

Designwall 2000/4000

Installation Guide

Architectural Insulated
Metal Panel Systems
North America



BENCHMARK™

Welcome to Kingspan, global leaders in the design and manufacture of insulated metal panels and building envelope solutions. Insulated panels serve as energy efficient, state-of-the-art alternative to traditional construction. This document serves as installation guidelines for the Designwall 2000/4000 Series wall panel systems.

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 Designwall 2000/4000 Series wall systems for 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 1-888-332-5862 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.

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1 | Introduction

1.1 Features

Designwall 2000/4000 panels are an ideal choice for both vertical and horizontal architectural applications.

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. Accessory items including metal flashings and aluminum extrusions are also available (contact Kingspan for more information).

1.2 Thicknesses Available

Designwall 2000/4000 series panels are available in the following configurations:

- 2" panel thickness
- 2.5" panel thickness
- 3" panel thickness
- 4" panel thickness

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

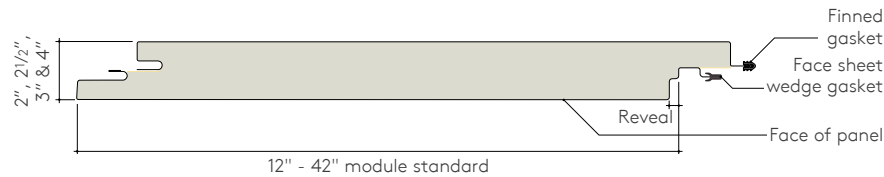


For more product information, scan [or click here](#) to connect to our website.

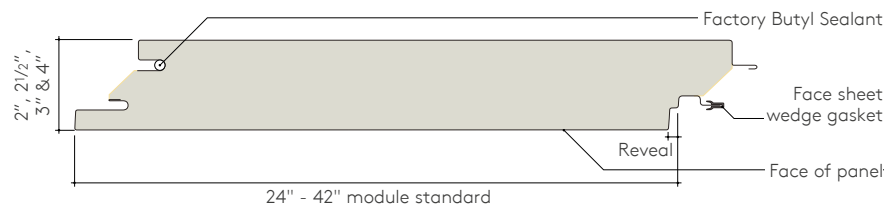
1 | Introduction

Vertical Panels

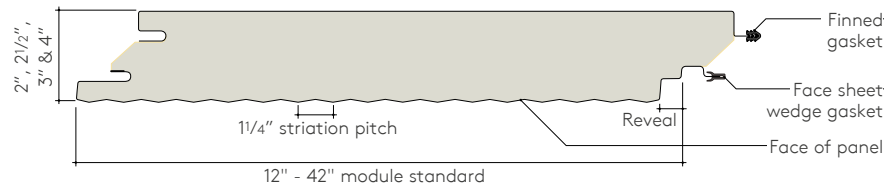
Designwall 2000V



Designwall 4000V

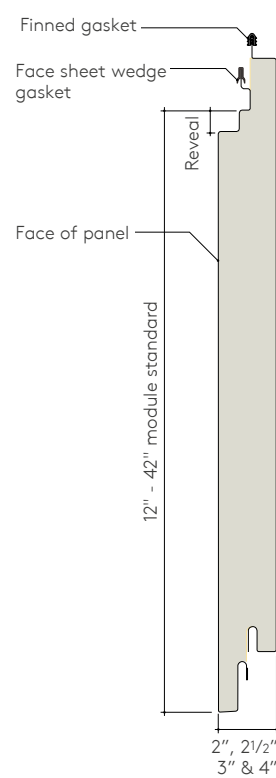


Designwall 2000S Striated

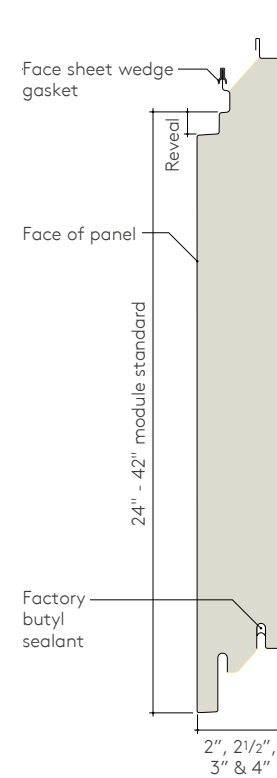


Horizontal Panels

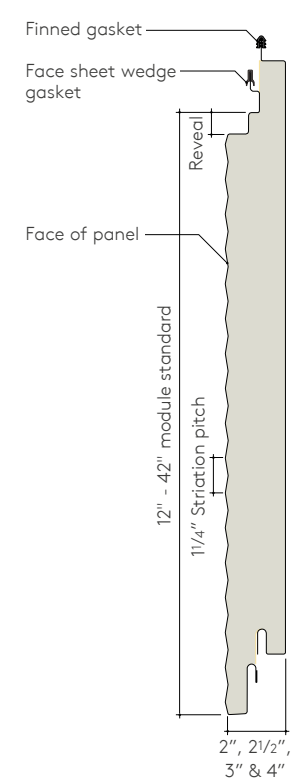
Designwall 2000



Designwall 4000



Designwall 2000S Striated

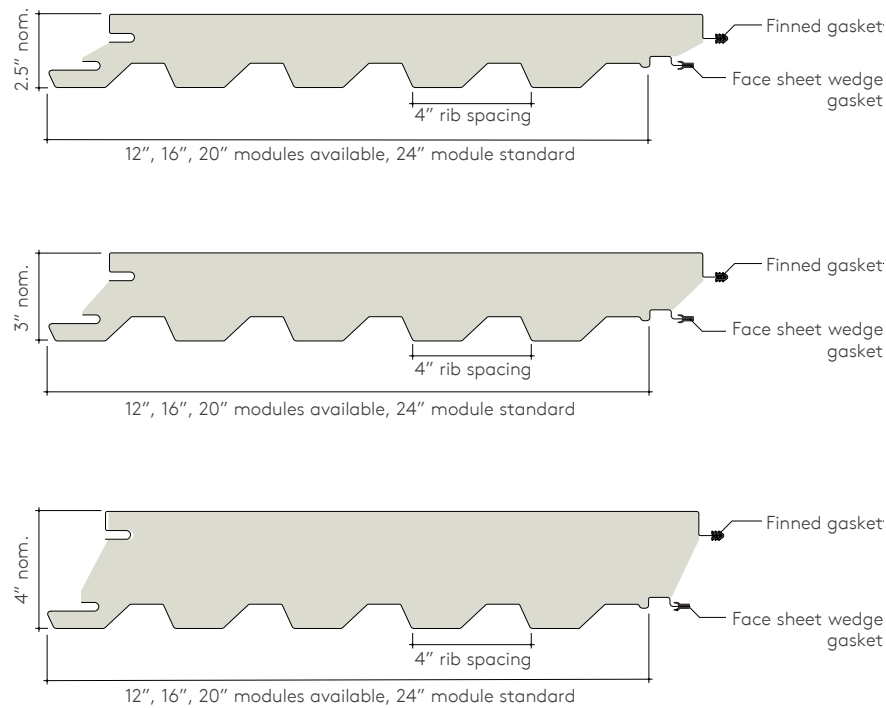


* Quadcore DW2000 modules under 24" may have thermal barrier requirements, contact Kingspan for further information
 Not for use in Canada.
 Widths available in 1/8" increments.

1 | Introduction

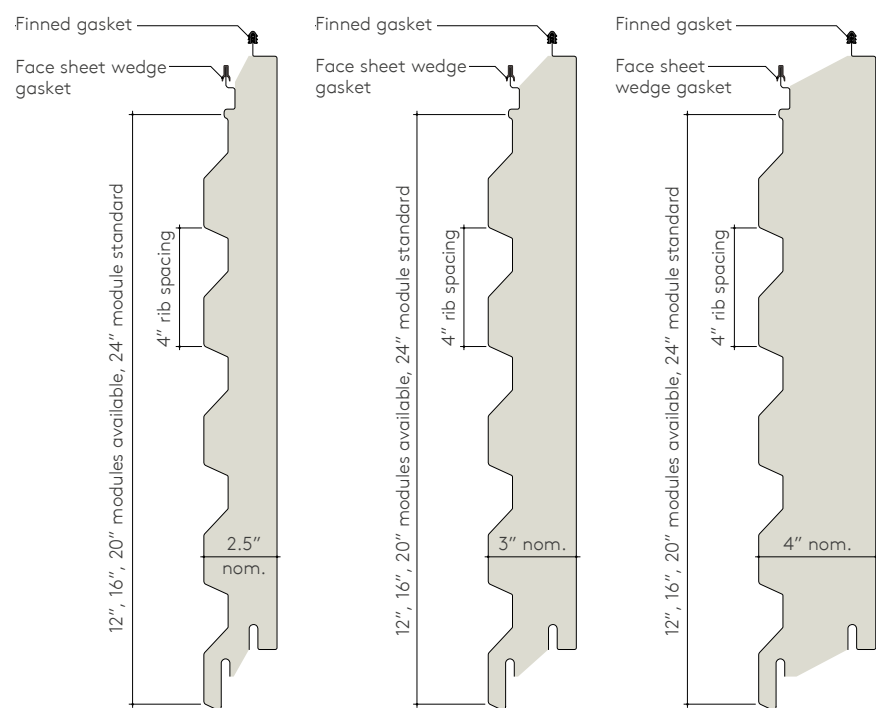
Vertical Panels

Designwall 2000R



Horizontal Panels

Designwall 2000R

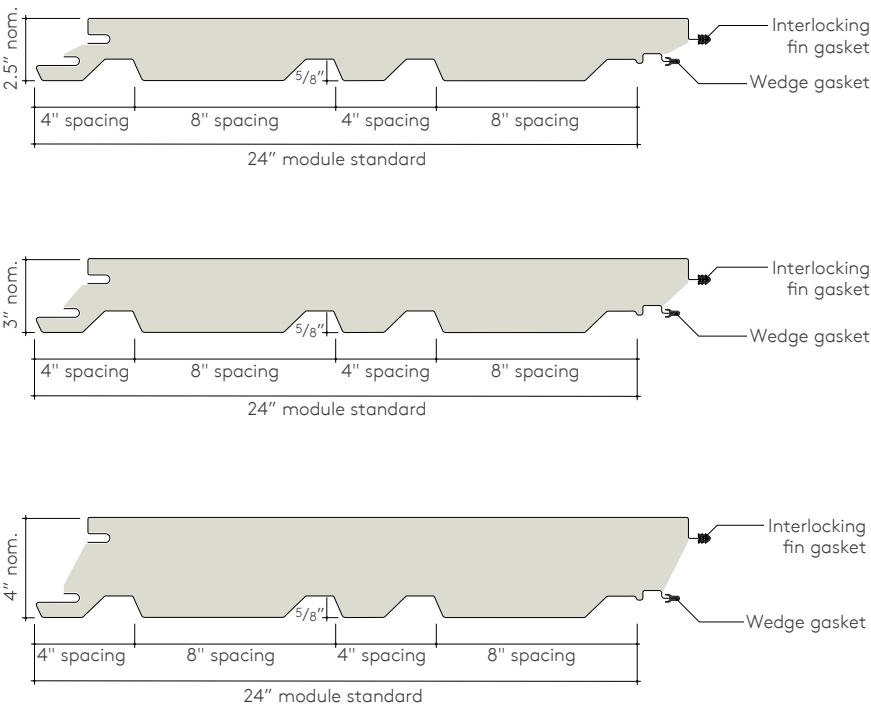


* Quadcore DW2000 modules under 24" may have thermal barrier requirements, contact Kingspan for further information
Not for use in Canada.

1 | Introduction

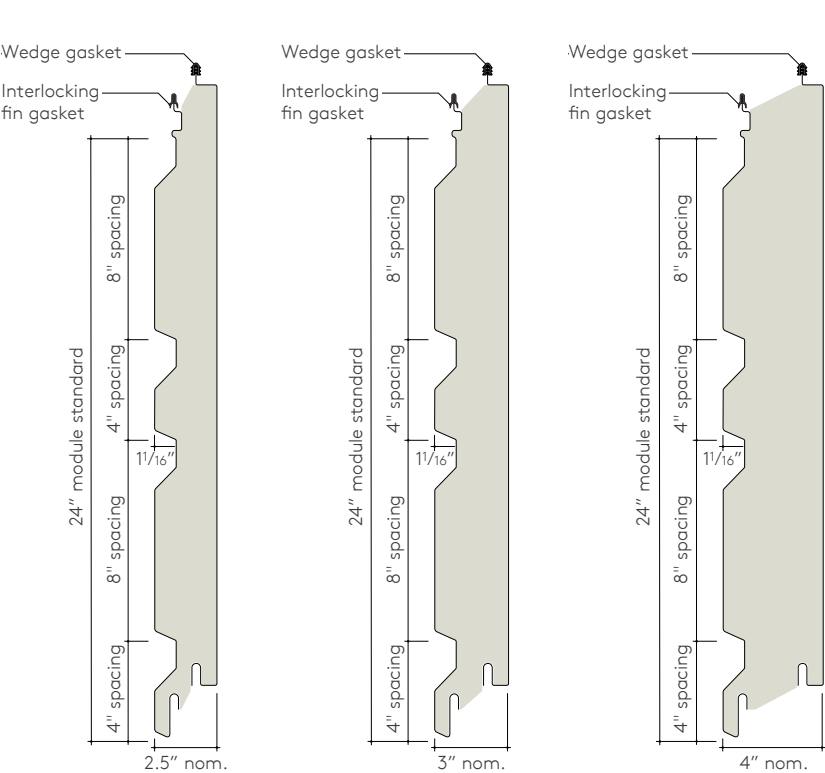
Vertical Panels

Designwall 2000R-459 - 24"



Horizontal Panels

Designwall 2000R-459 - 24"

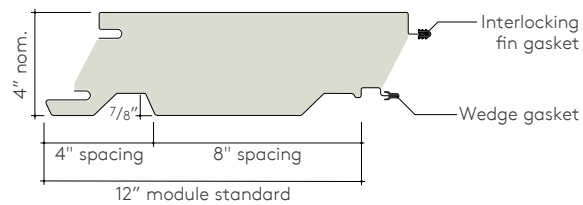
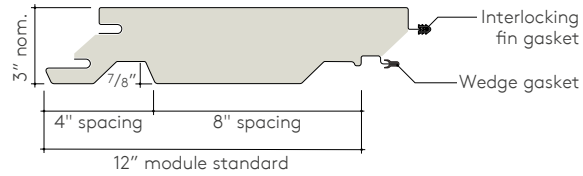
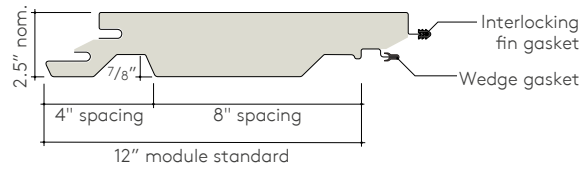


Not for use in Canada

1 | Introduction

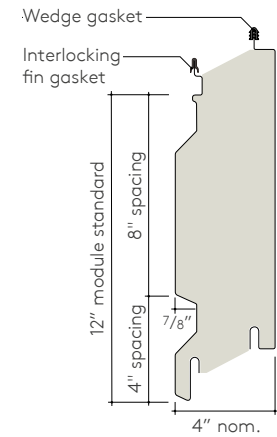
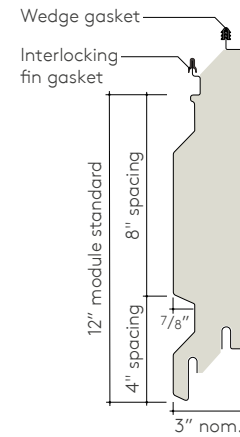
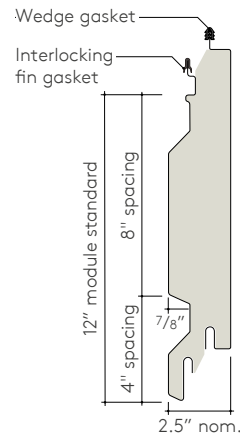
Vertical Panels

Designwall 2000R-459 - 12"



Horizontal Panels

Designwall 2000R-459 - 12"



1 | Introduction

1.3 Warranties - Standard Material Workmanship & Standard Finish Warranties

At Kingspan, we understand the unique challenges that design, and construction professionals face every day. To do our part in meeting these demands, Kingspan products are offered with our team's guidance and technical expertise, followed up after construction is completed with our product warranties:

- 2-year standard panel material workmanship warranty
- Up to 20 years standard panel exterior finish warranty

Contact our sales or customer service departments for information regarding our optional warranty programs.

1.4 Installer Qualifications

Kingspan recommends that our panels are installed under the direct supervision of an experienced installation contractor trained in the proper application of our products. Please contact Kingspan for information regarding our Certified Installer training programs.

1.5 Disclaimer

All details shown in this installation guide are the standard Kingspan BENCHMARK details. For project specific details, please refer to your project contract documents.

2 | Technical Information

Kingspan Designwall 2000/4000 Series wall panels have been evaluated and tested by independent third party laboratories 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.

Kingspan 2000/4000 Series panels have been evaluated by FM Approvals and are in compliance with FM 4881 Approval Standard for Exterior Wall Construction. See specific FM design listings for required support gauge & spacing, fasteners, and wind rating.

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.

2.2 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.

Refer to design Span Tables and Standard Details
for NFPA 285 Compliance information.

2.3 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.

2.4 Fire Ratings

Kingspan panels have been thoroughly evaluated by independent third-party testing laboratories and are covered under various product approval listings.

2.5 Air and Water Infiltration

Air and Water Infiltration testing has been successfully conducted on the Designwall 2000/4000 series panels in accordance with ASTM E-283/331 and AAMA 501.1.

For more information on any of the above items, please contact Kingspan Technical Services:

Columbus, OH – 1-888-332-5862

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 Inspection

Panels are carefully packaged in 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.

1. Under 20' panels are shipped using Styrofoam blocks and plastic wrapped with corners protected.
2. Over 20' panels are shipped using pallets.
3. Fabrications are shipped in wooden crates.



4 | Panel Handling

4.1 Panels Handled by Forklift

4.1.1 The recommended loading/unloading method for bundles less than or equal to 24' is to use a single forklift with widely spaced forks placed under the center of the bundle as shown in Figure 4.1a. Inspect travel route to ensure it is reasonably level, compacted and free of ruts and excavations.

4.1.2 To prevent panels from damage while lifting, carefully pick up bundles one at a time.

4.1.3 Bundles over 24' should be lifted by crane (see section 4.2).

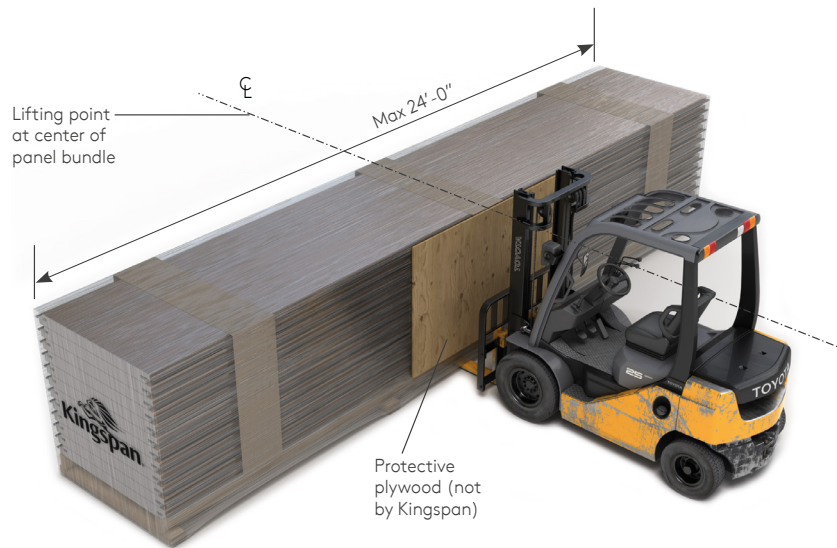


Fig. 4.1a

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 panels. Extreme care should be taken to avoid bumping and snatching of the bundles when lifting.

4.2.2 Panels with a total length of not more than 24'-0" 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.

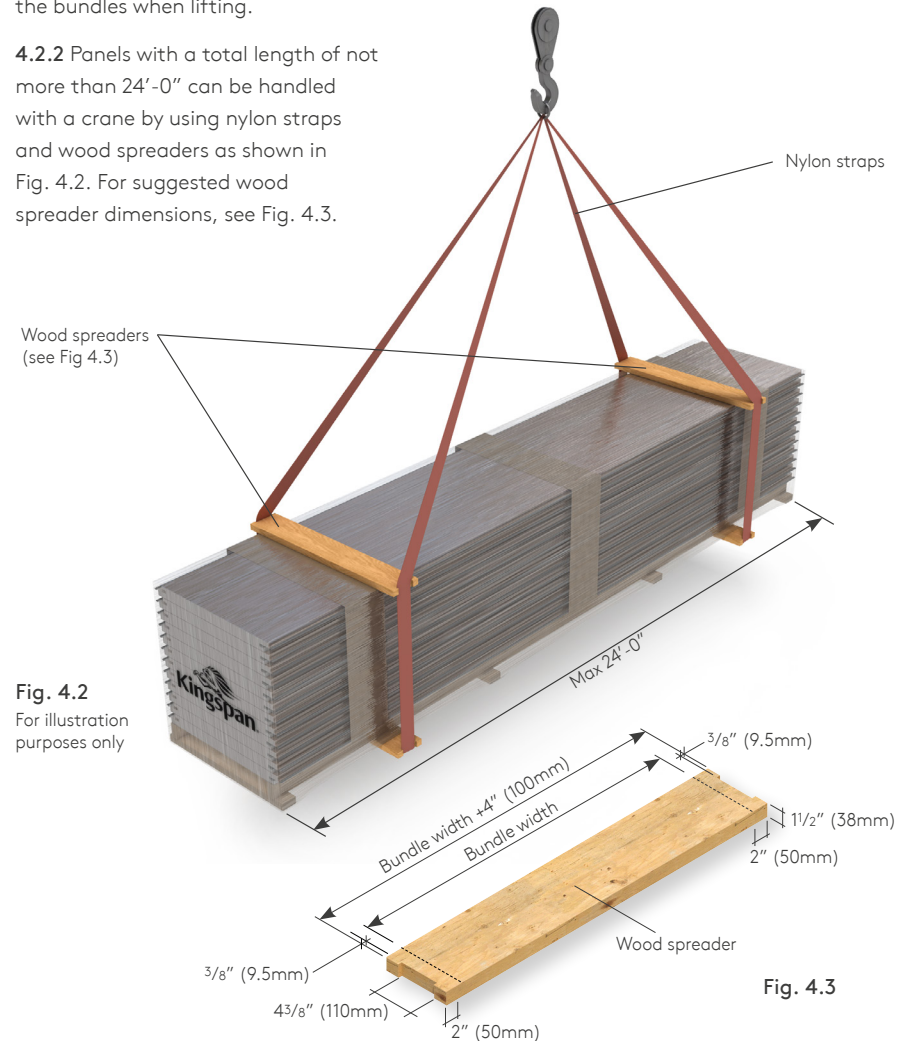


Fig. 4.2
For illustration purposes only

Fig. 4.3

4 | Panel Handling

4.2.3 When lifting bundles with a crane longer than 24'-0", three points of support are recommended 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 and Fig. 4.5.

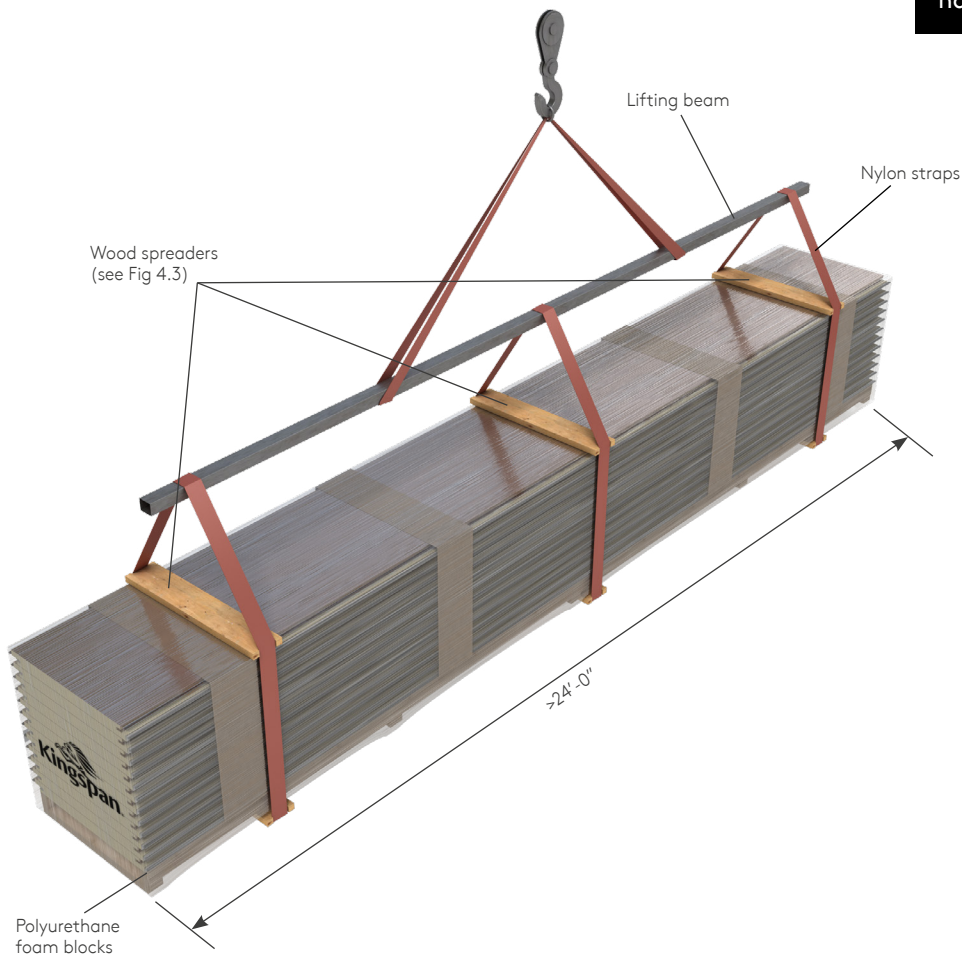


Fig. 4.4

4.3 Handling Individual Panels

CAUTION

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

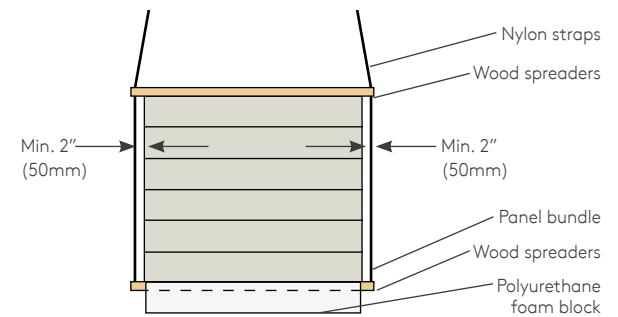
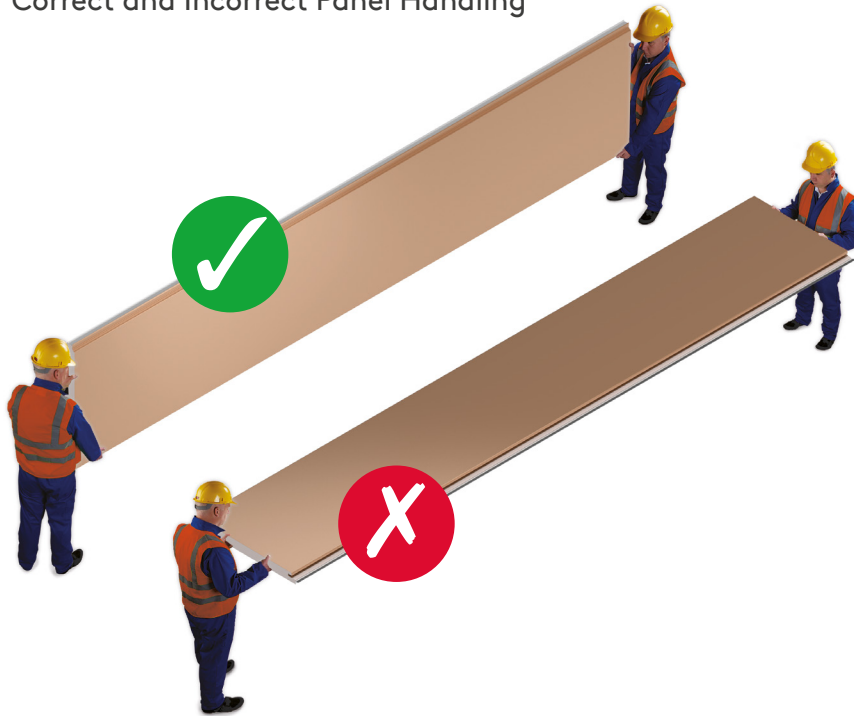


Fig. 4.5

4 | Panel Handling

Correct and Incorrect Panel Handling



CAUTION

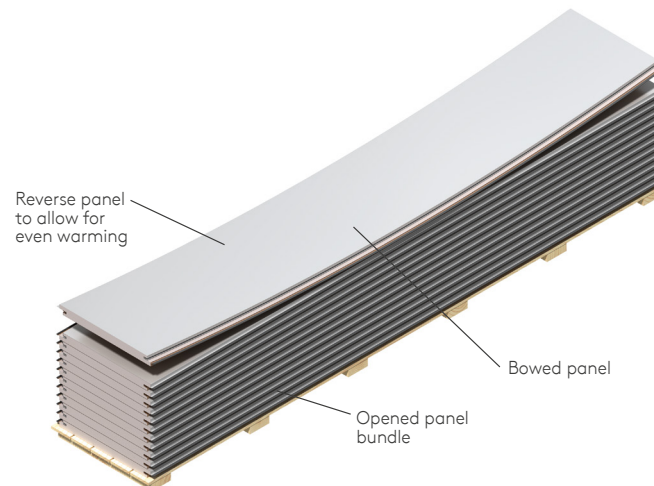
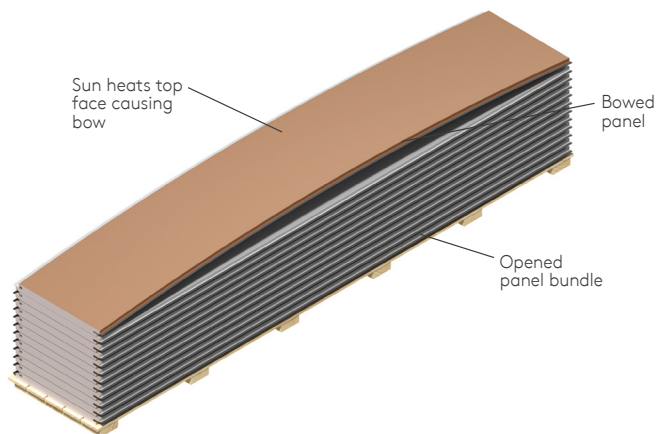
4.3.2 Individual panels should never be moved in a flat position as excessive flexing may result. Excessive flexing ruptures a panel's core, permanently distorts the facings and may lead to thermal blistering. When moving a panel, it must be turned on its edge first, then supported at each end with as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



CAUTION

4.3.3 To prevent joint damage, never lift a panel from the top sheet only. Grip from underneath the entire panel.



4 | Panel Handling

4.4 Lifting Panels 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. Vacuum lifts are not to be used with Designwall 2000R ribbed panels.

Fluted profiles may require specific vacuum heads.

CAUTION

4.3.4 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.



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 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 opened 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

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

5.6

Avoid outdoor storing for longer than 60 days. Moisture between panels can cause corrosion, staining, or a condition called wet stack. Staining of any kind is not considered to be a cause for rejection. It is the installer's responsibility to protect panels from the elements prior to installation. Tarping is always recommended and providing ventilation to prevent condensation inside the bundle wrap is also recommended.

5.7

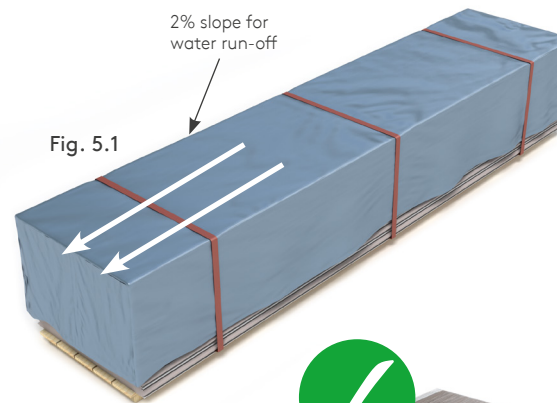
If panels are not to be used immediately, then they should be stored under a temporary shelter with all shrink plastic removed from the top and sides of the bundles. Re-cover the bundles with a protective tarp and adequately secure both tarp and panels to prevent wind damage (see Figure 5.1).

NOTE

Bundles should never be stacked under any circumstances.

NOTE

Tarping of bundles, whether they are opened or not, is always recommended for protection from the elements.



6 | Handling and Storage

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 production, the bundles should be unstacked and the protective film removed from each panel. Carefully re-stack 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 transfer of adhesive residue. Kingspan cannot be responsible for every condition encountered. When extremes such as temperatures are encountered, trials should be conducted to determine if any undesired side effect will result. Film removal and panel cleaning are the responsibility of the installation contractor when extreme conditions are encountered.

7.2

Kingspan BENCHMARK recommends that the protective film on the exterior of each panel be removed as each elevation is completed.

7.3

Loosen the film along all edges and peel back approximately 1 inch prior to installation of panels.

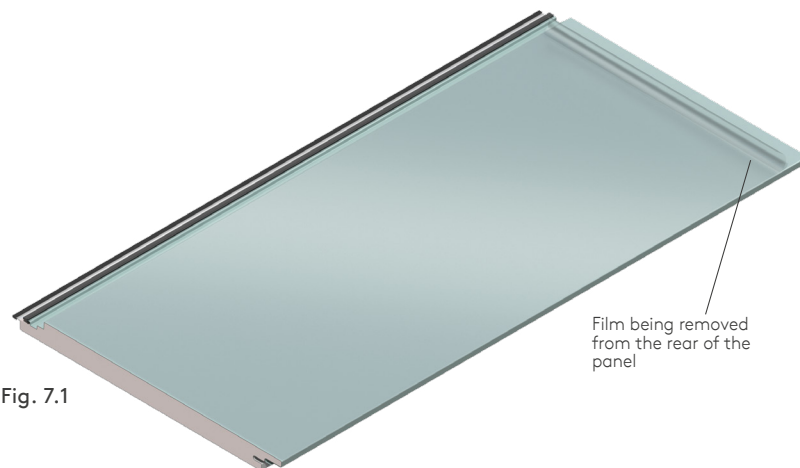


Fig. 7.1

7.4

If adhesive residue remains on panel surfaces after the protective film is removed, panels may be cleaned with a rag soaked in 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

Important: Removal of the film on the liner side of the panel before the panel is placed on the wall is required for proper sealing - an acceptable seal cannot be made if the film is left on the panel. The film can be removed entirely or peeled back from only the areas where it will be set in butyl.

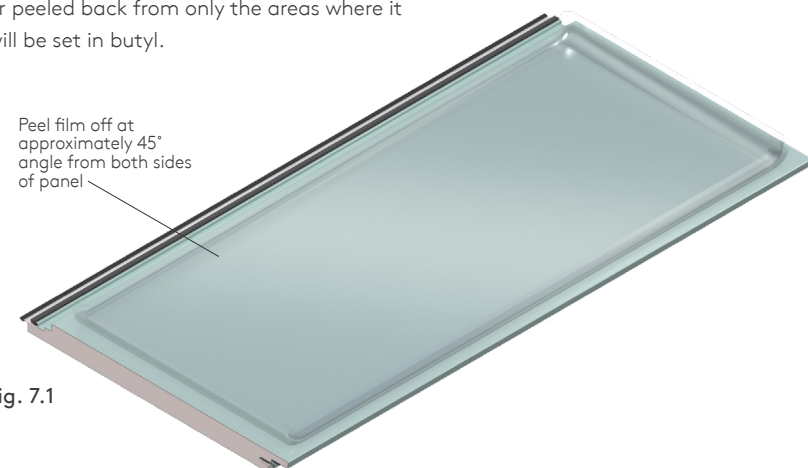


Fig. 7.1

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.

Support members shall be:

- a. Plus or minus $\frac{1}{8}$ " (3.17 mm) in 5 feet (1524 mm) in any direction along plane of framing.
- b. Plus or minus $\frac{1}{4}$ " (6.35 mm) in 20 feet (6096 mm) cumulative in any direction along plane of framing.
- c. Plus or minus $\frac{1}{2}$ " (12.7 mm) from framing plane on any elevation. Panel supports must extend to the outer extremities at all panel terminations.
- d. Plumb or level within $\frac{1}{8}$ " at all changes of wall direction for preformed corner panel applications.

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

NOTE

Shimming of panels may compromise rear seal and is not recommended.

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 appropriate tools and extreme care to avoid damaging bond between facer and core at the cut location. 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. 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 delamination.

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.

Step 4: 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.

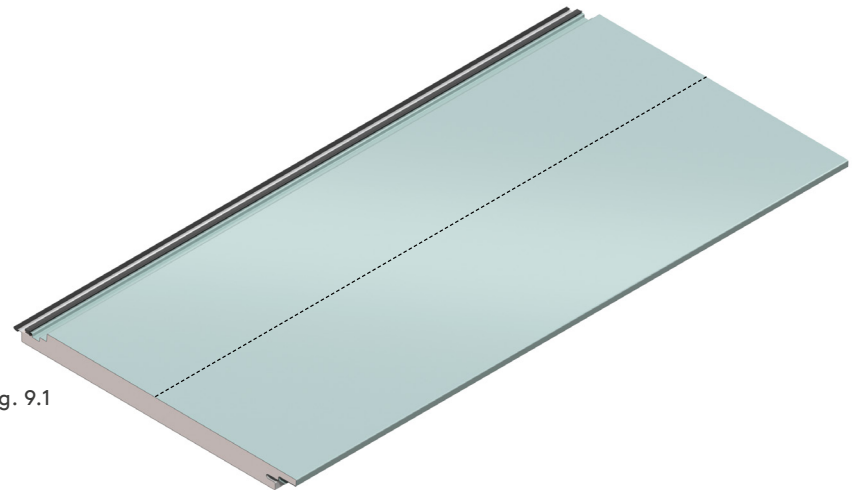


Fig. 9.1

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.

10 | Panel Engagement Procedures

Kingspan BENCHMARK does not recommend the use of any of the following methods:

Do not use impact forces such as hammer blows as internal damage can occur to the foam core or metal facings. Use slow steady force with mechanical assist to engage panels.

Do not attempt to install panels on a substrate that does not meet manufacturer's specifications.

Do not overdrive the fasteners, this can cause engagement issues.

Do not shim between mending plate and panel.

Do not seal roofing materials to the face of the panel, roofing materials must always extend up and terminate behind panels.

Do not caulk seal window head conditions in a manner that would impede vertical joint drainage to the exterior or allow vertical joints to back-drain over the window head to the interior.

Do not leave protective plastic film on panels. Excessive exposure to sun may cause plastic film to adhere to face of panels.

Do not install damaged panels.

10 | Panel Engagement Procedures

10.1 Panel Pusher Blocks

Designwall panels form a very tight and effective weather seal using finned rubber gaskets, and are sometimes more difficult to engage than anticipated.

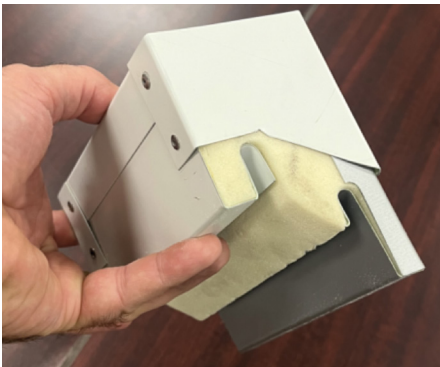
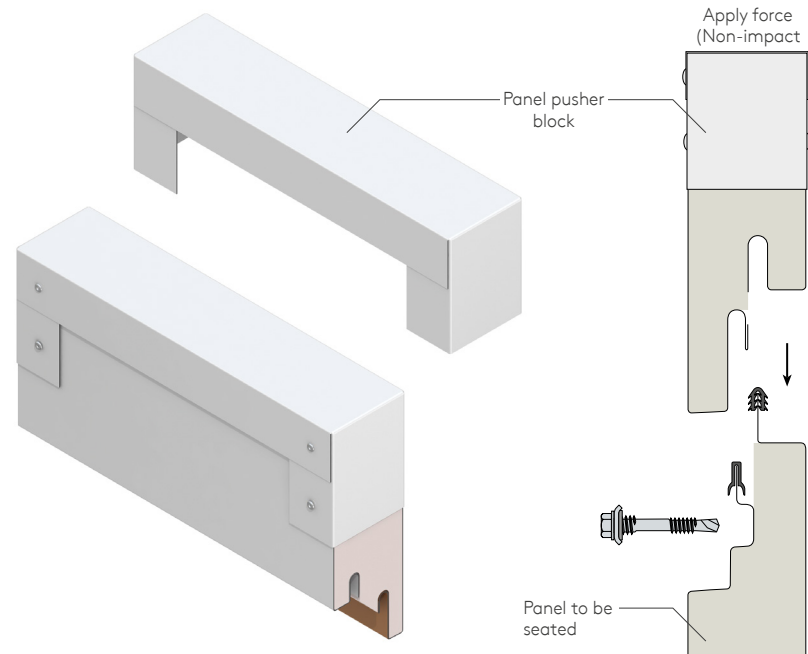
To ensure proper performance and alignment is achieved between panels, it is imperative that panels are fully engaged with each other. Various types of panel pusher blocks can be field fabricated to protect the joinery on the leading edge of a panel while adequate force is applied in order to seat. Never use impact forces such as hammer blows as internal damage can occur to the foam core or metal facings. Use slow steady force with mechanical assist to engage panels. Contact Kingspan if further information is required.

Use soapy water spray (or windshield washer fluid for winter installation) to lubricate gaskets and reduce friction prior to engaging next panel.

To assist in fully seating panels, panel pusher blocks can be field fabricated in several different ways:

- One option is to cut a section of the insulated panel which is being installed and wrap with sheet metal for added durability. This will mate with the panel joinery protecting it from damage. Use an expandable bar clamp to apply pressure.
- Optionally, modify a load binder by welding steel angles on each end, one angle will be clamped in place, the other is to push the panel - use a piece of lumber or a panel pusher block to protect the panel.

Contact Kingspan Technical Support for a 3D printer file that will allow you to produce a more durable pusher block specific to your project.



11 | Panel Sealant Placement

11.1

Standard Designwall 2000 panels are supplied with a unique integrated rubber gasket on both face and liner sheet.

Standard Designwall 4000 panels are supplied with a gasketed face sheet and factory applied butyl seal on the liner sheet.

Field applied butyl sealant is still required at other areas of the wall assembly (see further instructions in Sections 14, 15 & 16).

IMPORTANT!

Sealants have a limited shelf life. Always check the expiration dates for all sealants prior to use. Do not use any expired sealants.

NOTE

Installer is responsible for all required seal establishment, whether sealant is field or factory applied.

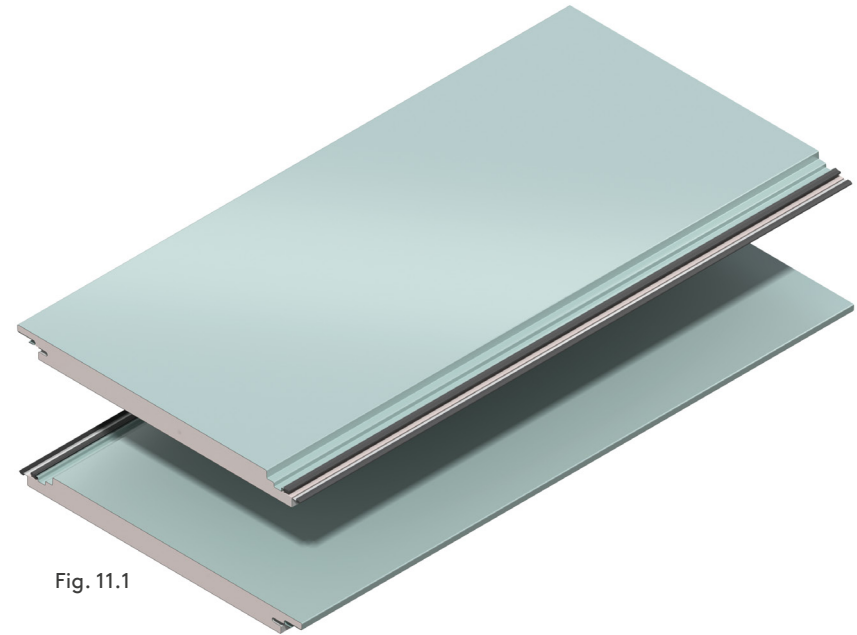


Fig. 11.1

IMPORTANT!

Butyl should be field applied to panel joinery when any of the following conditions may exist:

- If panels have been stored for more than 60 days without installation, inspect factory applied sealants to ensure proper pliability and bonding adhesion. Replace if necessary.
- Cold temperatures of -20F for prolonged periods prior to / during installation. Change to cold temps can cause added resistance during engagements, field application of butyl should be done only in the recommended temperature ranges, refer to data sheet.
- Dusty / dirty conditions that may contaminate butyl if packaging is open to the elements

Factory applied butyl exposed to these or other extreme conditions could result in butyl requiring replacement on-site prior to panel installation:

- Kingspan shall not be responsible for material or expense to correct any such condition.
- Failure to correct any/all deficient butyl conditions may result in unacceptable seal quality between panels.

12 | Panel Cleaning & 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 mineral spirits. 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

Reference Kingspan panel maintenance manual - use only approved products such as "Watts Cleansweep" as recommended by Shewin-Williams for removing adhesives, graffiti, felt pen markings, wax crayons, etc. from painted surfaces. Wire brushing or use of any abrasive material may damage painted surface and should not be used.

CAUTION

Strong solvents and abrasive cleaners should be avoided.



12.8

Contact Kingspan BENCHMARK Customer Service to receive a copy of the complete Kingspan Panel Maintenance Manual.

NOTE

Any cleaning method should be trialled in an inconspicuous area first to assure no ill effect results.

13 | Fastener Information

This chart is based on data from fastener manufacturers 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 :

Carbon and 410 stainless	1,800 rpm
304 Stainless	1,000 rpm

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.

Wind Loads:

Refer to project specific shop drawings for clip spacing and appropriate number of fasteners per clip.

NOTE

It is recommended to test self-drilling, self-tapping fasteners. It may be beneficial to pre-drill $\frac{3}{16}$ " pilot holes in some substrate materials and/or thicknesses.

NOTE

Contact Kingspan BENCHMARK's Technical Services Department for specific project fastening due to wind load recommendations based on geographic region.

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

Steel Thickness	TEK	Threads/inch
16 Ga. (.060)	#2 / #3	14
14 Ga. (.075)	#3	14
12 Ga. (.105)	#3	14
1/8" (.125)	#3	14
10 Ga. (.134)	#3	14
3/16" (.187)	#3	14
1/4" (.250)	#3 / #5	14 / 20
3/8" (.375)	#5	20
1/2" (.500)	#5	20

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

Steel Thickness	Drill Size
16 Ga. (.060)	#8 (.199)
14 Ga. (.075)	#7 (.201)
12 Ga. (.105)	#7 (.201)
1/8" (.125)	#2 (.221)
10 Ga. (.134)	#2 (.221)
3/16" (.187)	#2 (.221)
1/4" (.250)	#2 (.221)
3/8" (.375)	#2 (.221)
1/2" (.500)	#1 (.228)

Designwall - Clip Fastener Selection Charts

Panel Application	Bi-Metal Fastener Tek 3	
2" Thick Panel Fastened Direct to Support	SR 1/4-14X1.9 HWH DP3 BM 2000009899	
2 1/2" Thick Panel Fastened Direct to Support	SR 1/4-14X2.8 HWH DP3 BM 2000008366	
3" Thick Panel Fastened Direct to Support	SR 1/4-14X3.3 HWH DP3 BM 2000008367	
4" Thick Panel Fastened Direct to Support	SR 1/4-14X4.5 HWH DP3 BM 2000008368	
Panel Application	Bi-Metal Fastener Tek 3	
2" Thick Panel Fastened Through Sheathing	SR 1/4-14X2.8 HWH DP3 BM 2000008366	
2 1/2" Thick Panel Fastened Through Sheathing	SR 1/4-14X3.5 HWH DP3 BM 2000008365	
3" Thick Panel Fastened Through Sheathing	SR 1/4-14X4.5 HWH DP3 BM 2000008368	
4" Thick Panel Fastened Through Sheathing	SR 1/4-14X5.3 HWH DP3 BM 2000008369	

The 3" thick "Deep Joint" panel counts as a 2" panel for the purpose of fastener selection. The 4" thick "Deep Joint" panel counts as a 3" panel for the purpose of fastener selection. Ribbed panels have the exact same fastening requirements as flat panels.

14 | Vertical Panel | Installation

Pre-Installation Checklist

1. All walls meet contract documents, plumb and square (refer back to page 17).
2. Set benchmarks for panel base supports as per contract documents.
3. Verify that staged panels match the shop drawings based on the specific elevation.
4. Verify clip placement and fastening points based on project specific shop drawings.
5. Verify that sufficient blocking support has been provided behind all vertical joints in horizontal panel applications and behind all horizontal stack joints in vertical applications.
6. Kingspan BENCHMARK recommends the use of lasers to verify the horizontal and vertical panel lines.
7. Kingspan BENCHMARK recommends a mixture of dish soap and water to use as lubricant (applied to the gasket) for easier installation of panels (in cold weather environments, use only dish soap or windshield washer fluid).
8. Kingspan BENCHMARK recommends that equipment, safety gear, and procedures meet and/or exceed the OSHA approved standards.

CAUTION

Ensure that all conditions on the Pre-Installation Checklist are met prior to the installation of panels. If any one of these conditions are not met, Kingspan BENCHMARK recommends that installation of panels not begin until the issue is rectified.



14 | Vertical Panel | Installation

NOTE

When installing Kingspan BENCHMARK vertical panels are normally installed from left to right in sequence. Please take this into account when laying out the structure.

NOTE

All structural supports are by others (not by Kingspan) and are shown for illustrative purposes only. Single fastener shown for clarity only. Contact Kingspan Technical Services for project specific fastening recommendations.

NOTE

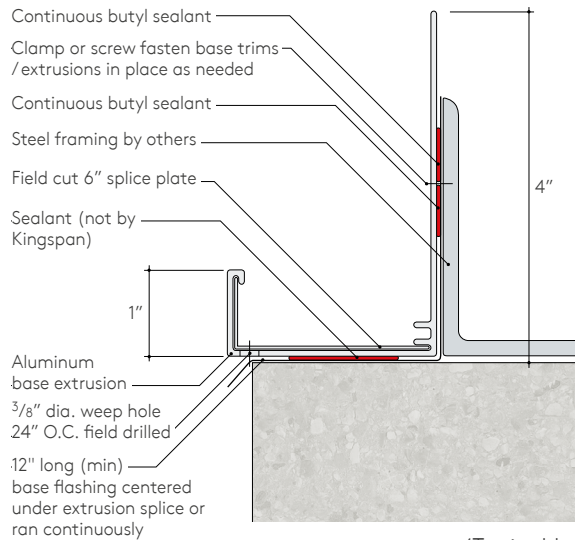
All beads of butyl are to be $\frac{3}{8}$ " diameter and the double rows of beads shall be located and spaced apart so the fasteners can be driven between the beads - this is important to achieve a proper seal.

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. Temporarily hold extrusion/trim in place with clamps or tack in place as necessary.

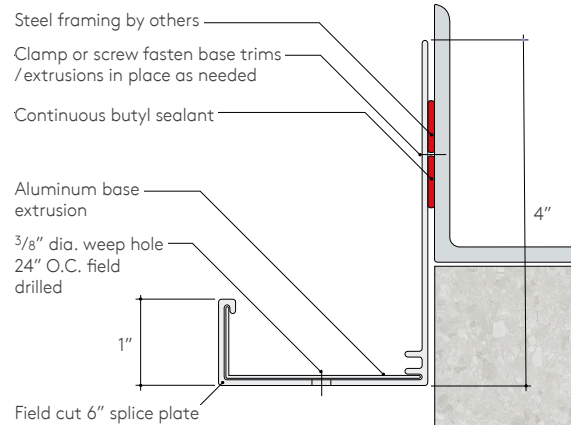
14 | Vertical Panel | Installation

Flush Base



(Typical base conditions)

Base Overhang



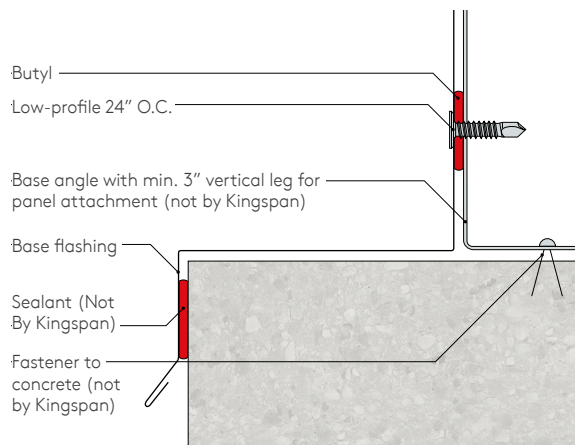
NOTE

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 are to be centered on each 1/4" expansion gap between extrusions. 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.

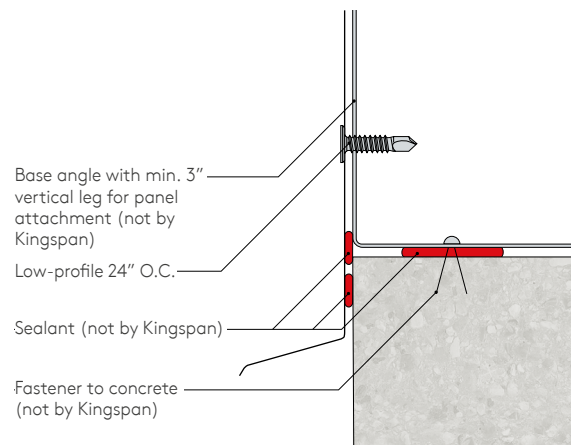
NOTE

Installer is responsible for all required seal establishment, whether sealant is field or factory applied.

Flush Base with Trim



Overhang with Base Angle



NOTE

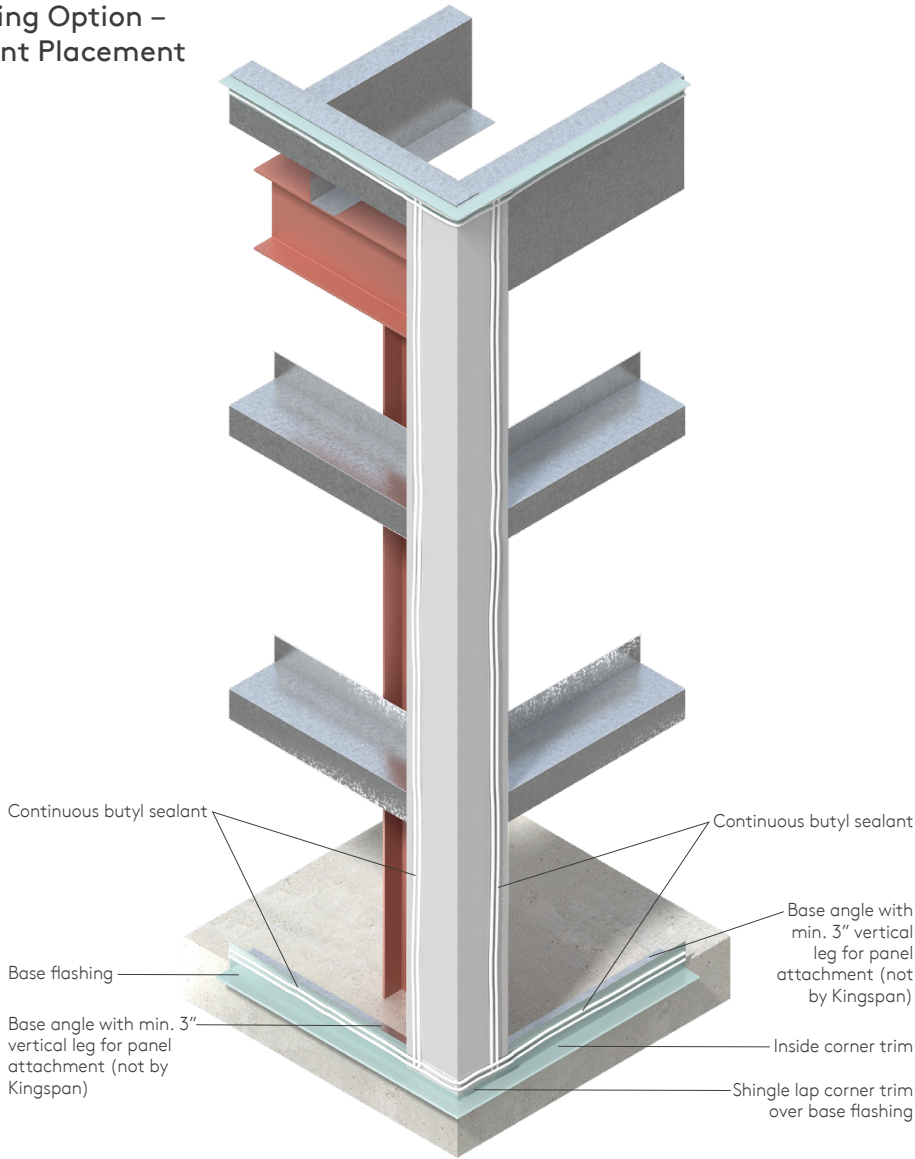
It is the responsibility of Contractor to verify compatibility of sealant with mating surface materials. (Not by Kingspan).

NOTE

Use only low-profile screws to secure base angles, inside corner trims, etc. Use of hex head fasteners will cause interference.

14 | Vertical Panel | Installation

Flashing Option – Sealant Placement



(Bypass base condition shown)

C Install butyl sealant on mending plates/flashings as panels are being installed, as per shop drawings.

NOTE
Mending plates to be no less than 24 GA to avoid waviness. Fasten 24" O.C. with low profile fasteners.

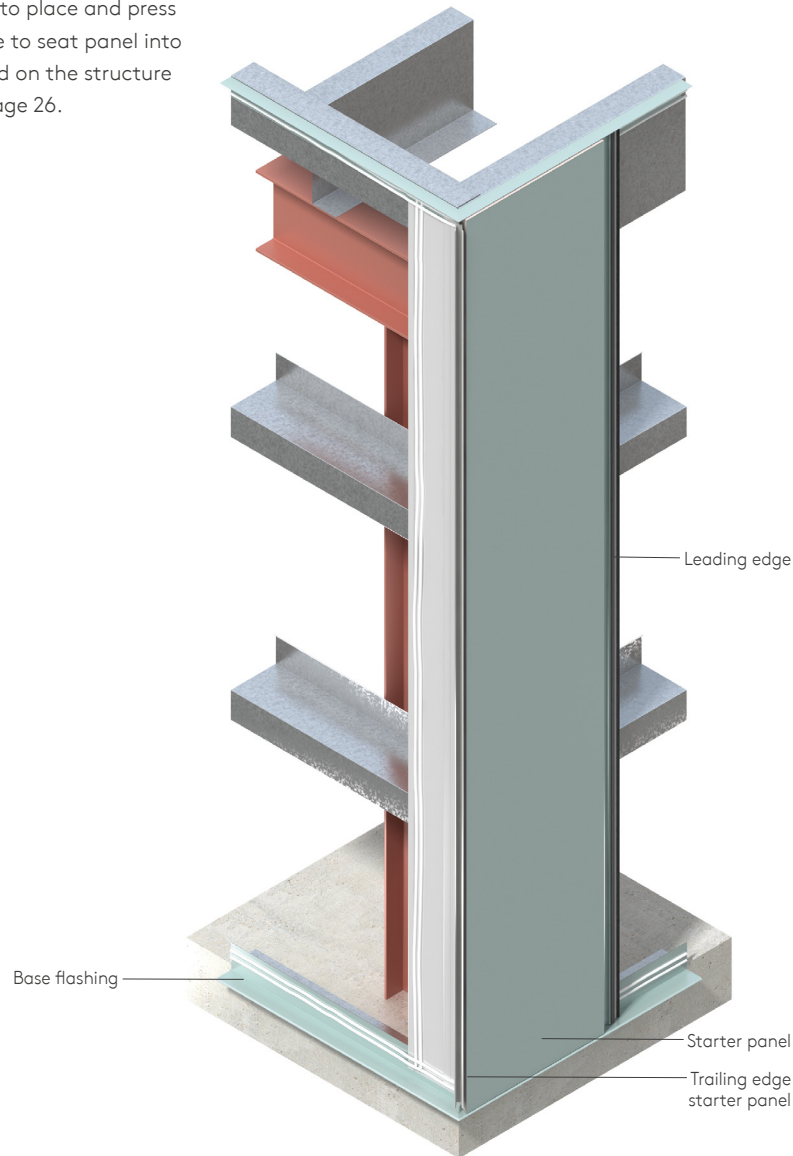
Installation sequence :

Panel 6	Panel 7	Panel 8	Panel 9	Panel 10
Panel 1	Panel 2	Panel 3	Panel 4	Panel 5

Install bottom row of panels working, within standard lengths of base trim or extrusion, then install row above - Working up the building as you move across the building allows you to incrementally manage side joint alignment against uncontrolled growth.

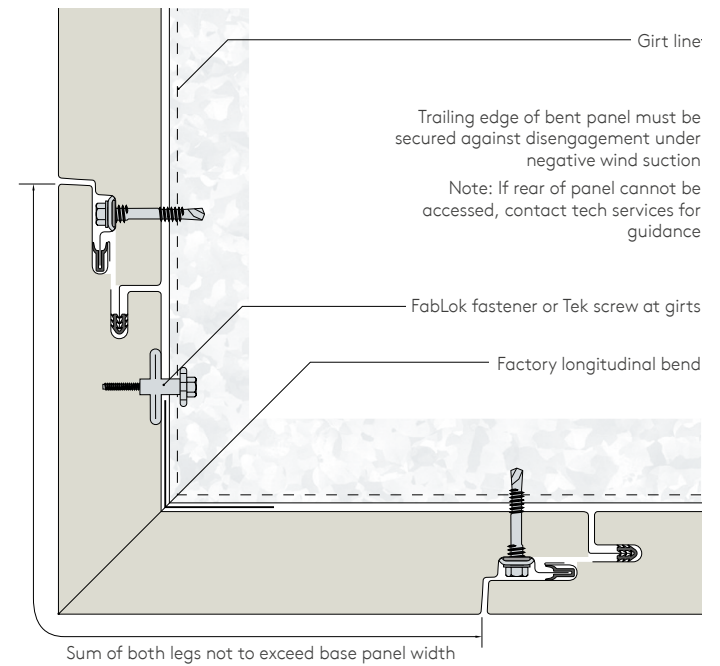
14 | Vertical Panel | Installation

D1 Lift starter panel into place and press firmly into structure to seat panel into butyl sealant placed on the structure during step C on page 26.



D2 For projects using one piece folded vertical corners, install panel at corner per detail below.

Longitudinal Bent Corner



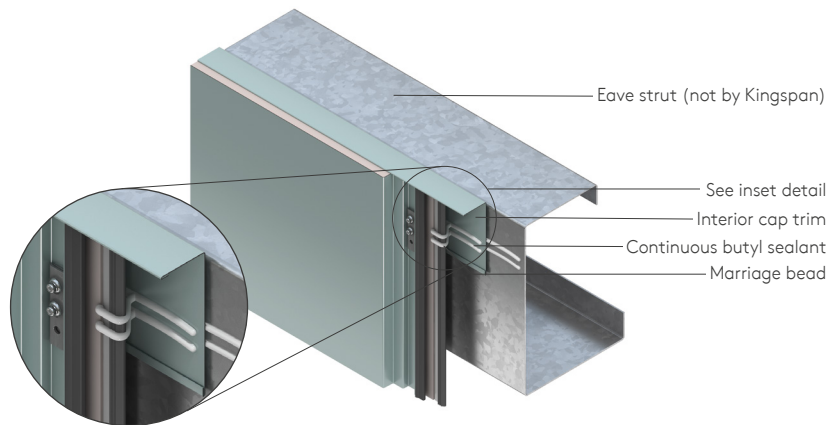
Note: Longitudinal bent corners are not available for DW2000R.

14 | Vertical Panel | Installation

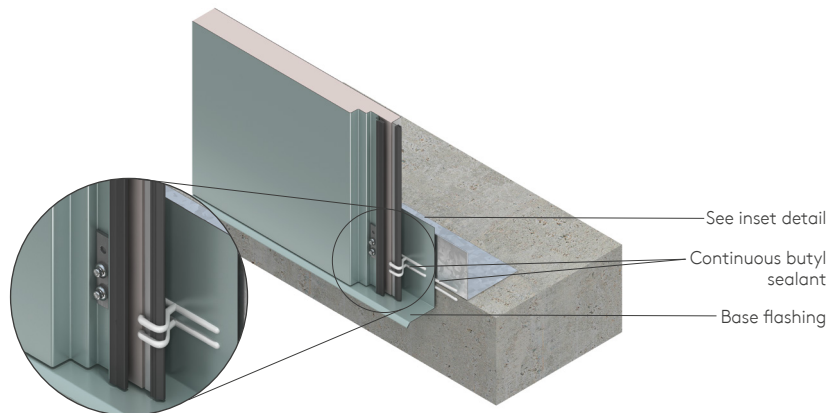
NOTE

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

Eave Condition

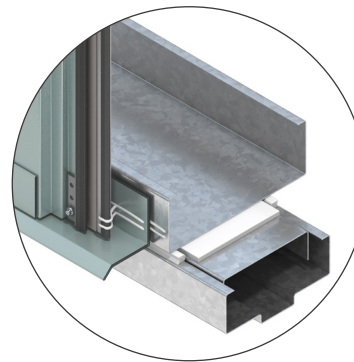


Base Condition

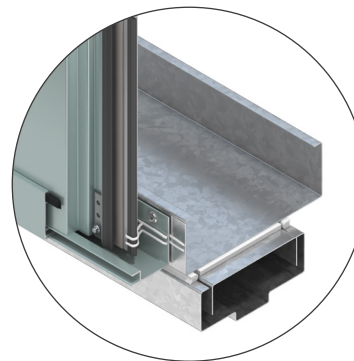


E Install marriage bead of sealant from interior joint to supporting structure at EVERY panel termination i.e. – bottom of wall at base support, at framed openings AND at top of wall at eave strut.

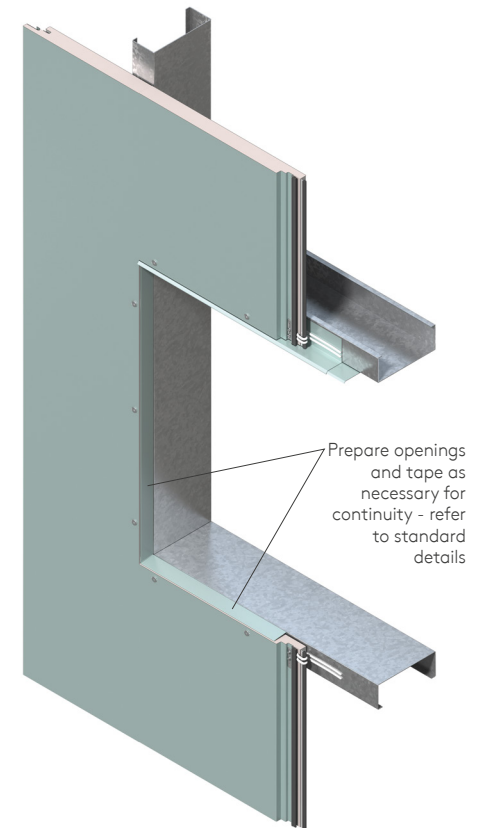
Framed Opening Head with Drip Edge



Header with Extrusion



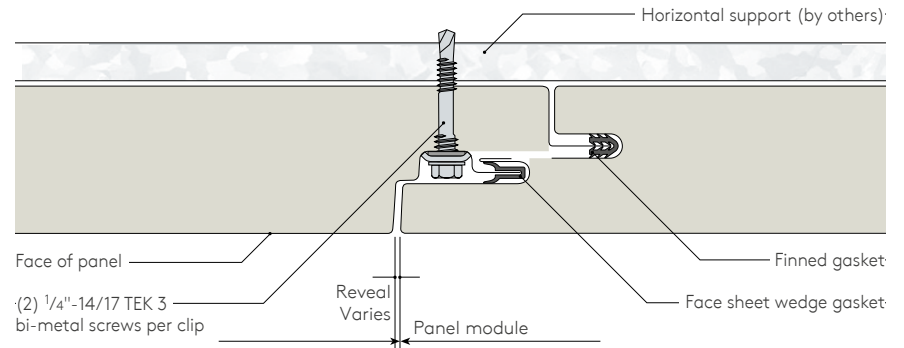
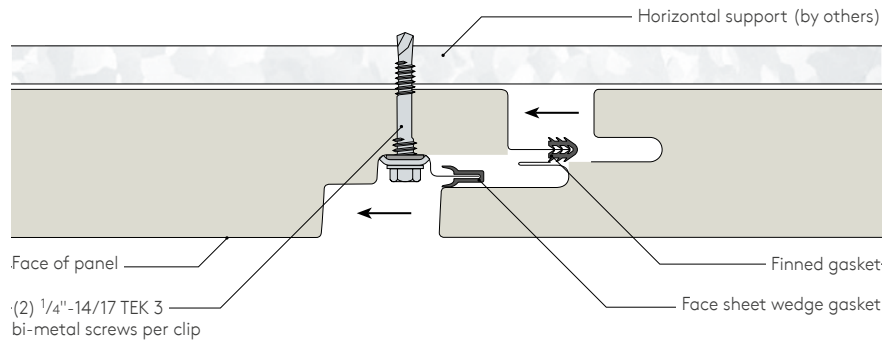
Framed Opening Condition



NOTE

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

14 | Vertical Panel | Installation



NOTE

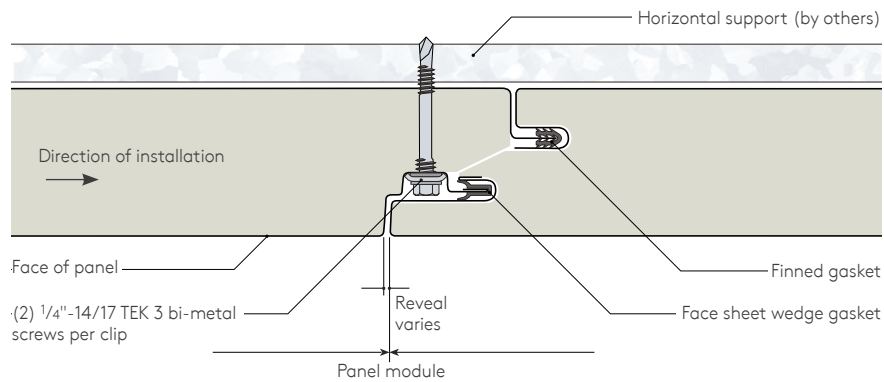
Visually inspect trailing edge of panel to ensure joinery is clear of all debris.

IMPORTANT!

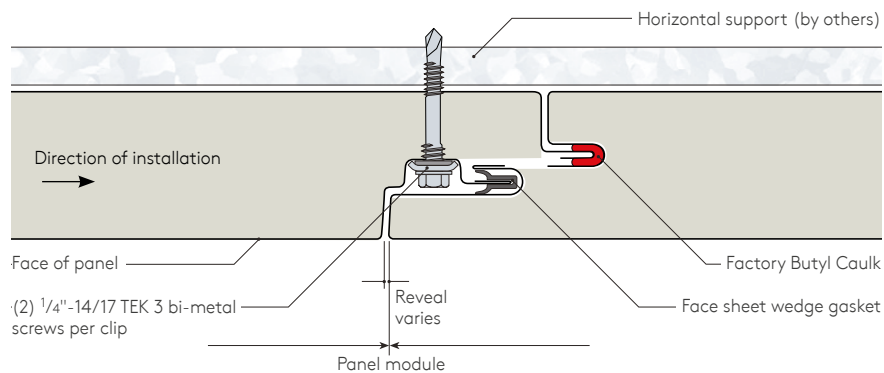
Vertical panels over vertical studs requires an array of horizontal subgirts or horizontal infill studs to accommodate panel fastening.

14 | Vertical Panel | Installation

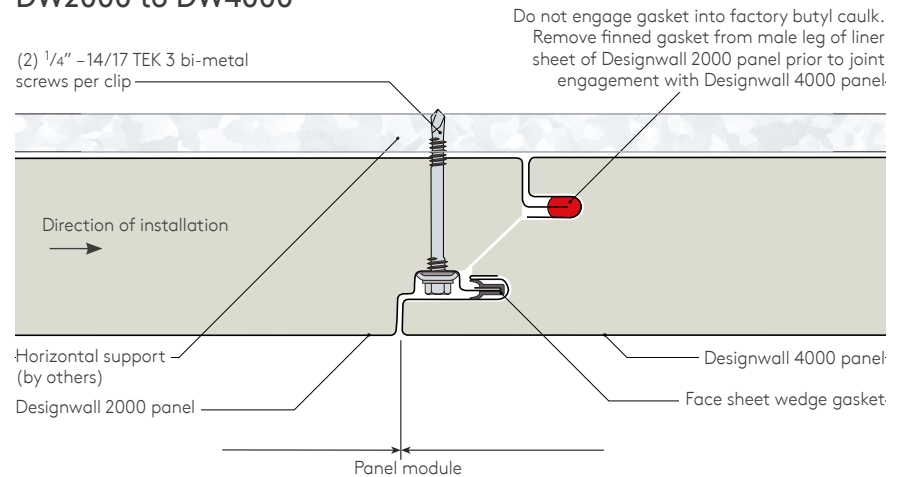
DW2000 to DW2000



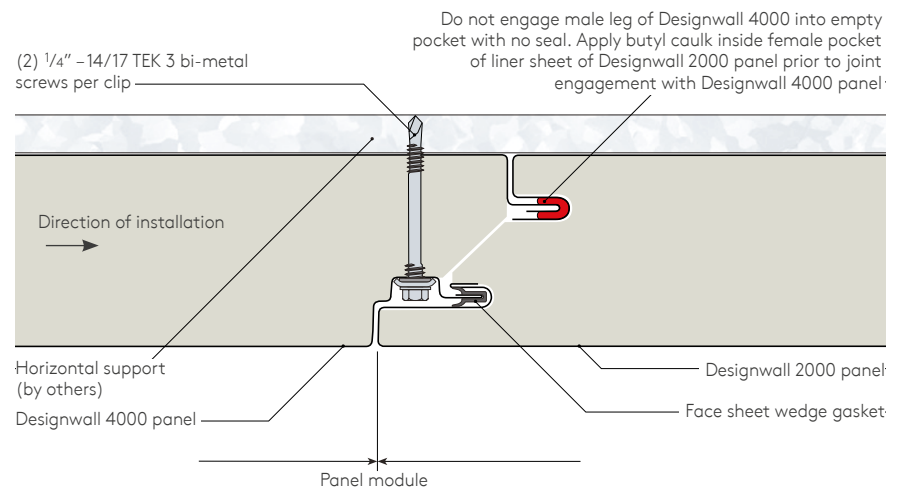
DW4000 to DW4000



DW2000 to DW4000



DW4000 to DW2000



NOTE

Transition details shown here are also applicable when transitioning DW2000R panels to / from DW4000 panels.

14 | Vertical Panel | Installation

DW4000 to DW2000

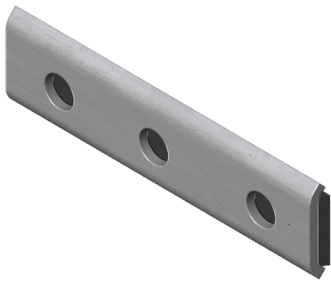
Do not engage male leg of DW4000 into empty pocket with no seal. Apply butyl caulk inside female pocket of liner sheet of DW2000 panel prior to joint engagement with DW4000 panel.

DW2000 to DW4000

Do not engage gasket into factory butyl caulk. Remove finned gasket from male leg of liner sheet of DW2000 panel prior to joint engagement with DW4000 panel.

Stainless Steel Fastening Clip with PVC Foam Tape Strip

Contact Kingspan Technical Services for specific project fastening requirements.



NOTE

Visually inspect trailing edge of panel to ensure joinery is clear of all debris.



SS Fastening clip with PVC foam strip
(2) 1/4" - 14 / 17 TEK 3 bi-metal screws per clip

14 | Vertical Panel | Installation

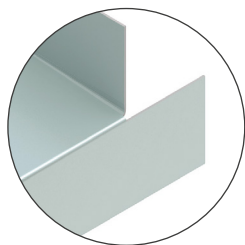
IMPORTANT INSTALLATION NOTE!

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.

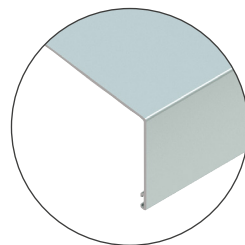
- F** Lift next panel into position and fully engage with previously installed panel. Verify panel is vertical using a laser placed on leading edge and install hidden clips and fasteners as required.

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

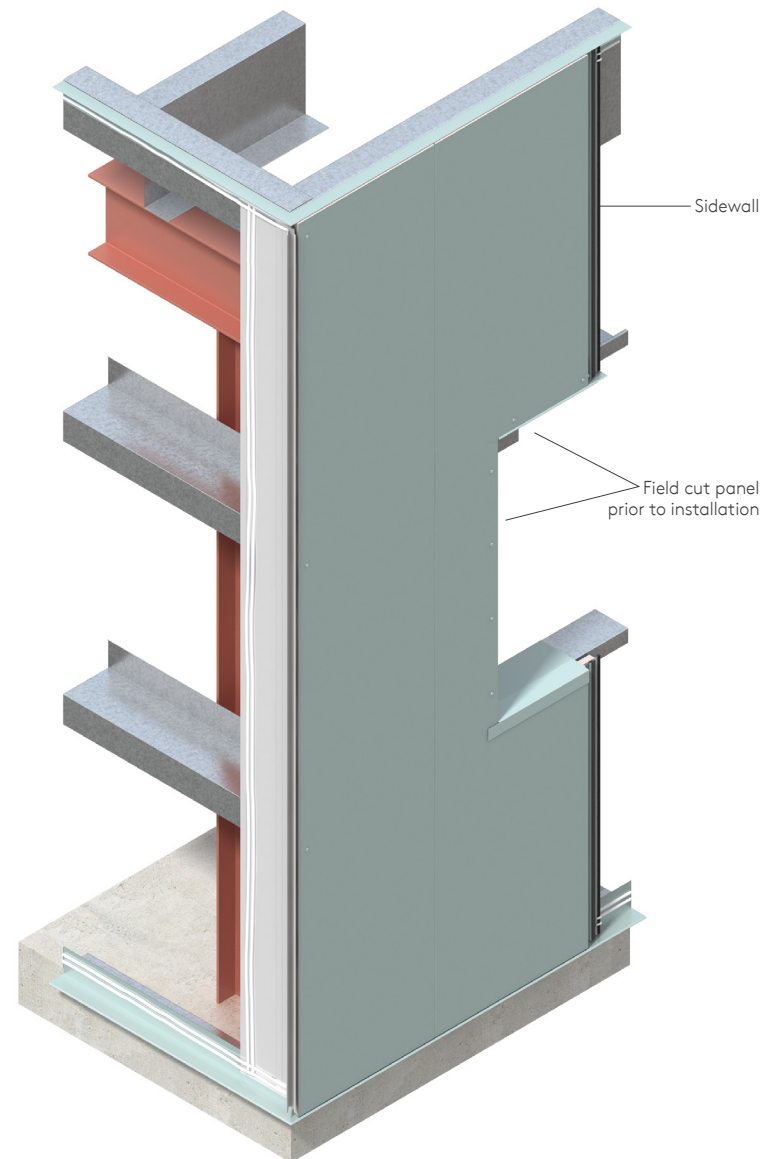
Apply foil tape / membrane for an adequate weather seal - additional details available on request.



Sill trim with
field bent tab

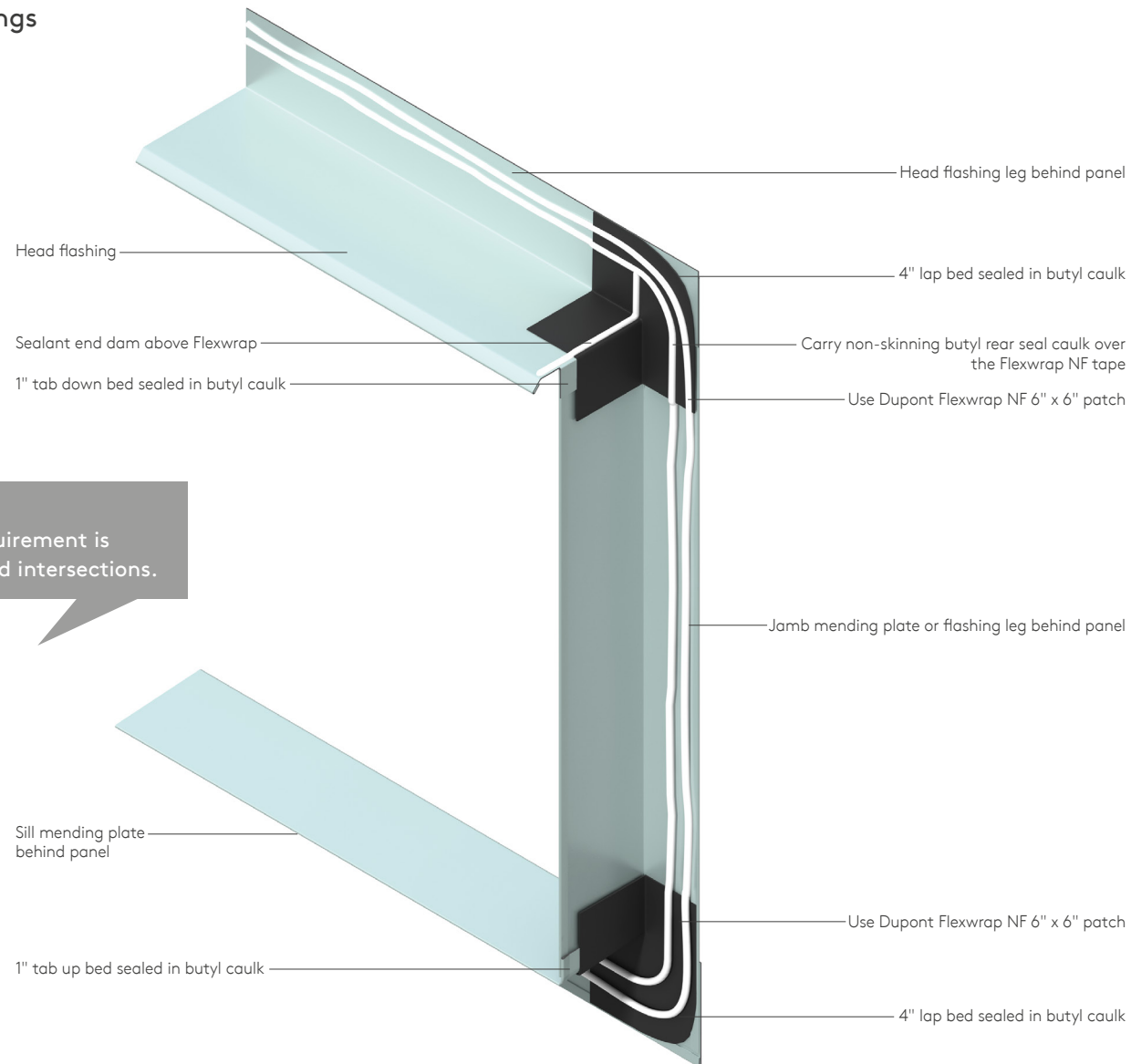


Sill Extrusion



14 | Vertical Panel | Installation

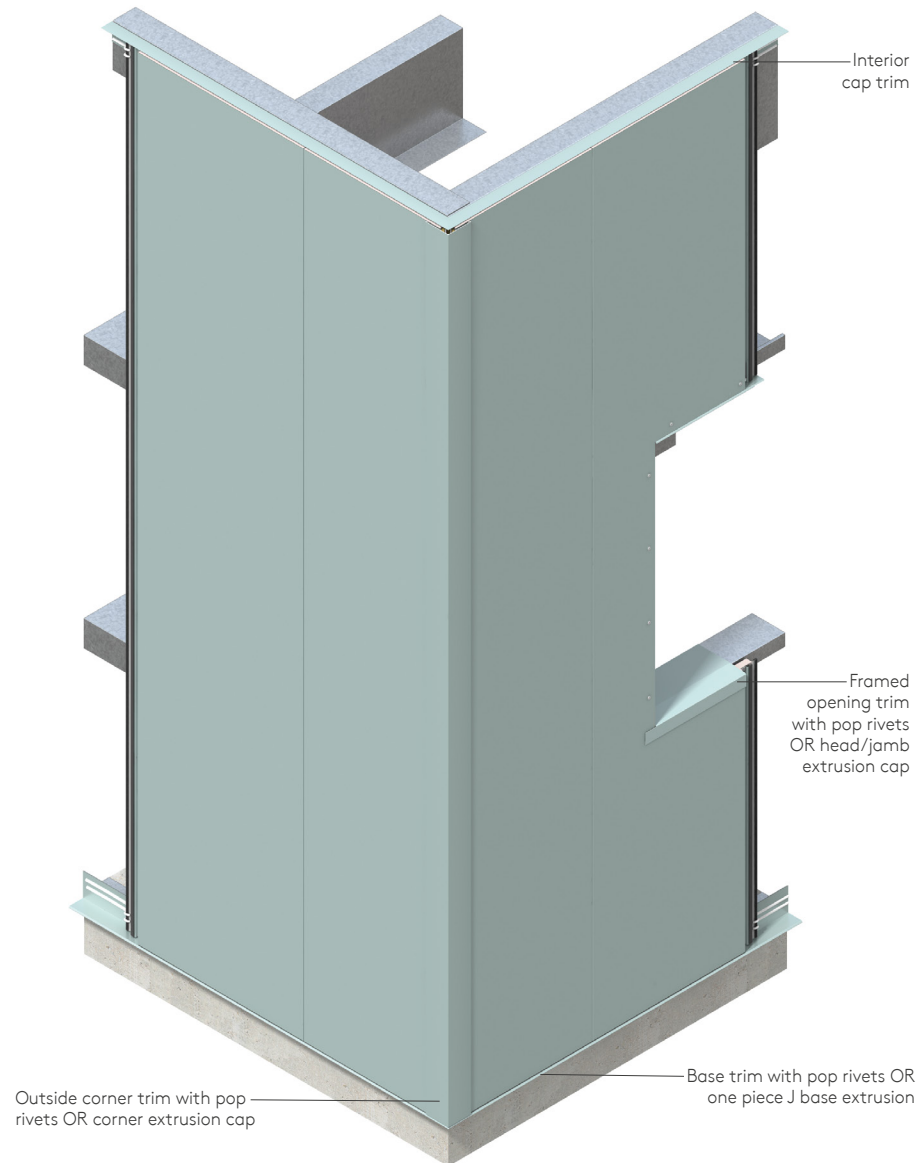
Trim at Framed Openings



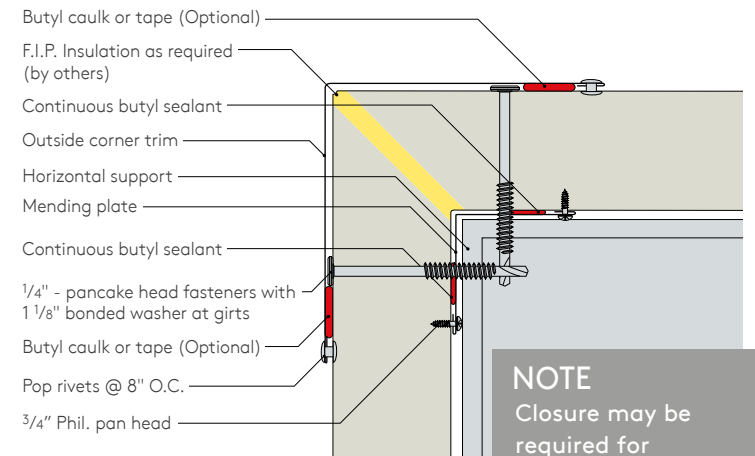
NOTE

Tabbing and sealant requirement is typical for all endlaps and intersections.

14 | Vertical Panel | Installation

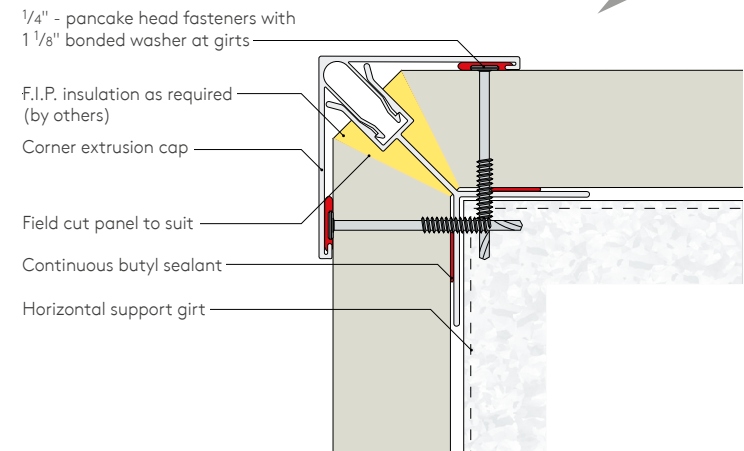


Outside Corner Miter Cut



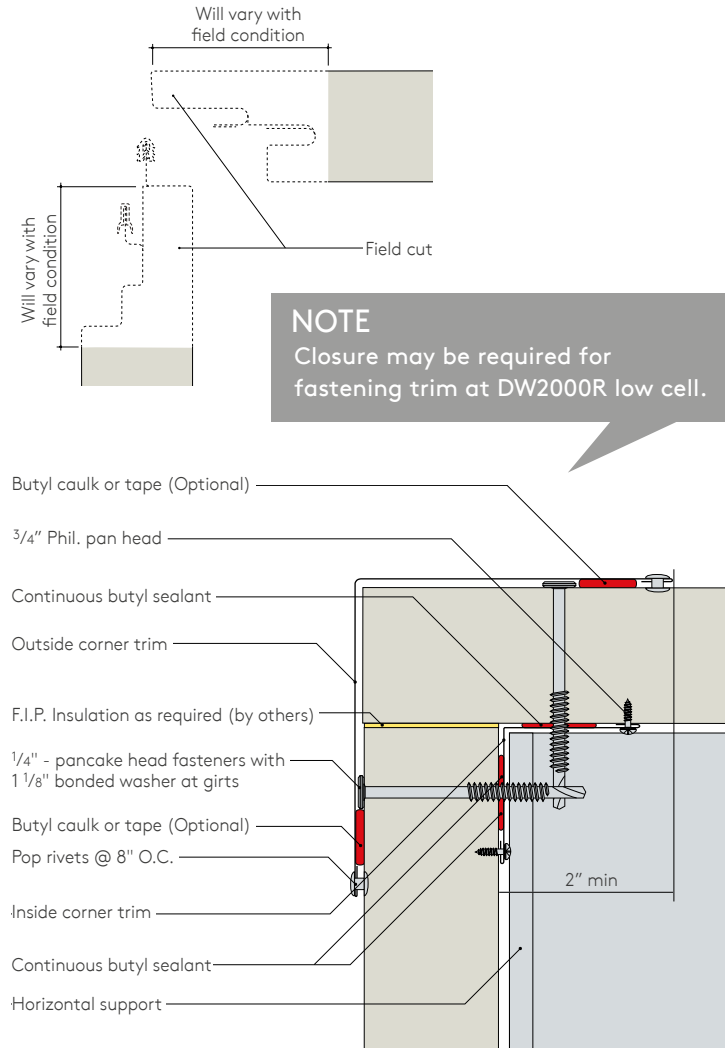
NOTE
Closure may be required for fastening trim at DW2000R low cell.

Corner Extrusion Option

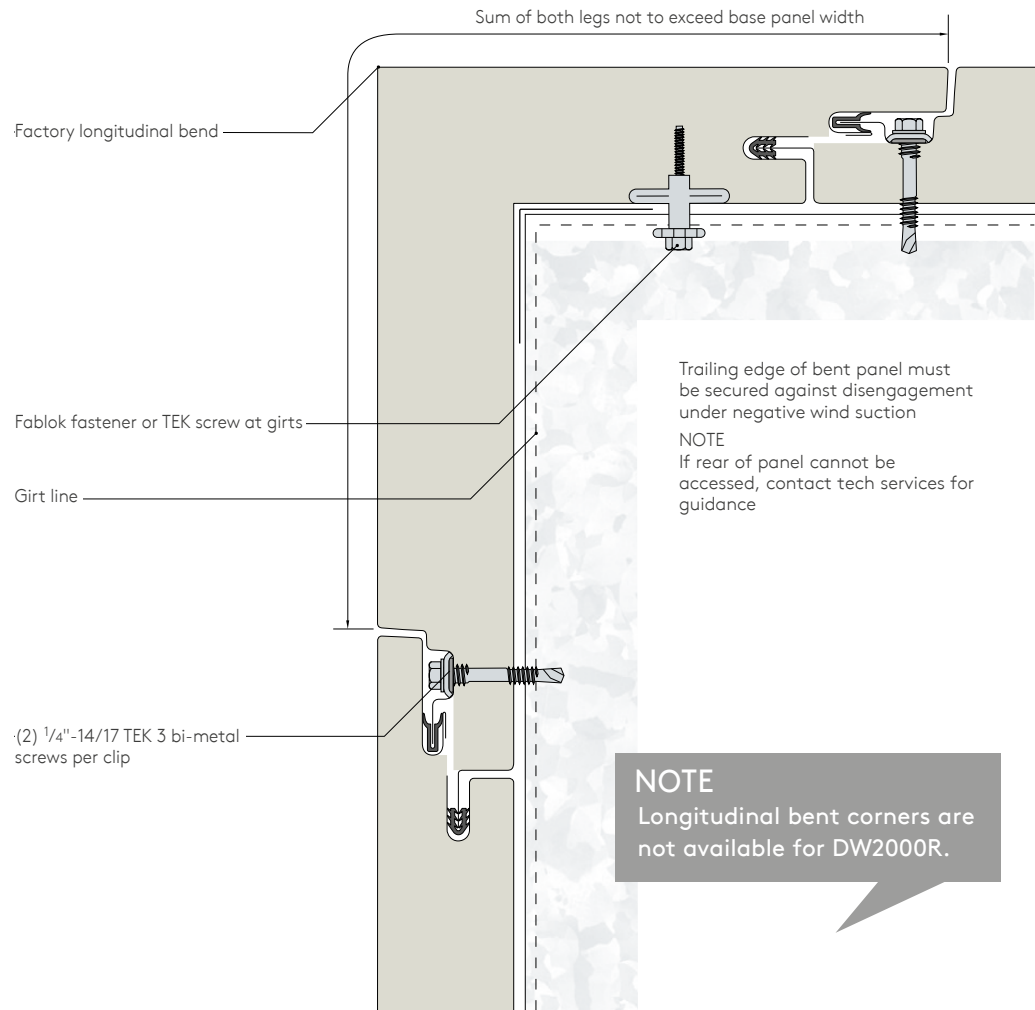


15 | Vertical Panel | Construction Details

Outside Corner with Flat Trim

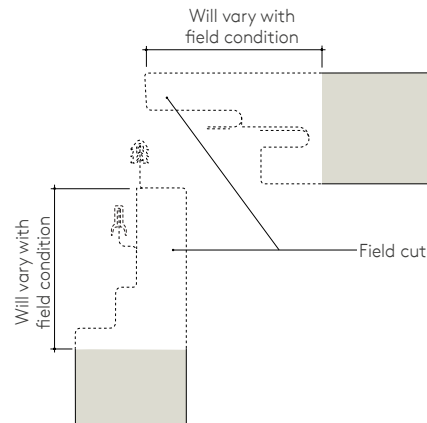


Longitudinal Bent Corner Detail

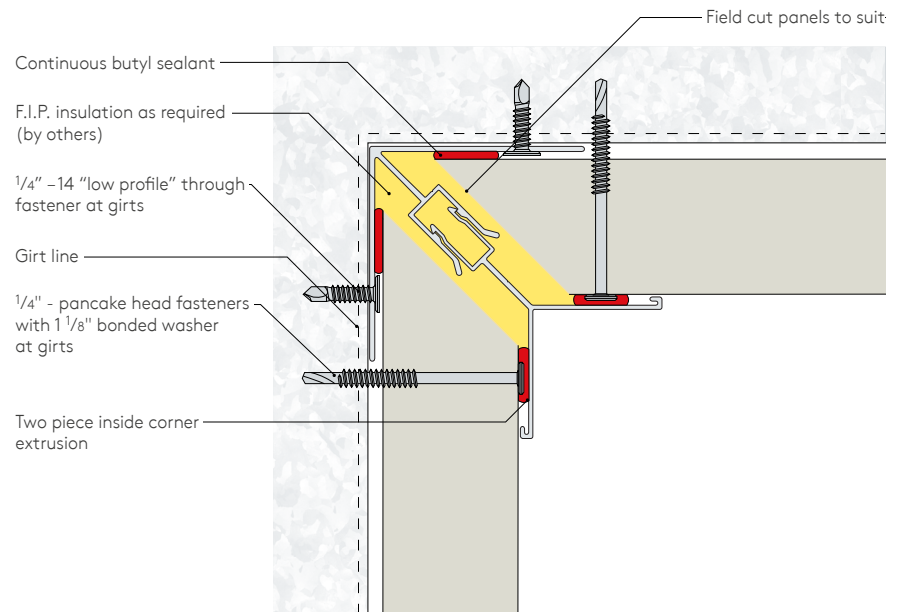
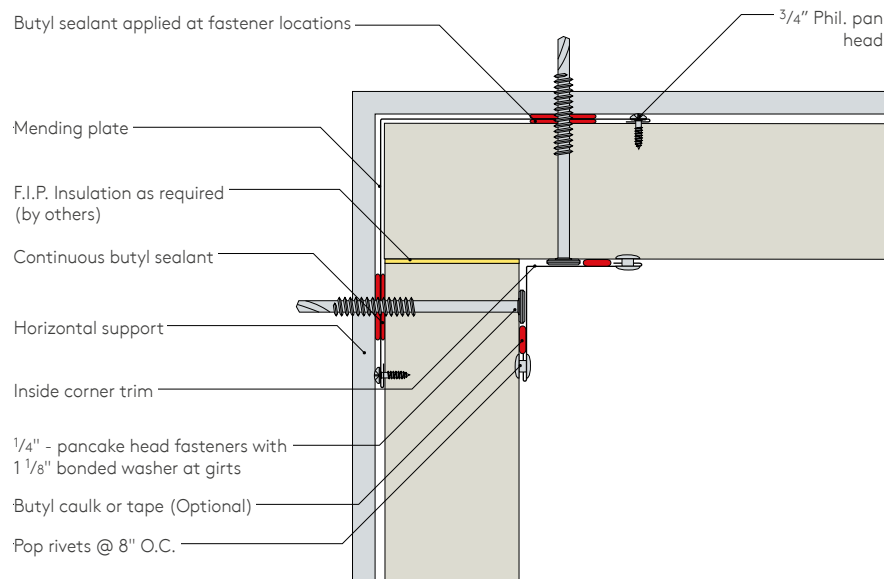
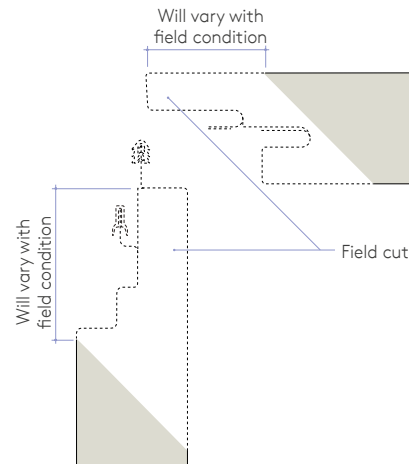


15 | Vertical Panel | Construction Details

Inside Corner with Flat Trim



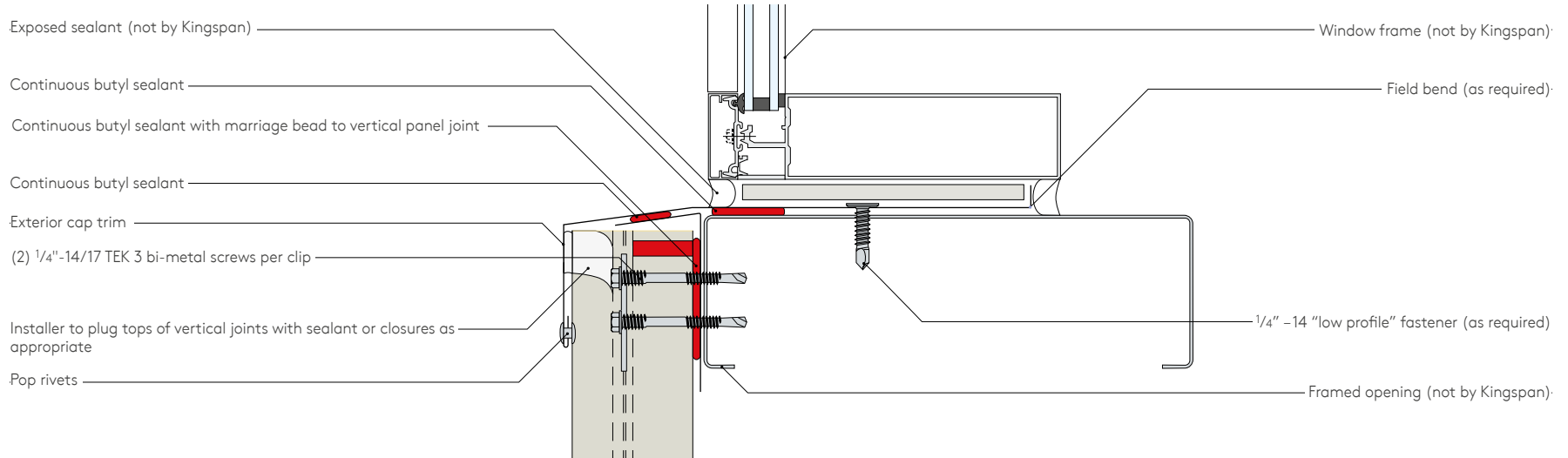
Inside Corner with Two Piece Extrusion



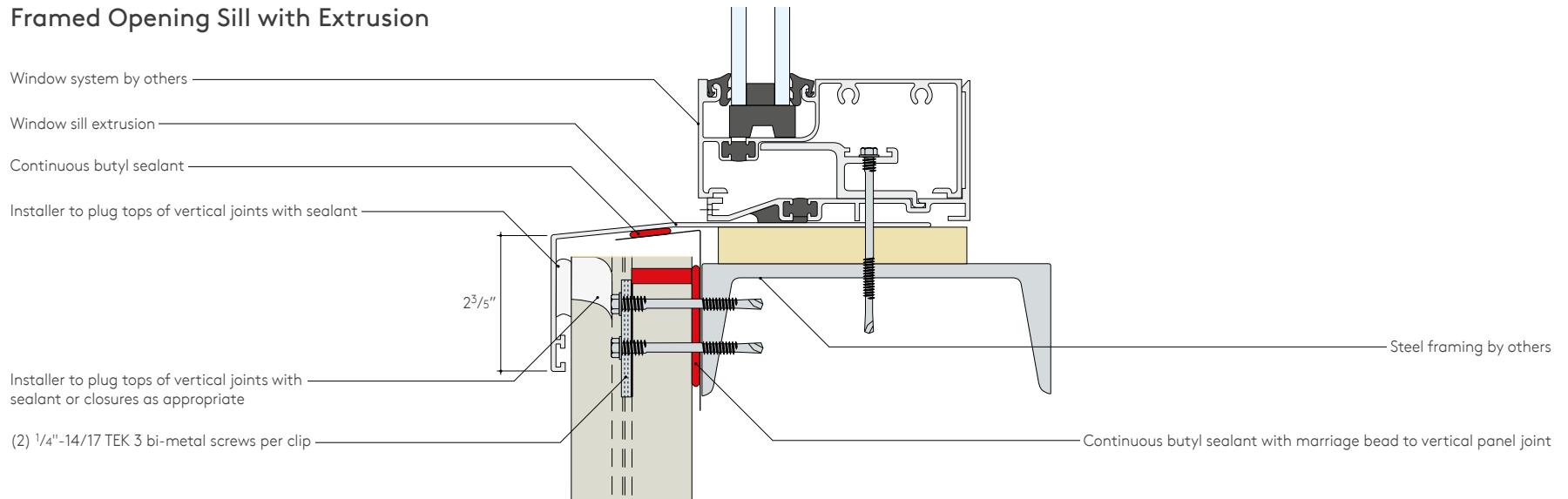
Disclaimer: Details shown within this guide are Kingspan BENCHMARK standard details and are not project specific. To ensure installation is compliant with all applicable standards, always refer to project details for proper panel and wall installation requirements. Requirements may vary based on the specific application and product being installed. Contact Technical Services if further information is needed.

15 | Vertical Panel | Construction Details

Framed Opening One Piece Sill

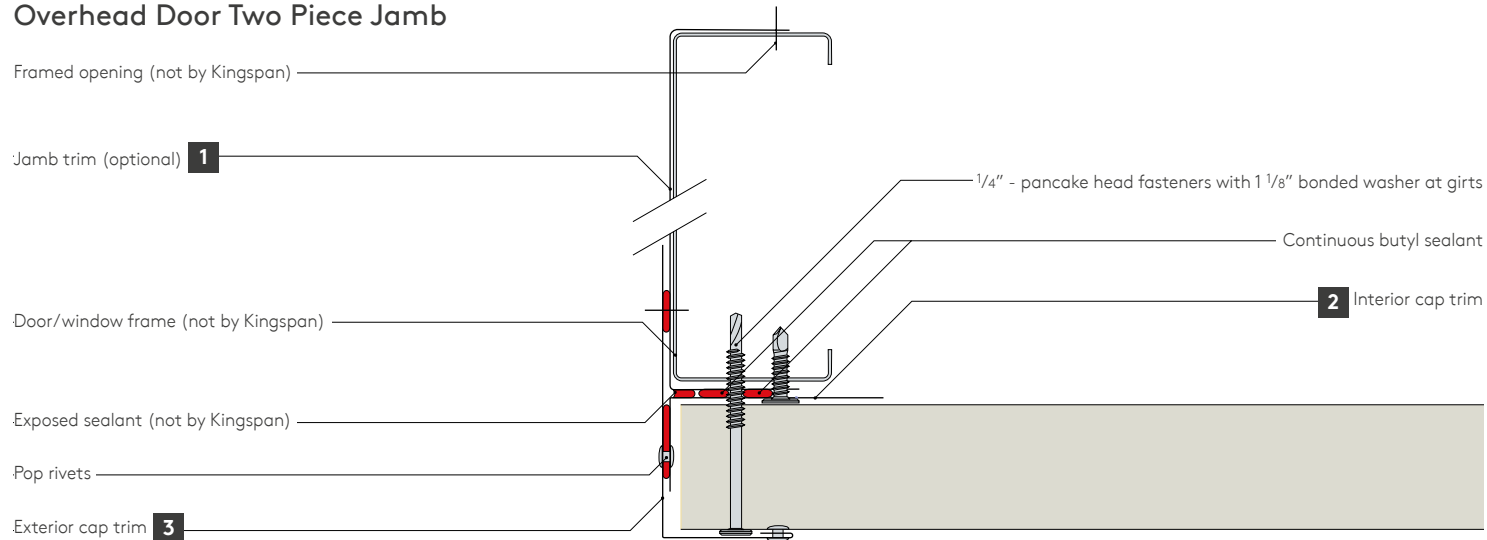


Framed Opening Sill with Extrusion



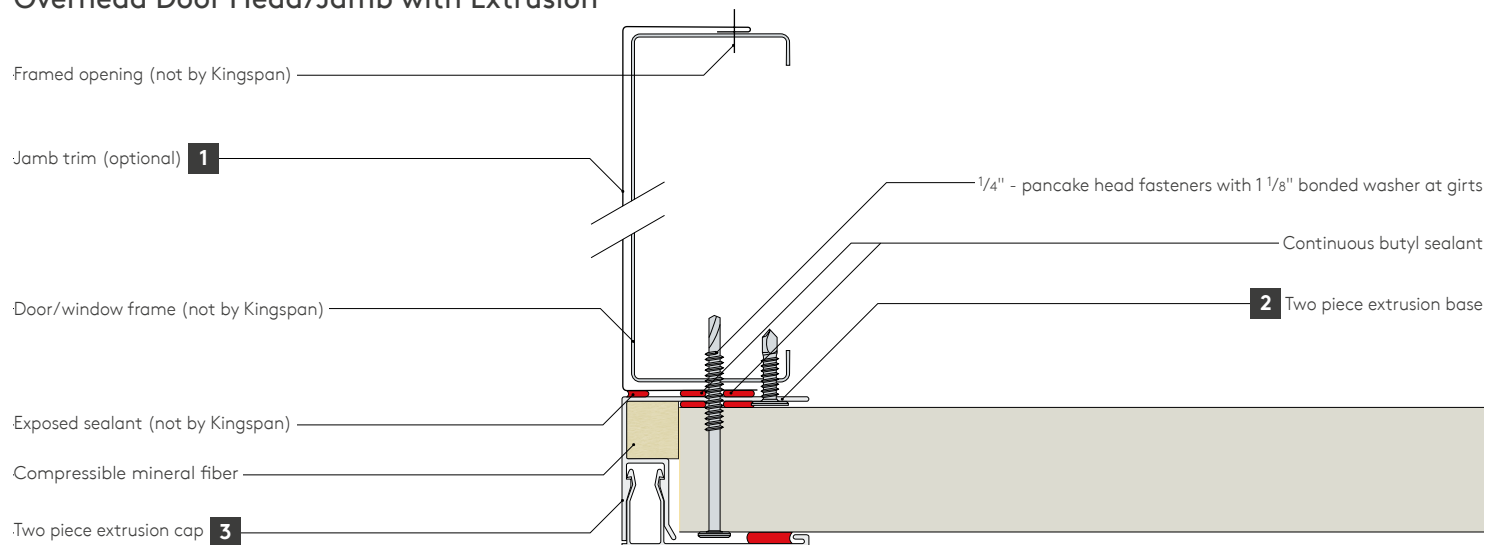
15 | Vertical Panel | Construction Details

Overhead Door Two Piece Jamb



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

Overhead Door Head/Jamb with Extrusion

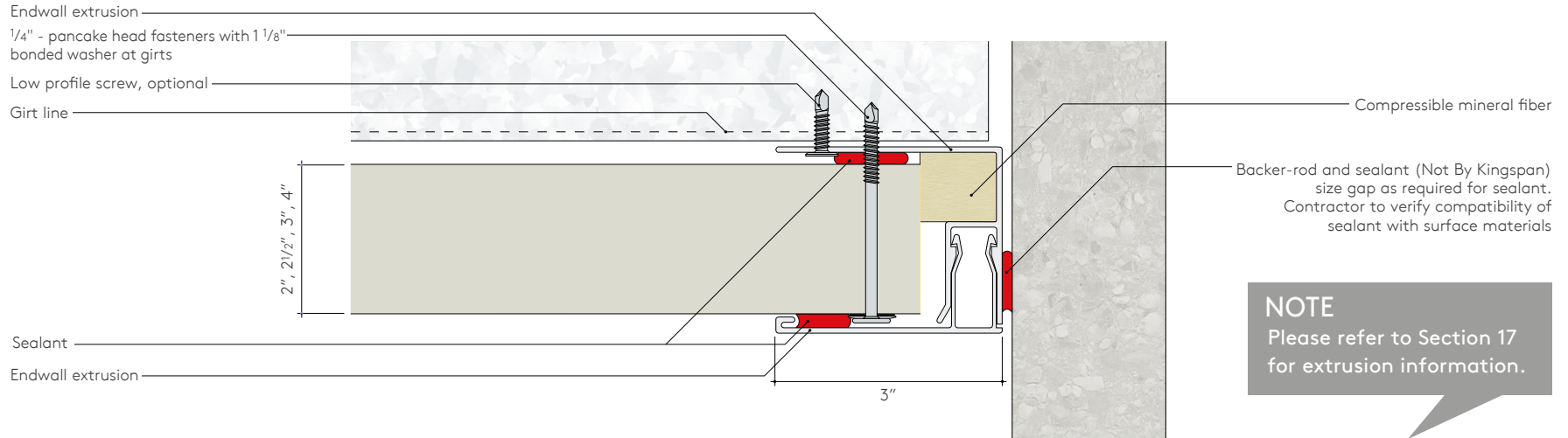


- 1** Install jamb trim (optional) and all applicable sealants.
- 2** Install two piece extrusion base and all applicable sealants prior to installing the panel and through fasteners.
- 3** Install two piece extrusion cap.

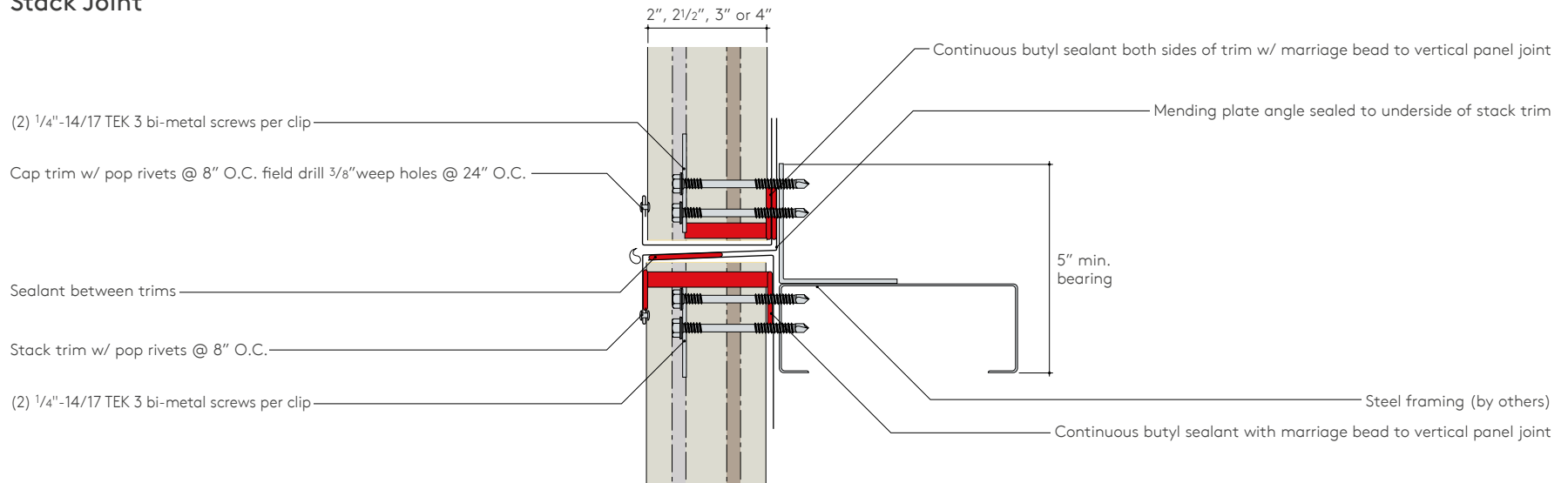
Disclaimer: Details shown within this guide are Kingspan BENCHMARK standard details and are not project specific. To ensure installation is compliant with all applicable standards, always refer to project details for proper panel and wall installation requirements. Requirements may vary based on the specific application and product being installed. Contact Technical Services if further information is needed.

15 | Vertical Panel | Construction Details

Endwall with Two Piece Extrusion



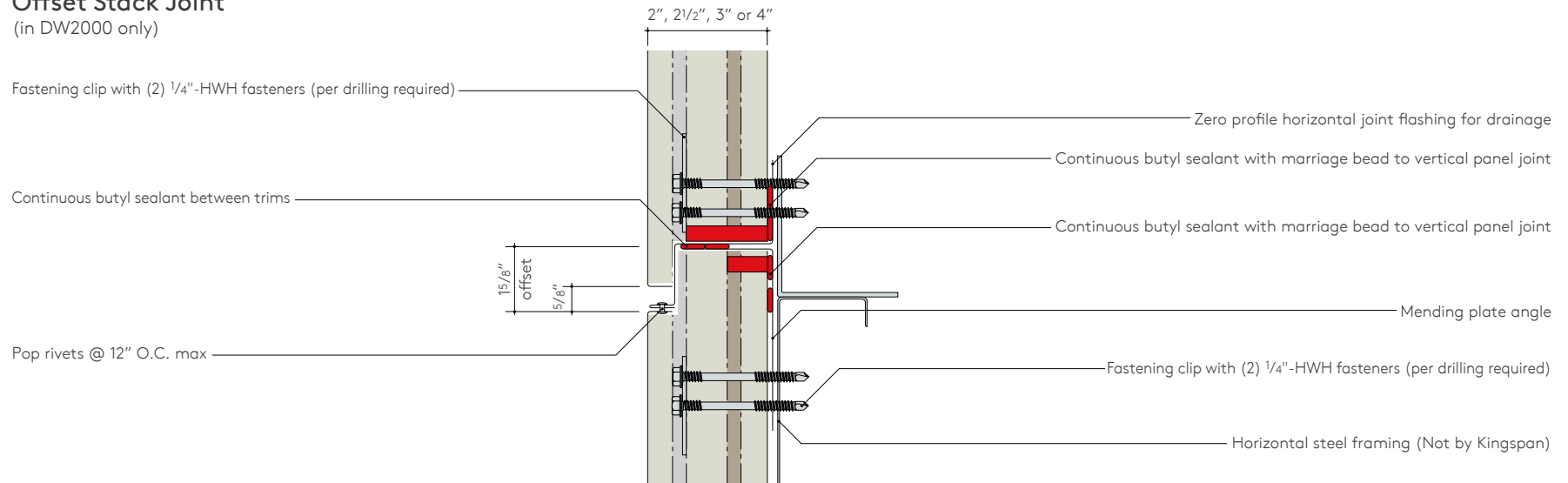
Stack Joint



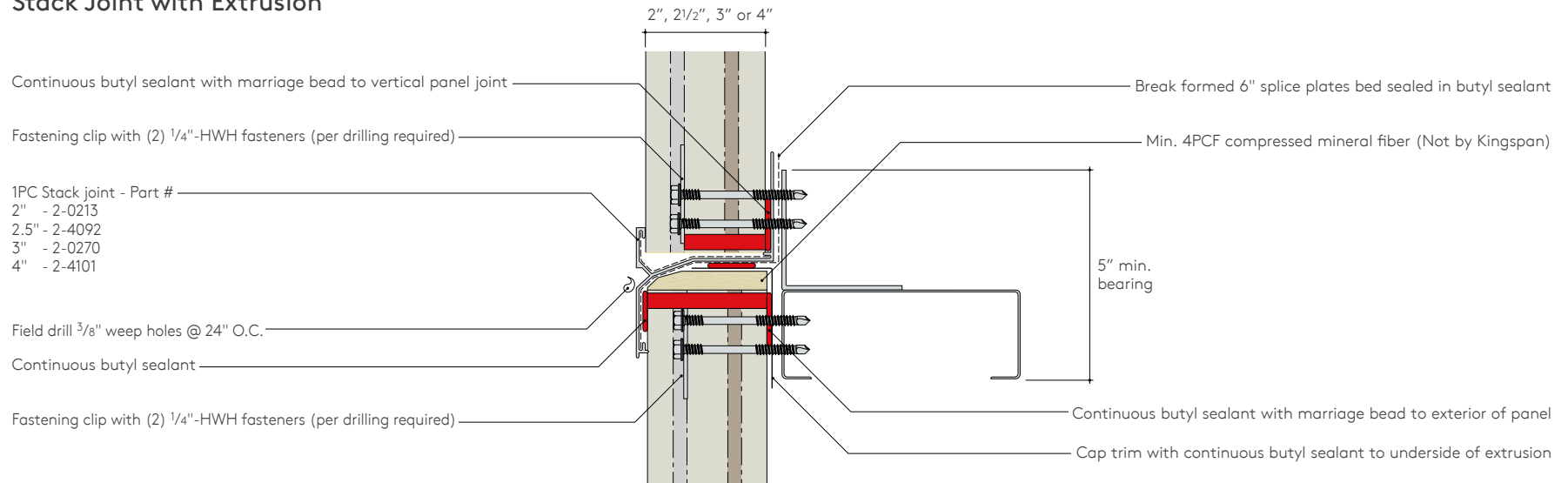
15 | Vertical Panel | Construction Details

Offset Stack Joint

(in DW2000 only)



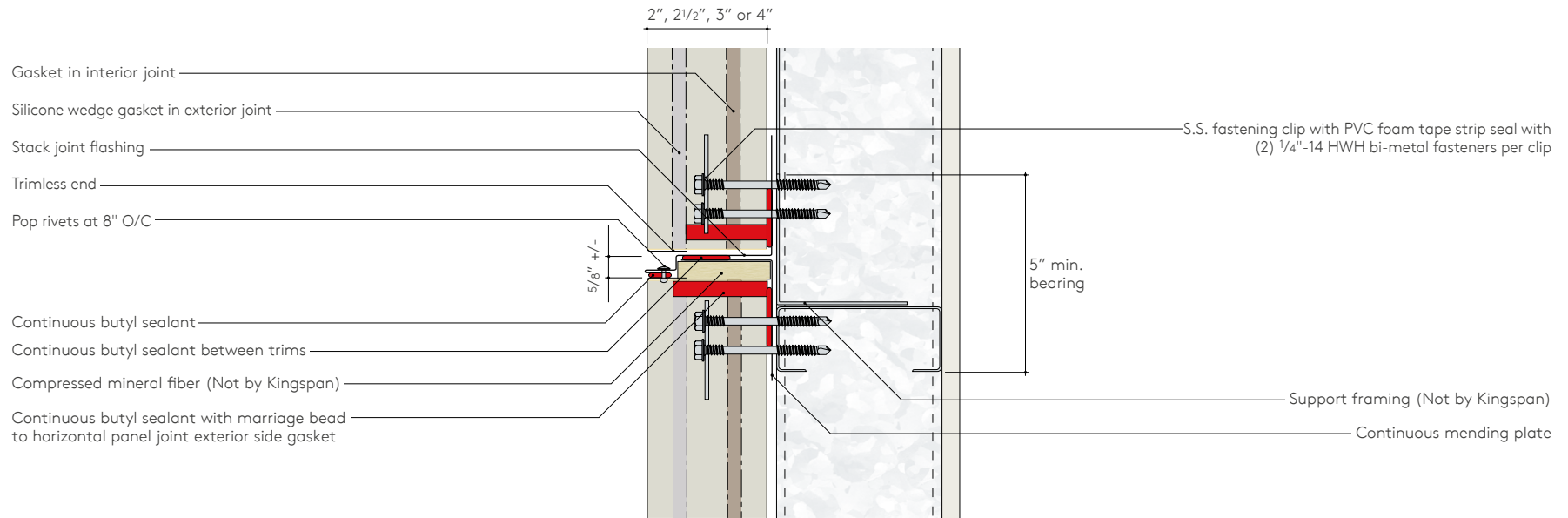
Stack Joint with Extrusion



Disclaimer: Details shown within this guide are Kingspan BENCHMARK standard details and are not project specific. To ensure installation is compliant with all applicable standards, always refer to project details for proper panel and wall installation requirements. Requirements may vary based on the specific application and product being installed. Contact Technical Services if further information is needed.

15 | Vertical Panel | Construction Details

Stack Joint



16 | Horizontal Panel | Installation

Pre-Installation Checklist

1. All walls meet contract documents, plumb and square (refer back to page 17).
2. Set benchmarks for panel base supports as per contract documents.
3. Verify that staged panels match the shop drawings based on the specific elevation.
4. Verify clip placement and fastening points based on project specific shop drawings.
5. Verify that sufficient blocking support has been provided behind all vertical joints in horizontal panel applications and behind all horizontal stack joints in vertical applications.
6. Kingspan BENCHMARK recommends the use of lasers to verify the horizontal and vertical panel lines.
7. Kingspan BENCHMARK recommends a mixture of dish soap and water to use as lubricant (applied to the gasket) for easier installation of panels (in cold weather environments, use only dish soap or windshield washer fluid).
8. Kingspan BENCHMARK recommends that equipment, safety gear, and procedures meet and/or exceed the OSHA approved standards.

CAUTION

Ensure that all conditions on the Pre-Installation Checklist are met prior to the installation of panels. If any one of these conditions are not met, Kingspan BENCHMARK recommends that installation of panels not begin until the issue is rectified.



16 | Horizontal Panel | Installation

IMPORTANT INSTALLATION NOTE!

- When installing Designwall panels horizontally, Kingspan recommends that the width of the load bearing steel supports at vertical joints is 6" (approx. 152 mm). This can be accomplished with two parallel studs spaced 6" apart, outside to outside, covered with a 6" wide steel backer plate, or 6" wide I-beam/HSS steel sections.
- Minimum bearing face for intermediate support is 1.625" (approx. 42mm).
- 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.

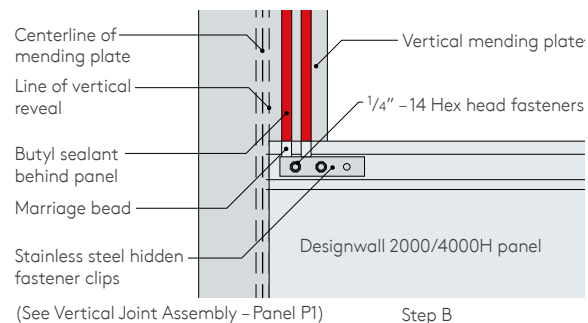
- A** Verify that all structural supports are properly aligned before installing panels (refer to Section 8 Structural Alignment).
- B** Install continuous mending plates at all vertical reveal locations. Using a level, mark the centerline of all vertical reveal joints on mending plates to match locations shown on shop drawings.
- 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.
- Back legs on all flashings and trims are required at head, jamb, and sill to be over-cut, notched, and sealed such that a continuous back flange is created that will in turn be butyl caulked to back side of panel.

NOTE

Care must be taken to properly seal all framed openings. Sealant MUST be installed between trims and supporting steel AND between trims and back side of panels.

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 are to be centered on each 1/4" expansion gap between extrusions. 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.



16 | Horizontal Panel | Installation

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.

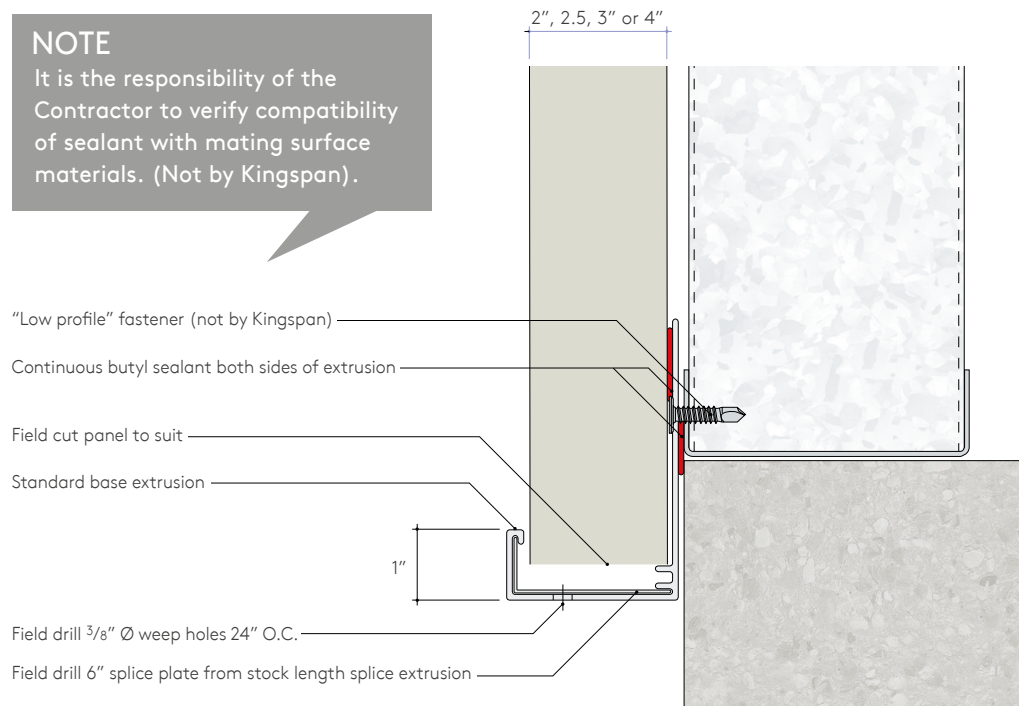
NOTE

Assure the base panel is levelled horizontally. Failure to level the base panel will result in saw-toothing of vertical joints as installation progresses.

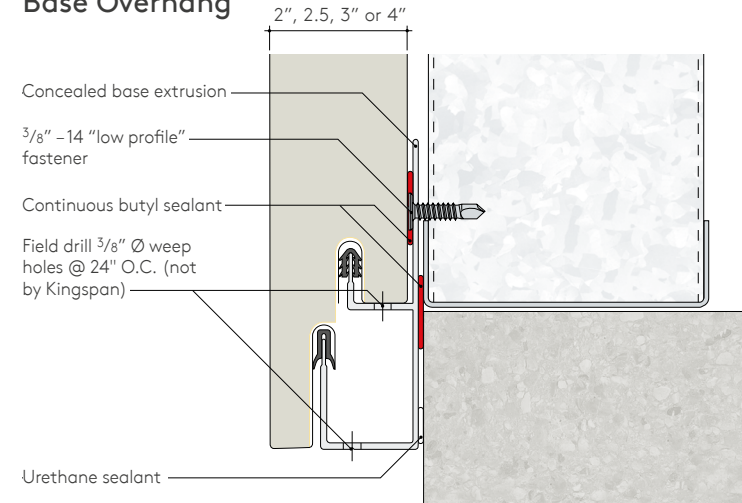
Field Cut Base detail with Standard J-Extrusion

NOTE

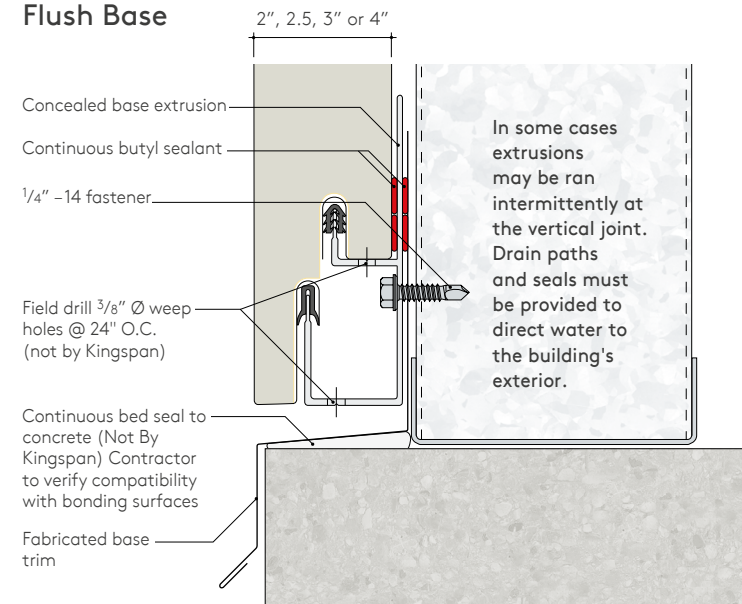
It is the responsibility of the Contractor to verify compatibility of sealant with mating surface materials. (Not by Kingspan).



Base Overhang

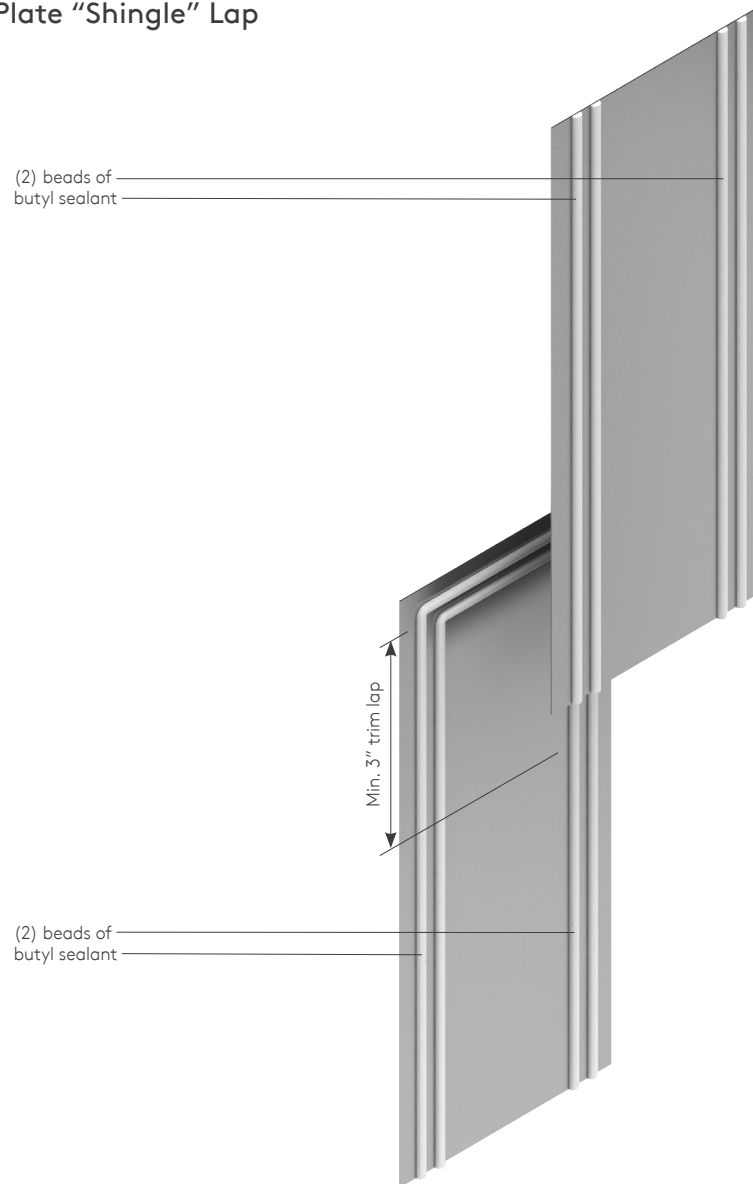


Flush Base



16 | Horizontal Panel | Installation

Mending Plate "Shingle" Lap

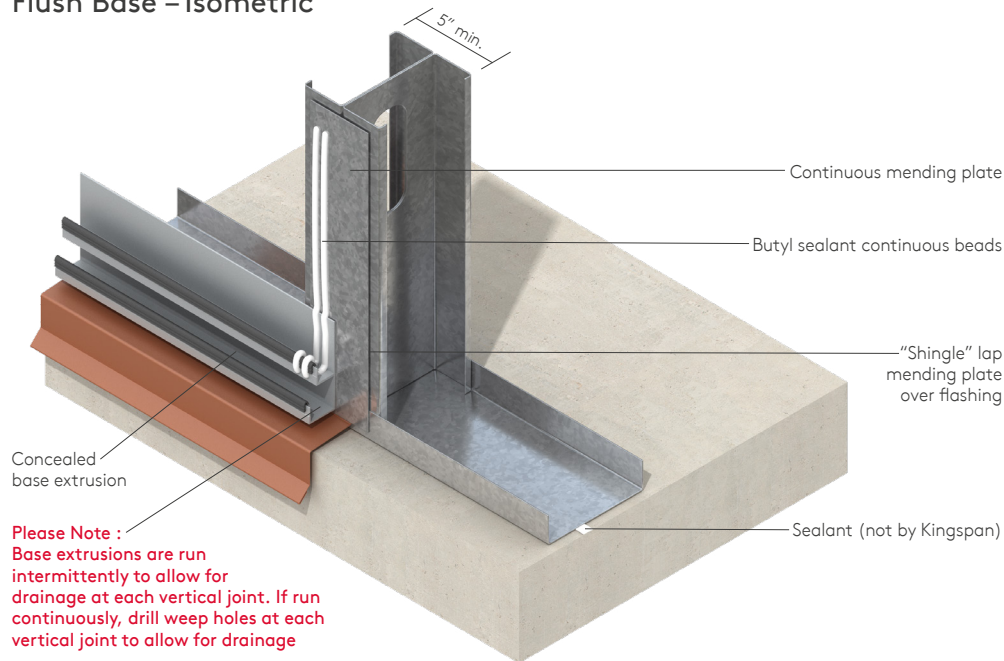


NOTE

Mending plates to be no less than 24 GA to avoid waviness. Fasten 24" O.C. with low profile fasteners.

16 | Horizontal Panel | Installation

Flush Base – Isometric



Please Note :
Base extrusions are run intermittently to allow for drainage at each vertical joint. If run continuously, drill weep holes at each vertical joint to allow for drainage

Please Note : Clips should be screwed in between butyl sealant

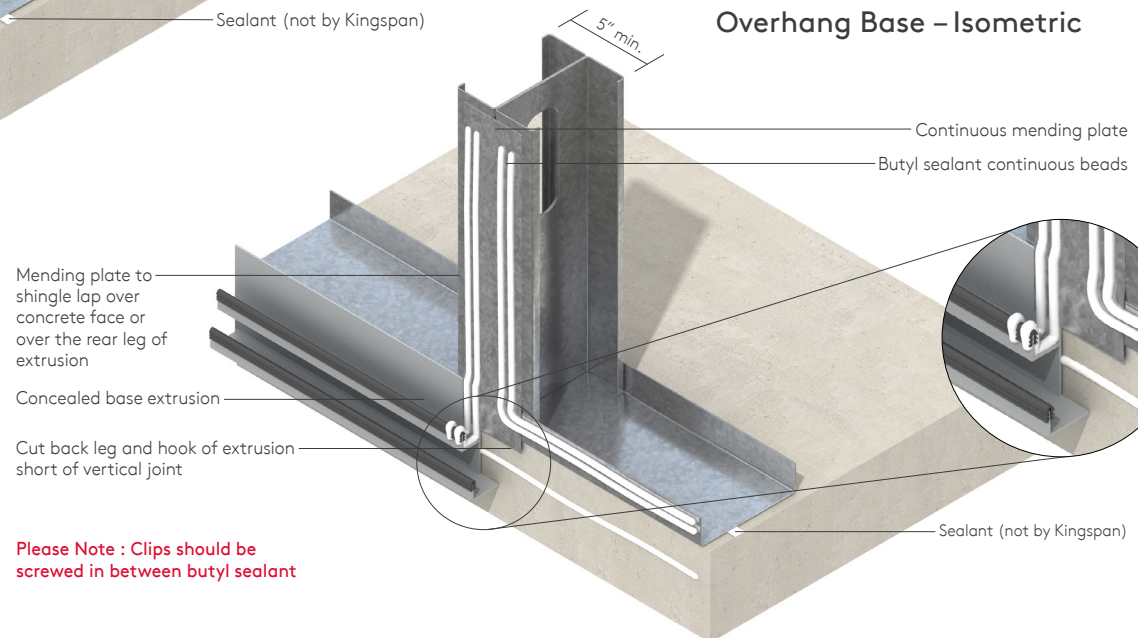
NOTE

In some cases extrusions may be ran intermittently at the vertical joint. Drain paths and seals must be provided to direct water to the building's exterior.

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 $\frac{1}{4}$ " at the ends of each piece. Lap strips should be used to keep the extrusions properly aligned and weatherproof. Lap strips are to be centered on each $\frac{1}{4}$ " expansion gap between extrusions. 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.

Overhang Base – Isometric

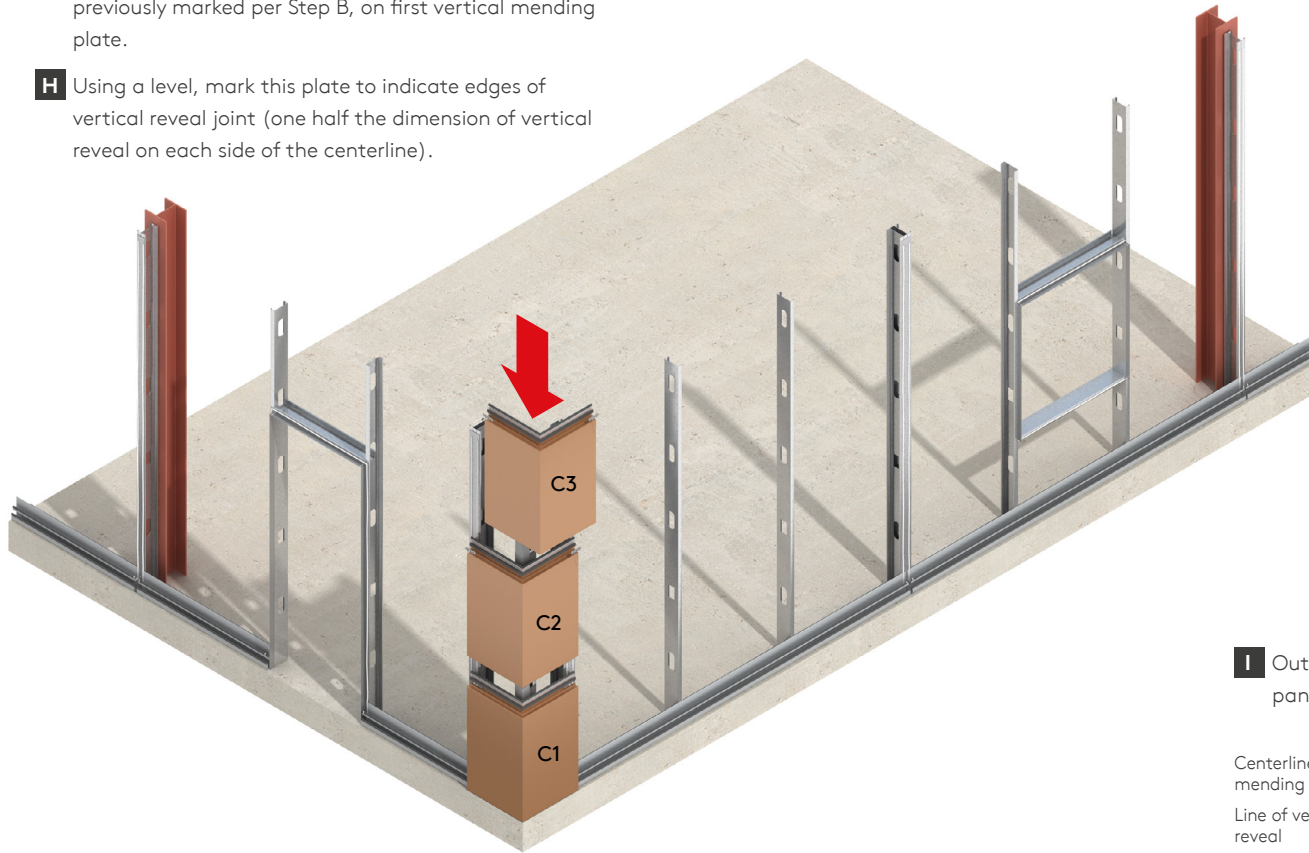


Please Note : Clips should be screwed in between butyl sealant

16 | Horizontal Panel | Installation

Prefabricated Corner Installation

- G** Starting from a corner, locate reveal centerline previously marked per Step B, 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 the centerline).



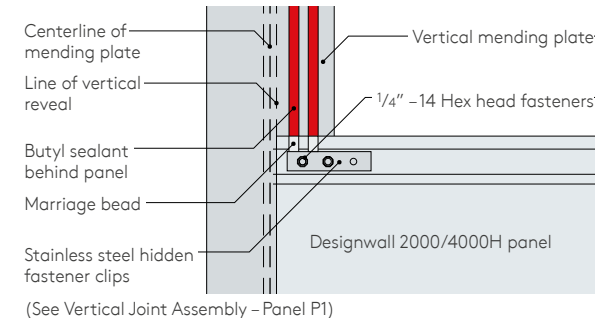
NOTE

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

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 "sawtoothing".

- I** Outside corners can be installed before or after flat panels on adjacent walls.

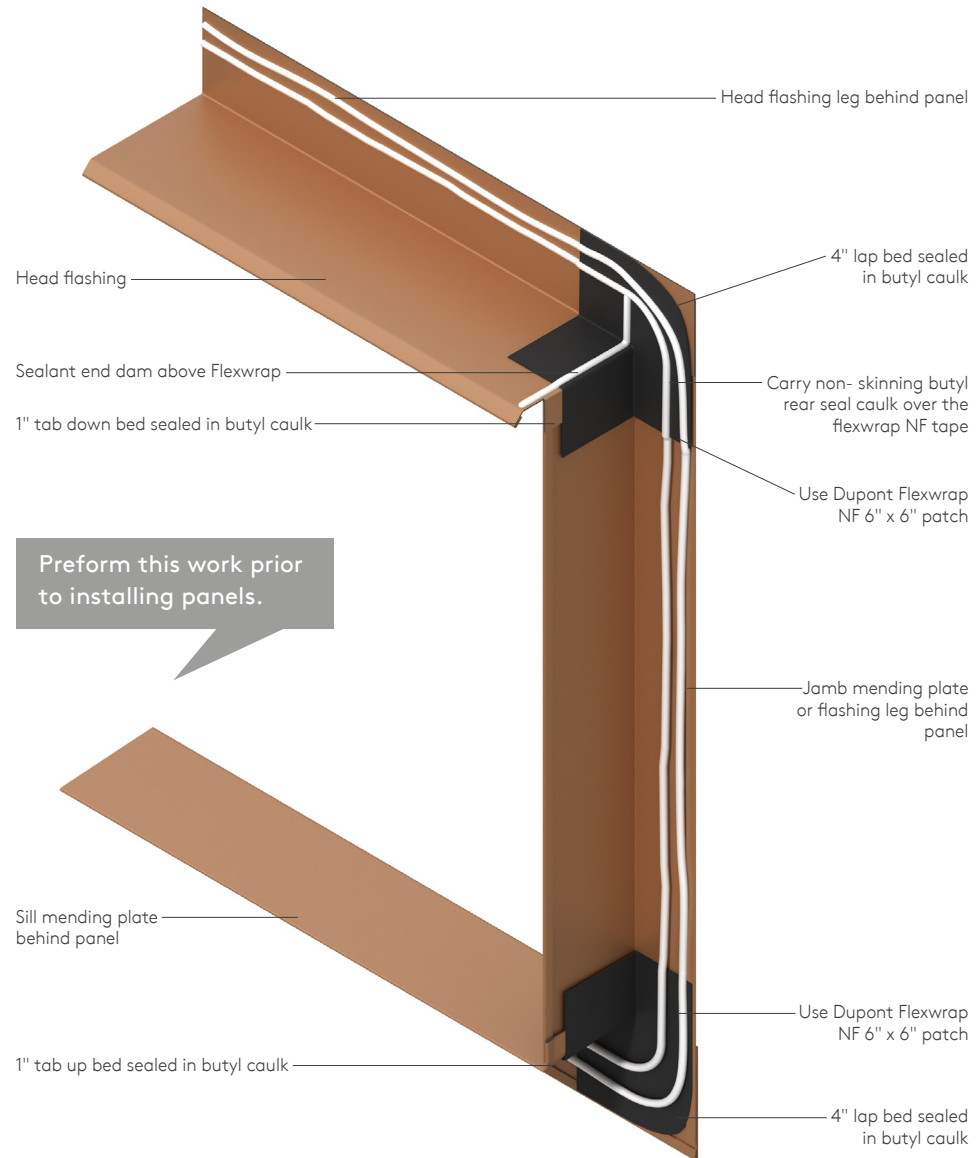


16 | Horizontal Panel | Installation

- J** Set panel P1 as shown. Line up left edge of panel with right side reveal mark on mending plate as shown.
- K** Fasten into supporting steel with appropriate clips and 1/4" – 14 fasteners as indicated on shop drawings.
- L** 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.
- M** Place panel P2 in position. Verify that the vertical edges of the panel are lined up with reveal marks on mending plate.

NOTE

Tabbing and sealant requirement is typical for all endlaps and intersections.



Preform this work prior to installing panels.

16 | Horizontal Panel | Installation

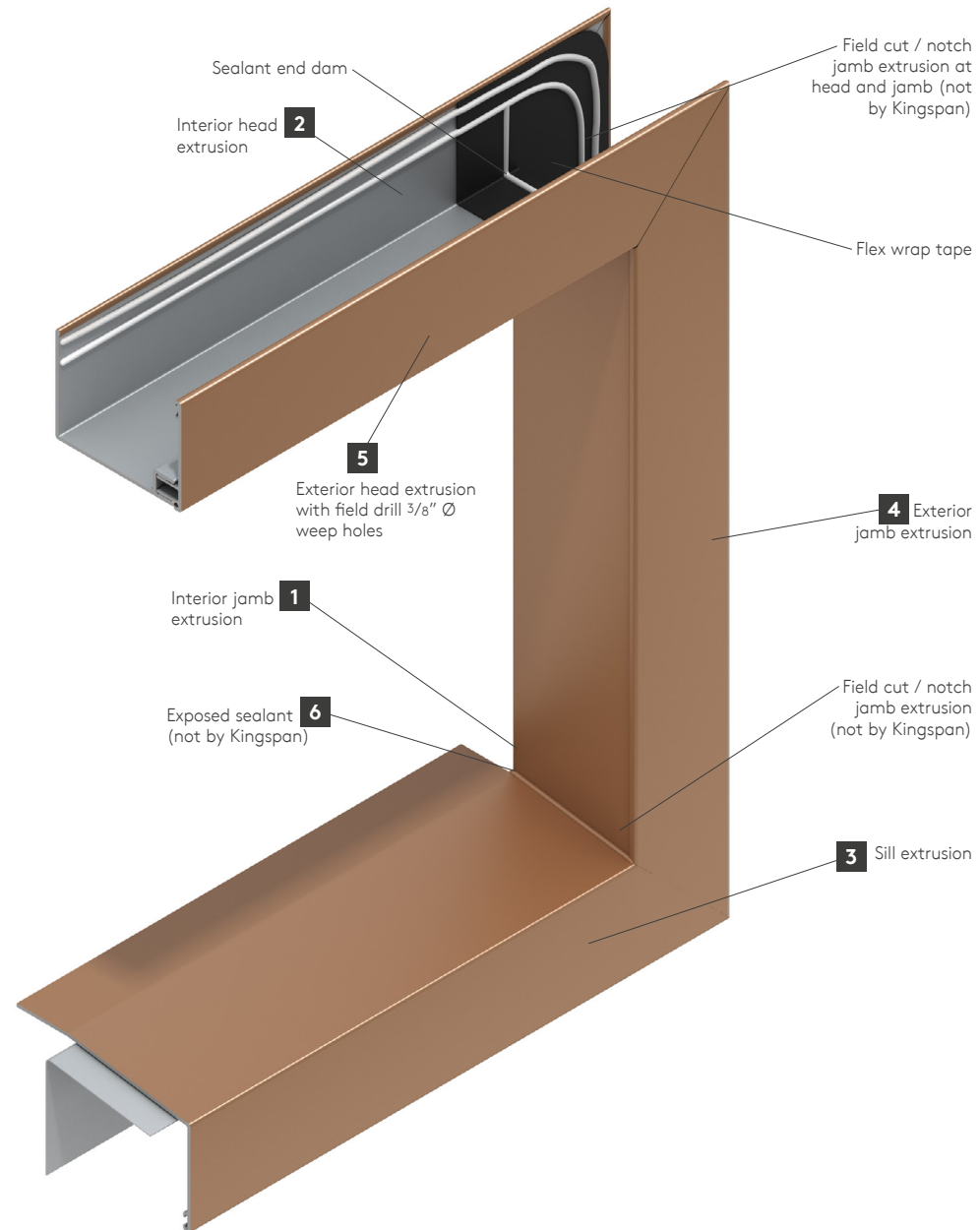
Extrusion at Framed Opening Detail

NOTE

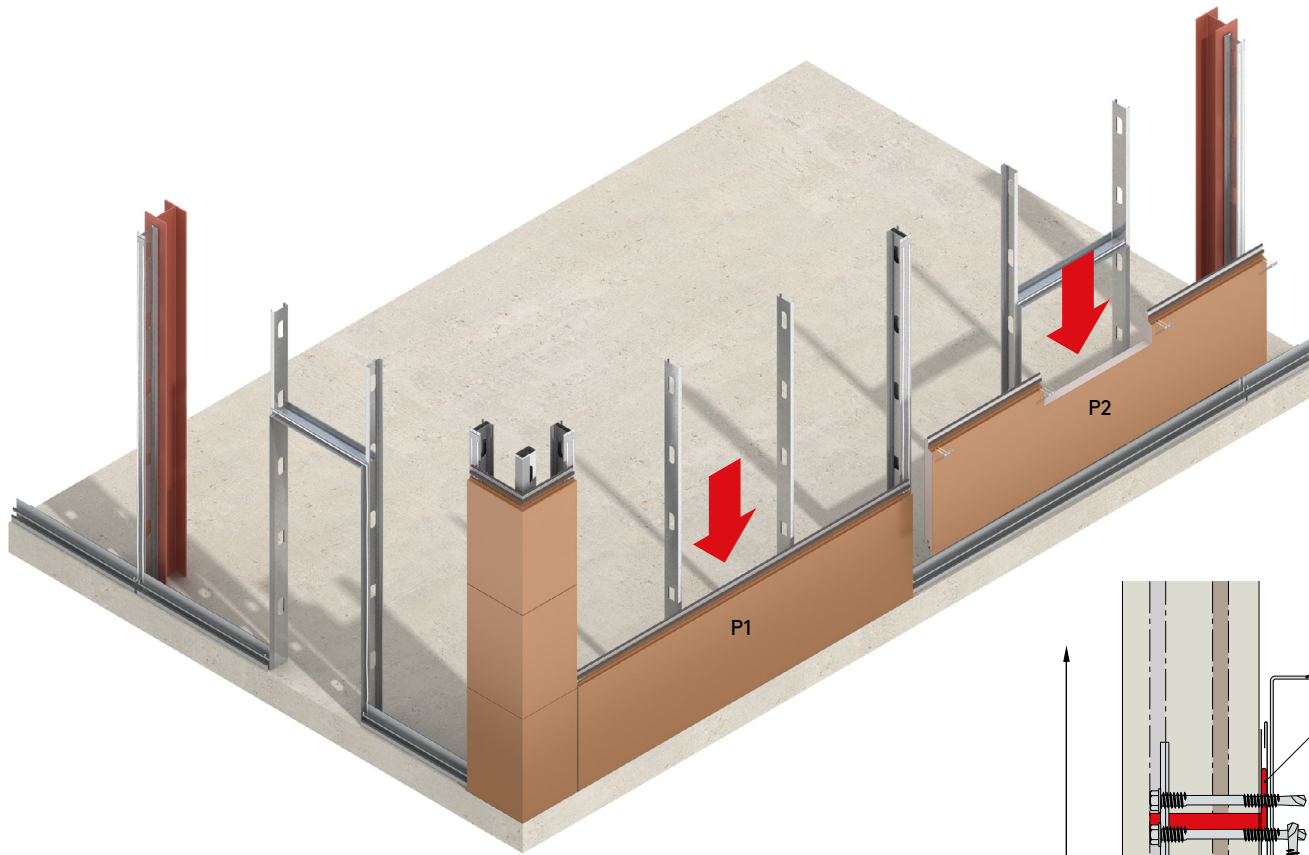
Weep holes should not exceed 24" on center.

Trim 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

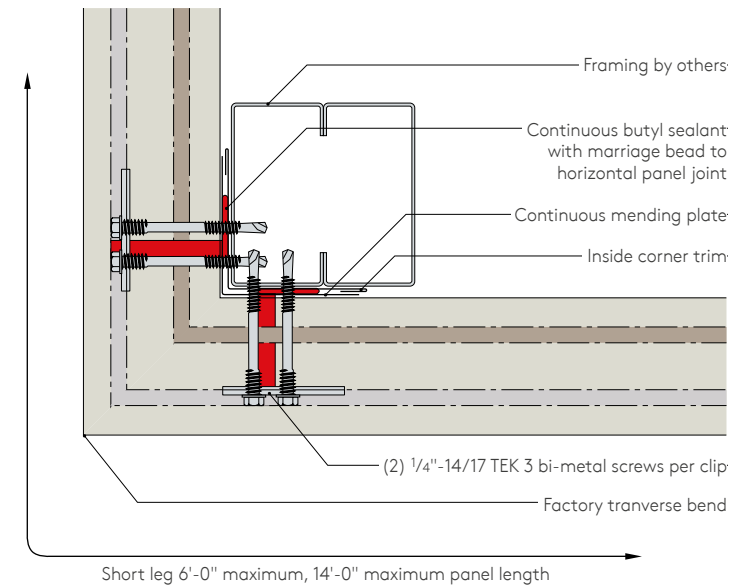


16 | Horizontal Panel | Installation



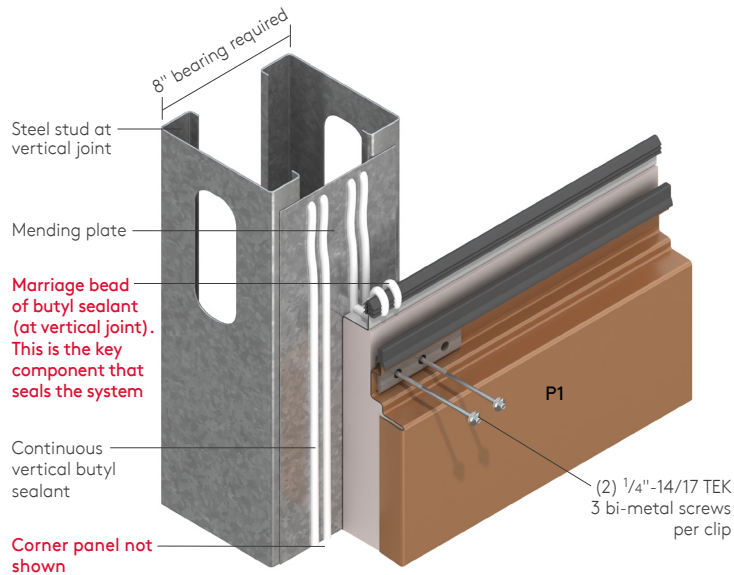
NOTE

Corner panels have a factory installed shipping angle on the interior side. This shipping angle can be removed and is not a substitute for use as the continuous interior corner trim called out in the detail.



16 | Horizontal Panel | Installation

Vertical Joint Assembly at Corner – Panel P1



Please Note : Clips should be screwed in between butyl sealant

NOTE

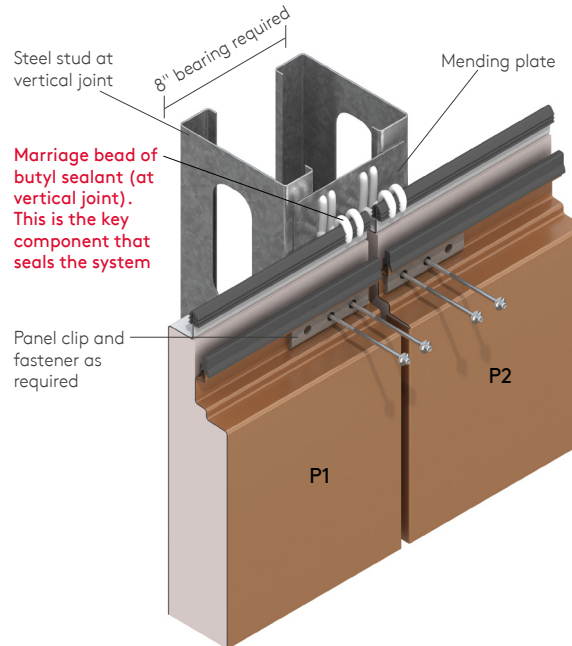
Panels with trimless ends can display some slight dimensional variation where use of the ABC sorting method during install will provide a more uniform look.

CAUTION

Do not over-tighten fasteners as damage to the panel core as well as facings will result.



Vertical Joint Assembly

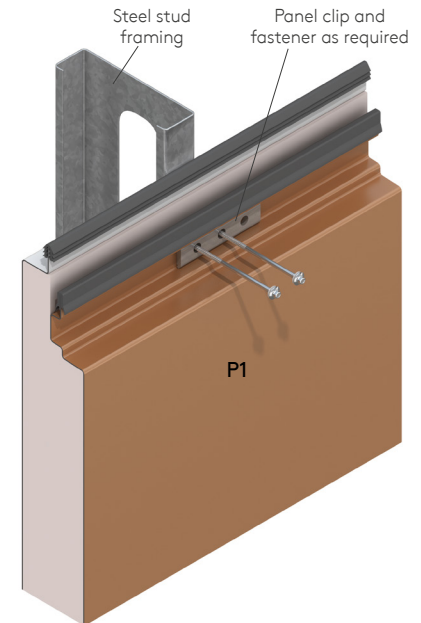


Please Note : Clips should be screwed in between butyl sealant

NOTE

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

Intermediate Fastener Position

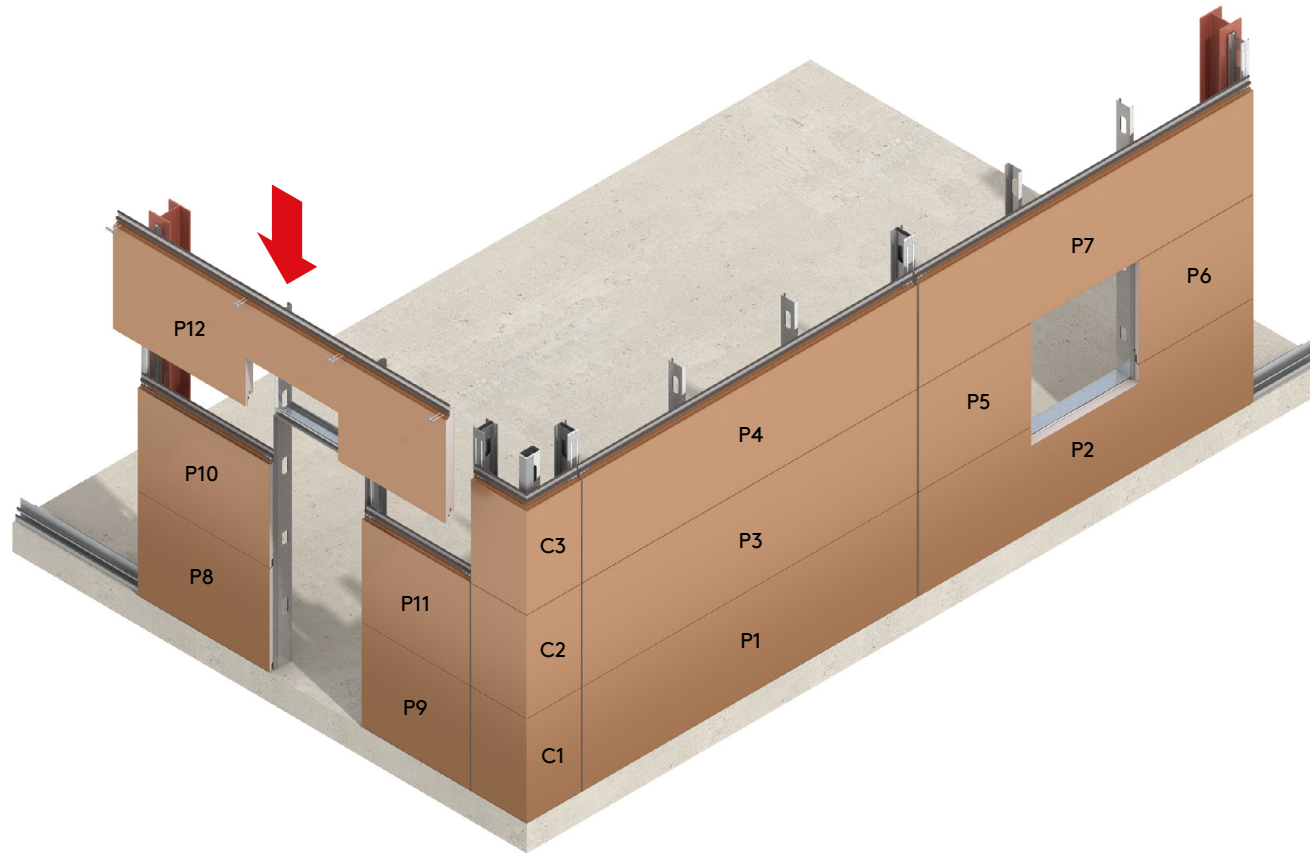


NOTE

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 "sawtoothing".

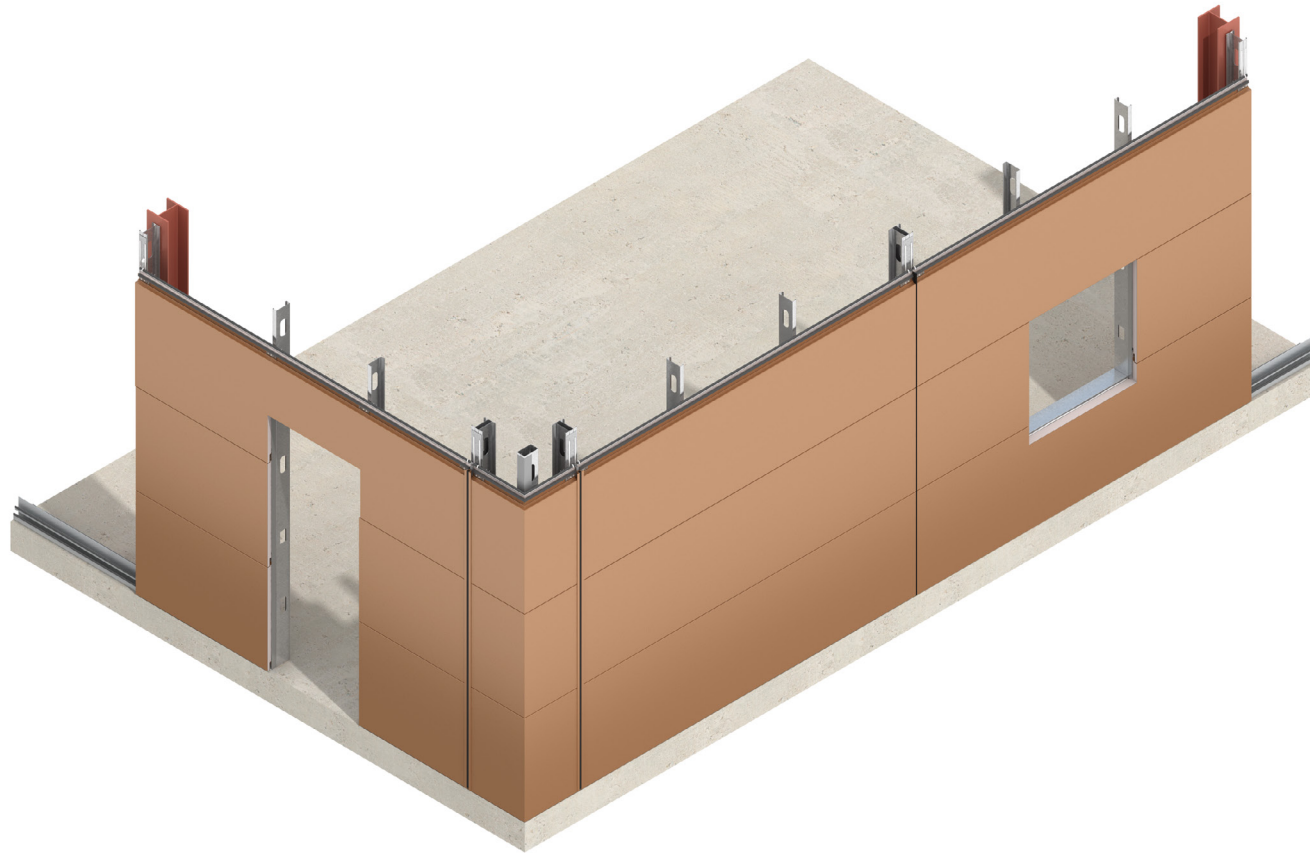
16 | Horizontal Panel | Installation

Panel Installation Sequence



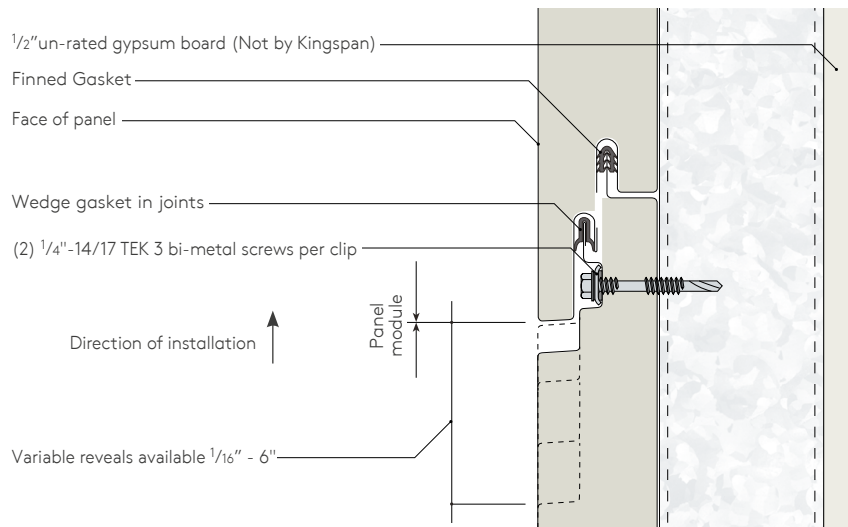
16 | Horizontal Panel | Installation

Framed Opening Trim/Extrusion Installation

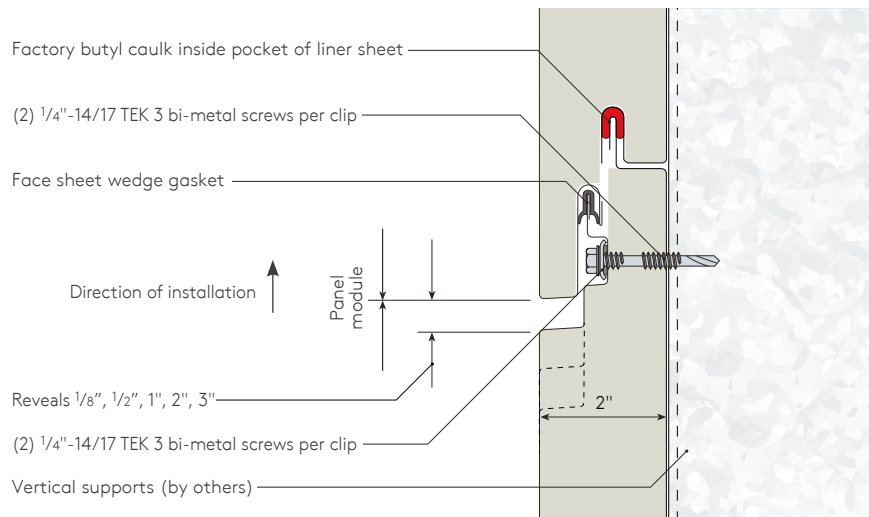


16 | Horizontal Panel | Installation

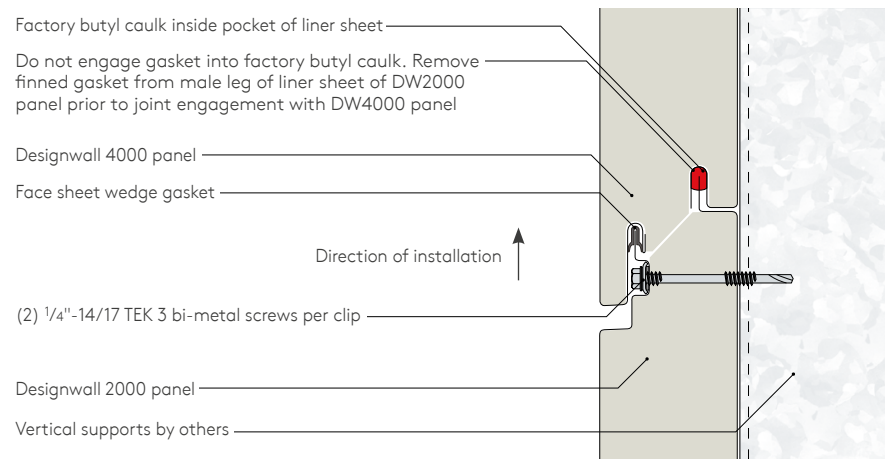
DW2000 to DW2000



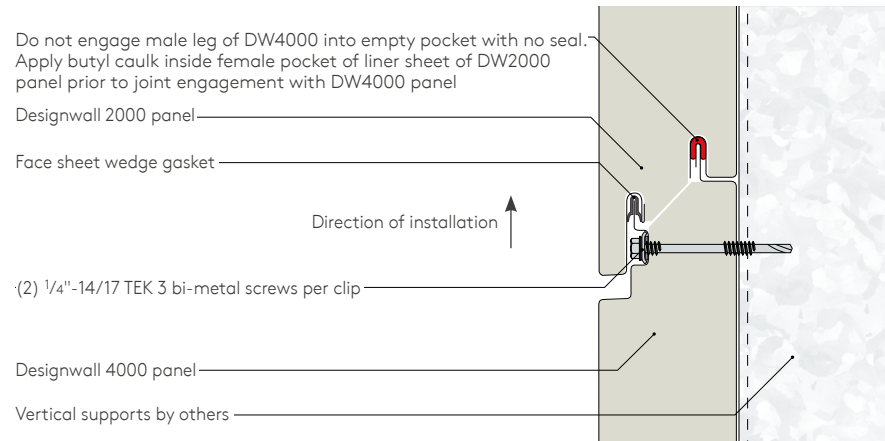
DW4000 to DW4000



DW2000 to DW4000



DW4000 to DW2000



NOTE

Transition details shown here are also applicable when transitioning DW2000R panels to / from DW4000 panels.

16 | Horizontal Panel | Installation

DW4000 to DW2000

Do not engage male leg of DW4000 into empty pocket with no seal. Apply butyl caulk inside female pocket of liner sheet of DW2000 panel prior to joint engagement with DW4000 panel.

DW2000 to DW4000

Do not engage gasket into factory butyl caulk. Remove finned gasket from male leg of liner sheet of DW2000 panel prior to joint engagement with DW4000 panel.

Stainless Steel Fastening Clip with PVC Foam Tape Strip

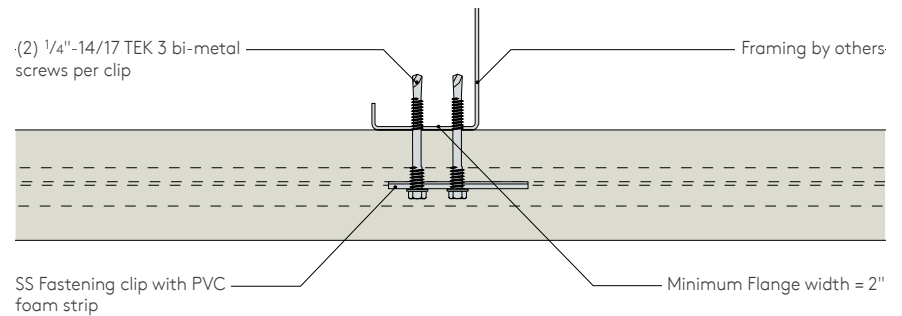
Contact Kingspan Technical Services for specific project fastening requirements.



NOTE

Visually inspect trailing edge of panel to ensure joinery is clear of all debris.

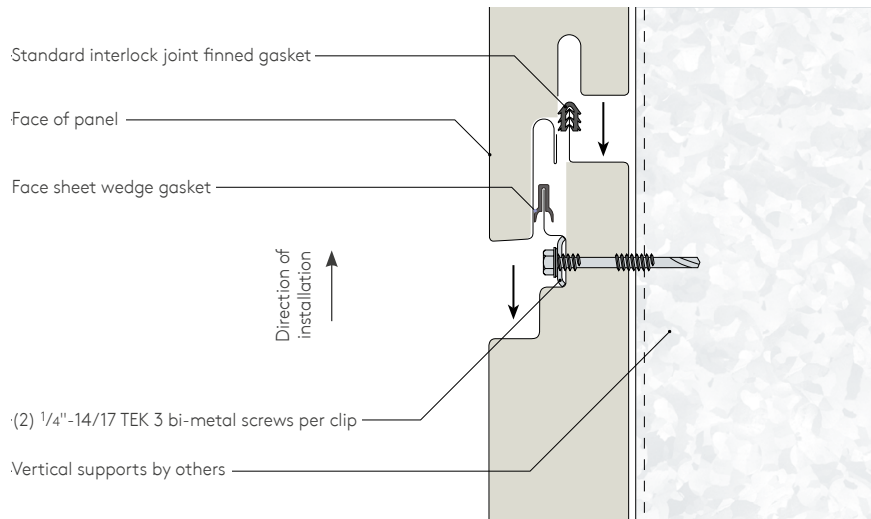
Intermediate Panel Fastener



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

16 | Horizontal Panel | Installation

Horizontal Expanded Panel Joint Section



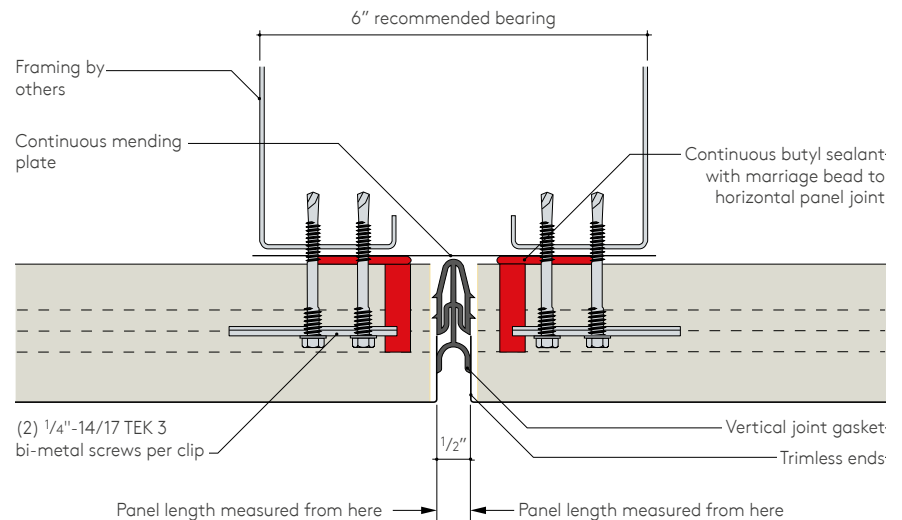
NOTE

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. Trimless ends not available on DW2000R panels.

NOTE

DW2000R panels require Rib Closure Caps at vertical joints which are factory stamped to match ribbed profile. Refer to DW2000R standard panel details.

Vertical Panel Joint



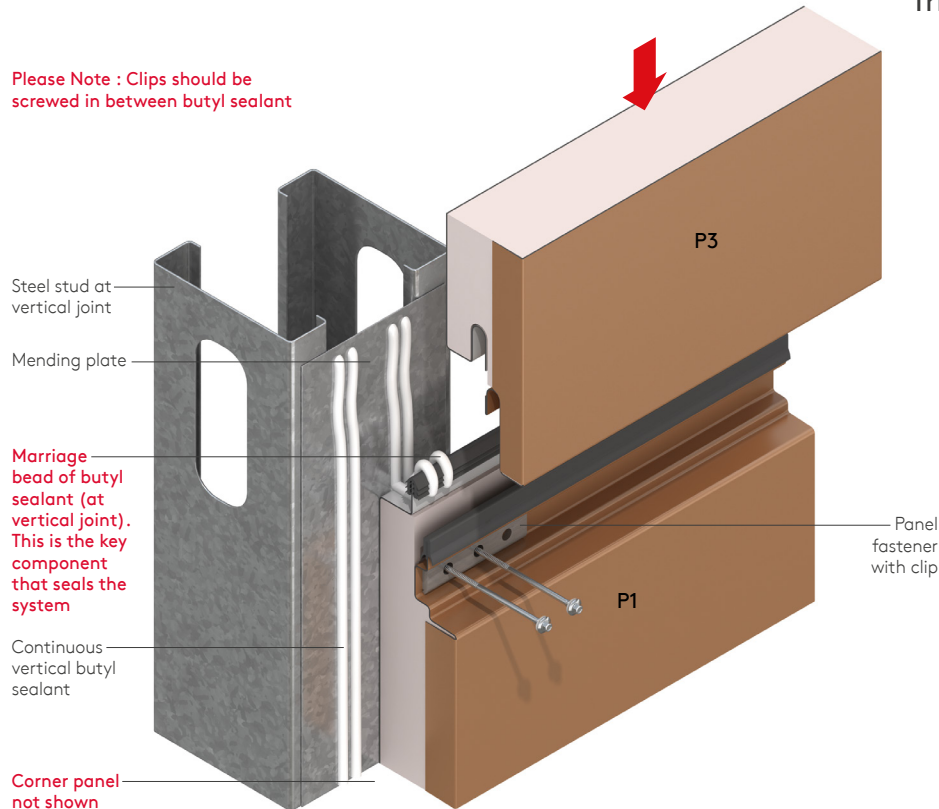
NOTE

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 "sawtoothing."

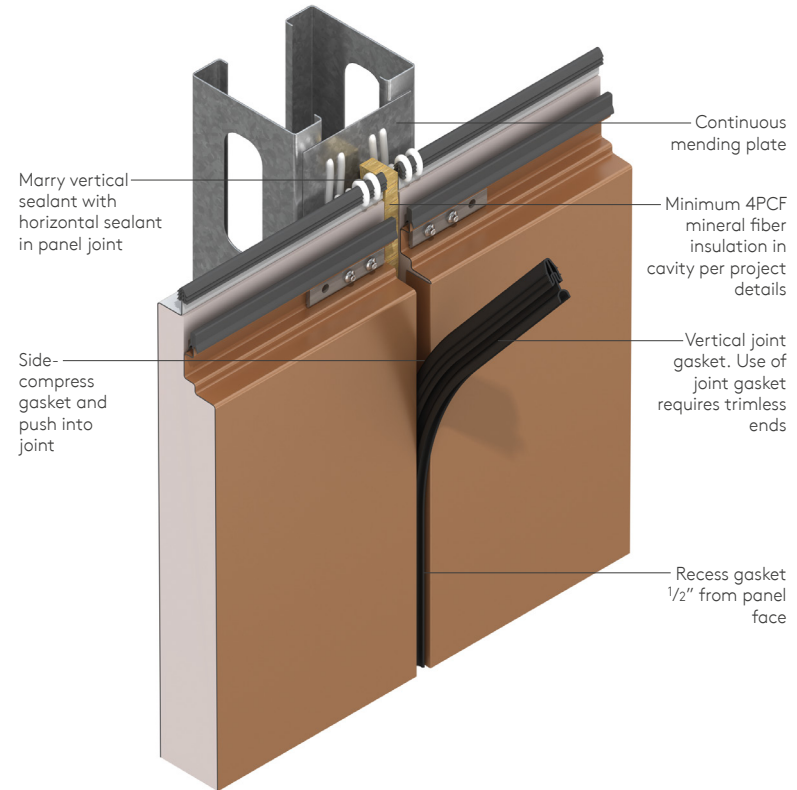
16 | Horizontal Panel | Installation

Vertica

Please Note : Clips should be screwed in between butyl sealant



Trimless End Joint with Gasket



NOTE

Please contact Kingspan BENCHMARK Technical Services for the following special installation conditions:

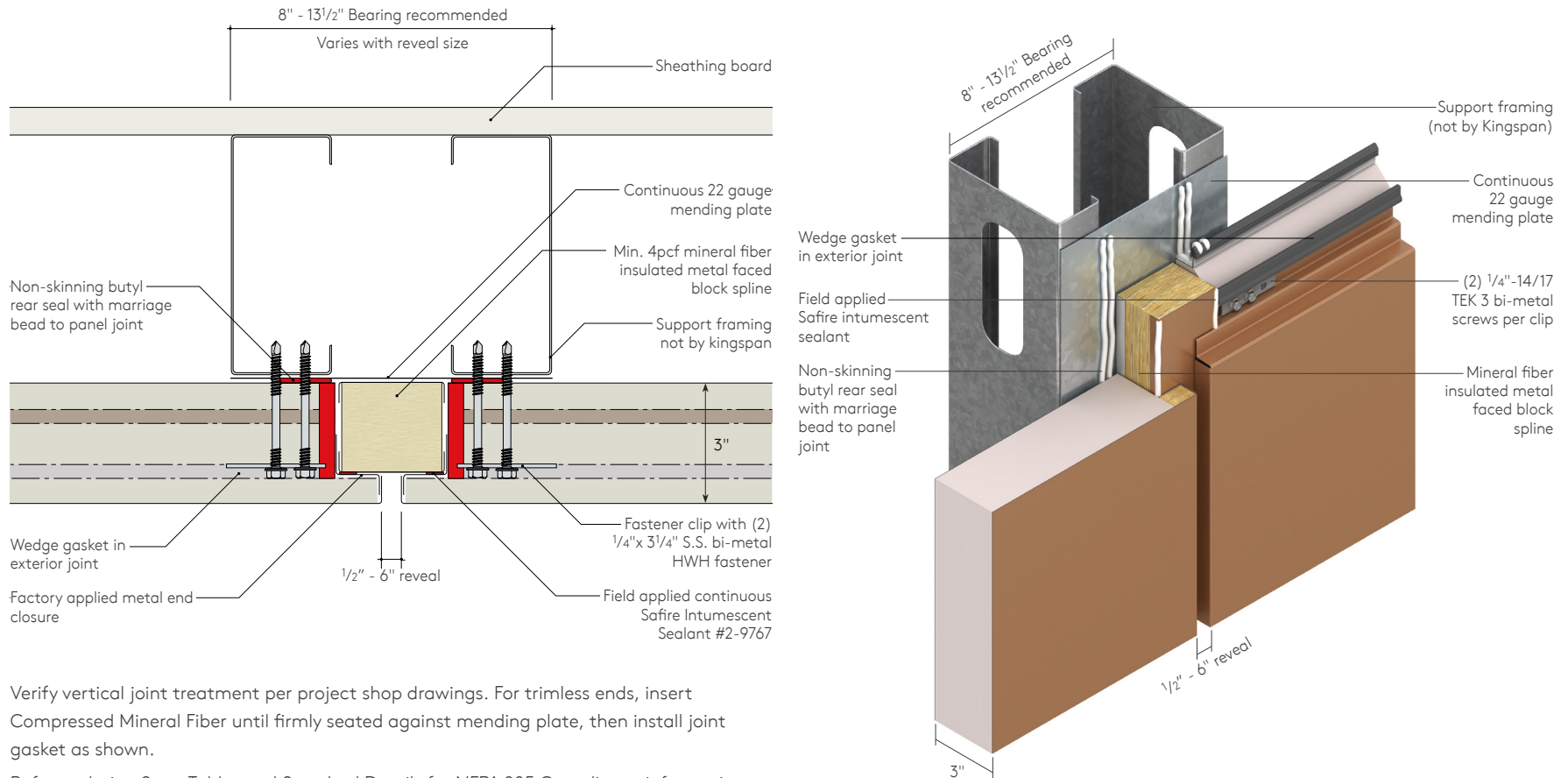
- Staggered Vertical Joints in Horizontal Applications
- Staggered Horizontal Joints in Vertical Applications

These conditions have special considerations that must be addressed to prevent leakage.

Installation@KingspanPanels.com / technical.na@kingspanpanels.com

16 | Horizontal Panel | Installation

Block Spline



Verify vertical joint treatment per project shop drawings. For trimless ends, insert Compressed Mineral Fiber until firmly seated against mending plate, then install joint gasket as shown.

Refer to design Span Tables and Standard Details for NFPA 285 Compliance information.

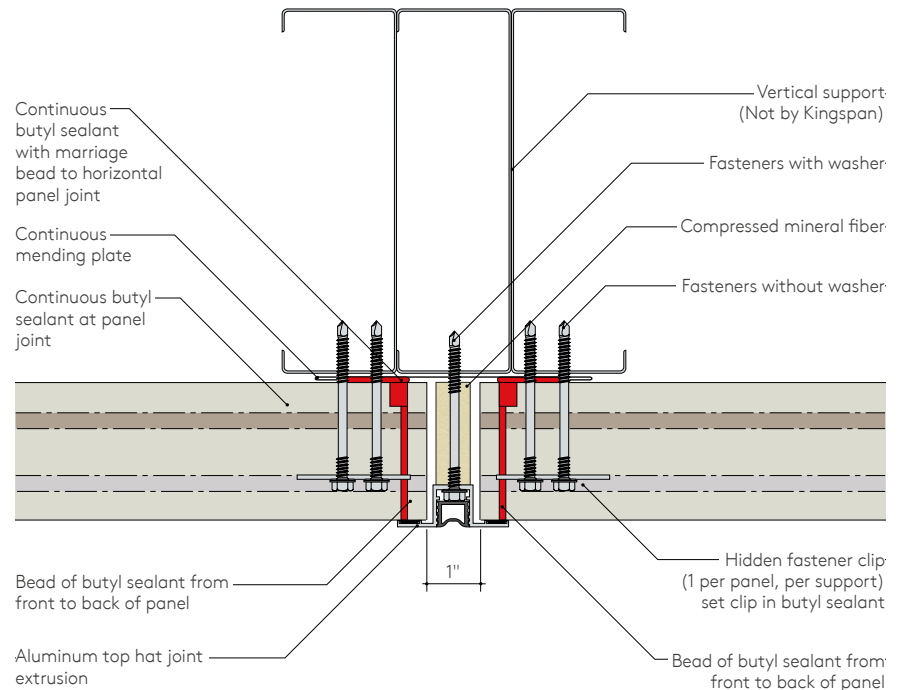
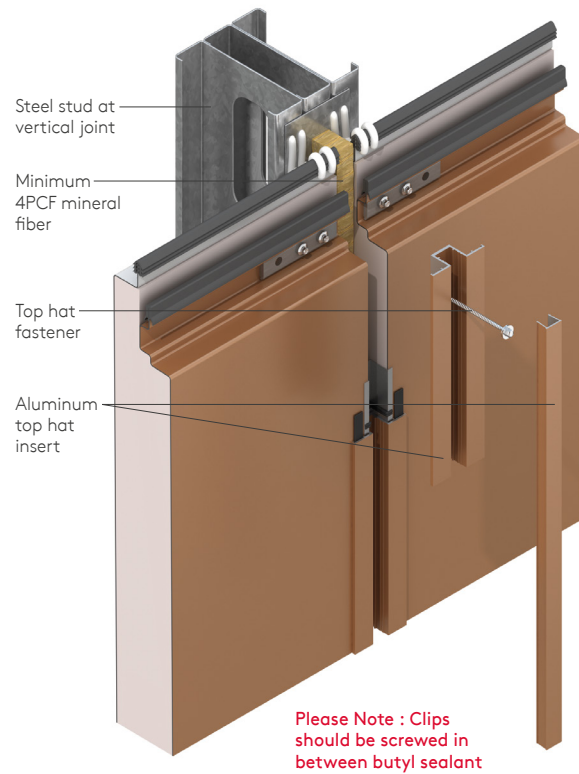
NOTE

DW2000R panels require Rib Closure Caps at vertical joints which are factory stamped to match ribbed profile. Refer to DW2000R standard panel details.

Disclaimer: Details shown within this guide are Kingspan BENCHMARK standard details and are not project specific. To ensure installation is compliant with all applicable standards, always refer to project details for proper panel and wall installation requirements. Requirements may vary based on the specific application and product being installed. Contact Technical Services if further information is needed.

16 | Horizontal Panel | Installation

Snap in Alum Cap Joint

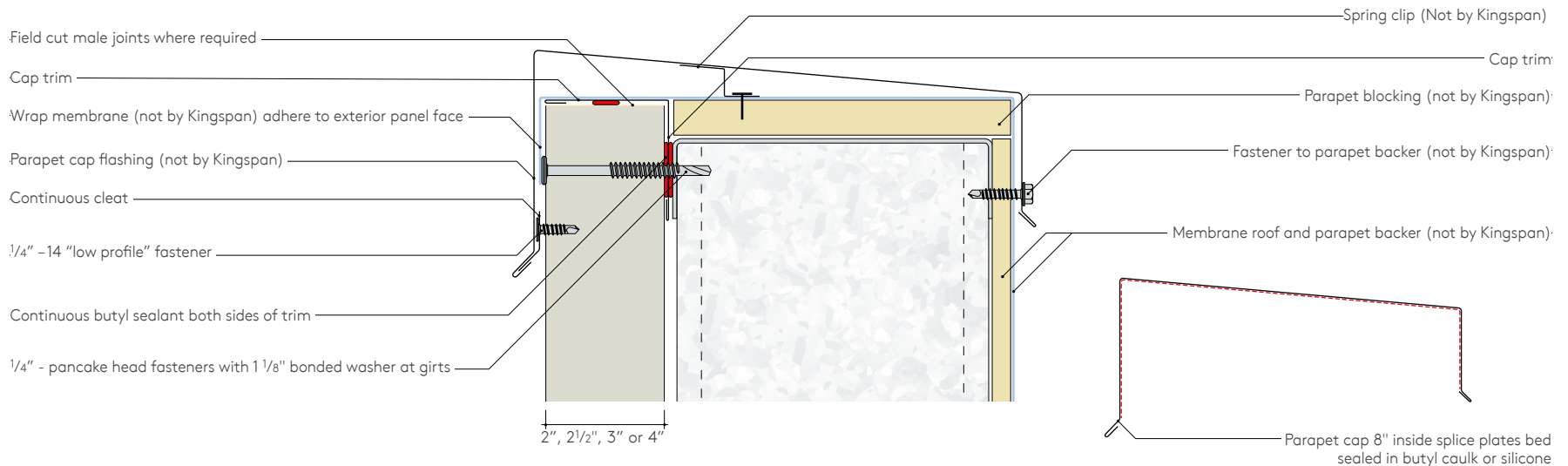


For aluminum extrusion assemblies, insert Compressed Mineral Fiber until firmly seated against mending plate, then install "Top-Hat" extrusion as shown. Use matching color lap strips at every extrusion butt joint.

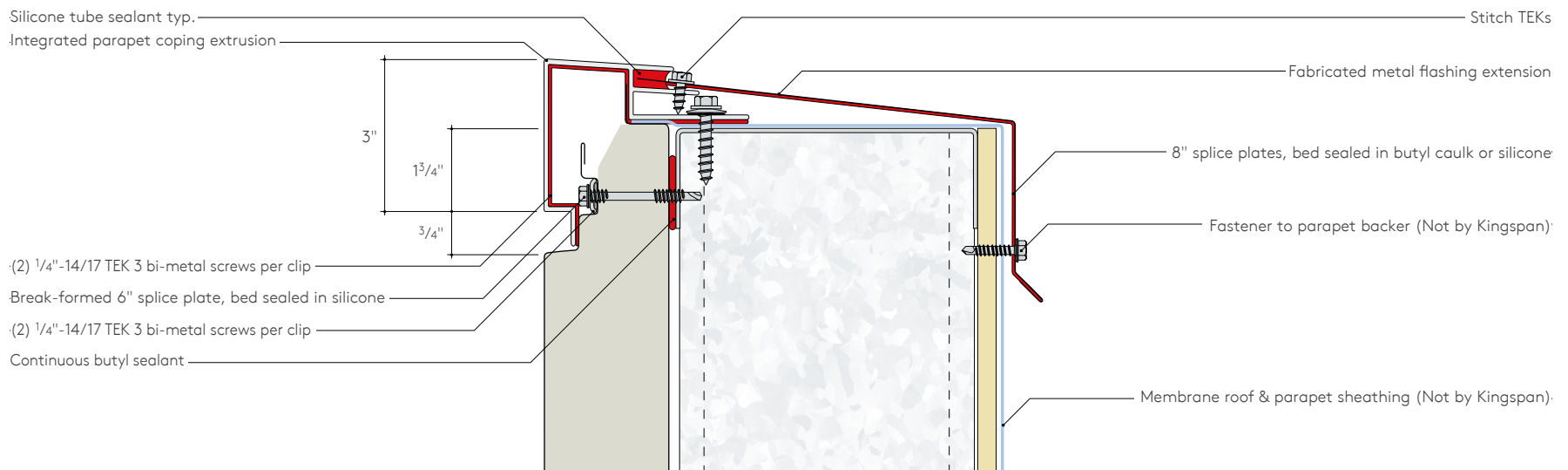
Refer to design Span Tables and Standard Details for NFPA 285 Compliance information.

16 | Horizontal Panel | Installation

Parapet with Flush Trim

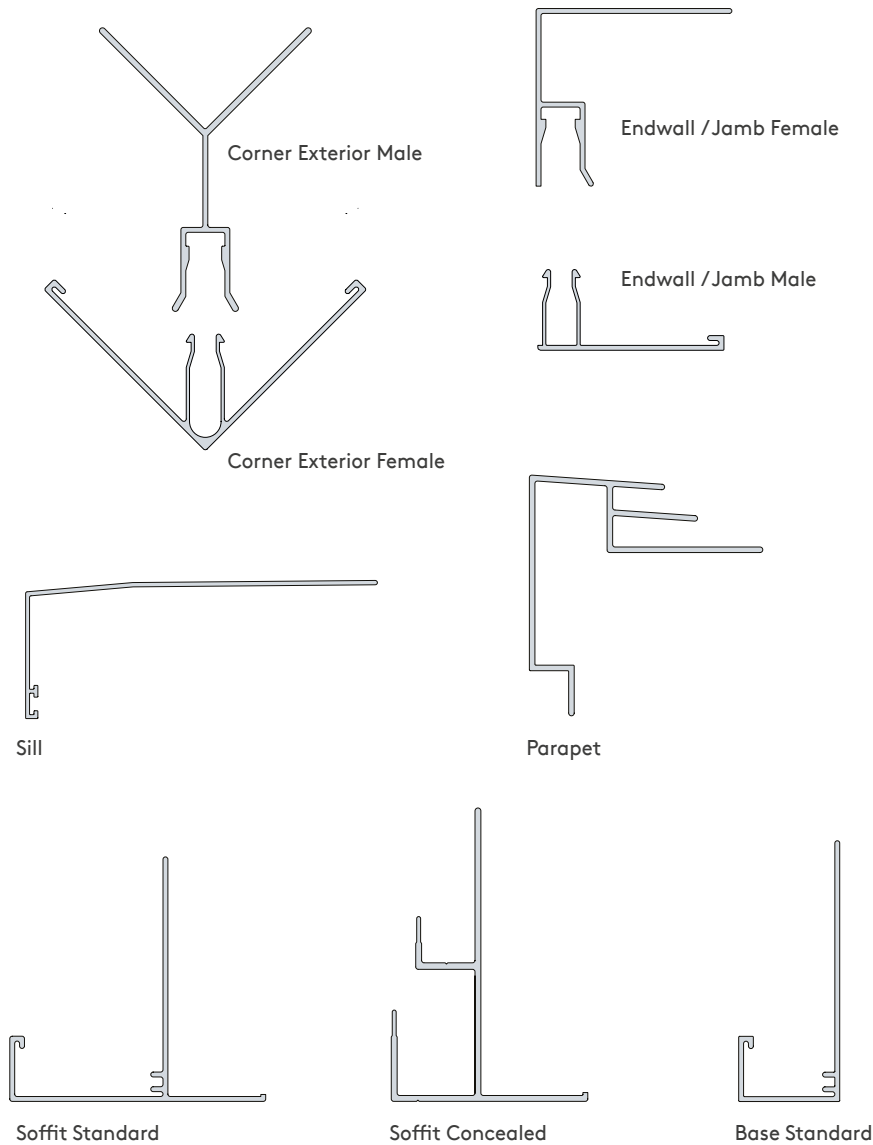


Parapet with profiled Extrusion



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17 | Extrusion Details



NOTE

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

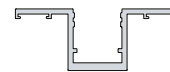
NOTE

See DW2000 Horizontal Standard details for additional extrusion options.

Top Hat Flush



Male

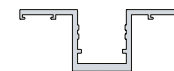


Female

Top Hat Recessed



Male



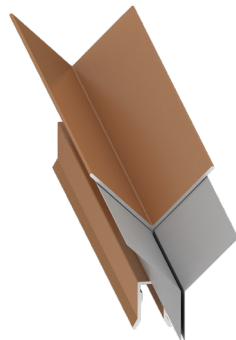
Female

17 | Extrusion Details

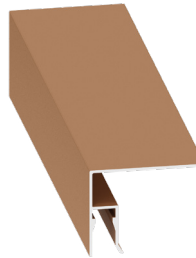
Corner Exterior Male



Corner Exterior Female



Endwall / Jamb Female



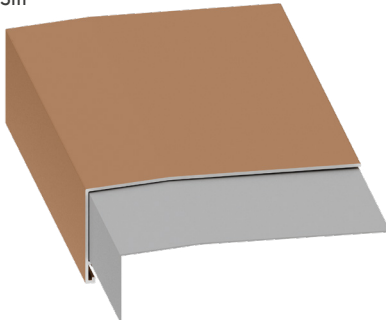
Endwall / Jamb Male



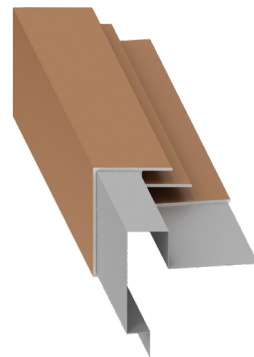
NOTE

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.

Sill



Parapet

Top Hat
Male & Female FlushTop Hat
Male & Female Recessed

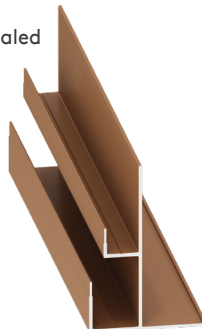
NOTE

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.

Soffit Standard



Soffit Concealed



Base Standard



Base Concealed



18 | Panel Touch-up Paint

18.1

The panel erector is to touch up all scratches, minor inclusions, and exposed fastener heads with touch up paint. Contact Kingspan BENCHMARK Customer Service for information on appropriate touch up paint.

Notes

Contact Details

USA

Columbus, OH: 888-332-5862

Modesto, CA: 800-377-5110

info.NA@kingspanpanels.com

www.kingspanpanels.us.

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