Multi-Family User’s Bulletin for Installation of DuPont Building Envelope Solutions Products

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Introduction

Use of this Residential Multi-Family User’s Bulletin

This user bulletin is designed to serve as a resource for building professionals and installers using DuPont Building Envelope Solutions products in multi-family applications. It does not override or change requirements in the Installation Guidelines or Warranties and should be used in conjunction with these documents. Always refer back to the applicable Installation Guidelines and Warranties, available at www.tyvek.com, for complete information.

DuPont Multi-Family Definition

The multi-family building segment varies widely within the industry. Multi-family buildings may refer to townhomes, four- or five-story apartment buildings, mixed-use apartment buildings, high rise apartment buildings, or other buildings for residential use as defined by the International Building Code (IBC). Different buildings types can have different performance criteria based on a number of factors, including building height, number of stories, type of construction, and design performance specifications which makes understanding multi-family design criteria both challenging and confusing.

This document will help guide builders, designers, consultants, installers, and others understand the appropriate installation details for the building envelope when using DuPont Building Envelope Solutions Products in order to meet performance and warranty requirements.

Specifically, this Multi-Family User’s Bulletin applies to low-rise buildings that are four stories or less from grade plane AND have performance specifications not exceeding ASTM E1677 (65 equivalent structural load and 15 mph equivalent wind-driven rain water infiltration resistance). A five story building can also be considered low-rise if it is a residential-use (Group R) building structure that is less than 60 feet in height from Grade Plane as defined by the International Building Code (IBC). A low-rise building in this category must be constructed of wood-based structural exterior framing and sheathing of Type V or Type III Construction (IBC Table 503). The IBC includes allowances for Automatic Sprinkler height increase (IBC S04.2) and ‘podium’ structures outlined in the Special Provisions (IBC Section 510). To meet this definition of a five story low-rise building, NFPA 285 compliance is not required for any of the building’s wall assemblies.
The specific requirements for eligibility of the DuPont Building Envelope Solutions Products 10-Year Limited Builder Warranty for Buildings Less Than 5 Stories and Low-Rise Multi-Family Residential Buildings Less Than 6 Stories are based on a distinction between single-family and multi-family structures. Single-family Residential applications include fully-detached one or two family structures, as well as townhouse structures not more than three stories above grade plane as defined in the 2012 International Residential Code (IRC) section R101.2, both to the extent they are exclusively Residential-Use building structures. See the Single Family User’s Bulletin For Installation of DuPont Building Envelope Solutions Products for further discussion about product and installation considerations single-family applications.

Applicable Products and Product Descriptions for the Multi-Family Market

Applicable DuPont Building Envelope Solutions products include Water Resistive Barriers (WRBs), Self-Adhered Flashing Products, and installation accessories such as fasteners, seam tape, primers, and sealants. Below is a description of each DuPont™ Building Envelope Solutions Product that can be used as part of the complete building envelope.

DuPont™ Tyvek® WRBs

DuPont™ Tyvek® WRBs are made from a tough, spunbonded polyethylene breathable membrane with microscopic pores that resist air penetration while allowing moisture vapor to pass through. When properly installed, these materials also act as a secondary barrier to bulk water that may penetrate the exterior plane to reduce thelikelihood of mold/rot/degradation and include:

- DuPont™ Tyvek® HomeWrap™ – Helps prevent air and water infiltration, but allows water vapor to escape to prevent rot and mold inside walls.
- DuPont™ Tyvek® StuccoWrap™ – Used in applications with a two layer WRB system for traditional stucco or as a single WRB for EIFS applications. Designed with a grooved texture to provide enhanced drainage.
- DuPont™ Tyvek® DrainWrap™ – Designed with a grooved texture to provide enhanced drainage.
- DuPont™ Tyvek® ThermaWrap™ LE – Designed with a metallized, low-emission (low-e) surface that reflects solar radiation away from the building to help improve energy efficiency.
- DuPont™ Tyvek® CommercialWrap™ – Designed for Commercial applications with increased durability, resistance to air, water, and UV exposure.
- DuPont™ Tyvek® CommercialWrap™ D – Designed for Commercial applications with increased durability, resistance to air, water, and UV exposure. The grooved texture provides enhanced drainage.
- DuPont® Fluid Applied WB+™ System Products – DuPont® Fluid Applied System Products provide a continuous WRB with fluid-applied products and includes fluid-applied flashing, sealant, and joint compound. These products are most typically used in commercial or high-performance installations.

While DuPont™ Tyvek® CommercialWrap™ and DuPont™ Tyvek® CommercialWrap™ D can be used for Single Family Residential applications, they are typically used on high performance commercial projects.

DuPont™ Tyvek® Self-Adhered Flashing Products

DuPont™ Tyvek® Self-Adhered Flashing Products work with DuPont™ Tyvek® WRBs to help seal the building envelope. The flashing is made from a butyl adhesive that performs through extreme temperatures, adheres to most common building materials, and contains no asphalt.

- DuPont™ FlexWrap™ NF – A moldable and formable self-adhered flashing used for sill applications and round-top windows.
- DuPont™ StraightFlash™ – A self-adhered flashing used for heads and jambs of rectangular windows and doors.
- DuPont™ StraightFlash™ VF – A self-adhered flashing with a versatile flange used for brick mold and non-flanged windows and doors.
- DuPont™ Flashing Tape – An alternative self-adhered flashing membrane used for heads and jambs of rectangular windows and doors.
- DuPont® Fluid Applied Flashing – DuPont Fluid Applied Flashing provides continuous flashing with fluid applied products. These products are most typically used in commercial or high performance installations.

DuPont Building Envelope Solutions Installation Accessories

DuPont offers a number of accessory products that work with DuPont™ Tyvek® WRBs and DuPont™ Tyvek® Self-Adhered Flashing Products to provide superior air and water barrier protection for durable, energy-efficient homes.

- DuPont™ Tyvek® Wrap Cap Fasteners (nails, screws, staples) – Designed to increase holding power and reduce tears when fastening DuPont™ Tyvek® Building Envelope Solutions products.
- DuPont™ Tyvek® Tape – Used for sealing the seams of DuPont™ Tyvek® Building Envelope Solutions products to help provide a continuous barrier against air and water infiltration.
- DuPont™ Residential Sealant – A urethane modified acrylic, formulated to bond with DuPont™ Tyvek® Building Envelope Solutions products.
- DuPont™ Adhesive/Primer – A high performance adhesive/primer designed to help create a high strength bond between self-adhered flashing products and wall surfaces where either adhesion can be difficult, or for use in cold temperature applications.
- DuPont™ Window & Door Foam – A minimal expansion, low pressure polyurethane window and door foam. It works with DuPont™ Tyvek® WRBs to help keep air and water out around windows, doors, pipe penetrations, and joints.

Additional information about these and other products such as DuPont™ RainVent™ Battens are included in the following tables:
Water-Resistive Barriers (WRB)

<table>
<thead>
<tr>
<th>Product</th>
<th>Dimensions</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>DuPont® Tyvek® HomeWrap®</td>
<td>3 ft x 100 ft</td>
<td>300 sq ft</td>
</tr>
<tr>
<td></td>
<td>3 ft x 65 ft</td>
<td>495 sq ft</td>
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<tr>
<td></td>
<td>5 ft x 200 ft</td>
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<tr>
<td></td>
<td>9 ft x 100 ft</td>
<td>900 sq ft</td>
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<td></td>
<td>9 ft x 150 ft</td>
<td>1,350 sq ft</td>
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<tr>
<td></td>
<td>10 ft x 100 ft</td>
<td>1,000 sq ft</td>
</tr>
<tr>
<td>DuPont® Tyvek® StuccoWrap®</td>
<td>5 ft x 200 ft</td>
<td>1,000 sq ft</td>
</tr>
<tr>
<td>DuPont® Tyvek® DrainWrap®</td>
<td>9 ft x 125 ft</td>
<td>1,125 sq ft</td>
</tr>
<tr>
<td></td>
<td>10 ft x 125 ft</td>
<td>1,250 sq ft</td>
</tr>
<tr>
<td>DuPont® Tyvek® ThermaWrap® LE</td>
<td>5 ft x 150 ft</td>
<td>750 sq ft</td>
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<tr>
<td></td>
<td>9 ft x 100 ft</td>
<td>900 sq ft</td>
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<tr>
<td>DuPont® Tyvek® CommercialWrap®</td>
<td>5 ft x 200 ft</td>
<td>1,000 sq ft</td>
</tr>
<tr>
<td></td>
<td>10 ft x 125 ft</td>
<td>1,250 sq ft</td>
</tr>
<tr>
<td>DuPont® Tyvek® CommercialWrap® D</td>
<td>5 ft x 200 ft</td>
<td>1,000 sq ft</td>
</tr>
<tr>
<td></td>
<td>10 ft x 125 ft</td>
<td>1,250 sq ft</td>
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Installation Accessories

<table>
<thead>
<tr>
<th>Product</th>
<th>Type</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>DuPont® Tyvek® Tape</td>
<td>2” Bulk Pack</td>
<td>36 rolls/case</td>
</tr>
<tr>
<td></td>
<td>3” Bulk Pack</td>
<td>24 rolls/case</td>
</tr>
<tr>
<td>DuPont® Tyvek® Metallized Tape</td>
<td>2” x 100’ Rolls</td>
<td>12 rolls/case</td>
</tr>
<tr>
<td>DuPont® Tyvek® Wrap Cap staples or other cap staples for Stinger® Cap Stapler</td>
<td>16 gauge, available in 7/8”, 1-1/4”, and 1-1/2” lengths</td>
<td>2,000/box</td>
</tr>
<tr>
<td></td>
<td>16 gauge, 3/8” length</td>
<td>2,016/box</td>
</tr>
<tr>
<td>DuPont® Tyvek® Wrap Cap nails</td>
<td>1” electro-galvanized ring shank nail</td>
<td>2,000/box</td>
</tr>
<tr>
<td>DuPont® Tyvek® Wrap Cap screws</td>
<td>2” Wrap Cap Screws</td>
<td>1,000/box</td>
</tr>
<tr>
<td>DuPont® RainVent® Battens</td>
<td>5/8 in x 3/8 in x 8 ft</td>
<td>40/pack</td>
</tr>
<tr>
<td>DuPont® Adhesive/Primer</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>DuPont® Residential Sealant</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>DuPont® Window &amp; Door Foam</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

DuPont® Self-Adhered Flashing Products

<table>
<thead>
<tr>
<th>Product</th>
<th>Width</th>
</tr>
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<tbody>
<tr>
<td>DuPont® FlexWrap® NF</td>
<td>6 in</td>
</tr>
<tr>
<td></td>
<td>9 in</td>
</tr>
<tr>
<td>DuPont® StraightFlash®</td>
<td>4 in</td>
</tr>
<tr>
<td></td>
<td>9 in</td>
</tr>
<tr>
<td>DuPont® StraightFlash® VF</td>
<td>6 in</td>
</tr>
<tr>
<td></td>
<td>4 in</td>
</tr>
<tr>
<td>DuPont® Flashing Tape</td>
<td>6 in</td>
</tr>
<tr>
<td></td>
<td>9 in</td>
</tr>
<tr>
<td></td>
<td>12 in</td>
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DuPont® Fluid Applied Products

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<thead>
<tr>
<th>Product</th>
<th>Quantity</th>
<th>Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>DuPont® Tyvek® Fluid Applied WB+</td>
<td>5 gal, 50 gal</td>
<td>55 – 65 sf/gal*</td>
</tr>
<tr>
<td>DuPont® Tyvek® Fluid Applied Flashing and Joint Compound</td>
<td>28 oz, 3.5 gal</td>
<td>50 – 60 sf/gal*</td>
</tr>
<tr>
<td>DuPont® Tyvek® Fluid Applied Flashing and Joint Compound (for gypsum sheathing seam treatment)</td>
<td>28 oz, 3.5 gal</td>
<td>2.5–3.5 lb/oz</td>
</tr>
<tr>
<td>DuPont® Sealant for Tyvek® Fluid Applied System</td>
<td>28 oz</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*Estimated surface coverage at 25 mils thick

General DuPont® Tyvek® WRB and Flashings Systems Installation Principles

The primary elements of proper weather barrier system installation for building envelopes are Continuity, Overlap, and Fastening.

- **Continuity** refers to establishing a continuous barrier to help prevent bulk moisture from penetrating the wall system, to help direct bulk moisture out of the wall system, and to help prevent air leakage from entering the building and affecting the building’s energy efficiency. Continuity encompasses taping seams, proper terminations at the roof-wall interface and the wall-to-foundation interface, and appropriate details at all penetrations, windows, doors, pipes, ducts, etc.

- **Overlap** refers to the proper shingling of the building envelope components on the wall. Much in the same way shingles are installed on a roof, it is important that the weather barrier membrane and flashing be properly overlapped so bulk water is directed down and away from the wall.

- **Cap Fasteners** are important for both overall durability of the weather barrier system, and also for reducing the potential for water penetration or air leakage at fastening points.

If these basic principles are compromised, bulk water may enter the wall system and cause damage over time. The areas around windows or other wall penetrations are extremely vulnerable; and therefore, proper window and door flashing and integration with the WRB is critical to water management. The plane where the WRB is placed is considered the drainage plane, and windows and doors should be flashed in a method that enables water to drain to the exterior of the drainage plane.

In addition to shedding water properly, the DuPont Flashing Installation Guidelines are designed to provide protection of the sill with DuPont® Tyvek® FlexWrap® NF. This product is installed at the sill to protect the vulnerable bottom corners of the sill where water damage is most likely to occur. Installing head and jamb flashing with DuPont® StraightFlash™ or DuPont® Flashing Tape after integral flanged windows are installed helps provide proper continuity between the window flange and the DuPont® Tyvek® WRB or sheathing. In this method, the window flange at the sill is not sealed to the WRB and provides a mechanism for water to drain to the exterior should it penetrate the drainage plane and accumulate at the sill.
The same approach is used for non-flanged windows such as brick mold installations, i.e. DuPont™ FlexWrap™ NF is first installed at the sill prior to installing the window. In this case, DuPont™ StraightFlash™ VF is installed directly to the brick mold at the window jambs and head prior to window installation in order to create a flange on the window that can be subsequently integrated to the sheathing and WRB to establish continuity of the drainage plane. For higher performance installations, the entire rough opening is sealed with flashing prior to the window installation.

The ability to design a continuous and durable air barrier plane despite transitions such as roof assemblies intersecting exterior walls, windows, and other service penetrations ultimately contributes to the air leakage of the whole building. DuPont offers the components necessary to construct an exterior air barrier assembly which includes a collection of compatible products that can be tied together to provide air tightness for the whole building enclosure.

The Home Energy Rating System (HERS) Index is a common industry method of rating the energy efficiency of new and existing homes. As a part of the HERS Index rating process, a blower door test is completed, which determines the air tightness of a home. As air tightness of a home increases, the energy efficiency will increase, resulting in a lower HERS Index Score. An air tight home prevents cold air infiltration in the winter months, and moist warm air infiltration in the summer months. DuPont™ Tyvek™ WRBs create an exterior air barrier that contributes to overall air tightness and energy efficiency and helps the conditioned air to stay inside of the home, minimizing energy loss. Each of the WRB Installation Guidelines provide requirements for air barrier installations.

**DuPont™ Building Envelope Solutions Installation Guidelines and Warranty Considerations**

Product installation on multi-family structures may be covered by one of two sets of the DuPont Installation Guidelines. It is important to understand which Installation Guideline and installation practices are aligned with the designated building envelope design performance and associated height considerations.

**Overview of Installation Guidelines and Performance Requirements**

Among other requirements, the Product and Labor component of Warranty eligibility is based on use of the appropriate installation Guideline and DuPont™ Building Envelope Solutions Products.

In general, the DuPont Installation Guidelines are separated by building envelope performance as follows:

- **Installation Guidelines for Buildings Less Than 5 Stories and Low-Rise Multi-Family Residential Buildings Less Than 6 Stories.**
- **Installation Guidelines for Buildings Greater Than 4 Stories and High Performance Installations of any Height.**

DuPont offers Installation Guidelines under each of these categories for both DuPont™ Tyvek™ WRB application and for DuPont™ Self-Adhered Flashing application for a variety of details.

Low-rise multi-family structures typically meet the criteria of the Installation Guidelines for Buildings Less Than 5 Stories and Low-Rise Multi-Family Residential Buildings Less Than 6 Stories. Multi-family buildings that are 6 stories or greater or have a high performance design specification automatically default to the Installation Guidelines for Buildings Greater Than 4 Stories and High Performance Installations of any Height. A full list of Installation Guidelines and Bulletins for Buildings Less Than 5 Stories and Low-Rise Multi-Family Residential Buildings Less Than 6 Stories are included later in this document.

**Overview of Warranty Requirements**

In addition to the criteria based upon number of stories, there are requirements for Warranty eligibility that also must be met in the DuPont Building Envelope Solutions 10-Year Limited Warranty for Buildings Less Than 5 Stories and Low-Rise Multi-Family Residential Buildings Less Than 6 Stories.

This Warranty follows the definition outlined above and includes low-rise buildings that are 4 stories or less from grade plane AND have performance specifications not exceeding ASTM E1677, Standard Specification for an Air Retarder (AR) Material or System for Low-Rise Framed Building Walls. In addition, a 5 story building can be considered low-rise, and eligible to this Warranty if it is a residential-use (Group R) building structure that is less than 60 feet in height from Grade Plane. It is important to note that this definition should match the same requirements used by the building official to determine height for code compliance. As outlined above, this low-rise building should also have a performance level not exceeding ASTM E1677 and be constructed of wood-based structural exterior framing and sheathing of Type V or Type III Construction (IBC Table 503). The IBC includes allowances for Automatic Sprinkler height increase (IBC 504.2) and ‘podium’ structures outlined in the Special Provisions (IBC Section 510). To meet this definition of a 5 story low-rise building, NFPA 285 compliance is not required for any of the building’s wall assemblies. Buildings that meet these criteria can follow the Installation Guidelines for Buildings Less Than 5 Stories and Low-Rise Multi-Family Residential Buildings Less Than 6 Stories.

Manufacturers’ warranties vary; some offer Product warranty, others a Product and Labor warranty. While not customary, a Product and Labor warranty can include the cost of restoring affected construction if the product contributed to the root cause of the problem. Both the Product Warranty and the Product and Labor Warranty offered by DuPont are Limited Warranties effective for a period of 10 years. The Product Warranty covers repair or replacement of defective DuPont Building Envelope Solutions products only and does not cover repair and replacement of other damaged materials. In addition to replacement of defective weather barrier materials, the Product and Labor Warranty covers reasonable construction repair costs to correct any problem that arises solely out of the failure of the applicable DuPont Building Envelope Solutions Product.
The DuPont 10-Year Limited Warranties are directly tied to the DuPont Installation Guidelines. The applicable Installation Guidelines must be followed in order to be eligible for the Product and Labor component of the Limited Warranty.

This section provides guidance on choosing the applicable Installation Guideline and installation details for eligibility for both the Product and Labor Components of the 10-Year Limited Warranties.

In order to be eligible for the Product and Labor components of the Warranty, DuPont Building Envelope Solutions Products must be used in all applicable areas of the structure, as indicated in the Installation Guidelines. For example, if a home has multiple claddings and one portion of is constructed using an EIFS product while the rest is constructed with fiber cement cladding, it is not necessary for the DuPont™ Tyvek® WRB to be installed under the EIFS portion of the wall, but would be required on the remainder of the building. This is because EIFS manufacturers often require the use of a specific WRB as a part of the EIFS system; and, DuPont™ WRBs would not be applicable behind these EIFS products. However, if a combination of DuPont™ Tyvek® WRBs and other manufacturer’s building wraps were otherwise used on the same home, the home would not be eligible for the Product and Labor components of the Warranty.

If a building is constructed with a flashing detail not covered in the Installation Guidelines, general drainage principles should be used. The DuPont™ Tyvek® Specialist Network (described below) is available to help evaluate whether or not a detail meets the criteria for the applicable DuPont™ Weatherization System Installation Guide.

The Warranty may cover only the DuPont™ Tyvek® WRB, or both the DuPont™ Tyvek® WRB Products and DuPont Self-Adhered Flashing Products.

- In order to be eligible for the Product and Labor component of the Warranty for the DuPont™ Tyvek® WRB, the DuPont™ Tyvek® WRB must be installed in accordance with the applicable Installation Guidelines, including the proper overlap, shingling, taped seams, fasteners, fastener schedule, terminations, etc. and all other terms of the DuPont™ Building Envelope Solutions 10-Year Limited Warranty process must be followed.

- In order to be eligible for the Product and Labor component of the Warranty for the DuPont™ Tyvek® Self-Adhered Flashing Products, DuPont™ Tyvek® Building Wrap Products must be used and installed in accordance with the applicable Installation Guidelines. The DuPont Self-Adhered Flashing Products must be installed in accordance with the applicable Installation Guidelines and all other terms of the DuPont™ Building Envelope Solutions 10-Year Limited Warranty process must be followed.

DuPont™ Tyvek® WRB Selection

When considering the Product and Labor component of the Warranty, DuPont™ Tyvek® HomeWrap®, DuPont™ Tyvek® StuccoWrap®, DuPont™ Tyvek® DrainWrap® should only be used when following the Installation Guidelines for Buildings Less Than 5 Stories and Low-Rise Multi-Family Residential Buildings Less Than 6 Stories. DuPont™ Tyvek® CommercialWrap® and DuPont™ Tyvek® CommercialWrap® D can be used when using either set of guidelines, but they are designed to be used with the Installation Guidelines for Buildings Greater Than 4 Stories and High Performance Installations of any Height.

The Figure below depicts the relationship between the Installation Guides, Warranties, and Applicable Products and may serve as a quick visual reference when seeking Warranty Coverage.

Overview of Installation Guideline and Warranty use.


*The “Conditional” 5 story building refers to the inclusion of buildings that meet specific criteria into the Buildings Less Than 5 Stories and Low Rise Multi-Family Buildings Less Than 6 Stories Warranty and associated Installation Guidelines. If a 5 story building does not meet the criteria, it will follow the DuPont Building Envelope Solutions 10-Year Limited Warranty for Buildings Greater Than 4 Stories and associated Installation Guidelines. The use of DuPont™ Flashing Tape is restricted for low-rise, lower performance buildings with the exception of specific applications and building types for the DuPont Building Envelope Solutions 10-Year Limited Warranty for Buildings Greater Than 4 Stories and associated Installation Guidelines. Refer to these documents and the appropriate Installation Guidelines for more information on the use of DuPont™ Flashing Tape.
Building Envelope Performance Requirements

The building envelope performance specification will affect the level of detail required for installation of the WRB. For example, commercial structures typically have a much higher performance specification than single family residential homes, and therefore require a more robust set of installation details. This following section will further explain how building envelope design considerations impact installation of DuPont Building Envelope Solutions Products.

Identifying Performance Requirements

Building envelope performance can be determined directly in the project specifications, indirectly in the engineering wind design loads, or in specifications of other building envelope components such as windows or cladding. Performance considerations of the WRB may include:

1. Reducing air infiltration to help meet energy code requirements,
2. Withstanding structural air and gust loads,
3. Resisting water infiltration into the wall assembly in order to contribute to wall assembly durability, and
4. Maintaining these properties while being subjected to thermal cycling in order to simulate real-world conditions.

The project specification manual within the project documents typically provides the air and water barrier performance specification for the building envelope.

Performance Testing

Wall assemblies can be tested using various standards and test methods. The standard that DuPont uses for low-rise buildings (Buildings Less Than 5 Stories and Low-Rise Multi-Family Residential Buildings Less Than 6 Stories) is ASTM E1677. This standard tests to a performance level equivalent to 65 mph structural load and 15 mph equivalent wind-driven rain water infiltration resistance.

When building performance requirements exceed ASTM E1677, the Installation Guidelines for Buildings Greater Than 4 Stories and High Performance Installations of any Height (High Performance Installation Guidelines) for DuPont Tyvek® Building Wraps and DuPont Self-Adhered Flashing Products are followed. The testing protocol for these Installation Guidelines is much more rigorous than those for low-rise buildings and is outlined in the DuPont Building Science Bulletin, DuPont™ Tyvek® Commercial Air Barrier Assemblies Exceed Air Barrier Association of America, ASHRAE 90.1 and IECC Air Leakage Requirements When Tested in Accordance with ASTM E2357.

When considering Warranty coverage for high performance installations and for commercial buildings greater than four stories, refer to the DuPont™ Weatherization Products 10-Year Limited Warranty for Buildings Greater Than 4 Stories.

In addition to the building envelope performance specification, the pressures used during air and water infiltration field testing of windows or other fenestrations should be considered when choosing the applicable DuPont Installation Guidelines and details. Building Envelope Consultants typically test a set percentage of the windows in a building. The testing pressures often vary by region or by test administrator. Test pressures are determined based on window design ratings, building exposure, or other design data. Common field testing methods used are ASTM E1105, Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference, or AAMA 502, Voluntary Specification for Field Testing of Newly Installed Fenestration Products.

High Performance Installation Requirements

When building envelope design criteria exceed ASTM E1677 (65 mph equivalent structural load and 15 mph equivalent wind-driven rain water infiltration resistance), the Installation Guidelines for Buildings Greater Than 4 Stories and High Performance Installations of any Height for DuPont™ Tyvek® WRBs and DuPont Self-Adhered Flashing products are followed.

When considering the Product and Labor Component of the 10-Year Limited Warranties, the installation details listed below, among others, must be considered when building envelope design criteria exceed ASTM E1677:

- DuPont™ Tyvek® WRB and DuPont Self-Adhered Flashing product selection and fastening requirements vary between the two sets of Installation Guidelines. Refer to the applicable Installation Guidelines for more details.
- 4” DuPont™ Flashing Tape can be used as an alternative to 3” DuPont™ Tyvek® Tape where specified (e.g. window head flaps and certain terminations) in the DuPont™ Tyvek® Air and Water Barrier Installation Guidelines for Buildings Greater Than 4 Stories. For residential multi-family buildings greater than 4 stories, or high performance installations, it is suitable to use 4” DuPont™ Flashing Tape to flash the jamb and head flanges of integral flanged windows on Residential Group R structures as outlined in the IBC.
- Air barrier installation may be part of the criteria for Product and Labor eligibility (sealing both vertical and horizontal seams and all terminations). The Installation Guidelines for Buildings Less Than 5 Stories and Low-Rise Multi-Family Residential Buildings Less Than 6 Stories do not require the WRB to be installed as an air barrier; however, it is a recommended best practice. Although not required by these Installation Guidelines, some specifiers may separately require an air barrier installation for the WRB. In contrast, the Installation Guidelines for Buildings Greater Than 4 Stories and High Performance Installations of any Height require a full air barrier installation. This involves properly sealing all seams and terminations. Refer to the applicable Installation Guidelines for more details.
• Air barrier installations for high performance installations will include the following:
  - The WRB is terminated at the top of the wall with DuPont™ StraightFlash™ and properly integrated with the roofing membrane, if present.
  - The termination at the bottom of the wall is consistent with the High Performance Installation Guidelines. Sealant alone cannot be used to terminate the WRB.
  - The WRB is installed before the windows for maximum continuity of the building envelope.

• Flashing patches are installed behind cladding fasteners such as brick ties, metal plates, and metal channels, to provide additional water and air sealing performance.
  - See the DuPont™ Tyvek® Mechanically Fastened Air and Water Barrier Installation Guidelines for Buildings Greater Than 4 Stories and High Performance Installations of any Height, “Alternate Fastening” section more information.
  - For high performance installations, additional mechanical fasteners are installed into the flashing at the head flap and perimeter of the window at recommended spacing in order to provide additional structural/gust loading performance. See DuPont Self-Adhered Flashing Systems Installation Guidelines for Buildings Greater Than 4 Stories and High Performance Installations of any Height for more information.

Additional Product and Installation Considerations

Fastening
Fastening requirements differ for the two sets of Installation Guidelines, both in type of fastener and in fastener spacing. Refer to the individual installation guidelines for the complete details.

The Installation Guidelines for Buildings Less Than 5 Stories and Low-Rise Multi-Family Residential Buildings Less Than 6 Stories were designed for nailable substrates, i.e. wood. The typical fastener for these guidelines is a DuPont™ Tyvek® Wrap Cap 1” cap staple, cap nail or other manufacturer’s equivalent cap fastener.

For the DuPont™ Tyvek® Air and Water Barrier Installation Guidelines for Buildings Greater Than 4 Stories, the typical fastener for the WRB is a 2” DuPont™ Tyvek® Wrap Cap Screw. These screws are intended to be used in combination with fiber-faced exterior gypsum sheathing and metal studs.

Both guidelines allow for alternative fasteners, such as cladding fasteners, brick ties or others. Flashing patches can be installed behind these fasteners for extra performance for air and water holdout, as described in the section above. In addition, temporary means of attachment are included in the Temporary Fastening section of each Installation Guideline. Temporary fasteners are sometimes installed due to the fact that the permanent fasteners – the cladding fasteners – will be installed very soon after. If temporary means of WRB attachment are used, it is important to note there is an increased risk of WRB blow off or damage of the WRB. Therefore, DuPont recommends installing the permanent fasteners as soon as practically possible. Temporary fastening methods can include adhesive/primer installed in vertical strips along stud lines, recommended fasteners installed at a reduced schedule, or other methods.

Finally, DuPont™ Tyvek® Wrap Cap Fasteners should not be installed where DuPont Self-Adhered Flashing or DuPont™ Tyvek® Tape will be applied to avoid interference with the adhesion of these products. DuPont™ Tyvek® Wrap Cap Fasteners can be installed over DuPont Self-Adhered Flashing or DuPont™ Tyvek® Tape.

Refer to the applicable Installation Guidelines for more information.

UV Exposure
For Warranty eligibility, DuPont requires that DuPont™ Tyvek® CommercialWrap™ and DuPont™ Tyvek® CommercialWrap D, and DuPont™ Tyvek® Fluid Applied Products be covered within nine months (270 days) of installation and that all other DuPont™ Tyvek® Building Wraps be covered within four months (120 days) of installation. DuPont Flashing products also have a UV exposure limit. DuPont™ FlexWrap™ NF and DuPont™ StraightFlash™ products should be covered within nine months (270 days) and DuPont™ Flashing Tape products should be covered within four months (120 days).

Primer
Adverse weather conditions or cold temperatures (below 25°F, -4°C) 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 DuPont™ Adhesive/Primer. Primer is not required when DuPont® Self-Adhered Butyl Flashing Products are being applied to wood, except when there are cold temperatures as described above.

Sealants
For information on sealants, refer to the Technical Bulletin Chemical Compatibility of Representative Building Sealants, DuPont™ Tyvek® Commercial Building Envelope Solutions Products. In addition, the Technical Bulletin Adhesion Performance Reference Sheet DuPont™ Tyvek® Fluid Applied Commercial Building Envelope Solutions Products contains information relating to both DuPont™ Tyvek® Fluid Applied Products and DuPont Self-Adhered Flashing Products.
Fluid Applied Products
DuPont offers a complete portfolio of Fluid Applied products: DuPont™ Tyvek® Fluid Applied WB+™ for a continuous weather barrier for a variety of wall systems, DuPont™ Tyvek® Fluid Applied Flashing and Joint Compound for complex detailing around fenestrations and penetrations, and DuPont™ Sealant for Tyvek® Fluid Applied System for interior perimeter seals around windows and other uses. These products can be applied to many substrates, including wood. Refer to the applicable Installation Guidelines for more details on DuPont™ Tyvek® Fluid Applied System products.

Installation Guidelines Applicability
There are a variety of DuPont™ Tyvek® WRB and Flashing Systems Installation Guidelines available for various conditions. Each of the guidelines and a description of applicability is included below.

DuPont™ Tyvek® WRB Installation Guidelines
2. DuPont™ Tyvek® Installation Guide for Water Resistive Barriers for Residing (K-22331) – Installation instructions for installing DuPont™ Tyvek® WRBs on residing projects that include integration of the WRB with existing window flashing.
4. DuPont™ Tyvek® Mechanically Fastened Air and Water Barrier Installation Guidelines for Buildings Greater Than 4 Stories and High Performance Installations of any Height (K-16160)

DuPont™ Self-Adhered Flashing Installation Guidelines
1. DuPont Self-Adhered Flashing Installation Guidelines-Installation Instructions for Windows and Doors After Water-Resistive Barrier (WRB) is Installed (K-17934)
2. DuPont Self-Adhered Flashing Systems Installation Guidelines-Installation Instructions for Windows and Doors Before Water-Resistive Barrier (WRB) is Installed (K-17933)
3. DuPont Self-Adhered Flashing Systems Installation Guidelines for Buildings Greater Than 4 Stories and High Performance Installations of any Height (K-17976)
4. DuPont Self-Adhered Flashing Systems Alternate Flanged Window Detail Aligned with FMA/AAMA 100-12 (Methods A, B, & C) (K-27329) – Describes 3 alternate window flashing methods that are aligned with FMA/AAMA 100-12 which includes procedures for the installation of windows into wood frame buildings subject to extreme wind and water climate exposure.

Air Barrier Installation Bulletins
There are also a series of Installation Bulletins available that describe details for establishing an air barrier for selective conditions within a home.
1. DuPont™ Tyvek® Weatherization Systems, Air Barrier Installation Detail: Top and Bottom of Wall (K-27367)
2. DuPont™ Tyvek® Weatherization Systems, Air Barrier Installation Detail: Garage to Attic Interface (K-27368)
3. DuPont™ Tyvek® Weatherization Systems, Air Barrier Installation Detail: Cantilever Interface (K-27369)
4. DuPont™ Tyvek® Weatherization Systems, Air Barrier Installation Detail: Attic Knee Wall Interface (K-27370)

5. Installation of Integral Flanged Windows in Recessed Openings After Water-Resistive Barrier (WRB) Is Installed for up to 4” Recess Using Single and Double Stud Window Framing (K-27349) – Describes methods for installing windows into shallow recessed window conditions after the WRB has been installed. This condition is more common in the Southwest.
6. Installation of Integral Flanged Windows in Recessed Openings Before Water-Resistive Barrier (WRB) is Installed for up to 4” Recess Using Single and Double Stud Window Framing (K-27340) – Describes methods for installing windows into shallow recessed window conditions before the WRB has been installed. This condition is more common in the Southwest.
7. Installation of Integral Flanged Windows in Recessed Openings After Water-Resistive Barrier (WRB) is Installed for Greater Than 4” Recess Using Single and Double Stud Window Framing (K-27358) – Describes methods for installing windows into deep recessed window conditions after the WRB has been installed. This condition is more common in the Southwest.
8. Installation of Integral Flanged Windows in Recessed Openings Before Water-Resistive Barrier (WRB) is Installed for Greater Than 4” Recess Using Single and Double Stud Window Framing (K-27357) – Describes methods for installing windows into deep recessed window conditions before the WRB has been installed. This condition is more common in the Southwest.
9. DuPont™ Flashing Tape for Inside and Outside Wall Corners (K-27372) – Describes methods for providing enhanced protection of both inside and outside corners created by intersecting walls using 12’ wide DuPont™ Flashing Tape.
Educational Materials

Tech Talk
- Weather Barriers are a Must with Exterior Foam Sheathing (K-25107)

Building Science Bulletins
- The Truth About Vapor Permeability (K-26358)
- DuPont™ Tyvek® HomeWrap® (K-16325)
- DuPont™ Tyvek® CommercialWrap® D (K-16778)
- Understanding High Perm vs. Low Perm (K-01472)
- Chemical Compatibility of Representative Building Sealants, DuPont™ Tyvek® Commercial Weatherization Systems Products (K-27282)
- Adhesion Performance Reference Sheet DuPont™ Tyvek® Fluid Applied Commercial Weatherization Systems Products (K-27283)
- Understanding the Use of Air and Water-Resistive Barriers in NFPA 285 Compliant Wall Assemblies (K-28384)
- DuPont™ Tyvek® Commercial Air Barrier Assemblies Exceed Air Barrier Association of America, ASHRAE 90.1 and IECC Air Leakage Requirements When Tested in Accordance with ASTM E2357 Building Science Bulletin (K-26060)

White Paper
- DuPont Building Innovations White Paper – Vapor Permeable or Impermeable Building Envelope Materials, Does it Matter? (K-26352)

Additional Resources

Specialist Network
The DuPont™ Tyvek® Specialist Network is an elite team of more than 180 highly-trained field representatives dedicated to keeping up with trends and supporting installations before, during and after construction. From the latest updates on building codes to keeping up with current challenges, local DuPont™ Tyvek® Specialists can provide on-site consulting and training to help make sure the job gets done right.

Certified Installer
DuPont offers a program to train installers on the basics of building science, product knowledge, and proper installation of DuPont Building Envelope Solutions. These installers receive classroom and on-site training on proper installation techniques and safety practices from a DuPont™ Tyvek® Specialist and must pass written and hands-on installation tests to become part of the Certified Installer network.

- Residential Certified Installer training
- Commercial Certified Installer training
- DuPont™ Tyvek® Fluid Applied System products Certified Installer training

Building Envelope CEU: AIA/CES Learning Units
DuPont is a participant in the American Institute of Architects’ Continuing Education Systems (AIA/CES) Registered Provider program and offers a range of AIA/CES Learning Units designed to help building professionals stay up-to-date on best building practices and specifications. These units cover a wide range of weatherization-related topics, ranging from Better Design of Buildings to Moisture Management Systems Review to Commonly Made Energy Mistakes. Within the AIA/CES system, a Learning Unit (LU) is earned for each 60-minute increment of instruction or study. A Continuing Education Unit (CEU) is earned for each 10 hours of instruction or study. Each of these CEUs can be presented by your local Tyvek® Certified Specialists.
DuPont® Tyvek® WRB Installation
Fasteners installed directly to studs and spaced 6-18” per schedule.
- DuPont® Tyvek® Wrap Cap nails, screws, or staples
- Other cap staples for Stinger® Cap Stapler
- Other manufacturers’ equivalent fasteners
- No fasteners within 6” of window sill and jambs and 9” of window head.

Vertical overlaps 6”-12” and horizontal overlaps min. 6”.
All vertical seams taped with DuPont®

**Integral Flanged Window Installed After WRB**

1” cut WRB at rough opening with 45° cuts at window head extending min. 8” from corner. Flaps at jambs folded into the opening and secured.

Head flap flipped up and secured.

DuPont® FlexWrap™ NF installed at the sill extending min. 6” up jambs.

Sealant applied to three sides of the window opening at jambs and head. Optional: Skip sealing at the sill for drainage.

Window installed per manufacturer’s specifications.

DuPont® StraightFlash™ or DuPont® Flashing Tape applied over flanges at jambs and head.

Head flap trimmed 1-2” and secured overhead flashing with DuPont® Tyvek® Tape or DuPont Self-Adhered Flashing products.

Full interior perimeter seal applied.

**Non-Integral Flanged Window Installed After WRB**

“O” cut (flush cut) WRB at rough opening with 45° cuts at window head extending 8” from corners.

Head flap flipped up and secured.

DuPont® FlexWrap™ NF installed at the sill, minimum 6” up the jambs.

9” DuPont® StraightFlash™ installed at jambs.

DuPont® FlexWrap™ NF installed at head of rough opening.

Window installed per manufacturer’s specifications.

Optional: Drip cap installed and integrated.

Exterior perimeter seal applied at jambs and head.

Optional: Skip sealing at sill for drainage.

Head flap trimmed 1-2” and secured overhead flashing with DuPont® Tyvek® Tape or DuPont Self-Adhered Flashing Systems products.

Full interior perimeter seal applied.

**Sealing Penetrations – Non-Flanged Products**

**Method 1**
DuPont® Tyvek® WRB piece installed under bottom flange.
DuPont® Self-Adhered Flashing products applied to flanges.
DuPont® Tyvek® WRB installed to overlap piece below by min. 6”.

**Method 2**
DuPont® Tyvek® WRB cut back 1” around penetration.
Single piece of DuPont® FlexWrap™ NF applied from bottom, and around penetration with 2” overlap onto layer below.

Optional: piece of DuPont® Tyvek® WRB taped over top of DuPont® FlexWrap™ NF

**Sealing Penetrations – Non-Flanged Products**

**Method 1**
DuPont® Tyvek® WRB cut back 1” around penetration with head flap cut above.
First piece of DuPont® FlexWrap™ NF installed around bottom of penetration before second piece installed around top of penetration, overlapping bottom layer by 2”.

Head flap sealed using DuPont® Tyvek® Tape or DuPont Self-Adhered Flashing Systems products.

**Method 2**
DuPont® Tyvek® WRB cut back 1” around penetration to expose flange.
DuPont® Self-Adhered Flashing products installed at bottom, sides, and top of flanges.

Optional: DuPont® Residential Sealant applied around penetration.
**Multifamily User’s Bulletin – Field Installation Examples**

This document is designed to serve as a resource. The examples provided do not override or change any requirement in the currently published Installation Guidelines or Warranties. Always refer back to the applicable Installation Guidelines and Warranties, available at www.tyvek.com, for complete information.

### Shelf Angle

Through wall flashing applied over shelf angle. DuPont® Tyvek® WRB terminated onto through wall flashing with min. 6" overlap and sealed with DuPont® Tyvek® Tape or DuPont® Self-Adhered Flashing Product.

DuPont® Tyvek® WRB sealed to bottom of shelf angle using DuPont® Self-Adhered Flashing Systems Product.

**Note:** For lintels or floating lintels, refer to the DuPont® Self-Adhered Flashing Installation Guidelines for Buildings Greater than 4 Stories and High Performance Installations of Any Height.

### Parapet with Brick Façade

- Roofing membrane installed.
  - DuPont® Tyvek® WRB terminated with DuPont® StraightFlush™.
  - Through wall flashing installed over parapet wall, overlapping DuPont® Tyvek® WRB and roofing membrane min. 4".

**Optional:** DuPont® Self-Adhered Flashing patches installed behind brick ties.

Coping Cap installed.

### WRB to Concrete Transition

Concrete primed with DuPont® Adhesive/Primer.

DuPont® Tyvek® WRB overlapped min. 2" onto concrete column.

DuPont® Tyvek® WRB sealed to concrete with DuPont® Self-Adhered Flashing product.

DuPont® Tyvek® WRB mechanically fastened to studs.

### Brick Mold Door Installed After WRB

DuPont® StraightFlash™ VF applied to interior side of door frame along jambs and head (head piece installed first).

**"I" cut WRB at rough openings with continuous horizontal cuts at head and sill. 45° cuts at window head extending min. 8" from corners.** Flaps at jambs folded into the opening and secured. Head flap flipped up and secured. DuPont® FlexWrap™ NF installed at the sill extending min. 6" up jambs. Integrated back dam as applicable. Release paper removed from DuPont® StraightFlash™ VF and flashing adhered at jambs and head.

Door installed per manufacturer’s specifications. Head flap trimmed 1/2" and secured over head flashing with DuPont® Tyvek® Tape or DuPont® Self-Adhered Flashing products. Optional: drip cap installed with head flap lapped over drip cap.

Optional: high pressure skirt installed to door frame prior to door installation for higher performance requirements. Full interior perimeter seal applied.

### Storefront Window on Slab Installed After WRB

**"O" cut (flush cut) in WRB at rough opening with 45° cuts at window head extending 8" from corners.** Head flap flipped up and secured. Sill pan flashing shimmed, leveled, anchored, and sealed per manufacturer’s recommendation.

9" DuPont® StraightFlash™ installed at jambs at wrapped into rough opening.

DuPont® FlexWrap™ NF installed at head of rough opening.

Storefront window installed and glazed per manufacturer’s instructions.

Head flap trimmed 1/2" and secured over head flashing with DuPont® Tyvek® Tape or DuPont® Self-Adhered Flashing products.

Full interior perimeter seal applied.

### Storefront Window on Knee Wall Installed After WRB

**"O" cut (flush cut) WRB at rough opening with 45° degree cuts at window head extending 8" from corners.** Head flap flipped up and secured. DuPont® FlexWrap™ NF installed at the sill, minimum 6” up the jambs. Sill pan flashing shimmed, leveled, anchored, and sealed per manufacturer’s recommendation.

DuPont® StraightFlash™ installed at jambs. DuPont® FlexWrap™ NF installed at head of rough opening.

Storefront window installed and glazed per manufacturer’s instructions.

Head flap trimmed 1/2" and secured over head flashing with DuPont® Tyvek® Tape or DuPont® Self-Adhered Flashing products.

Full interior perimeter seal applied.

### Brick Mold Window Installed After WRB

DuPont® StraightFlash™ VF applied to interior side of door frame along jambs and head (head piece installed first).

**"I" cut at rough opening. 45° cuts at door head extending 8" from corners.** Head flap flipped up and secured. Flaps at jambs folded into the opening and secured. DuPont® FlexWrap™ NF installed at the sill extending min. 6” up jambs. Integrated back dam as applicable. Release paper removed from DuPont® StraightFlash™ VF and flashing adhered at jambs and head.

Window installed per manufacturer’s specifications. Head flap trimmed 1/2" and secured over head flashing with DuPont® Tyvek® Tape or DuPont® Self-Adhered Flashing products. Optional: drip cap installed with head flap lapped over drip cap.

Full interior perimeter seal applied.

### Adjacent Integral Flanged Windows Installed After WRB

**"I" cut WRB at rough openings with continuous horizontal cuts at head and sill. 45° cuts at window head extending min. 8" from corners.** Flaps at jambs folded into the opening and secured. Head flap flipped up and secured. DuPont® FlexWrap™ NF installed at each sill extending min. 6” up jambs. DuPont® StraightFlash™ or DuPont® Flashing Tape installed onto vertical framing, bottom edge aligned with sill, top edge extending 4” above head.

Horizontal cuts in flashing along top of head to edge of vertical framing. Flasings folded into rough opening and adhered to inside framing. Sealant applied to three sides of the window opening at jambs and head. Optional: Skip sealing at the sill for drainage.

Window installed per manufacturer’s specifications. DuPont® StraightFlash™ or DuPont® Flashing Tape applied over flanges at jambs and head.

Head flap trimmed 1/2” and secured over head flashing with DuPont® Tyvek® Tape or DuPont® Self-Adhered Flashing products. Full interior perimeter seal applied.
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