Insulation

First Revision June 2016

GreenGuard® Building Wrap

INSTALLATION GUIDE FOR COMMERCIAL APPLICATIONS

Kingspan®

Contents

		Page
1	General Information	3
2	Usage & Limitations	3
3	Building Code Requirements	4
4	Compliance	4
5	Handling & Storage	4
6	Health & Safety	4
7	Fasteners & Fastening Options	5
8	Adhesives, Sealants & Primers	5
9	Installation of Building Wrap	6
10	General Installation of Flashing	6
11	Flashing of Window Rough Openings	7
12	Flashing of Arched Windows with Mounting Flange	12
13	Sealing at Terminations – Through-Wall Flashing	12
14	Sealing at Terminations – Shelf Angles	13
15	Sealing at Terminations – Cantilevers	13
16	Sealing at Terminations – Concrete Columns	13
17	Sealing at Terminations – Parapet Walls	14
18	Repairing Building Wrap	14

1. General Information

Kingspan **GreenGuard®** MAX™, RainDrop® 3D, HPW™ and C2000 Building Wrap are designed specifically for use in the commercial construction applications shown in this Guide. They are high performance air–barrier and water–resistive barrier products that help deflect water and wind–driven rain, while also allowing trapped moisture vapor to escape.

Such use involves the installation of these products in wall systems in combination with various types of exterior wall sheathings and exterior coverings e.g. brick, stone, exterior insulation finish systems (EIFS), conventional stucco, vinyl, fiber cement and wood.

These products perform as both a water–resistive barrier and an air-barrier material, however, the air–barrier must be maintained by sealing seams with tape, e.g. *Kingspan* **GreenGuard®** Custom Seam Tape, and by sealing around all windows, doors, wall penetrations, roof / wall intersections and other areas that require an air–tight seal, using flashing, e.g. *Kingspan* **GreenGuard®** Flashing.

Kingspan Insulation LLC recommends the use of *Kingspan* **GreenGuard®** Butyl Flashing and *Kingspan* **GreenGuard®** SuperStretch™ Butyl Flashing with *Kingspan* **GreenGuard®** Building Wrap. *Kingspan* **GreenGuard®** Butyl Flashing and *Kingspan* **GreenGuard®** SuperStretch™ Butyl Flashing, have a butyl adhesive that has a wider recommended service temperature range and better adhering properties than ordinary flashings and 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 waterproof seal. *Kingspan* **GreenGuard®** Butyl Flashing is designed for sealing at straight openings, while *Kingspan* **GreenGuard®** SuperStretch™ Butyl Flashing is flexible and designed for sealing around curved openings.

Kingspan **GreenGuard®** SuperStretch™ Butyl Flashing is ideal for flashing window sills, since it is flexible and will conform to the window rough opening without cutting

Alternatively, *Kingspan* **GreenGuard®** Standard Flashing may be used. *Kingspan* **GreenGuard®** Standard Flashing is a self–adhering membrane comprising a polyolefin film and a rubber–modified asphalt adhesive and is designed for sealing at straight openings.

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 is intended only as a guide and is for the convenience of contractors, specifiers, and other interested parties. The final application and details are the sole responsibility of the design authority on record for the project.

2. Usage & Limitations

Installed with the print side facing outward, *Kingspan* **GreenGuard®** MAX™, RainDrop® 3D, HPW™ and C2000 Building Wrap may be exposed for up to 9 months.

Kingspan **GreenGuard®** Building Wrap products should not be used as a vapor retarder or as roofing paper.

For recommended installation temperature limits for *Kingspan* **GreenGuard®** Flashing products, please refer to the Product Sheets for these products. For installation at temperatures below 40ºF, store *Kingspan* **GreenGuard®** Flashing in a heated area until use.

When installed, *Kingspan* **GreenGuard®** Butyl Flashing and *Kingspan* **GreenGuard®** SuperStretch™ Butyl Flashing, may remain exposed for up to 120 days, *Kingspan* **GreenGuard®** Flashing for 30 days.

All surfaces on which flashing is to be installed should be dry, free from dust, dirt, loose debris and obstructions. All surfaces should be free of frost and moisture. Clean surfaces to remove dirt, moisture, and grease that could interfere with adhesion.

3. Building Code Requirements

Building codes typically require the use of a water–resistive barrier (WRB) in all exterior walls that is at least equivalent to Grade D building paper. Applications involving the use of a cementitious base coat or exterior covering, such as adhered veneers, conventional stucco coatings and exterior insulation finish systems (EIFS) require the use of two layers of Grade D or equivalent building paper / wrap. This can be accomplished by first installing a layer of *Kingspan* **GreenGuard®** Building Wrap followed by a layer of Grade D building paper (Type 15).

Kingspan **GreenGuard®** Building Wrap products are recognized by the Air Barrier Association of America (ABAA, www. airbarrier.org) as air-barrier materials that comply with industry standards. They are also certified for compliance with the National Green Building Standard (NGBS) by the NAHB Home Innovation Research Lab (www.HomeInnovation.com/green, Certificate #00137).

4. Compliance

See Intertek CCRR–1018 for IBC, IECC and IRC Compliance;
DrJ Engineering TER No. 1407–05 (NFPA 285);
ASTM D 226, Type I (Specification for Building / Roofing Paper);
ASTM E 1677, Type II (*Kingspan* **GreenGuard®** MAX™, RainDrop® 3D, HPW™ and C2000 Building Wrap);
ASTM E 2178 – Air Barrier Material (*Kingspan* **GreenGuard®** MAX™, RainDrop® 3D, HPW™ and C2000 Building Wrap);
ASTM E 2357 – Air Barrier Assembly (go to www.airbarrier.org);
ASTM E 2556, Type II (*Kingspan* **GreenGuard®** MAX™, RainDrop® 3D, HPW™ and C2000 Building Wrap);
CCMC–13280–R – Sheathing Membrane (*Kingspan* **GreenGuard®** MAX™ Building Wrap);
CCMC–13290–R – Air Barrier Material (*Kingspan* **GreenGuard®** MAX™ Building Wrap);
HUD/FHA UU–B–790a – Equivalent to Grade D / Type 15 Building Paper;
Ontario Ministers Ruling No. 07-27-185 / 14-04-300 (CCMC 13280-R).

5. Handling & Storage

When stored outdoors, *Kingspan* **GreenGuard®** Building Wrap products should be protected from exposure to direct sunlight using the original packaging or an opaque, light–colored tarp. Material that has been unwrapped should be covered or rewrapped.

Store boxes containing *Kingspan* **GreenGuard®** Flashing products in a clean, dry area without prolonged, direct exposure to sunlight.

WARNING: *Kingspan* **GreenGuard®** Building Wrap products are combustible. A protective barrier or a thermal barrier is required as specified in the appropriate building code. Protect them from exposure to open flame or other ignition sources during shipping, storage and installation.

WARNING: The release paper of *Kingspan* **GreenGuard®** Flashing product is slippery and should not be walked on at anytime. Discard release paper in a designated container.

6. Health & Safety

Kingspan **GreenGuard®** Building Wrap products are made of synthetic materials that are generally recognized as not providing a food source for insects, fungus, mold, or mildew. They should always be properly installed and stored.

Review this Installation Guide prior to installation.

Refer to the Safety Data Sheets for the products referred to in this Installation Guide for additional information.

7. Fasteners & Fastening Options

Kingspan **GreenGuard®** Building Wrap products are mechanically attached either through structural sheathing board or insulation board to underlying vertical framing members or directly to framing members. For installation of *Kingspan* **GreenGuard®** Building Wrap products in residential or light commercial building applications involving installation on structures that are less than 40 feet (5 stories) in height, refer to the *Kingspan* **GreenGuard®** "Building Wrap Installation Guide for Residential and Light Commercial Applications".

The table below shows the fastening information for various framing and wall types.

Note: When attaching wall ties for anchoring masonry exterior cladding, first install a patch of *Kingspan* **GreenGuard®** Flashing at the penetration site before installing the wall tie. The patch should be of a size adequate to seal only the penetration points.

	Minimum Fixing Requirement for Different Substrates											
	Kingspan **GreenGuard®** C2000 Building Wrap			*Kingspan* **GreenGuard®** MAX™ Building Wrap			*Kingspan* **GreenGuard®** RainDrop® 3D Building Wrap			*Kingspan* **GreenGuard®** HPW™ Building Wrap		
Min. Required	Metal	Wood	Masonry	Metal	Wood	Masonry	Metal	Wood	Masonry	Metal	Wood	Masonry
Corrosion-resistant (e.g. Galvanized) Screw Type / Length (in)	1 5/8	1 5/8	1 5/8 Tap Con	1 1/4	1 1/4	1 1/4 Tap Con	1 1/4	1 1/4	1 1/4 Tap Con	1 1/4	1 1/4	1 1/4 Tap Con
Metal / Plastic Washer Diameter, Min. (in)	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4	1 3/4
Fastener Spacing, Max. (in)	24	24	24	16	16	16	16	16	16	16	16	16

8. Adhesives, Sealants & Primers

Many common adhesives, sealants and primers are compatible with *Kingspan* **GreenGuard®** Building Wrap and *Kingspan* **GreenGuard®** Flashing. Prior to beginning a project, the installer should obtain chemical compatibility information from the manufacturer of the adhesive, sealant or primer. For more information regarding adhesives, sealants and primers for use with *Kingspan* **GreenGuard®** Building Wrap and *Kingspan* **GreenGuard®** Flashing, go to www.kingspaninsulation.us and look for Technical Bulletin #11 under 'Product Literature'.

9. Installation of Building Wrap

The following guidelines should be used when installing *Kingspan* **GreenGuard®** Building Wrap products on exterior walls (see Figure 1).

NOTE: Alternative installation details may be used if approved in writing by Kingspan Insulation LLC prior to installation.

9a. Install building wrap over structural sheathing board, over foam plastic insulation board with fasteners extending through insulation into framing members, over exterior gypsum board or directly to framing members.

9b. Begin by aligning the bottom edge of the roll with the base of the wall, approximately 12" around the inside or outside corner of the wall. The building wrap should overlap any corner joint by 6" min. The building wrap should overlap through wall flashing by a minimum of 6" (see section 13). If no through–wall flashing is being used, then the bottom edge of the building wrap should overlap the sill plate at least 2" and should be sealed using tape, e.g. *Kingspan* **GreenGuard®** Custom Seam Tape, or an adhesive.

9c. Unroll the building wrap with the printed side out, wrapping the entire building, including window and door rough openings. Make sure that upper courses of building wrap overlap lower courses in water–shedding fashion. Vertical and horizontal seams must be overlapped a minimum of 6" (vertical) and 2" (horizontal), unless otherwise specified for a particular application.

All building wrap seams must be taped using 3" wide tape, e.g. *Kingspan* **GreenGuard®** Custom Seam Tape. Ensure that building wrap surfaces are clean and dry before taping seams. Press tape firmly as it is applied to the building wrap.

9d. Install fasteners based on the required minimum spacing described in Section 7 of this Guide.

9e. Fasteners must penetrate the nail base or stud a minimum of 3/4".

9f. Do not install fasteners within 6" of the sill at window openings and around door openings. In addition, do not install fasteners within 9" of a window or door head.

9g. Make a modified 'I' cut through the building wrap at window openings. Fold excess material to the inside of the rough opening, trim, and secure to a framing member. Make diagonal cuts at the corners of the window head, fold the building wrap up, and temporarily secure it to the wall with a small piece of tape, e.g. *Kingspan* **GreenGuard®** Custom Seam Tape. This piece will be folded down over the head flashing during the window installation (see Section 10 of this Guide). Note: The final fenestration and flashing details are the sole responsibility of the design authority on record for the project. Follow the window manufacturer's installation instructions to avoid potential issues relating to the window warranty. See Section 11 of this Guide.

9h. Seal around all wall penetrations using *Kingspan* **GreenGuard®** Flashing (see Section 11 for Flashing Installation Details and Sections 12–17 for Sealing at Terminations and Penetrations).

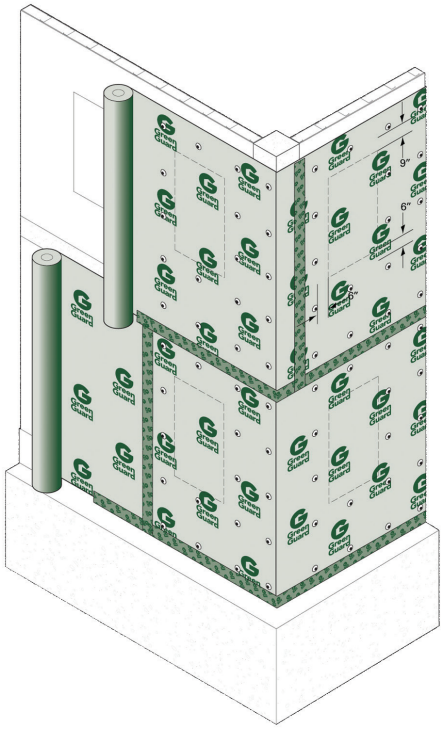

Figure 1 *Kingspan* **GreenGuard®** Building Wrap Installation

10. General Installation of Flashing

10a. Verify that substrate is flat, dry and free of dirt and moisture that might interfere with adhesion. Beginning of installation means that the installer accepts the existing conditions.

10b. Apply the adhesive or primer to the substrate, as required, and allow it to cure or set as described in its manufacturer's instructions.

10c. Unroll the flashing, e.g. *Kingspan* **GreenGuard®** Flashing, and cut pieces using a common utility knife. Be sure to cut pieces to allow for a minimum 4" of overlap of intersecting flashing pieces.

10d. Begin by peeling back the release paper and pressing the flashing firmly to the substrate, applying pressure along the entire surface to prevent wrinkles or air bubbles. For better adhesion, use a J–roller.

10e. Flashing, e.g. *Kingspan* **GreenGuard®** Flashing, must be covered with the finished exterior covering or cladding as soon as scheduling permits, since these products are not intended to remain exposed to direct sunlight in a finished wall system.

11. Flashing of Window Rough Openings

When installing building wrap in conjunction with windows, it is important to integrate all construction materials in order to prevent potential water intrusion. The following installation details for windows represent a “best practice” approach that is consistent with the various installation options provided in ASTM E 2112 (Standard Practice for Installation of Exterior Windows, Doors, and Skylights).

NOTE: The project architect and superintendent should confirm all installation instructions prior to beginning a project.

11a. Windows with Mounting Flange

11a.1 Cutting Wrap at Window

Make a modified ‘I’ cut through the building wrap at the window rough opening. Make two 45°, 6" cuts in the building wrap at the window head as shown.

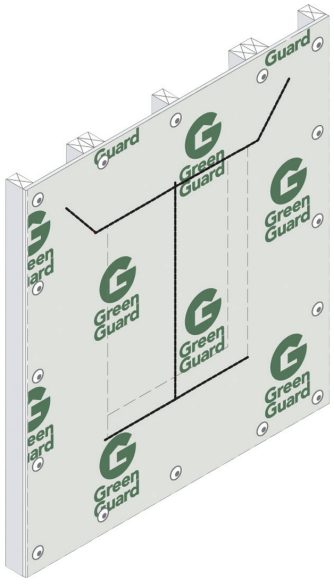

Figure 2 Cutting Wrap at Window

11a.2 Preparation of Window Head

Flip the building wrap at the header up and temporarily tape the flap to the wall. This flap will be folded back down after the head flashing has been installed in a later step.

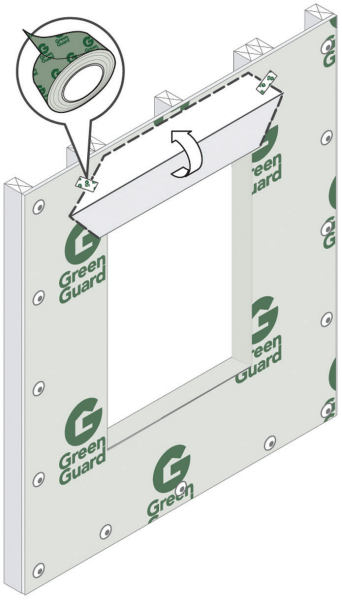

Figure 3 Preparation of Window Head

11a.3 Wrapping of Window Rough Opening

Fold the excess building wrap at the sides of the window inside the rough opening, trim excess wrap and secure to the nearest framing member as shown.

Figure 4 Wrapping of Window Rough Opening

11a.4 Installation of Sill Flashing

Cut a piece of stretchable flashing, e.g. *Kingspan* **GreenGuard®** Flashing or SuperStretch™ Butyl Flashing, that is at least 12" longer than the width of the window opening, allowing for about 6" of flashing up each side of the window opening. Use the appropriate width of flashing to cover the sill and at least 2" overlap to the face of the rough opening.

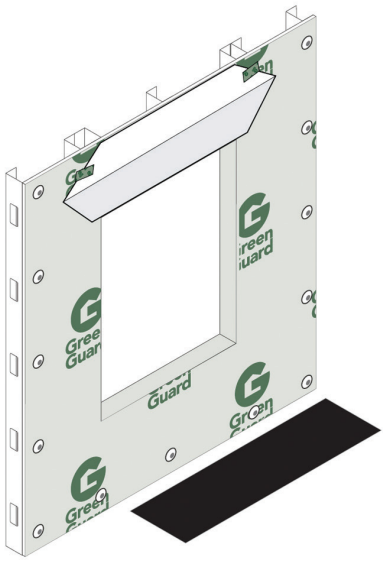

Figure 5 Preparation of Still Flashing

Remove the interior section of the split release paper and adhere the sill flashing piece to the rough opening sill as shown, (Optional: Leave a 1" area at the back of the sill for installation of a back dam.)

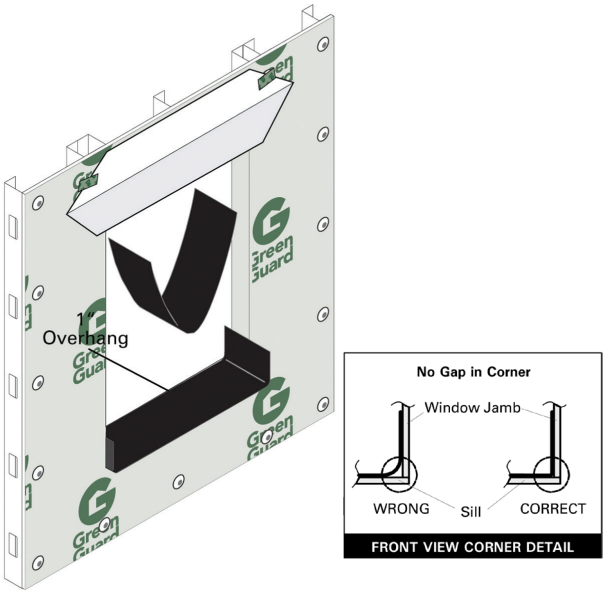

Figure 6 Installation of Sill Flashing

Use fasteners (cap nails, screws or roofing nails) to ensure adequate attachment of the flashing as shown.

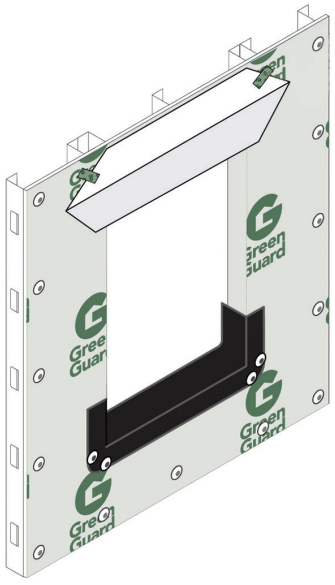

Figure 7 Attachment of Flashing at Corners

For alternative sill flashing methods, please refer to the "*Kingspan* **GreenGuard®** Building Wrap Installation Guide for Residential and Light Commercial Applications"

11a.5 Applying Sealant around Window

Apply a bead of sealant to the face of the wall around the rough opening or to the back side of the window flange (consult window manufacturer's installation instructions for confirmation of this detail). Important: Do not apply sealant to the flange at the bottom of the window, since this may restrict drainage.

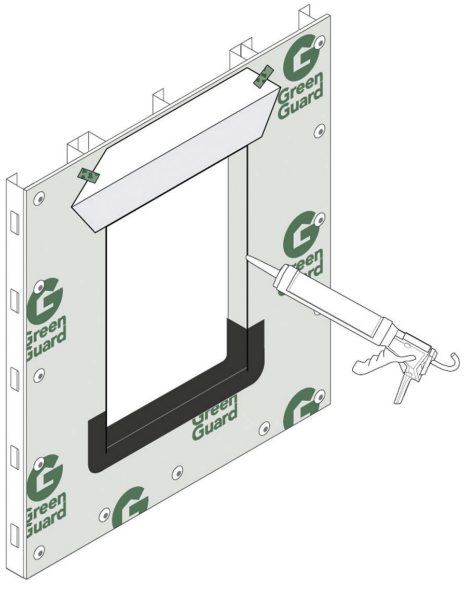

Figure 8 Applying Sealant around Window

11a.6 Installation of Window and Jamb and Head Flashings

Install the window in accordance with the window manufacturer's installation instructions. Once the window has been installed, apply flashing, e.g. *Kingspan* **GreenGuard®** Flashing, to the jamb on each side of the window, and then to the head as shown.

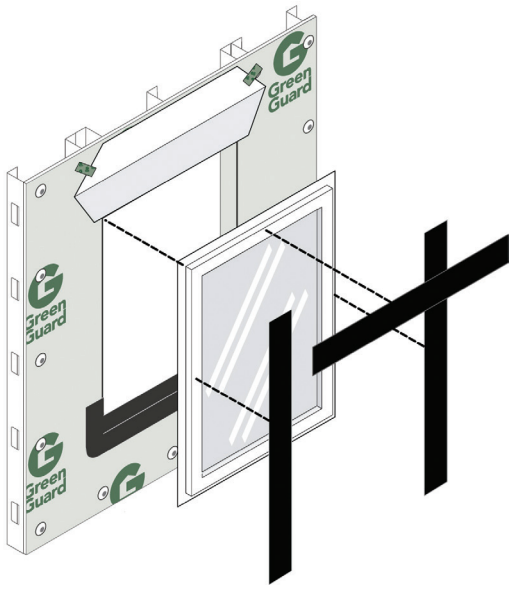

Figure 9 Installation of Window and Jamb and Head Flashings

11a.7 Sealing Window Head

Fold the building wrap down at the window head and secure with a piece of tape, e.g. *Kingspan* **GreenGuard®** Custom Seam Tape, or flashing, e.g. *Kingspan* **GreenGuard®** Flashing.

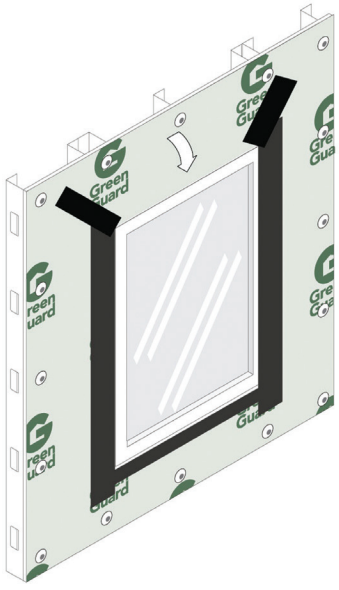

Figure 10 Sealing of Window Head

11a.8 Sealing Back of Window Opening

Seal the gaps at the back side of the rough opening with backer rod, expanding foam or sealant.

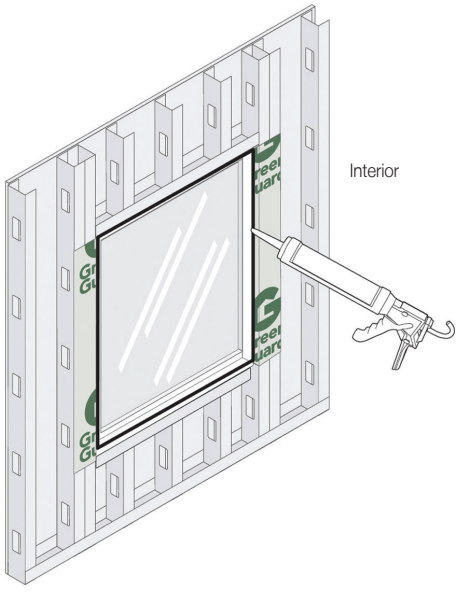

Figure 11 Sealing Back of Window Opening

11b. Non–Flanged Windows

11b.1 Cutting Wrap at Window

Make a square cut around the perimeter of the window opening. Make two 45°, 5" cuts in the building wrap at the window head as shown.

11b.2 Preparation of Window Head

Flip the building wrap at the header up and temporarily tape the flap to the wall. This flap will be folded back down after the head flashing has been installed in a later step.

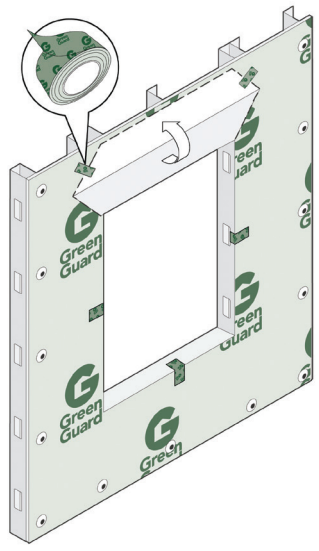

Figure 12 Preparation of Window Head

11b.3 Installation of Sill Flashing

Cut a piece of stretchable flashing, e.g. *Kingspan* **GreenGuard®** SuperStretch™ Butyl Flashing, that is at least 12" longer than the width of the window opening, allowing for about 6" of flashing up each side of the window opening. Use the appropriate width of flashing to cover the sill and at least 2" overlap to the face of the rough opening.

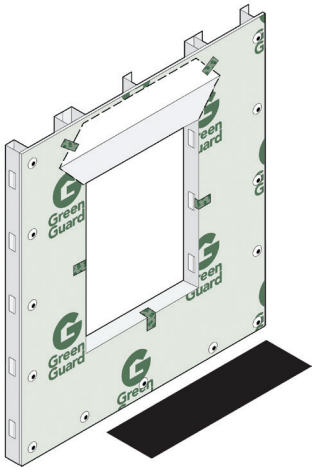

Figure 13 Preparation of Sill Flashing

Remove the interior section of the split release paper and adhere the sill flashing to the rough opening sill as shown, (Optional: Leave a 1" area at the back of the sill for installation of a back dam.)

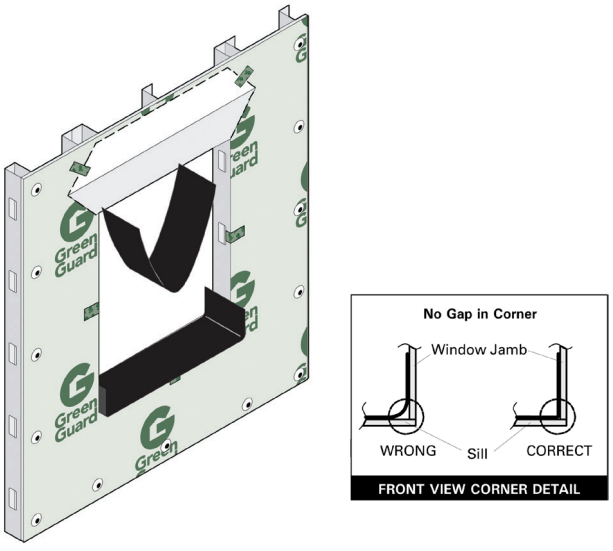

Figure 14 Installation of Sill Flashing

Use fasteners (cap nails, screws or roofing nails) to ensure adequate attachment of the flashing as shown in figure 15.

For alternative sill flashing methods, please refer to the "*Kingspan* **GreenGuard®** Building Wrap Installation Guide for Residential and Light Commercial Applications".

11b.4 Attachment of Flashing at Corners and Window Jamb Flashing

Use flashing, e.g. *Kingspan* **GreenGuard®** Flashing, to wrap the inside of the jambs of the rough opening and on to the wall face. The jamb flashing should overlap the sill flashing by at least 2". Use the appropriate width of flashing to cover the jamb and at least 2" overlap to the face of the rough opening.

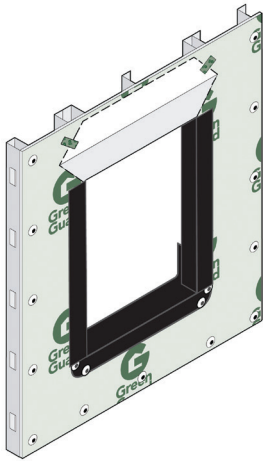

Figure 15 Window Jamb Flashing

11b.5 Preparation of Window Head

Use approved primer to seal the exposed sheathing at the rough opening head (see Section 85 of this Guide for information regarding primer products).

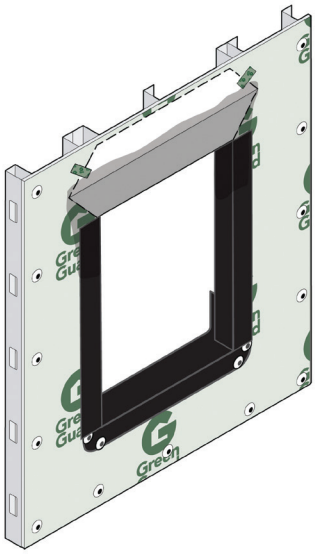

Figure 16 Sealing of Window Head

11b.6 Window Head Flashing

Cut a piece of stretchable flashing, e.g. *Kingspan* **GreenGuard®** SuperStretch™ Butyl Flashing, that is at least 12" longer than the width of the window opening, allowing for about 6" of flashing up each side of the window opening. Use the appropriate width of flashing to cover the sill and at least 2" overlap to the face of the rough opening. Use fasteners (cap nails, screws or roofing nails) to ensure adequate attachment of the flashing as shown.

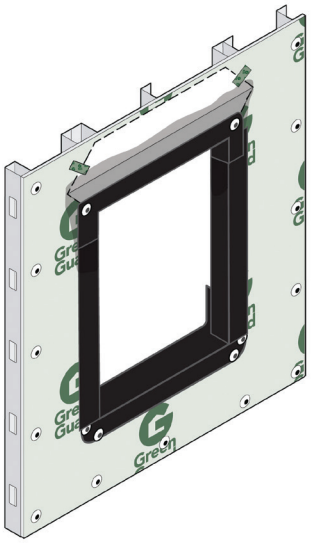

Figure 17 Window Head Flashing

11b.7 Sealing Window Head

Install the window in accordance with the window manufacturer's installation instructions. Once the window has been installed, fold down the building wrap at the window head and seal with an additional piece of flashing, e.g. *Kingspan* **GreenGuard®** Flashing, at the head. Install additional pieces of flashing, e.g. *Kingspan* **GreenGuard®** Flashing, to seal the angle cuts.

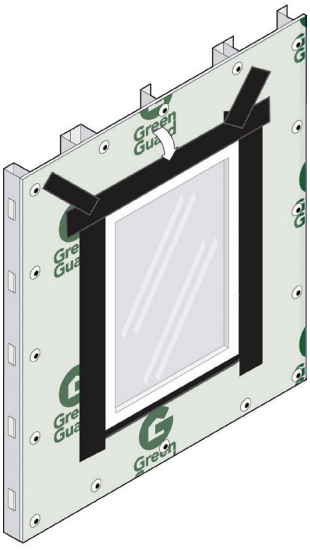

Figure 18 Sealing of Window Head

11b.8 Sealing Back of Window Opening

Seal the interior around the entire perimeter with backer rod, expanding foam or sealant. Finish installation with the window manufacturer's retention clips or other fastening mechanism.

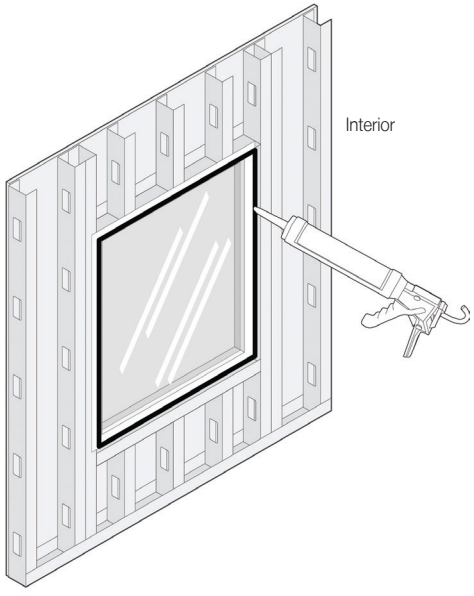

Figure 19 Sealing Back of Window Opening

12. Flashing of Arched Windows with Mounting Flange

12.a Flashing of Arched Top Windows

Install the flashing and window as shown in Figures 2 through 11, except for the head flashing piece. Use a piece of stretchable flashing, e.g. *Kingspan* **GreenGuard®** SuperStretch™ Butyl Flashing, and stretch it to fit the window arch. Use fasteners to ensure adequate attachment of the flashing at the window head.

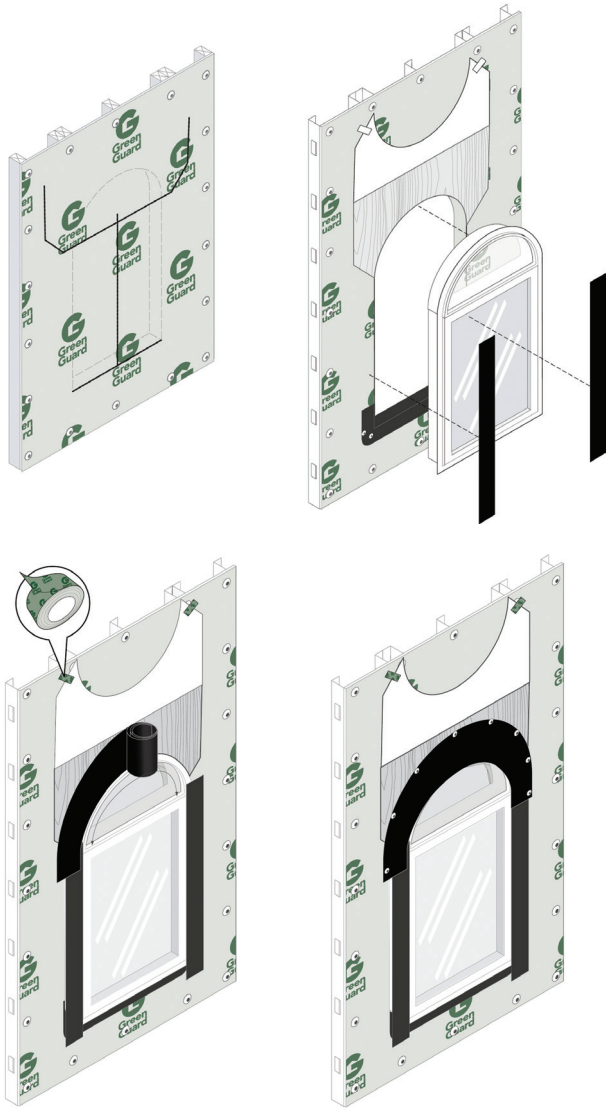

Figure 20 Flashing of Arched Windows

12.b Sealing of Arched Top Window Head

Fold the building wrap down at the window head and secure with tape, e.g. *Kingspan* **GreenGuard®** Custom Seam Tape, or flashing, e.g. *Kingspan* **GreenGuard®** Flashing.

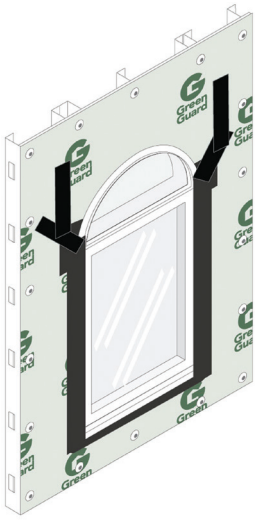

Figure 21
Sealing of Window Head

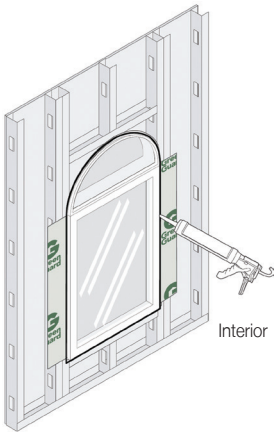

Figure 22
Sealing Back of Window Opening

12.c Sealing Back of Window Opening

Seal the gaps at the back side of the rough opening with backer rod, expanding foam or sealant.

13. Sealing at Terminations – Through-Wall Flashing

Install through–wall flashing first and then overlap with building wrap by a minimum of 6". Mechanically attach the bottom of the building wrap using the applicable fasteners as described in Section 7 of this Guide. Seal the building wrap to the through-wall flashing, and all horizontal and vertical seams using tape, e.g. *Kingspan* **GreenGuard®** Custom Seam Tape, or flashing, e.g. *Kingspan* **GreenGuard®** Flashing.

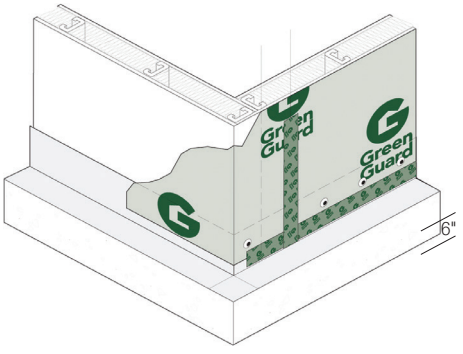

Figure 23

14. Sealing at Terminations – Shelf Angles

Install through–wall flashing first over the top of the shelf angle. The building wrap should overlap the through–wall flashing a minimum of 6". Seal the building wrap to the through–wall flashing using tape, e.g. *Kingspan* **GreenGuard®** Custom Seam Tape, or flashing, e.g. *Kingspan* **GreenGuard®** Flashing. Seal the building wrap to the underside of the shelf angle in the same manner.

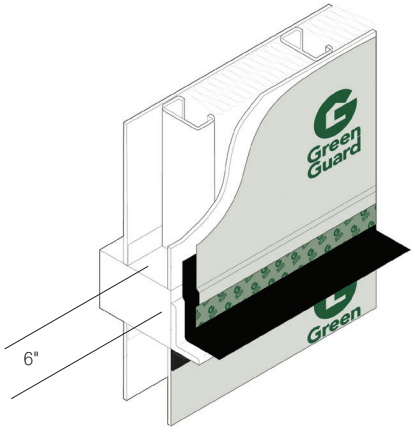

Figure 24

15. Sealing at Terminations – Cantilevers

Install stretchable flashing, e.g. *Kingspan* **GreenGuard®** SuperStretch™ Butyl Flashing, to seal at the intersection between the cantilever and the wall as shown. Then install building wrap so that it overlaps the flashing and seal with tape, e.g. *Kingspan* **GreenGuard®** Custom Seam Tape.

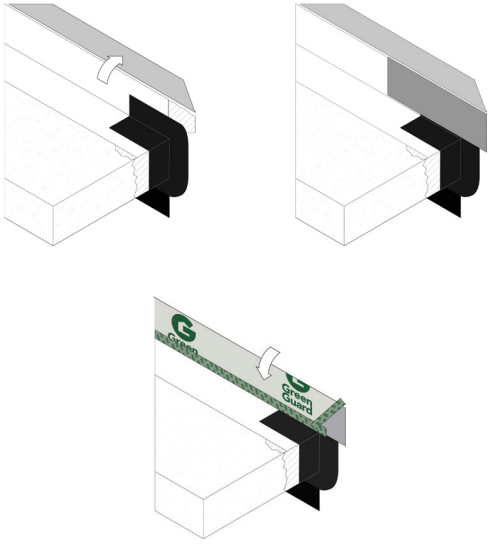

Figure 25

16. Sealing at Terminations – Concrete Columns

Option 1

Install building wrap around the concrete column as shown. Attach the building wrap using the applicable fasteners as described in Section 7 of this Guide.

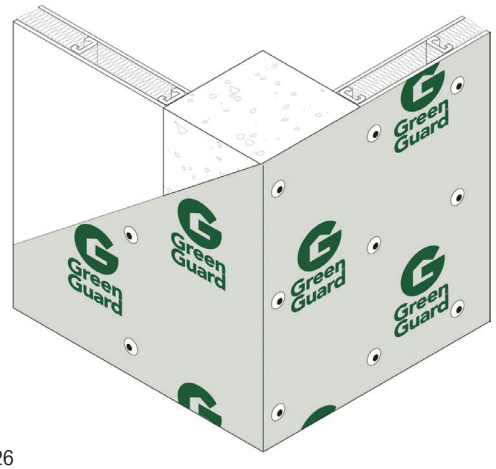

Figure 26

Option 2

Apply a primer to the concrete in accordance with the manufacturer's instructions (see Section 8 of this Guide for information regarding primer products). Cut the building wrap near the edge of the concrete column, leaving about 2" overlapping the column. Fasten the building wrap to the wall as described in Section 9 of this Guide. Use flashing, e.g. *Kingspan* **GreenGuard®** Flashing, to seal building wrap to the concrete column as shown.

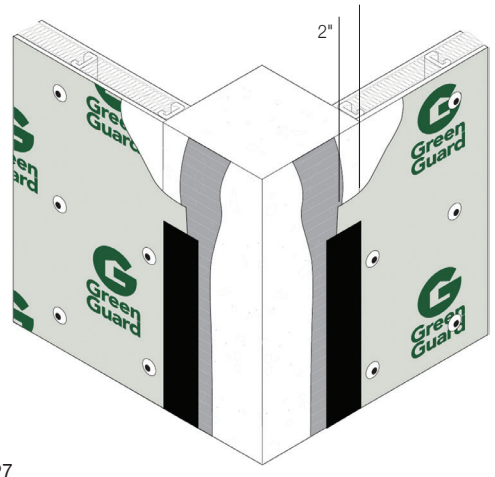

Figure 27

17. Sealing at Terminations – Parapet Walls

Install flashing, e.g. *Kingspan* **GreenGuard®** Flashing, on the top of the wall as shown and extend the flashing so that it overlaps the building wrap a minimum of 2".

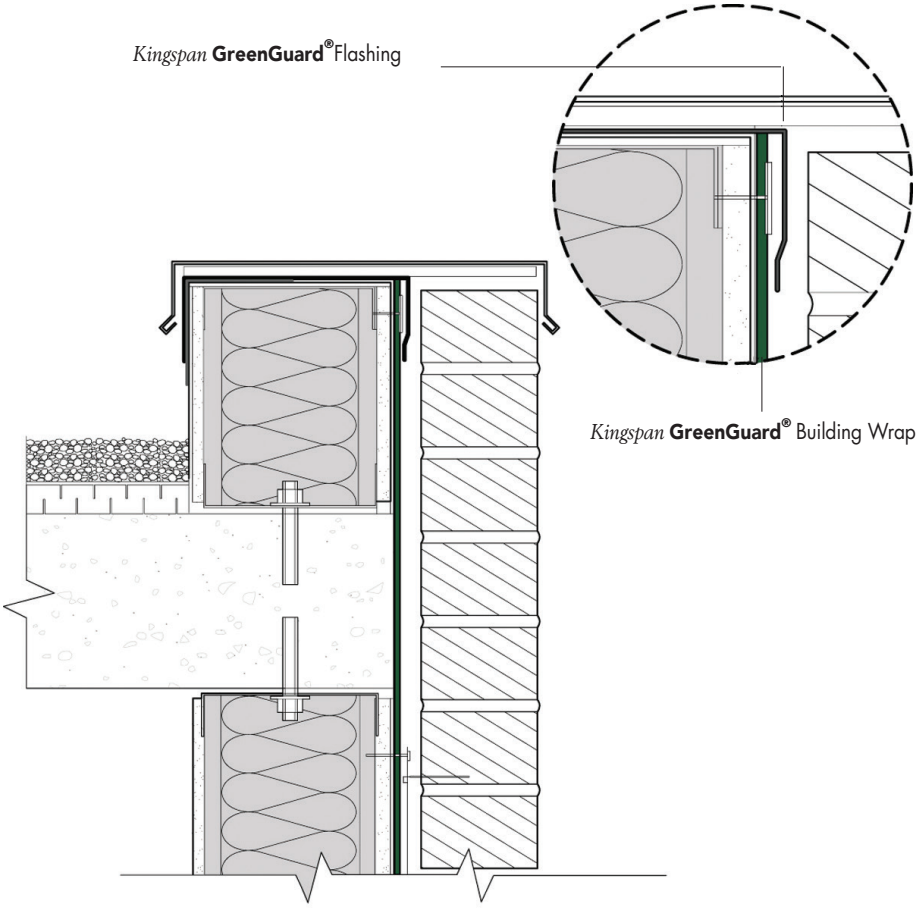

Figure 28

18. Repairing Building Wrap

18a. Small Tears and Holes

Use flashing, e.g. *Kingspan* **GreenGuard®** Flashing, to cover small tears or holes.

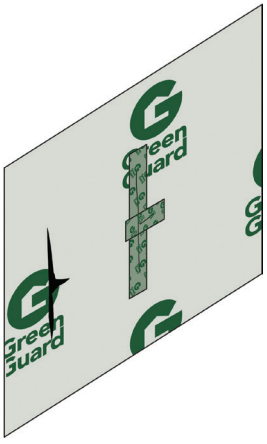

Figure 29

18b. Large Damaged Areas

If the damaged area is large, a building wrap patch may be required. Begin by making a cut several inches above the damaged area. Tuck the piece of building wrap up underneath the cut with most of the building wrap piece extending out over the building wrap on the wall. Then flash all edges of the building wrap patch area with flashing, e.g. *Kingspan* **GreenGuard®** Flashing, as shown.

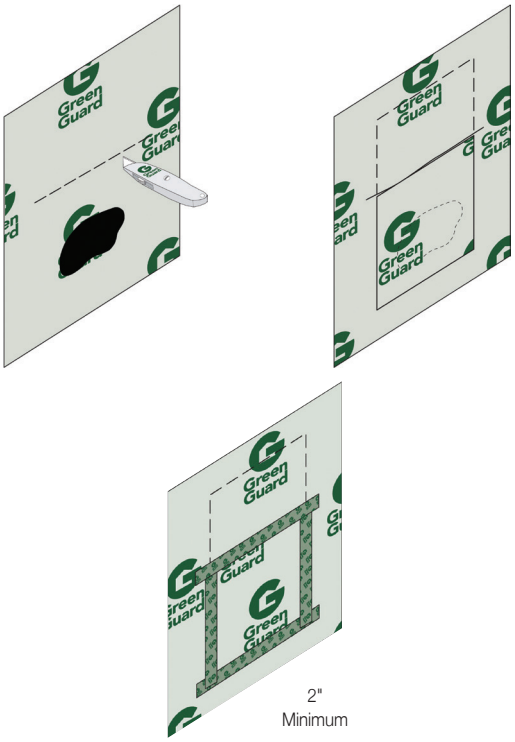

Figure 30

Contact Details

USA and Canada

Sales and Technical Support
Tel 1 800 241 4402
Fax 1 678 589 7325
email info@kingspaninsulation.us
web site www.kingspaninsulation.us
www.kingspaninsulation.ca

Kingspan Insulation LLC
2100 RiverEdge Parkway, Suite 175, Atlanta, Georgia 30328
info@kingspaninsulation.us

1-800-241-4402
www.kingspaninsulation.us
www.kingspaninsulation.ca

INSTL-COMM
1606