# ENVELOPE 2000®

## RAINSCREEN (RS) SYSTEM

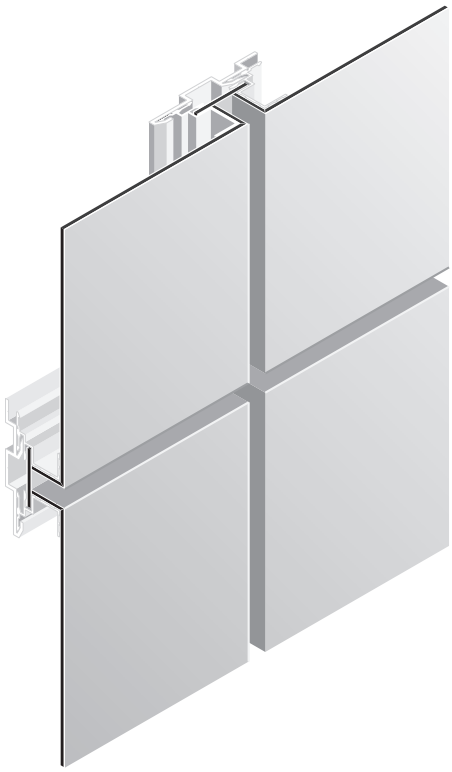
### The Ultimate in Performance in a Dry-Joint System

### TECHNICAL MANUAL

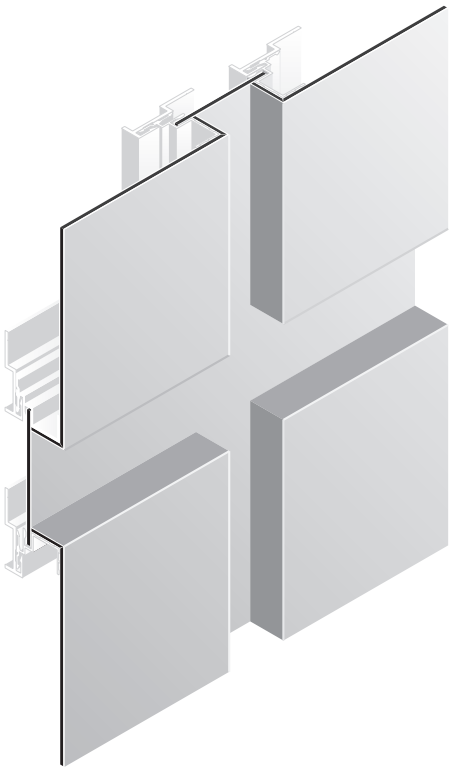
- System Assembly
- Substrate Layouts
- CAD Sections/Details
- Physical Properties
- Performance Properties

CITADEL

# SYSTEM ASSEMBLY

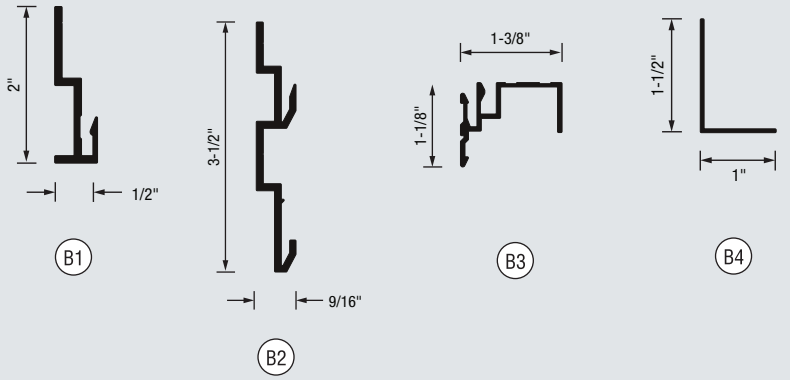


STANDARD JOINT



VARIABLE JOINT

## MOLDINGS / EXTRUSIONS




## PROPERTIES

**B1** 8212 Starter
*12'-6", 4.45 lbs*

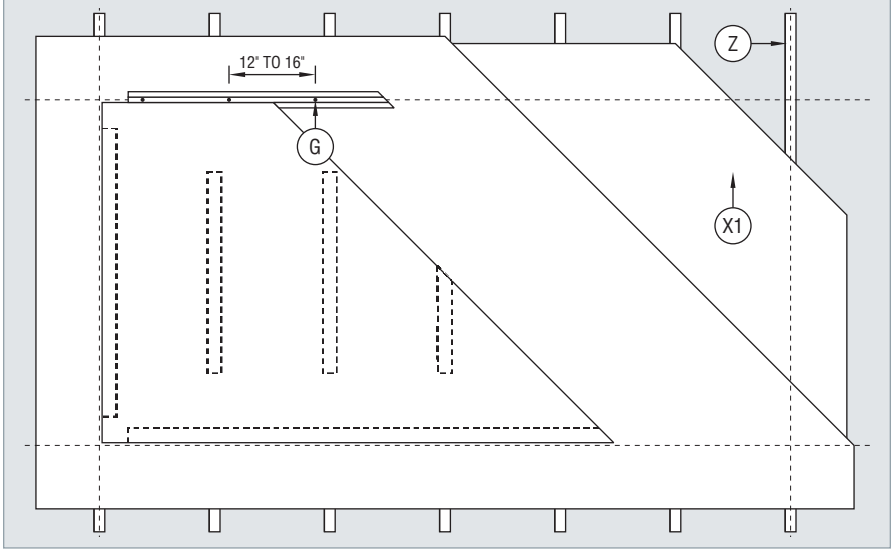
**B2** 8214 Hanger
*12'-6", 7.50 lbs*

**B3** 8216 Panel
*12'-6", 3.56 lbs*

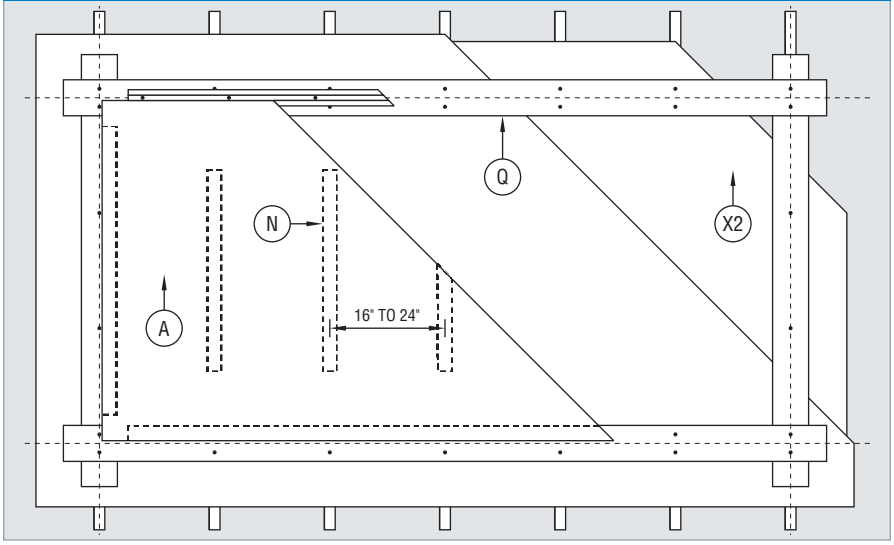
**B4** RR-103 Panel Clip (not shown)
*12'-6", 2.11 lbs*

# SUBSTRATE LAYOUT

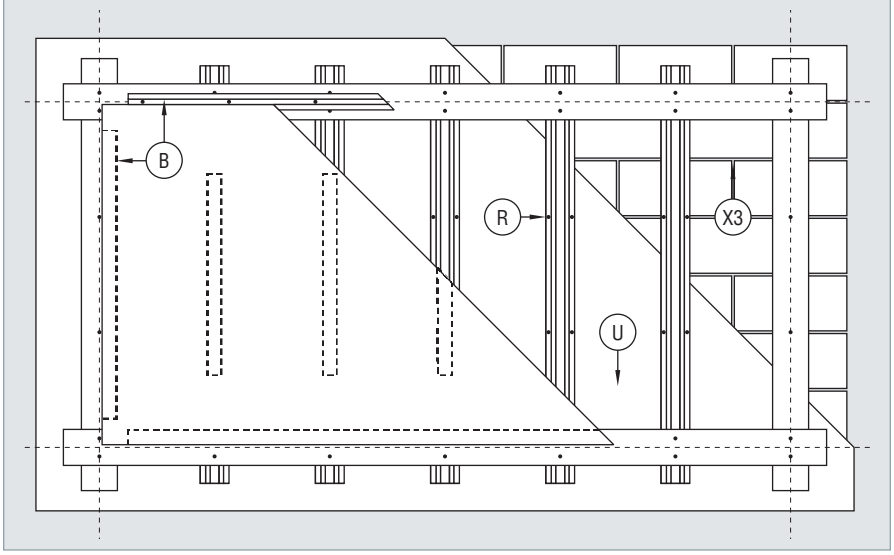
## NAILABLE SUBSTRATE




## NON-NAILABLE SUBSTRATE




## MASONRY SUBSTRATE




## COMPONENTS

**A** Envelope 2000

**B** Extrusion

**G** Fastener
As selected by contractor to suit project requirements.
- Panel - 12" to 16" around perimeter
- Molding - 12" to 16" along length

**N** Stiffener
- Located 16" to 24" o.c.
- For panels 36" x 36" or larger
- Length to be 2/3 panel height

**Q** Grid Strapping
- 16ga (min) recommended
- Fastened 12" to 16" along length

**R** Furring
- Metal (hat channels, z-girts) or wood
- Located 16" to 24" o.c.
- Fastened 12" to 16" along length

**S** Shim (not shown)
- Plastic shims recommended
- Flatness tolerance is 1/4" in 20'-0"

**U** Air/Moisture Barrier
Required for this system.

**X1** Nailable Substrate
- Plywood - 1/2" (min) recommended
- OSB - 1/2" (min) recommended

**X2** Non-Nailable Substrate
- Exterior gypsum board

**X3** Masonry Substrate
- CMU (block)
- Pre-formed concrete

**Z** Stud Framework
- Metal or wood
- Located 16" to 24" o.c.

NOTE: Combine both SECTION and SUBSTRATE drawings for a complete listing of components.

## DESCRIPTION

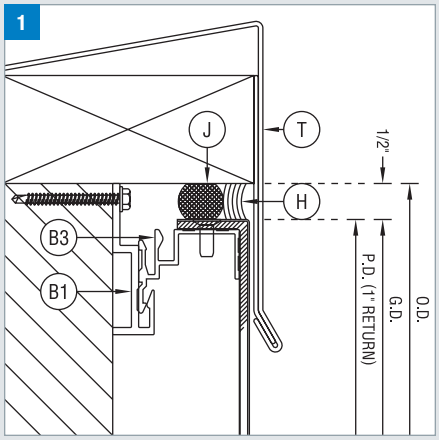
- **Shop Fabricated** - preliminary steps (shop drawings, field measurements) are performed and then the panels are fabricated prior to arriving at the job site.
- **Cavity Wall (aka rainscreen)** - incidental moisture is allowed to enter the system but then is channeled out through weep holes.
- **Progressive** - each step of the installation process builds off the previous step in a sequential manner, moving up and across the elevation.
- **Joints** - in between fabricated 'pans', a small accent strip (panel) floats in place and completes the appearance of the joint.

**Comparative Installed Cost**

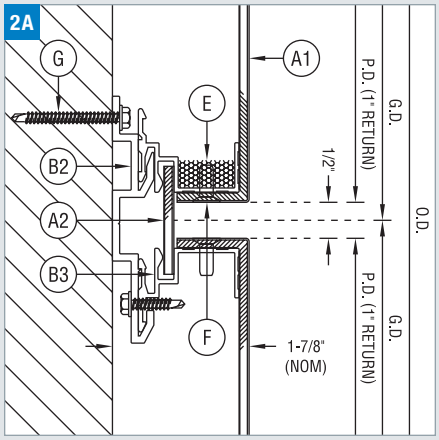
$ (compared to other Citadel systems) $$

| | |
|---|---|
| **Lead Time:** | 6-8 weeks |
| **Minimum Qty:** | none |
| **System Depth:** | 1-7/8" from the face of the substrate to the face of the panel |

1




2A

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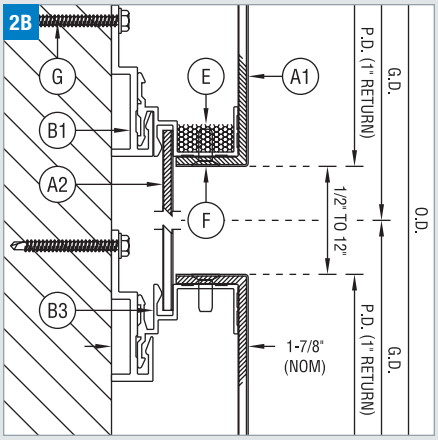


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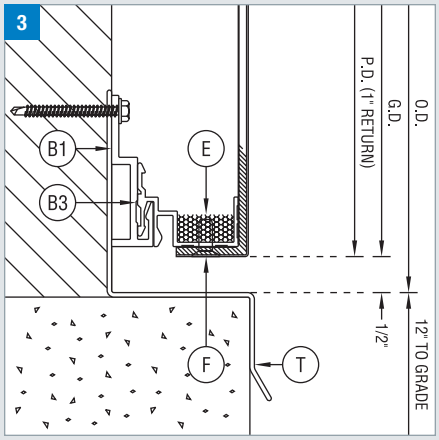



## HORIZONTAL SECTIONS

### 1: Parapet

Metal flashing secured over blocking completes the vertical run and prevents moisture from getting behind the cladding system.

### 2A & 2B: Horizontal

The lower fabricated 'pan' assembly is mechanically fastened to the substrate. The upper pan is then slid into the mounted extrusion and 'floats'. An accent strip (panel) floats within the extrusions. Joint may vary from 1/2" to 12".

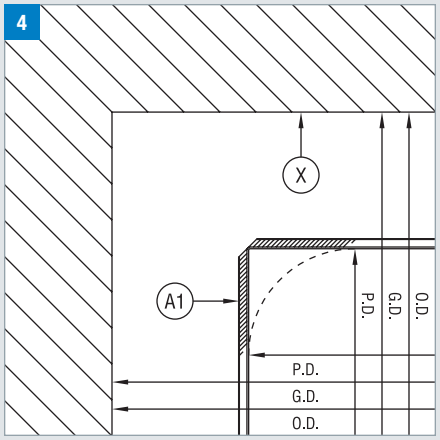
### 3: Base/Foundation

Installation typically begins at the base of the wall and moves vertically. The cladding should be kept approximately 12" away from landscaping grade. However, if the system is installed adjacent to a concrete sidewalk, that dimension may be reduced to 1/2".

## INSIDE CORNER

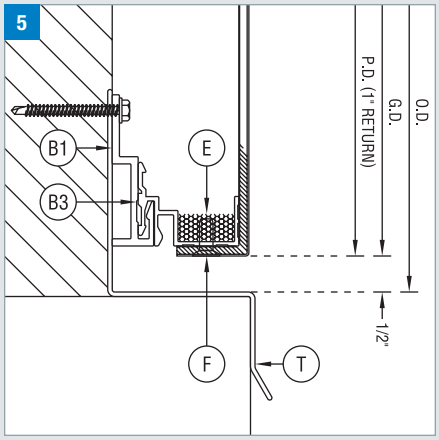
**4: Inside Corner**
As a shop fabricated system, there are no visible moldings. As a result, all corners are routed and bent within a shop setting. This condition is also applicable for wall to soffit transitions.

4



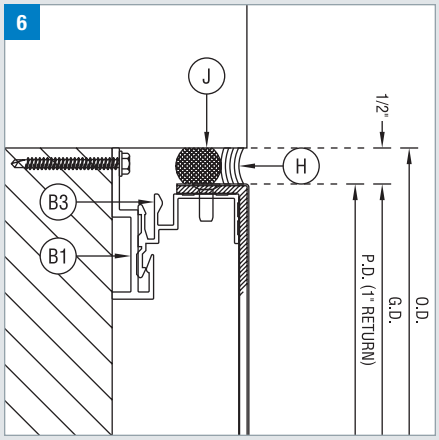

## WINDOW HEAD & SILL

5

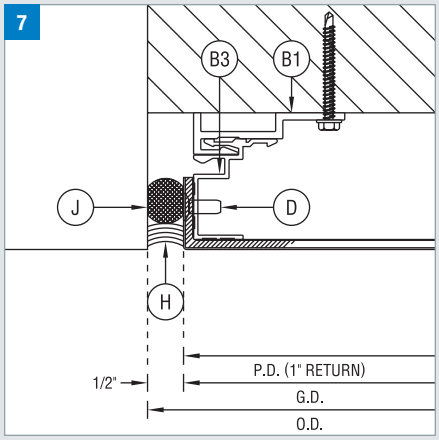


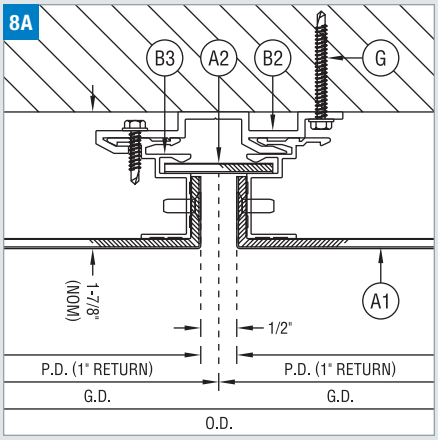

**5: Head**
Similar to the base condition, flashing should be used behind the system to direct water away and prevent moisture intrusion. Weep holes in the bottom of the molding allow any moisture that may have entered the system to escape. The holes are covered on the back side by a foam baffle.

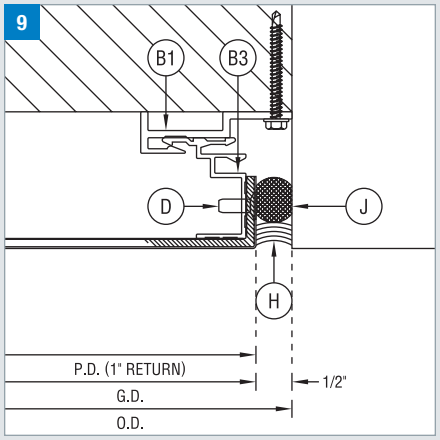
6




**6: Sill**
Depending upon visual preference, windows will either extend past the face of the panel or be aligned so that they sit flush. A sealant joint conceals the fastener and prevents excessive water from entering the cladding cavity.



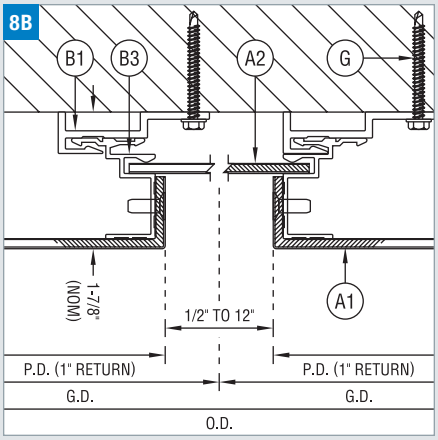




## VERTICAL SECTIONS

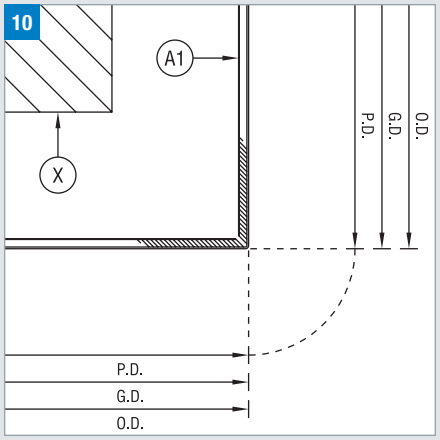
**7 & 9: Jamb**
When abutting dissimilar material, a sealant joint should be used to prevent excessive water from entering the cladding system.

**8A & 8B: Vertical**
Same condition as the horizontal with the exception of the weep hole and baffle foam. In the vertical plane, these items are not required.




## OUTSIDE CORNER

**10: Outside Corner**
As a shop fabricated system, there are no visible moldings. As a result, all corners are routed and bent within a shop setting. This condition is also applicable for fascia to soffit transitions.



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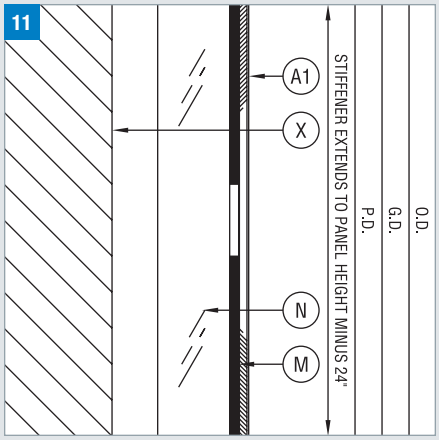


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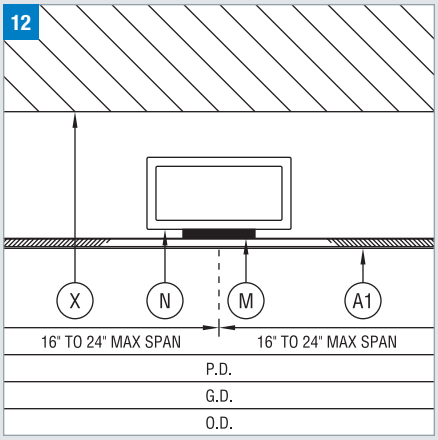
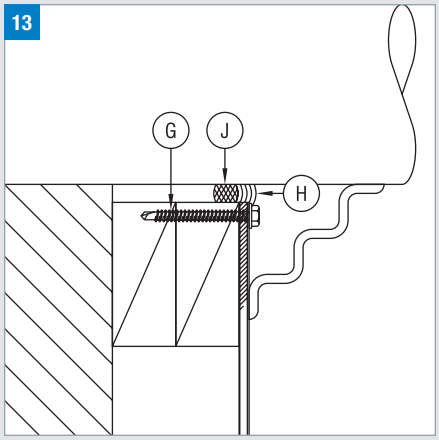



## INTERMEDIATE CONNECTION

**11: Intermediate Connection - Horz**
As a fabricated system, the field of the panel is not secured to the substrate. Rather, stiffeners are located at intermediate connections to provide panel support. The length of this stiffener should extend to cover a majority of the panel.

**12: Intermediate Connection - Vert**
The spacing of the stiffener may be dependent upon the overall size of the panel.

13

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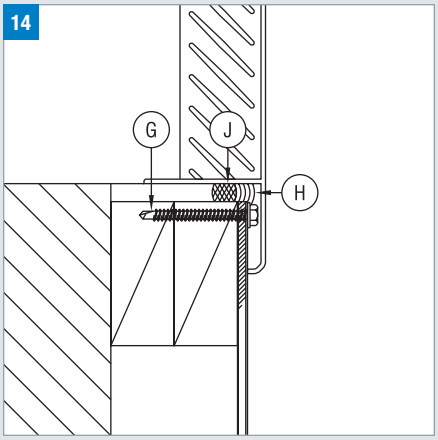



## SYSTEM PENETRATIONS

**13: Round**
When piping or other round penetrations must occur, the hole should be made slightly larger to accomodate a backer rod (when possible) and sealant joint around the object.

**14: Linear (Square or Rectangular)**
A proper sealant joint should be utilized to prevent excessive water from entering the system.

## COMPONENTS

**A1** Envelope 2000

**A2** Spline (Envelope 2000)

**B1** 8212 Starter Extrusion

**B2** 8214 Hanger Extrusion

**B3** 8216 Panel Extrusion

**B4** RR-103 Panel Clip (not shown)

**C** PF-204 Reinforcement (not shown)

**D** Pop Rivet

**E** Weep Baffle
Placed on the inside of the weep hole to prevent debris from entering system.

**F** Weep Hole
- 1/4" x 3/4" elongated round hole
- 2 (min) per panel regardless of size

**G** Fastener
As selected by contractor to suit project requirements.
- Panel - 12" to 16" around perimeter
- Molding - 12" to 16" along length

**H** Silicone Sealant
An approved sealant must be used. Contact Citadel for current list.

**J** Foam Backer Rod

**M** Adhesive Foam Tape (Double-Sided)

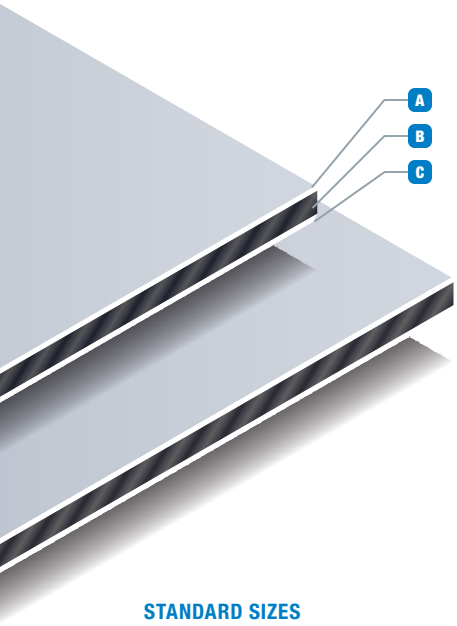
**N** Stiffener
- Located 16" to 24" o.c.
- For panels 36" x 36" or larger
- Length to be 2/3 panel height

**T** Flashing

**X** Substrate
As selected by architect to suit project requirements.

NOTE: Combine both SECTION and SUBSTRATE drawings for a complete listing of components.

# ENVELOPE 2000 RAINSCREEN (RS) SYSTEM




### STANDARD SIZES

48" x 96" (121.9cm x 243.8cm)
48" x 120" (121.9cm x 304.8cm)
48" x 144" (121.9cm x 365.8cm)
60" x 96" (152.4cm x 243.8cm)
60" x 120" (152.4cm x 304.8cm)
60" x 144" (152.4cm x 365.8cm)

Cut-to-size panels are available in any increment up to 60" x 144."

### WARRANTY

Panel Composition: 10 years
Kynar 500 Finishes: 30 years
Anodized Finishes: 20 years

### RECYCLED CONTENT (BY WEIGHT)

Post-Consumer: 0.5%
Post-Industrial: 23.3 to 23.9%

### BENDING / CURVING

Panels and extrusions may be curved in a factory setting.

Minimum Radius: 12"

### MATERIAL PROPERTIES

| Component | Standard (in) | Metric (mm) |
|---|---|---|
| **A.** Prefinished Smooth Aluminum[1] | .024" | 0.61mm |
| **B.** Thermoset Phenolic Resin | .105" | 2.68mm |
| **C.** Primed Smooth Aluminum | .010" | 0.25mm |

### PANEL PROPERTIES

| Property | Standard (in) | Metric (mm) |
|---|---|---|
| Panel Weight | 1.25 lbs/ft$^2$ | 6.12 kg/m$^2$ |
| Nominal Thickness[2] | 1/8" | 4mm |
| Thickness Tolerance | ±1/32" | ±0.79mm |
| Length & Width Tolerance | +0, -1/8" | +0, -3.18mm |
| Squareness | 1/64" Per Lineal ft | |
| Flatness | Visually Flat | |

### FINISH PROPERTIES

| Finish | Type | Coating |
|---|---|---|
| Smooth Kynar 500® | 2-coat PVDF (Solid, Mica) | 0.20 mil Primer + 0.80 mil Color |
| | 3-coat PVDF (Metallic) | 0.20 mil Primer + 0.80 mil Color + 0.70 mil Cclear |
| Smooth Anodized | Exterior Standard No. 1[3] | 0.20 mil to 0.45 mil (Depending on Color) |

### PANEL PERFORMANCE[4]

| Property | Test | Value | Unit |
|---|---|---|---|
| Flame Spread | ASTM E84 | Class A | --- |
| Peel Strength | ASTM D1781 | 34.5 | lb-in/lb |
| Ignition Temperature | ASTM D1929 | 900° | °F |
| Impact Resistance | ASTM D5420 | On Request | |

### SYSTEM PERFORMANCE (ENVELOPE 2000 RS SYSTEM)[4]

| Property | Test | Value |
|---|---|---|
| Air Infiltration | ASTM E283 | Pass |
| Water Resistance | ASTM E330 | Pass |
| Uniform Load | ASTM E331 | Pass |
| International Code Council (ICC) | --- | Pass |
| Intermediate Scale Multi-Story[5] | UBC 26-9 | Pass |

1 - Prefinished aluminum skins are furnished with a PVC film for protection during shipment and installation.
2 - 3mm, 6mm, and 8mm thicknesses are also available for use with the RainScreen (RS) System.
3 - Class I or Class II anodizing is available as a premium custom finish. However, the warranty remains the same and fabrication difficulties will result (increased crazing, cracking) due to the increased film thickness.
4 - Other testing is available upon request.
5 - UBC 26-9 is equivalent to NFPA 285 (verified by third party lab).

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