KS Series Commercial and Industrial Wall Panels

Optimo™, Azteco®, Granitstone®, Mini-Wave,
Mini Micro-Rib, Micro-Rib, Shadowline

Insulated Metal Wall Systems
Installation Guide
Disclaimer

This installation guide is only to be used in conjunction with panel installation drawings and Kingspan recommended details. Details shown in project shop drawings take precedence over any similar information in this manual. Shop drawings may be prepared either by Kingspan or by the panel contractor. Kingspan Technical Service Department is available to assist the panel contractor in the review of shop drawings.

This guide is intended to provide the panel contractor with recommended methods, procedures and guidelines for the installation of the KS Series wall systems for commercial / industrial and architectural applications. Information presented is accurate but may not cover all situations, building conditions and / or details of your specific project. Consult Kingspan Technical Services where this guide does not cover your unique construction requirements. It is the sole responsibility of the project engineer and panel installer to ensure specified air and weather tightness of a building by good design and workmanship in accordance with approved drawings using only the appropriate type of sealants. It is the sole responsibility of the owner’s representative and panel installer to maintain quality workmanship in accordance with approved shop drawings to ensure the best performance of the wall system. Kingspan recommends installers read this document fully before receiving the panels on the job site. Installation classes are available through Kingspan’s Technical Services Department. Please call 1-877-638-3266 for more information.

Follow the architect’s approved shop drawings and engineering calculations for your project specific fastening patterns. The engineer of record is responsible for verifying applicable design loads and panel fastening requirements.

All safety procedures, including adequate fall protection, are the responsibility of the panel contractor.

IMPORTANT!
Please read all information related to your project before receiving materials at the job site and before starting the installation.
Welcome to Kingspan, global leaders in the design and manufacture of insulated metal panels. Insulated panels serve as energy efficient, state-of-the-art alternative to traditional construction. This document serves as installation guidelines for the KS Series wall panel systems.

1.1 Features
The KS Series product range is suitable for large scale industrial and commercial applications where both vertical and horizontal panels are required. The product set varies from 42” vertical panels with a Shadowline profile to a high end flat smooth 24” Optimo™ profile.

1. Single component wall panels provide exterior weather barrier, insulating core and interior vapor barrier all-in-one
2. Unique side joint clip system eliminates the need for exposed fasteners
3. Panels are lightweight, easy to install under most weather conditions
4. Wide variety of profiles and textures provide architecturally appealing solutions
5. Panels are available in lengths of up to 52’ to minimize the number of stack joints required
6. Accessory items including metal flashings and aluminum extrusions are also available (contact Kingspan for more information)
KS Series panels are available in the following configurations:

1.2 Insulation Values

KS Series panels offer the building designer R values of approximately 7.2 per inch Nominal, as well as the ability to balance initial cost versus long-term energy savings.

To complete the wall system a full range of integrated accessories including attachment clips, metal trims and aluminum extrusions are available.

1.3 Warranties

Kingspan can furnish various performance warranties as required by project specifications. The items covered by these warranties include weathertightness, corrosion, structural performance and finish performance.

Weathertight warranties require the use of Kingspan Authorized Installers. In addition, these projects require several jobsite inspections, so be sure to schedule inspections in advance.

Kingspan requires that all specifications and shop drawings are reviewed prior to warranty issuance. In addition, warranties are limited to materials supplied by Kingspan, and are not issued until full payment for all services and material provided is received.

Contact Kingspan Customer Service for more information on our warranty programs.

1.4 Installer Qualifications

Kingspan recommends that our panels are installed under the direct supervision of an experienced sheet metal craftsman trained in the proper application of our products. Please contact Kingspan at 1-877-638-3266 for information regarding our Authorized Installer training programs.
Kingspan KS Series wall panels have been thoroughly evaluated and tested by independent third party laboratories (UL, ULC, Factory Mutual etc.) to determine all aspects of their performance. The results of these tests, in combination with our comprehensive engineering analysis, enable us to provide design assistance for nearly every project. This includes complete panel analysis of wind, live, seismic and thermal loading as well as allowable spans, deflection and recommended fastening.

2.1 Deflection
Current International Building Codes specify wall cladding to be designed for a deflection of L/180. The project designer and/or engineer of record should always check the applicable code(s) for deflection limits. For deflection limits other than L/180, please contact Kingspan Technical Services for evaluation.

Kingspan panels have been evaluated by Factory Mutual and are in compliance with FM 4881 Approval Standard for Exterior Wall Construction.

2.3 Panel Diaphragm
Insulated panels should NOT be relied upon to provide significant diaphragm strength. Instead, cross bracing (cables, rods, angle iron etc.) should be used to provide diaphragm. Insufficient bracing for the walls may result in damage to the panels, and will void the panel warranty.

2.4 Seismic
Kingspan wall panels are mechanically attached on one side only, with the other side free to slide along the tongue and groove joint configuration. In addition to this built-in slip joint design, the panels are very light (approx. 3-4 psf). As a result, they are ideal for use in seismically sensitive projects.

2.5 Fire Ratings
Kingspan panels have been thoroughly evaluated by Factory Mutual, UL and ULC and are covered under various product approval listings.

2.6 Air and Water Infiltration
Air and Water Infiltration testing has been successfully conducted on the KS Series panels in accordance with ASTM E-283/331.

For more information on any of the above items, please contact Kingspan Technical Services:
Deland, FL – 386-626-6789
Modesto, CA – 209-531-9091
Caledon, Ontario (Canada) – 905-951-5600

For installation assistance: installation@kingspanpanels.com
For engineering assistance: technicalservice@kingspanpanels.com

The information contained in this guide is thought to be reliable and correct, but is subject to change without notice.
3 Inspection upon Delivery

3.1 Panels are carefully packaged in large shrink-wrapped bundles, then shipped on flat bed trailers to the construction site. When a shipment is received, check all items against the shipping document for quantities, dimensions, colors, transit damage, etc. Document any shortage of panels and accessories or panel damage on the bill of lading and have it signed by the driver. It is the receiver’s responsibility to make any damage claims immediately. Please note that although every effort is made to prevent shipping damage, Kingspan is not responsible for damage which may occur during transportation, delivery, storage or on-site handling.
4 Panel Handling

4.1 Panels
Handed by
Forklift

4.1.1 The recommended loading / unloading method for bundles less than or equal to 30’ is to use a single forklift with widely spaced forks placed under the center of the bundle as shown in Figure 4.1a. Panel bundles over 30’ in length may be moved by using two forklifts spaced equally along the length of the bundle as shown in Figure 4.1b. Inspect travel route to assure a reasonable level and compacted surface free of ruts and excavations.
4 Panel Handling

4.2 Panels Handled by Crane

4.2.1 The recommended crane lifting method is to use nylon straps positioned at a minimum of two points along the length of the bundle. Suitable wood spreaders should be used and located at the top and bottom of the bundles at the strap positions to protect the edges of the upper and lower panels. Extreme care should be taken to avoid bumping and snatching of the bundles when lifting.

4.2.2 Panel bundles with a total length of not more than 30'-0" (9.14m) can be handled with a crane by using nylon straps and wood spreaders as shown in Fig. 4.2. For suggested wood spreader dimensions, see Fig. 4.3.

Fig. 4.2

Wood spreaders
(see Fig 4.3)

Nylon straps

Polyurethane foam blocks

Wood spreader

Max. 30'-0" (9.14 m)

For illustration purposes only

Fig. 4.3

3/8" (9.5 mm)

1/2" (19 mm)

2" (50 mm)

43/8" (110 mm)

Bundle width +4" (100 mm)

Bundle width

2" (50 mm)

3/8" (9.5 mm)

1/2" (38 mm)
4 Panel Handling

**4.2.3** When lifting bundles with a crane longer than 30'-0" (9.14m), three points of support are required from lifting beam to bundle, as shown in Fig. 4.4. To prevent damage from nylon straps, use wood spreaders at top and bottom at lifting locations as shown in Fig. 4.4 & Fig. 4.5.

**4.3 Handling Individual Panels**

**4.3.1 CAUTION**

Workers must wear appropriate protective gear at all times when handling panels. Failure to do so may cause injury.
**4 Panel Handling**

**Correct and Incorrect Panel Handling**

**Thermal Bowing**

Sun heats top face causing bow

Bowed panel

Opened panel bundle

Reverse panel to allow for even warming

Bowed panel

Opened panel bundle

4.3.2 **CAUTION!**

Individual panels should never be moved in a flat position as excessive flexing may result. Excessive flexing ruptures a panel’s core, permanently distorts the facings and may lead to thermal blistering. When moving a panel, it must be turned on its edge first, then supported at each end with as many men as necessary to safely handle.

**NOTE**

Panels exposed to direct sunlight may exhibit thermal bow, which can hinder panel engagement. This can be corrected by either placing the panels in a shaded area, or by flipping the panels over exposing the cool side of the panel to the sunlight for approximately 15 minutes.

Panels are to be fastened at every support unless otherwise indicated on the shop drawings. Fastener requirements at each clip are based on design loads. Refer to the shop drawings for the correct fastening, or contact Kingspan Technical Services for assistance.
4 Panel Handling

4.3.4 CAUTION!
Never drag a panel from a bundle or across other surfaces. It will scratch and damage the panel coating / finish. Always lift panels when removing from bundle.

4.3.4 CAUTION!
To prevent joint damage and possible delamination, never lift a panel from the top sheet only. Lift from underneath the entire panel.

4.4 Panels
Lifting using Vacuum Equipment
Panel installation time can often be reduced by using vacuum lifting equipment. The following items need to be verified by the equipment supplier prior to use: lifting equipment must be adequate for panel lengths and weights, and provide sufficient mobility and reach for the project conditions.

Vacuum heads (cups) must be suitable to safely lift panels with profiled and / or embossed surfaces. Fluted profiles may require specific vacuum heads.

Kingspan recommends using Rotaboy and Cladboy vacuum lifting systems. For equipment parameters and availability, please contact: AutoMak Assembly Inc. at 1-219-310-8458 / info@automakassembly.com.
5 Panel Storage on Site

5.1 Site must have adequate storage space to receive and store the panel bundles. This space must be level, firm, clean and free from standing water. Bundles should be stored in a dry condition, with one end slightly elevated to facilitate moisture drainage.

5.2 Panels should be inspected upon delivery for presence of moisture. If moisture is present, bundles should be slit open immediately to allow ventilation and drainage.

5.3 If panels are to be used immediately, bundles should be placed at pre-planned strategic locations around the building perimeter, as close as possible to the specific work areas. Review installation shop drawings to determine the best locations.

5.4 Panels in opened bundles should be covered by a plastic sheet or tarp at the end of the working day. The covering and bundles must be securely fastened to prevent wind damage (see Figure 5.1).

5.5 Granitestone panels exposed to site dust may exhibit a perceived tint variation when placed next to a clean panel. This effect is preventable if protected from dust accumulation and is not cause for rejection of the panel or claim against color match. Dust type may affect ease of cleaning, and may require multiple cleanings or time to fully weather in. Only use prescribed cleaning products and methods see section 12 for cleaning instructions.

5.6 When handling panels and / or panel bundles, ropes, steel cables or chains must not be used.

5.7 Avoid outdoor storing for longer than 60 days. Moisture between panels can cause corrosion or staining. Staining of any kind is not considered to be a cause for rejection.

5.8 If panels are not to be used immediately, then they should be stored under a temporary shelter with the plastic removed from the top and sides of the bundles. Recover the bundles with a protective tarp and adequately secure both tarp and panels to prevent wind damage (see Figure 5.1).

NOTE
When stacking bundles (maximum two high) limit storage time to 30 days to prevent panel damage.
6 Handling and Storage of Auxillary Items and Accessories

6.1 Care should be taken during unloading and storage to prevent damage to small items, ie. trims fasteners, clips, sealants, etc.

6.2 Cover all pallet crates or boxes to protect materials from weather but allow for ventilation to prevent condensation. Temperature sensitive items such as butyl tapes and sealants should be stored under controlled conditions to maintain suitable application characteristics.

7 Removal of Protective Film

7.1 **IMPORTANT!**
If panels will not be installed within 60 days of receipt, the bundles should be unstacked and the protective film removed from each panel. Carefully restack the panels and protect from the elements. Failure to remove the film within this time period may result in excessive film adhesion and breakdown of the plastic, making removal extremely difficult. In addition, failure to remove the film as instructed may result in a buildup of adhesive residue. Kingspan is not responsible for either of these conditions. Film removal and panel cleaning is the responsibility of the installation contractor.

7.2 It is recommended to remove protective film as panels are installed. Film on installed panels should be removed by the end of each day.

7.3 Loosen film along male edge and peel it off and down at approximately 45° angle from both sides of panels (see Fig. 7.1).

7.4 If adhesive residue remains on panel surfaces after the protective film is removed, panels may be cleaned with a rag soaked in Oil-flo 141 409, SFR or equivalent. After cleaning, rinse thoroughly. For safety, provide adequate eye and skin protection, ventilation and follow all other manufacturer’s instructions.

7.5 Care should be taken when cleaning panels, the amount of force and time spent rubbing the surface can result in a polishing effect on the panel’s surface. You should always trial methods and products in an inconspicuous area first.
7 Removal of Protective Film

8 Structural Alignment

8.1 Review shop drawings prior to installation to verify that structural members are in the correct location.

8.2 Installer must examine the alignment of the structural steel before installation of the wall panels. The walls must be square, and support members to which panels are attached must be in the same plane, flat and free of obstructions such as weld marks, bolts or screw heads.

For vertically installed panels, support members shall be:

a. Plus or minus 1/8" (3.17 mm) in 5 feet (1524 mm) in any direction along plane of framing
b. Plus or minus 3/8" (9.525 mm) in 20 feet (6096 mm) cumulative in any direction along plane of framing
c. Plus or minus 3/4" (19.05 mm) from framing plane on any elevation. Panel supports must extend to the outer extremities at all panel terminations.

8.3 For horizontally installed panels, support members shall be:

a. Plus or minus 1/8" (3.17 mm) in 5 feet (1524 mm) in any direction along plane of framing
b. Plus or minus 1/4" (6.35 mm) in 20 feet (6096 mm) cumulative in any direction along plane of framing
c. Plus or minus 1/2" (12.7 mm) from framing plane on any elevation. Panel supports must extend to the outer extremities at all panel terminations.

Any variance from tolerances can affect both performance and aesthetics and must be reported to the architect and general contractor, and corrected by the responsible party before panel installation begins.
9 Panel Cutting Procedures

9.1 Personnel working with panel cutting equipment should wear respiratory and eye protection at all times.

9.2 Panel cutting should take place prior to panel installation whenever possible.

9.3 Use the appropriate cutting tools with extreme care to avoid panel delamination. Do not use a cutting disk, torch, and other high heat producing methods for cutting. Hot filings may damage the painted surface of the panel and would affect the coating’s warranty on the panel. Kingspan recommends use of a circular saw with a fine tooth carbide tip blade.
A band saw with a suitable metal cutting blade may also be used.

9.4 For small penetrations, a Dremel type router may be used to cut each face of the panel, and a serrated bread knife may be used to cut the foam core.

9.5 Power snips, nibblers or hand snips may be used to cut trims and flashings.

NOTE
Do not use an electric grinder, reciprocating saw, or any tool that may cause serious delamination which affects aesthetics, performance and panel warranty.
9 Panel Cutting Procedures

9.6 Step 1: Mark the cut line on the interior and exterior panel facings.

Step 2: Leave protective film in place during cutting. If film has already been removed, apply masking tape adjacent to the area to be cut.

Step 3: Recheck measurements and proceed with cutting operation. Cut the interior face of the panel and about \( \frac{1}{4} \) of the foam thickness using a circular saw with a fine toothed carbide tipped blade. Then carefully turn panel over and cut the exterior face and the remainder of the foam.

Step 4: For panels located at framed opening locations where 50% or more of the panel width is removed, cut interior face and foam to a depth of approx. \( \frac{1}{4}'' \). Flip panel over and cut exterior face and foam to a depth of approx. \( \frac{1}{4}'' \). Then cut through the joints on the edge of the panel that is to be removed for the opening. Lift the panel into place, secure with fasteners as required, then use a serrated bread knife to fully cut through the foam and remove the cut section of panel.

Step 5: File or sand off any burrs or rough spots at the cut line. Sweep off all metal shavings etc. The panel is now ready to be erected.

Fig. 9.1

NOTE
To prevent damage to Granitstone® finish panels, it is strongly advised that the saw and carbide tipped blade used are large enough to cut through the entire panel from the liner side only, except as noted in step 4 above.
10 Panel Sealant Placement

10.1 Apply butyl sealant to interior female joint to ensure proper vapor barrier. Joint should be dry and clean before applying sealant. Fill female pocket approximately 1/2 to 3/4 full. Add / delete as necessary during panel installation to maintain proper panel seal.

Applying sealant on site (Fig. 10.1)

Fig. 10.1

Fig. 10.1a

NOTE
Pull (not push) caulk tube along length of side joint for more uniform sealant bead.

NOTE
In extreme cold weather locations, it may be advisable to caulk both interior and exterior joints. It is also advisable to keep sealants in a warming bin until ready for use to ensure proper viscosity. Contact Kingspan Technical Services for more information.
11 Panel Touch-up Paint

11.1 The panel erector is to touch up all exposed field cut edges with touch up paint. Contact Kingspan Customer Service for information on appropriate touch up paint.

12 Panel Cleaning and Maintenance

12.1 Proper installation and maintenance are extremely important in obtaining the very best service and appearance from pre-painted metal insulated panels.

12.2 All dirt, oil, grease, fingerprints, metal filings or other contaminants should be removed to assure proper service life of the paint system. The installer should wipe-down the panels as they are erected.

12.3 Dirt pickup may cause apparent discoloration of the paint after prolonged exposure. Slight chalking from strong sunlight exposure may also cause a change in appearance. A thorough cleaning will usually restore the original appearance of the panels.

12.4 In many cases, a simple low pressure wash of the building with plain water will be adequate. In areas of heavy dirt deposits, a solution of water and detergent (1/3 cup Tide per gallon of water) may be used. Use a rag, sponge, or soft bristle brush to clean. A clean water rinse should follow.

12.5 Mildew may occur in areas subjected to high humidity. To remove mildew, use the following solution followed with a clear water rinse: 1/3 cup of detergent (Tide), 2/3 cup of tri-sodium phosphate (Soilex), 1 quart sodium hypo chlorite 5% solution (Clorox), 3 quarts water.

12.6 Caulking compounds, oil, grease, tars, wax and similar substances can be removed by wiping with a cloth soaked with WD-40 lubricant or Oil-flo 141. Test on an inconspicuous area first. Do not rub excessively or damage to the finish may result. Wipe only contaminated areas and follow with detergent cleaning and thorough rinsing.

12.7 To remove oxidation and tough stains, use a household cleaner recommended for use on porcelain skins and bathtubs. This should be followed with a thorough rinsing. Wire brushing or any abrasive material may damage the painted surface and should not be used.

12.8 Special cleaning and maintenance procedures are necessary for Granitstone® panels. Please consult a Project Coordinator or Regional Sales Manager for instructions.

CAUTION!

Strong solvents and abrasive cleaners should be avoided.

12.9 Contact Kingspan Customer Service to receive a copy of the complete Kingspan Panel Maintenance Manual.
13 Vertical Panel Installation

Inspect panels to be installed on the elevation to be sheeted. Set aside panels with damaged side joints, surface dents or scratches. Remove excess foam (if any) from panel joints to allow proper panel engagement.

A Verify that the structural supports are properly aligned **before** installing panels (refer to Section 8 Structural Alignment).

B Install base support and associated drip flashings per project details.

C Install inside corner trim and associated structural supports per project details.

**NOTE**
All structural supports are by others (not by Kingspan) and are shown for illustrative purposes only.
13 Vertical Panel Installation

Install interior portion only of two piece framed opening trims as indicated on project details. Tack in place as necessary using pop rivets or similar.

**Two Piece Head Detail**
- Continuous butyl sealant
- Interior cap trim
- Exposed sealant (not by Kingspan)
- Door / window frame (not by Kingspan)

**Two Piece Head Detail with Drip Edge**
- Continuous butyl sealant both sides of trim w/ marriage bead to vertical panel joint
- Drip flashing
- Exposed sealant (not by Kingspan)
- Door / window frame (not by Kingspan)

**Framed Opening Two Piece Jamb Detail**
- Framed opening (not by Kingspan)
- Door / window frame (not by Kingspan)
- Exposed sealant (not by Kingspan)
- Pop rivets
- Exterior cap trim

( Typical framed opening head conditions)

**NOTE**
One piece sill trims / extrusions to be installed AFTER panel installation, but BEFORE exterior header and jamb trims / extrusions are installed.
Install butyl sealant (vapor barrier seals) over base support / flashings, inside corner trims, framed openings, eave strut and rake angle per shop drawing details.

**NOTE**
It is the installer’s responsibility to establish the continuous backside seal using a heavy 3/8” bead of butyl sealants.
13 Vertical Panel Installation

Install butyl sealant on vertical leg of interior framed opening trims to provide proper weather and vapor seals at all framed opening locations.
**Panel joints offset from jamb**
(preferred condition for better seal at jamb conditions)

**Panel joints align with jamb**

**IMPORTANT INSTALLATION NOTE!**
Panel layouts on the shop drawings should be drawn so that the vertical joints of the panel DO NOT line up with edges of framed openings. Lining up the vertical joints at penetrations does NOT allow proper weather seals due to the offset joint configuration of the KS Series panels.

**NOTE**
Leading edge is defined as the side of the panel that receives the hidden clip and fasteners.

Sheeting is typically installed from left to right. (Sheeting direction may be changed by rotating panels 180 degrees to change direction of joints).

Cut the joints off trailing edge of the starter panel as shown. Be sure to cut first panel to proper width so that panel joints at framed openings are properly aligned.
Verify liner side joint sealant has been installed (per Section 10). Sealant quantity should be adequate to properly seal male to female joints (approx. 50% to 75% fill in female pocket).

Lift starter panel into place and press firmly into structure to seat panel into butyl sealant placed on the structure and associated trims per step E above.
Verify panel is vertical using a level placed on leading (non-cut) edge. Install hidden clips with 2 fasteners at EVERY structural support per shop drawings. Also attach trailing (cut edge) of panel to corner structure with fasteners as required per shop drawings. Be careful not to overtighten the fasteners as panel damage will result.

NOTE
If liner side factory caulking was provided, installer MUST inspect sealant bead and modify as necessary to insure a proper panel seal.
13 Vertical Panel Installation

**NOTE**
Marriage beads are critical to ensure proper vapor barriers and are required at all panel terminations.

Install marriage bead of sealant from interior joint to supporting structure at EVERY panel termination i.e. - bottom of wall at base support, at framed openings AND at top of wall at eave strut.

**Eave Condition**
- Eave strut (not by Kingspan)
- Continuous butyl sealant
- Insert Detail

**Base Condition**
- Marriage bead
- Continuous butyl sealant
- Insert Detail

**NOTE**
Verify panels are completely engaged, with proper sealant contact and joint reveals.

**Framed Opening Condition**

**Framed Opening Head with Drip Edge**
Lift next panel into position and fully engage with previously installed panel. Verify panel is vertical using a level placed on leading edge and install hidden clips and fasteners as required.

Install one piece sill trim / extrusion at framed opening locations as shown.

NOTE
It is generally easier to cut framed openings from panels prior to installing (refer to Section 9 for panel cutting directions). However, extra care must be taken during panel lifting to prevent kinking pre-cut panels. See Section 9.6 for information on cutting panels at framed opening locations.
Repeat steps K through M until wall elevation is completed.

O Repeat process for other wall elevations. For non-parapet wall conditions, endwall (rake wall) panels must be field cut to match slope of roof.

P Once all walls are sheeted, install exterior corner trims, exterior base trims and exterior framed opening trims as required. Follow fastening information on project shop drawings.

**NOTE**
Refer to page 46 for detailed instructions on framed opening trim assembly.
14 Fastener Information

This chart is based on data from fastener manufacturers laboratory test results. Since actual job site conditions will vary, chart is a basic guideline. If in doubt, field drilling and pull tests are recommended.

If #14 type ‘B’ plated fasteners are to be used, pre-drilling is required. Use the drill bit sizes listed below.

Suggested Fastener Driving Speeds
Quarter inch diameter self drilling, self tapping TEK type and B point self tapping type

<table>
<thead>
<tr>
<th>Material</th>
<th>TEK Type</th>
<th>Speed (rpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon and 410 stainless</td>
<td>#2, #3</td>
<td>1,800</td>
</tr>
<tr>
<td>304 Stainless</td>
<td>#2, #3</td>
<td>1,000</td>
</tr>
</tbody>
</table>

Note: Proper tools are required to produce consistent drilling and minimize potential fastener or application failures due to over or under driven fasteners. A torque control or depth sensing nose piece for the screw gun is recommended for proper installation.

Recommended TEK type for 1/4” diameter (self-drilling, self tapping) fasteners

<table>
<thead>
<tr>
<th>Steel Thickness</th>
<th>TEK</th>
<th>Threads / inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 Ga. (0.060)</td>
<td>#2, #3</td>
<td>14</td>
</tr>
<tr>
<td>14 Ga. (0.075)</td>
<td>#2, #3</td>
<td>14</td>
</tr>
<tr>
<td>12 Ga. (0.105)</td>
<td>#3</td>
<td>14</td>
</tr>
<tr>
<td>1/8” (0.125)</td>
<td>#3</td>
<td>14</td>
</tr>
<tr>
<td>10 Ga. (0.134)</td>
<td>#5</td>
<td>20 minimum</td>
</tr>
<tr>
<td>3/16” (0.187)</td>
<td>#5</td>
<td>14 (3)/20 minimum (5)</td>
</tr>
<tr>
<td>1/4” (0.250)</td>
<td>#3, #5</td>
<td>14 (3)/20 minimum (5)</td>
</tr>
<tr>
<td>3/8” (0.375)</td>
<td>#5</td>
<td>20 minimum</td>
</tr>
<tr>
<td>1/2” (0.500)</td>
<td>#5</td>
<td>20 minimum</td>
</tr>
</tbody>
</table>

Pilot Hole Chart for 1/4” diameter B Point Fasteners (self tapping)

<table>
<thead>
<tr>
<th>Steel Thickness</th>
<th>Drill Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 Ga. (0.060)</td>
<td>#8 (0.199)</td>
</tr>
<tr>
<td>14 Ga. (0.075)</td>
<td>#7 (0.201)</td>
</tr>
<tr>
<td>12 Ga. (0.105)</td>
<td>#7 (0.201)</td>
</tr>
<tr>
<td>1/8” (0.125)</td>
<td>#2 (0.221)</td>
</tr>
<tr>
<td>10 Ga. (0.134)</td>
<td>#2 (0.221)</td>
</tr>
<tr>
<td>3/16” (0.187)</td>
<td>#2 (0.221)</td>
</tr>
<tr>
<td>1/4” (0.250)</td>
<td>#2 (0.221)</td>
</tr>
<tr>
<td>3/8” (0.375)</td>
<td>#2 (0.221)</td>
</tr>
<tr>
<td>1/2” (0.500)</td>
<td>#1 (0.228)</td>
</tr>
</tbody>
</table>
To install type ‘B’ fastener, pre-drill using the correct drill size from chart on previous page. Insert fastener through clip and tighten down until assembly is snug. Panels are to be fastened at every support. Fastener requirements are based on design loads. Consult Kingspan Technical Services for allowable panel and fastener design loads. Do not use impact tools. Do not over tighten.

After drilling always remove metal chips that have fallen onto flashings or panels.

NOTE
Contact Kingspan’s Technical Services Department for specific project fastening recommendations.
15 Vertical Construction Details

- **KS Azteco Panel**
  - **EXTERIOR FACE**: 42" Coverage (36", 30" & 24" optional)

- **KS Granitstone® Panel**
  - **EXTERIOR FACE**: 42" Coverage (36", 30" & 24" optional)

- **KS Micro-Rib Panel**
  - **EXTERIOR FACE**: 42" Coverage (36", 30" & 24" optional)

- **KS Mini Micro-Rib Panel**
  - **EXTERIOR FACE**: 42" Coverage (36", 30" & 24" optional)

- **KS Mini-Wave Panel**
  - **EXTERIOR FACE**: 42" Coverage (36", 30" & 24" optional)

- **KS Shadowline Panel**
  - **EXTERIOR FACE**: 36" Coverage (40", 30" and 24" optional)

- **Optimo™ Panel**
  - **EXTERIOR FACE**: 36" Coverage (40", 30" and 24" optional)

- **KS Shadowline Panel**
  - **EXTERIOR FACE**: 42" Coverage (36", 30" & 24" optional)
15 Vertical Construction Details

Horizontal support

12 Ga Stainless steel hidden fastener clip (1 per panel, per support set clip in butyl sealant)

Wall panel installation direction

1/4” - 14 Hex head fasteners without washer

Continuous butyl sealant

Panel module

1/8”

Horizontal support

Continuous butyl sealant

Continuous butyl sealant (optional)

12 Ga Stainless steel hidden fastener clip (1 per panel, per support set clip in butyl sealant)

1/4” - 14 Hex head fasteners without washer

Wall panel installation direction
Flush Base Detail

- 1/4" - 14 Hex head fasteners without washer
- 12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant
- Continuous butyl sealant w/marriage bead to vertical panel joint
- Base angle w/min. 3" vertical leg for panel attachment. Base channel set in sealant (not by Kingspan)
- Fastener to concrete (not by Kingspan)
- Base trim
- Base flashing
- Continuous butyl sealant below base flashing
- Sealant marriage bead to vertical panel joint

Base at Notched Concrete Detail

- 1/4" - 14 Hex head fasteners without washer
- 12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant
- Continuous butyl sealant w/marriage bead to vertical panel joint
- Base angle w/min. 3" vertical leg for panel attachment. Base channel set in sealant (not by Kingspan)
- Fastener to concrete (not by Kingspan)
- Base trim
- Base flashing
- Continuous butyl sealant below base flashing
- Continuous butyl sealant
15 Vertical Construction Details

Overhang with Base Support Detail

- 1/4” - 14 Hex head fasteners without washer
- 12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant
- Continuous butyl sealant w/marriage bead to vertical panel joint
- Base support w/min. 3” vertical leg for panel attachment.
- Base channel set in sealant (not by Kingspan)

- Pop rivets @ 12” o.c.
- Base trim
- Fastener to concrete (not by Kingspan)
- Continuous butyl sealant below base flashing

Overhang with Base Angle Detail

- Continuous butyl sealant w/marriage bead to vertical panel joint
- 1/4” - 14 Hex head fasteners without washer
- 12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant
- Pop rivets @ 12” o.c.
- Base trim
- Butyl sealant

Overhang with Base ‘J’ Extension Detail

- Optional wiper gasket (field installed)
- Base ‘J’ extrusion
- Field drill 1/8” Ø weep holes
- Butyl sealant
- Fastener to concrete (not by Kingspan)

NOTE
See details on pages 45 and 46 for typical trim lap instructions.
Outside Corner with Profiled Trim Detail

Outside Corner with Flat Trim Detail
Outside Corner with Extrusion Detail

1/4" - 14 "low profile" through fastener with 1/8" bonded washer (as required for wind load)
Corner extrusion cap
F.I.P. Insulation as required (by others)
Continuous butyl sealant
Corner extrusion base
Vertical support
Optional wiper gasket (field installed)

Inside Corner with Profiled Trim Detail

Butyl sealant applied at fastener locations
Outside corner trim
F.I.P. Insulation as required (by others)
Continuous butyl sealant
1/4" Phil. pan head
1/4" - 14 through fasteners w/washer (as required for wind load)
Inside corner trim
Pop rivets

NOTE
Verify wind loads with Kingspan prior to using expansion fasteners for panel attachment.
Inside Corner with Flat Trim Detail

Butyl sealant applied at fastener locations
Outside corner trim
F.I.P. Insulation as required (by others)
Continuous butyl sealant
Horizontal support
Inside corner trim
1/4" - 14 "low profile" through fastener (as required for wind load)
Pop rivets

Inside Corner with Extrusion Detail

Vertical support
1/4" - 14 "low profile" fastener
Aluminum corner extrusion
Corner extrusion base
Continuous butyl sealant
1/4" - 14 "low profile" through fastener (as required for wind load)
Optional wiper gasket (field installed)
15 Vertical Construction Details

**Framed Opening Two-Piece Head Detail**
- Continuous butyl sealant in vertical panel joint
- 1/4" - 14 "low profile" through fastener @ 12" o.c.
- Pop rivets
- Exterior cap trim
- Field drill 1/8" weep holes to align with panel joints
- Exposed sealant (not by Kingspan)
- Door / window frame (not by Kingspan)

**Framed Opening Head with “Drip Edge” Detail**
- Continuous butyl sealant w/marriage bead to vertical panel joint
- Continuous butyl sealant
- 1/4" - 14 "low profile" through fastener
- Pop rivets
- Base trim
- Drip flashing
- Exposed sealant (not by Kingspan)
- Door / window frame (not by Kingspan)

**Header with Extrusion Detail**
- Continuous butyl sealant
- 1/4" - 14 "low profile" through fastener
- Field cut female joints where required
- Two piece jamb extrusion
- Field drill 1/8" Ø weep holes
- Exposed sealant (not by Kingspan)
- Door / window frame (not by Kingspan)

**NOTE**
See details on pages 45 and 46 for typical trim lap instructions.
Framed Opening Two Piece Jamb Detail

- Framed opening (not by Kingspan)
- Door / window frame (not by Kingspan)
- Exposed sealant (not by Kingspan)
- Pop rivets
- Exterior cap trim

Framed Opening One Piece Jamb Detail

- Framed opening (not by Kingspan)
- Door / window frame (not by Kingspan)
- Exposed sealant (not by Kingspan)
- Pop rivets

Jamb with Extrusion Detail

- Framed opening (not by Kingspan)
- Door / window frame (not by Kingspan)
- Exposed sealant (not by Kingspan)
- Two piece jamb extrusion
- Continuous butyl sealant
- Field cut panels where required

Continuous butyl sealant
Interior cap trim

1/4" - 14 "low profile" through fastener @ 12" o.c.

NOTE
See details on pages 45 and 46 for typical trim lap instructions.
15 Vertical Construction Details

Framed Opening One Piece Sill Detail

- Exposed sealant (not by Kingspan)
- Continuous butyl sealant
- Continuous butyl sealant w/marriage bead to vertical panel joint
- Exterior cap trim
- Pop rivets
- 1/4" - 14 "low profile" through fastener

- Door / window frame (not by Kingspan)
- Field bend (as required)
- Framed opening (not by Kingspan)

Sill with Extrusion Detail

- Door / window frame (not by Kingspan)
- Continuous butyl sealant
- Exposed sealant (not by Kingspan)
- Sill extrusion
- Field bend (as required)

- Framed opening (not by Kingspan)
- 1/4" - 14 "low profile" through fastener
- Continuous butyl sealant w/marriage bead to vertical panel joint
- 1/4" - 14 "low profile" fastener

Optional wiper gasket (field installed)

NOTE
See details on pages 45 and 46 for typical trim lap instructions.
Overhead Door Head with Extrusion Detail

Continuous butyl sealant w/marriage bead to vertical panel joint

1/4" - 14 "low profile" through fastener

Field cut female joint where required

Two piece jamb extrusion

Field drill 3/8" Ø weep holes

Exposed sealant (not by Kingspan)

Continuous butyl sealant

1/4" - 14 "low profile" through fastener

Framed opening (not by Kingspan)

Fastener (not by Kingspan)

Header trim (optional)

Optional wiper gasket (field installed)

NOTE
See details on pages 45 and 46 for typical trim lap instructions.
15 Vertical Construction Details

Overhead Door Jamb with Extrusion Detail

- Fastener (not by Kingspan)
- Frame opening (not by Kingspan)
- Jamb trim (optional)
- Continuous butyl sealant
- Exposed sealant (not by Kingspan)
- Two piece jamb extrusion
- Field cut panels where required
- \( \frac{1}{4}" - 14 "low profile" through fastener with washer \)
- \( \frac{1}{4}" - 14 "low profile" through fastener \)

Optional wiper gasket (field installed)
NOTE
For wall elevations requiring stack joints, it is necessary that each column of panels is installed at the same time to maintain proper vertical reveal alignment.

Stack Joint Detail

12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant
1/4” - 14 hex head fasteners without washer
Continuous butyl sealant w/marriage bead to vertical panel joint
Horizontal support

Pop rivets
Stack trim
Stack flashing
Continuous butyl sealant below base flashing
Continuous butyl sealant w/marriage bead to vertical panel joint
Continuous 3” x 3” (gauge to match girt) (not by Kingspan)
Fasten as required (not by Kingspan)

Stack Joint with Extrusion Detail

1/4” - 14 hex head fasteners without washer
1/4” - 14 “low profile” through fasteners
Fill void with compressible foam closure
Fasten as required (not by Kingspan)
Horizontal support
Two piece stack extrusion
Continuous 3” x 3” (gauge to match girt) (not by Kingspan)
Continuous butyl sealant w/marriage bead to vertical panel joint

Parapet with Flush Trim Detail

12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant
Parapet cap
Wrap membrane adhere to exterior panel face (not by Kingspan)
1/4” - 14 “low profile” fasteners @ 12” o.c.
Continuous cleat
1/4” - 14 hex head fasteners without washer

Continuous butyl sealant w/marriage bead to vertical panel joint
Parapet blocking (not by Kingspan)
Fastener to parapet backer (not by Kingspan)
Membrane roof & parapet backer (not by Kingspan)
15 Vertical Construction Details

**Parapet with Profiled Trim Detail**
- Wrap membrane (not by Kingspan)
- Continuous butyl sealant w/marriage bead to vertical panel joint
- 12 Ga Stainless steel hidden fastener clip (1 per panel per girt) set clip in butyl sealant
- Parapet cap
- Wrap membrane adhere to exterior panel face (not by Kingspan)
- Pop rivet
- 1/4" - 14 hex head fasteners without washer

**Parapet with Extrusion Detail**
- Aluminum parapet extrusion
- Field cut male joints where required
- Wrap membrane adhere to exterior panel face (not by Kingspan)
- 1/4" - 14 hex head fasteners with washer

**Framed Opening Partition Details**
- Cap trim
- Phil. pan head fasteners
- Continuous butyl sealant

**NOTE**
Contact Kingspan Technical Services for engineering assistance regarding these details.
Trim Lap with Hem Detail

Field notch hem(s) as required (not by Kingspan)

(2) beads butyl sealant

Min. 3" trim lap

Min. 3" trim lap

Trim End Lap with Lap Strip Detail

8" long lap strip

(2) beads butyl sealant

Nom. 1/4" gap
15 Vertical Construction Details

Trim Lap at Framed Opening Detail

**NOTE**
Weep holes should be aligned with vertical panel joints (not to exceed 24” on center).

Trim installation sequence:
1. Interior jamb trim
2. Interior head trim with tabs bent down
3. Sill trim with tabs up
4. Exterior jamb trim
5. Exterior head trim
6. Exterior sealants as required

Sill trim with field bent tab
Squared off trim alternate detail
NOTE

Aluminum extrusions may be used in lieu of press broke metal trims. Due to expansion and contraction, it is important to leave a gap of approximately 1/4” at the ends of each piece. Lap strips should be used to keep the extrusions properly aligned and weatherproof. Lap strips for horizontal extrusions should be set in two rows of butyl sealant at each end. Extrusions should be field drilled with weep holes within 2” of the ends of the lap strips to allow adequate drainage.

NOTE

For ease of installation, use a lubricant such as WD-40 or graphite when mating two piece extrusions.
**15 Vertical Construction Details**

**Extrusion at Framed Opening Detail**

**NOTE**
Weep holes should be aligned with vertical panel joints (not to exceed 24” on center).

**Installation sequence:**
1. Interior jamb extrusion
2. Interior head extrusion
3. Sill extrusion
4. Exterior jamb extrusion
5. Exterior head extrusion
6. Exterior exposed sealants as required
16 Horizontal Panel Installation

**IMPORTANT INSTALLATION NOTES!**

- Minimum width of load-bearing steel exposed behind two horizontal panels at vertical joint is 5” nominal (approx. 127mm) which could be provided by standard double steel stud configuration with steel backer plate. Optional I-beam or HSS steel sections.
- Minimum bearing face for intermediate support is 1.625” (approx. 42mm).
- Where long runs of integrated strip windows are installed, the vertical panel joints should terminate above and continue below the window units.
- Visually check all internal and external tongue-and-groove joints between two adjacent panels to ensure panels are engaged fully and the gaps do not exceed tolerances.
- Details shown in this guide are for reference only. Consult project shop drawings for actual details required.

**A** Verify that all structural supports are properly aligned **before** installing panels (refer to Section 8 Structural Alignment - Horizontal Panels).

**B** Install continuous mending plates at all vertical reveal locations. Using a level, mark the centerline of all vertical reveal joints on mending plates to match locations shown on shop drawings.

If the structure does not meet alignment specs, it should be straightened. Shimming is not recommended at the vertical joint, as the mending plate must be fully supported and firmly against the backside of the panel with minimal gap to establish and hold the seal.

**C** Verify all framed opening locations. Apply butyl sealant to outside face of steel supports / studs around framed openings. Install interior portion of two piece trims / extrusions, tack in place as necessary.

Apply butyl sealant to exterior side of interior trims / extrusions around perimeter of opening to form vapor seal to back side of panels (as shown on page 51).

**NOTE**

Care must be taken to properly seal all framed openings. Sealant MUST be installed between trims / extrusions and supporting steel AND between trims / extrusions and back side of panels.
Continuous butyl sealant
Drip flashing
Door / window frame (not by Kingspan)
Exposed sealant (not by Kingspan)
Two Piece Head Detail
Framed opening (not by Kingspan)
Exterior head trim
Exposed sealant (not by Kingspan)
Door / window frame (not by Kingspan)
Header with Extrusion Detail
Continuous butyl sealant
1/4" - 14 "low profile" fastener
Header extrusion
Field drill 3/8" Ø weep holes (not by Kingspan)
Door / window frame (not by Kingspan)
Framed opening (not by Kingspan)
Field drill 3/8" Ø weep holes (not by Kingspan)
Exterior head trim
Exterior jamb trim
Interior header trim
Jamb framing (not by Kingspan)
Mending plates
Interior jamb trim
Sill framing (not by Kingspan)
Field applied butyl end dams (typical)
Panel Attachment at the Base

D Install base extrusion per project shop drawings. Extrusion must be level and set in butyl sealant.

E Base extrusion must be stopped short of vertical reveal locations as shown.
Insert compressible foam closures per project details.

F Apply beads of butyl sealant on vertical mending plates as shown.

Base Flush Detail
- Continuous butyl sealant
- ¼" - 14 hex head fasteners with washer
- Optional butyl sealant
- Aluminum base extrusion
- Fill void with compressible foam closure
- Continuous butyl sealant below base extrusion
- Fastener to concrete (not by Kingspan)

“J” Base Overhang Detail
- ¼" - 14 “low profile” fastener
- Continuous butyl sealant at panel joint
- Fill void with compressible foam closure
- Aluminum “J” base extrusion
- Field drill ½" Ø weep holes
- Fastener to concrete (not by Kingspan)

Vertical supports (not by Kingspan)
Continuous butyl sealant at panel joint
Base channel set in sealant (not by Kingspan)
Sealant (not by Kingspan)
Optional wiper gasket (field installed)
Continuous mending plate
Butyl sealant continuous beads
"Shingle" lap mending plate over flashing
Flashing behind and under base extrusion
Sealant (not by Kingspan)

Base Flush Detail

Base extrusion with butyl sealant below
Stop extrusion short of panel edge
Marriage bead to joint sealant
Sealant (not by Kingspan) span

"J" Base Overhang Detail

"J" base extrusion
Marriage bead to joint sealant
Cut back leg and hook of extrusion short of vertical joint
Sealant (not by Kingspan) span
**16 Horizontal Panel Installation**

Prefabricated Corner Installation

**G** Starting from a corner, locate reveal centerline previously marked on first vertical mending plate.

**H** Using a level, mark this plate to indicate edges of vertical reveal joint (one half the dimension of vertical reveal on each side of centerline).

**NOTE**
Cut panels in field as necessary for framed openings (see section 9).

**NOTE**
Consult with Kingspan Technical Department for allowable panel loads, spans and fastening pattern.

**NOTE**
Panel installation may begin with either the corners or straight wall panels. Site measurements verifying dimensions of corner panels should be made prior to corner panel fabrication.

For large, complex structures or those with dimensional errors, it is typical to set the straight panels first, then install folded corners (as shown in this guide).

For simpler buildings it is typical to set the corner panels prior to the straight wall panels. Proceed directly to steps P-S, then return to complete steps I-O.
J Set the factory bent corner panel (C1) into the base extrusion. Be sure to position the panel between the vertical joint centers, level, and fasten as required.

NOTE
Steel must be plumb and level for proper fit of factory bent corner panels.

J Install butyl sealant marriage beads from mending plate to interior male joint.

K Lower factory bent corner panel (C2) into position using vertical joint reveals as a guide. Firmly seat panel to assure proper sealant contact. Level panel as required.

L Install butyl sealant marriage bead from mending plate to interior male joint.

Repeat steps R and S for panel C3.

Outside Corner - Factory Folded Detail

Outside Corner with Extrusion Detail

Factory folded corners and trimless ends available with Granitstone®, Micro-Rib, Mini Micro-Rib and Optimo® panels.
16 Horizontal Panel Installation

Panel Installation - Bottom Row

**M** Set panel P1 as shown. Line up left edge of panel with right side reveal mark on mending plate as shown.

**N** Fasten into supporting steel with appropriate clips and 7/8" - 14 fasteners as indicated on shop drawings.

**O** Once panel is secured, apply butyl sealant over the interior male lip at both panel ends to create a marriage bead to the sealant on the vertical mending plate.

**P** Place panel P2 in position. Verify that the vertical edges of the panel are lined up with reveal marks on mending plate.

**Vertical Joint Assembly at Corner - Panel P1**

- Steel stud at vertical joint
- Mending plate
- Marriage bead of butyl sealant (at vertical joint)
- Continuous vertical butyl sealant
- Panel fastener with clip
NOTE
Verify panels are completely engaged, with proper sealant contact and joint reveals.

CAUTION!
Do not over-tighten fasteners as damage to the panel core as well as facings will result.
16 Horizontal Panel Installation

**Intermediate Panel Fastener Detail**

- Vertical support
- 12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant
- 1/4" - 14 hex head fasteners without washer

**Horizontal Expanded Panel Joint Section Detail**

- Continuous butyl sealant
- Vertical support
- 1/4" - 14 hex head fasteners without washer
- 12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant

NOTE

- Vertical support framing may vary. See page 71 for alternate condition.

**NOTE**

- Complete installation of base course of panels.
- Install first column of panels bottom to top using the same procedures. (Panels P3-P4).

**NOTE**

- Many horizontal panel applications use “trimless” panel ends and factory bent corner panels. As a result, most installers prefer to set the entire base course of panels first. This allows field checking of critical vertical reveal locations.

**NOTE**

- Slight deviations in panel length should be accommodated by sliding the panel horizontally, so that half the difference shows up on the reveal to the left, half on the reveal to the right. This minimizes “sawtothing”.

**Horizontal Panel Joint Detail**

- 5" minimum
- Vertical support
- Continuous mending plate
- Fill voids with compressible foam closure
- Continuous butyl sealant
- Continuous butyl sealant with marriage bead to horizontal panel joint
- 1/4" - 14 hex head fasteners with washer
- Santoprene rubber gasket at vertical joint recessed 1/2" from panel face
- Factory folded trimless end (1")
- Panel length measured from here
- Panel length measured from here
- 12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant

Trimless ends available with Granitstone®, Micro-Rib, Mini Micro-Rib and Optima™ panels.
Panel Installation - Vertical Stacking

Steel stud at vertical joint
Top hat fastener
Top hat lap strip with sealant at every stack joint
Compressible foam closure
Aluminum top hat insert
PVC foam gasket
Aluminum Top Hat Joint Assembly
Once the first building elevation is completed (P1-P7), start around the corner on next elevation using the same sequence and method (P8-12).

**NOTE**

Numbers indicate order of panel installation.

**NOTE**

To minimize panel cutting, panel lengths should be predetermined to align with framed opening jambs.
Vertical Joint Options

Verify vertical joint treatment per project shop drawings. For trimless ends, insert compressible foam closure until firmly seated against mending plate, then install Santoprene joint gasket as shown.

For aluminum extrusion assemblies, insert compressible foam closure until firmly seated against mending plate, then install “Top-Hat” extrusion as shown. Use matching color lap strips at every extrusion butt joint.

(See page 88 for “top hat” lap strip details).
16 Horizontal Panel Installation

Framed Opening Trim / Extrusion Installation

Install exterior framed opening trims and extrusions as required.

Seal with exposed sealants where indicated on shop drawings. Field drill weep holes as indicated on shop drawings.

Window Assembly Detail - Trim

- Window by others
- Window frame
- Window sill flashing with 3" slope to facilitate drainage

Door Assembly Detail - Trim

- Door head flashing fastened with rivet fasteners 16" O.C.
- Panel fastener set in-place after flashing is positioned
- Continuous butyl sealant around opening frame
- Continuous butyl sealant applied installed with flashing

NOTE
See details on pages 84 and 85 for typical trim lap instructions.
Framed Opening Two Piece Jamb Detail

Framed opening (not by Kingspan)

Jamb trim (optional) 1

Exposed sealant (not by Kingspan)

Continuous butyl sealant with marriage bead to horizontal panel joint

Pop rivets @ 12” o.c.

Field cut panels where required

1/4" - 14 hex head fastener with washer

NOTE
Field bend ends of sill trim upwards (see page 85 for recommended trim installation sequence).

Trim installation sequence:
1 Jamb trim (optional) & all applicable sealants.
2 Interior cap trim & all applicable sealants prior to installing the panel and through fasteners.
3 Exterior cap trim.

Framed Opening Head with Drip Flashing Details

Horizontal wall panel

Pop Rivet

Base flashing

Base drip flashing

Exposed sealant (not by Kingspan)

Steel framing

Window frame

1/4"-14 “low profile” through fastener

Trim installation sequence:
1 Drip flashing & all applicable sealants prior to installing the panel and through fasteners.
2 Base flashing.

Framed Opening One Piece Sill Details

Field bend (as required)

1/4"-14 “low profile” through fastener

Sill flashing with rivet

Sealant between sill flashing and opening framing

Frame opening (not by Kingspan)

Continuous bead of sealant

Sill trim with field bent tab
16 Horizontal Panel Installation

Framed Opening Assembly Details - Extrusions

**Jamb with Extrusion Detail**
- Framed opening (not by Kingspan)
- Door / window frame (not by Kingspan)
- Exposed sealant (not by Kingspan)
- Two piece jamb extrusion
- Continuous butyl sealant with marriage bead to horizontal panel joint
- Field cut panels where required

**Header with Extrusion Detail**
- Continuous butyl sealant
- 1/4” - 14 “low profile” through fastener
- Field cut female joints where required
- Two piece head extrusion cap
- Field drill 3/8” Ø weep holes
- Two piece jamb extrusion base
- Door / window frame (not by Kingspan)

**NOTE**
See page 90 for recommended extrusion installation sequence.
Sill with Extrusion Detail

- Door / window frame (not by Kingspan)
- Continuous butyl sealant
- Exposed sealant (not by Kingspan)
- Sill extrusion
- Field cut male joints where required
- Framed opening (not by Kingspan)
- 1/4" - 14 "low profile" through fastener
- Continuous butyl sealant
- 1/4" - 14 "low profile" fastener

Optional wiper gasket (field installed)
17 Horizontal Construction Details

Panel KS Azteco®

Panel KS Granitstone®

Panel KS Micro-Rib

Panel KS Mini Micro-Rib

Panel KS Mini-Wave

Panel KS Optimo™

Panel KS Shadowline
Vertical support

Wall panel installation direction

Female joint

Male joint

Continuous butyl sealant

Continuous butyl sealant (optional)

Continuous butyl sealant

Continuous butyl sealant (optional)

1/4" - 14 Hex head fasteners without washer

1/4" - 14 Hex head fasteners with washer

12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant support

12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant support

Male joint

Female joint

Vertical support

Wall panel installation direction

1/4" - 14 Hex head fasteners without washer

1/4" - 14 Hex head fasteners with washer

12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant support

12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant support

Custom reveals up to 6" are available in 1" increments

NOTE
Contact Kingspan Technical Services for specific project fastening recommendations.

NOTE
Variable reveal only available with Optimo™.
17 Horizontal Construction Details

Vertical Joint with Trim Detail

- 5" minimum
- Vertical support
- Fill voids with compressible foam closure
- Continuous mending plate
- Continuous butyl sealant at panel joint
- Pop rivets
- "Top hat" vertical reveal trim
- Continuous butyl sealant with marriage bead to horizontal panel joint
- 1/4" - 14 hex head fasteners without washer
- 12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant
- Compressible foam closure
- Stainless steel hidden fastener clip
- 1/4" - 14 hex head fasteners with washer
- Vertical support
- Continuous butyl sealant
- Marriage bead to panel joint
- "Top hat" vertical reveal trim with pop rivets
Vertical Joint with Trimless End Detail

Trimless ends available with Granitstone®, Micro-Rib, Mini Micro-Rib and Optimo™ panels.
17 Horizontal Construction Details

Vertical Joint with Extrusion Detail

Vertical support
Continuous butyl sealant with marriage bead to horizontal panel joint
Aluminum top hat joint extrusion
Continuous mending plate
Continuous butyl sealant at panel joint
PVC foam gasket
Black EPDM gasket
1/4" - 14 hex head fasteners with washer
Fill voids with compressible foam closure
1/4" - 14 hex head fasteners without washer
12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant

Vertical joint - Alternate Framing Detail

Vertical support
Continuous butyl sealant with marriage bead to horizontal panel joint
Continuous mending plate
Continuous butyl sealant at panel joint
PVC foam gasket
Black EPDM gasket
1/4" - 14 hex head fasteners with washer
Fill voids with compressible foam closure
1/4" - 14 hex head fasteners without washer
Factory folded trimless end (1"
12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant

Trimless ends available with Granitstone®, Micro-Rib, Mini Micro-Rib and Optimo™ panels.
Base Flush Detail

Continuous butyl sealant

1/4" - 14 hex head fasteners with washer

Optional butyl sealant

Panel base “C” extrusion

Fill void with compressible foam closure

Continuous butyl sealant below base extrusion

Fastener to concrete (not by Kingspan)

Vertical supports (not by Kingspan)

Continuous butyl sealant at panel joint

Base channel set in sealant (not by Kingspan)

Compressible foam closure

Continuous mending plate

Vertical joint gasket (shown) or field applied backer rod and sealant

Butyl sealant continuous beads

“Shingle” lap mending plate over flashing. See page 86

Flashing behind and under base extrusion

Base channel set in sealant (not by Kingspan)

Sealant (not by Kingspan)

Panel joint sealant

Fill void with compressible foam closure

Base extrusion with butyl sealant below

Stop extrusion short of panel edge

Marriage bead to panel joint

Trimless ends available with Granitstone®, Micro-Rib, Mini Micro-Rib and Optimo™ panels.
17 Horizontal Construction Details

“J” Base Overhang Detail

- 1/4” - 14 “low profile” fastener
- Continuous butyl sealant at panel joint
- Fill void with compressible foam closure
- Panel base “A” extrusion
- Field drill 1/8” Ø weep holes
- Fastener to concrete (not by Kingspan)
- Vertical supports (not by Kingspan)
- Continuous butyl sealant
- Base channel set in bead of sealant (not by Kingspan)
- Vertical joint gasket (shown) or field applied backer rod and sealant
- Base channel set in bead of sealant (not by Kingspan)
- Optional wiper gasket (field installed)

2" min.

Butyl sealant continuous beads

22 GA. mending plate
(Continuous flashing)

Compressible foam closure

Panel joint sealant

Fill void with compressible foam closure

“A” Base extrusion

Cut back leg and hook of extrusion short of vertical joint

Sealant (not by Kingspan)
Outside Corner with Flat Trim Detail

- Outside corner trim
- Field miter panels
- Pop rivets
- Continuous butyl sealant at panel joint

12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant

Inside corner trim

F.I.P. insulation as required (by others)

Continuous butyl sealant with marriage bead to horizontal panel joint

Vertical support

Outside Corner - Factory Folded Detail

- Maximum length 10’
  Minimum length 1’

- Maximum length 4’
  Minimum length 1’

- 1/4” - 14 hex head fasteners without washer

12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant

Factory installed inside corner trim

Factory mitered and formed

Vertical support

Continuous butyl sealant at panel joint

Factory folded corners and trimless ends available with Granitstone®, Micro-Rib, Mini Micro-Rib and Optimo® panels.
17 Horizontal Construction Details

**Outside Corner with Extrusion Detail**

- Corner extrusion cap
- Continuous butyl sealant with marriage bead to horizontal panel joint
- 1/4" - 14 hex head fasteners without washer
- Continuous butyl sealant at panel joint
- Vertical support
- 12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant
- 1/4" - 14 "low profile" fastener
- Corner extrusion base
- Optional wiper gasket (field installed)

**Inside Corner with Flat Trim Detail**

- F.I.P. Insulation as required (by others)
- Outside corner trim
- Continuous butyl sealant at panel joint
- Continuous butyl sealant with marriage bead to horizontal panel joint
- 1/4" - 14 hex head fasteners without washer
- 12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant
- Inside corner trim
- Pop rivets
Inside Corner with Gasket Detail

- Vertical support
- Continuous butyl sealant with marriage bead to horizontal panel joint
- Fill voids with compressible foam closure
- Outside corner trim
- 1/4" - 14 hex head fasteners without washer
- Continuous butyl sealant at panel joint
- Factory folded trimless end (1"
- Vertical joint gasket
- Panel length measured from here

Trimless ends available with Granitstone®, Micro-Rib, Mini Micro-Rib and Optimo™ panels.

Inside Corner with Trim Detail

- Vertical support
- Continuous butyl sealant with marriage bead to horizontal panel joint
- Fill voids with compressible foam closure
- Outside corner trim
- 1/4" - 14 hex head fasteners without washer
- Continuous butyl sealant at panel joint
- 12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant
- Backer rod and sealant (not by Kingspan)
- Cap trim with pop rivets
- Panel length measured from here
Inside Corner with Jamb Extrusion Detail

- Vertical support
- 1/4” - 14 “low profile” fasteners without washer
- Continuous butyl sealant with marriage bead to horizontal panel joint

- Corner extrusion cap
- Continuous butyl sealant at panel joint

- 1/4” - 14 hex head fasteners without washer
- Backer rod and sealant (not by Kingspan)
- 12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant
- Two piece jamb extrusion cap
- Optional wiper gasket (field installed)

Inside Corner with Extrusion Detail

- Vertical support
- Continuous butyl sealant with marriage bead to horizontal panel joint

- 1/4” - 14 “low profile” fasteners
- Corner extrusion cap
- Optional wiper gasket (field installed)

- 1/4” - 14 hex head fasteners without washer
- 12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant
- Corner extrusion base
- Continuous butyl sealant at panel joint

Fill voids with compressible foam closure

Outside corner trim
**Framed Opening Two Piece Head Detail**

1/4" - 14 "low profile" through fastener

Pop rivets

Exterior cap trim

Field drill 1/8" Ø weep holes

Field cut female joints where required

Exposed sealant (not by Kingspan)

Door / window frame (not by Kingspan)

Interior cap trim

Continuous butyl sealant

Framed opening (not by Kingspan)

Trim installation sequence:
1. Interior cap trim & all applicable sealants prior to installing the panel & through fasteners.
2. Exterior cap trim.

**Framed Opening Head with “Drip Edge” Detail**

1/4" - 14 "low profile" through fastener

Pop rivets

Exterior cap trim

Drip flashing

Field cut female joints where required

Exposed sealant (not by Kingspan)

Door / window frame (not by Kingspan)

Continuous butyl sealant

Framed opening (not by Kingspan)

**Framed Opening Two Piece Jamb Detail**

Framed opening (not by Kingspan)

Door / window frame (not by Kingspan)

Exposed sealant (not by Kingspan)

Pop rivets

Field cut panels where required

Exterior cap trim

1/4" - 14 Hex head fasteners without washer

Continuous butyl sealant with marriage bead to horizontal panel joint

Interior cap trim

12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant

NOTE
See details on pages 84 and 85 for typical trim lap instructions.
17 Horizontal Construction Details

**Framed Opening One Piece Jamb Detail**

- Framed opening (not by Kingspan)
- Door / window frame (not by Kingspan)
- Continuous butyl sealant
- Exposed sealant (not by Kingspan)
- Field cut panels where required
- Cap trim
- 12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant

**Continuous butyl sealant with marriage bead to horizontal panel joint**

- 1/4" - 14 “low profile” fastener (as required)
- 1/4" - 14 Hex head fasteners without washer
- Pop rivets

**Framed Opening One Piece Sill Detail**

- Continuous butyl sealant
- Exposed sealant (not by Kingspan)
- Continuous butyl sealant
- Field cut male joints where required
- Exterior cap trim

- Door / window frame (not by Kingspan)
- Exterior cap trim
- Pop rivets
- 1/4" - 14 “low profile” through fastener

**Overhead Door Two Piece Header Detail**

- Continuous butyl sealant
- Exposed sealant (not by Kingspan)
- 1/4" - 14 “low profile” through fastener
- Pop rivets
- Exterior cap trim
- Field drill 1/8" Ø weep holes

- Door / window frame (not by Kingspan)
- Fastener (not by Kingspan)
- Interior cap trim

**Trim installation sequence:**

1. Install header trim (optional) & all applicable sealants.
2. Install interior cap trim & all applicable sealants prior to installing the panel and through fasteners.
3. Install exterior cap trim.

*NOTE*
See details on pages 84 and 85 for typical trim lap instructions.
Overhead Door Head with “Drip Edge” Detail

- Continuous butyl sealant
- \(\frac{1}{4}\)" - 14 "low profile" through fastener
- Field cut female joints where required
- Pop rivets
- Exterior cap trim
- Framed opening (not by Kingspan)
- Fastener (not by Kingspan)
- Drip flashing
- Exposed sealant (not by Kingspan)

Trim installation sequence:
1. Install header trim (optional) & all applicable sealants
2. Install drip flashing & all applicable sealants prior to installing the panel and through fasteners
3. Install exterior cap trim

Overhead Door Two Piece Jamb Detail

- Fastener (not by Kingspan)
- Frame opening (not by Kingspan)
- \(\frac{1}{4}\)" - 14 hex head fastener without washer
- Jamb trim (optional)
- Exposed sealant (not by Kingspan)
- Pop rivets
- Field cut panels where required
- Exterior cap trim
- Continuous butyl sealant
- 12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant

Trim installation sequence:
1. Install jamb trim (optional) & all applicable sealants.
2. Install interior cap trim & all applicable sealants prior to installing the panel and through fasteners.
3. Install exterior cap trim.

Header with Extrusion Detail

- Continuous butyl sealant
- \(\frac{1}{4}\)" - 14 "low profile" through fastener
- Field cut female joints where required
- Two piece jamb extrusion cap
- Field drill \(\frac{3}{8}\)" Ø weep holes
- Two piece jamb extrusion base
- Door / window frame (not by Kingspan)
- Optional wiper gasket (field installed)
- Framed opening (not by Kingspan)

NOTE
See details on pages 84 and 85 for typical trim lap instructions.
17 Horizontal Construction Details

Jamb with Extrusion Detail

- Framed opening (not by Kingspan)
- Door / window frame (not by Kingspan)
- Continuous butyl sealant
- Exposed sealant (not by Kingspan)
- Two piece jamb extrusion base
- Continuous butyl sealant with marriage bead to horizontal panel joint
- Field cut panels where required
- Two piece jamb extrusion cap

Sill with Extrusion Detail

- Door / window frame (not by Kingspan)
- Continuous butyl sealant
- Exposed sealant (not by Kingspan)
- Sill extrusion
- Field cut male joints where required
- Framed opening (not by Kingspan)
- 1/4” - 14 “low profile” through fastener
- Continuous butyl sealant
- 1/4” - 14 “low profile” fastener

Overhead Door Head with Extrusion Detail

- Continuous butyl sealant
- 1/4” - 14 “low profile” through fastener
- Field cut female joint where required
- Two piece jamb extrusion base
- Two piece jamb extrusion cap
- Field drill 1/8” Ø weep holes
- Exposed sealant (not by Kingspan)
Overhead Door Jamb with Extrusion Detail

- Fastener (not by Kingspan)
- Framed opening (not by Kingspan)
- 1/4” - 14 hex head fastener without washer
- Jamb trim (optional)
- Continuous butyl sealant
- Exposed sealant (not by Kingspan)
- Field cut panels where required
- Continuous butyl sealant with marriage bead to horizontal panel joint
- Two piece jamb extrusion base
- Two piece jamb extrusion cap

Optional wiper gasket (field installed)

1/4” - 14 “low profile” fastener

12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant
17 Horizontal Construction Details

Field Cut Parapet with Flush Trim Detail

- Field cut male joints where required
- Wrap membrane (not by Kingspan) adhere to exterior panel face
- Parapet cap
- 1/4" - 14 "low profile" fastener
- Continuous cleat
- 1/4" - 14 "low profile" through fastener
- Continuous butyl sealant
- Parapet blocking (not by Kingspan)
- Fastener to parapet backer (not by Kingspan)
- Membrane roof & parapet backer (not by Kingspan)
- Wrap membrane (not by Kingspan) adhere to exterior panel face
- Parapet cap
- Continuous cleat
- 1/4" - 14 hex head fastener without washer
- Pop rivets
- 12 Ga Stainless steel hidden fastener clip (1 per panel, per support) set clip in butyl sealant
- Wrap membrane (not by Kingspan) adhere to exterior panel face
- 1/4" - 14 "low profile" fastener
- 1/4" - 14 hex head fastener without washer
- Continuous butyl sealant
- Parapet blocking (not by Kingspan)
- Fastener to parapet backer (not by Kingspan)
- Membrane roof & parapet backer (not by Kingspan)
Parapet with Profiled Trim Detail

12 Ga Stainless steel hidden fastener clip
(1 per panel, per support) set clip in butyl sealant
Wrap membrane (not by Kingspan) adhere to exterior panel face

1/4" - 14 hex head fastener without washer

Pop rivets

Field Cut Parapet with Extrusion Detail

Parapet extrusion

Field cut male joints where required

Wrap membrane (not by Kingspan) adhere to exterior panel face

1/4" - 14 "low profile" through fastener

1/4" - 14 "low profile" through fastener

Parapet cap trim

Membrane roof & parapet backer (not by Kingspan)
17 Horizontal Construction Details

Trim End Lap Detail

- Min. 3˚ trim lap
- (2) beads butyl sealant

Trim Lap with Hem Detail

- Min. 3˚ trim lap
- Field notch hem(s) as required (not by Kingspan)

Trim End Lap with Lap Strip Detail

- Min. 3˚ trim lap
- (2) beads butyl sealant
- 8" long lap strip
- Nom. 1/4" gap
Trim Lap at Framed Opening Detail

Trim installation sequence:
1. Interior jamb trim
2. Interior head trim with tabs bent down
3. Sill trim with tabs up
4. Exterior jamb trim
5. Exterior head trim
6. Exterior sealants as required

Field notch and overlap trims, pop rivet and seal as necessary (not by Kingspan)
Field miter and overlap trims, pop rivet as necessary (not by Kingspan)
Field cut / notch cap trim at corners to allow for lap (not by Kingspan)
Field cut / notch cap trim at corners to allow for lap (not by Kingspan)
Field notch and overlap trims, pop rivet and seal as necessary (not by Kingspan)

NOTE
Weep holes should not exceed 24” on center.
Mending Plate “Shingle” Lap Detail

(2) beads of butyl sealant

Min. 3" trim lap

(2) beads of butyl sealant
Extrusions

NOTE
For ease of installation, use a lubricant such as WD-40 or graphite when mating two piece extrusions.
17 Horizontal Construction Details

NOTE

Aluminum extrusions may be used in lieu of press broke metal trims. Due to expansion and contraction, it is important to leave a gap of approximately 1/4” at the ends of each piece. Lap strips should be used to keep the extrusions properly aligned and weatherproof.
NOTE
Lap strips for horizontal extrusions should be set in two rows of butyl sealant at each end. Extrusions should be field drilled with weep holes within 2” of the ends of the lap strips to allow adequate drainage.
NOTE
Weep holes should not exceed 24" on center.

Extrusion at Framed Opening Detail

Installation sequence:
1. Interior jamb extrusion
2. Interior head extrusion
3. Sill extrusion
4. Exterior jamb extrusion
5. Exterior head extrusion
6. Exterior exposed sealants as required
18 Materials, Tools and Hardware

Tools and Sealants

- Electric snips
- Circular saw with fine tooth carbide blade
- Power nibbler
- Power drill
- Drive bits and sockets
- Expandable foam
- Caulking gun
- Laser or gravity levellers
- Grip clamp

Fastening Hardware

- Primary fastener
- Through fastener (primary fastener extended by 1”)
- Low profile fastener
- Secondary fastener
- Rivet fastener
- Hidden fastener wall panel clip
- Knife and Scraper
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Kingspan North America
Deland, FL; 386-626-6789
Modesto, CA; 209-531-9091
Caledon, ON; 905-951-5600
Langley, BC; 604-607-1101

www.kingspanpanels.com