



OLDCASTLE APG  
UNIVERSITY



# *Ventilated Facade Systems: Versatility, Creativity & Resiliency*



*June 28<sup>th</sup>, 2023*

# Upcoming 2023 APG U Courses

- *7/13*      *Masonry IQ*
- *8/10*      *High Wind Applications for Roof Top Pavers*
- *9/14*      *Derek Hodgins – Forensic Engineer*
- *10/12*     *Cast Stone Review*
- *11/9*      *What specifiers need to know about SRW*
- *12/14*     *Thin Veneer Detailing*

<https://www.echelonmasonry.com/oldcastle-apg-university-online>

# National Reach, Local Support

186

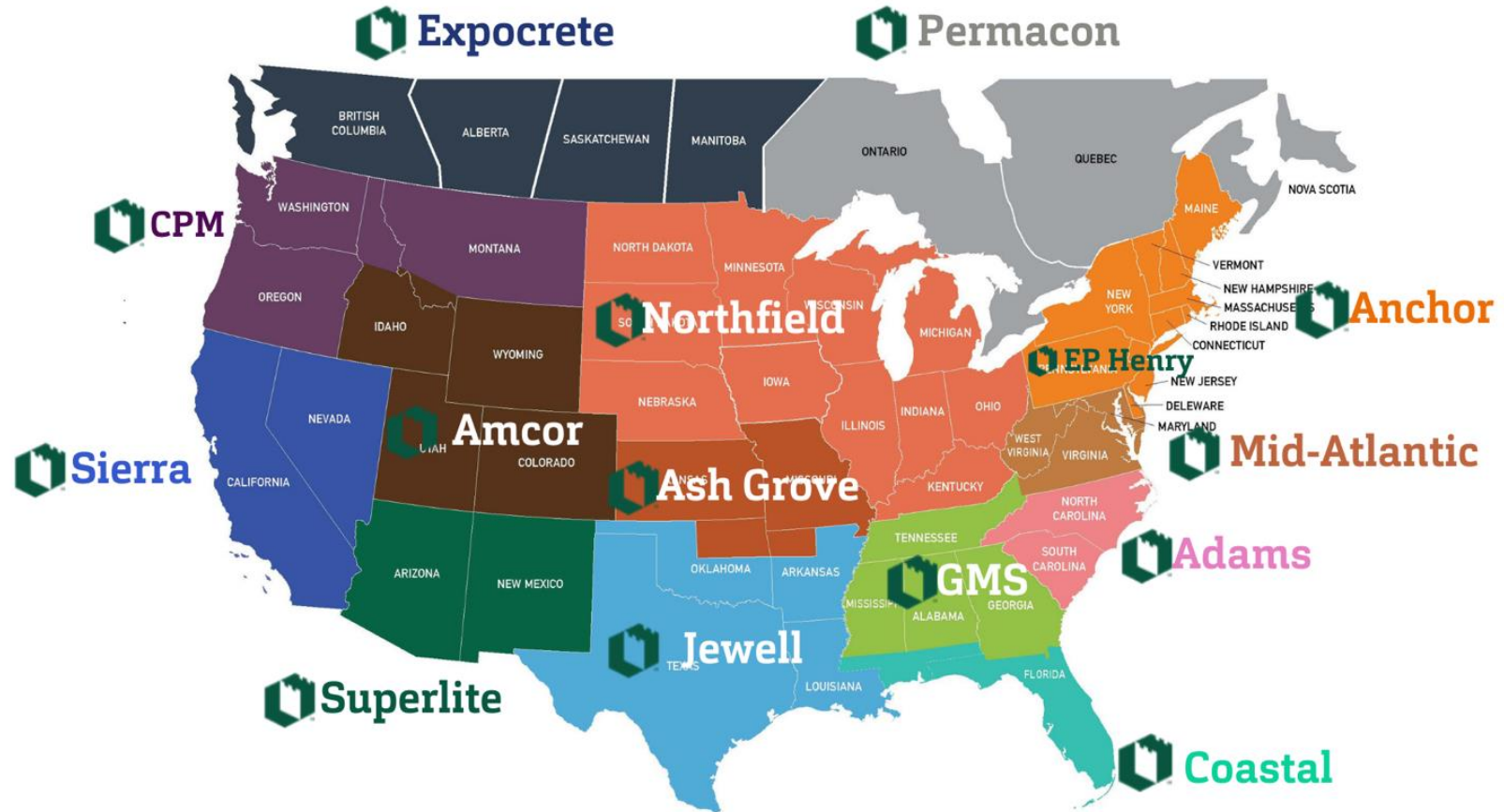
Locations

6,000+

Employees

ONE

Oldcastle APG





# *Ventilated Facade Systems: Versatility, Creativity & Resiliency*



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# ***Ventilated Facade Systems: Versatility, Creativity & Resiliency***

## **Learning Objectives:**

- Participants will understand the engineering values applied during the design of a project ensuring safety and resiliency throughout the life of a building.
- Participants will understand how Ventilated Facades interact with the Best Practices of LEED.
- Participants will learn how a Ventilated Facade satisfies energy and structural code requirements.

# ***Ventilated Facade Systems: Versatility, Creativity & Resiliency***

## **Learning Objectives (continued):**

- Participants will understand the various connection details safely utilizing large format materials in a design.
- Participants will be shown exterior finish opportunities in stone, cast stone and engineered finishes.
- Participants will understand the resilient characteristics of a Ventilated Facade system promoting the healthy and safe performance of a building.

# ***Ventilated Facade Systems: Versatility, Creativity & Resiliency***

## **Agenda...**

- Ventilated Facade – Installation system review
- Cast Stone – Finishing options
- Natural Stone – Finishing options

## **Questions...**

- Post your questions in Q & A and we'll get to them as we go thru the presentation



**GRIDWORX®**

The revolutionary stone cladding system





## What is **Gridworx**?

**GRIDWORX** designs, engineers, and fabricates ventilated rainscreen systems. Located and manufactured in Dallas, TX, founded in 2005 and with over 15 million square feet of cladding installed, **GRIDWORX** is a recognized industry leader that continues to expand and innovate ventilated rainscreen design and installation methods.



# The **GRIDWORX** Family of Anchors

Depending on the project and the needs of our customer, **GRIDWORX** offers both pre-engineered and/or custom anchoring solutions.

**GRIDWORX** has developed and perfected **5** unique patented ventilated rainscreen anchoring methods.



**STANDARD KERF SYSTEM**

Anchor: Kerf  
Classification: Mechanical  
Panel Thickness: 20mm - 2"  
Panel Height: 12" - 36"  
Method: Rotational Engagement



**MECHANICAL KERF SYSTEM**

Anchor: Undercut  
Classification: Mechanical  
Panel Thickness: 8mm - 2"  
Panel Height: 12" - 36"  
Method: Rotational Engagement



**GRIDPLANX SYSTEM**

Anchor: Adhesive  
Classification: Chemical  
Panel Thickness: 8mm - 20mm  
Panel Height: 12" - 36"  
Method: Rotational Engagement



**ULTRA L**

Anchor: Undercut  
Classification: Mechanical  
Panel Thickness: 8mm - 20mm  
Panel Height: Unlimited  
Method: Floating Mount

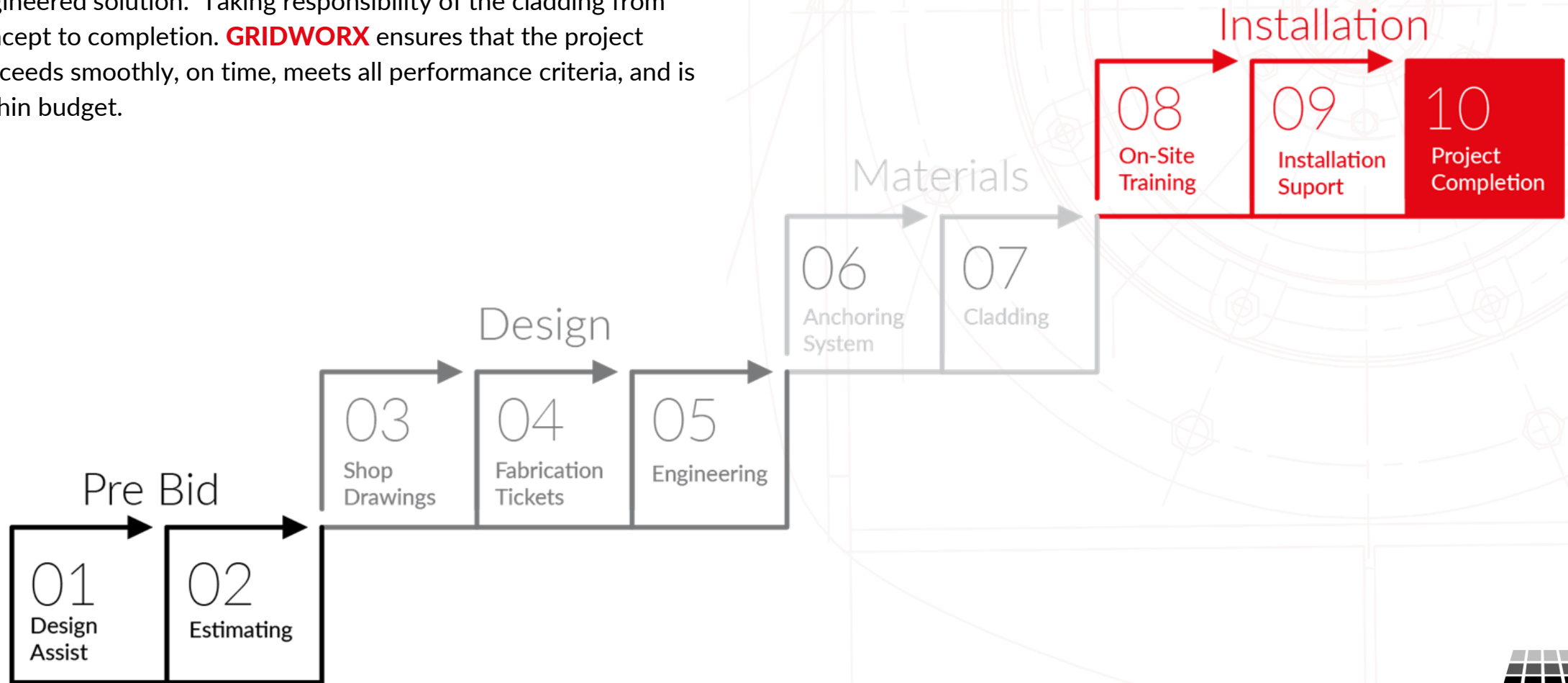


**ULTRA XL**

Anchor: Undercut  
Classification: Mechanical  
Panel Thickness: 1 ¼" - 4"+  
Panel Height: Unlimited  
Method: Floating Mount

# The **GRIDWORX** Difference

**GRIDWORX** is more than a system. **GRIDWORX** is a packaged engineered solution. Taking responsibility of the cladding from concept to completion. **GRIDWORX** ensures that the project proceeds smoothly, on time, meets all performance criteria, and is within budget.



# Ventilated Rainscreen **Facades**

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**WHAT IS VENTILATED RAINSCREEN? ■**

**KEY PRINCIPLES OF VENTILATED RAINSCREEN ■**

**ADVANTAGES OF VENTILATED RAINSCREEN ■**

**ANCHORING SYSTEM METHODS ■**

**DELEGATED DESIGN ■**

**RECAP AND QUESTIONS ■**





The background features a faint, light-colored architectural drawing of a building facade with various lines and shapes. Overlaid on the left side is a grayscale photograph of a modern building with a large, grid-like facade. A large, bold, red 'X' is drawn over the entire image, with its center point located near the top right. The text 'What is a VENTILATED RAINSCREEN?' is positioned in the upper right quadrant, with 'VENTILATED RAINSCREEN?' in red and underlined.

# What is a **VENTILATED RAINSCREEN?**

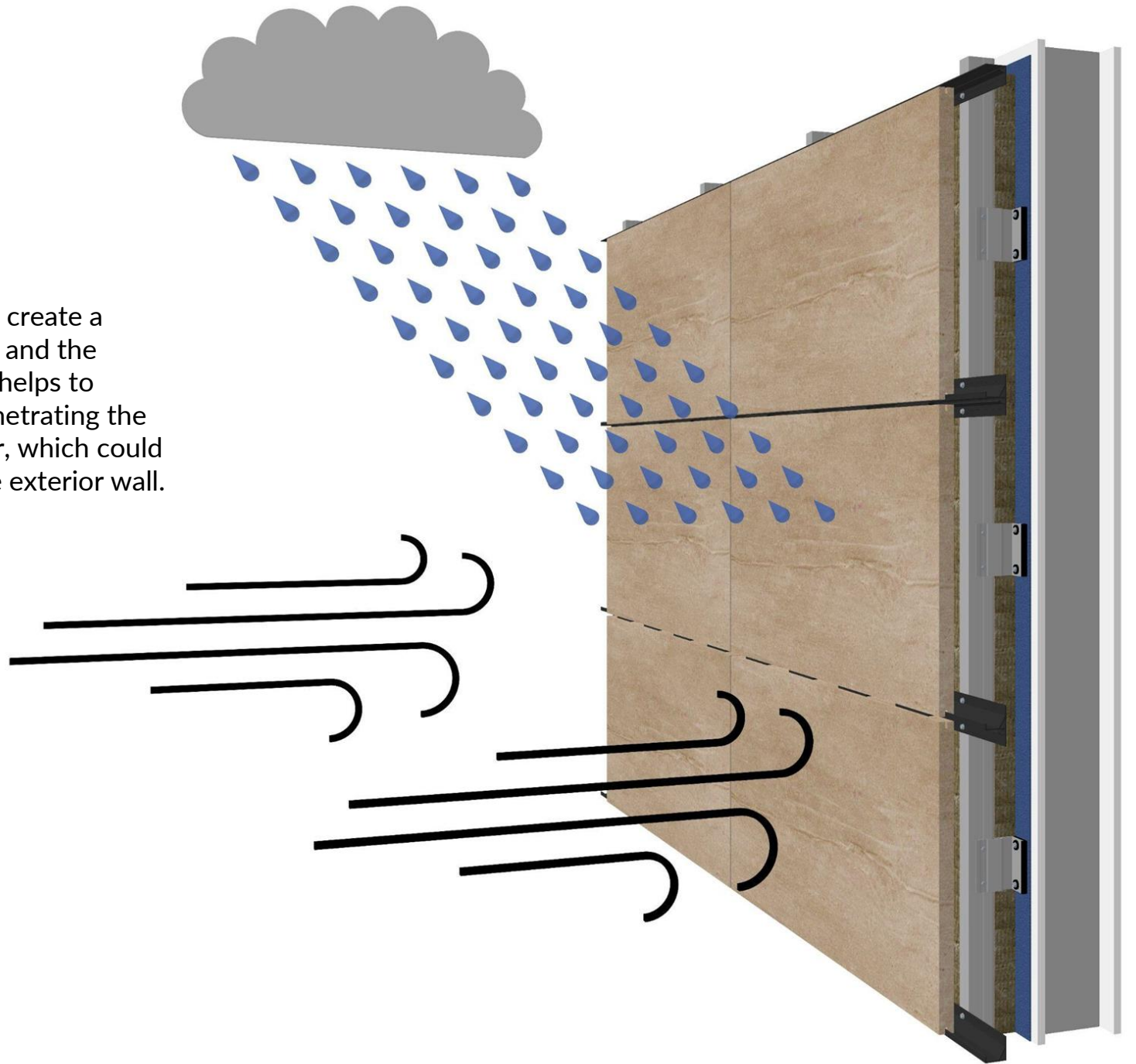


# Ventilated Rainscreen

## Characteristics

### BASIC RAINSCREEN CONCEPT

- The primary purpose of a rainscreen system is to create a barrier between unpredictable exterior elements and the underlying structure of the building. This barrier helps to prevent water, snow, wind and sunlight from penetrating the wall assembly and reaching the building's interior, which could lead to long term damage and degradation of the exterior wall.



# Ventilated Rainscreen

## Typical Wall Assembly

### SUBSTRATE

(STEEL, CONCRETE, CMU, WOOD)

### SHEATHING

### AIR VAPOR BARRIER

### INSULATION

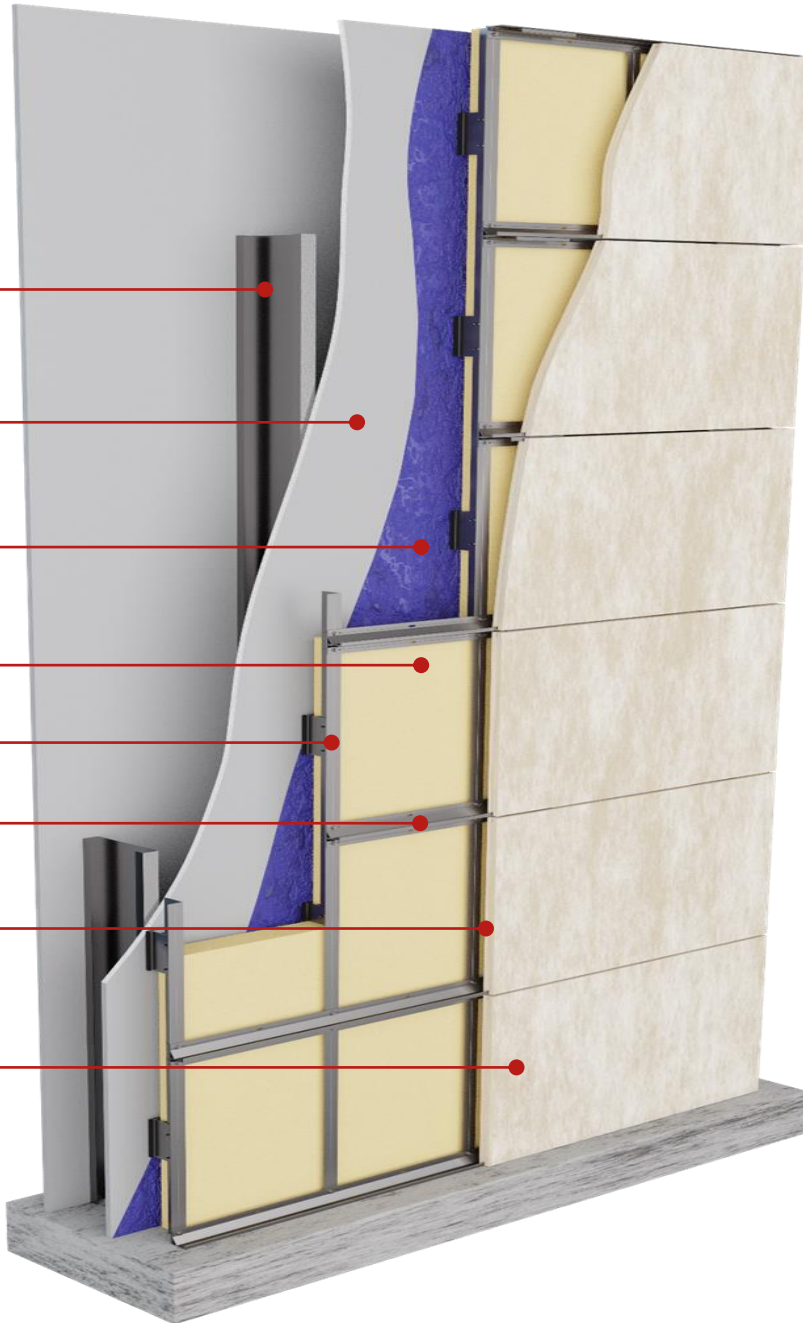
### SUBFRAME

(WALL BRACKET AND VERTICAL MULLION)

### CLADDING ANCHORING CHANNELS

### AIR CAVITY

### CLADDING PANELS



## Key Layers for a Ventilated Rainscreen

- **Outer Cladding**
  - Natural Stone
  - Cast Stone
  - Porcelain
  - Ultra Compact
  - Terra Cotta
- **Ventilation Cavity**
  - 1" Minimum
- **Insulation**
  - Mineral Wool
  - XPS
  - EPS
  - ISO
- **Air and Moisture Barrier**
- **Structural Wall**
  - Steel Stud
  - Cast in Place Concrete
  - CMU
  - Wood Framing

The background of the slide features a grayscale photograph of a modern building with a large, grid-like facade. This image is partially obscured by large, overlapping geometric shapes: a gray triangle in the top left, a white triangle in the middle, and a red triangle in the bottom left. Faint, light-red technical drawings, including floor plans and circular diagrams, are visible in the background.

# Key Principles of **VENTILATED RAINSCREEN**

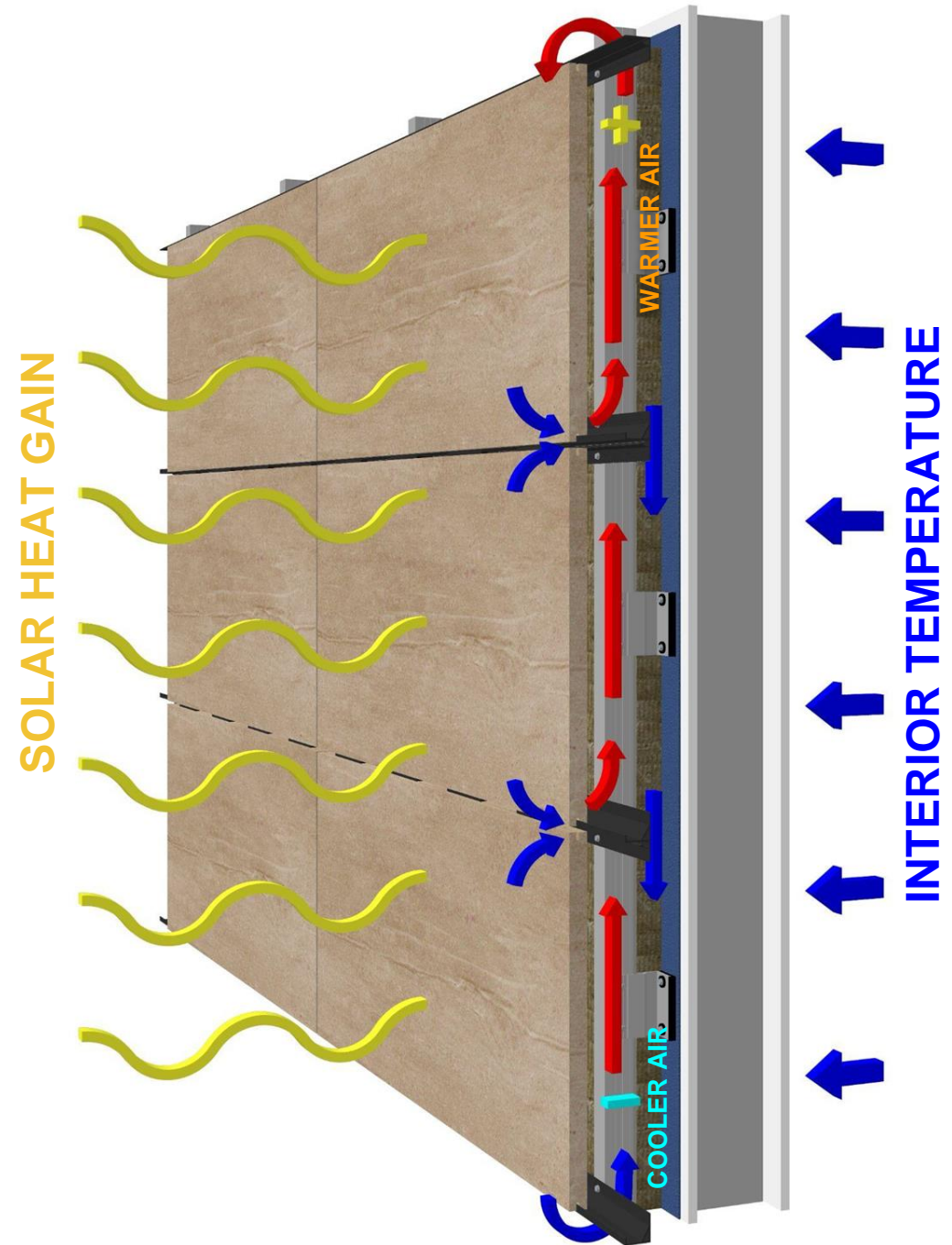
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# Ventilated Rainscreen

## Key Principles

### The CHIMNEY EFFECT

- Outer Cladding is warmed by the Sun
- Warm Air within the air cavity rises
  - Creates positive pressure at the top of cavity
- Cool Air within the air cavity falls
  - Creates negative pressure at the bottom of the cavity
- This Temperature and Pressure Differential Creates an Airflow Pattern



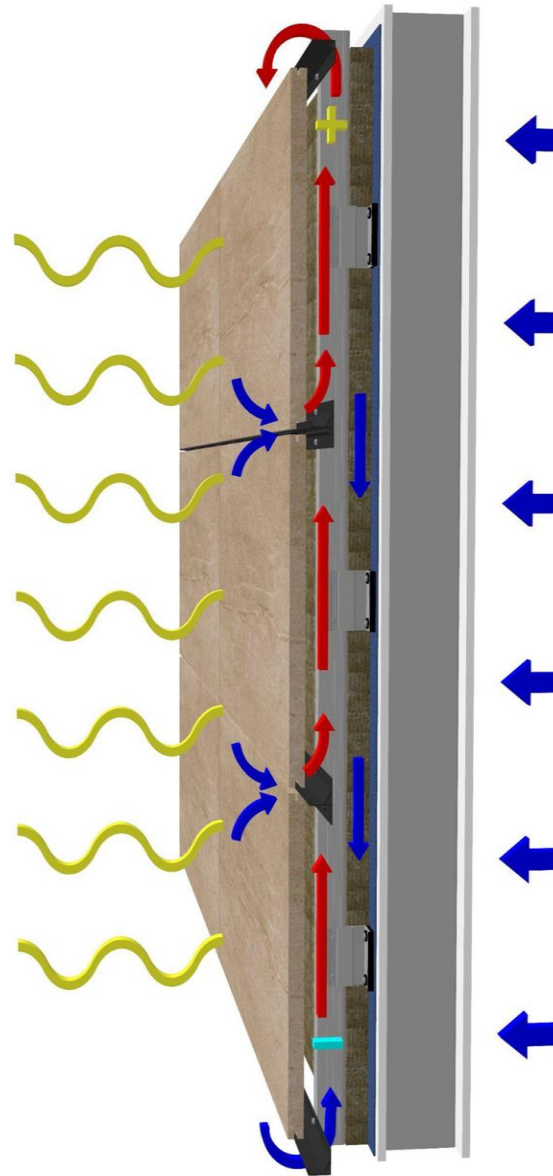


# Ventilated Rainscreen

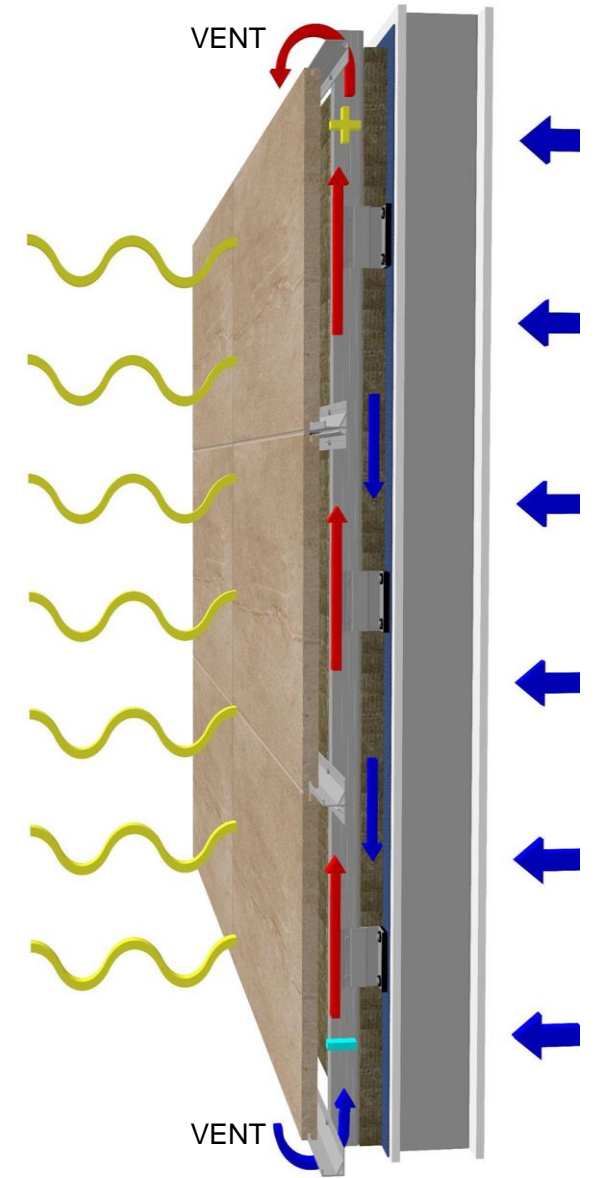
## Key Principles

### The CHIMNEY EFFECT - Sealed Joint vs Open Joint

- OPEN JOINT
  - Localized Ventilation between Panels
- SEALED JOINT
  - Requires ventilation openings at top and bottom of wall



OPEN JOINT



SEALED JOINT

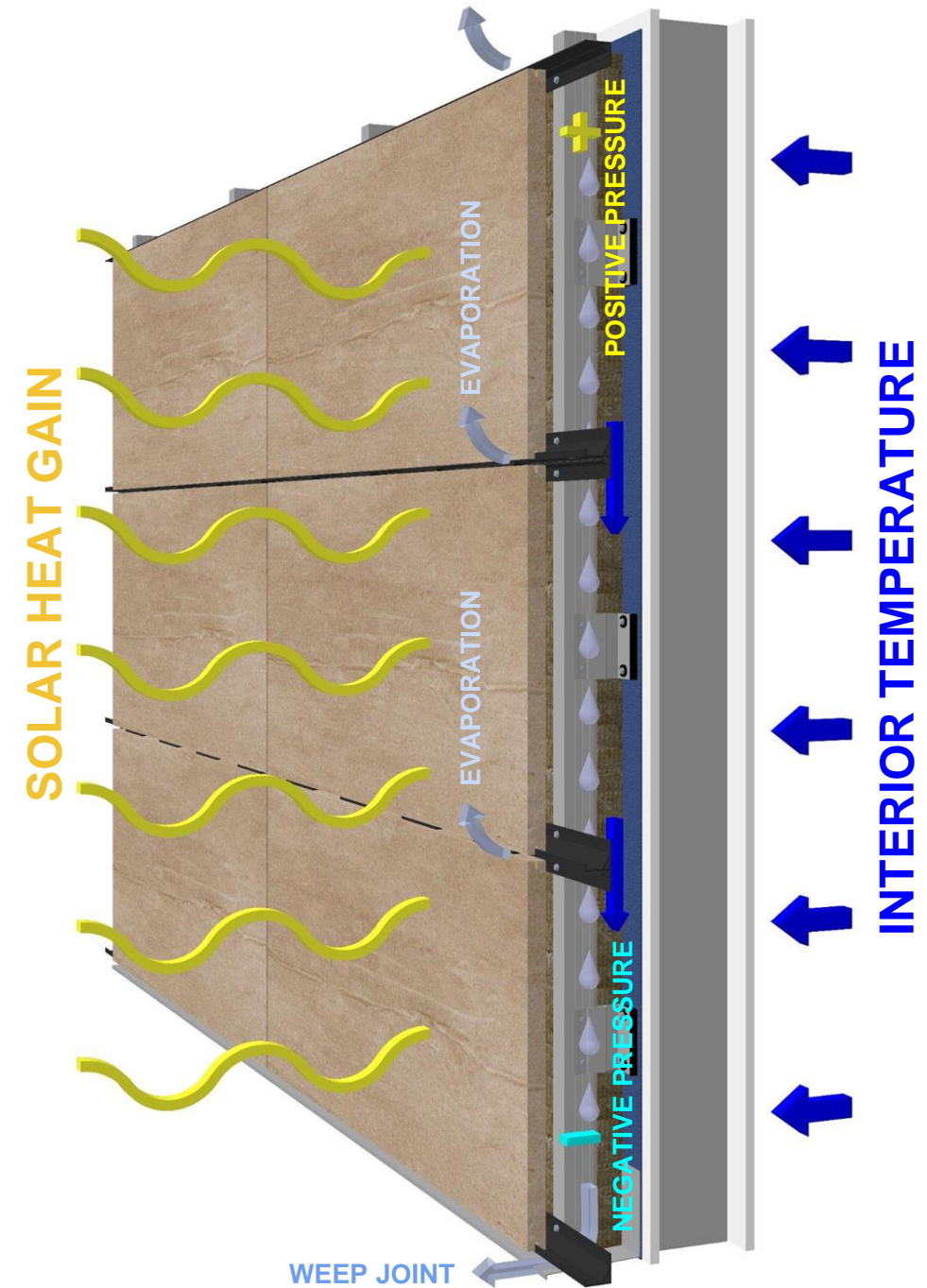


# Ventilated Rainscreen

## Key Principles

### MOISTURE MANAGEMENT

- Chimney Effect Provides Superior Moisture Protection
  - Negative Pressure at base of wall creates a “suction effect”
  - This results in water and condensation being drawn to the base of the wall, facilitating it’s exist from the cavity.
  - Additional Airflow also results in a greater rate of evaporation.
- Path for Water Drainage
  - The Air cavity between the Air Vapor Barrier and Back of Stone creates a clear path for water to drain and exit the wall assembly.



The background features a faint, light-colored architectural drawing of a building's floor plan or site plan, overlaid on a dark gray photograph of a modern building with large glass windows. The image is divided into geometric sections by white diagonal lines. A solid red triangle is located in the bottom left corner.

# Advantages of **VENTILATED RAINSCREEN**

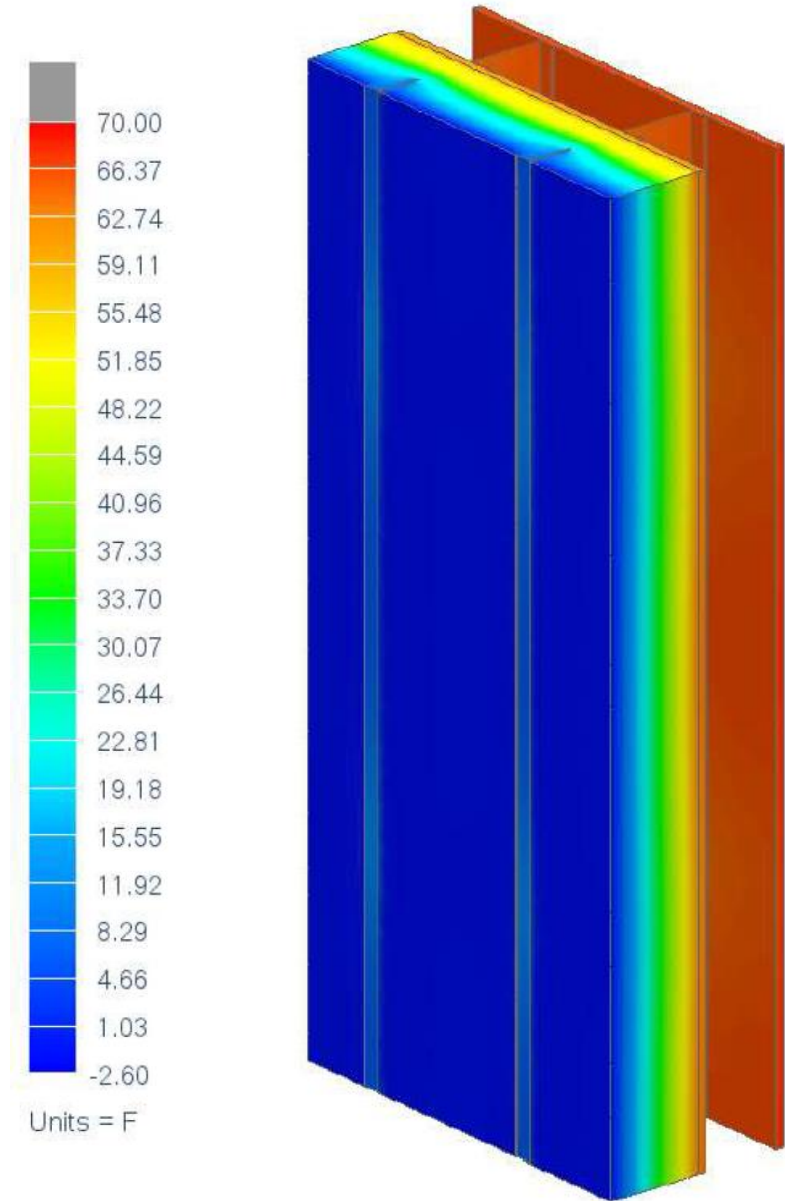
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# Ventilated Rainscreen

## Advantages

### THERMAL PERFORMANCE AND ENERGY SAVINGS

- Convective Heat Transfer
  - Air Circulation within the cavity:
    - Absorbs thermal energy from cladding
    - Warmed air (+) rises and exits wall assembly
    - Warm air is replaced by cooler air (-) at the base of wall.
    - Process repeats, reducing thermal load of building
- Additional layer of insulation
  - Ventilated Rainscreens allow space for exterior insulation
    - Boost thermal performance of the wall system
    - Reduces Thermal Bridging
    - Moves the potential dew point outside of the air vapor barrier, reducing condensation risk within sealed exterior wall.



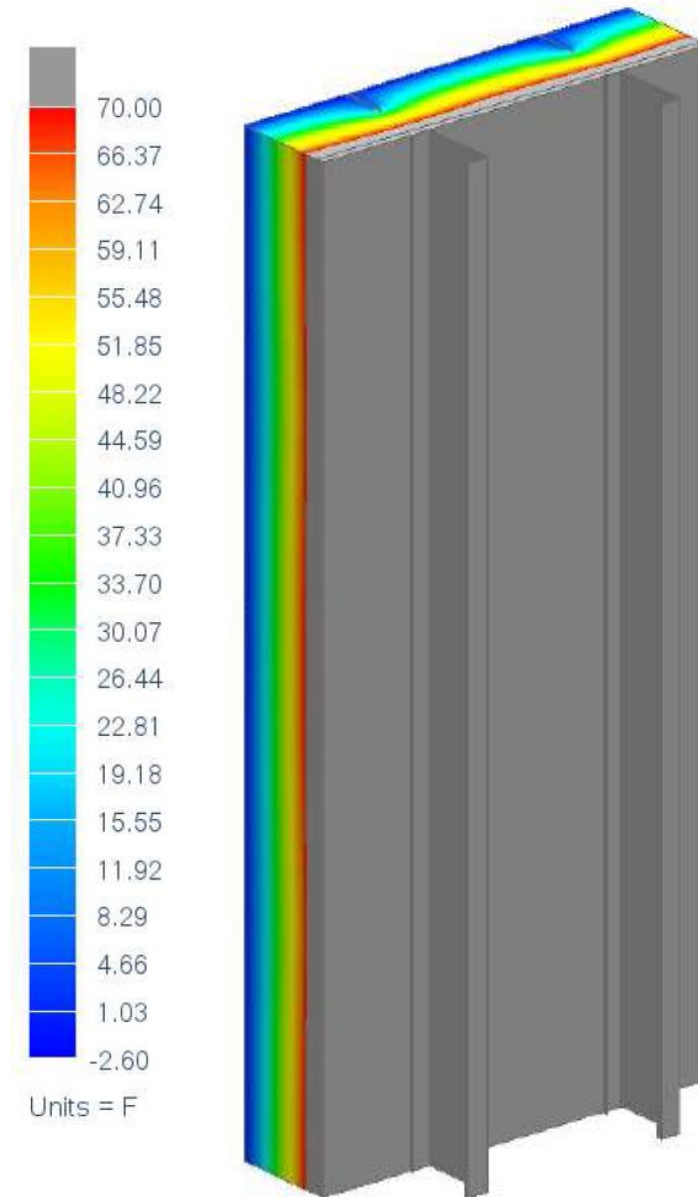
**EXTERIOR VIEW**  
**PROJECT SPECIFIC THERMAL MODEL**  
Exterior Design Temp = -2.6°

# Ventilated Rainscreen

## Advantages

### HEALTH BENEFITS

- CONDENSATION AND HUMIDITY CONTROL
  - Significantly reduces moisture building
    - Prevents potential respiratory issues associated with mold
- IMPROVED AIR QUALITY
  - Constant air movement reduces the chance of volatile organic compounds or other pollutants from entering the interior via the wall assembly.



**INTERIOR VIEW**  
**PROJECT SPECIFIC CONDENSATION MODEL**  
Dew Point Temperature = 50.6°

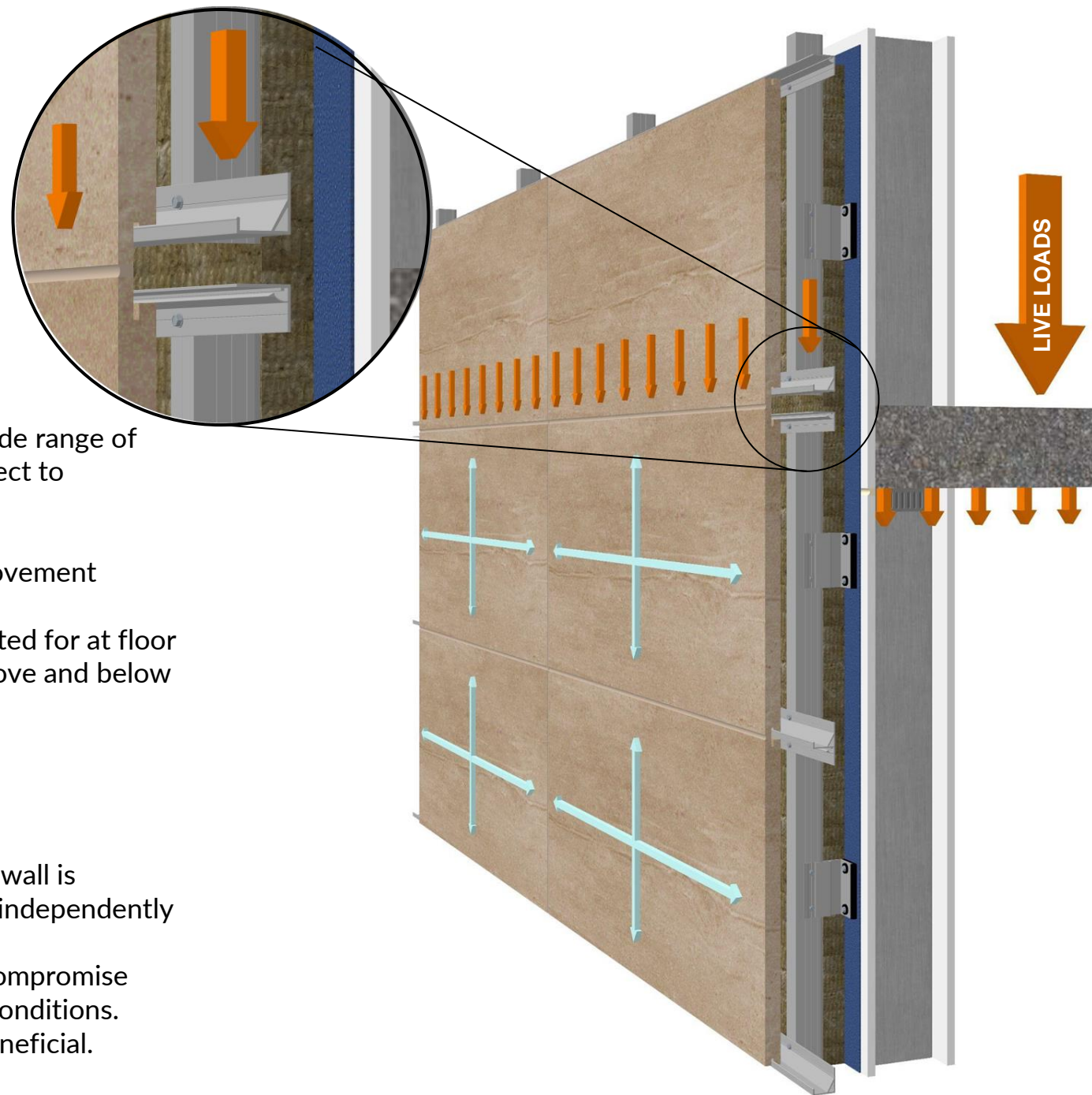


# Ventilated Rainscreen

## Advantages

### STRUCTURAL / MOVEMENT FLEXIBILITY

- DEFLECTION
  - Rainscreen Systems move with the substrate
    - Allows for masonry applications with a wide range of deflection criteria ( $L/180$  to  $L/600$ ) - subject to engineer.
  - Panels are independently supported
    - Each panel head joint absorbs building movement uniformly across the length of the wall
    - Interstory / Live load deflection is accounted for at floor lines or slip tracks. System terminates above and below to accommodate required movement.
- THERMAL
  - Panels are individually supported
    - Reduces the overall +/- expansion, as the wall is composed of individual panels that move independently from each other.
    - Anchoring components are sized to not compromise under significant expansion/contraction conditions.
    - Punched slots at fastener locations are beneficial.





# Ventilated Rainscreen

## Advantages

### REDUCED ASSEMBLY WEIGHT

- Thin Cladding Panels
  - Reduce transportation costs
  - Less labor for installation
    - Easier to handle
    - Panels less than 180 pounds can be manually lifted
  - Reduced Structural Loads
    - Lower Foundation Requirements
      - Less loads imposed to foundation
    - Reduce the structural requirements for the building
      - Less loads imposed to structural system
    - Also ideal for retrofits
      - Compatible with existing structures
      - Reduces potential disruption for existing tenants

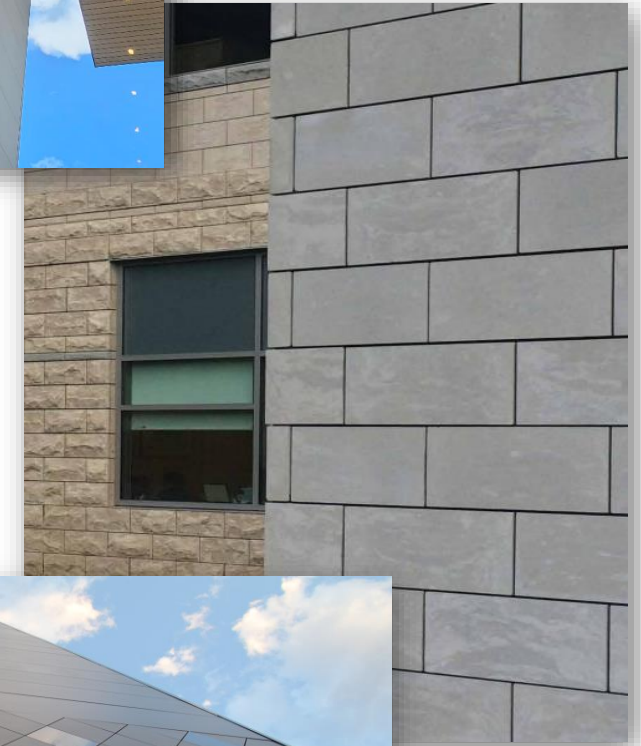
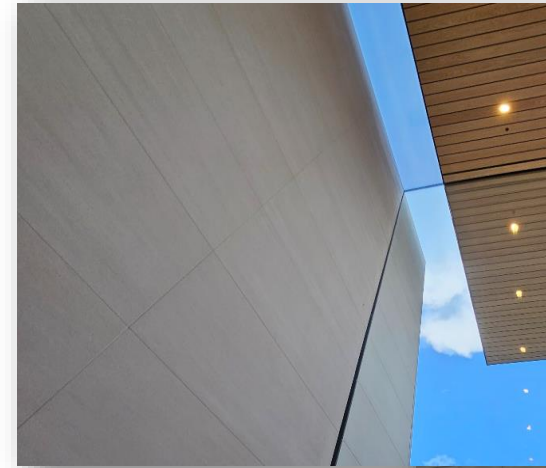


# Ventilated Rainscreen

## Advantages

### UNLIMITED DESIGN OPTIONS

- Panel size varieties
  - Large format cladding
    - Sleek and Modern Appearance
    - Less joints allow for a visually seamless facade
    - Reduced installation time
  - Traditional format cladding
    - Appearance of traditional masonry with modern wall performance
  - Unique shapes and finishes
    - Independent supported cladding panels allow for panels of any shape and configuration
- Joint Configuration
  - Open Joints
    - Requires Black Anodized Anchoring System
    - Provides Modern Aesthetic
  - Sealed Joints
    - Resembles tradition mortar
    - Traditional Aesthetic





# Ventilated Rainscreen

## Advantages

### MAINTENANCE

- Long Term Durability of the Wall Assembly
  - Ventilation and Moisture Management:
    - Preserves the integrity of the sealed exterior wall
    - Prolongs the life of the exterior insulation cavity
    - Prevents long term damage
    - Reduced staining of the exterior cladding
- Flexibility and Repairs
  - Independently supported rainscreen panels allow for:
    - The removal or replacement of panels
    - Access to mechanical systems within the wall cavity
- Joint Configuration
  - Open Joints
    - Requires Black Anodized Anchoring System
    - Provides Modern Aesthetic
  - Sealed Joints
    - Resembles cementitious mortar
    - Provides a Traditional Aesthetic



# Ventilated Rainscreen

## Advantages

### ENVIRONMENTAL / SUSTAINABILITY

- Reduced Panel Thickness
  - Reduces the amount of materials needed for wall coverage
  - Reduced transportation costs
- Energy Efficiency
  - Less energy consumption to heat and cool building
- Improved Air Quality
  - Circulation of air between cladding and building envelope removes stagnant pollutants and other harmful substances from entering building
- Sustainable Materials
  - Most Ventilated Rainscreen System providers source their materials and extrusions from recyclable materials, such as aluminum and stainless steel.
  - Systems can accommodate various types of cladding materials that are sustainably sourced or manufactured.







# **VENTILATED RAINSCREEN**

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Questions?



The background features a faint, light-colored architectural drawing of a city grid and circular patterns. Overlaid on the left side is a photograph of a modern building with a large glass facade and a concrete base. The image is divided into geometric sections by white diagonal lines, with a solid red triangle in the bottom left corner.

# VARIETY OF **ANCHORING METHODS**

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# Anchoring Methods

## Panel Attachment Options

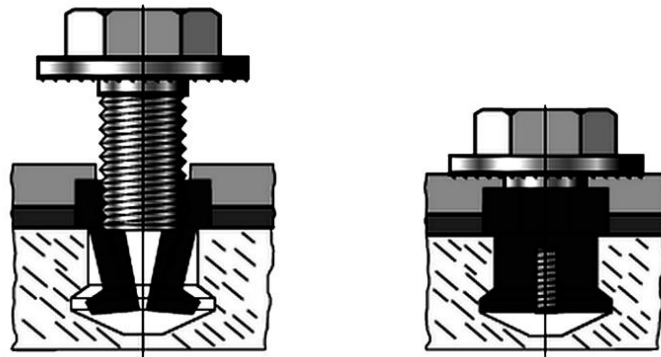
### SAW KERF

A saw kerf refers to the narrow slot or cut made by a saw blade along the outside edge of the cladding panel. It is essentially the width of the saw blade itself is used in conjunction with T and J shaped anchors.



### CONCEALED MECHANICAL ANCHOR

A concealed mechanical anchor refers to an anchor that is inserted into a precut hole or slot that is typically applied to the back of a cladding panel. These anchors are designed to provide structural support, distribute the weight of the panels, and accommodate the natural expansion and contraction of the materials due to environmental conditions



### ADHERED/CHEMICAL

An adhered/chemical application refers to a synthetic, high strength bonding agent that affixes the cladding panels to a backup system. This method typically requires specific panel and components preparation with primers and cleaning agents to ensure a complete and secure bond.



# Saw Kerf

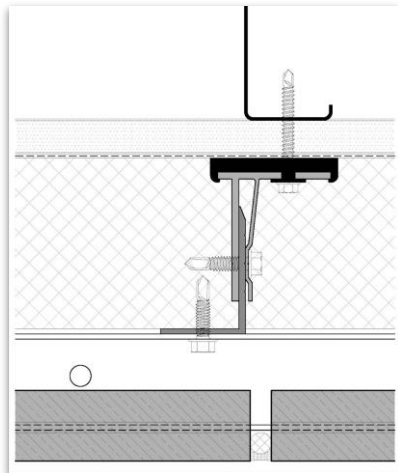
## Applications

- 2 part rotational engagement system
- Utilizes a continuous saw cut kerf along the top and bottom edge
- Ideal for panel thicknesses 30mm to 2"
- Ideal panel heights are between 12" up to 36" (subject to engineering review)

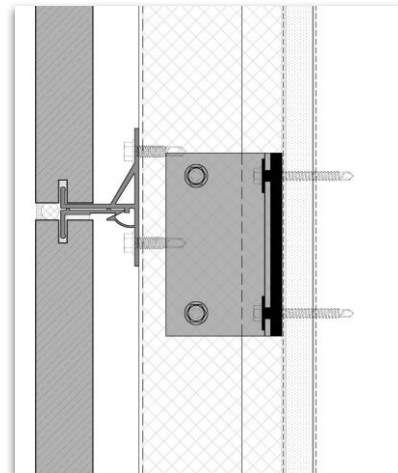
## Advantages include:

- Saw kerfs simplify panel preparation and installation
- Allows for a fast and efficient installation
- Non-sequential installation of panels
- Easy removal/replacement of panels without affecting surrounding cladding
- Continuous panel support
- Manageable panel sizes can reduce labor expenses

Plan



Section



# Saw Kerf

## Components

### GRIDWORX CHANNEL

TWO-PART ANCHORING SYSTEM PROVIDES CONTINUOUS PANEL SUPPORT WHILE ALLOWING FOR NON-SEQUENTIAL INSTALLATION AND EASY REMOVAL/REPLACEMENT OF PANELS WITHOUT IMPACTING SURROUNDING CLADDING

### GRIDWORX L-BRACKET

INSTALLED WITHIN CONTINUOUS KERF ROTATIONALLY ENGAGES WITH GRIDWORX CHANNEL FOR SECURE CONNECTION

### CONTINUOUS VERTICAL MULLION

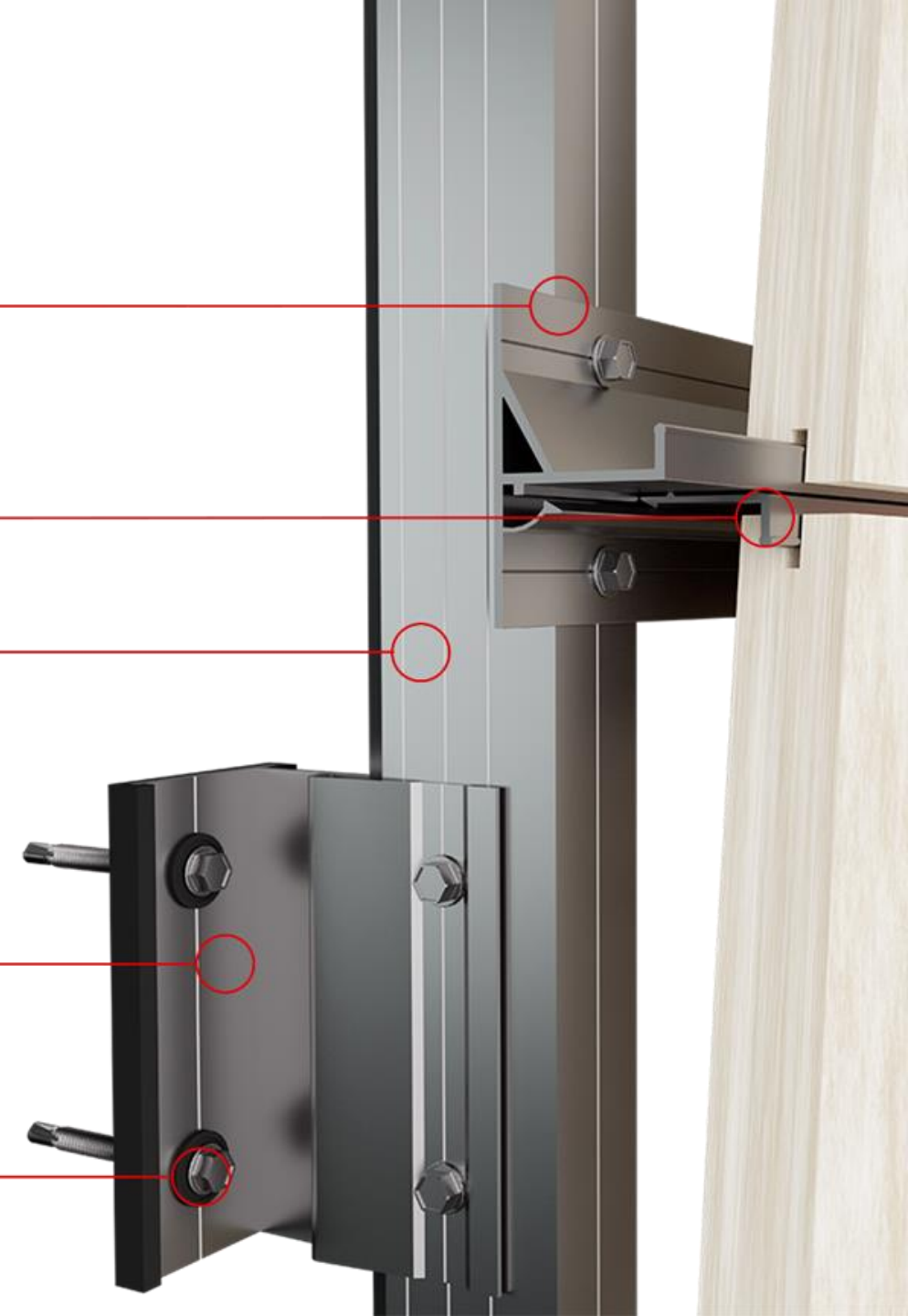
ALLOWS FOR +/- 1/2" OF IN/OUT ADJUSTABILITY TO PLUMB WALLS. AVAILABLE IN MULTIPLE DEPTHS

### DISCRETE ISOTHERMAL WALL BRACKET

AVAILABLE FOR EXTERIOR CAVITY DEPTHS FROM 2"-10". CAN BOOST PROJECT-SPECIFIC THERMAL REQUIREMENTS BY PROVIDING CONTINUOUS INSULATION

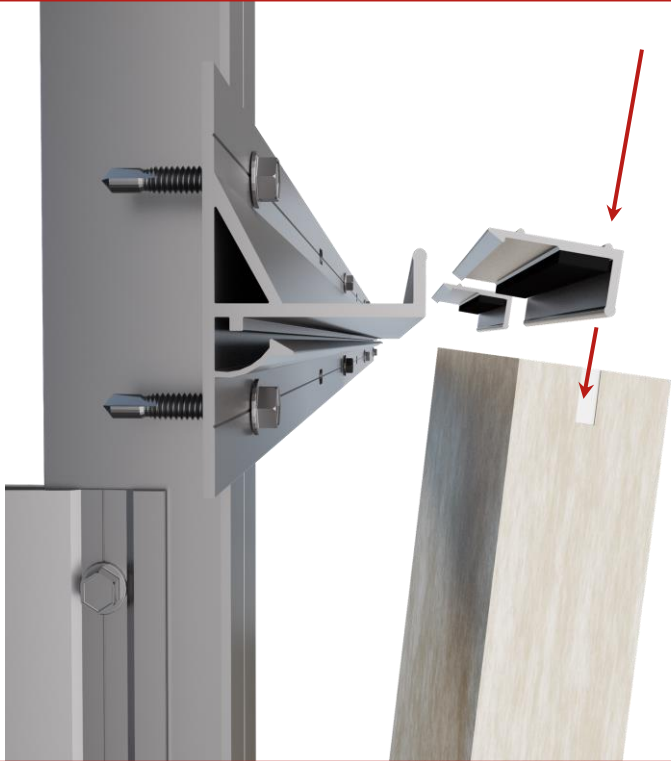
### THERMAL ISOLATION SHIMS AND BEARINGS

REDUCES THERMAL BRIDGING BY ISOLATING THE GRIDWORX RAINSCREEN APPARATUS FROM THE BUILDING STRUCTURE

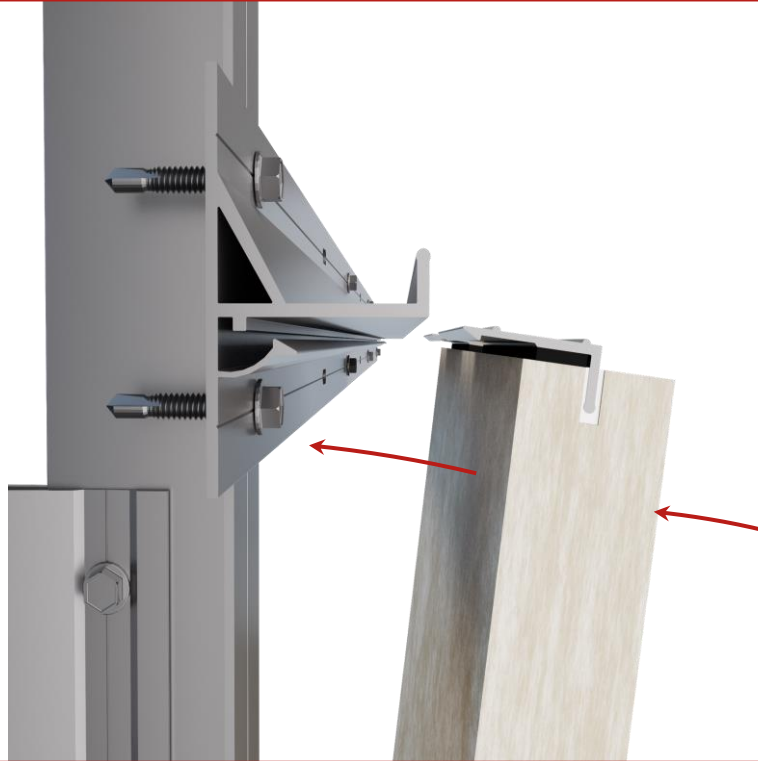


# Saw Kerf

Patented Rotational Engagement



SET L-BRACKET



ROTATE PANEL



SNAP IN PLACE





**Saw** Kerf

***Donald W. Reynold Razorback Stadium***  
*Fayetteville, Arkansas*





**Saw** Kerf

***Will County Justice Center***  
*Joliet, IL*





**Saw** Kerf

***San Andreas Courthouse***  
*San Andreas, CA*





**American University Washington College of Law**  
*Washington, DC*



# Mechanical Kerf

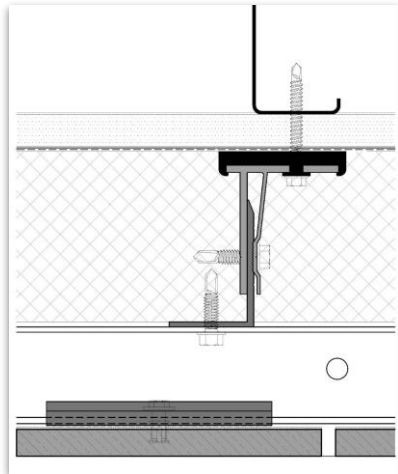
## Applications

- 2 part rotational system
- Utilizes 4" long, discrete mechanical kerf extrusions that are applied via blind undercut anchors along the back surface, located along the top and bottom edge of the panel.
- Ideal for panel thicknesses 8mm to 20mm
- Ideal panel height are between 12" to 36" (subject to engineering review)

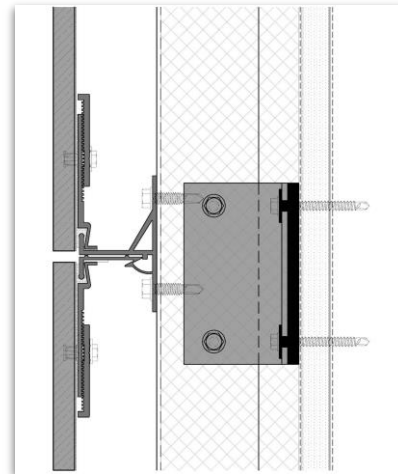
## Advantages include:

- Benefits of saw kerf system available for thinner panels
- Allows for a fast and efficient installation
- Non-sequential installation of panels
- Easy removal/replacement of panels without disturbing surrounding cladding
- Manageable panel sizes can reduce labor expenses

Plan



Section





# Mechanical Kerf

## Components

### GRIDWORX MECHANICAL KERF

DISCRETE CLIP THAT IS INSTALLED ON THE BACK FACE OF PANEL. ACCOMMODATES BLIND CONNECTION AND CLEAN PANEL EDGES. ALLOWS THE INSTALLATION OF THIN PANELS WITH THE GRIDWORX CHANNEL.

### GRIDWORX CHANNEL

TWO-PART ANCHORING SYSTEM PROVIDES CONTINUOUS PANEL SUPPORT WHILE ALLOWING FOR NON-SEQUENTIAL INSTALLATION AND EASY REMOVAL/REPLACEMENT OF PANELS WITHOUT IMPACTING SURROUNDING CLADDING

### GRIDWORX L-BRACKET

INSTALLED WITHIN CONTINUOUS KERF ROTATIONALLY ENGAGES WITH GRIDWORX CHANNEL FOR SECURE CONNECTION

### CONTINUOUS VERTICAL MULLION

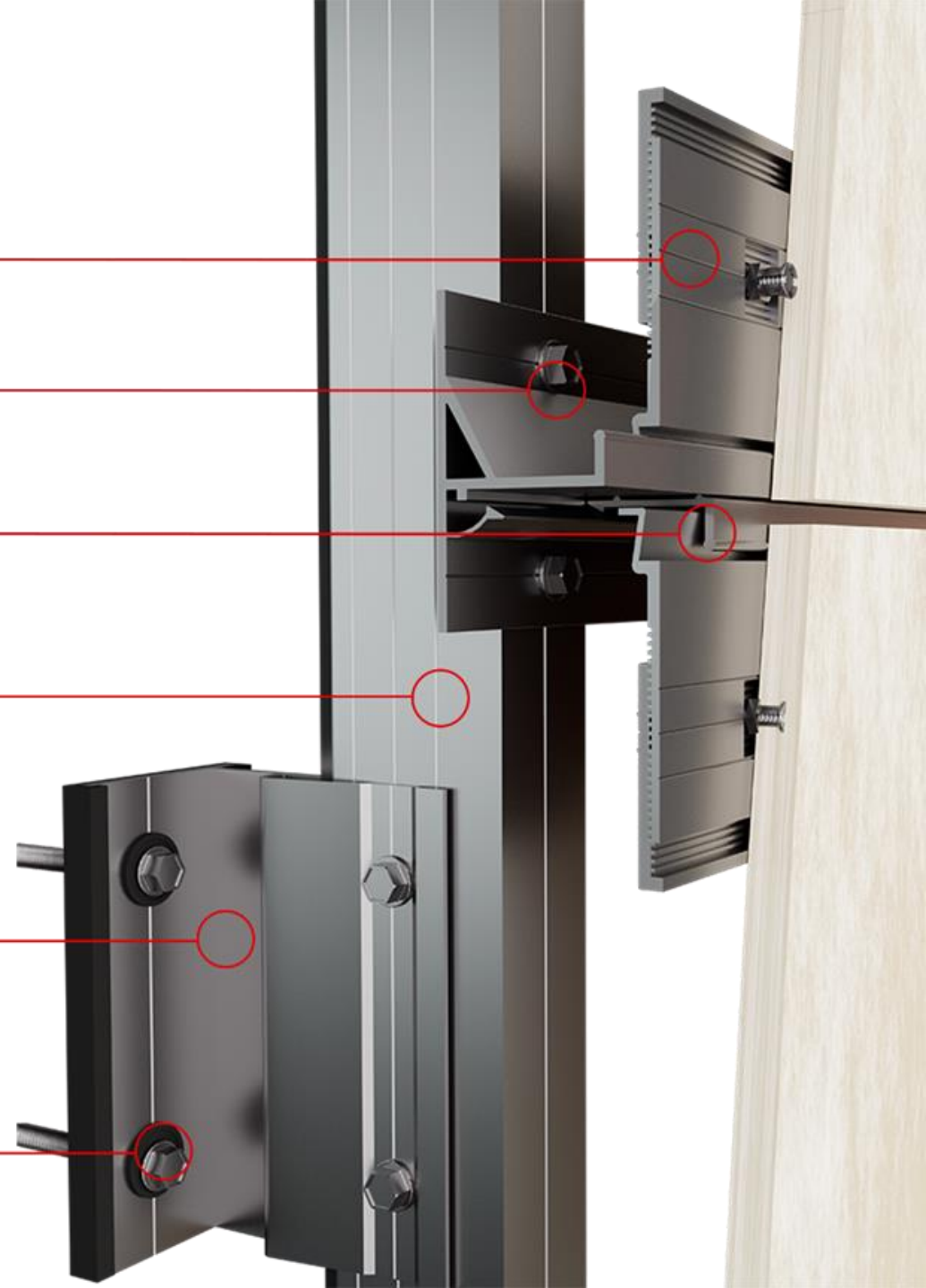
ALLOWS FOR +/- 1/2" OF IN/OUT ADJUSTABILITY TO PLUMB WALLS . AVAILABLE IN MULTIPLE DEPTHS

### DISCRETE ISOTHERMAL WALL BRACKET

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### THERMAL ISOLATION SHIMS AND BEARINGS

REDUCES THERMAL BRIDGING BY ISOLATING THE GRIDWORX RAINSCREEN APPARATUS FROM THE BUILDING STRUCTURE





**Mechanical** Kerf

*Flagship Retail - Aventura Mall*  
Aventura, FL





**Mechanical** Kerf

*Flagship Retail - Dadeland*  
Miami, FL





**Mechanical** Kerf

*Flagship Retail - Grove*  
*Los Angeles, CA*

# Adhered Kerf

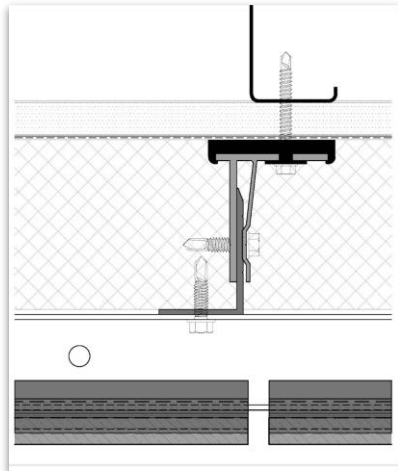
## Application

- 2 part rotational system
- Utilizes a continuous saddle extrusion that is adhered along the top and bottom edge of panel
- Ideal for panel thicknesses 12mm to 20mm
- Ideal panel heights are between 12" to 36" (subject to engineering review)

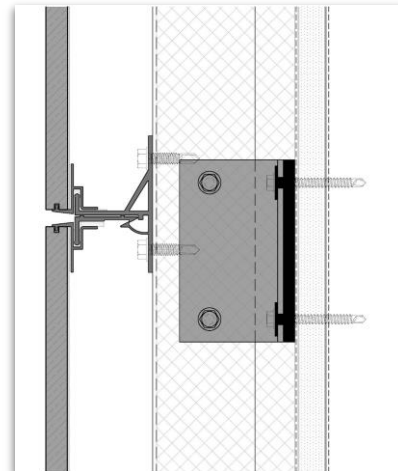
## Advantages include:

- Benefits of saw kerf system available for thinner panels
- Undercut anchor holes not required
- Non-sequential installation of panels
- Easy removal/replacement of panels without disturbing surrounding cladding
- Continuous panel support
- Manageable panel sizes can reduce labor expenses

Plan



Section





# Adhered Kerf

## Components

### GRIDWORX CHANNEL

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### GRIDWORX L-BRACKET

INSTALLED WITHIN CONTINUOUS KERF ROTATIONALLY ENGAGES WITH GRIDWORX CHANNEL FOR SECURE CONNECTION

### GRIDWORX PLANX CLIP

CONTINUOUS CLIP THAT IS INSTALLED ALONG THE TOP AND BOTTOM EDGE OF PANEL VIA ADHESIVE AND A MICRO-KERF. ALLOWS THE INSTALLATION OF THIN PANELS WITH THE GRIDWORX CHANNEL.

### CONTINUOUS VERTICAL MULLION

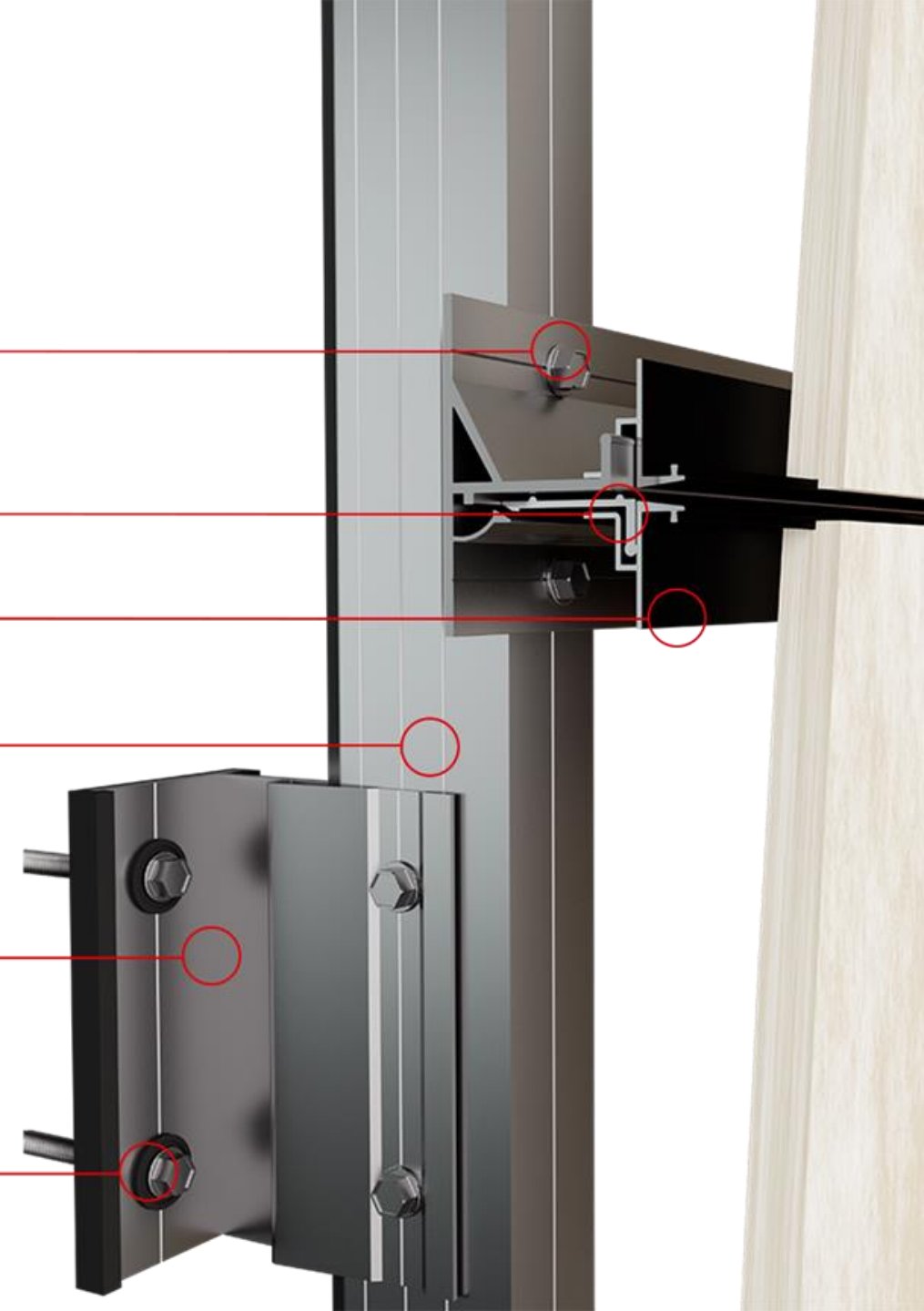
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### THERMAL ISOLATION SHIMS AND BEARINGS

REDUCES THERMAL BRIDGING BY ISOLATING THE GRIDWORX RAINSCREEN APPARATUS FROM THE BUILDING STRUCTURE







**Adhered** Kerf

University of Missouri Memorial Stadium  
Columbia, MO





**Adhered** Kerf

**Ocean Avenue Residences**  
*Brooklyn, NY*



# Floating Mount

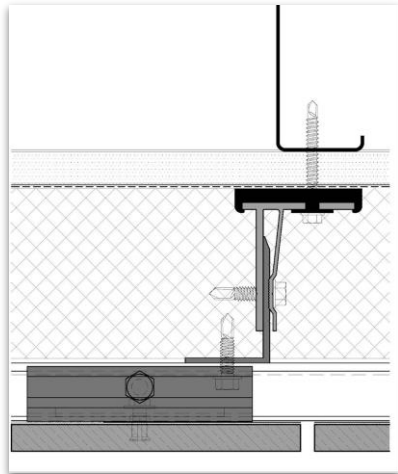
## Applications

- 2 part floating mount system
- Utilizes 4" long panel clips that are applied to the back of panel via blind undercut anchors, location and spacing is dependent on panel strength.
- Ideal for cladding thicknesses 8mm to 3"
- No limit on cladding panel height (subject to engineering review)

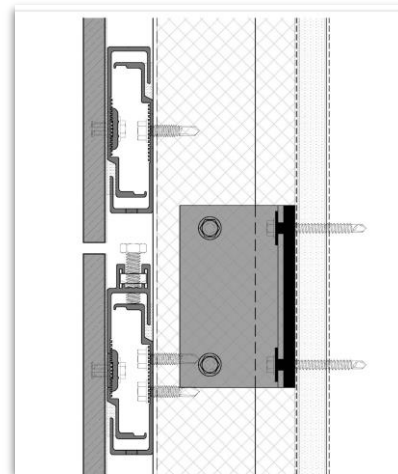
## Advantages include:

- No panel height limit (subject to engineer review)
- Easy to adjust vertical and horizontal panel placement
- Large panel sizes allow for more coverage per panel
- Thinner panel sizes can reduce labor expenses

Plan



Section





# Floating Mount

## Components

### **GRIDWORX ULTRA L SUBSTRATE CHANNEL**

CONTINUOUS RECEIVING BRACKET THAT SECURES THE PANEL CLIPS TO THE SUBSTRATE.

### **GRIDWORX ULTRA L LATERAL LOAD PANEL CLIP**

DISCRETE EXTRUSION THAT IS ANCHORED TO THE BACK FACE OF PANEL. DESIGNED TO SECURE THE PANEL FOR LATERAL/WIND LOADS

### **CONTINUOUS VERTICAL MULLION**

ALLOWS FOR +/- 1/2" OF IN/OUT ADJUSTABILITY TO PLUMB WALLS . AVAILABLE IN MULTIPLE DEPTHS

### **PITCH BOLT**

ALLOWS FOR THE MICRO ADJUSTMENT OF THE PANEL TO ENSURE A LEVEL PANEL WITH CONSISTENT JOINTS.

### **GRIDWORX ULTRA L DEAD LOAD PANEL CLIP**

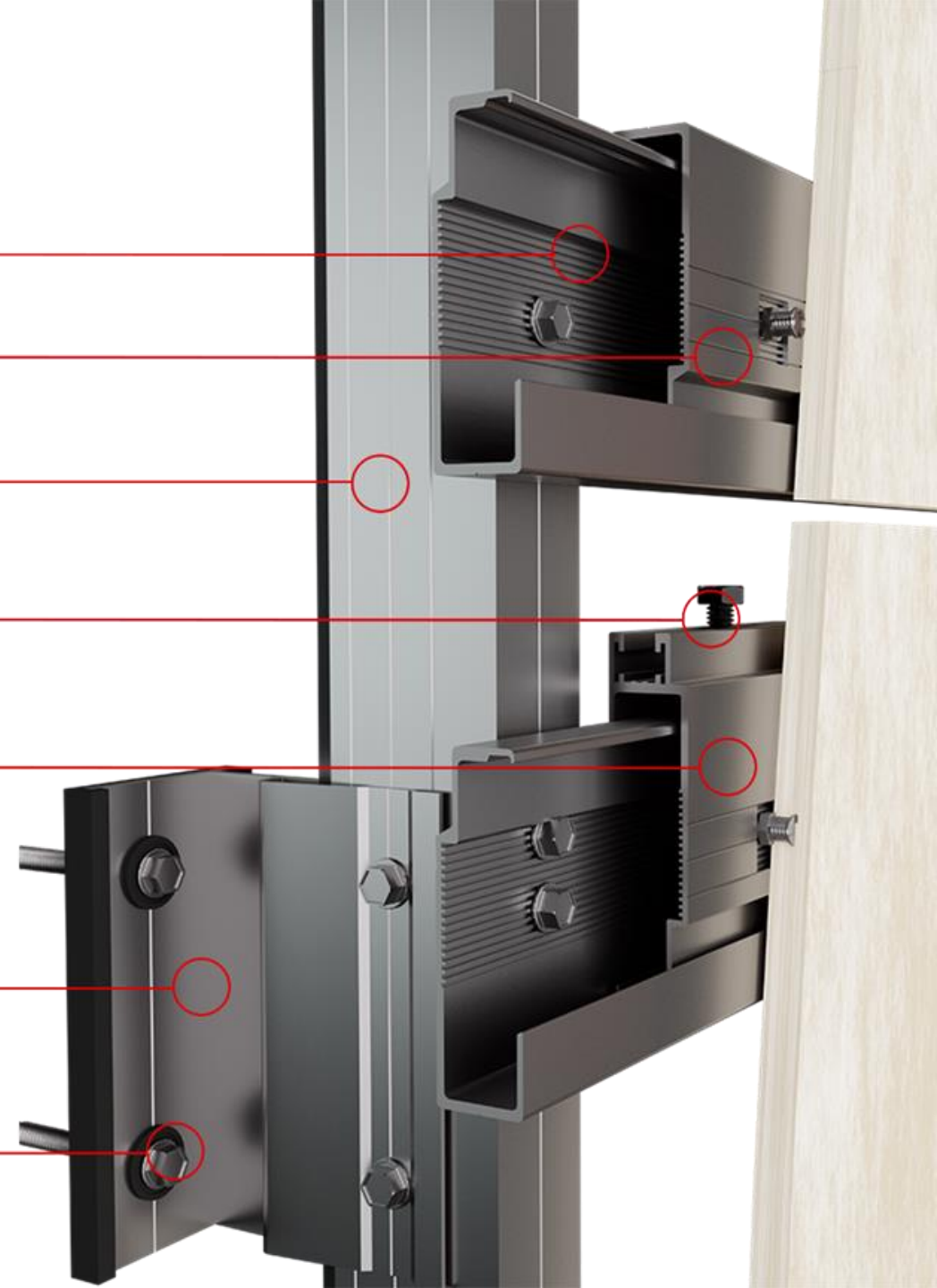
DISCRETE EXTRUSION THAT IS ANCHORED TO THE BACK FACE OF PANEL. DESIGNED TO TRANSFER THE DEAD LOAD OF THE PANEL TO THE SUBSTRATE CHANNEL

### **DISCRETE ISOTHERMAL WALL BRACKET**

AVAILABLE FOR EXTERIOR CAVITY DEPTHS FROM 2"-10". CAN BOOST PROJECT-SPECIFIC THERMAL REQUIREMENTS BY PROVIDING CONTINUOUS INSULATION

### **THERMAL ISOLATION SHIMS AND BEARINGS**

REDUCES THERMAL BRIDGING BY ISOLATING THE GRIDWORX RAINSCREEN APPARATUS FROM THE BUILDING STRUCTURE





**Floating** Mount

Atlantic Packaging Headquarters  
Wilmington, NC





**Floating** Mount

**St. Louis Kaplan Feldman Holocaust Museum**  
*St. Louis, MO*





**Floating** Mount

**15 West 96 Street**  
New York, NY



The background of the slide is a composite image. On the left, there is a grayscale photograph of a modern building with a large, grid-like facade. This image is partially obscured by large, white, diagonal geometric shapes that create a sense of depth and movement. Overlaid on the entire background are faint, light-colored technical drawings, including a site plan with a grid of streets and a circular diagram with various lines and arrows, suggesting a design or engineering context.

# Delegated Design Services **For Ventilated Rainscreens**

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# Delegated Design

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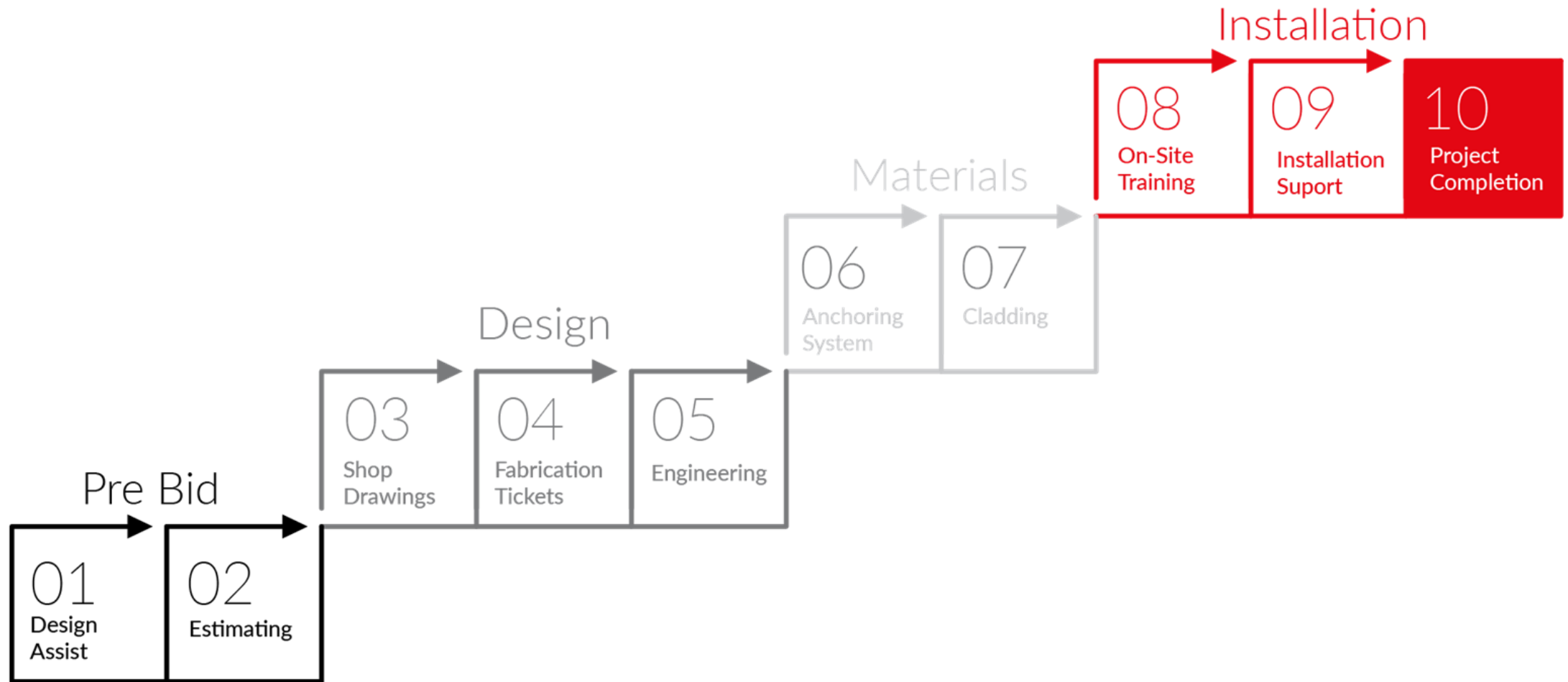
What is a Delegated Design?

## What is Delegated Design?

- A delegated design is a specified approach where the design and engineering responsibilities for the facade are assigned to specialized consultants or subcontractors. Instead of the primary architect or design team handling all aspects of the facade design, they delegate specific tasks to experts in the field.
  - The Architect/design team establishes the overall design intent and conceptual framework for the building facade.
    - Aesthetic Vision - Basis of Design
    - Approved Methods and Assemblies - Specification
    - Performance Criteria
  - The Delegated Designer should have in-depth knowledge of the facade system. Their expertise ensures a well-informed and optimized design solution.
    - Brings efficiency to the design process
    - Ensures that facade system meets or exceed performance requirements.
    - Expertise allows for customized solutions to unique building conditions
    - Can provide cost effective solutions / value engineering options
    - Takes of the risk / liability of the facade assembly
- The Delegated design process requires close collaboration between the architect, general contractor, installation team and the Delegated Designer.

# Delegated Design

From Project Concept to Completion





# Delegated Design

## Design Assistance

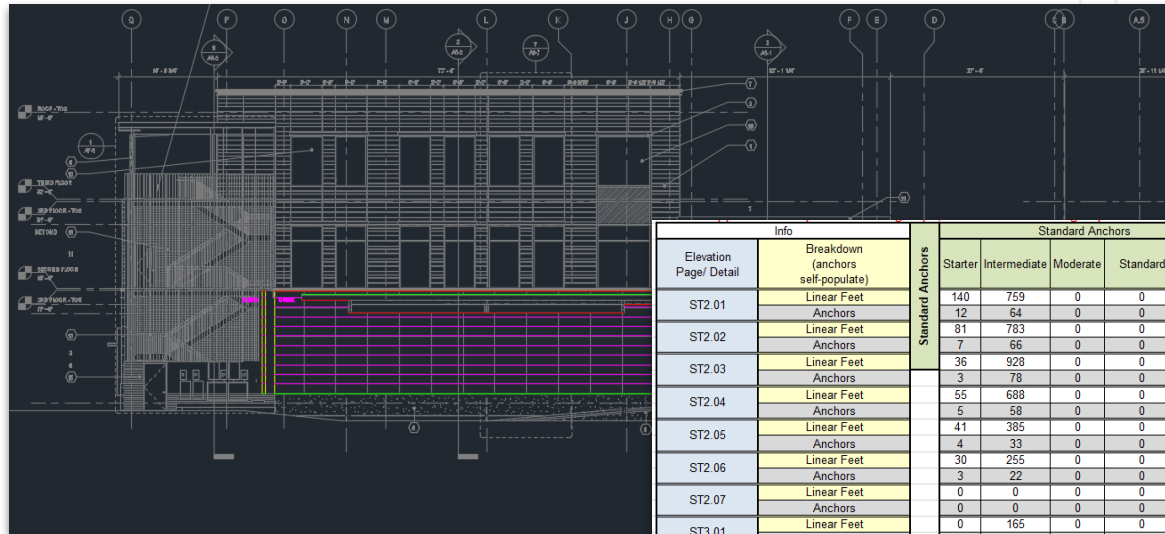
- Assist the Architect with designing a wall cladding system that achieves the desired design intent while meeting code and engineering compliance.
- Provide project specific connection details for atypical conditions.
- Submit relevant product submittal documents for permits



# Delegated Design

## Cost Estimating

Review the construction documents and provide an itemized take off that gives the owner, architect and installer the tools to meet the project budget.



Info		Standard Anchors					Extended Back Plate Anchors				Slim Anchors	
Elevation Page/ Detail	Breakdown (anchors self-populate)	Starter	Intermediate	Moderate	Standard	Top	Starter	Intermediate	Soffit T	Top	Starter	Starter
ST2.01	Linear Feet	140	759	0	0	0	0	0	27	277	128	
	Anchors	12	64	0	0	0	0	0	3	24	11	
ST2.02	Linear Feet	81	783	0	0	0	0	0	34	187	100	
	Anchors	7	66	0	0	0	0	0	3	16	9	
ST2.03	Linear Feet	36	928	0	0	0	0	0	27	255	210	
	Anchors	3	78	0	0	0	0	0	3	22	18	
ST2.04	Linear Feet	55	688	0	0	0	0	0	8	102	46	
	Anchors	5	58	0	0	0	0	0	1	9	4	
ST2.05	Linear Feet	41	385	0	0	0	0	0	3	69	27	
	Anchors	4	33	0	0	0	0	0	1	6	3	
ST2.06	Linear Feet	30	255	0	0	0	0	0	9	30	0	
	Anchors	3	22	0	0	0	0	0	1	3	0	
ST2.07	Linear Feet	0	0	0	0	0	0	0	0	135	135	
	Anchors	0	0	0	0	0	0	0	0	12	12	
ST3.01	Linear Feet	0	165	0	0	0	0	0	4	59	57	
	Anchors	0	14	0	0	0	0	0	1	5	5	
ST3.02	Linear Feet	0	172	0	0	0	0	0	1	39	38	
	Anchors	0	15	0	0	0	0	0	1	4	4	
ST3.03	Linear Feet	0	392	0	0	0	0	0	1	83	82	
	Anchors	0	33	0	0	0	0	0	1	7	7	
GROSS LINEAR FEET		383	4527	0	0	0	0	0	114	1236	823	0
+ 5% OVERAGE		20	227	0	0	0	0	0	6	62	42	0
TOTAL LINEAR FEET		403	4754	0	0	0	0	0	120	1298	865	0
TOTAL ANCHOR COUNT		34	397	0	0	0	0	0	10	109	73	0



Precision Wall Systems  
10990 Alder Circle  
Dallas, TX 75238  
214.774.4502 214.432.5963 Fax  
www.gridworxwalls.com

## QUOTATION

Quote Number: 1891  
Quote Date: Feb 11, 2019  
Page: 1

Voice: 214-774-4502  
Fax: 214-432-5963

### Quoted To:

Amiscraft International, Inc.  
PO BOX 3150  
Cambridge, ON N3H 4S8

### Shipped To:

Anderson Transit  
1220 Jackson Street  
Anderson, IN 46016

Customer ID	Good Thru	Payment Terms	Sales Rep
arr	3/13/19	Net 30 Days	

Quantity	Item	Description	Unit Price	Amount
42.00	003	Top Course J Anchor (12ft in Length). Used with top course panels- beneath windows and other architectural features.	64.50	2,709.00
217.00	002	Intermediate T Anchor (12ft in Length). Used in the central field course.	64.50	13,996.50
42.00	001	Starter J Course Anchor (12ft) in length. Used around the base perimeter- tops of windows and doors.	64.50	2,709.00
339.00	Z025	2 -1/4in Z-Channel - .08 min thickness aluminum/12' lengths	26.00	8,814.00
3,200.00	L003	3/8in Joint L-Bracket - Used with 1/4in Foam Tape. (.5) Provided and Priced per 6in piece	0.30	960.00
32.00	C002	Self Adhesive Foam Tape 1/4in 50 ft length (Used with 3/8in L-Brackets)	7.75	248.00
256.00	S200	Dow 790 Silicone used in the Kerf before L-Bracket is inserted to seal joints between stone panels and other elements. COLOR TBD (Pecora or Dow 756 is addtl)	12.75	3,264.00
4.00	C200	3/8in Open Cell Backer Rod 750 ft length (Used in 3/8in Horizontal Joints / Used in all 1/4in Joints)	70.50	282.00
2.00	C201	5/8in Open Cell Backer Rod 500 ft length (Used in 3/8in Vertical Joints Only)	47.75	95.50
5.00	WV001	Weep Vents used every 2ft along the Starter	5.25	26.25

Take off quantities are presented on a best efforts basis. It is the responsibility of the customer to purchase appropriate quantities for the project. Manufacturer will not be responsible for a variance between product purchased and product required.

Subtotal	Continued
Sales Tax	Continued
Freight	Continued
TOTAL	Continued

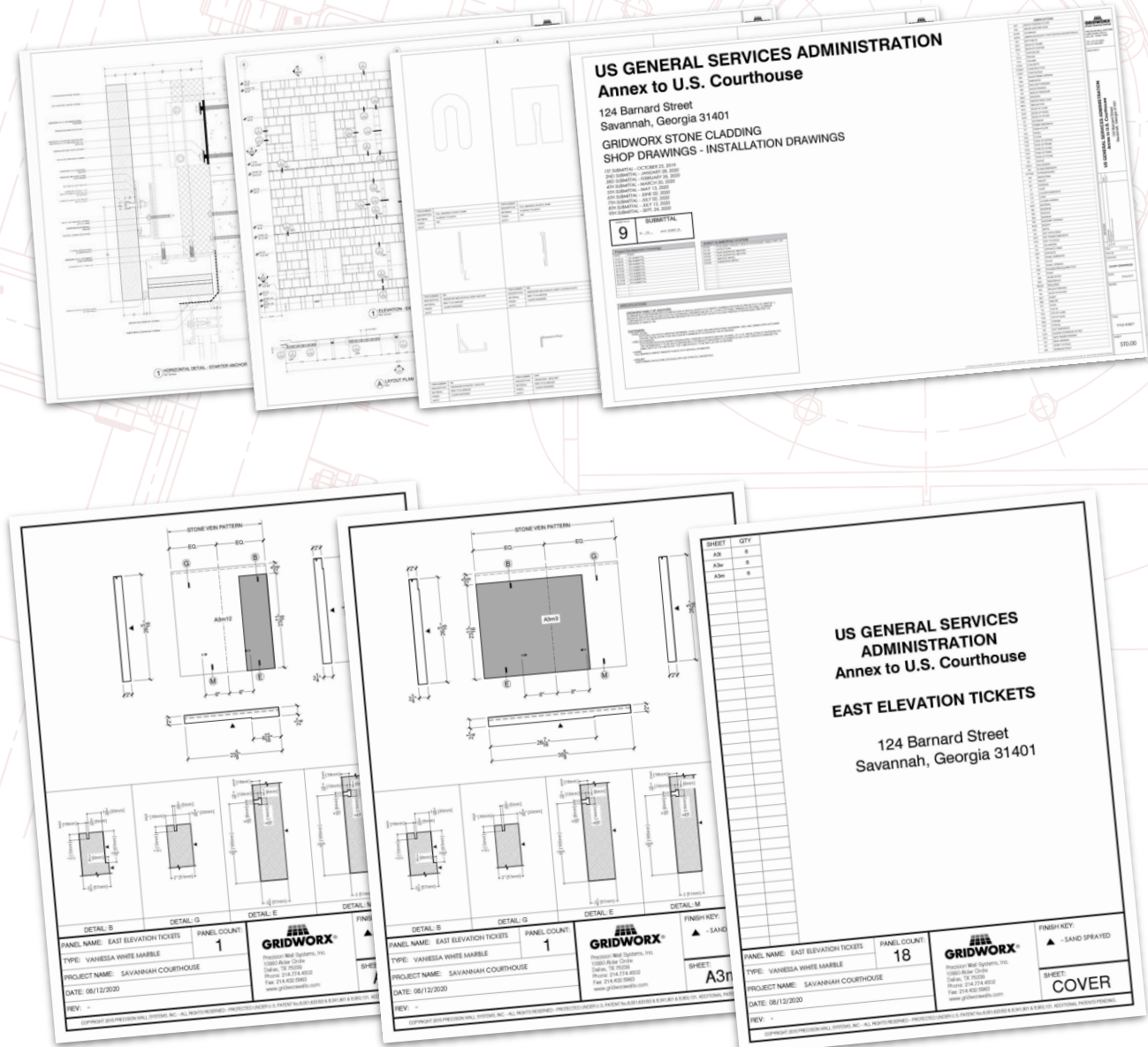
# Delegated Design

## Shop Drawings and Fabrication Tickets

**Shop Drawings** - a complete design package that ensures the cladding design meets the architect's design intent, and provides the installation team with the details and workpoints necessary to efficiently and properly install the anchoring system.

- Shop Drawings Include:
  - Product Data
  - Illustrates Parts List
  - Plans
  - Elevations
  - Wall Sections
  - Plan and Section Details

**Fabrication Tickets** - based on the approved geometry within the shop drawing package. Tickets include panel geometry, size, modifications and quantities to ensure that the quarry has the information needed for fabrication. Each ticket includes an identification tag that aligns with a specific location within the shop drawings.





# Delegated Design

## Engineering Certification

The party responsible for delegated design should work closely with an in-house or third party engineering partner, to ensure the cladding solution meets all local code requirements for permit and construction.

### Typical delegated design engineering package includes:

- Signed and stamped calculation package
  - Takes into account ASCE 7-10 loading requirements (dead, live, wind and seismic)
  - Anchorage loads
  - Fastener loads
  - Cladding breakage loads (based on ASTM results)
  - All calculations take into account safety factors, per code
- Signed and stamped shop drawings




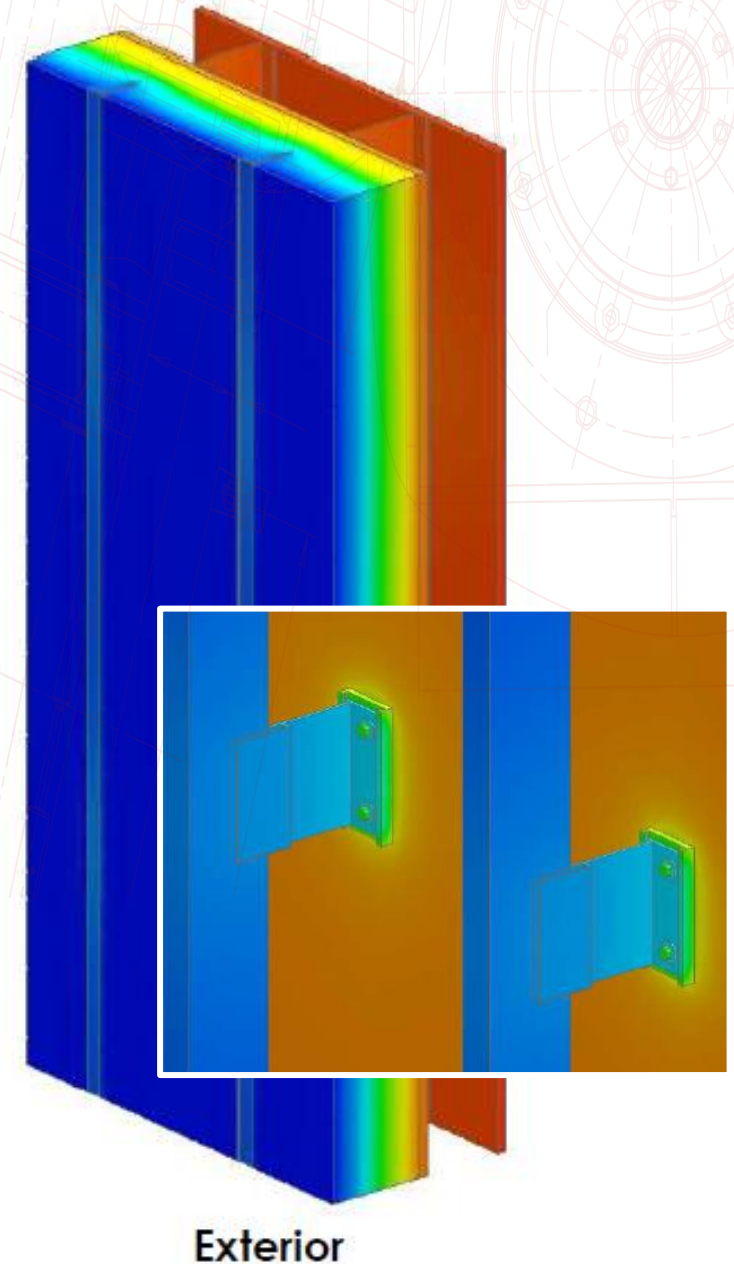
# Delegated Design

## Supplemental Testing and Reports

Additional performance certifications may be requested per specification, to be including in the engineering calculation package:

- Thermal and Condensation Reports
  - Exterior design temperature
  - Interior design conditions
  - Exterior and Interior heat transfer coefficients
  - Critical system locations and surface temperatures
  - Maximum allowable interior humidity, if applicable.
- Miami Dade, NOA assembly testing (or similar performance testing)
  - NoA Engineering Package
  - HVHZ testing on Performance Mock up
  - Engineering Report certifying performance of HVHZ test
  - Miami Dade certification process
- Air Barrier Testing
  - Air Permeance
  - Water Resistance
  - Self Sealing
  - Pull Adhesion

  
Ivan Lee, P.Eng., M.A.Sc.  
Principal, Building Science Consultant



# Ventilated Rainscreen

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## Key Takeaways

- Rainscreens are a double-wall construction method that relies on an “outer skin” made of cladding panels to protect the “inner facade” and thermal insulation of the building from direct rain, humidity, and condensation.
- Ventilated Rainscreens utilize the “chimney effect” to create constant ventilation within the facade cavity.
- This ventilation delivers superior thermal performance and moisture/condensation management.
- Ventilated Rainscreens provide healthier and safer environments for people, by reducing the chance for humidity, mold, or pollutants from entering the building.
- Ventilated Rainscreen Systems move with the substrate, allowing for greater flexibility with structural design.
- Ventilated Rainscreen Facades are typically low maintenance, and allow for the easier removal of cladding panels.
- Cladding that can be utilized with ventilated rainscreen systems can be larger, lighter and provide a variety of aesthetic options for architects.
- There are a variety of anchoring and attachment methods to accommodate a wide range of cladding materials, sizes and thicknesses.



The background features a faint, light-colored architectural drawing of a building facade with various lines and arrows. Overlaid on the left side is a grayscale photograph of a modern building with a large, grid-like ventilated rainscreen. The image is divided into geometric sections by white diagonal lines, with a solid red triangle at the bottom left.

# **VENTILATED RAINSCREEN**

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Thank You!



**GRIDWORX®**

The revolutionary stone cladding system