Wall Moisture Management Installation Guide

DEFLECTION/DRAINAGE/DRYING

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PACTIV

BUILDING WRAP INSTALLATION

1. General

GreenGuard Building Wraps are polyolefin building wraps intended to perform as water-resistive barriers in residential applications when installed in accordance with the guidelines provided in this manual. They are intended to reduce the risk of air and bulk water infiltration when installed under exterior coverings such as brick, stucco, clay tile, etc., and various siding materials like wood, vinyl, fiber cement, etc.

GreenGuard Building Wraps are available as cross-woven wraps (Value Wrap, Classic Wrap, GreenGuard® MAX™, and RainDrop®) and as a non-woven wrap (Ultra Wrap). The GreenGuard Building Wraps conform with the intent of the following building codes and industry standards:

Attention: A water-resistive barrier is now required behind all exterior coverings.

- **2006 International Residential Code - Water-Resistant Sheathing Paper**
  Section R703.2, Table R703.4 as an alternate to No. 15 asphalt-saturated felt building paper complying with ASTM D 226, Type I.

- **2006 International Building Code - Water-Resistive Barrier**
  Sections 1404.2 and 1403.2 as an alternate to No. 15 asphalt-saturated felt building paper complying with ASTM D 226, Type I.

- **International One- and Two-Family Dwelling Code - Weather - Resistant Sheathing Paper**
  Section 703.2 and Table 703.4 as an alternate to asphalt-saturated felt building paper weighing not less than 14 pounds per 100 square feet.

- **BOCA National Building Code - Weather-Resistive Barrier**
  Section 1404.1 as an alternate to No. 15 asphalt-saturated felt building paper complying with ASTM D 226, Type I.

- **ICBO Uniform Building Code - Weather-Resistive Barrier**
  Section 1404.1 as an alternate to No. 15 asphalt-saturated felt building paper complying with ASTM D 226, Type I.

- **SBCCI Standard Building Code - Moisture Protection Barrier**
  Sections 1404.2 and 1404.3 as an alternate to No. 15 asphalt-saturated felt building paper complying with ASTM D 226, Type I.

- **ASTM E 1677, Type I (Specification for Air Retarder Materials or Systems)**

- **HUD/FHA UU-B-790A (Equivalent to Grade D Building Paper)**

2. Description

This manual provides guidelines for installing GreenGuard Building Wraps in residential applications as a water-resistive barrier. These guidelines are not intended to address all possible combinations of construction materials that may be used in a wall system. For this reason, the installation information provided in this manual is intended only as a guide and is for the convenience of builders, specifiers, and other interested parties. The following are general descriptions of the GreenGuard Building Wraps:

GreenGuard Value Wrap consists of a coated, cross-woven polyolefin scrim with micro-perforations, which allow for moisture vapor transmission.

GreenGuard Classic Wrap consists of a coated, cross-woven polyolefin scrim with micro-perforations, which allow for moisture vapor transmission.

GreenGuard MAX consists of cross-woven polyolefin scrim with a breathable polyolefin coating.

GreenGuard RainDrop consists of a coated, cross-woven polyolefin scrim that is manufactured with inherent properties that allow for moisture vapor transmission.

GreenGuard Ultra Wrap consists of a non-woven, reinforced polyolefin sheet with a breathable polyolefin coating.

3. Usage and Limitations

GreenGuard Building Wraps are intended to perform as water-resistive barriers in residential applications when installed in accordance with the guidelines provided in this manual. The following conditions apply to the use of GreenGuard Building Wraps:

- GreenGuard Building Wraps are excellent water-resistive barriers that help deflect water and wind-driven rain, yet are designed to breathe to assist trapped moisture vapor to escape, helping walls dry faster. GreenGuard Building Wraps are made of synthetic materials that are generally recognized as not providing a food source for insects, fungus, mold, or mildew. GreenGuard Building Wraps should always be properly installed and stored.
- GreenGuard Value Wrap and Classic Wrap Building Wraps installed with the print side facing outward may not be exposed to sunlight for more than 12 months.
- GreenGuard Ultra Wrap, GreenGuard MAX and RainDrop Building Wraps installed with the print side facing outward may not be exposed to sunlight for more than 4 months.
- GreenGuard RainDrop must be installed with the black strands in the vertical position on the exterior wall. Installation with angled positions must be verified by Pactiv.
- GreenGuard Building Wraps are not intended to be used as roofing paper.
- GreenGuard Building Wraps are not intended to be used as a vapor retarder.
- **WARNING:** GreenGuard Building Wraps will ignite if exposed to fire of sufficient heat and intensity. Protect building wraps from exposure to open flame or other ignition sources during shipping, storage, and installation.
- Some building code jurisdictions require the use of two layers of Grade D building paper over wood sheathing when a cementitious covering (conventional stucco) is used. As an alternative, one layer of Grade D building paper can be used in conjunction with one layer of foam plastic insulation. Check with a local building code official to verify requirements.

4. General Installation Guidelines

4.A. Building Wrap Installed Over Sheathing (*Applies to All GreenGuard Building Wraps*)

1. Install building wrap over structural sheathing board, over insulation board (see Figures 1 and 2), or directly to framing members.
2. Begin by aligning the bottom edge of the roll with the base of the wall, approximately 2 feet around a corner, folding several inches of the material under itself and fastening securely to a structural sheathing, through insulation board to a framing member, or directly to studs.
3. Unroll the building wrap with the printed side out, wrapping the entire building, including door and window openings. Common galvanized roofing nails, plastic cap nails, or staples with a minimum 1-inch crown may be used for attachment of building wrap. If smaller crown staples are used, then more fasteners must be used.

   When installing building wrap over non-structural sheathing products such as insulation board or directly to studs, fasteners must penetrate the nail base a minimum of 1/2 inch. Fasteners should be spaced every 16 inches along every other stud location.

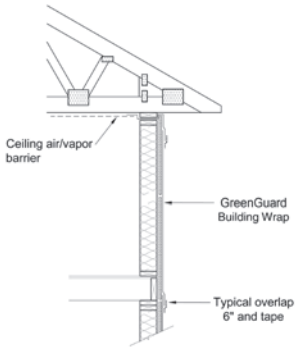

FIGURE 1: EXTERIOR WALL CROSS-SECTION

4. For best results, a modified "I" pattern should be made through the building wrap at window openings. Fold excess material inside the rough opening and fasten securely through all layers to a framing member (see Figure 3). If door frames and windows are already in place when installing the building wrap, then trim as close to them as possible and tape the building wrap edges. Use of GreenGuard flashing materials is encouraged.

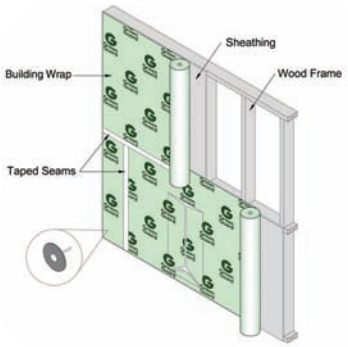

FIGURE 2: EXTERIOR WALL WITH GREENGUARD BUILDING WRAP

5. When the end of a roll is reached, fold the edge of the building wrap under itself and attach to the structural sheathing or through the non-structural sheathing to the nearest framing member. Vertical and horizontal seams must be overlapped a minimum of 6 inches (vertical) and 2 inches (horizontal) unless otherwise specified for a particular application. Upper courses of building wrap must overlap the lower courses (in water-shedding fashion). All vertical and horizontal seams can be taped using Pactiv Contractor Tape ("Standard" type or "Enhanced Adhesion" type) or an equivalent tape (optional).

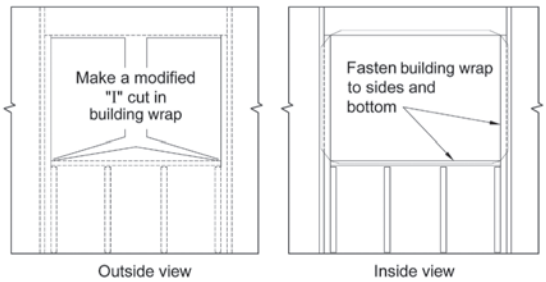

FIGURE 3: EXAMPLE OF MODIFIED "I" CUT AT A WINDOW OPENING

4.B. Installation of Building Wrap at Window Frame Detail

Figure 4 shows an example of a window frame detail where the building wrap is installed over the sheathing and is wrapped around the window jambs to the interior of the wall. Windows should be sealed in accordance with the window manufacturer's installation instructions.

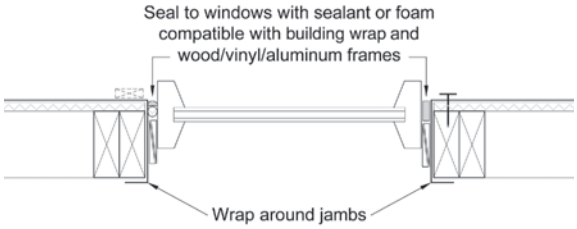

FIGURE 4: WINDOW FRAME CROSS-SECTION

4.C. Installation of Building Wrap at Exterior Electrical Boxes

All exterior electrical boxes and other penetrations through the building wrap should be sealed to prevent air and moisture intrusion at the openings. The building wrap must be taped to the electrical box in order to provide an adequate seal (see Figure 5).

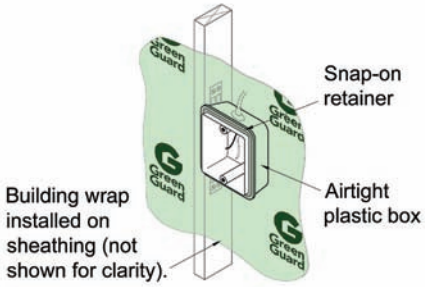

FIGURE 5: INSTALLATION OF BUILDING WRAP AT EXTERIOR ELECTRICAL BOXES

4.D. Installation of Building Wrap at Wall Penetrations

When penetrations, such as those for pipes and ducts, breach the building wrap, they must be sealed to the building wrap using a sealant that is compatible with both the building wrap and the pipe or duct material (see Figure 6).

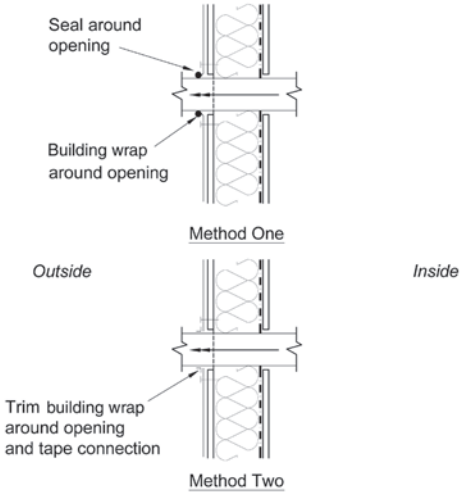

FIGURE 6: INSTALLATION OF BUILDING WRAP AT WALL PENETRATIONS

4.E. Installation of Building Wrap (Roof/Roof and Roof/Wall Intersections)

GreenGuard Building Wrap should overlap the step flashing at the roof to wall intersection (see Figure 7).

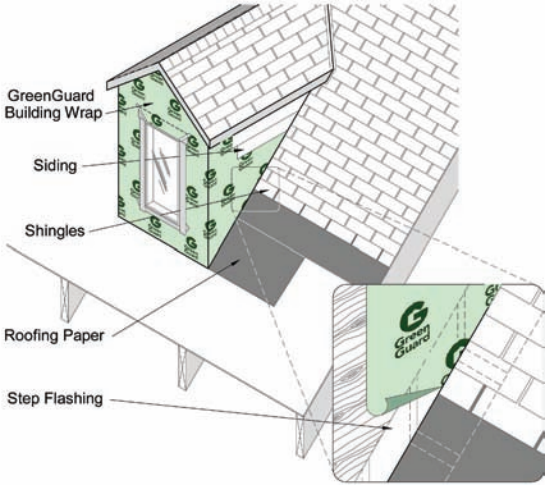

FIGURE 7: INSTALLATION OF BUILDING WRAP/WALL INTERSECTION

FLASHING INSTALLATION

1. General

GreenGuard Flashing and GreenGuard SuperStretch™ Flashing are self-adhered, waterproof flashing materials designed for sealing around openings and penetrations in exterior walls. These rubber-based materials have a butyl adhesive that enhances their ability to provide a seal against water intrusion when installed around window and door openings, roof/wall intersections, deck/porch attachments to walls, pipe penetrations, and other areas that require a weatherproof seal.

2. Compliance

GreenGuard Flashing and GreenGuard SuperStretch Flashing meet the requirements of the following industry standards and building codes:

- **2006 International Residential Code**
  Section R703.8: Flashing. Approved corrosion-resistive flashing shall be provided in the exterior wall envelope in such a manner as to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. The flashing shall extend to the surface of the exterior wall finish and shall be installed to prevent water from reentering the exterior wall envelope. Approved corrosion-resistant flashings shall be installed at all of the following locations:

1. At top of all exterior window and door openings in such a manner as to be leakproof, except that self-flashing windows having a continuous lap of not less than 1.125 inches over the sheathing material around the perimeter of the opening, including corners, do not require additional flashing; jamb flashing may also be omitted when specifically approved by the building official.

2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.

3. Under and at the ends of masonry, wood, or metal copings and sills.

4. Continuously above all projecting wood trim.

5. Where exterior porches, decks, or stairs attach to a wall or floor assembly of wood-frame construction.

6. At wall and roof intersections.

7. At built-in gutters.

- **ASTM E 2112 (Standard Practice for Installation of Exterior Windows, Doors, and Skylights)**

3. Description

This manual provides guidelines for installing GreenGuard Flashing and GreenGuard SuperStretch Flashing as flashing materials in residential applications. These guidelines are not intended to address all possible combinations of construction materials that may be used in a wall system. For this reason, the installation information provided in this manual is intended only as a guide and is for the convenience of builders, specifiers, and other interested parties. The following are general descriptions of the GreenGuard Flashing Products:

GreenGuard Flashing is a rubber-based material with a butyl adhesive, which is designed for sealing openings that have straight edges. This flashing material is available in rolls measuring 4 inches by 66 feet (100 mm by 20 m), 6 inches by 66 feet (150 mm by 20 m) and 9 inches by 66 feet (225 mm by 20 m).

GreenGuard SuperStretch Flashing is a rubber-based material with a butyl adhesive, which is designed with a flexibility that enables it to conform to openings and edges that have arched or curved dimensions. This flashing material is available in rolls measuring 7 inches by 33 feet (175 mm by 10 m) and 9 inches by 33 feet (225mm by 10m).

4. Usage and Limitations

GreenGuard Flashing and GreenGuard SuperStretch Flashing are intended to provide a weatherproof seal around openings and penetrations in exterior walls when installed in accordance with the guidelines provided in this manual. The following conditions apply to the use of GreenGuard Flashing and GreenGuard SuperStretch Flashing:

- **Installation:** To obtain the best adhesion, GreenGuard Flashing Products should be installed when outdoor temperatures range from 25 to 120°F (-4 to 49°C) over surfaces that are free of dirt and moisture.

- **Environmental Conditions:** GreenGuard Flashing and GreenGuard SuperStretch Flashing installed with the non-adhesive surface facing the environment may remain exposed for up to 120 days.

- **Storage:** Store boxes containing GreenGuard Flashing Products in a clean, dry area without prolonged, direct exposure to sunlight.

- **WARNING:** Like most commercially available flashing materials, GreenGuard Flashing Products will ignite if exposed to fire of sufficient heat and intensity (> 700°F/371°C). Protect GreenGuard Flashing Products from exposure to open flame or other ignition sources during shipping, storage, and installation.

- **WARNING:** The release paper of GreenGuard Flashing Products is slippery and should not be walked on at any time. Discard release paper in a designated container.

5. Installation (Windows With Mounting Flanges)

Note: The following installation information is intended to represent a "best practices" approach and is not intended to address all possible construction scenarios. Some of the information described below for installation of building wrap and flashing materials is similar to that described in ASTM E 2112, Method A1.

1. Install GreenGuard Building Wrap over the entire exterior wall and make a modified "I" cut through the building wrap at the window opening (see Figure 1A). Cut a header flap in the building wrap and fold material above top of window and tape. Cut building wrap on sill to promote flashing to wood adhesion (see Figure 1B).

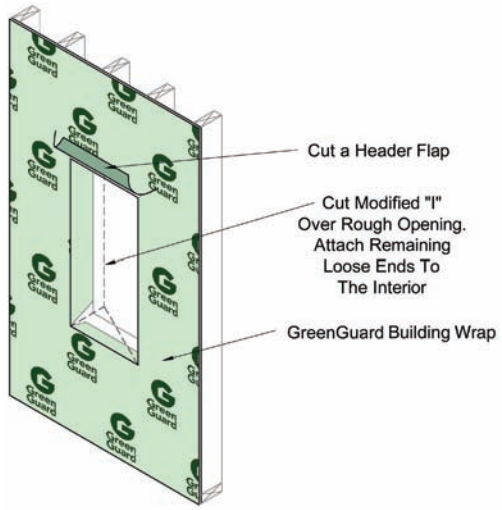

FIGURE 1A: PREPARATION OF ROUGH OPENING

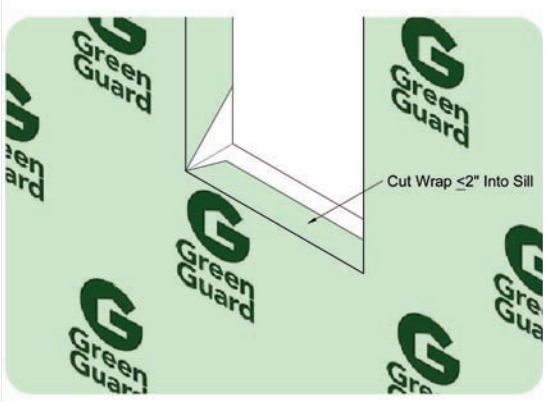

FIGURE 1B: CUTTING OF WRAP ON SILL

2. *Optional Sill Flashing Method No. 1:* Cut a piece of GreenGuard SuperStretch Flashing that is at least 12 inches (304 mm) longer than the width of the rough opening. Remove the release paper and align the flashing so that it extends 2 inches (50 mm) onto the sill and up the inside jamb (see Figures 1C and 1D).

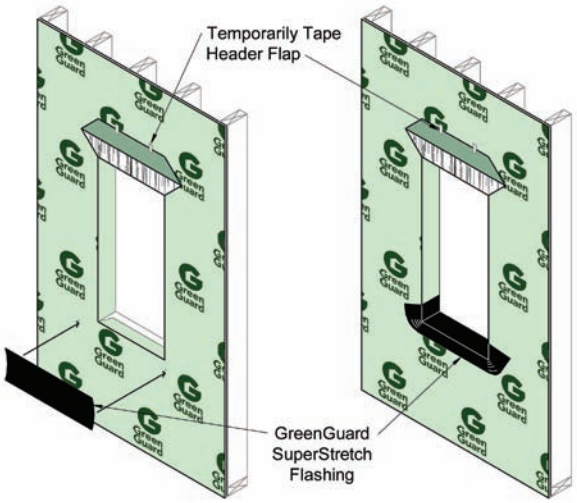

FIGURE 1C: INSTALLATION OF SILL FLASHING

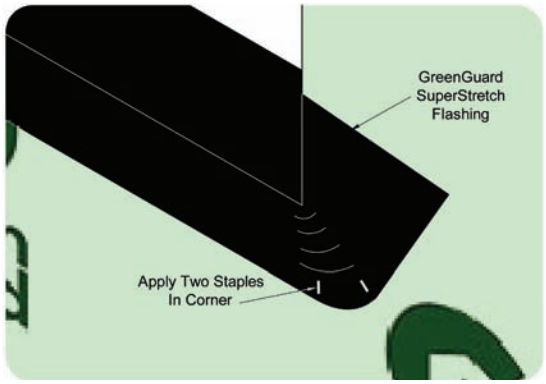

FIGURE 1D: INSTALLATION OF SILL FLASHING

Optional Sill Flashing Method No. 2: Install a sloped sill directly over the building wrap at the sill and then install the GreenGuard SuperStretch Flashing as described in Method 1 (see Figure 2A).

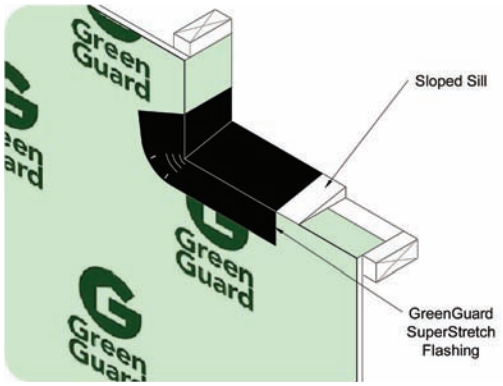

FIGURE 2A: INSTALLATION OF SLOPED SILL

Optional Sill Flashing Method No. 3: Install a sill dam directly over the building wrap at the back of the sill and then install the GreenGuard SuperStretch Flashing as described in Method 1 (see Figure 2B).

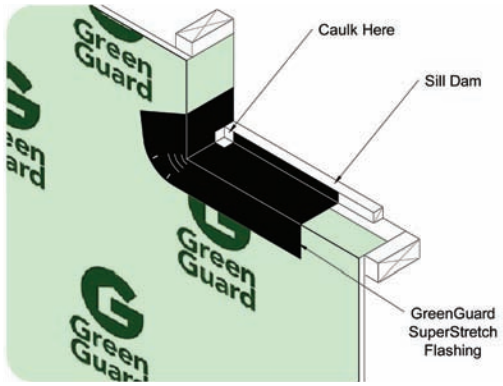

FIGURE 2B: INSTALLATION OF SILL DAM

Optional Sill Flashing Method No. 4: Install a sill pan directly over the building wrap after applying a bead of sealant to the back side of the front edge of the sill pan (see Figure 2C-1). Attach the sill pan using roofing nails or panhead screws as shown in Figure 2C-2. Then install small pieces of GreenGuard SuperStretch Flashing at the sill corners so that they overlap the sill pan edges and the side jamb (see Figure 2C-3).

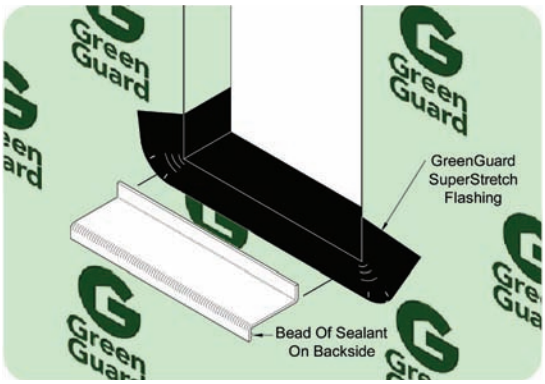

FIGURE 2C-1: SILL PAN OPTION

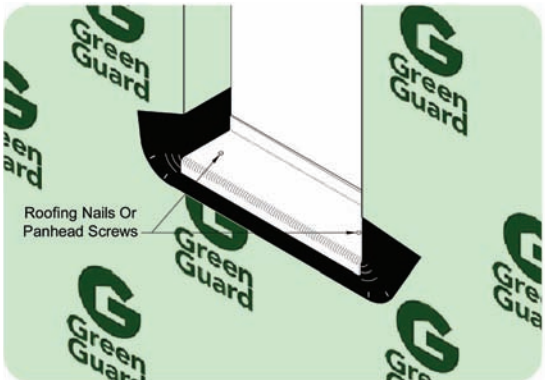

FIGURE 2C-2: SILL PAN OPTION

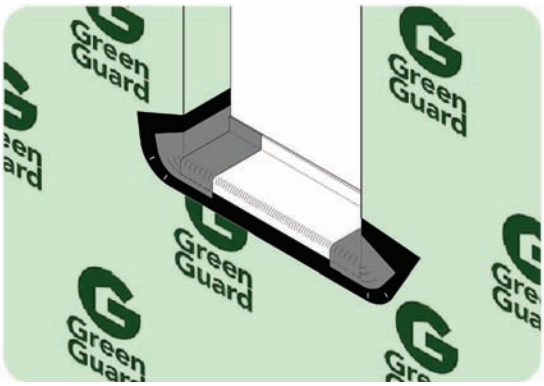

FIGURE 2C-3: SILL PAN OPTION
CORNERS SEALED

3. Install the window in accordance with the window manufacturer's installation instructions. Typically, this requires that a bead of sealant be applied to the back side of the window flange prior to installing the window (see Figure 3A). IMPORTANT: DO NOT SEAL THE BOTTOM FLANGE OF THE WINDOW. Attach the window using fasteners specified by the window manufacturer.

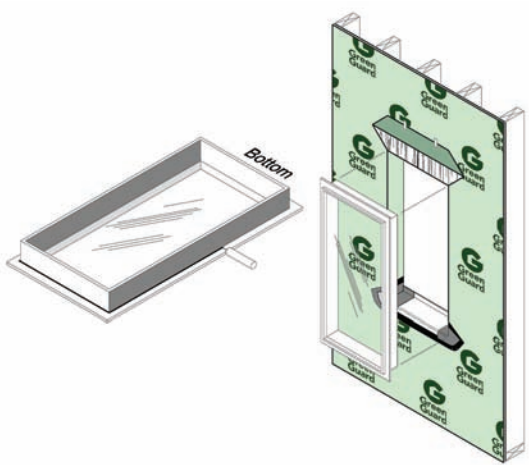

FIGURE 3A: INSTALLATION OF WINDOW
NOTE: DO NOT SEAL BOTTOM FLANGE OF WINDOW

4. Install the jamb flashing so that it overlaps the sill flashing (see Figure 3B).

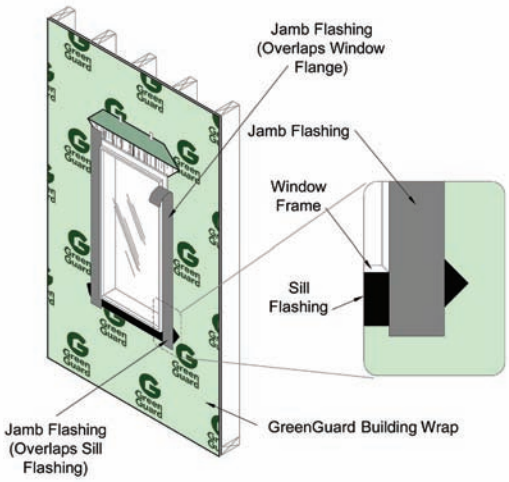

FIGURE 3B: INSTALLATION OF WINDOW
JAMB FLASHING

5. Install the head flashing so that it overlaps and extends beyond the jamb flashing. Fold the building wrap down at the header so that it overlaps the head flashing (see Figure 3C). Tape the diagonal cuts in the building wrap at the header (see Figure 3D).

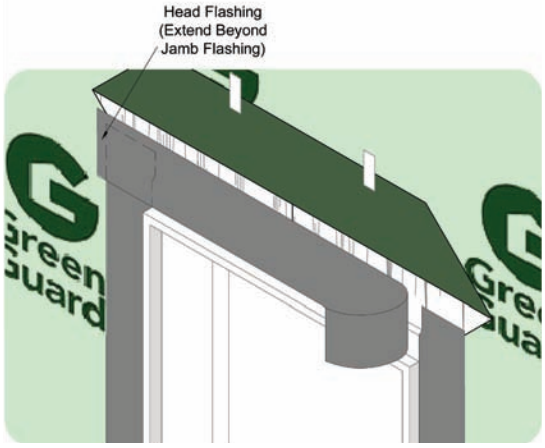

FIGURE 3C: INSTALLATION OF WINDOW
HEAD FLASHING

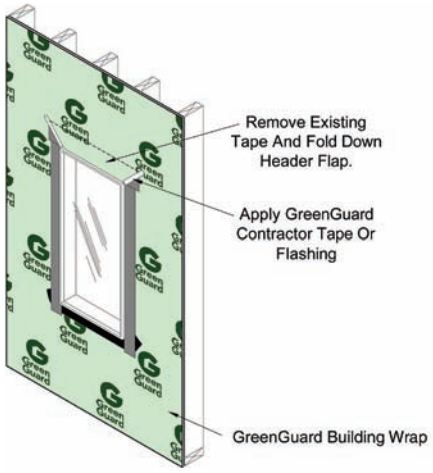

FIGURE 3D: INSTALLATION OF WINDOW
TAPE HEAD FLASHING

6. Installation (Arched Windows)

GreenGuard SuperStretch Flashing will conform to the contour of any opening with arched or curved dimensions as shown in Figure 4. Remove the release paper and then press GreenGuard SuperStretch Flashing against the wall, making sure that all flashing seams are overlapped at least 2 inches (50 mm).

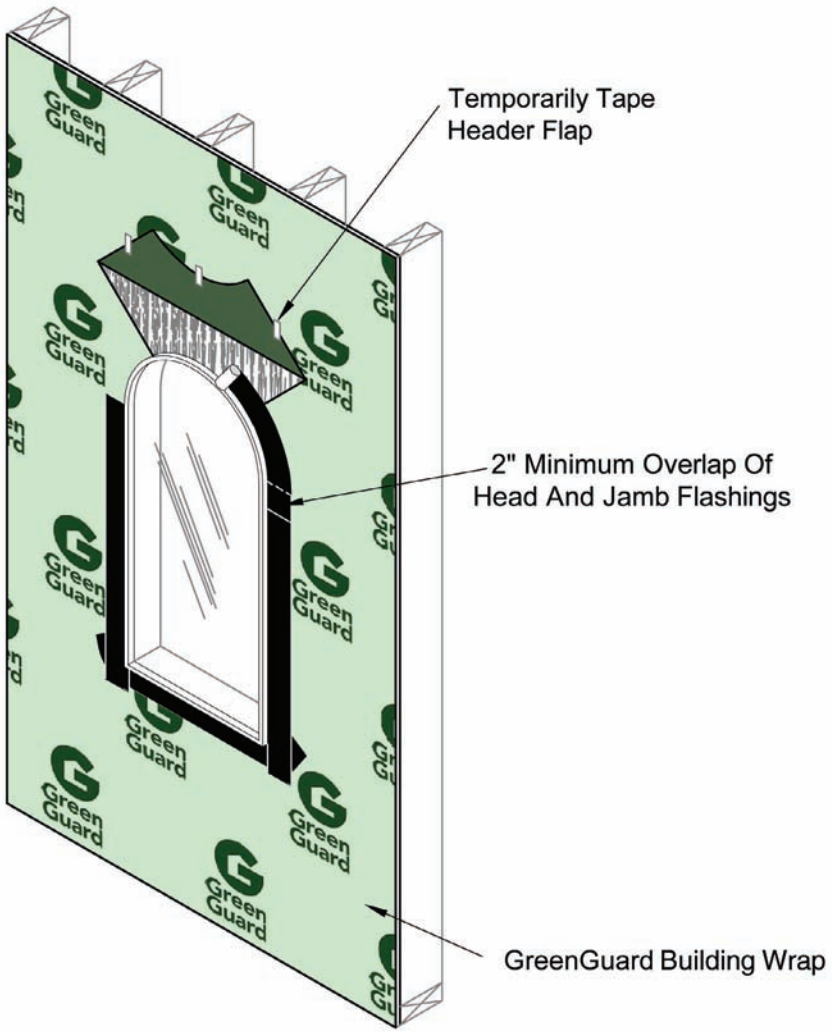

FIGURE 4: INSTALLATION OF FLASHING
ARCHED WINDOW

7. Installation (Deck or Porch Attachment to Wall)

GreenGuard Flashings can be used to provide a weatherproof seal at areas where there is an attachment made to an exterior wall, such as the attachment of a deck or porch. Figure 5 shows the installation of GreenGuard Flashing at the ledger board of a deck attachment.

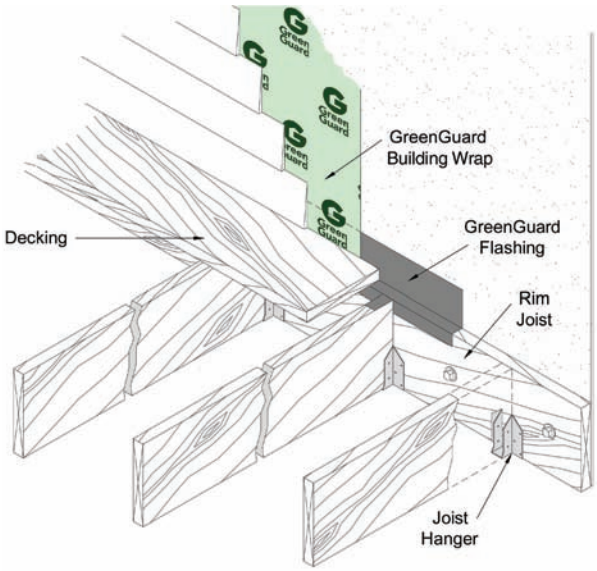

FIGURE 5: INSTALLATION OF FLASHING
LEDGER BOARD

8. Installation (Sill Plate)

GreenGuard Flashings can be used to form a weatherproof seal at sill plate locations where they are installed between the sill plate and the foundation and over the seam between the sill plate and the foundation wall as shown in Figure 6.

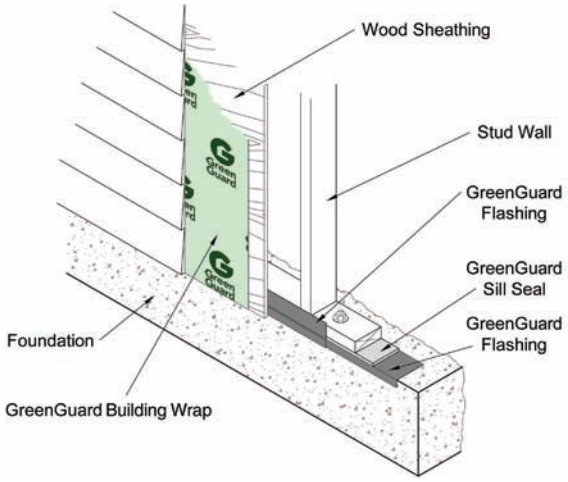

FIGURE 4: INSTALLATION OF FLASHING
AT SILL PLATE

9. Installation (Mounting Block)

GreenGuard Flashings can be used to seal a standard mounting block as shown in Figures 7A-7C.

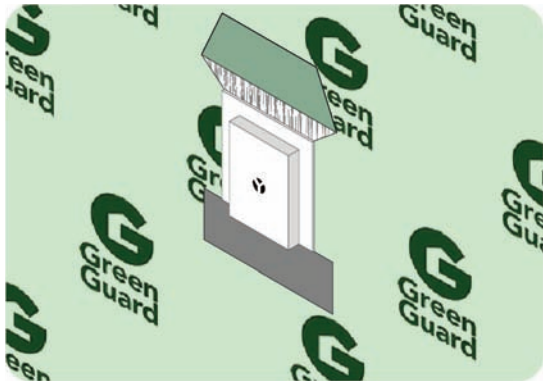

FIGURE 7A: INSTALLATION OF FLASHING
MOUNTING BLOCK

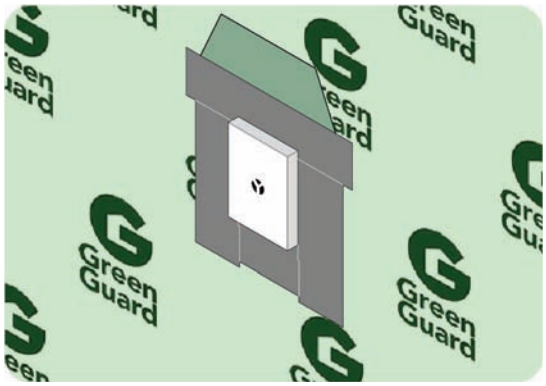

FIGURE 7B: INSTALLATION OF FLASHING
MOUNTING BLOCK

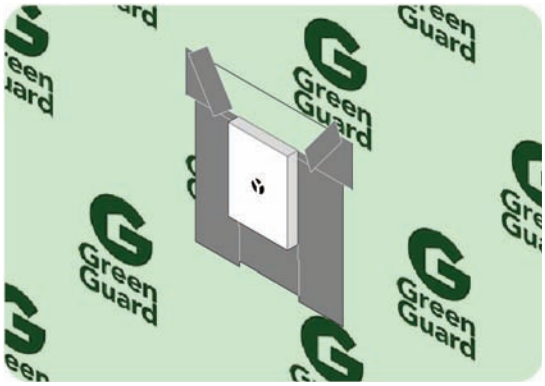

FIGURE 7C: INSTALLATION OF FLASHING
MOUNTING BLOCK

10. Installation (Pipe Penetrations)

GreenGuard Flashings can be used to seal around penetrations in an exterior wall. Figures 8A-8C show how GreenGuard SuperStretch Flashing is applied around a pipe penetration.

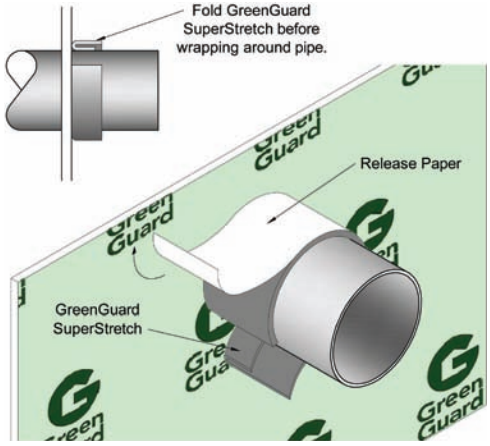

FIGURE 8A: INSTALLATION OF FLASHING
PIPE PENETRATION

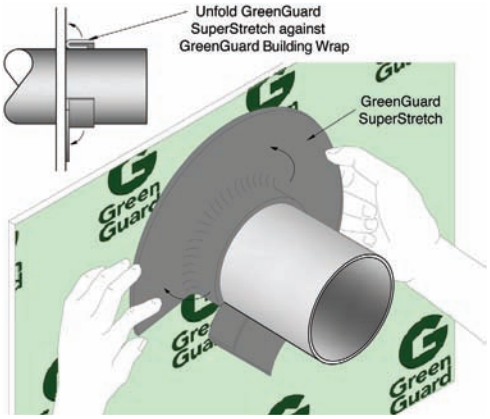

FIGURE 8B: INSTALLATION OF FLASHING
PIPE PENETRATION

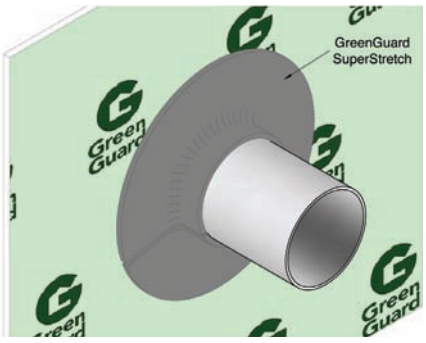

FIGURE 8C: INSTALLATION OF FLASHING
PIPE PENETRATION

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Pactiv's GreenGuard Products are ENERGY STAR Qualified products as a part of EPA's Home Sealing Effort.

ENERGY STAR
HOME SEALING

EPA recommends sealing the "envelope" that surrounds your living space:
- the ceiling
- outer walls
- windows
- floors

ENERGY STAR is a program of the U.S. Environmental Protection Agency and the U.S. Department of Energy.

To save on your heating and cooling bill and increase the comfort of your home:
- Add insulation
- Seal air leaks
- Choose ENERGY STAR qualified windows when replacing windows

www.energystar.gov

For the most current product information, go to www.green-guard.com.

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