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

DESIGNWALL™ 2000/4000

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. Polyisocyanurate foam core retains original insulating value over time.
3. Unique side joint clip system eliminates the need for exposed fasteners.
4. Panels are lightweight, easy to install under most weather conditions.
5. Wide variety of profiles and textures provide architecturally appealing solutions.
6. Accessory items including metal flashings and aluminum extrusions are also available (contact Kingspan for more information).

1.2 INSULATION VALUES

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

• 2” panel thickness
• 2.5” panel thickness
• 3” panel thickness
• 4” panel thickness

Designwall™ 2000/4000 series panels offer the building designer R-values of approximately 7 per inch, 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.

For more product information, scan or click here to connect to our website.

Scan or click here to view our video library on KingspanTV.
VERTICAL PANELS

Designwall™ 2000V/4000V, 2"

- Standard interlock joint finned gasket
- Face sheet wedge gasket
- Face of panel

24", 30", 36" module standard

Designwall™ 2000V/4000V, 3"

- Standard interlock joint finned gasket
- Face sheet wedge gasket
- Face of panel

24", 30", 36" module standard

Designwall™ 2000S Shadowline, 2"

- Standard interlock joint finned gasket
- Face sheet wedge gasket
- Face of panel

1 1/4" striation pitch
24", 30", 36" module standard

Designwall™ 2000S Shadowline, 3"

- Standard interlock joint finned gasket
- Face sheet wedge gasket
- Face of panel

1 1/4" striation pitch
24", 30", 36" module standard
1. INTRODUCTION

DESIGNWALL™ 2000/4000

HORIZONTAL PANELS

Designwall™ 2"
- Standard interlock joint finned gasket
- Face sheet wedge gasket

Designwall™ 3"
- Standard interlock joint finned gasket
- Face sheet wedge gasket

Designwall™ 2000S Shadowline
- Standard interlock joint finned gasket
- Face sheet wedge gasket

Face of panel

24", 30", 36" module standard

2", 2 1/2", 3" or 4"
Designwall™ 2000R Ribbed

- 12", 16", 20", or 24" module standard
- 4" rib spacing
- 2.5" nom.
- Standard interlock joint finned gasket
- Face sheet wedge gasket

- 12", 16", 20", or 24" module standard
- 4" rib spacing
- 3" nom.
- Standard interlock joint finned gasket
- Face sheet wedge gasket

- 12", 16", 20", or 24" module standard
- 4" rib spacing
- 4" nom.
- Standard interlock joint finned gasket
- Face sheet wedge gasket
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 that all installers have taken and passed the Designwall 2000/4000 Certified Installer Training Course prior to the panel installation. 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 trade craftsman trained in the proper application of our products. Please contact Kingspan at 1-888-332-5862 for information regarding our Authorized Installer training programs.

1.5 DISCLAIMER
All details shown in this installation guide are the standard BENCHMARK By Kingspan details. For project specific details, please refer to your project contract documents.
2. TECHNICAL INFORMATION
DESIGNWALL™ 2000/4000

Kingspan Designwall™ 2000/4000 Series wall panels have been thoroughly evaluated and tested by independent third party laboratories (UL, ULC, FM Approvals 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.

2.2 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.

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 FM Approvals, UL and ULC 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
DESIGNWALL™ 2000/4000

3.1
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
DESIGNWALL™ 2000/4000

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. PANEL HANDLING

DESIGNWALL™ 2000/4000

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

Fig. 4.3
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.

4.3 HANDLING INDIVIDUAL PANELS

**CAUTION**

Workers must wear appropriate protective gear at all times when handling panels. Failure to do so may cause injury.
4. PANEL HANDLING
DESIGNWALL™ 2000/4000

CORRECT AND INCORRECT PANEL HANDLING

THERMAL BOWING

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.
4.4 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.

Fluted profiles may require specific vacuum heads.

**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.

**CAUTION!**

To prevent joint damage and possible delamination, never lift a panel from the top sheet only. Lift from underneath the entire panel.
5. PANEL STORAGE ON SITE

DESIGNWALL™ 2000/4000

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 or staining. Staining of any kind is not considered to be a cause for rejection.

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.
6. HANDLING AND STORAGE
AUXILIARY 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
DESIGNWALL™ 2000/4000

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
BENCHMARK By Kingspan 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.

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.
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 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.

d. Plumb or level within 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.
9. PANEL CUTTING PROCEDURES

DESIGNWALL™ 2000/4000

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. 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.

**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
DESIGNWALL™ 2000/4000

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

- Do not use an impact force, such as hammer blows.
- 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.

11. PANEL SEALANT PLACEMENT
DESIGNWALL™ 2000/4000

11.1
Standard Designwall™ 2000/4000 panels are supplied with a unique integrated rubber gasket face and liner sheet.

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

Butyl sealant is still required at other areas of the wall assembly (see further instructions in Section 12 and 15).
12. VERTICAL PANEL INSTALLATION

PRE-INSTALLATION CHECKLIST

1. All walls meet contract documents, plumb and square (refer back to page 19).
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. BENCHMARK By Kingspan recommends the use of lasers to verify the horizontal and vertical panel lines.
7. BENCHMARK By Kingspan 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).
8. BENCHMARK By Kingspan 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, BENCHMARK By Kingspan recommends that installation of panels not begin until the issue is rectified.
12. VERTICAL PANEL
INSTALLATION

NOTE
When installing BENCHMARK By Kingspan vertical panels they must be installed from left to right in sequence. Please take this into account when laying out the structure.

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.

Flush Base

Continuous butyl sealant
Steel framing by others
Aluminum base extrusion
1/4" dia. weep hole 24" O.C. field drilled
Field cut 6" splice plate
Sealant

Base Overhang

Steel framing by others
Continuous butyl sealant
Aluminum base extrusion
1/4" dia. weep hole 24" O.C. field drilled
Field cut 6" splice plate

Flush Base with Trim

Base angle with min. 3" vertical leg for panel attachment (not by Kingspan)
Base flashing
Continuous butyl sealant below base flashing
Fastener to concrete (not by Kingspan)

Overhang with Base Angle

Base angle with min. 3" vertical leg for panel attachment (not by Kingspan)
Butyl sealant
Fastener to concrete (not by Kingspan)

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 duckbills or tack in place as necessary.

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.

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
Install butyl sealant on mending plates/flashings as panels are being installed, as per shop drawings.

Flashing Option – Sealant Placement

Continuous butyl sealant

Base angle with min. 3” vertical leg for panel attachment (not by Kingspan)

Inside corner trim

Continuous butyl sealant

Base angle with min. 3” vertical leg for panel attachment (not by Kingspan)

(Bypass base condition shown)
12. VERTICAL PANEL
INSTALLATION

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 25.

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

Longitudinal Bent Corner

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
NOTE
Marriage beads are critical to ensure proper vapor barriers and are required at all panel terminations.

Eave Condition
- Eave strut (not by Kingspan)
- Marriage bead
- See inset detail

Base Condition
- See inset detail
- Continuous butyl sealant

Framed Opening Condition
- Framed Opening Head with Drip Edge
- Header with Extrusion

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

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
12. 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.

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.

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
Outside Corner Miter Cut

- F.I.P. Insulation as required (by others)
- Continuous butyl sealant
- Outside corner trim
- Horizontal support
- Mending plate
- Continuous butyl sealant
- 3/4” Phil. pan head
- Pop rivets

Corner Extrusion Option

- 1/4” – 14 “low profile” through fastener (as required for wind load)
- F.I.P. Insulation as required (by others)
- Corner extrusion cap
- Field cut panel to suit
- Continuous butyl sealant
- Horizontal support girt

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
13. VERTICAL PANEL

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

<table>
<thead>
<tr>
<th>Material</th>
<th>RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon and 410 stainless</td>
<td>1,800</td>
</tr>
<tr>
<td>304 Stainless</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.

**Wind Loads:**

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

**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. (.060)</td>
<td>#3</td>
<td>14</td>
</tr>
<tr>
<td>14 Ga. (.075)</td>
<td>#3</td>
<td>14</td>
</tr>
<tr>
<td>12 Ga. (.105)</td>
<td>#3</td>
<td>14</td>
</tr>
<tr>
<td>1/8&quot; (.125)</td>
<td>#3</td>
<td>14</td>
</tr>
<tr>
<td>10 Ga. (.134)</td>
<td>#3</td>
<td>14</td>
</tr>
<tr>
<td>3/16&quot; (.187)</td>
<td>#3</td>
<td>14</td>
</tr>
<tr>
<td>1/4&quot; (.250)</td>
<td>#3</td>
<td>14</td>
</tr>
<tr>
<td>3/8&quot; (.375)</td>
<td>#5</td>
<td>20</td>
</tr>
<tr>
<td>1/2&quot; (.500)</td>
<td>#5</td>
<td>20</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>14 Ga. (.075)</td>
<td>#7 (.201)</td>
</tr>
<tr>
<td>12 Ga. (.105)</td>
<td>#7 (.201)</td>
</tr>
<tr>
<td>1/8&quot; (.125)</td>
<td>#2 (.221)</td>
</tr>
<tr>
<td>10 Ga. (.134)</td>
<td>#2 (.221)</td>
</tr>
<tr>
<td>3/16&quot; (.187)</td>
<td>#2 (.221)</td>
</tr>
<tr>
<td>1/4&quot; (.250)</td>
<td>#2 (.221)</td>
</tr>
<tr>
<td>3/8&quot; (.375)</td>
<td>#2 (.221)</td>
</tr>
<tr>
<td>1/2&quot; (.500)</td>
<td>#1 (.228)</td>
</tr>
</tbody>
</table>

"**NOTE**

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

**Disclaimer:** Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
14. VERTICAL PANEL
CONSTRUCTION DETAILS

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project's shop drawings for project specific information.
Outside Corner with Flat Trim

- Continuous butyl sealant
- Outside corner trim
- Attached clip (by others)
- F.I.P. Insulation as required (by others)
- 1/4” – 1 1/4” “low profile” through fastener (as required for wind load)
- Pop rivets
- Inside corner trim
- Continuous butyl sealant
- Horizontal support

Longitudinal Bent Corner Detail

- Factory longitudinal bend
- Fablok fastener or TEK screw at girts
- Girt line
- Stainless steel bi-metal TEK 3 screw
- Sum of both legs not to exceed base panel width

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
Outside Corner Miter Cut

- Continuous butyl sealant
- Outside corner trim
- Vertical support
- Horizontal support
- Mending plate
- Continuous butyl sealant
- 3/4" Phil pan head
- Pop rivets
- F.I.P. Insulation as required (by others)
- Corner extrusion base
- Vertical support
- Optional wiper gasket (field installed)

Outside Corner with Extrusion

- Continuous butyl sealant
- Corner extrusion cap
- Continuous butyl sealant
- Corner extrusion base
- Vertical support
- F.I.P. Insulation as required (by others)
- 1/4" – 1/4” “low profile” through fastener (as required for wind load)

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
Inside Corner with Flat Trim

- Mending plate
- F.I.P. Insulation as required (by others)
- Continuous butyl sealant
- Horizontal support
- Inside corner trim
- 1/4” – 1/4” “low profile” through fastener (as required for wind load)
- Pop rivets
- Butyl sealant applied at fastener locations
- 3/4” Phil pan head

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.

Inside Corner with Two Piece Extrusion

- Sealant
- 1/4” – 1/4” “low profile” through fastener at girts
- Girt line
- 1/4” – 1/4” “low profile” through fastener with washer at girts
- Two piece inside corner extrusion
- Field cut panels to suit

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
Framed Opening One Piece Sill

- Exposed sealant (not by Kingspan)
- Continuous butyl sealant
- Continuous butyl sealant with marriage bead to vertical panel joint
- Exterior cap trim
- Fastening clip with S.S. Bi-metal Tek 3 screw
- Pop rivets
- 1/4” – 1/4” “low profile” fastener (as required)

Framed Opening Sill with Extrusion

- Window system by others
- Window sill extrusion
- Installer to plug tops of vertical joints with sealant
- Installer to plug tops of vertical joints with sealant
- Fastening clip with stainless steel bi-metal TEK 3 screw
- Continuous butyl sealant with marriage bead to vertical panel joint
- Steel framing by others

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
14. VERTICAL PANEL
CONSTRUCTION DETAILS

Overhead Door Two Piece Jamb

Framed opening (not by Kingspan)

Jamb trim (optional)

Door/window frame (not by Kingspan)

Exposed sealant (not by Kingspan)

Pop rivets

Exterior cap trim

Trim installation sequence:
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

Framed opening (not by Kingspan)

Jamb trim (optional)

Door/window frame (not by Kingspan)

Exposed sealant (not by Kingspan)

Two piece extrusion cap

Optional wiper gasket (field installed)

Trim installation sequence:
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 are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
Endwall with Two Piece Extrusion

Endwall extrusion

1/4” – 14 “low profile” through fastener with washer at girts

Girt line

2”, 21/2”, 3”, 4”

Sealant

Endwall extrusion

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.

Stack Joint

Fastening clip with stainless steel bi-metal TEK 3 screw

Do not caulk here allow to drain

Silicone sealant and backer rod

Installer to plug tops of vertical joints with sealant

2”, 21/2”, 3” or 4”

Zero profile horizontal joint flashing for drainage

Steel framing by others

5/8”

5” min. bearing

Continuous butyl tube sealant married to side joint gasket

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
15. HORIZONTAL PANEL
INSTALLATION

PRE-INSTALLATION CHECKLIST

1. All walls meet contract documents, plumb and square (refer back to page 19).
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. BENCHMARK By Kingspan recommends the use of lasers to verify the horizontal and vertical panel lines.
7. BENCHMARK By Kingspan 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 dishsoap).
8. BENCHMARK By Kingspan 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, BENCHMARK By Kingspan recommends that installation of panels not begin until the issue is rectified.
Verify that all structural supports are properly aligned before installing panels (refer to Section 8 Structural Alignment).

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.

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.

IMPORTANT INSTALLATION NOTES!

- 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 studs spaced apart, 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).
- 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.

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.
15. HORIZONTAL PANEL
INSTALLATION

Parapet with Flush Trim

- Continuous butyl sealant
- Parapet blocking (not by Kingspan)
- Fastener to parapet backer (not by Kingspan)
- Membrane roof and parapet backer (not by Kingspan)

Field cut male joints where required
Wrap membrane (not by Kingspan) adhere to exterior panel face
Parapet cap flashing
Continuous cleat
1/8” – 1/4” “low profile” fastener
1/8” – 1/4” “low profile” through fastener

Integrated Parapet Coping

- Stitch TEKs to the flashing in place
- Fabricated metal flashing extension
- Stainless steel screw painted to match panel 12” O.C.

Silicone tube sealant
Integrated parapet coping extrusion
Pop rivet
Silicone sealant
Fastening clip with wood screw

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
**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.

**Field Cut Base detail with Standard J-Extrusion**

- 2", 2.5", 3" or 4"
- Conical base extrusion
- Bed seal to concrete
- Fabricated base trim
- Continuous butyl sealant
- Field drill 3/8" Ø weep holes (not by Kingspan)
- Field drill 1/4" Ø weep holes 24" O.C.
- Field drill 6" splice plate from stock length splice extrusion

**Base Overhang**

- 2", 2.5", 3" or 4"
- Concealed base extrusion
- Continuous butyl sealant
- 1/4" – 14 “low profile” fastener
- Field drill 1/4" Ø weep holes (not by Kingspan)

**Flush Base**

- 2", 2.5", 3" or 4"
- Concealed base extrusion
- Continuous butyl sealant
- 1/4" – 14 fastener
- Field drill 1/4" Ø weep holes (not by Kingspan)
- Bed seal to concrete
- Fabricated base trim

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**Disclaimer:** Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project's shop drawings for project specific information.
Mending Plate “Shingle” Lap

(2) beads of butyl sealant

Min. 3” trim lap

(2) beads of butyl sealant
Flush Base – Isometric

- Continuous mending plate
- Butyl sealant continuous beads
- "Shingle" lap mending plate over flashing
- Flashing behind and under base extrusion
- Sealant (not by Kingspan)

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.

Overhang Base – Isometric

- Continuous mending plate
- Butyl sealant continuous beads

Please Note: Clips should be screwed in between butyl sealant

Concealed base extrusion

Cut back leg and hook of extrusion short of vertical joint

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
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 the centerline).

I We recommend installers begin with corner panels so the field can be properly laid out.

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

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
Panel Installation – Bottom Row

Panel fastener with clip
Marriage bead of butyl sealant (at vertical joint). This is the key component that seals the system.

Vertical Joint Assembly at Corner – Panel P1

Steel stud at vertical joint
Mending plate
Marriage bead of butyl sealant (at vertical joint). This is the key component that seals the system.
Continuous vertical butyl sealant
Panel fastener with clip

Please Note: Clips should be screwed in between butyl sealant

Vertical Joint Assembly

Steel stud at vertical joint
Mending plate
Marriage bead of butyl sealant (at vertical joint). This is the key component that seals the system.
Panel clip and fastener as required

Please Note: Clips should be screwed in between butyl sealant
15. HORIZONTAL PANEL
INSTALLATION

Intermediate Fastener Position

Steel stud framing

Panel clip and fastener as required

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

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

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
Panel Installation Sequence

Scan here to view videos on KingspanTV.

kingspantv.com
15. HORIZONTAL PANEL
INSTALLATION

Intermediate Panel Fastener

Horizontal Expanded Panel Joint Section

N Complete installation of base course of panels.
O 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 “sawtooothing”.

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
Vertical Joint Assembly at Corner (P1, P3)

Panel fastener with clip

Marriage bead of butyl sealant (at vertical joint). This is the key component that seals the system.

Mending plate

Steel stud at vertical joint

Continuous vertical butyl sealant

Panel fastener with clip

NOTE

Please contact BENCHMARK By Kingspan 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
technicalservice@KingspanPanels.com

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
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15. HORIZONTAL PANEL
INSTALLATION

Vertical Joint Options
Trimless End Joint with Gasket Assembly

Continuous mending plate
Compressible foam closure
Joint gasket (Santoprene)
Recess gasket 1/2" from panel face

Please Note: Clips should be screwed in between butyl sealant

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific information.
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.

Disclaimer: Details shown are the BENCHMARK By Kingspan standard details and are not project specific. Please refer to your project’s shop drawings for project specific 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

<table>
<thead>
<tr>
<th>Material</th>
<th>Drill Size</th>
<th>RPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon and 410 stainless</td>
<td>#7 (.201)</td>
<td>1,800</td>
</tr>
<tr>
<td>304 Stainless</td>
<td>#7 (.201)</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.

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

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. (.060)</td>
<td>#3</td>
<td>14</td>
</tr>
<tr>
<td>14 Ga. (.075)</td>
<td>#3</td>
<td>14</td>
</tr>
<tr>
<td>12 Ga. (.105)</td>
<td>#3</td>
<td>14</td>
</tr>
<tr>
<td>1/8” (.125)</td>
<td>#3</td>
<td>14</td>
</tr>
<tr>
<td>10 Ga. (.134)</td>
<td>#3</td>
<td>14</td>
</tr>
<tr>
<td>3/16” (.187)</td>
<td>#3</td>
<td>14</td>
</tr>
<tr>
<td>1/4” (.250)</td>
<td>#3</td>
<td>14</td>
</tr>
<tr>
<td>3/8” (.375)</td>
<td>#5</td>
<td>20</td>
</tr>
<tr>
<td>1/2” (.500)</td>
<td>#5</td>
<td>20</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>14 Ga. (.075)</td>
<td>#7 (.201)</td>
</tr>
<tr>
<td>12 Ga. (.105)</td>
<td>#7 (.201)</td>
</tr>
<tr>
<td>1/8” (.125)</td>
<td>#2 (.221)</td>
</tr>
<tr>
<td>10 Ga. (.134)</td>
<td>#2 (.221)</td>
</tr>
<tr>
<td>3/16” (.187)</td>
<td>#2 (.221)</td>
</tr>
<tr>
<td>1/4” (.250)</td>
<td>#2 (.221)</td>
</tr>
<tr>
<td>3/8” (.375)</td>
<td>#2 (.221)</td>
</tr>
<tr>
<td>1/2” (.500)</td>
<td>#1 (.228)</td>
</tr>
</tbody>
</table>

“NOTE
Contact BENCHMARK By Kingspan’s Technical Services Department for specific project fastening due to wind load recommendations based on geographic region.”
17. PANEL TOUCH-UP PAINT

DESIGNWALL™ 2000/4000

14.1
The panel erector is to touch up all scratches, minor inclusions, and exposed fastener heads with touch up paint. Contact BENCHMARK By Kingspan Customer Service for information on appropriate touch up paint.

18. PANEL CLEANING & MAINTENANCE

DESIGNWALL™ 2000/4000

15.1
Proper installation and maintenance are extremely important in obtaining the very best service and appearance from pre-painted metal insulated panels.

15.2
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.

15.3
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.

15.4
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.

15.5
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.

15.6
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.

15.7
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.

15.8
Contact BENCHMARK By Kingspan Customer Service to receive a copy of the complete Kingspan Panel Maintenance Manual.
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