough to overlap the sheathing on the adjacent module, once modules are set, by at least 16".

$$\text{Total width of Tyvek® WRB} = \text{Width of module sheathing (W)} + \text{Width of mate line area (M}_v\text{)} + 16''$$

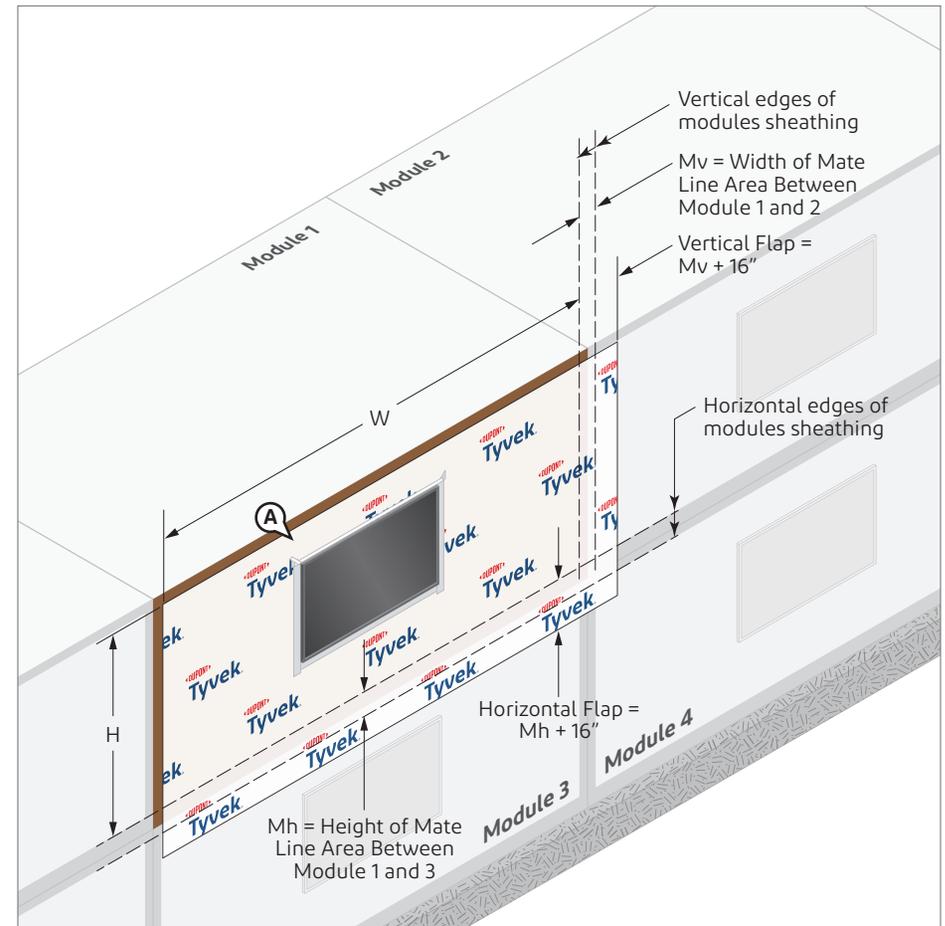
To ensure proper shingling, the **Tyvek® WRB** extending beyond the bottom edge of the module sheathing will be used to create a flap that overlaps the horizontal mate line area,  $M_h$ , and extends at least 16" beyond the sheathing of the lower module, or foundation once modules are set.

$$\text{Total height of Tyvek® WRB} = \text{Height of module sheathing (H)} + \text{Height of mate line area (M}_h\text{)} + 16''$$

If additional courses of **Tyvek® WRB** are required to achieve the required horizontal overlap, the top **Tyvek® WRB** course must overlap the bottom course by a minimum of 6". **Tyvek® WRBs** should also maintain a minimum vertical overlap of 6". Tape all horizontal and vertical seams with **DuPont™ Tyvek® Tape**. Use 3" **DuPont™ Tyvek® Tape** for **DuPont™ Tyvek® StuccoWrap®**, **Tyvek® DrainWrap™**, and **Tyvek® CommercialWrap® D**, and for high performance installations\*.

#### Notes:

- The **Tyvek® WRB** may be installed from right to left in which case the vertical flap will extend beyond the left edge of the module
- Vertical and horizontal flap lengths will depend upon the width of the vertical and horizontal mate line areas ( $M_v$  and  $M_h$ ) for each individual project. Flap lengths should be long enough to cover the mate line areas and overlap the **Tyvek® WRB** on the adjacent module by 16" once modules are set.



B. Secure **DuPont™ Tyvek® WRB** along the studs with one of the following recommended fasteners:

- **DuPont™ Tyvek® Wrap Cap** nails
- **DuPont™ Tyvek® Wrap Cap** screws
- **DuPont™ Tyvek® Wrap Cap** staples or other cap staples for Stinger™ Cap Stapler (Except when installing **Tyvek® WRB** over foam and other non-nail-base sheathings)
- Other manufacturers' equivalent fasteners. Please see "Special Considerations" section above for equivalent fastener requirements.

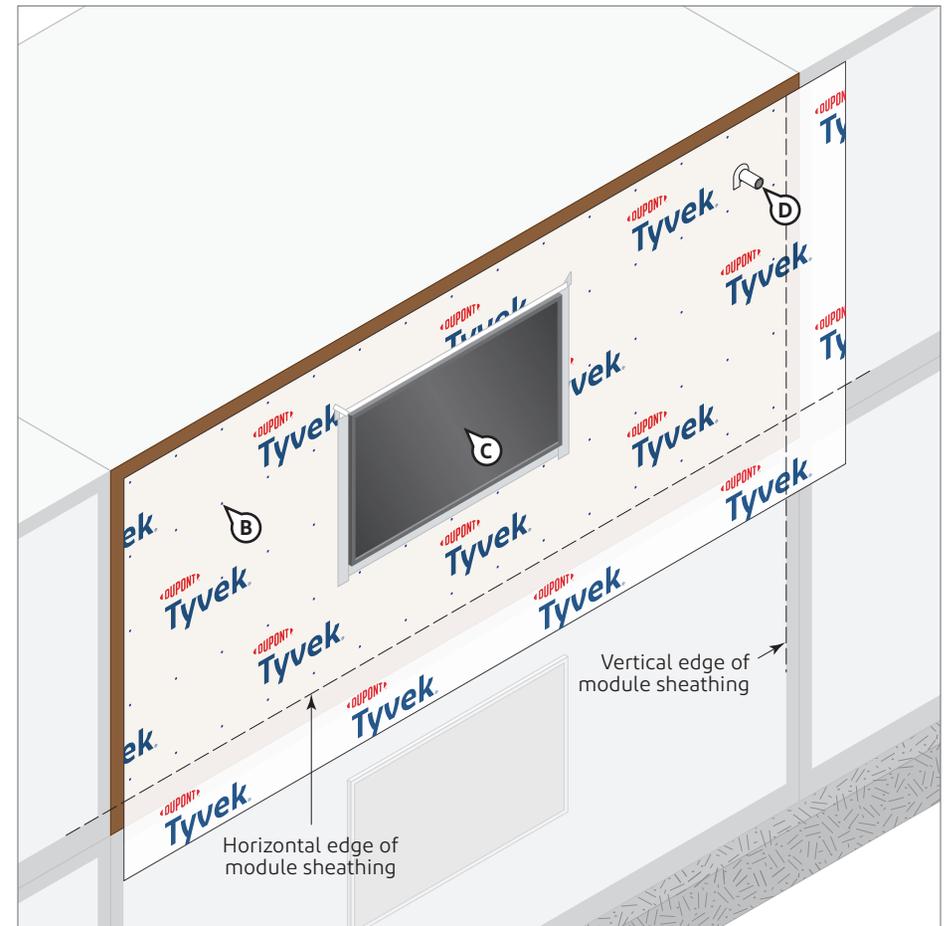
Fasteners should be no closer than 6" and no farther than 18" apart on vertical stud lines. Securing along stud lines will assist in maintaining fastening pattern.

Cover window and door rough openings with **Tyvek® WRBs**, but do not install fasteners within 6" of the sills and jambs and within 9" of the head of window rough opening to allow for proper installation and flashing of windows and doors.

C. For window and door installation and flashing, refer to the *DuPont™ Self-Adhered Flashing Systems Installation Guidelines, Installation Instructions for Windows and Doors AFTER Water-Resistive Barrier (WRB) is Installed*. For high performance installations\*, refer to the *DuPont Self-Adhered Flashing Systems Installation Guidelines For Buildings Greater Than 4 Stories and High Performance Installations of Any Height*.

**Note:** Packaged Terminal Air Conditioner (PTAC) units should be flashed in accordance with the non-flanged or brick mold window flashing methods included in the *DuPont Self-Adhered Flashing Systems Installation Guidelines For Buildings Greater Than 4 Stories and High Performance Installations of Any Height*.

D. For wall penetration flashing details, refer to the *DuPont™ Tyvek® Water-Resistive and Air Barriers Installation Guidelines*. For high performance\* wall penetration flashing details, refer to the *DuPont™ Tyvek® Mechanically Fastened Air and Water Barrier Installation Guidelines For Buildings Greater Than 4 Stories and High Performance Installations of Any Height*.



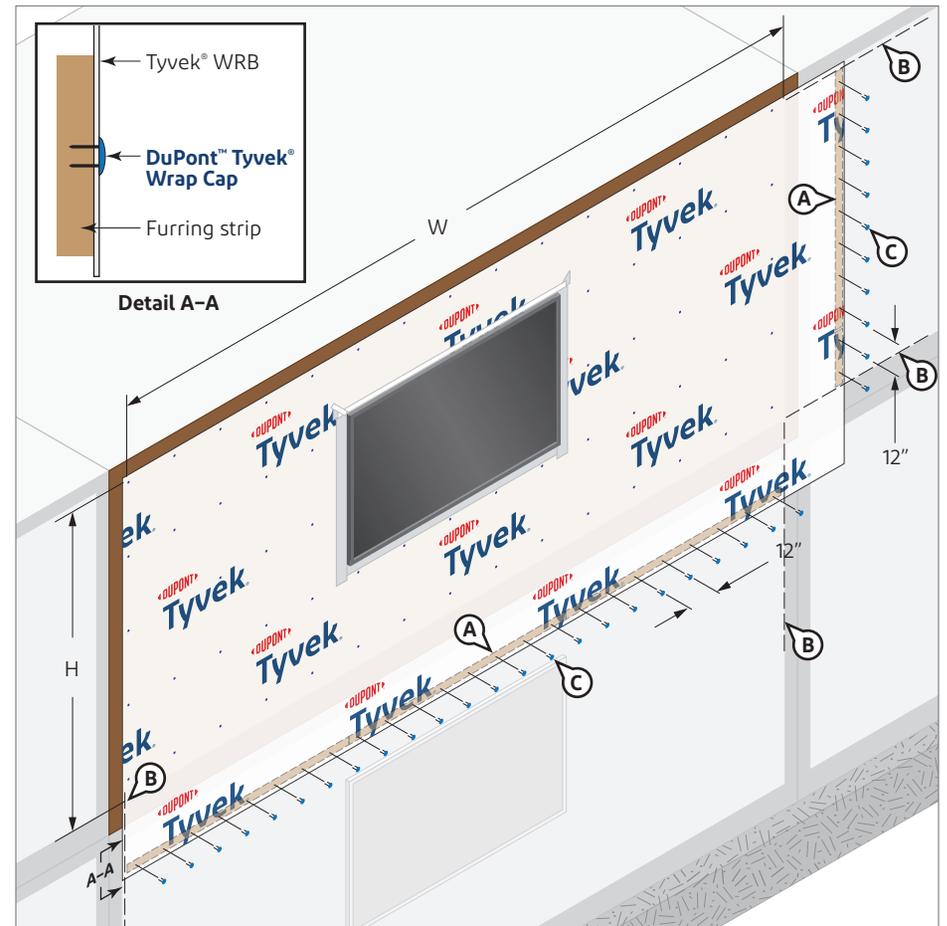
\*Performance requirements exceeding ASTM E1677, 65 mph equivalent structural load and 15 mph equivalent wind-driven rain water infiltration, or for buildings over 60' require the use of **DuPont™ Tyvek® CommercialWrap®** or **CommercialWrap® D** and sealing all seams of WRB with 3" **DuPont™ Tyvek® Tape**. In addition, **DuPont™ Flashing Tape** is only permitted to flash the flanges of windows for Residential-Use building structures. Residential-Use (Group R) is defined by the 2015/2018 International Building Code.

## STEP 2

### Attach Wood Furring Strips to **DuPont™ Tyvek® WRB** Flaps

- A. Cut 2" wide strips of wood furring from OSB or plywood to span the width (W) and height (H) of the module sheathing.
- B. Holding furring strips against a flat surface, lap the **Tyvek® WRB** over the top of furring strips, ensuring the entire furring strip is covered. The vertical furring strip should be positioned to align with the top and bottom edges of the module sheathing. The horizontal furring strip should be positioned to align with the left and right edges of the module sheathing. When attaching furring strips to flaps, ensure vertical furring strips are plumb and horizontal furring strips are level in order to be parallel to module sheathing.
- C. Fasten **Tyvek® WRB** to furring strips using Stinger™ Cap Stapler with 3/8" **DuPont™ Tyvek® Wrap Cap** staples. Fasten at each end of the furring strip and every 12" to secure flaps to furring strips.

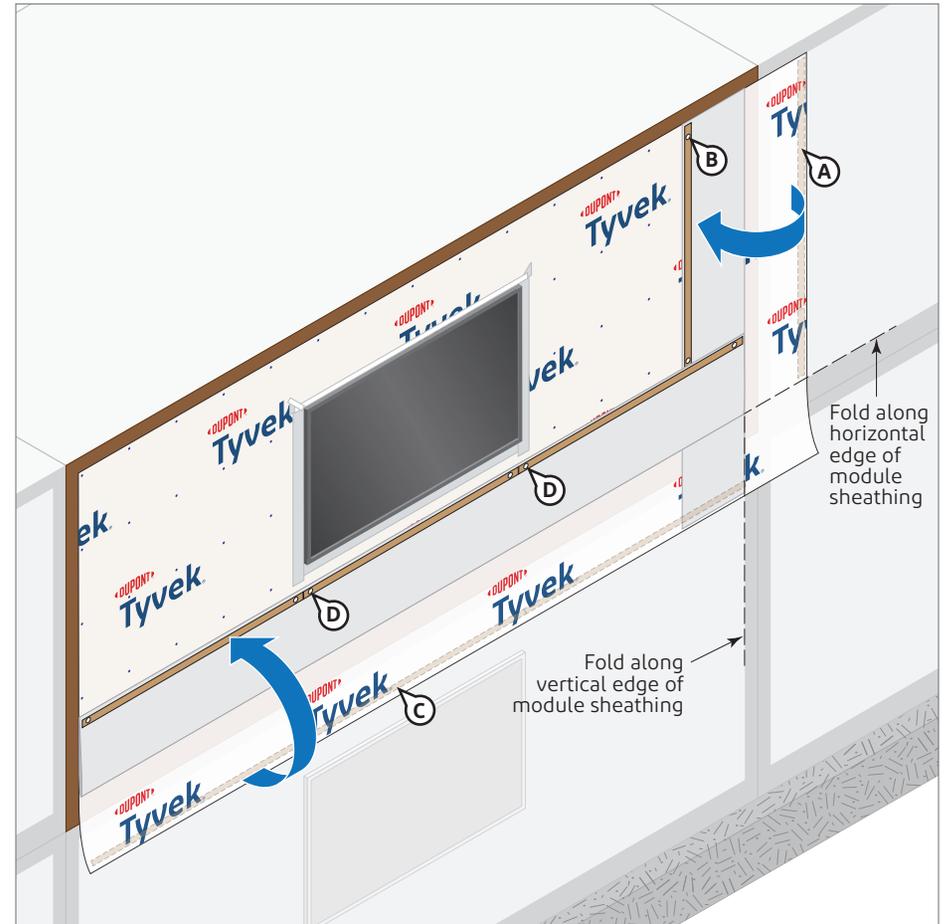
Once modules are set, the flaps will be opened (Part 2) and overlap onto the adjacent modules to provide continuity of the **Tyvek® WRB** on the structure.



### STEP 3

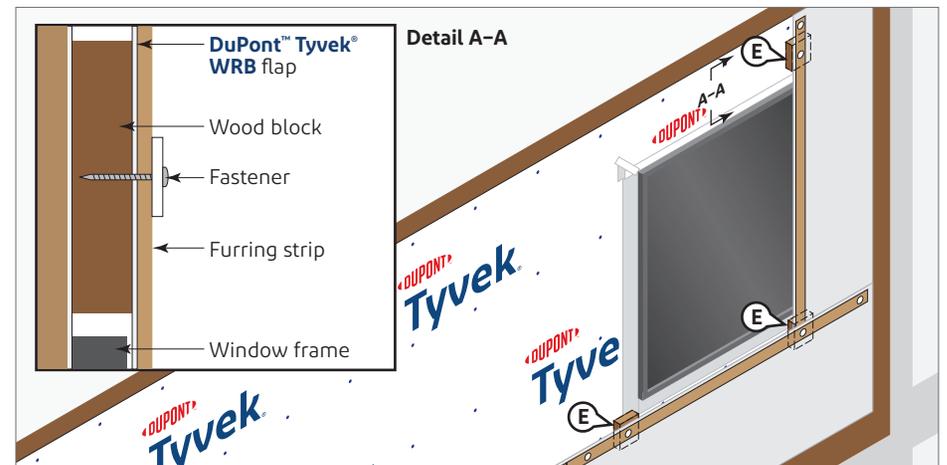
#### Securing DuPont™ Tyvek® WRB Flaps with Furring Strips to Face of Module

- A. Holding the vertical furring strip, fold back the **Tyvek® WRB** flap at the vertical edge of the module sheathing. Fold the flap such that furring strip aligns with stud of module wall.
- B. Using a wood screw of sufficient length to penetrate the stud, fasten the top of the furring strip to wall framing within 12" of the top edge of the module sheathing. Use of screws facilitates the opening and closing of flaps shown in Part 2. For maximum holding power, 2" **Tyvek® Wrap** Cap washer (or min. 1" rigid washer) is recommended. Repeat at bottom of module wall by installing an additional fastener within 12" of the bottom edge of module sheathing. Fasten so the vertical furring strip is aligned parallel to the vertical edge of the module sheathing.
- C. Holding the horizontal furring strip, fold up the **Tyvek® WRB** flap at the horizontal edge of the module sheathing.
- D. Fasten the furring strip to wall framing within 12" of the left and right edges of the module sheathing. Ensure the horizontal furring strip is level.
- E. (Optional) If a window/door, PTAC unit, or any component that protrudes from the wall is installed in close proximity to the edge of the module sheathing, it will be necessary to install blocking a minimum 1/4" thicker than protrusion to support the furring strip.



#### Notes:

- Do not fasten furring strips within 6" of window, door, or other wall penetrations in order to avoid damaging the flashing or window/door components.
- It is acceptable to use multiple furring strips as necessary for a single flap when installing onto larger modules. It may also be necessary to use additional fasteners in the center of the furring strips to fully secure flaps.



## Part 2: Closing and Opening DuPont™ Tyvek® WRB Flaps at the Job Site

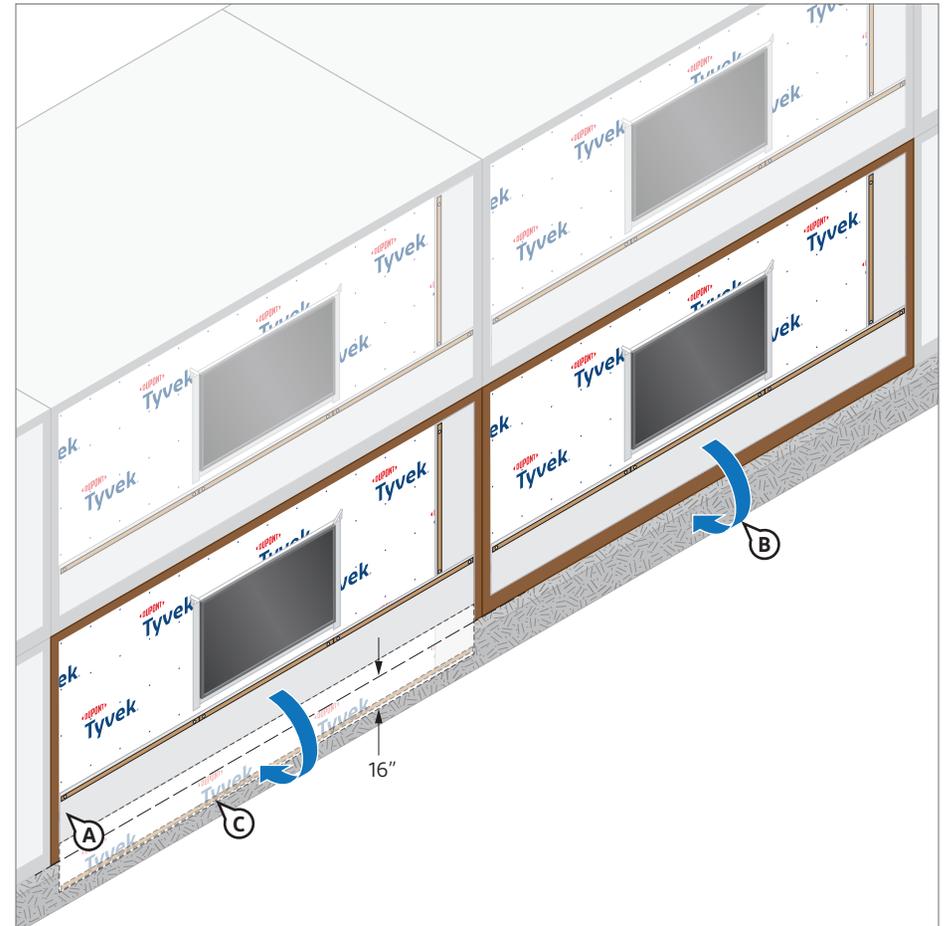
This section provides details for closing the **DuPont™ Tyvek® WRB** flaps at the job site in order to avoid water infiltration at mate line areas during the construction process. Similarly, this section provides details for opening the flaps when work or inspections are required along the mate line areas.

### STEP 1

#### Unfold Horizontal **DuPont™ Tyvek® WRB** Flaps over Foundation and Secure

- A. Starting at the bottom left module, remove the screws used to secure the horizontal furring strip and fold **Tyvek® WRB** flap down over foundation.
- B. Repeat for adjacent modules to right. The flaps should overlap the foundation by 16”.
- C. Secure onto foundation as necessary.

**Note:** Overlap of **Tyvek® WRB** onto foundation will vary based on bottom of wall conditions. See Part 3 for more information about trimming and sealing the flaps at the foundation.



## STEP 2

Unfold Vertical **DuPont™ Tyvek® WRB** Flaps of Lower Modules over Mate Line and Secure

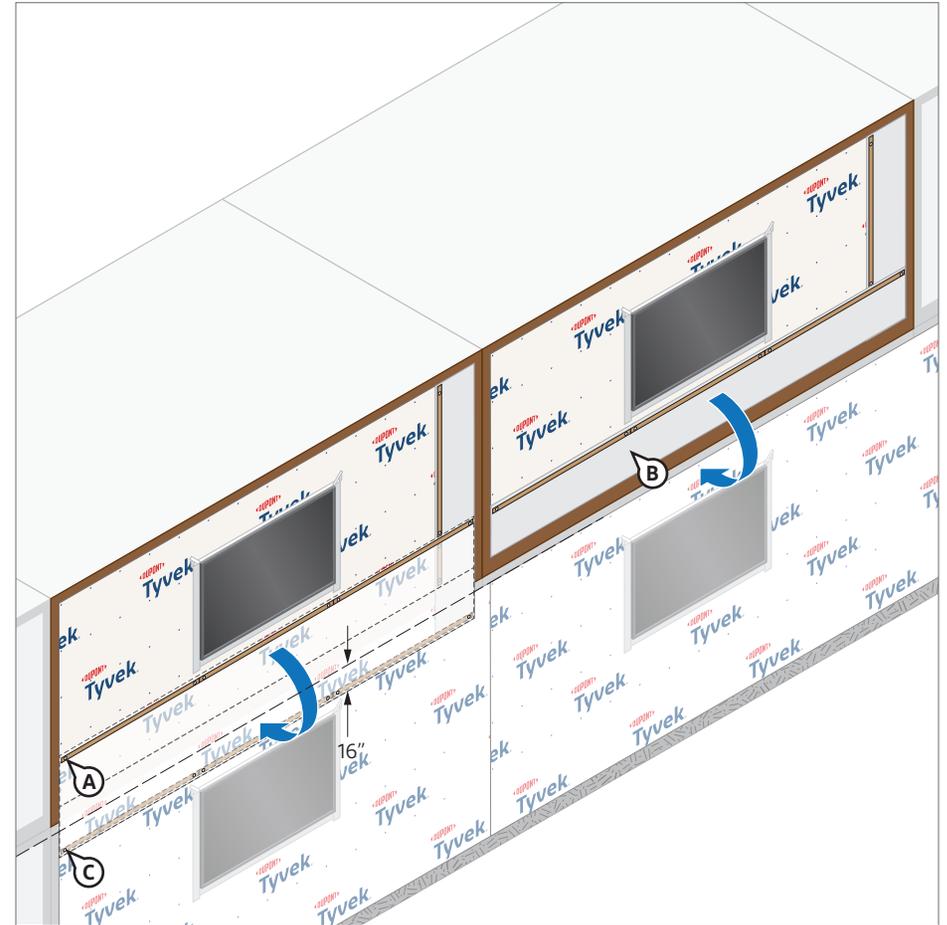
- Starting at the bottom left module, remove the screws used to secure the vertical furring strip. Fold vertical **Tyvek® WRB** flap to the right over mate line area. The flap should overlap the **Tyvek® WRB** on the module to the right by 16".
- Use the same screws to secure the furring strip into studs of the adjacent module.
- Repeat for adjacent modules to right.



## STEP 3

Unfold Horizontal **DuPont™ Tyvek® WRB** Flap of Upper Modules over Mate Lines and Secure

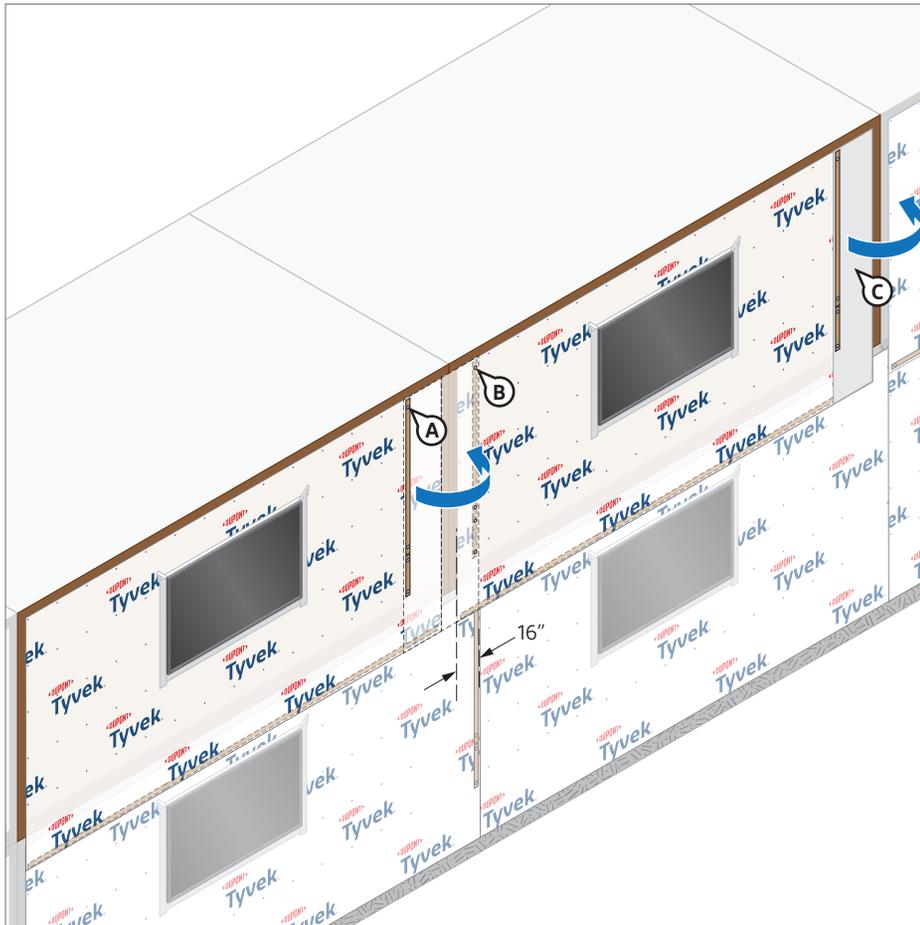
- Starting at the top left module, remove the screws used to secure the horizontal furring strip and fold **Tyvek® WRB** flaps down over mate line area. The flap should overlap the **Tyvek® WRB** on the module below by 16".
- Repeat for adjacent modules to right.
- Use the same screws to secure the furring strips into studs of the modules below.



## STEP 4

Unfold Vertical **DuPont™ Tyvek® WRB** Flaps of Upper Modules over Mate Line Area and Secure

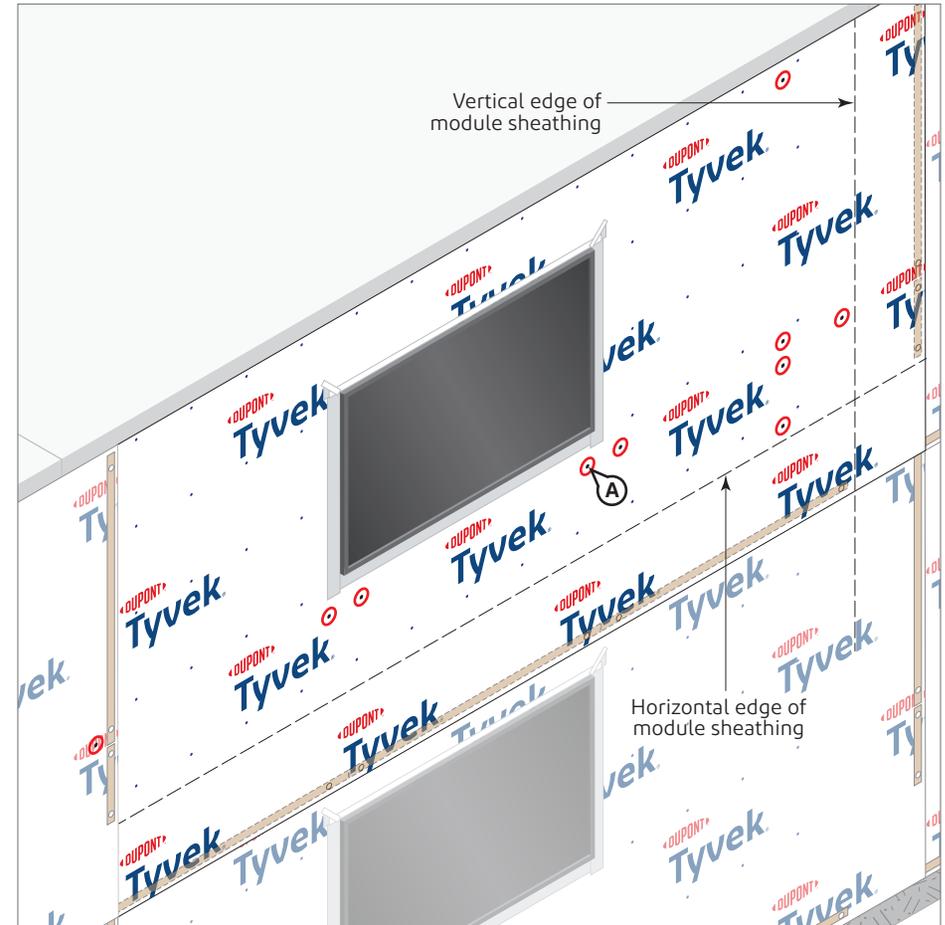
- Starting at the upper left module, remove the screws used to secure the vertical furring strip. Fold vertical furring strip and **Tyvek® WRB** flap to the right over mate line area. The flap should overlap the **Tyvek® WRB** on the module to the right by 16”.
- Use the same screws to secure the furring strip into studs of the adjacent module.
- Repeat for adjacent modules to right.



## STEP 5

Mark Holes Created by Fasteners in the **Tyvek® WRB**

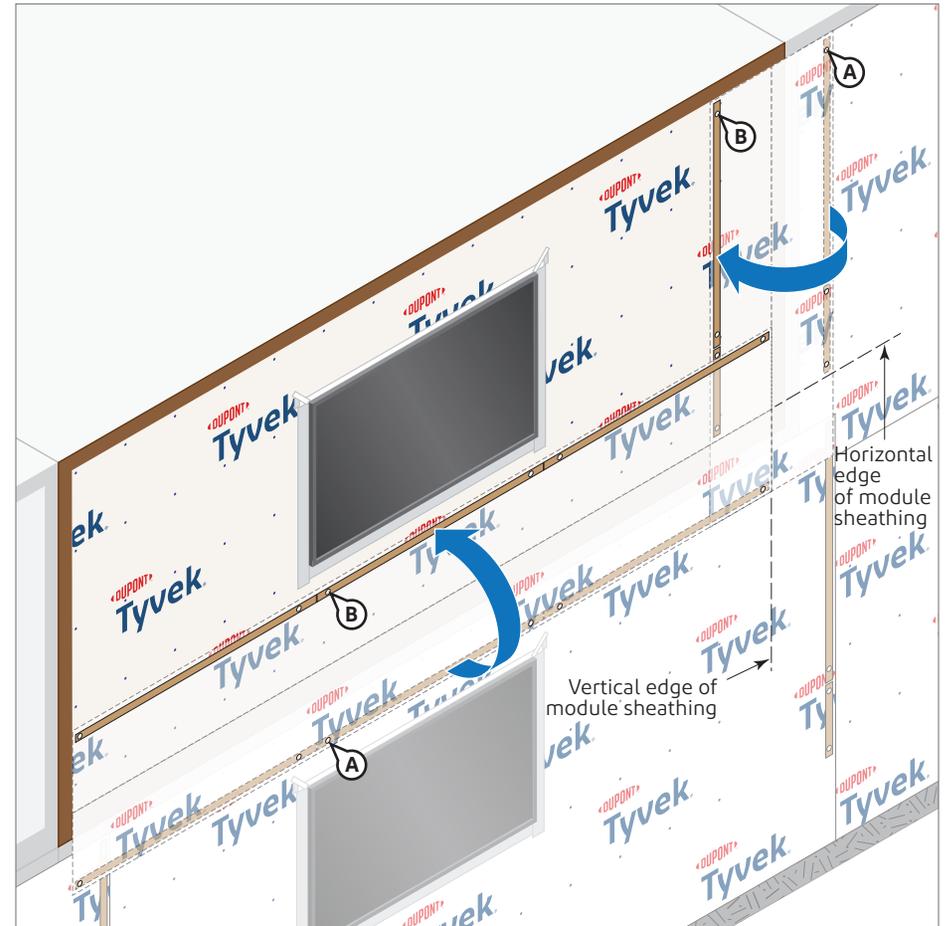
- After furring strips are secured across mate line areas, mark all holes created by fasteners in the **Tyvek® WRB**. This allows for easy recognition where **DuPont™ Tyvek® Tape** will be required to seal holes during final building weatherization process.



## STEP 6

When Necessary, Open **DuPont™ Tyvek® WRB** Flaps and Secure to Face of Module Using Previous Fastener Holes

- A. Remove the screws used to secure the vertical and/or horizontal furring strip , as necessary.
- B. Fold flaps back onto face of module per instructions in Part 1, Step 3 and use the same screws to secure the furring strip to the face of the module. In order to minimize holes through the **Tyvek® WRB**, fasten the furring strips through previous fastening locations, or as close to previous fastening locations as practically possible.

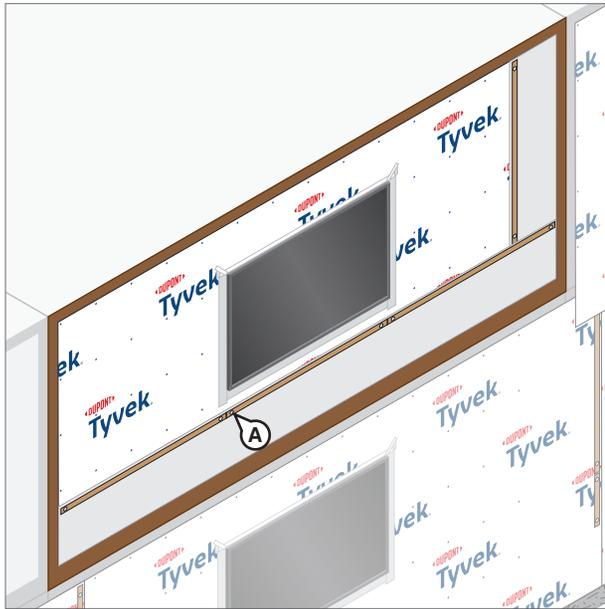


### Part 3: Removing Furring Strips from DuPont™ Tyvek® WRB Flaps and Final Sealing of the WRB

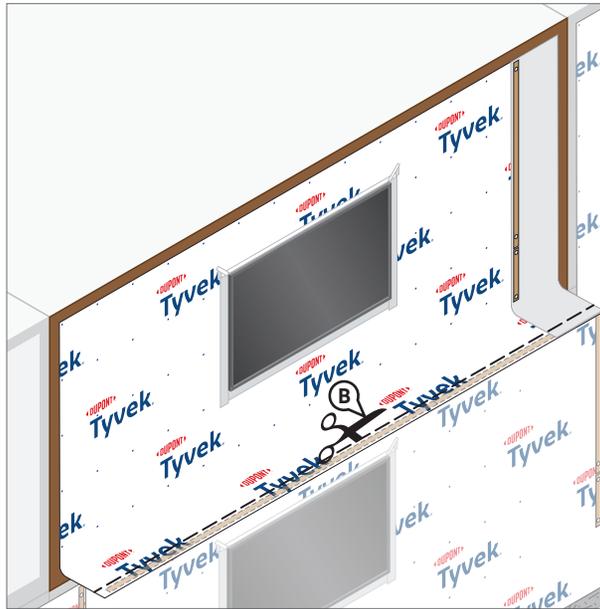
This section provides details for removing the furring strips from the **Tyvek® WRB** flaps once construction along the mate line areas is complete and the building is ready to be sealed.

#### STEP 1

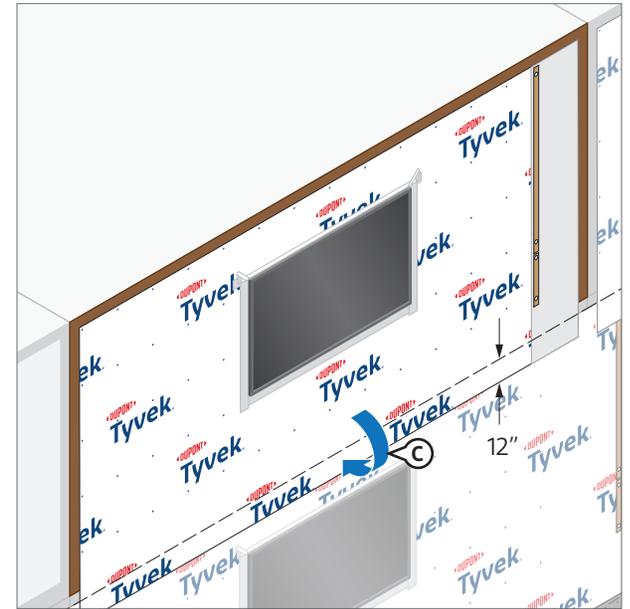
Cut Tyvek® WRB Flaps Along Horizontal Edges to Remove Furring Strips



A. Remove the screws used to secure the horizontal furring strips.



B. To remove the furring strip, cut the **Tyvek® WRB** flap along the edge of the furring strip.



C. Fold horizontal flap over mate line. Flap should overlap the **Tyvek® WRB** on module below by a minimum of 12". Trim flap at foundation as necessary per plans and specifications.

## STEP 2

### Cut DuPont™ Tyvek® WRB Flaps Along Vertical Edges to Remove Furring Strips

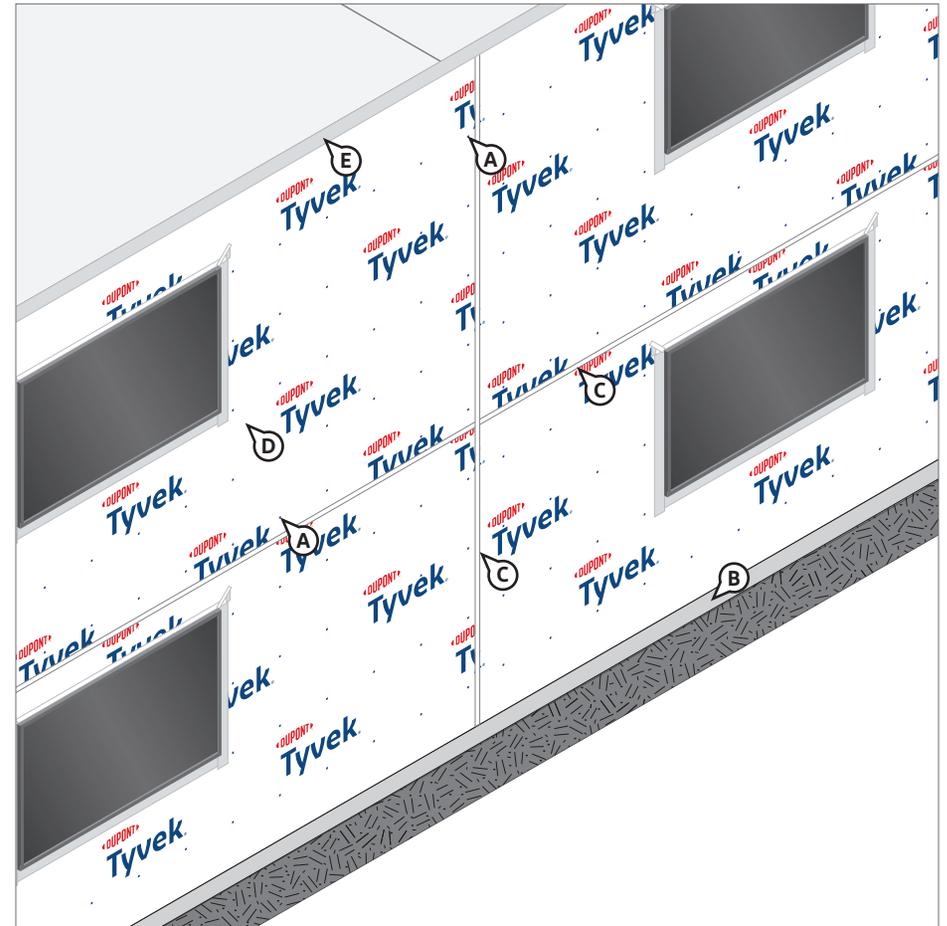
- A. Remove the screws used to secure the vertical furring strips.
- B. To remove the furring strip, cut the Tyvek® WRB flap along the edge of the furring strip.
- C. Fold vertical flap over mate line area. Flap should overlap the Tyvek® WRB on adjacent module by a minimum of 12".



## STEP 3

### Secure and Tape Seams of DuPont™ Tyvek® WRB Flaps

- A. Mechanically fasten the horizontal and vertical **Tyvek®** flaps using the recommended fasteners and spacing per Part 1 above. Do not place fasteners where seams will be sealed with **DuPont™ Tyvek® Tape**.
- B. If bottom of wall condition includes through wall flashing, it should be installed per plans and specifications. Trim **Tyvek® WRB** flap to overlap through wall flashing by a minimum of 6" and seal using **Tyvek® Tape** or **DuPont™ Self-Adhered Flashing products**. For high performance\* installations, mechanically fasten Tyvek® WRB through top of through wall flashing. If **Tyvek® WRB** directly overlaps foundation, tape or seal the horizontal flaps overlapping the foundation using **DuPont™ Self-Adhered Flashing products** with **DuPont™ Adhesive/Primer** (or recommended primer) as applicable to seal the **Tyvek® WRB** directly to concrete, wood, or other rough surfaces. For lower performance installations, the **Tyvek® WRB** can also be sealed to rough surfaces using DuPont approved sealant.
- C. Use **Tyvek® Tape** to seal the horizontal and vertical seams of the **Tyvek® WRB** flaps onto the adjacent modules. Seal the horizontal flaps before sealing the vertical flaps. For lower performance installations where the **DuPont™ Tyvek® WRB** is not being installed as an air barrier, **DuPont™ Tyvek® Tape** is not required on horizontal seams but is considered a recommended best practice.
- D. Use **Tyvek® Tape** to seal holes created by the furring strip fasteners. DuPont™ Self-Adhered Flashing patches are recommended for sealing multiple holes in close proximity.
- E. Terminate the **Tyvek® WRB** at the top of the wall with **DuPont™ Self-Adhered Flashing** or other approved method per plans and specifications.



\*Performance requirements exceeding ASTM E1677, 65 mph equivalent structural load and 15 mph equivalent wind-driven rain water infiltration, or for buildings over 60' require the use of **DuPont™ Tyvek® CommercialWrap®** or **CommercialWrap® D** and sealing all seams of WRB with 3" **DuPont™ Tyvek® Tape**. In addition, **DuPont™ Flashing Tape** is only permitted to flash the flanges of windows for Residential-Use building structures. Residential-Use (Group R) is defined by the 2015/2018 International Building Code.

## For Modules with Outside Corners

### Alternate Part 1: Installing DuPont™ Tyvek® WRB with Flaps to Overlap Mate Line Areas and Integrate with Adjacent Modules

Modules set as outside corners will typically have wall sheathing that extends to the corner of the module because there are no vertical mate lines in this location. Therefore, the vertical Tyvek® WRB flap on the left face of the corner module will extend 16" from the corner of the module to overlap onto the Tyvek® WRB installed on the right face of the module.

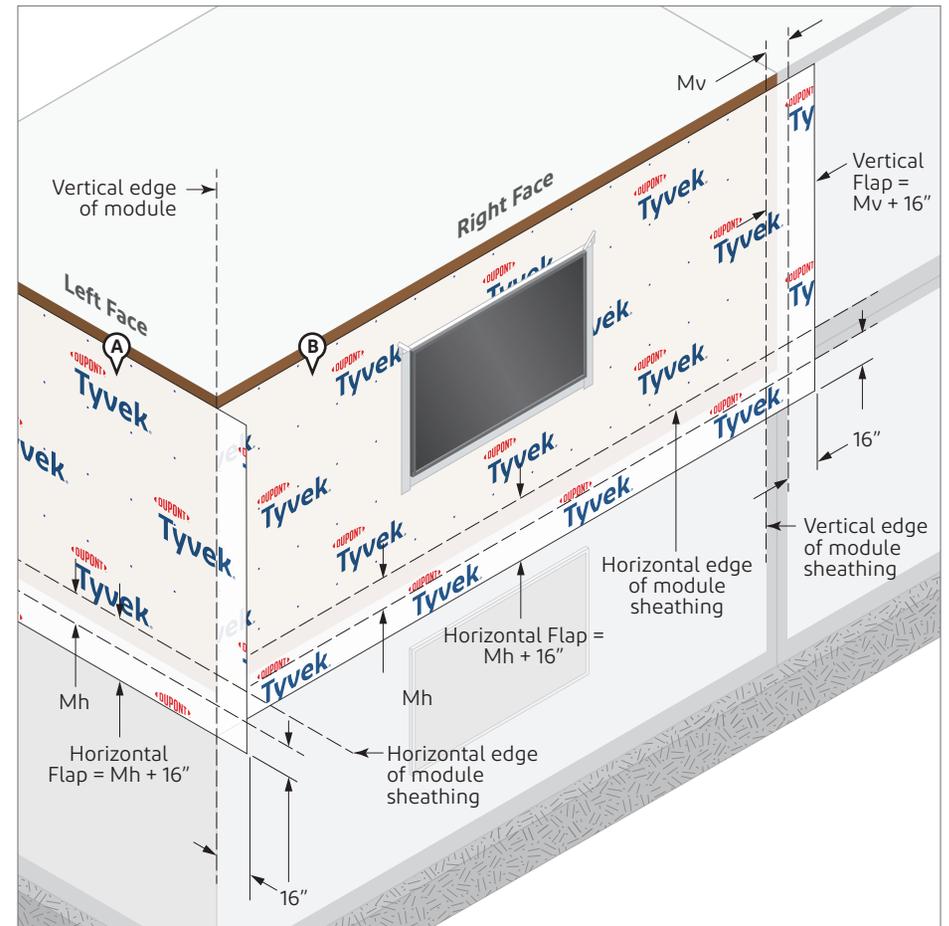
#### STEP 1

##### Installing Tyvek® WRB onto Corner Modules

- A. Install the Tyvek® WRB on the left face of the corner module per instructions in Part 1 above, with a 16" vertical flap.

**Note:** The excess 16" of Tyvek® WRB at the corner will allow proper overlap onto the right face of the module once flaps are unfolded and modules are set.

- B. Install the Tyvek® WRB on the right face of the corner module per instructions in Part 1 above, with the vertical edge at the corner aligned with the module sheathing.

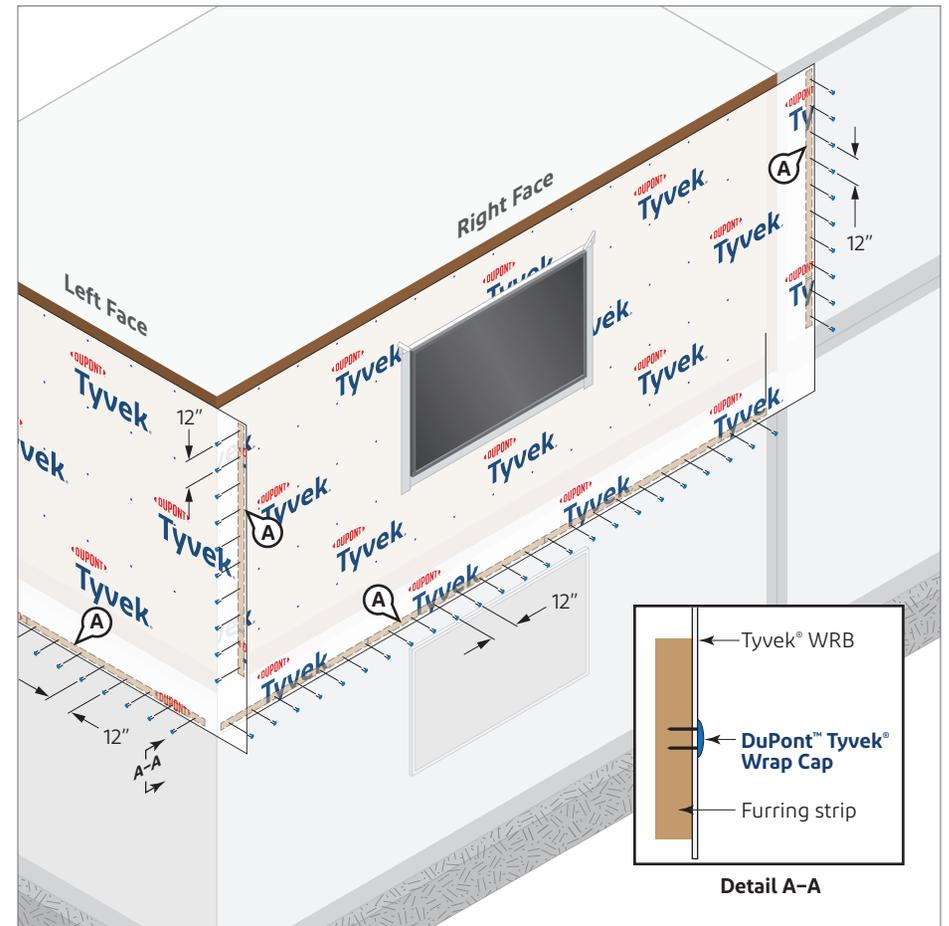


## For Modules with Outside Corners

### STEP 2

#### Install Furring Strips

- A. Cut and install furring strips per instructions in Part 1 above for both the right and left faces of corner module, ensuring that the horizontal furring strips are cut and attached the width and height of the corner module sheathing on each face.



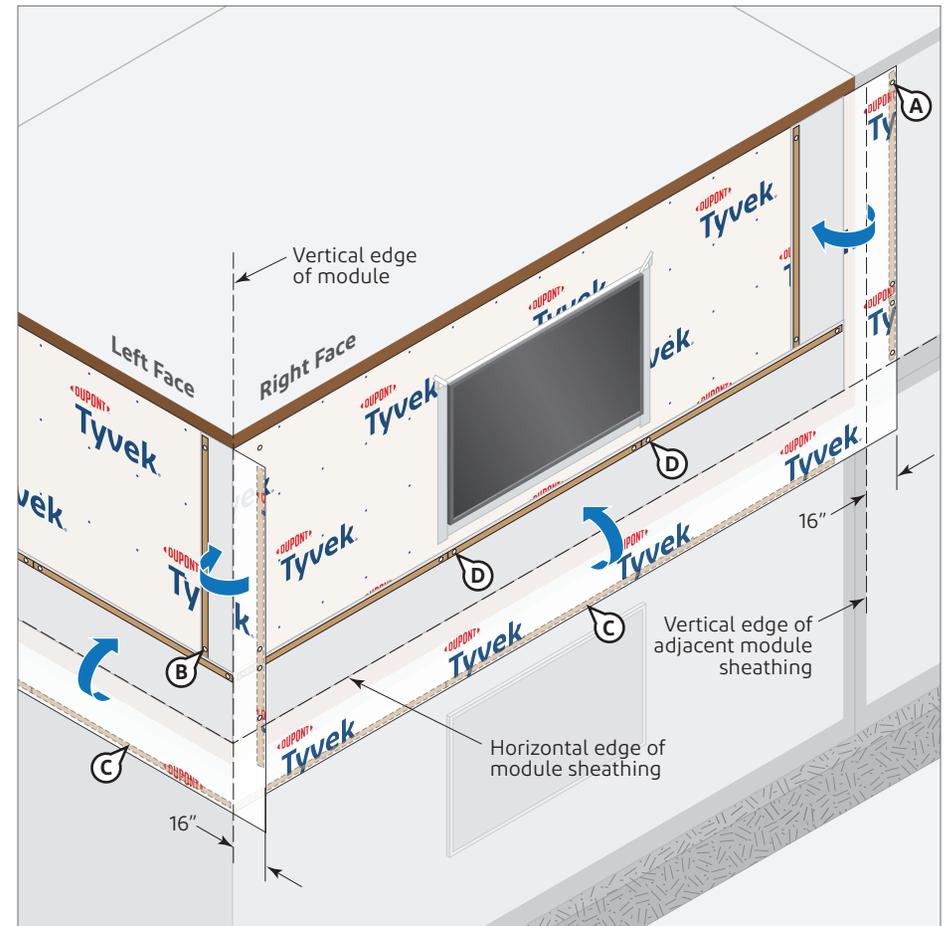
## For Modules with Outside Corners

### STEP 3

Fold DuPont™ Tyvek® WRB Flaps onto Faces of Corner Module and Fasten.

- A. Holding the vertical furring strips, fold back the Tyvek® WRB flaps at the vertical edges of the module sheathing. Create fold(s) such that furring strip aligns with stud of module wall.
- B. Using wood screws of sufficient length to penetrate the stud, fasten the top of the furring strips to wall framing within 12" of the top edge of the module sheathing. For maximum holding power, 2" DuPont™ Tyvek® Wrap Cap washer (or min. 1" rigid washer) is recommended. Repeat at bottom of wall by installing an additional fastener within 12" of the bottom edge of module sheathing. Fasten so the vertical furring strips are aligned parallel to the vertical edges of the module sheathing.
- C. Holding the horizontal furring strips, fold up the Tyvek® WRB flaps at the horizontal edge of the module sheathing.
- D. Fasten the furring strips to wall framing within 12" of the left and right edges of the module sheathing. Ensure the horizontal furring strips are level.

**Note:** It is acceptable to use multiple furring strips as necessary for a single flap when installing onto larger modules. It may also be necessary to use additional fasteners in the center of the furring strips to fully secure flaps.



## For Modules with Outside Corners

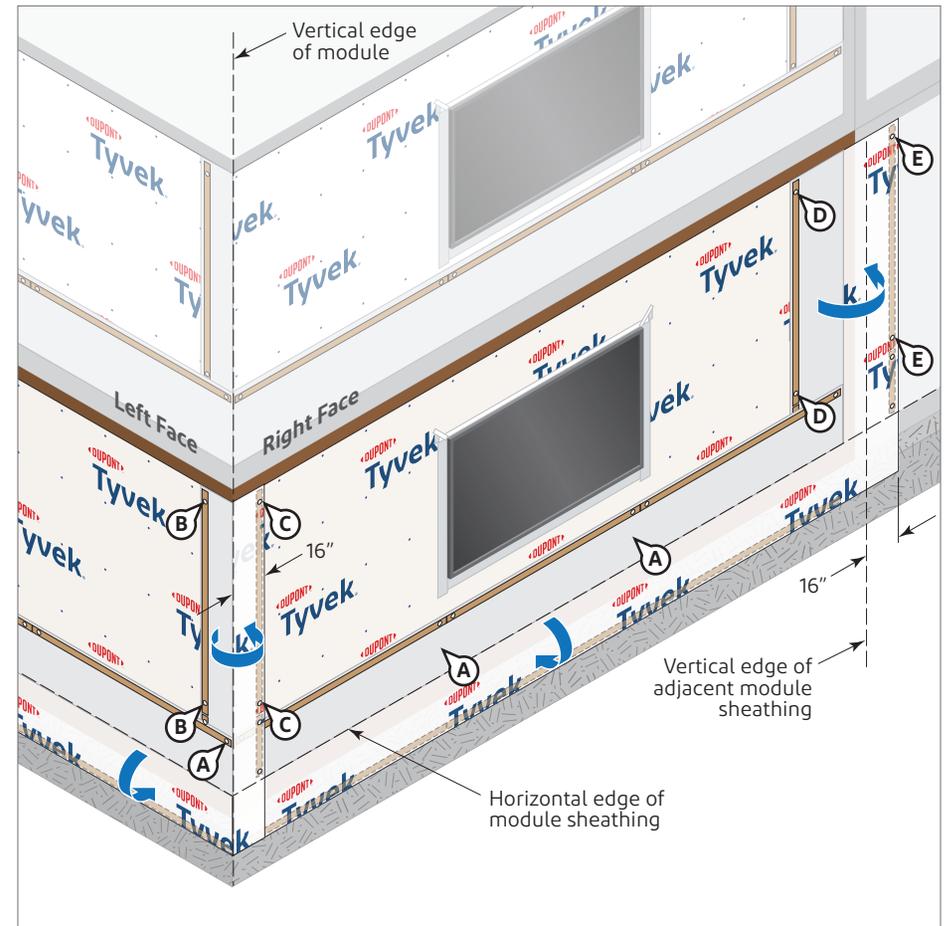
### Alternate Part 2: Closing DuPont™ Tyvek® WRB Flaps Over Mate Line Areas at the Job Site

This section provides details for closing the **Tyvek® WRB** flaps for outside corner modules at the job site in order to avoid water infiltration at mate line areas during the construction process. Follow the same process in Part 2 and Part 3 above for opening and closing the flaps when work or inspections are required, removing furring strips, and sealing the flaps during the final weatherization process.

#### STEP 1

##### Unfold DuPont™ Tyvek® Flaps of Lower Modules.

- A. Starting at the bottom corner module, remove the screws used to secure the horizontal furring strips and fold **Tyvek® WRB** flaps down over the foundation.
- B. Starting at the left face of the bottom corner module, remove the screws used to secure the vertical furring strips. Fold corner vertical furring strip and **Tyvek® WRB** flap around the corner onto the right face of the corner module. The flap should overlap the **Tyvek® WRB** on the side of the corner module by 16".
- C. Use the same screws to secure the furring strip into studs of right face of corner module.
- D. Fold the vertical furring strip and **Tyvek® WRB** flap on the right face of the corner module to the right over mate line area and use same screws to secure into studs of adjacent module. The flap should overlap the **Tyvek® WRB** on the adjacent module by 16".
- E. Use the same screws to secure the furring strips into studs of the adjacent module.



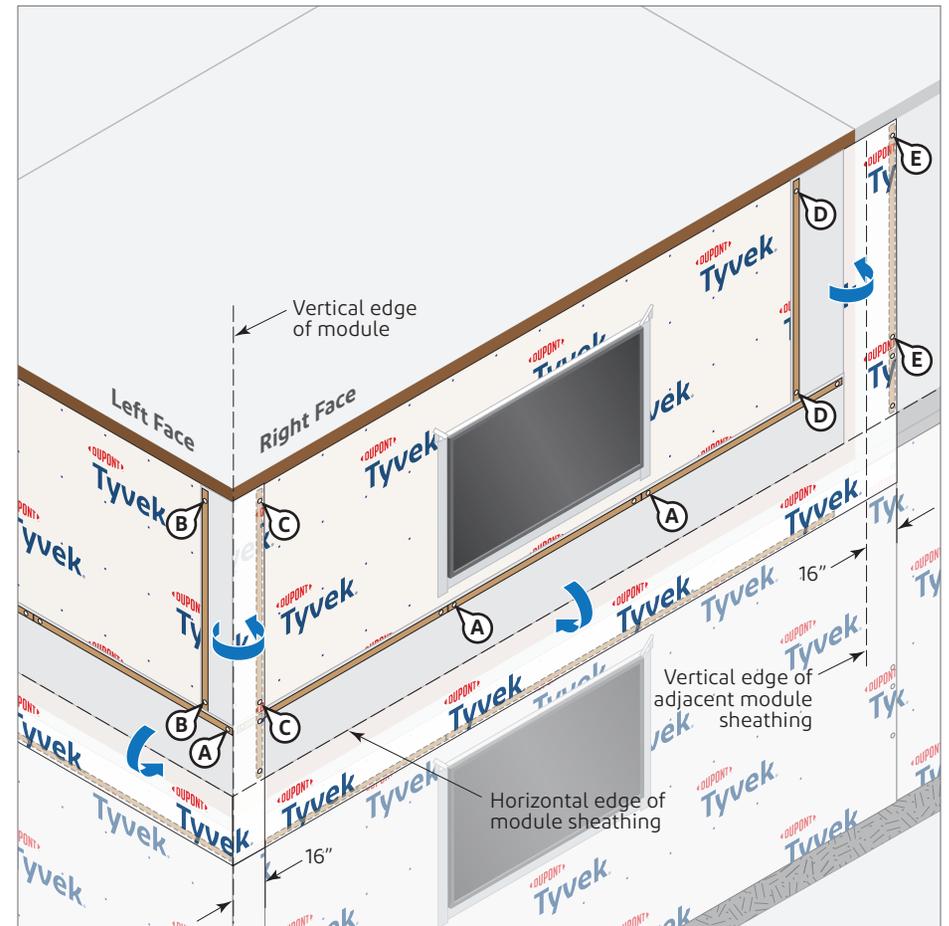
## For Modules with Outside Corners

### STEP 2

Unfold DuPont™ Tyvek® WRB Flaps of Upper Modules.

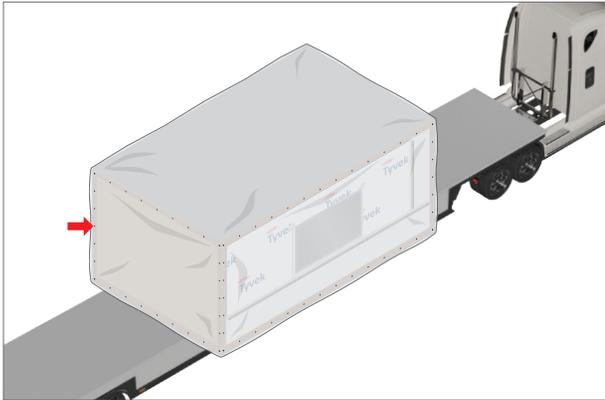
- A. Starting at the top corner module, remove the screws used to secure the horizontal furring strips and fold Tyvek® WRB flaps down over mate line areas. The flaps should overlap the Tyvek® WRB on the module below by 16".
- B. Starting at the left face of the top corner module, remove the screws used to secure the vertical furring strips. Fold corner vertical furring strip and Tyvek® WRB flap around the corner onto the right face of the corner module. The flap should overlap the Tyvek® WRB on the side of the corner module by 16".
- C. Use the same screws to secure the furring strip into studs of right face of corner module.
- D. Fold the vertical furring strip and Tyvek® WRB flap on the right face of the corner module to the right over mate line area. The flap should overlap the Tyvek® WRB on the adjacent module by 16".
- E. Use the same screws to secure the furring strips into studs of the adjacent module.

**Note:** Follow instructions above for reopening and closing flaps, sealing fastener holes, trimming furring strips, and sealing seams of Tyvek® WRB.



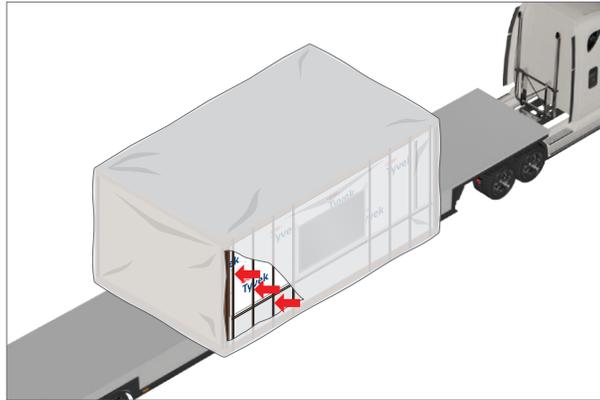
## Special Considerations for Packaging Modules for Transport

Once the DuPont™ Tyvek® WRB is installed with flaps secured per Parts 1 and 2 above, DuPont recommends that modules be fully covered with a protective material such as a tarp or plastic sheeting to prevent damage to the module, wall components, and the Tyvek® WRB. When securing the protective covering to the modules, avoid fastener placement through the DuPont™ Tyvek® WRB. The following methods can be employed to secure the protective covering without damaging the Tyvek® WRB. Protection of the module will be determined by the manufacturer and is not limited to the methods shown below.



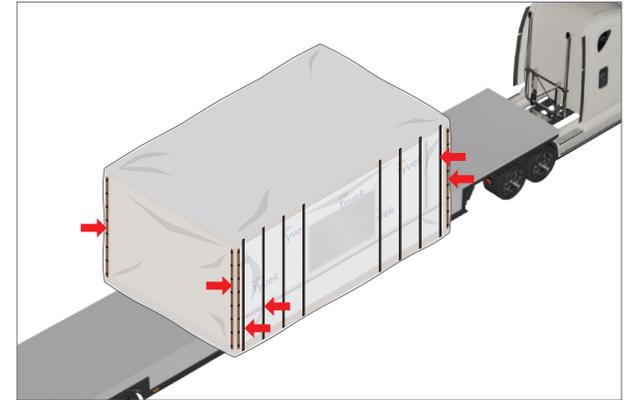
### Method 1

Install the protective covering with fasteners at locations limited to framing, module bracing, or other structural members left exposed after folding and securing the Tyvek® WRB flaps.



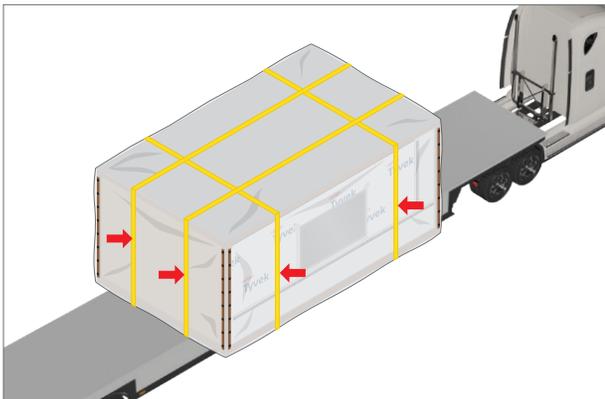
### Method 2

Install vertical furring strips as needed across the face of the module UNDER the protective covering to provide a fastening base for attachment of the covering to during transport. The furring strips should be secured to framing, module bracing, or other structural members left exposed after folding and securing the Tyvek® WRB flaps.



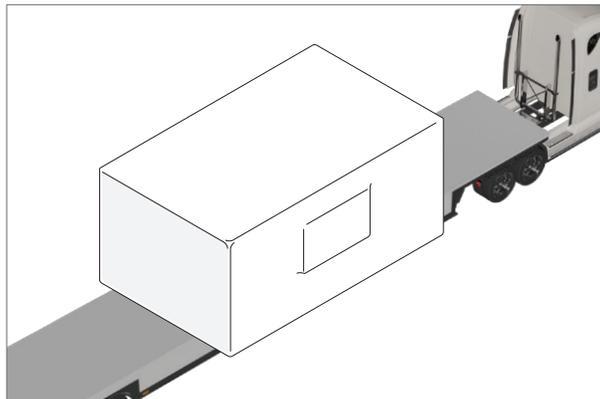
### Method 3

Install vertical furring strips as needed across the face of the module OVER the protective covering to secure and reinforce during transport. The furring strips should be secured through the covering to framing, module bracing, or other structural members left exposed after folding and securing the Tyvek® WRB flaps.



### Method 4

Install strapping as necessary around the protective covering to secure and reinforce during transport.



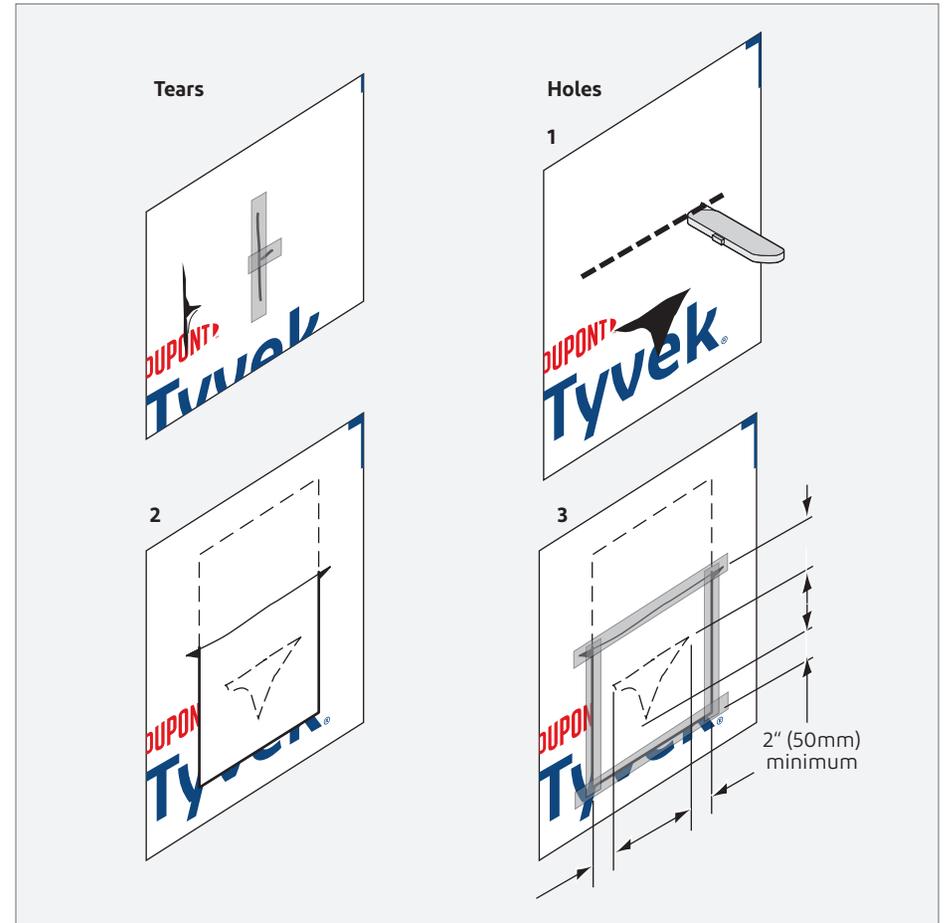
### Method 5

Install heat activated shrink wrap covering over entire module. If necessary, initial attachment of membrane should be made to framing, module bracing, or other structural members left exposed after folding and securing the Tyvek® WRB flaps.

**Note:** Regardless of which method is used, be careful when removing the protective covering to avoid damaging the Tyvek® WRB. Repair as necessary per the *Repairing Holes and Tears Section* below.

## Repairing Holes and Tears

- During the course of installing the **DuPont™ Tyvek® WRB**, minor tears may occur. Be sure to tape all tears. Tears can easily be covered with **DuPont™ Tyvek® Tape** or **DuPont™ Self-Adhered Flashing products**.
- Larger tears may require cutting a piece of **Tyvek® WRB** to repair the tear. Measure and cut a piece of **Tyvek® WRB** large enough to cover tear with an excess of 2" around the tear plus an extra 6" in height. Cut a slit 2" above the tear large enough to accommodate the patch. Tuck patch into slit at least 6" and shingle over lower air and water barrier. Tape along the perimeter by starting at bottom of tear and shingling the upper tape over the bottom tape.



## Alternate Fastening

- A. Standard brick tie base plates and metal plates with **DuPont™ StraightFlash™**, **DuPont™ Flashing Tape** or DuPont recommended alternate patches behind.
- B. Metal channels, horizontal z-girts, etc. with **DuPont™ StraightFlash™**, **DuPont™ Flashing Tape** or DuPont recommended alternate patches behind.
- C. Wood furring strips mounted vertically.

**DuPont™ StraightFlash™**, **DuPont™ Flashing Tape** or DuPont recommended alternate not required unless the furring strips are shimmed.

### Notes:

- Additional fasteners may be needed between brick ties, and other alternate fasteners to maintain recommended fastener spacing.
- **DuPont™ StraightFlash™**, **DuPont™ Flashing Tape** or DuPont recommended alternate patches should be applied behind fastening plates (brick tie base plates, metal fastening clips, metal channels, etc.) when building envelope design requirements exceed ASTM E1677, 65 mph equivalent structural load and 15 mph equivalent wind-driven rain water infiltration resistance.



## Facade Considerations

Water-resistive barrier performance is dependent upon the ability of the facade to drain. The following must be considered for specific facades.

### Stucco and Direct-Applied Stone

When stucco is installed over wood-based sheathing, the 2015 International Building Code (Section 2510.6) requires a water-resistive vapor-permeable barrier with a performance at least equivalent to two layers of water resistive barrier complying with ASTM E 2556, Type I, or a water resistive barrier which is separated from the stucco by an intervening, substantially nonwater-absorbing layer or drainage space. When stucco is installed over wood-based sheathing, the 2015 International Residential Code (Section R703.7.3) requires a water-resistive vapor-permeable barrier with a performance at least equivalent to two layers of Grade D paper or a water-resistive barrier which is separated from the stucco by an intervening, substantially nonwater-absorbing layer or designed drainage space. The individual layers shall be installed independently such that each layer provides a separate continuous plane and any flashing intended to drain to the water-resistive barrier is directed between the layers. **DuPont™ Tyvek® WRBs** used behind stucco should be separated from the stucco by a second layer of **Tyvek® WRB**, a layer of Grade D building paper, felt, rigid foam board or the paper backing of paper-backed lath. **DuPont™ Tyvek® DrainVent™ Rainscreen** can also be used as the intervening layer over the WRB. The first layer (directly over sheathing or studs) serves as the wall system's water-resistive barrier and is integrated with window and door flashings, the weep screed at the bottom of the wall and any through wall flashings or expansion joints. Lath shall be installed over the intervening layer in accordance with ASTM C1063-03 Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster and applicable codes. Rigid foam board, when installed over **Tyvek® WRB** as an intervening layer, will provide enhanced structural support to the **Tyvek® WRB** and may reduce the required number of fasteners used for the attachment of the **Tyvek® WRB** if installed as soon as practically possible. **DuPont™ Tyvek® StuccoWrap®, DrainWrap™** or **CommercialWrap® D** is recommended for this application.

### Brick

The 2015 International Residential Code (Section R703.8.4) requires a nominal 1 inch air space separating the brick from the water-resistive barrier (WRB). The Brick Industry Association recommends a 1 inch air-space in front of wood stud construction and a 2 inch air-space in front of steel stud construction. Consistent with these requirements and recommendations, **Tyvek® WRBs** shall be separated from the brick veneer by a nominal 1 inch air-space. Window and door flashing, and through-wall flashing shall be integrated with the **Tyvek® WRB** layer ensuring proper shingling. For maximum moisture management and drying of the wall system the air space in front of the **Tyvek® WRB** shall be vented to the exterior at the top and bottom of the wall. Some types of brick ties will act as additional fasteners for **Tyvek® WRBs**, and, if installed as soon as practically possible after the **Tyvek® WRB**, may reduce the required number of fasteners used for the initial attachment of the **Tyvek® WRB**.

### Stone Veneer

The 2015 International Building Code (Section 1405.10) requires two layers of water resistive barrier (WRB) behind stone veneers over wood frame construction. When used behind stone veneer, **Tyvek® WRBs** shall be installed in a similar manner as they are installed behind stucco. **Tyvek® WRBs** should be separated from the stone and mortar by a second layer of **Tyvek® WRB**, a layer of grade D building paper, felt, rigid foam board or the paper backing of paper-backed lath. **DuPont™ Tyvek® DrainVent™ Rainscreen** can also be used as the intervening layer over the WRB. The first layer (directly over sheathing or studs) serves as the wall system's air and water barrier and shall be integrated with window and door flashings, the weep screed at the bottom of the wall and any through wall flashing or expansion joints. Lath shall be installed over the intervening layer (second layer) in accordance with ASTM C1063-03 Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster and applicable codes. When rigid foam board is used as the second layer, it is installed over the **Tyvek® WRB**. **DuPont™ Tyvek® StuccoWrap®, DrainWrap®** or **CommercialWrap® D** is recommended for this application.

### Wood Siding

The **Tyvek® WRB** and wood siding shall be installed according to manufacturer's instructions, industry standards and applicable codes. As recommended by the Western Red Cedar Lumber Association and U. S. Forest Product Laboratory, wood siding should be primed on all six sides before installation. Foam sheathing panels often have low vapor permeability, and therefore can cause moisture to accumulate on the back of siding and cause staining, buckling and damage to finish coats. As a result, the Western Red Cedar Lumber Association and other wood siding manufacturers recommend that furring strips are used to create an air space between foam sheathing and siding. Other recommendations that should be followed to minimize potential problems are:

- Use thicker siding patterns in widths of 8 inches or less. Thick, narrow siding is more stable than thinner, wider patterns and better able to resist dimensional changes.
- Use kiln-dried siding over rigid foam sheathing.
- Proper pre-finishing is essential.
- Use light color finish coats to maximize heat reflection and reduce dimensional movement.

**DuPont™ Tyvek® StuccoWrap®, DrainWrap™** or **CommercialWrap® D** applied over the foam sheathing is recommended for this application.

In high exposure installations, enhanced drainage and water management may be provided by using **DuPont™ Tyvek® StuccoWrap®, DrainWrap™** or **CommercialWrap® D**, by installing **DuPont™ Tyvek® DrainVent™ Rainscreen** or other drainage mesh over the water-resistive barrier, or by creating rainscreen cladding with a larger air space behind the siding using furring strips. If furring is installed over the **Tyvek® WRB** to create a rainscreen, the primary fastener spacing can exceed 18”.

## Fiber Cement Siding

**DuPont™ Tyvek® WRBs** and fiber cement siding shall be installed according to manufacturer's instructions and industry standards. In high exposure installations, enhanced drainage and water management may be provided by using **DuPont™ Tyvek® StuccoWrap®**, **DrainWrap™** or **CommercialWrap® D**, by installing a drainage mesh over the water-resistive barrier, or by creating rainscreen cladding with a larger air space behind the siding using furring strips. If furring is installed over the **Tyvek® WRB** to create a rainscreen, the primary fastener spacing can exceed 18". In high wind areas at gable end walls, FEMA recommends fiber cement siding be installed over wood sheathing rather than over plastic foam sheathing. **Tyvek® WRBs** and fiber cement siding shall be installed according to manufacturer's instructions, industry standards and applicable codes.

## Vinyl Siding

Vinyl Siding is installed directly over **Tyvek® WRBs**. Vinyl siding shall be installed in accordance with manufacturer's instructions, industry standards and applicable codes, including ASTM D4756-15 Standard Practice for Installation of Rigid Poly(Vinyl Chloride) (PVC) Siding and Soffit. In high wind areas at gable end walls, FEMA recommends vinyl siding be installed over wood sheathing rather than over plastic foam sheathing.

## EIFS

**Tyvek® WRBs** and EIFS cladding shall be installed according to manufacturer's instructions and industry standards. In order to promote drainage, it is recommended that **DuPont™ Tyvek® StuccoWrap®**, **DrainWrap®** or **CommercialWrap® D** be installed behind the exterior insulation. Window and door flashing, and through wall flashing shall be integrated with the WRB layer ensuring proper shingling. The successful installation and performance of EIFS cladding is dependent upon the proper design and construction of the adjacent materials and systems of the structure.

## Exterior Insulation

**Tyvek® WRBs** and exterior insulation shall be installed according to the manufacturer's instructions and industry standards. **Tyvek® WRBs** can be installed either over the rigid exterior insulation or underneath between the sheathing and the exterior insulation. In order to promote drainage, it is recommended that **DuPont™ Tyvek® StuccoWrap®**, **DrainWrap®** or **CommercialWrap® D** be used when installing the **Tyvek® WRB** layer between the sheathing and exterior insulation. Window flashing, door flashing, and through wall flashing shall be integrated with the **Tyvek® WRB** layer ensuring proper shingling. The successful installation and performance of exterior insulation is dependent upon the proper design and construction of adjacent materials and systems of the structure.

**Note:** **DuPont™ RainVent™ Battens** can be used to improve the ventilation and draining space behind wood, stucco or stone masonry, vinyl, and fiber cement cladding types.

## Technical Specifications

**Tyvek® WRBs** used in construction products are made from 100% flash spunbonded high density polyethylene fibers which have been bonded together by heat and pressure, without binders or fillers, into a tough, durable sheet structure. Additives have been incorporated into the polyethylene to provide ultraviolet light resistance. DuPont requires that **DuPont™ Tyvek® CommercialWrap®** and **CommercialWrap® D** WRB's be covered within 9 months (270 days) of installation and that all other DuPont WRB's be covered within 4 months (120 days) of installation.

**DuPont™ Self-Adhered Flashing products** are made from a synthetic rubber adhesive and a laminate of polyethylene film, polypropylene film, elastic fiber, synthetic rubber adhesive, polyurethane adhesive, and a top sheet of flash spunbonded high density polyethylene fibers or polypropylene film. Additives have been incorporated into these materials to provide ultraviolet light resistance. DuPont requires that **DuPont™ FlexWrap™ EZ**, **FlexWrap™ NF**, **StraightFlash™** and **StraightFlash™ VF** be covered within nine months (270 days) of installation. DuPont requires that **DuPont™ Flashing Tape** be covered within four months (120 days) of installation.

## Warning

**Tyvek® WRBs** are slippery and should not be used in any application where they will be walked on. In addition, because they are slippery, DuPont recommends using kickjacks, scaffolding, or lifts for exterior work above the first floor. If ladders must be used, extra caution must be taken to use them safely by following the requirements set forth in ANSI Standards 14.1, 14.2, and 14.5 for ladders made of wood, aluminum, and fiberglass, respectively. **Tyvek® WRBs** are combustible and should be protected from flames and other high heat sources. **Tyvek® WRBs** will melt at 275°F (135°C) and if the temperature of **Tyvek® WRBs** reach 750°F (400°C), they will burn and the fire may spread and fall away from the point of ignition.

DuPont™ **DuPont™ Self-Adhered Flashing products** and their release paper are slippery and should not be walked on. Remove release paper from work area immediately. **DuPont™ Self-Adhered Flashing products** will melt at temperatures greater than 250°F (121°C). **DuPont™ Self-Adhered Flashing products** are combustible and should be protected from flames and other high heat sources. **DuPont™ Self-Adhered Flashing products** will not support combustion if the heat source is removed. However, if burning occurs, ignited droplets may fall away from the point of ignition.

**DuPont™ Residential Sealant** is irritating to skin, eyes, and respiratory tract. For proper usage, follow directions stated on the product label.

For DuPont Product health information, refer to the Material Safety Data Sheet or call Chemtrec at 1-800-424-9300.

*This document is limited to the installation details for using DuPont Products in modular construction applications as outlined herein. Please refer to the applicable DuPont Performance Building Solutions Installation Guidelines available at [building.dupont.com](http://building.dupont.com) for details not included in this bulletin. DuPont believes this information to be reliable and accurate. The information may be subject to revision as additional experience and knowledge is gained. It is the user's responsibility to determine the proper construction materials needed.*

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