High Performance Façade Subsystems

"Build What is Designed, Easily"

FACADE SYSTEMS INC.

Learning Objectives

- Why systems thinking when designing high performance facades is essential, and better than just looking at the 'clip'.
- How design-assist and collaboration early helps ensure success.
- Why designing the system for specific building needs is better than 'one size fits all'.
- How value engineering can be accomplished at the design assist stage can capture savings from the beginning.
- How specification practices impact success.
- What to expect in shop drawings.
- Review case studies.

PASSIVEHOUSE CANADA Build better. Feel better.

Luiz Bezerra

Luiz is a Certified Passive House Designer and Civil Engineer with over 9 years of experience. He was the Project Manager for the first Certified Passive House in Latin America, located in his hometown of Natal in Brazil. In addition to his technical credentials, Luiz also has an MBA in Buildings Management and Construction Technology

High Performance Facades

Innovative products and construction.

Proven for all facades globally.

Toughest challenges made easy.

Making a difference for the planet.

"Build what is designed, easily"

FACADE SYSTEMS INC.

We are a manufacturer of rear ventilated façade systems made of aluminum and stainless steel.

Our design team provides engineering support to engineers and architects. We are focused on products quality and reliability which brings us in line with eco-friendliness and energy conservation.

This is the main reason why leading developers and architect offices choose U-kon.

Argeton

CERACLAD
Rain Screen Exterior Siding System

CORIUM

DEKTON® FACADES
designed by COSENTINO

U-kon SYSTEMS

Achieving High Performance Facades Should Not Be Left To Chance

We assist you to design great facades, suggest products and systems, and develop great relationships.

Stop Wondering If You Have The Optimal Facade

Facades are complex. You need a trustworthy resource

Don't leave it to chance. Together we can make iconic buildings simple and simple buildings iconic.

FSi
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Toughest Challenges – what you are telling us

- Built ≠ Design
- Trade-offs; performance and / or cost
- Specification
- Constructability
- Independence of cladding.
- Best value engineering opportunities.
- Initial and Lifecycle costs.
- Sustainability

Consider Everyone's Needs

OWNER
Tender evaluation
Monitoring
Energy efficiency

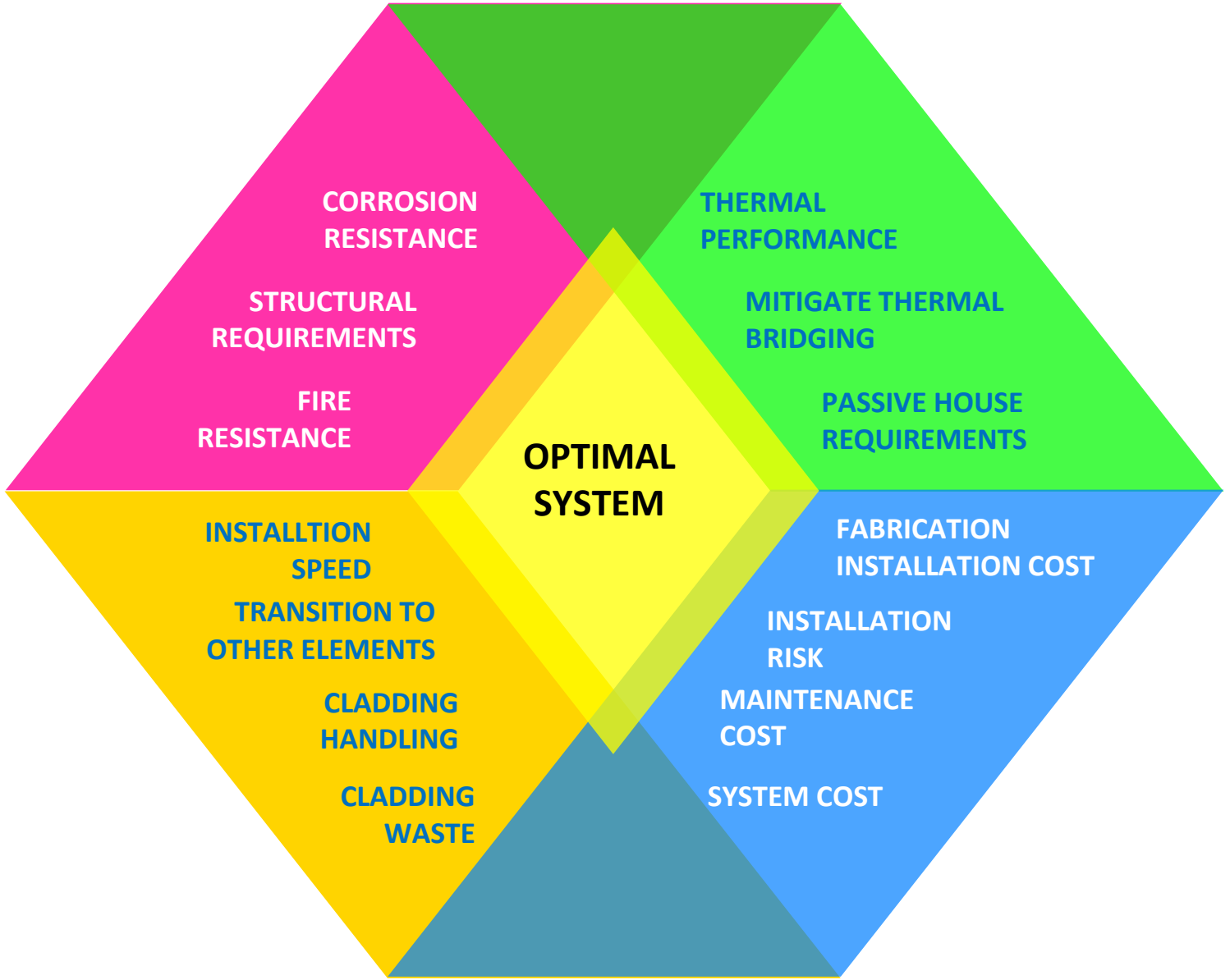
CLADDING INSTALLER
Bidding support
Layout optimisation
Installation documents

ONE-STOP SOURCE

ARCHITECT
One system for all types of design ideas
Concept and detailed design
3D Modeling
Thermal calculation

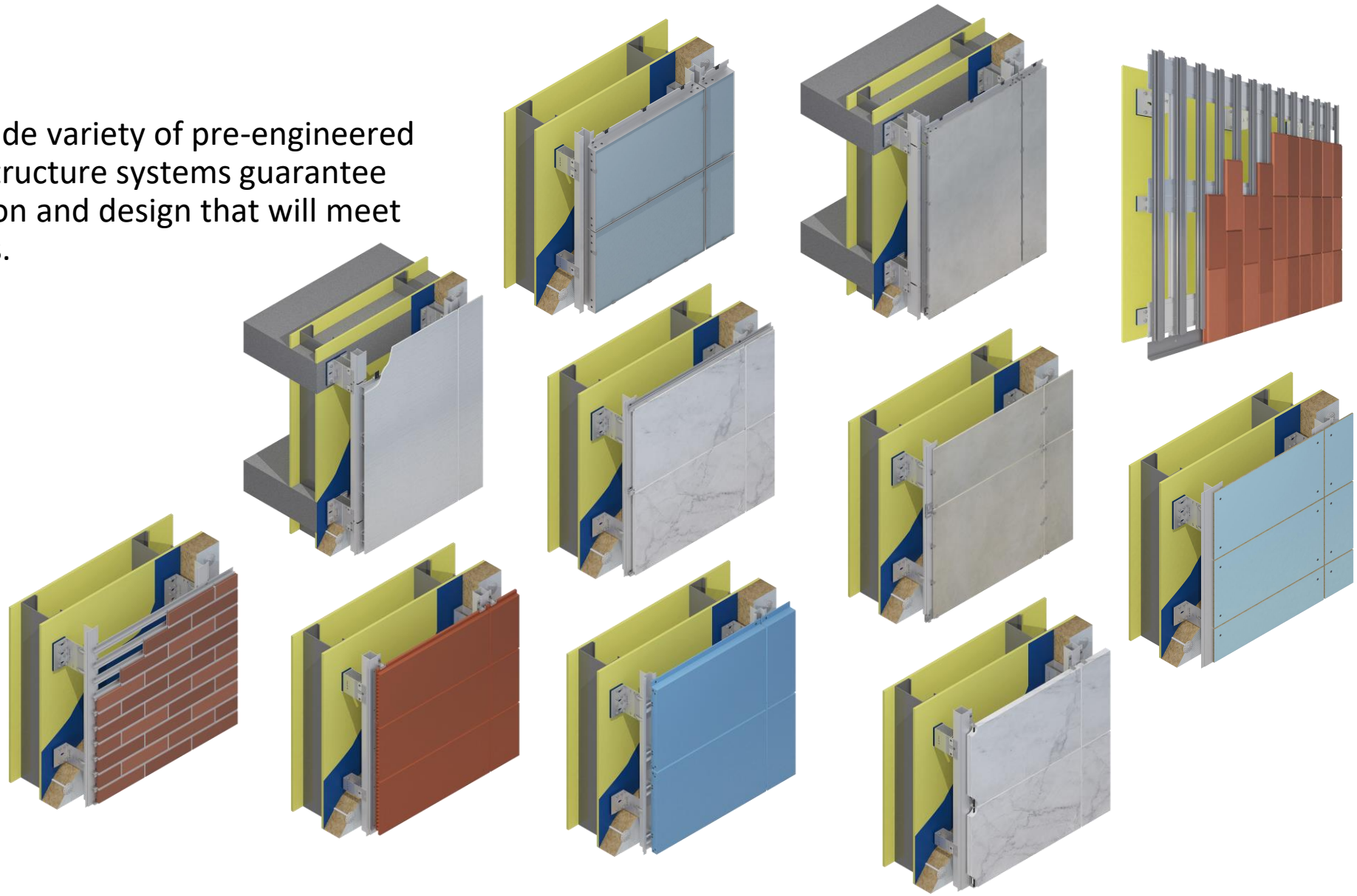
GENERAL CONTRACTOR
Value engineering
Technical/ Construction design
Mock-ups/Prototypes

Many factors; Systems Thinking by Experts



Subsystem Independent of Cladding Types

The wide variety of pre-engineered rainscreen substructure systems guarantee simple installation and design that will meet all requirements.



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Build What Is Designed

Best accomplishments are at the beginning

- Design review.
- Cladding layout review.
- Initial system recommendation.
- Initial structural engineering and resulting thermal performance.
- Comprehensive value engineering.
- Cladding fabrication recommendations.
- Budgeting.

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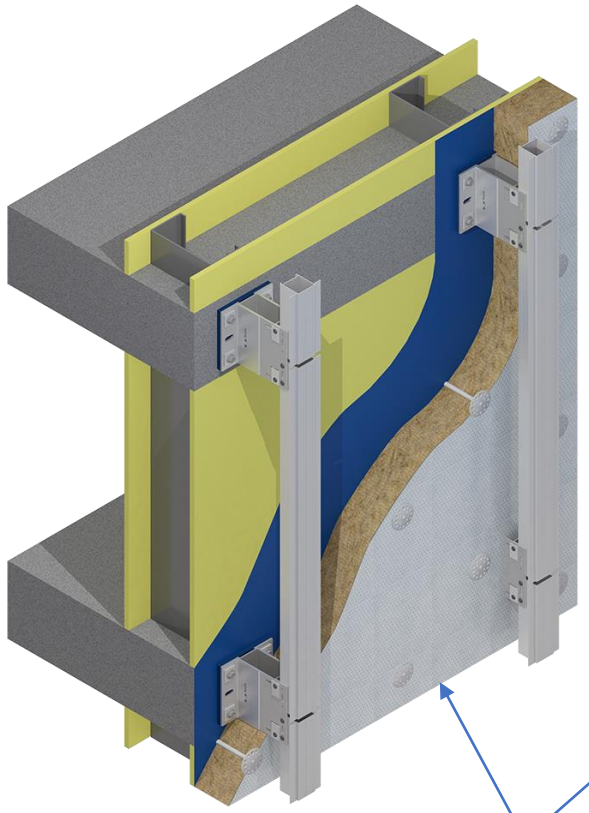
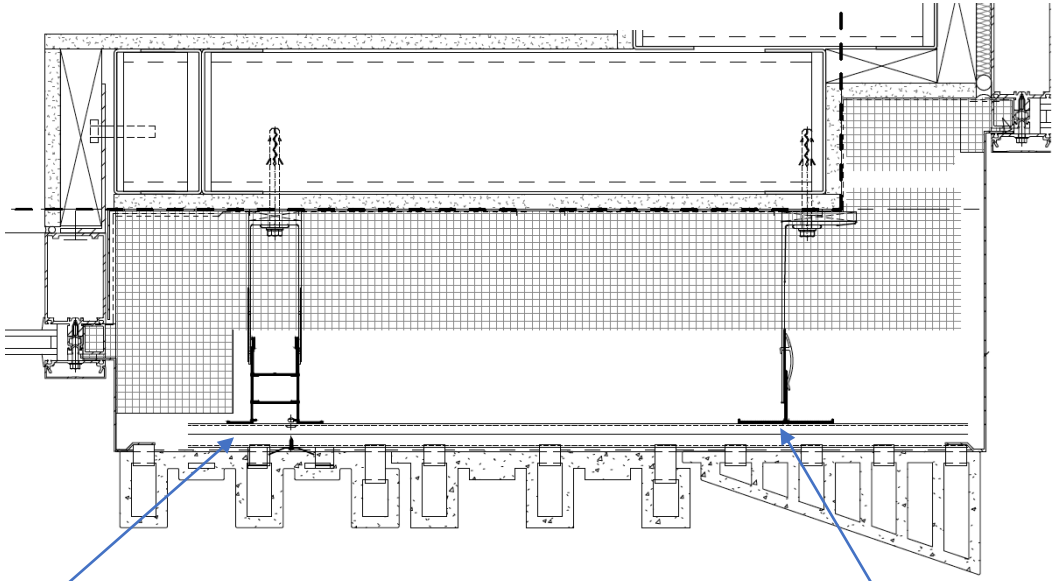
Moving on to the 'how'

System Selection at Concept = Highest Return





Slab to Slab
Higher loads / Wall Bracket
Faster Install

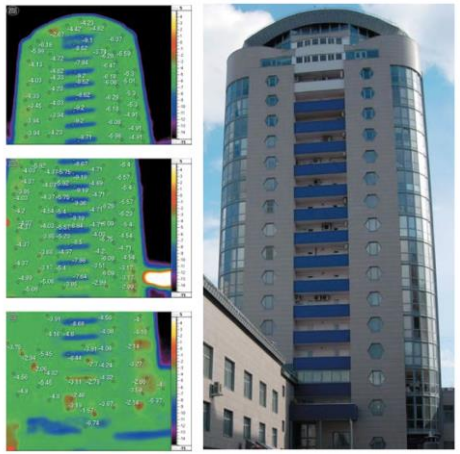
Distributed System
Lighter gauge wall backets
Slower Install

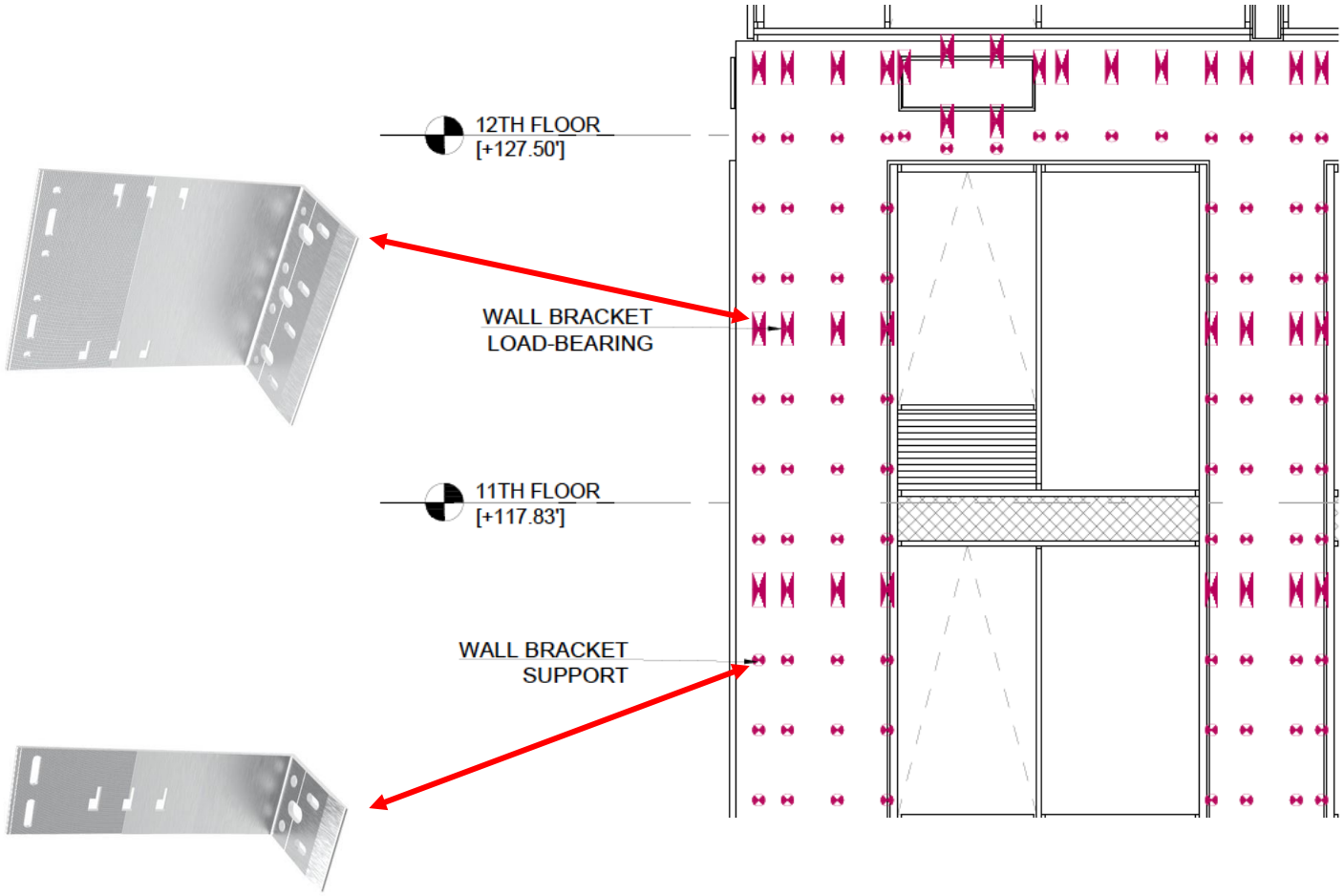
Design Assist Example: Connecting Structural and Thermal Requirements

A façade is modelled for structural requirements and thereby thermal results.

Initial budgeting and value engineering opportunities identified.

Problems revealed early.

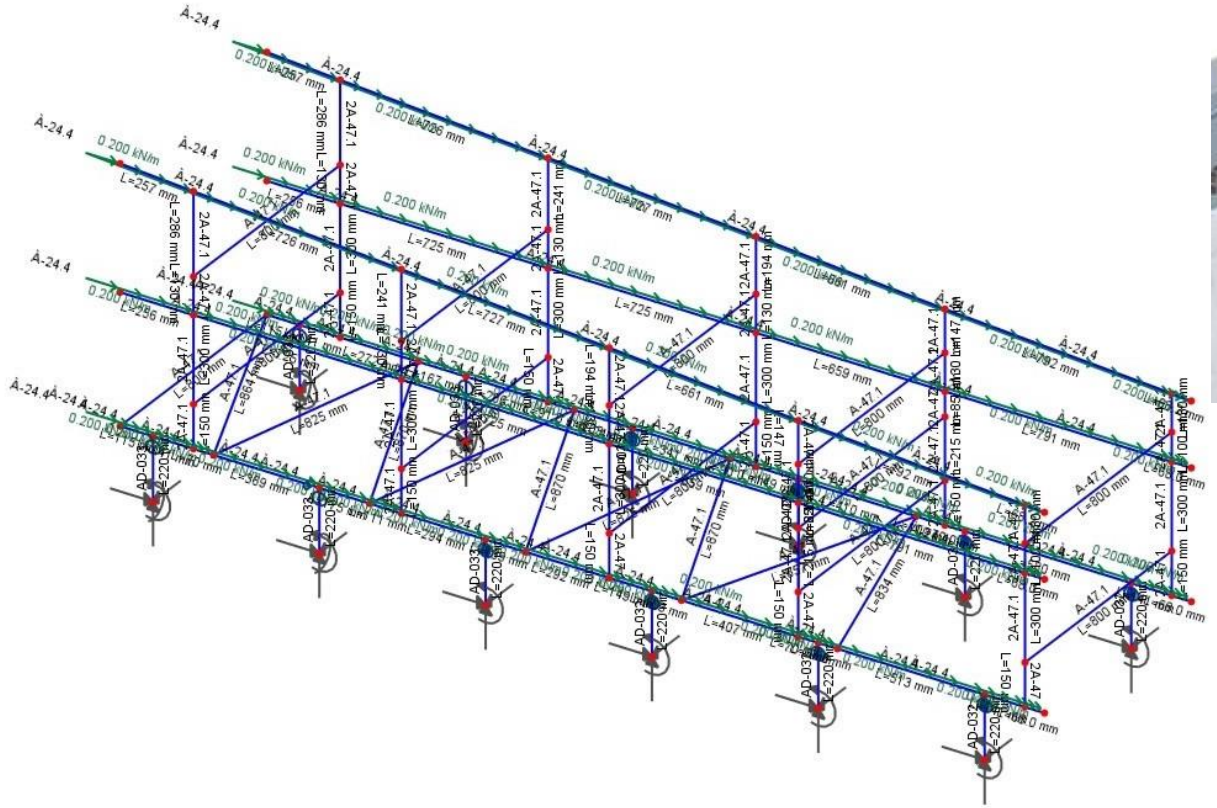


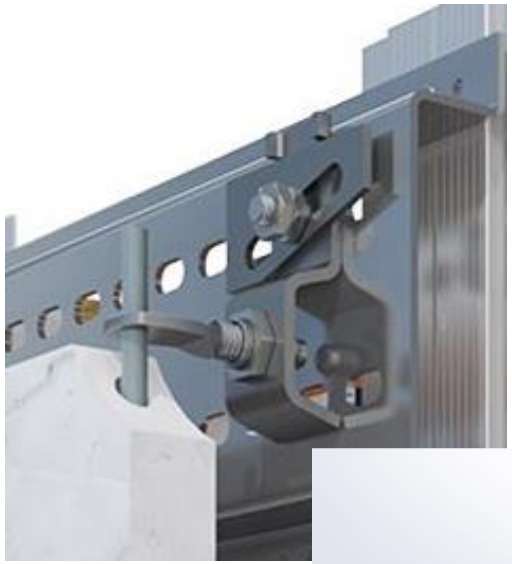


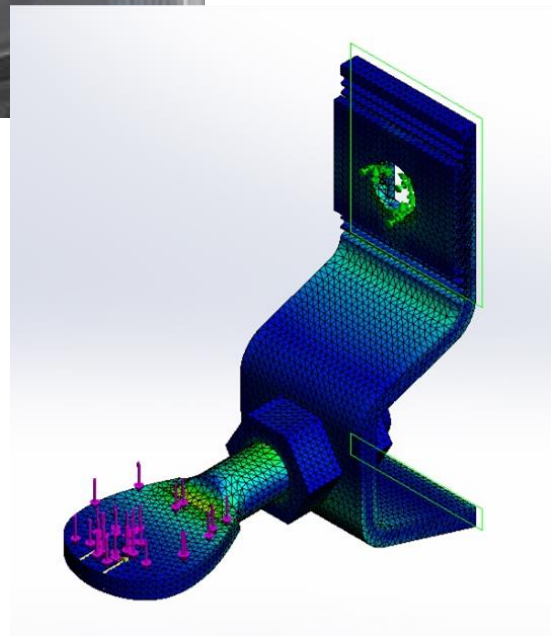
Location of wall brackets; based on structural analysis

Structural calculations model of specific components and system

Engineering goes back to **first principles**, avoiding the one size fits all.







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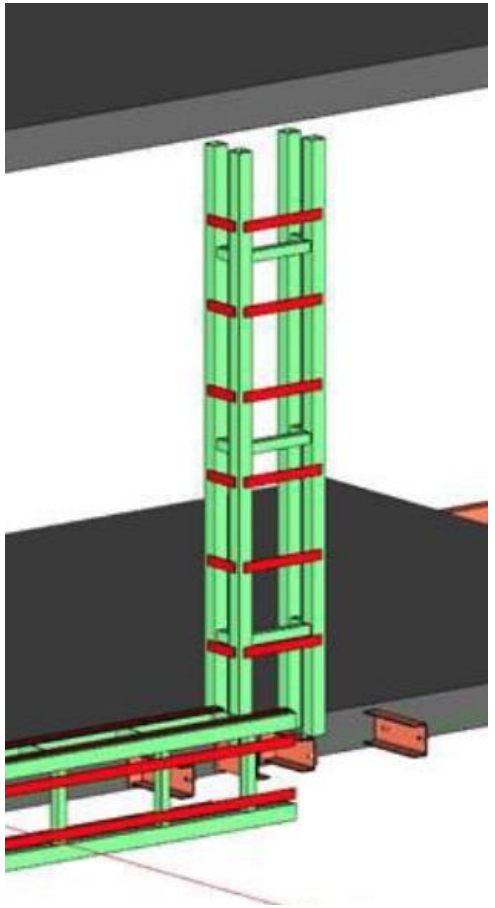
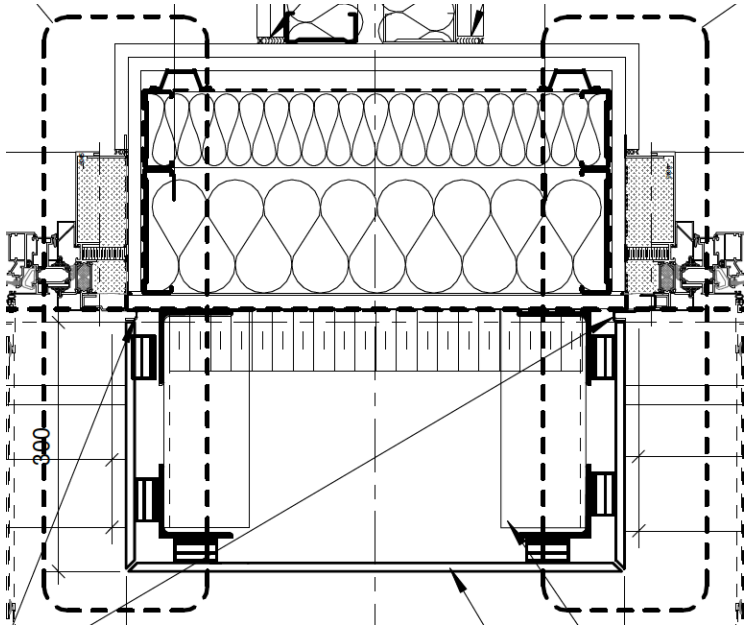
Value Engineering: Replace HSS

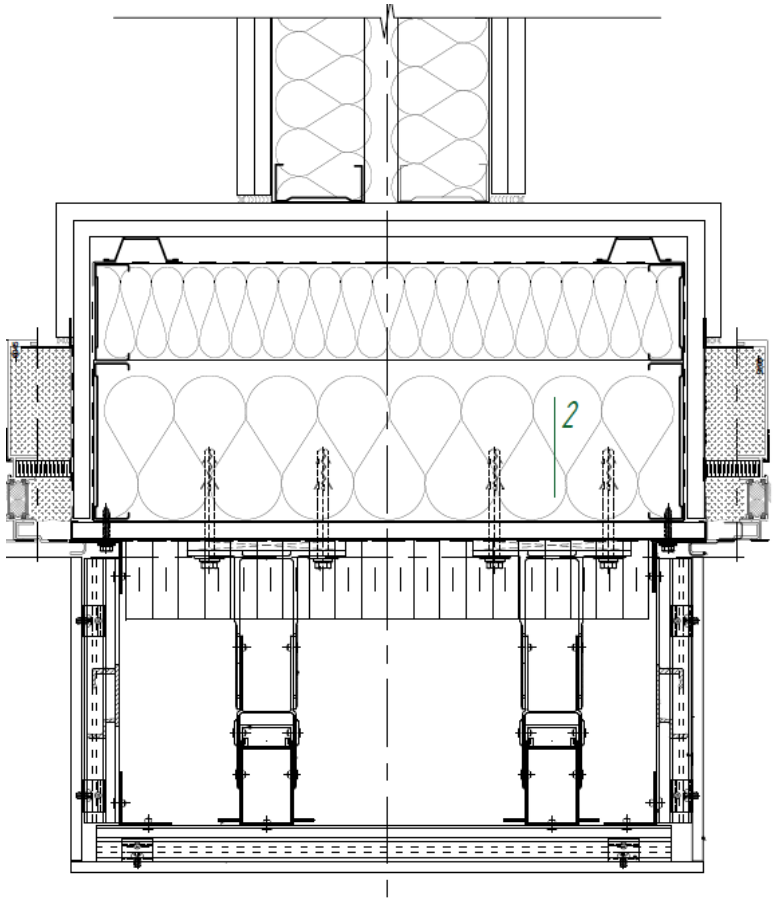
Original design

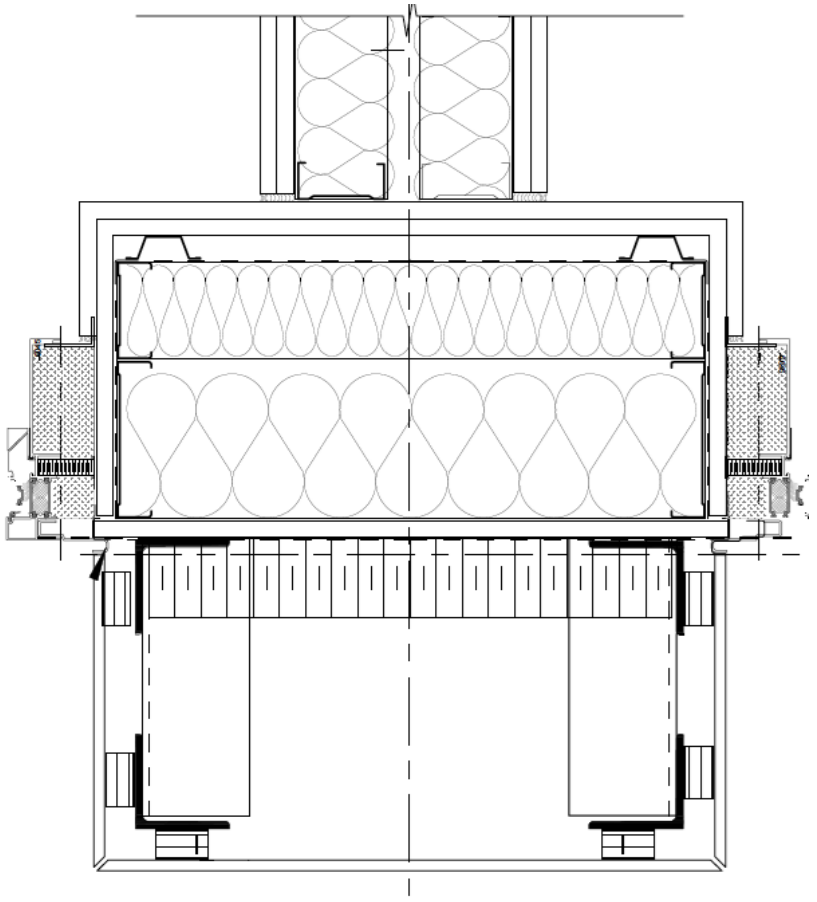




Column

Value Engineering: Replace HSS





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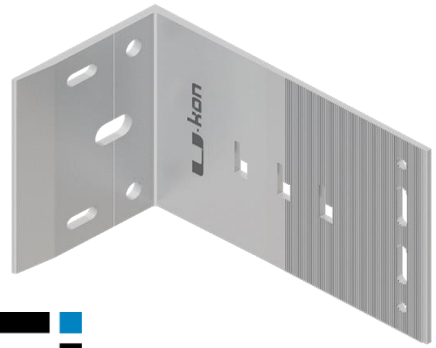
Proposed design

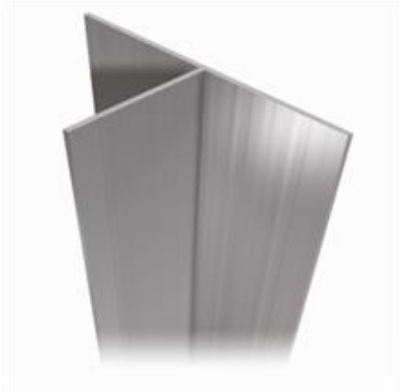
High Rise Stone

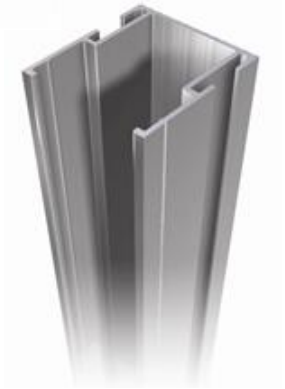
Systems & “Building Blocks”

#1 Wall Brackets



#2 Profiles





#3 Cladding Attachments

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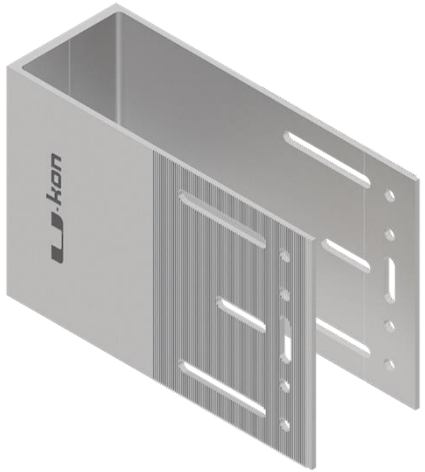
Note: Often different systems are used on the same building, depending on cladding and loads

First “Building Block” – Wall Brackets

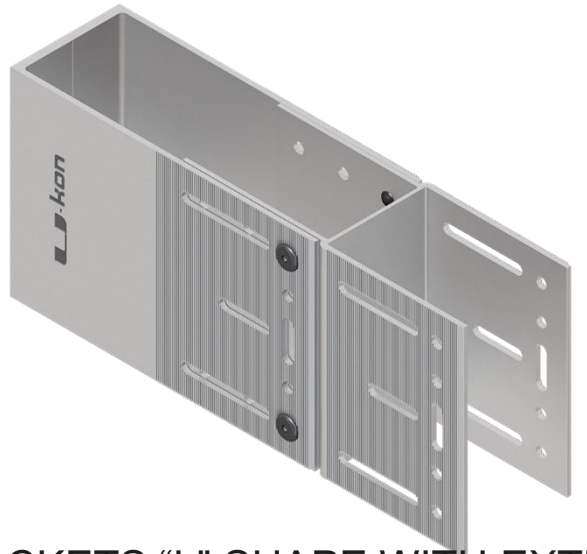
Different brackets, extenders, materials provides unique flexibility

Adjustable in three directions: higher quality, faster install

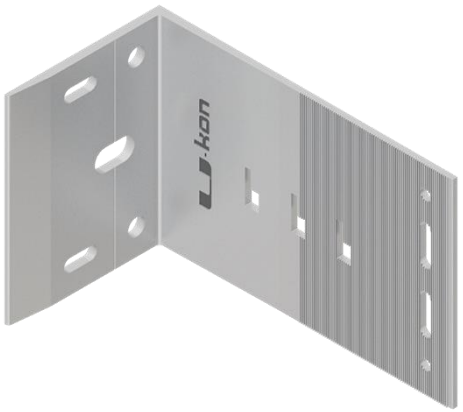
WALL BRACKETS “U” SHAPE



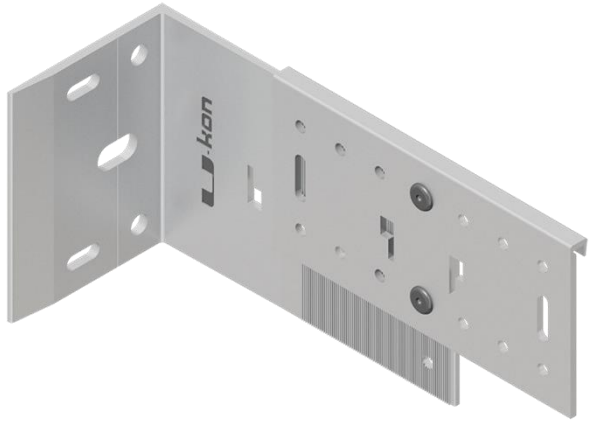
WALL BRACKETS “U” SHAPE WITH EXTENSION



WALL BRACKETS “L” SHAPE



WALL BRACKETS “L” SHAPE WITH EXTENSION



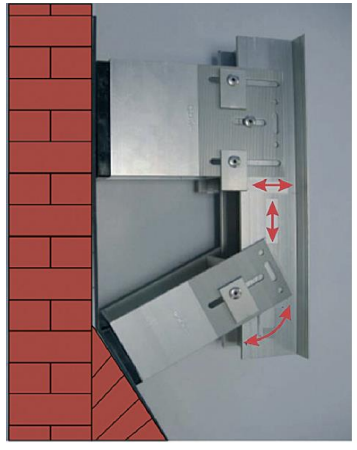
Wall Brackets Adjustable in Three Directions

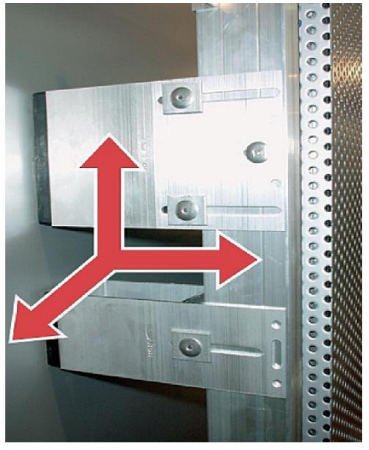
Uneven wall not an issue, e.g. recladding.

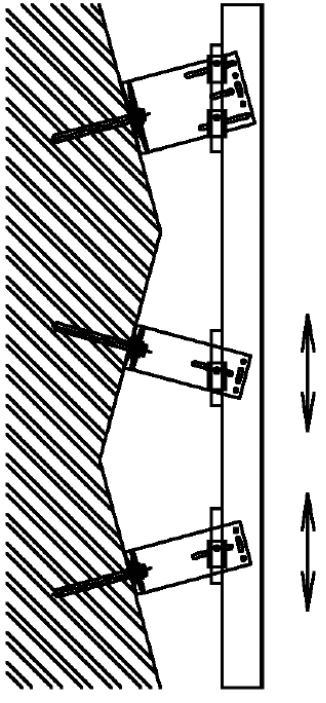
Install: attach then adjust, reducing error and rework.

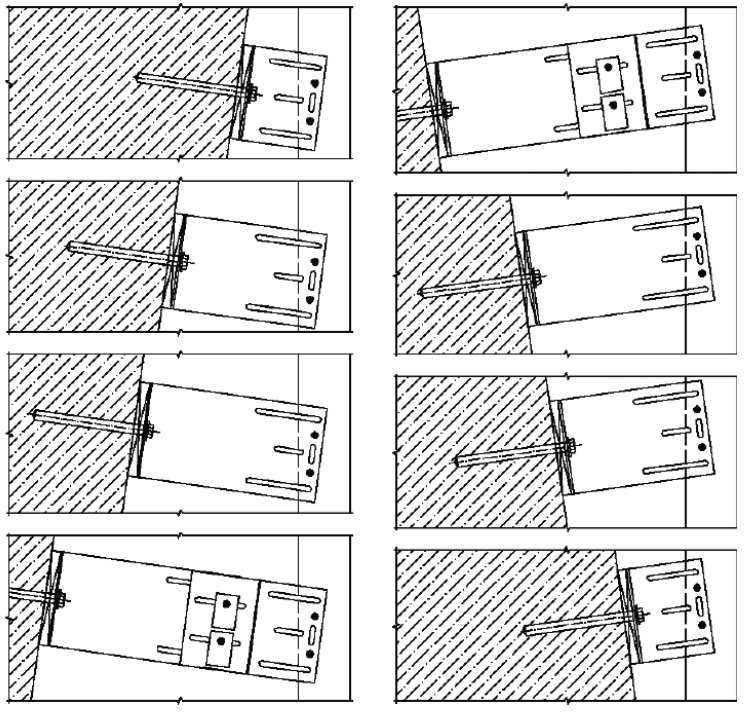
Reduce compromises on site,

“Build What Is Designed, Easily”

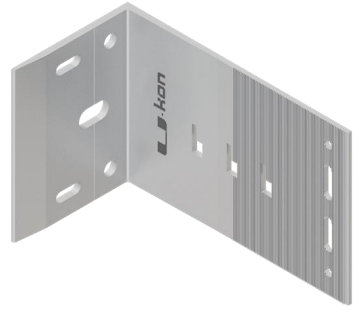






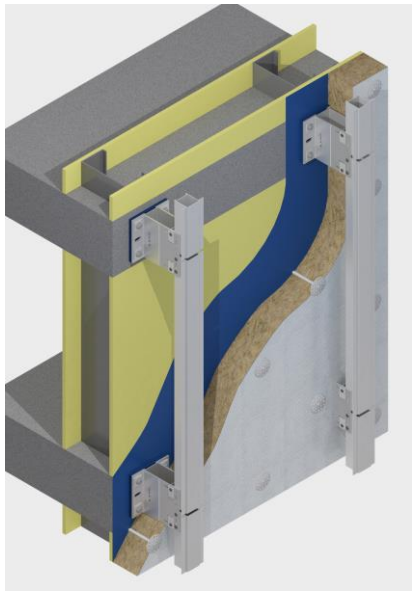


WITHOUT EXTENSION



WITH EXTENSION

Thermal Performance Explained



Vertical Spacing **in**	Exterior Insulation Thickness **in**	Exterior Insulation Nominal R-Value	Aluminum Bracket Assembly Effective R-Value	Stainless Steel Bracket Assembly Effective R-Value	Assembly Effective R-Value (Stainless steel Bracket HIGH)*
24	4	R-16.8	R-14.3	R-17.7 (20%)	
24	5	R-21.0	R-16.0	R-21.1 (25%)	
24	6	R-25.2	R-17.7	R-24.8 (29%)	
36	4	R-16.8	R-15.8	R-18.3 (14%)	
36	5	R-21.0	R-18.0	R-21.9 (18%)	
36	6	R-25.2	R-20.2	R-25.8 (22%)	
48	4	R-16.8	R-16.7	R-18.7 (11%)	
48	5	R-21.0	R-19.3	R-22.4 (14%)	
48	6	R-25.2	R-21.8	R-26.3 (18%)	
120	4	R-16.8			18.2*
120	5	R-21.0			21.9*
120	6	R-25.2			25.8*

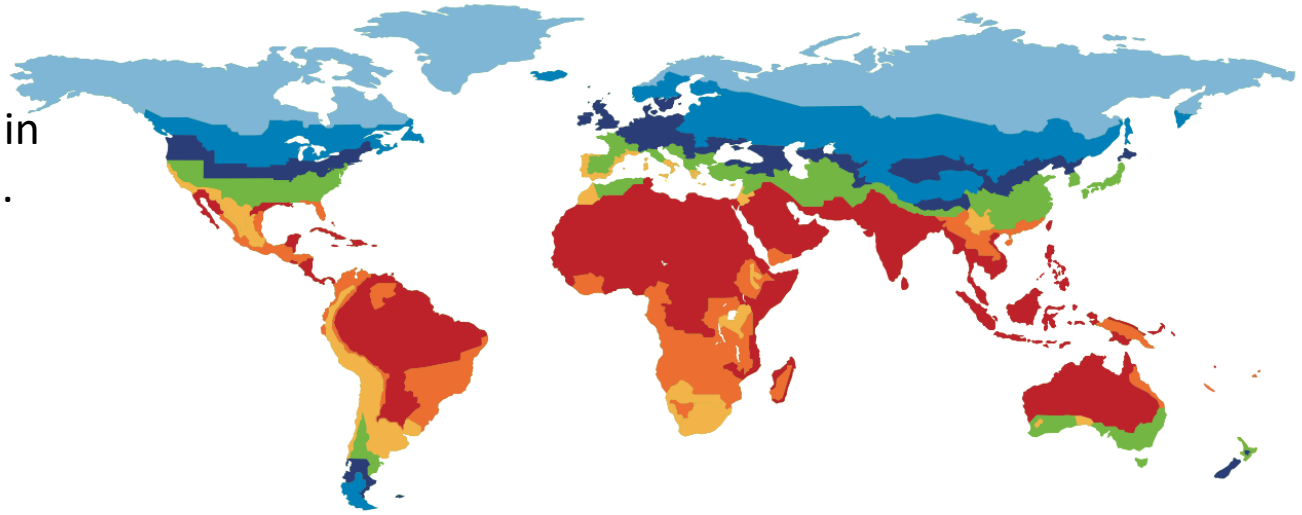
THERMAL ANALYSIS PERFORMED BY MORRISON & HERSHFIELD

* - Bracket is mounted to the intermediate floor slab, thermal bridging of the concrete slab must be included in the analysis. As a result, a linear transmittance value, Ψ, is provided to account for the thermal bridging effect of the intermediate floor.

Passive House – Façade Anchor

Passive House Institute tests and certifies products in respect of their suitability for use in Passive Houses.

Certification facilitates the designer's task and contributes significantly to ensuring the faultless functioning of the resultant Passive House.



Passive is Not Passive For All ‘Anchors’
(Wall brackets)

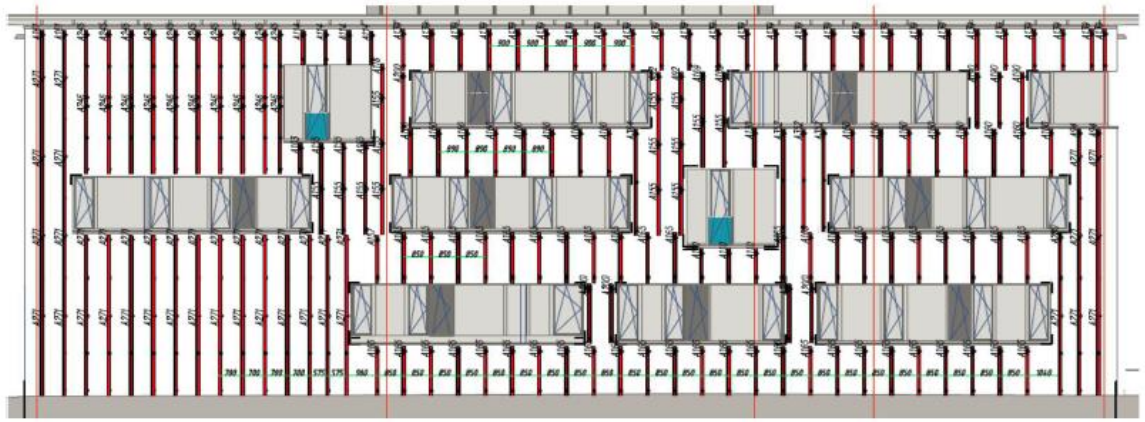
Certification requires meeting design targets set by PHI, using manufacturer’s documented engineering factors e.g. structural capacity.

There are four levels of certification.

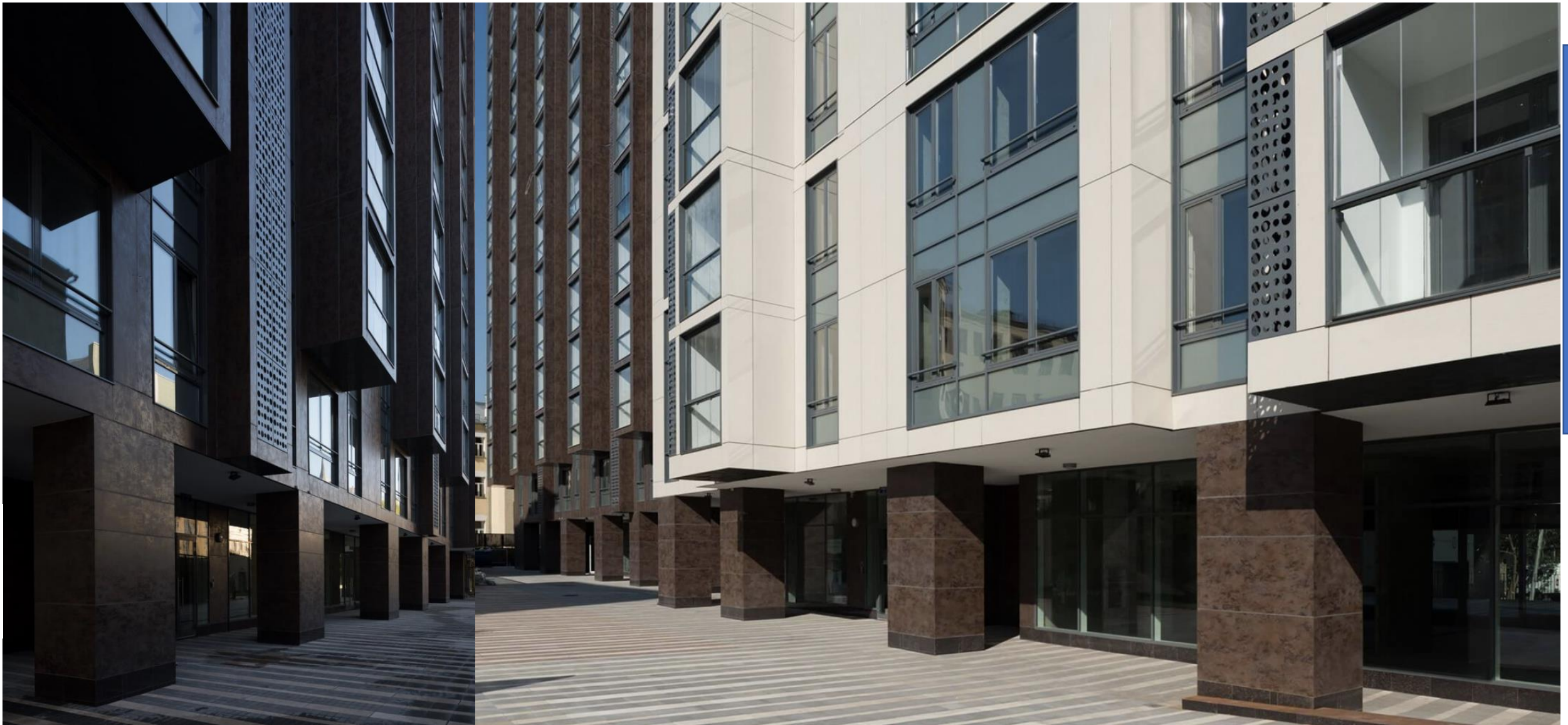
Designers beware of input assumptions on regions, loading and certification level.

cool, temperate climate phC CERTIFIED COMPONENT Passive House Institute	< 0,200 W/(kN K)	certifiable component
cool, temperate climate phB CERTIFIED COMPONENT Passive House Institute	< 0,070 W/(kN K)	basic component
cool, temperate climate phA CERTIFIED COMPONENT Passive House Institute	< 0,030 W/(kN K)	advanced component
cool, temperate climate phA+ CERTIFIED COMPONENT Passive House Institute	< 0,010 W/(kN K)	very advanced component

Criteria validated based on reference facade	ΔU [W/m²K]
LC VI	0.0164



Porcelain

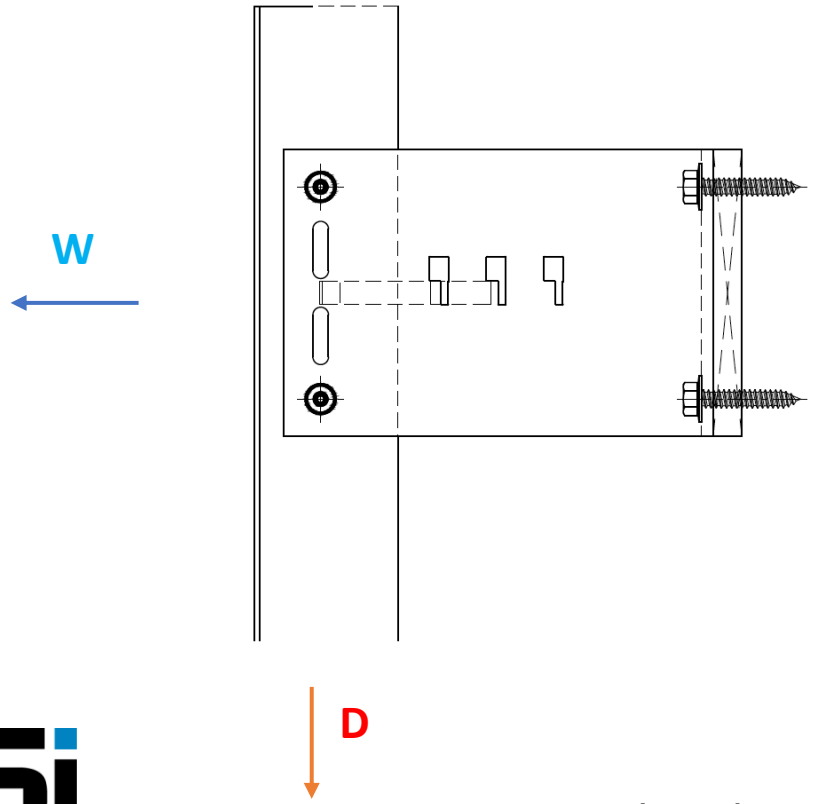


Profiles: “Building Block” #2

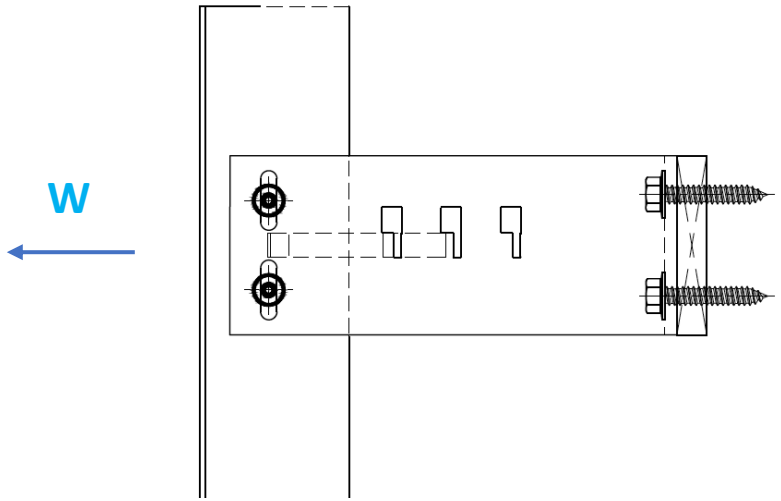
VERTICAL PROFILES DEPENDS ON TYPE OF WALL
BRACKETS AND CLADDING PANELS CHANGES

Fix and Sliding connection

Fix Point Bracket



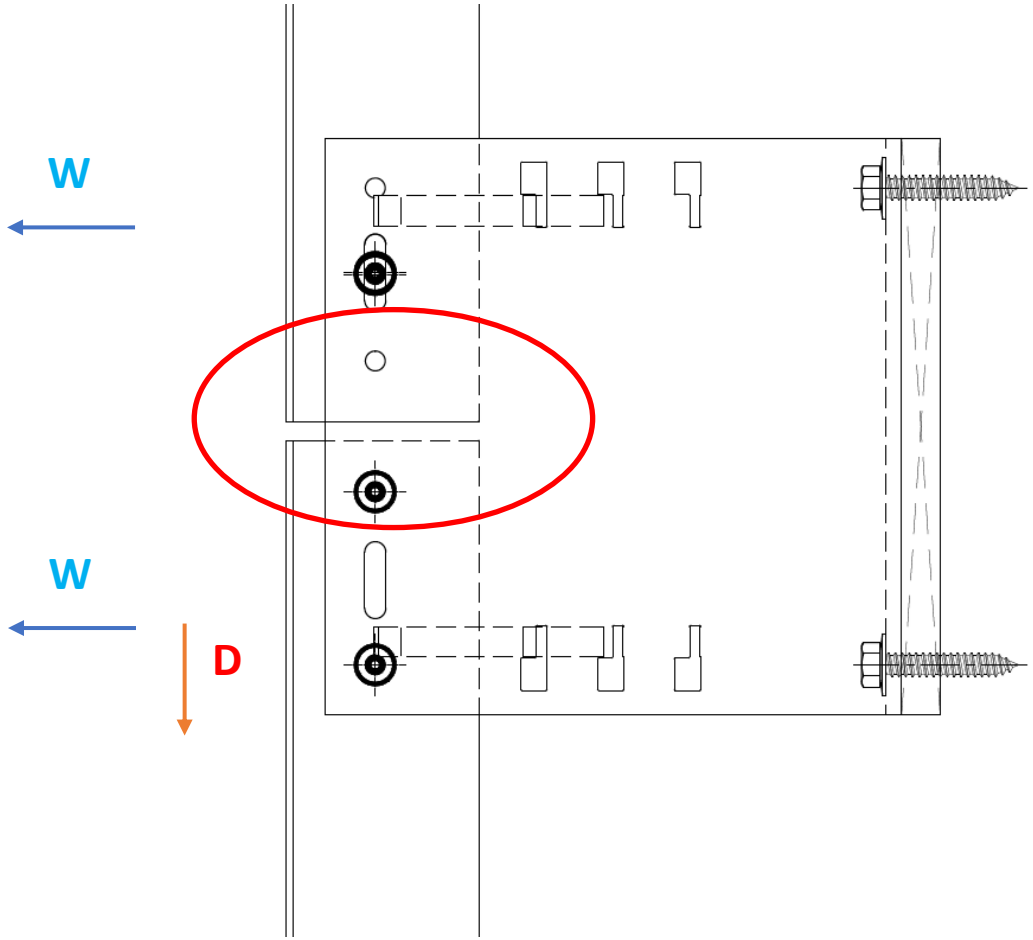
Sliding Point Bracket



When the temperature of aluminium is increased, the metal expands and this is called thermal expansion.

Vertical rail in -20C has length 2700 mm with +30C the length will change to 2703 mm

Innovations Reducing Wall Brackets



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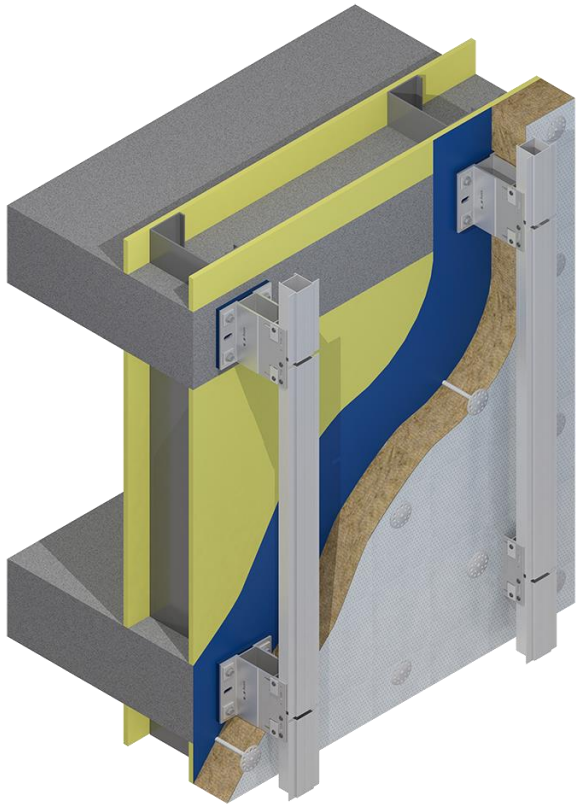
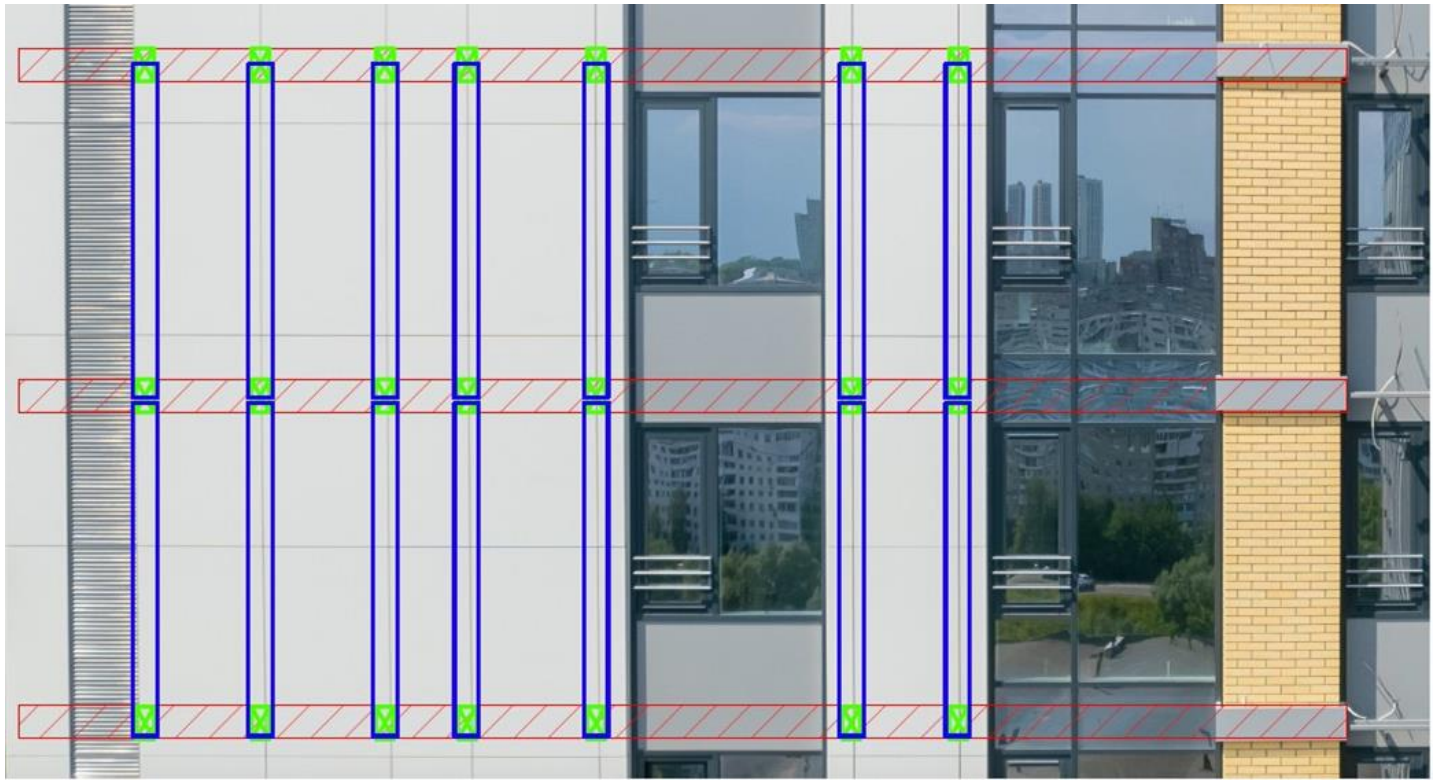
Connected Slab to Slab

Innovative System: Slab-To-Slab

Reduce wall brackets, easy alignment, unload studs.





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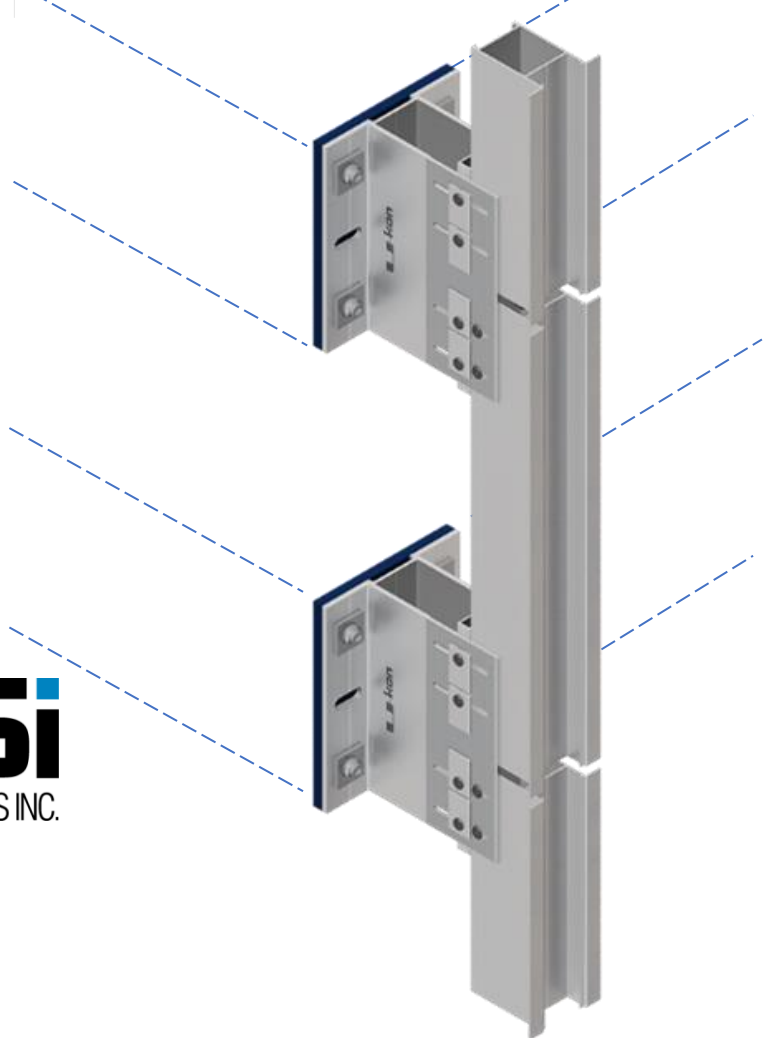
Back wall can be anything: studs, concrete, block or existing wall

Slab to Slab attachment methods

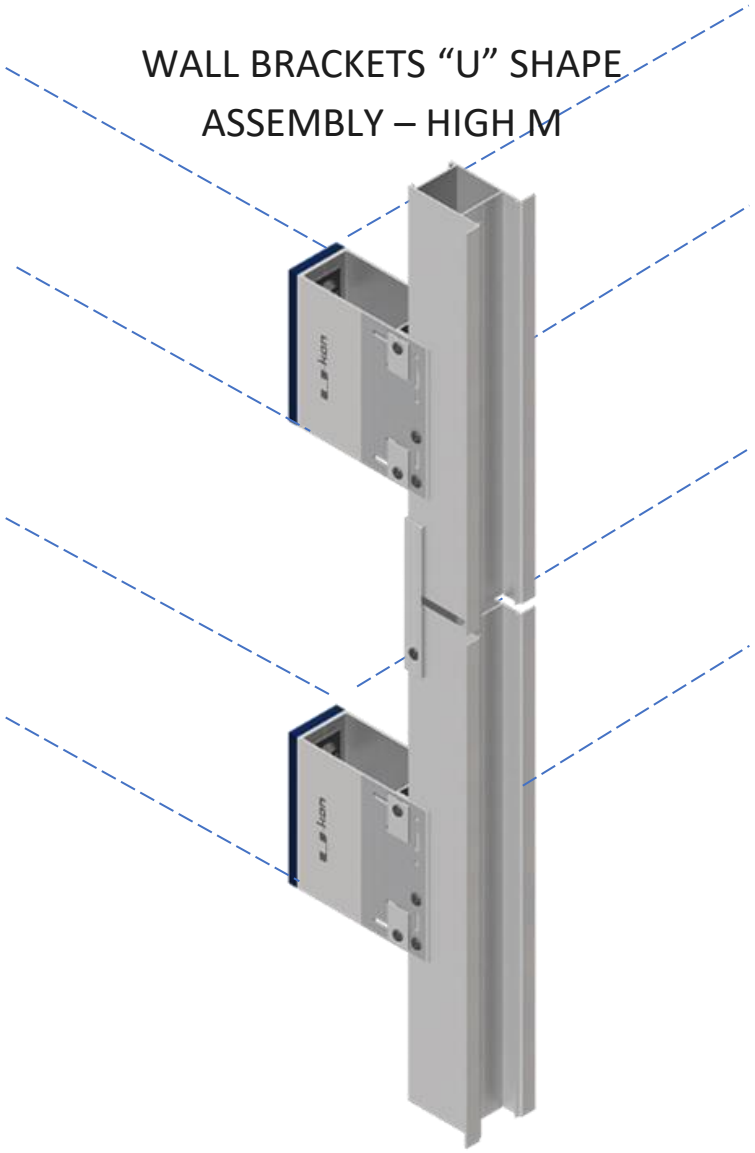
WALL BRACKETS “U” SHAPE

ASSEMBLY - HIGH



WALL BRACKETS “U” SHAPE

ASSEMBLY – HIGH M



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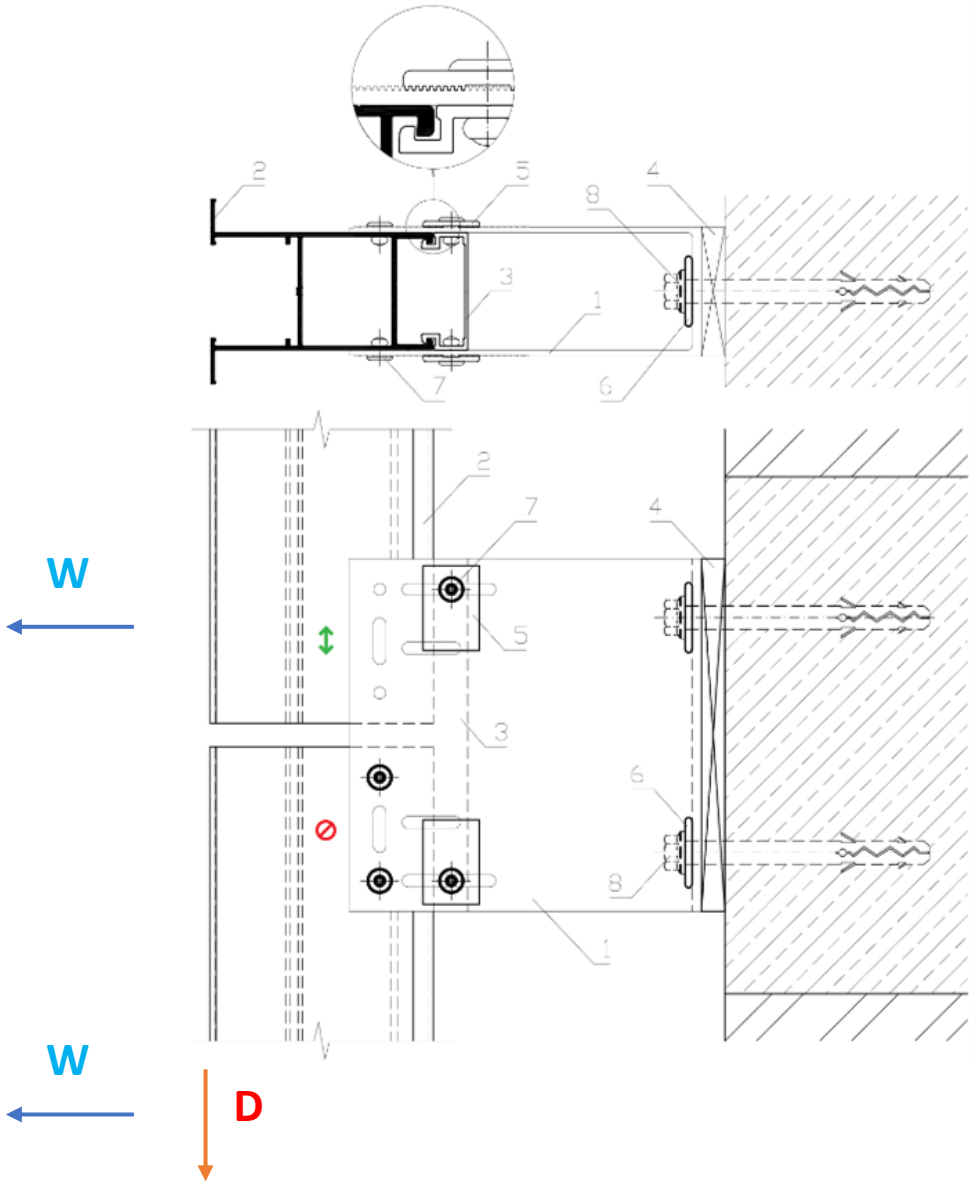
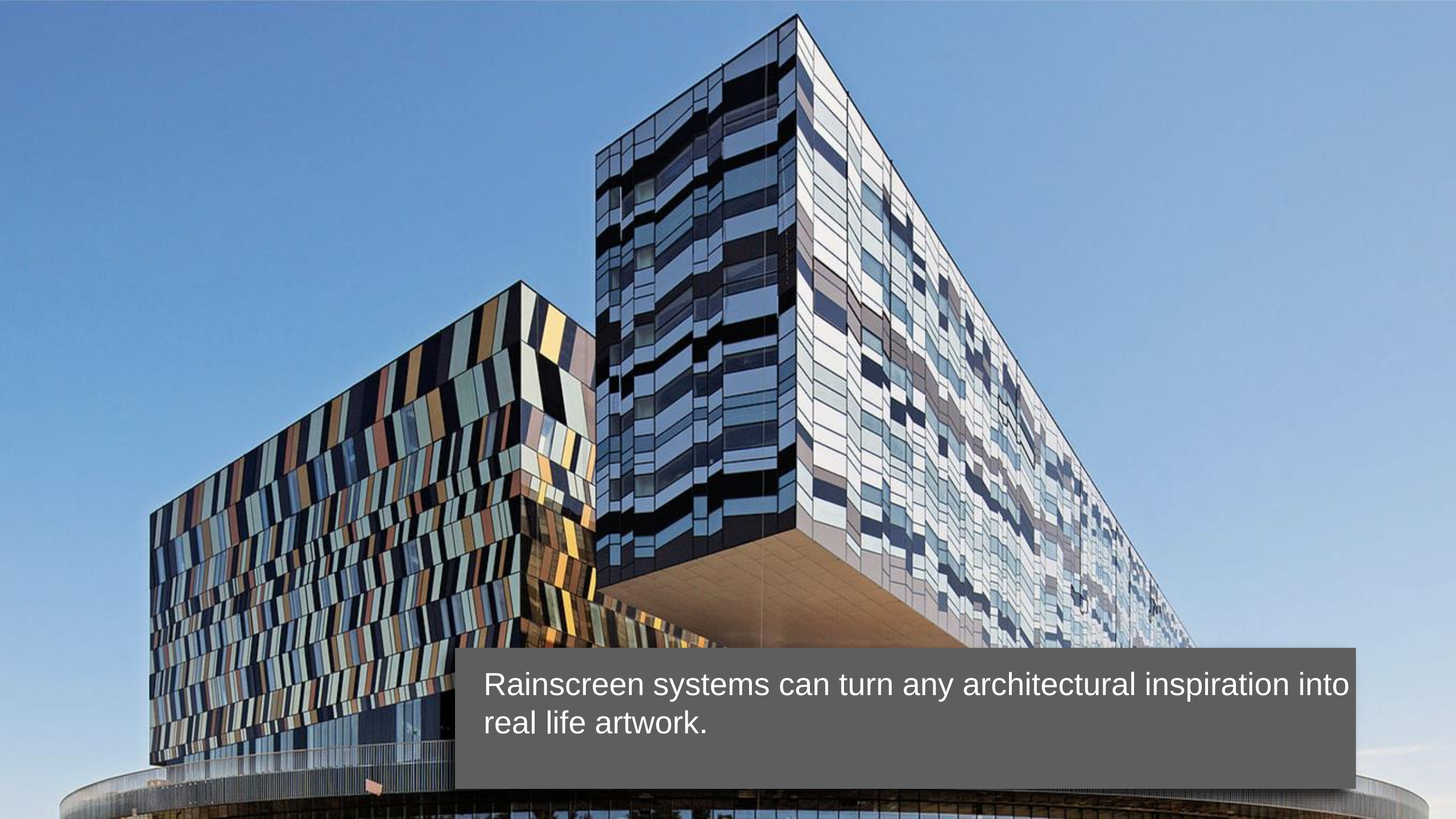
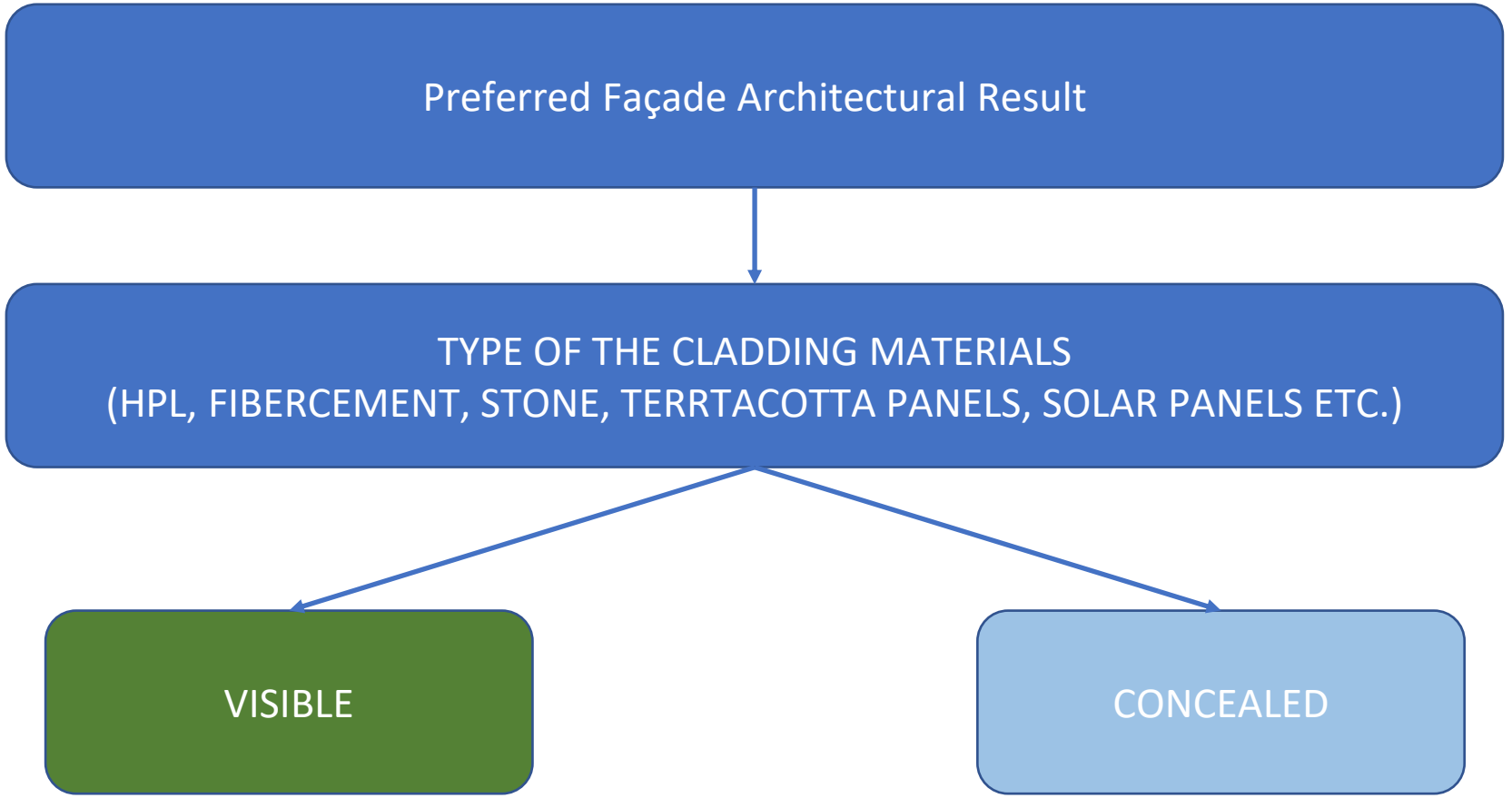
Fix and Sliding connection



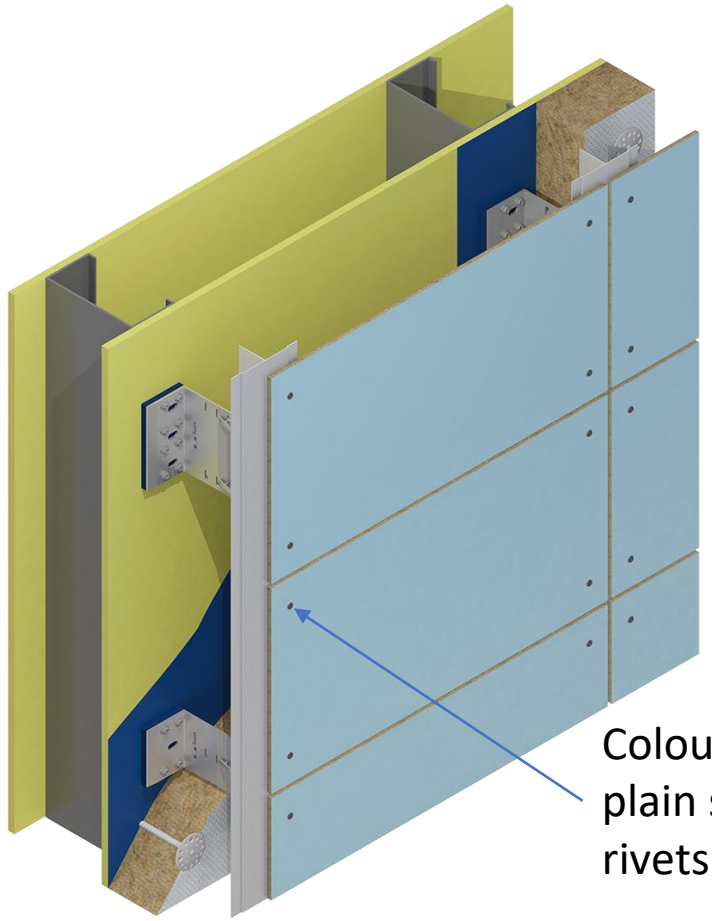


Rainscreen systems can turn any architectural inspiration into real life artwork.

Building Block #3 – Cladding Attachment



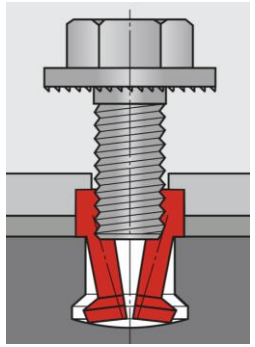
Simple System: Visible Fasteners



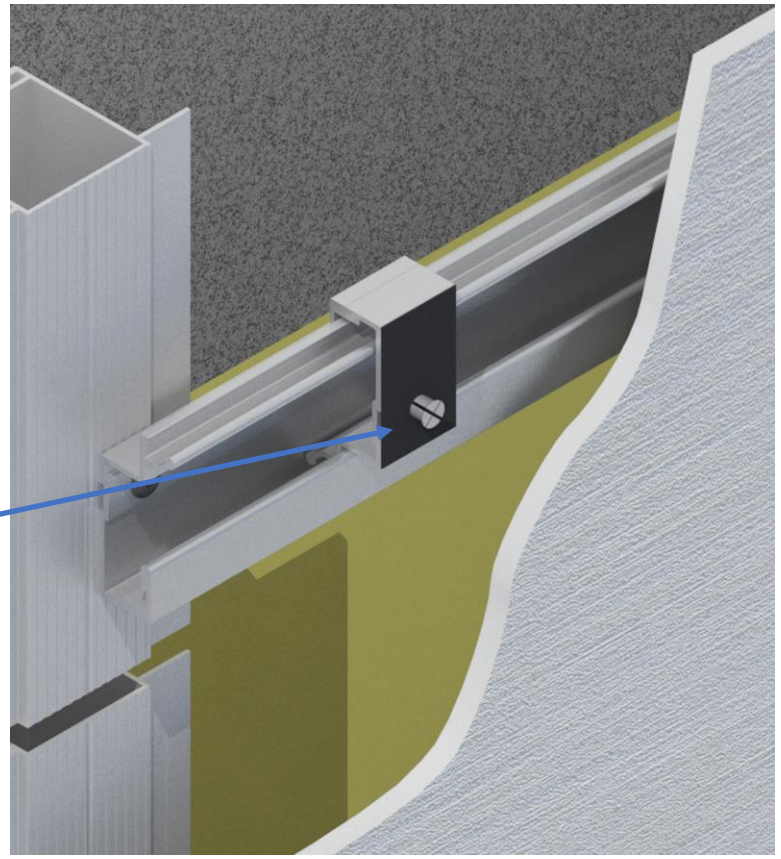
The system is a simple, economical and frequently used system for visible fixing of flat facade material like aluminum composite panels, sheets, HPL, fiber cement corrugated and standing seam metal panels.

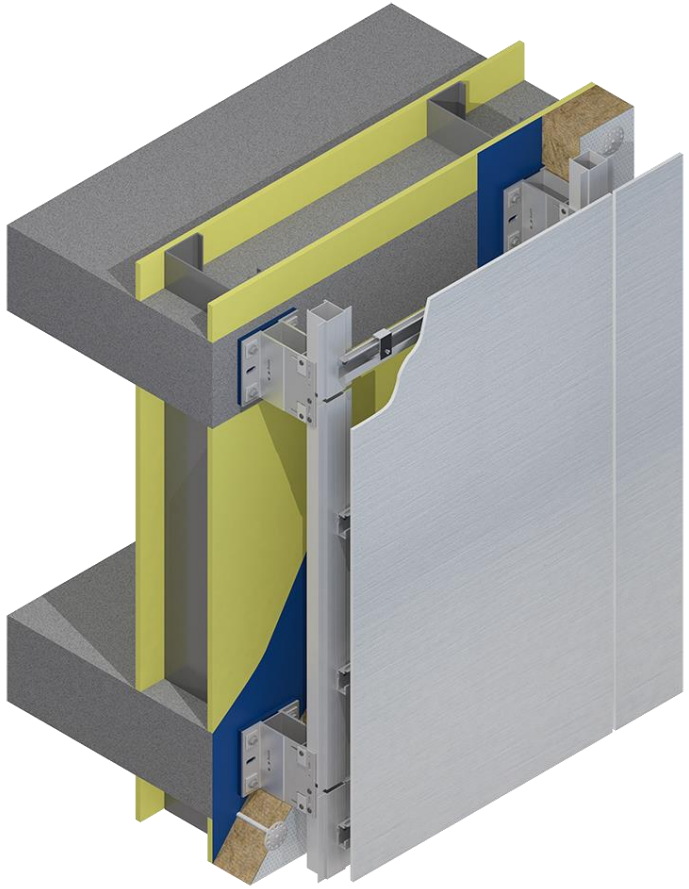
Visible Fasteners

Simple System: Undercut Anchors System



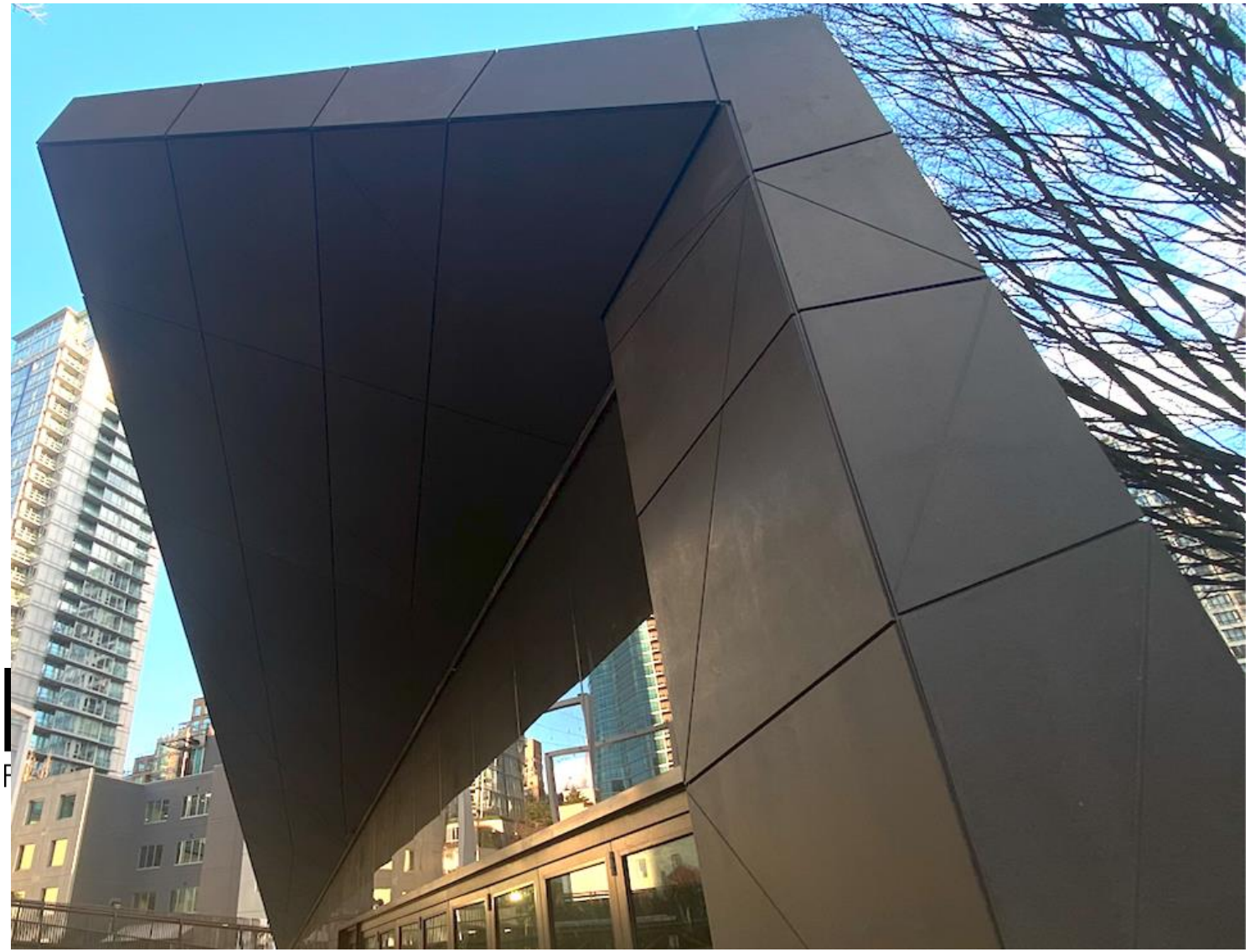
Location of under cut anchor, typical 2’ spacing

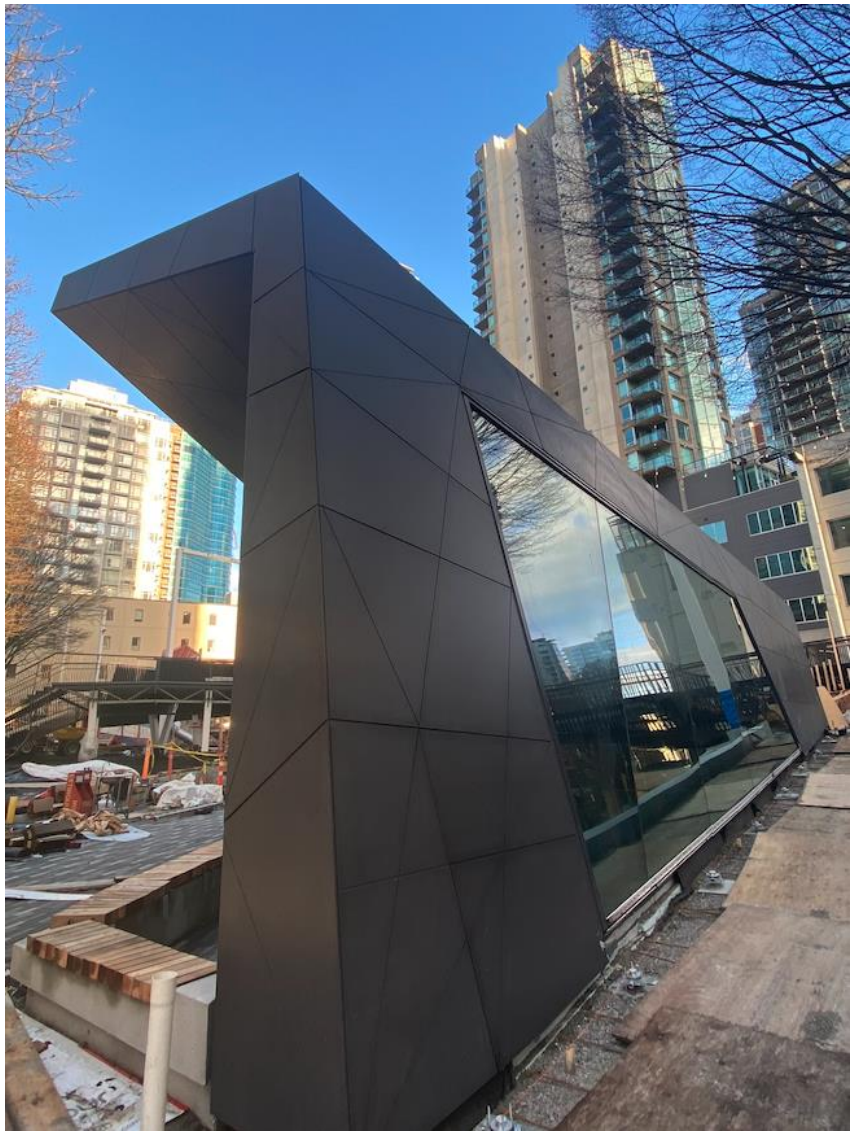




The system is designed for invisible fixing of ceramic, porcelain, HPL and fiber cement panels using special undercut technology.

Undercut Anchors System





Under Cut Anchors and FRC

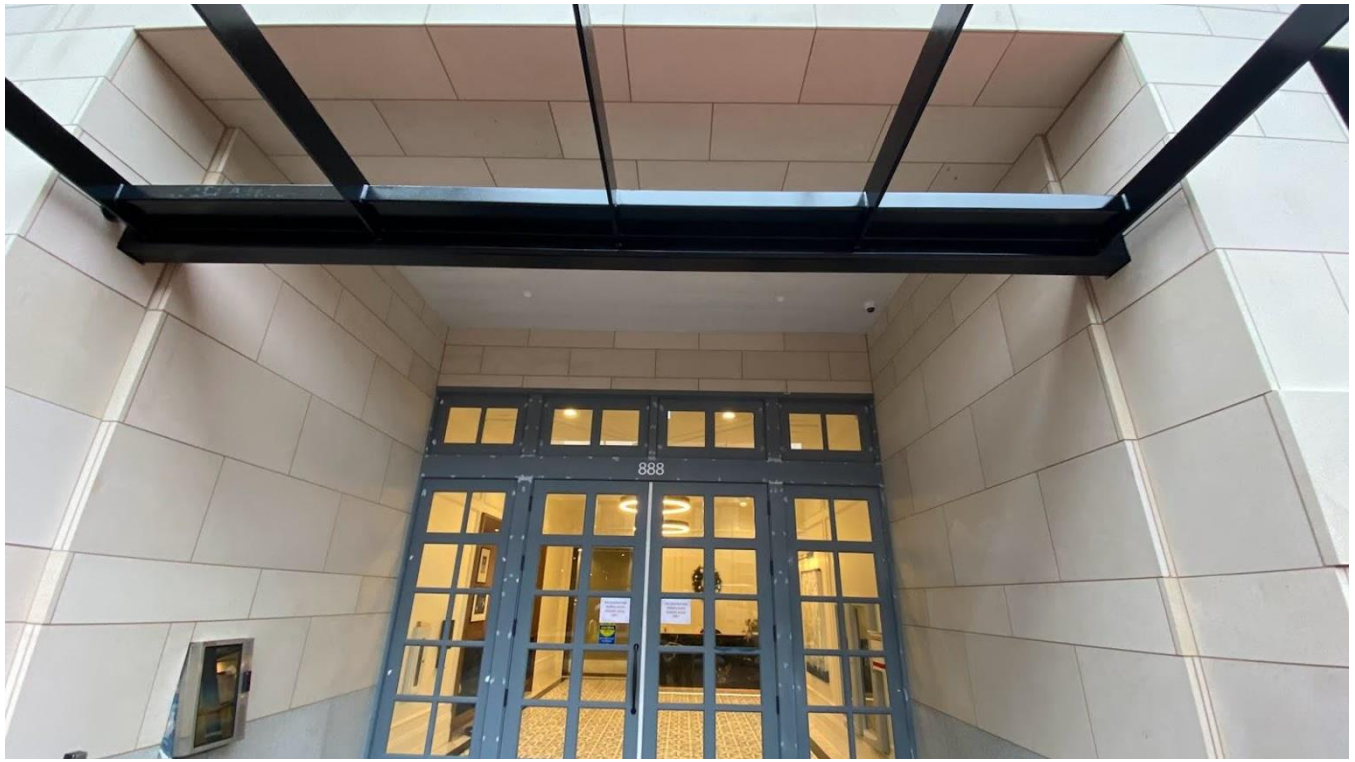
Innovative Systems: Kerf System for Heavy Facades

The system is designed for concealed way of fastening the natural stone.

The cladding is fixed to the system of vertical and horizontal profiles.

Stone panels are installed on horizontal girts, for which in the lower and upper ends of the panel the cut is made, where installing special horizontal profiles is set.

Kerf attachment for Stone and Engineered Stone



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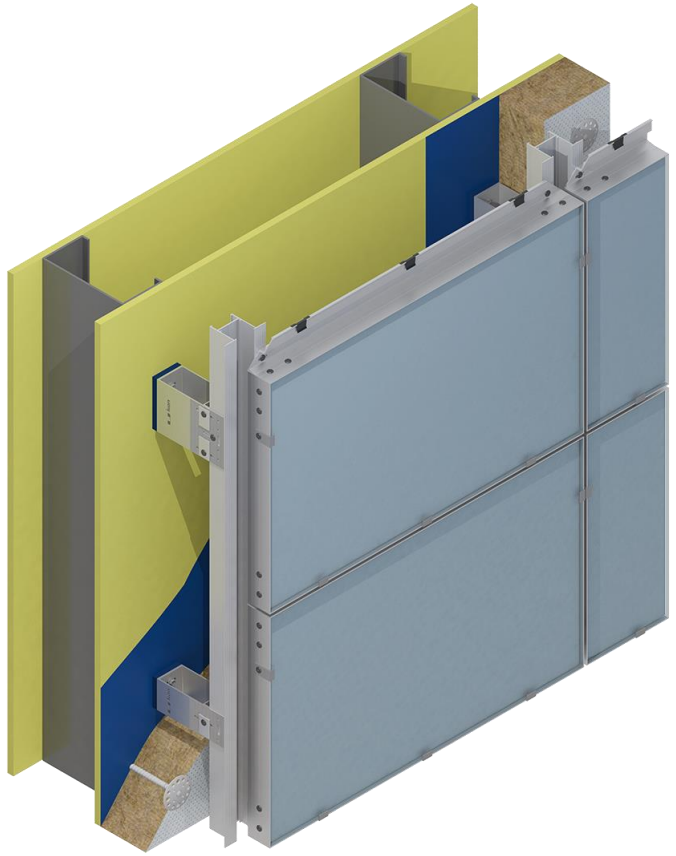
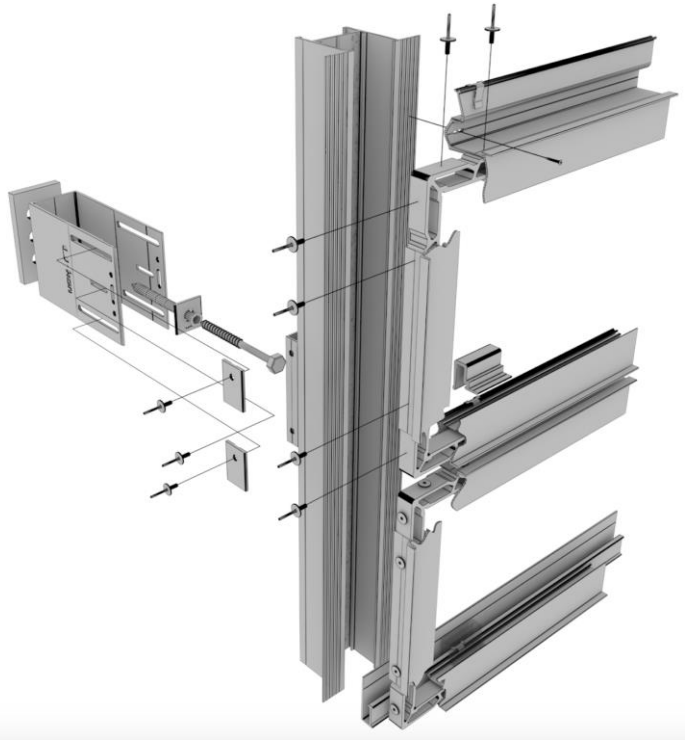
Innovative Configuration: Glass/ Building Integrated PV (BIPV) Facades

This system is designed for invisible fixing of glass, ceramic, and photovoltaic solar panels. The system can withhold a large format of panels that have a thickness between 3.5 mm to 8 mm.
The cladding panel is glued into the frame of aluminum profiles. Special stainless steel safety clips are installed around the perimeter of the cladding panel.

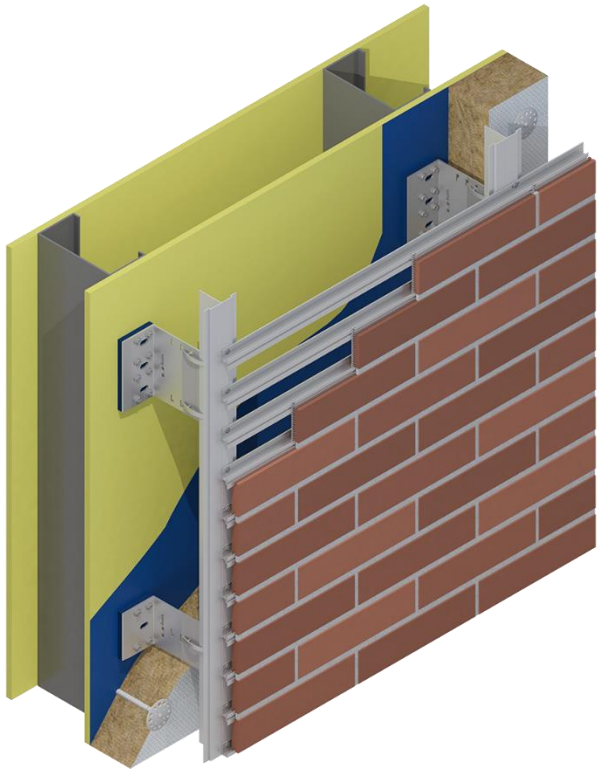


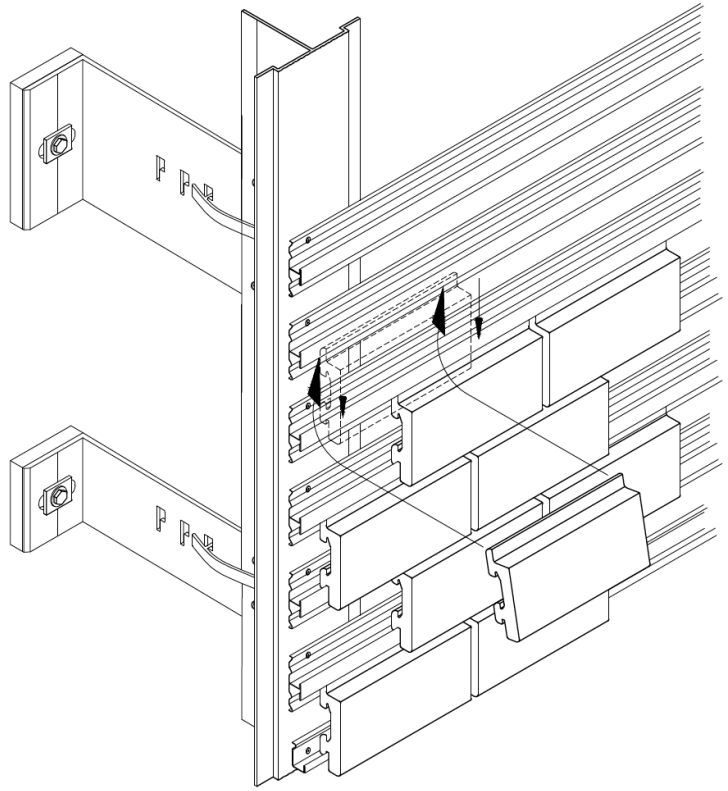


Innovative Configuration: Building Integrated PV (BIPV)

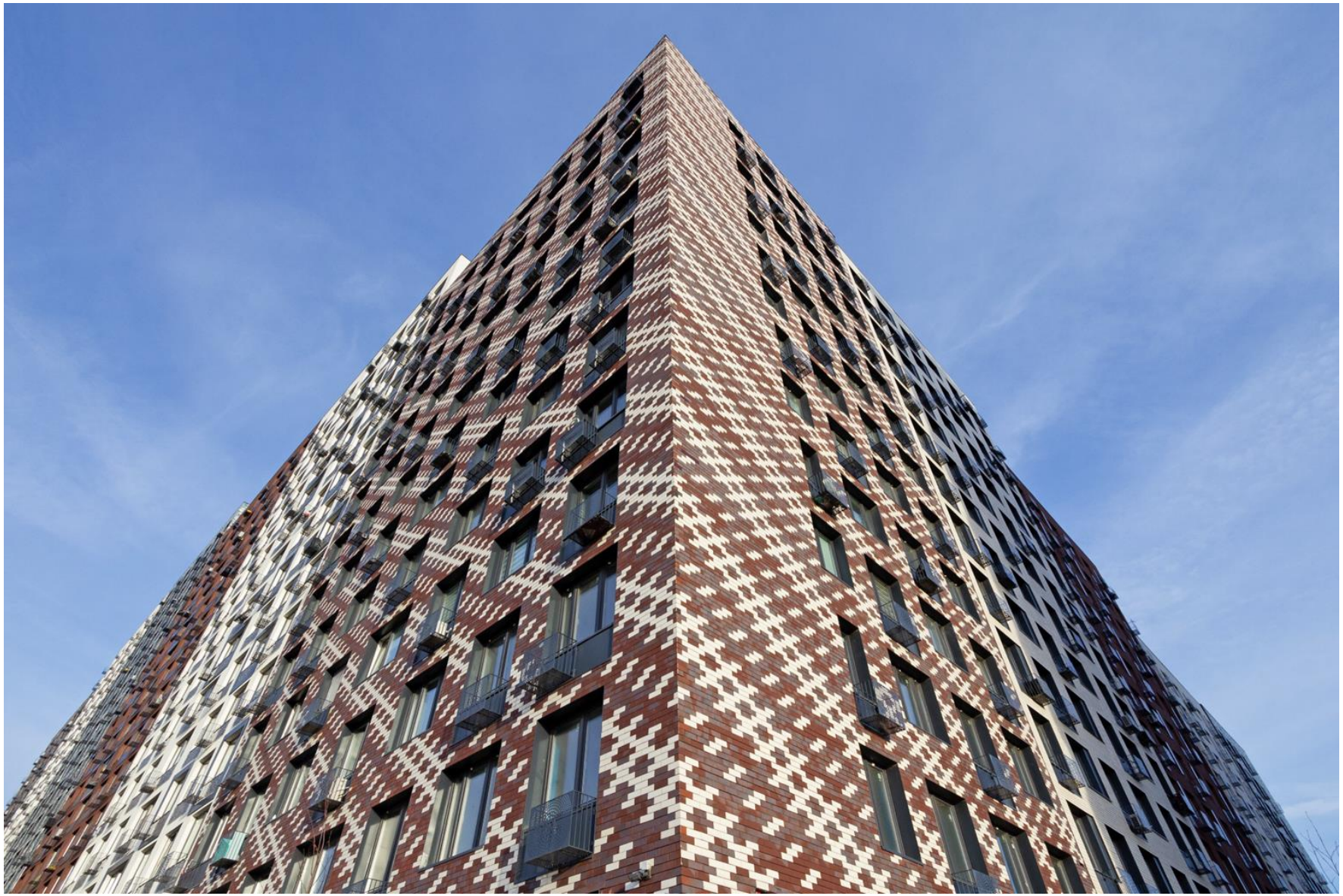
Smart Klinker: Mechanically Attached Brick

This system is designed for invisible fixing of thin brick. The brick veneer can be
installed with or without grouting.
Brick veneer without grouting: Cladding panels are installed on horizontal rails, the shelves of which engage with grooves in the horizontal ends of the panels.
Horizontal and vertical seams overlap shelves of plates.





Smart Klinker: Mechanically Attached Brick



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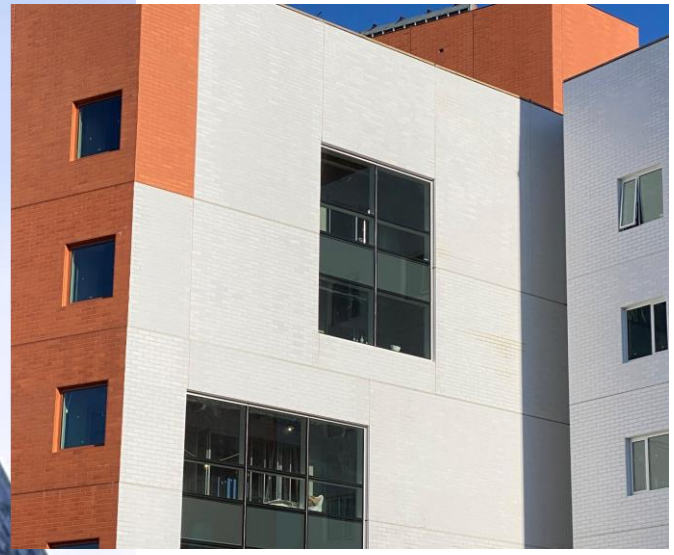
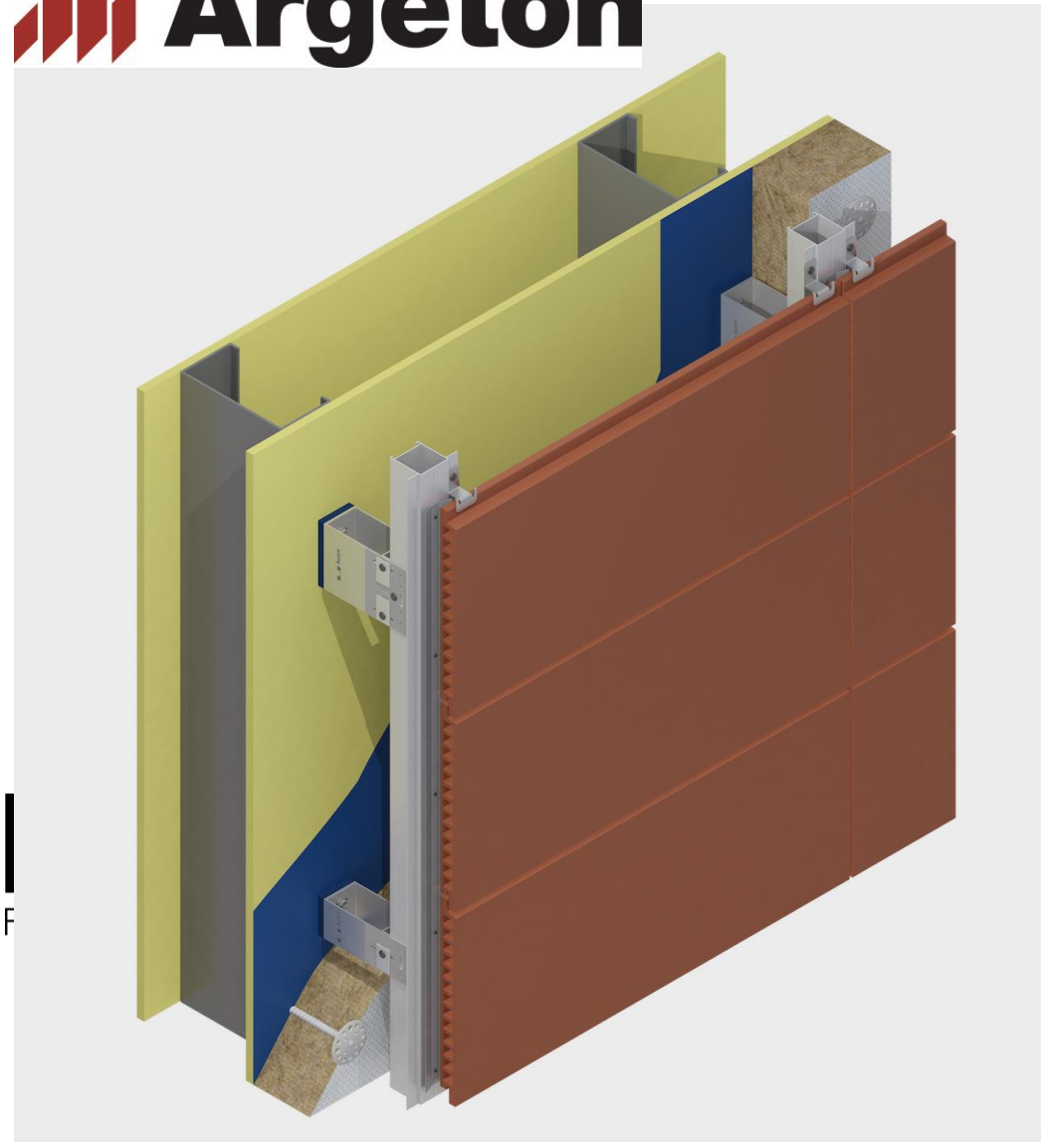
CORIUM

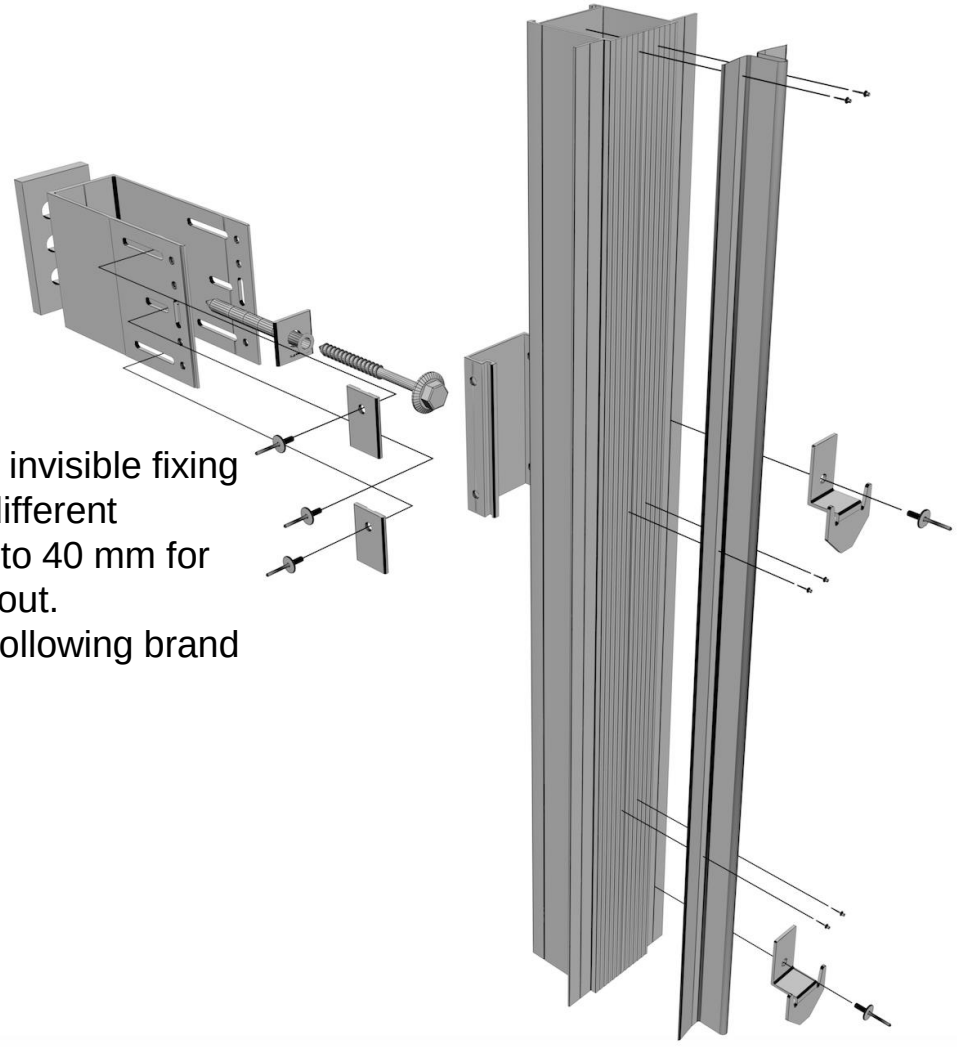


FSi
FACADE SYSTEMS INC.

Terra Cotta Systems for all Manufacturers

Argeton





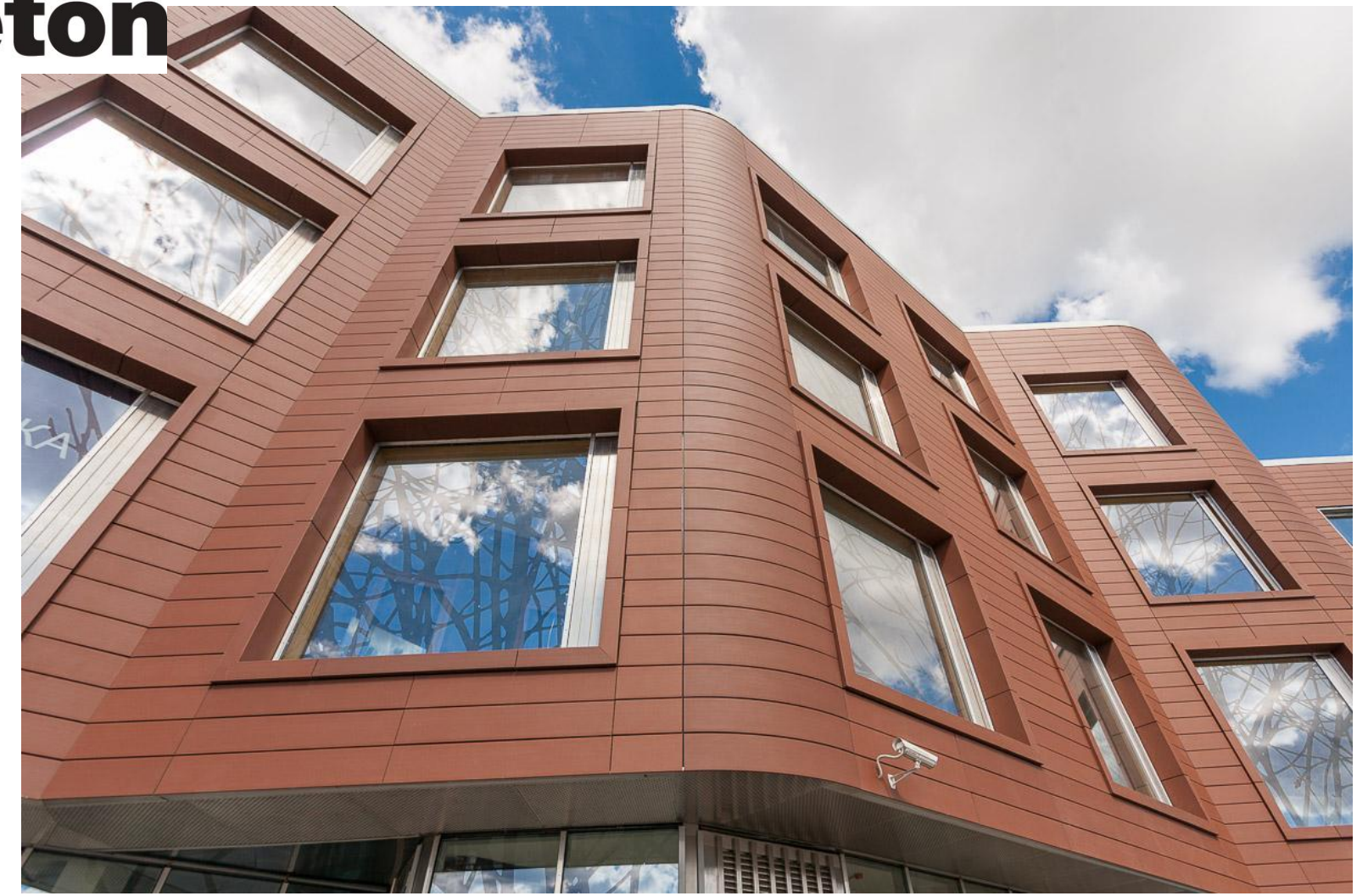
Systems are designed for invisible fixing of terracotta panels with different thicknesses from 8,5 mm to 40 mm for vertical and horizontal layout.
We provide a system for following brand of terracotta panels:

- AgGeTon
- Agrob Buchtal
- Ceramics Terracotta
- CN-ceramic
- Faveton
- Frontek
- Moeding
- NBK
- Tempio
- Terreal

Terra Cotta Systems for all Manufacturers

U-kon SYSTEMS

Argeton



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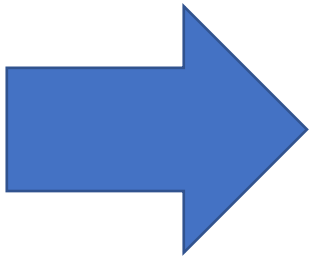
Unique Shapes of Terra Cotta for all Manufacturers

Change the Way You Specify

Status Quo

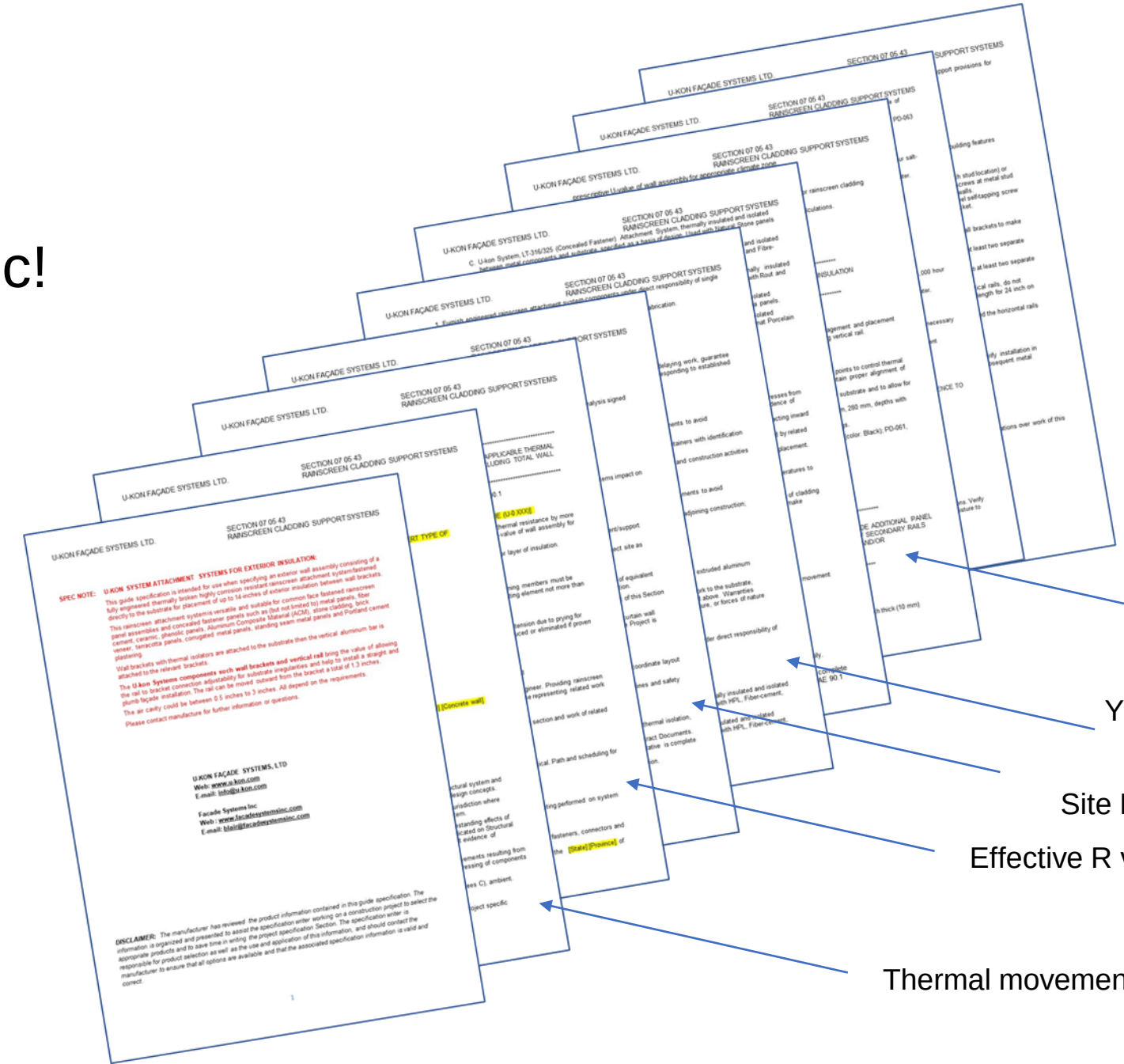
- A paragraph in the Div 07 Cladding Spec.
- Approved vendors just the clip.
- Depth but not performance.
- Little about inspections.
- Little about acceptable review (shop) drawings.
- Confused in with trims, bird screens, AVB etc.



Proposed Change

- Separate Subsystem Spec.
- Applicable to all cladding on the project.
- Approved vendors for the complete system.
- Depth and performance.
- Inspection expectations.
- Structural, thermal and engineering by manufacturer.
- Training for Subcontractor.
- Duration in marketplace.

That is a spec!



Sole accountability

Years in business

Site Launch meeting

Effective R value

Thermal movements

Post Award – *Build What is Designed Easily*

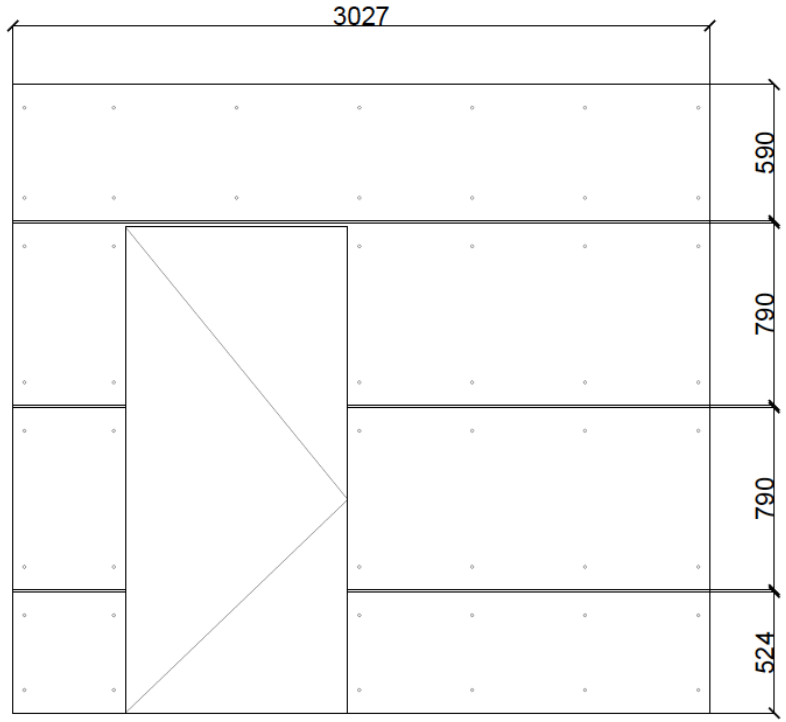
For the Architect

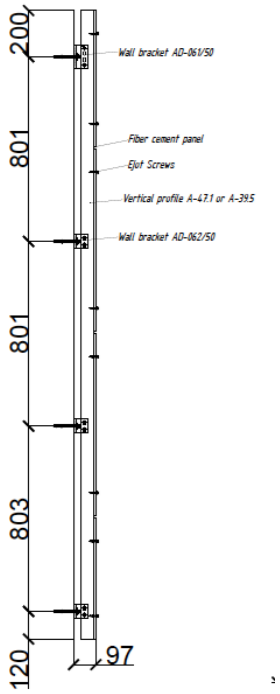
- Review drawings directly from Architect's model.
- Accurate component and system design from model.
- Comprehensive review drawings.
- Mock-up support if required.
- Site inspection from manufacturer's representation.
- Services mitigate risk, overages.

For the Contractor

- Shop drawings directly from Architect's model.
- Accurate component and systems.
- Layout of wall brackets on the wall
- Fabrication support – layout holes, anchors, cut sizes etc.
- Consideration of cladding and cladding supplier.
- Prefabricated optimal length of profiles
- Mock-up support if required.
- Panel layout optimisation
- Anchor pull-out site testing

Visible Fasteners





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Visible Fasteners

What is next?

- Tells us your woes, challenges, and curiosities about high performance facades. You can help us help you or guide us on our next webinar.
- Under no obligation, let's review a project at any stage and discuss some ideas.
- or just give us a call. We love learning.

We hope we have set expectations about how you should proceed on thermal and structural aspects of high-performance facades… and taught you a bit about us, wink wink.

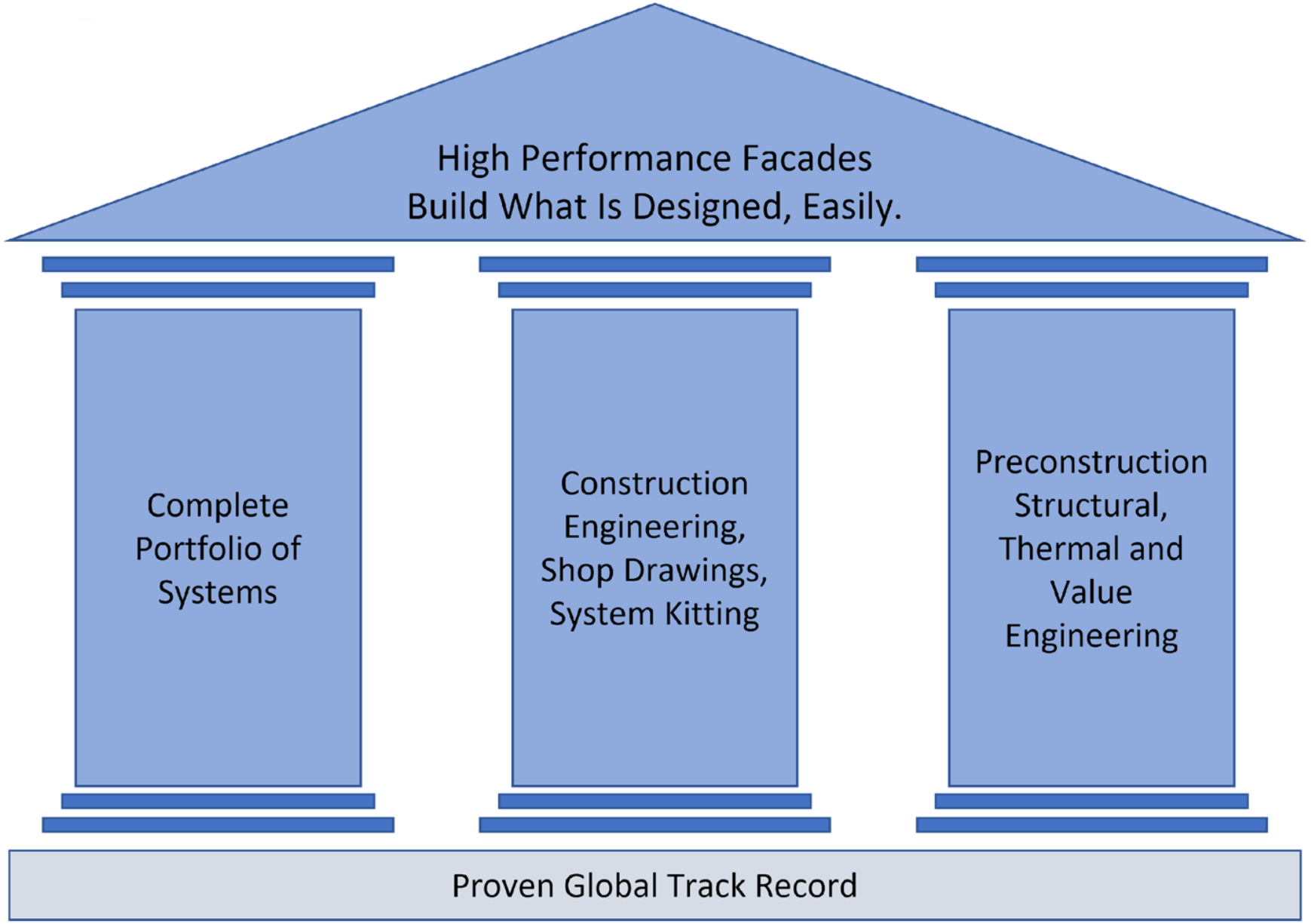
Achieving High Performance Facades Should Not Be Left to Chance

Alexander Mirilenko
U-kon Façade Systems Ltd.
(250) 419-2417

General Manager
U-kon Façade Systems Ltd.

Blair Davies, P.Eng.
Façade Systems Inc.
(647)923-8967
blair@facadesystemsinc.com

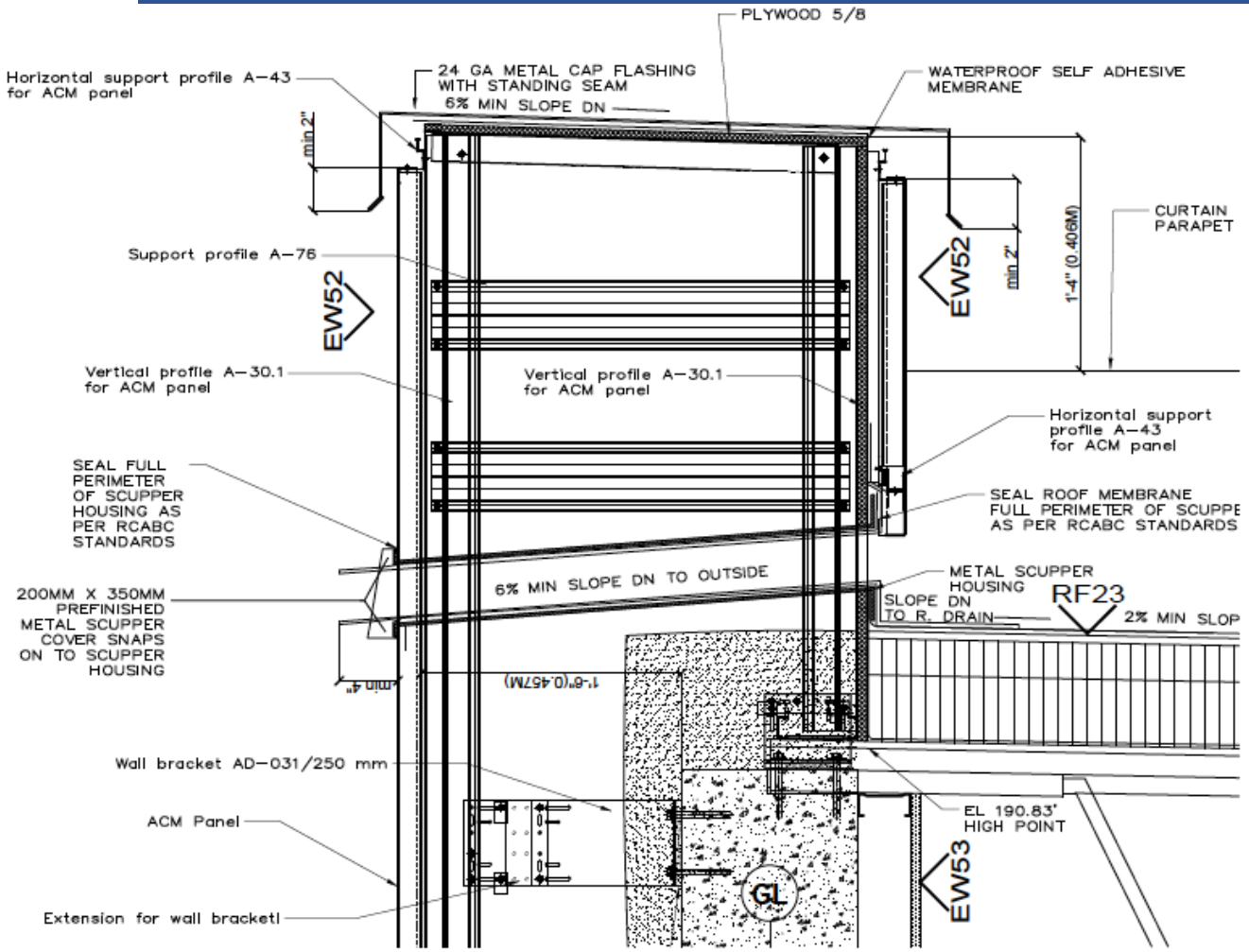
Agent for Facades and Building Systems that are innovative, aesthetic, sustainable, constructible, affordable and proven.


High Performance Facades
Build What Is Designed, Easily.
Complete Portfolio of Systems
Construction Engineering, Shop Drawings, System Kitting
Preconstruction Structural, Thermal and Value Engineering
Proven Global Track Record

Thank you

This is the end

Parapet


PLYWOOD 5/8
Horizontal support profile A–43 for ACM panel
24 GA METAL CAP FLASHING WITH STANDING SEAM
6% MIN SLOPE DN
WATERPROOF SELF ADHESIVE MEMBRANE
min 2"
CURTAIN PARAPET
Support profile A–76
EW52
EW52
min 2"
1'-4" (0.406M)
Vertical profile A–30.1 for ACM panel
Vertical profile A–30.1 for ACM panel
Horizontal support profile A–43 for ACM panel
SEAL FULL PERIMETER OF SCUPPER HOUSING AS PER RCABC STANDARDS
SEAL ROOF MEMBRANE FULL PERIMETER OF SCUPPE AS PER RCABC STANDARDS
6% MIN SLOPE DN TO OUTSIDE
METAL SCUPPER HOUSING
SLOPE DN TO R. DRAIN
RF23
2% MIN SLOP
200MM X 350MM PREFINISHED METAL SCUPPER COVER SNAPS ON TO SCUPPER HOUSING
min 4"
1'-6"(0.457M)
Wall bracket AD–031/250 mm
ACM Panel
Extension for wall bracket
EL 190.83' HIGH POINT
EW53
GL