High Performance Façade Subsystems

"Build What is Designed, Easily"

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Learning Objectives

- Discuss macro-forces at work emphasizing ventilated rainscreen facades.
- Explain system choices. Why ‘systems’ thinking is so important. From Simple, to High Performance to Innovative.
- Explain Bespoke System Design, and the system for the exact location on the exact building.
- How early Design Precision and value engineering cuts costs and avoids failure.
- How sloppy specification can lead to failure and what to do about it.
- What to expect in review, shop, and installation drawings.
- Review case studies.

Achieving High Performance Facades Should Not Be Left to Chance

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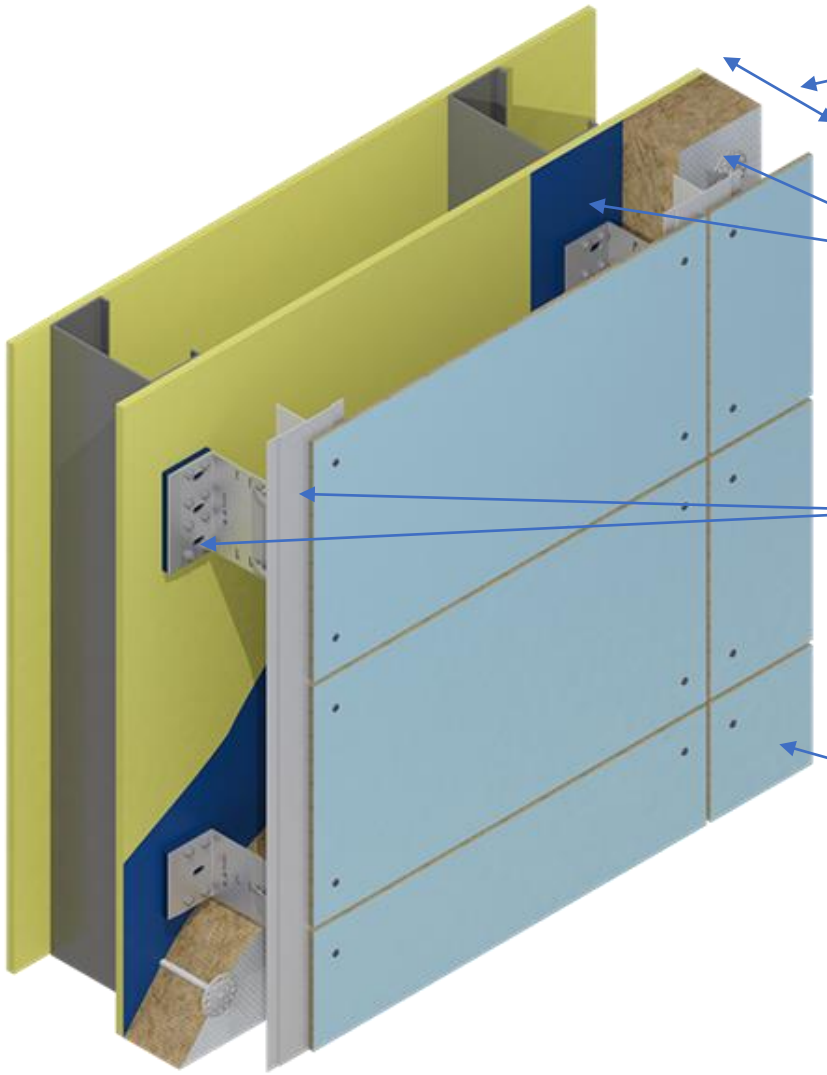
Agent for Facades and Building Systems that are innovative, aesthetic, sustainable, constructible, affordable and proven.

Macro Directions – moves as fast as you want them to.

- Labour availability and skill
- >6” insulation application

- GHG impact
- >6” insulation application

- Long term resilience – gaskets.
- Thermal performance now
- % fenestration going down.
- Curtain wall exceptions (office, high performance spandrels)



Façade – everything outside of Sheathing

Insulation & AVB

Thermally Broken Substructure ‘System’

Cladding; Skin, Light to Heavy, All types of finishes; Resilient; All budgets; Sustainable; Replaceable.

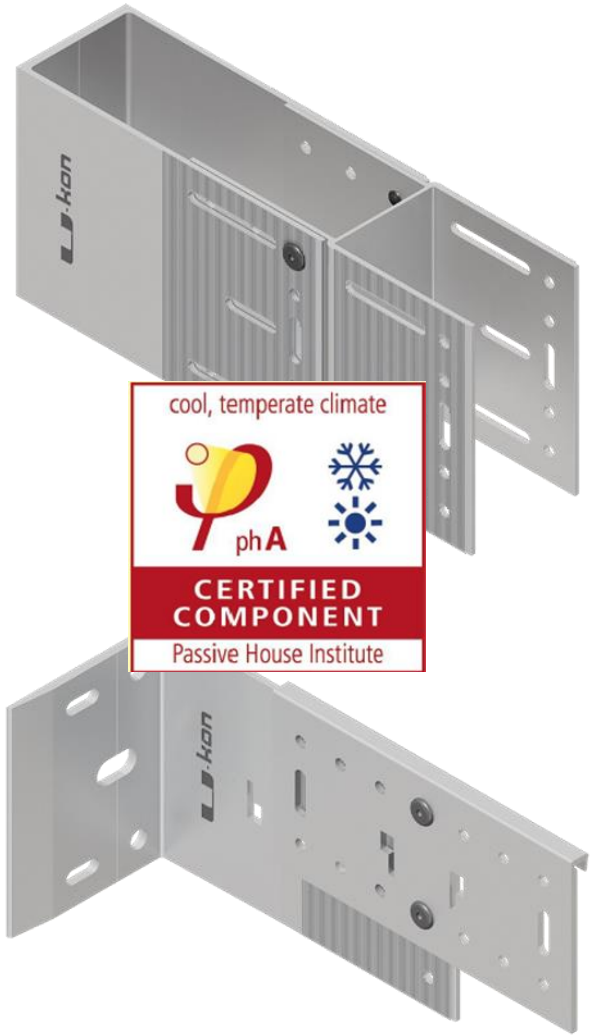
Toughest Challenges – what you are telling us

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

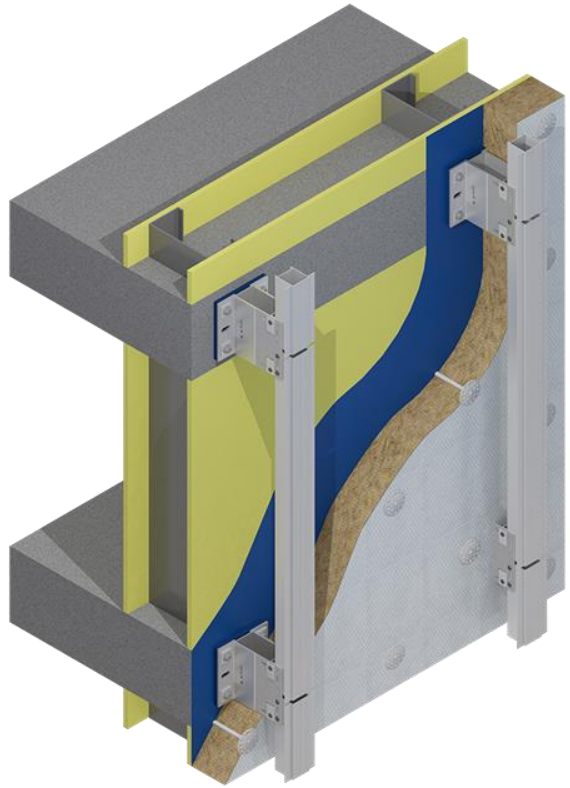
System Choices*

Simple

High Performance



Innovative (slab-to-slab)



*And Everything Between

Design Precision

Build = Design Starts at Beginning

Best accomplishments are at the beginning;
Greatest Failures Avoided are too.

- Design review.
- Cladding layout review.
- Initial system recommendation.
- Initial structural engineering and resulting thermal performance.
- Comprehensive value engineering.
- Cladding fabrication recommendations.
- Document creation; details, specifications.
- Budgeting.

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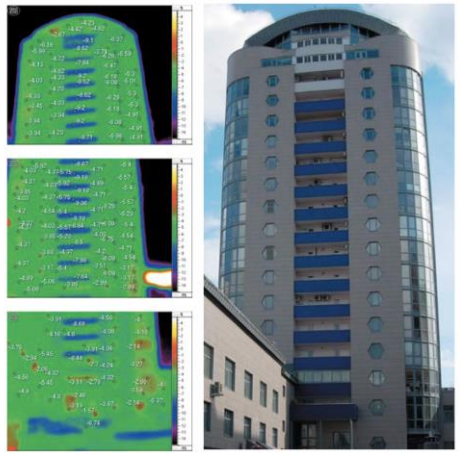
You Should Ask for This.

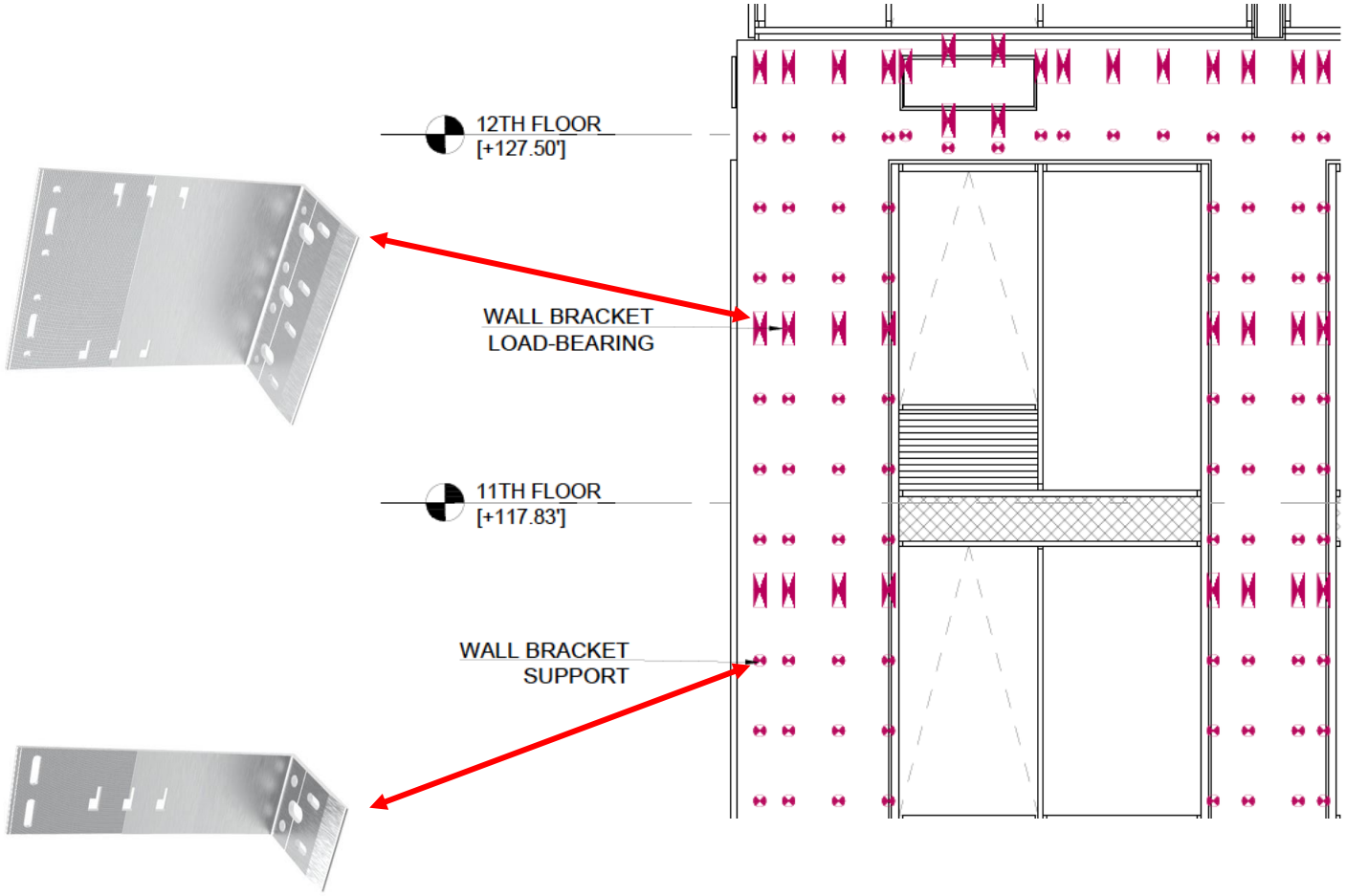
Structural and Thermal Engineering Together

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

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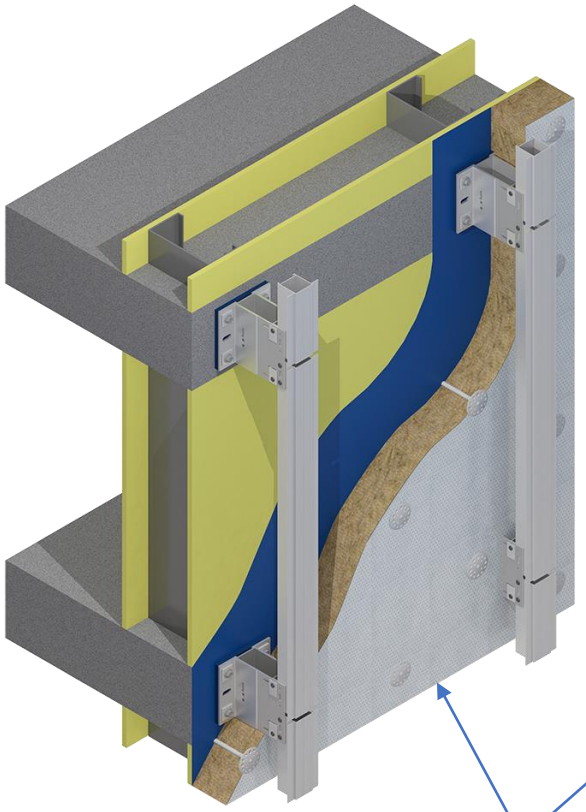
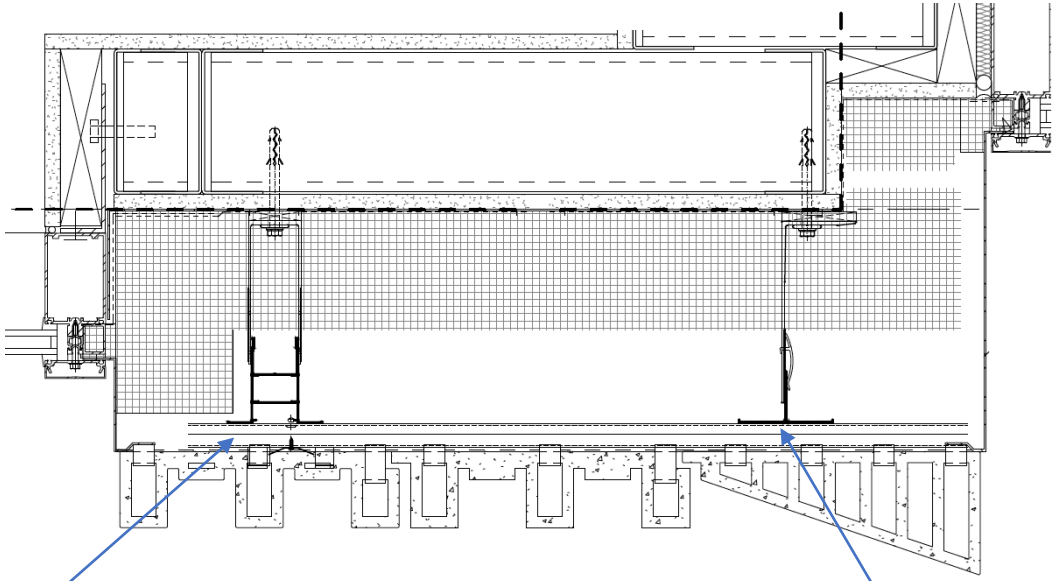
System Selection

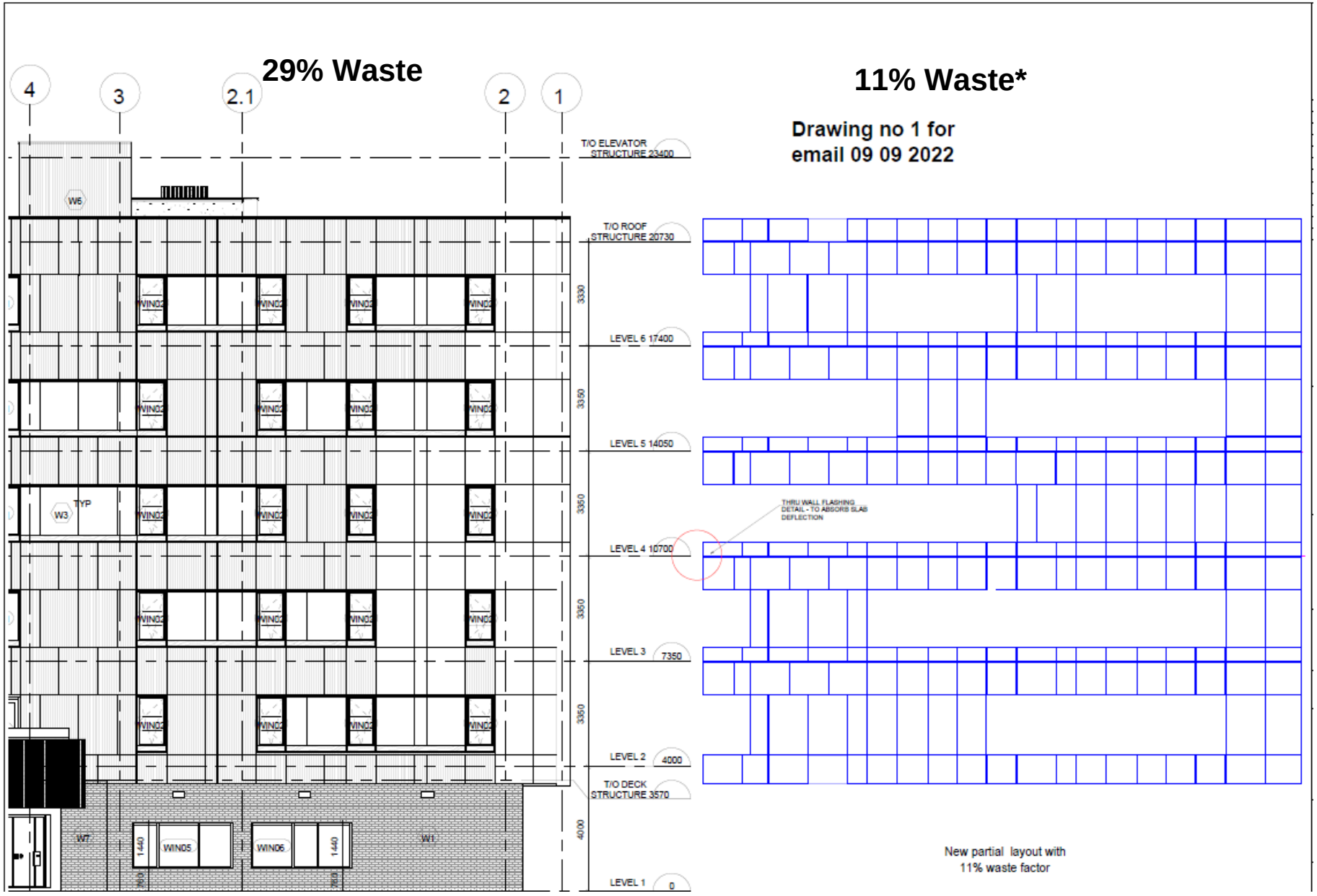




Slab to Slab
Higher loads / Wall Bracket
Faster Install

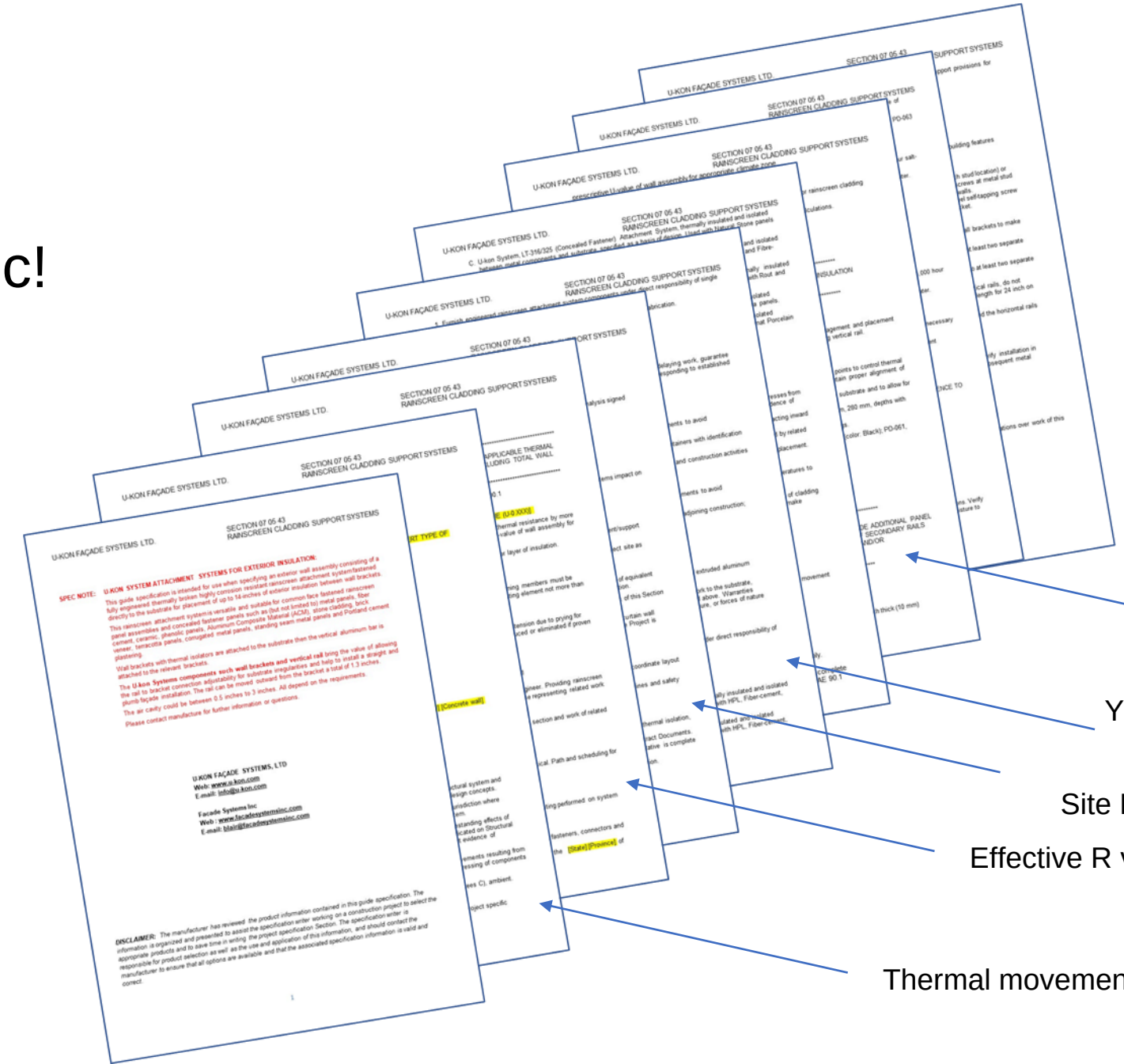
Distributed System
Lighter gauge wall backets
Slower Install

Panel Optimization



*and accounted for building deflection.

That is a spec!



Sole accountability

Years in business

Site Launch meeting

Effective R value

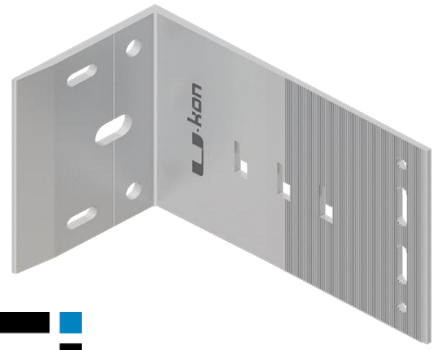
Thermal movements

Excellent Details Lead to Excellent Review Drawings Post Award

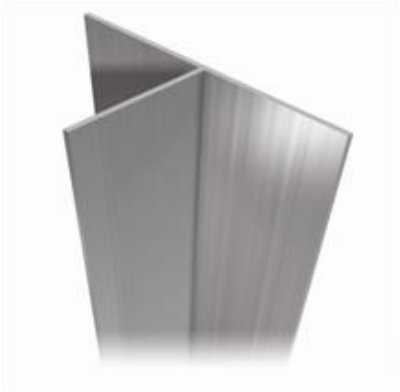
Bespoke Systems

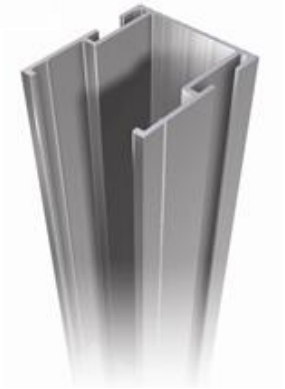
Bespoke Systems “Building Blocks”

#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

If you just want Simple*

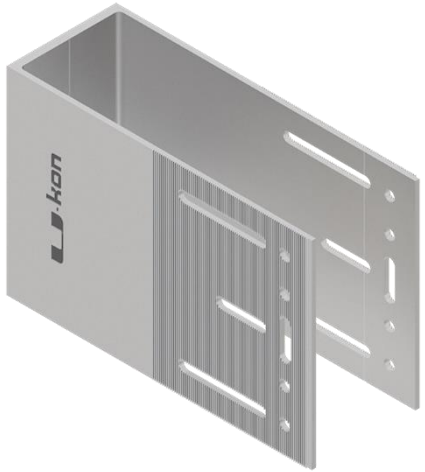
*Clip like every one else

Wall Brackets that offer Options – High Performance

Different brackets, extenders, materials provides unique flexibility

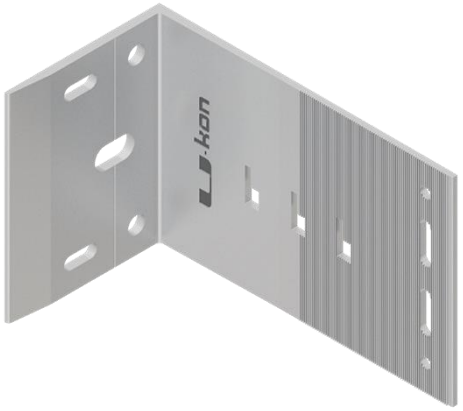
Adjustable in three directions: higher quality, faster install

WALL BRACKETS “U” SHAPE

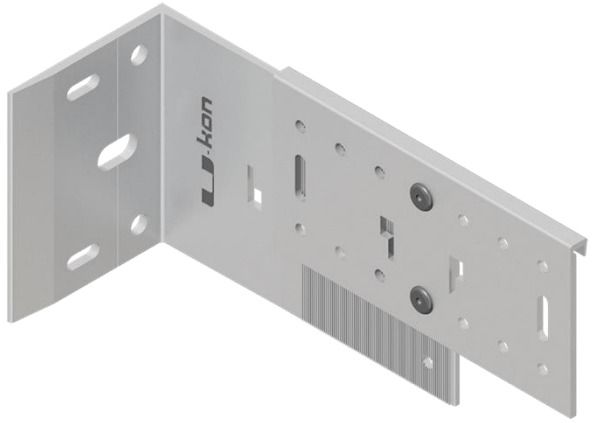


WALL BRACKETS “U” SHAPE WITH EXTENSION

WALL BRACKETS “L” SHAPE



WALL BRACKETS “L” SHAPE WITH EXTENSION



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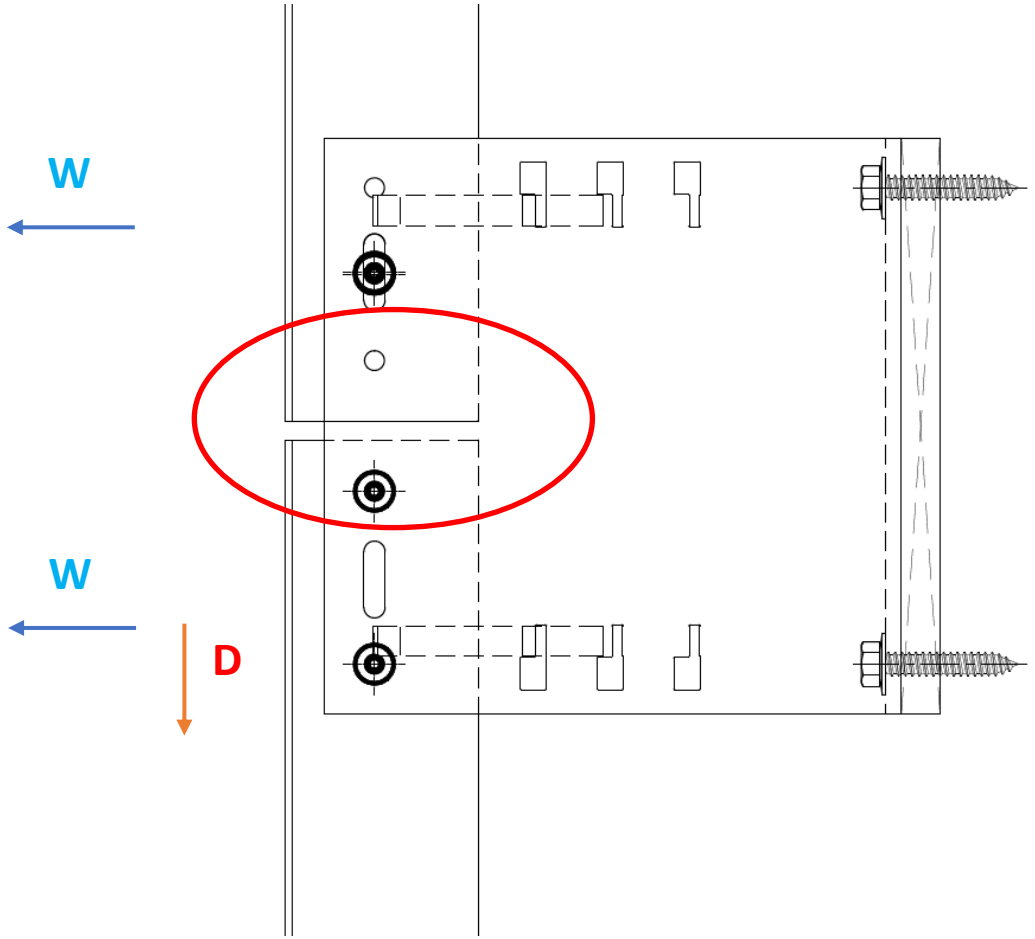
Innovations Reducing Wall Brackets



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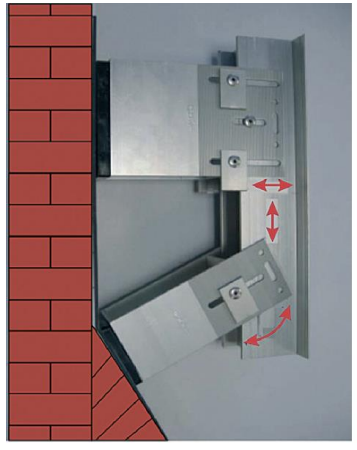
Wall Brackets Adjustable in Three Directions

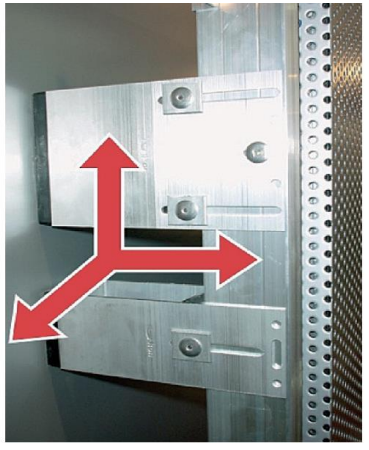
Uneven wall not an issue, e.g. recladding.

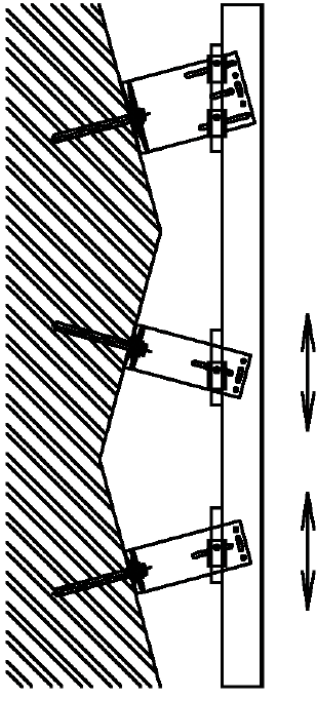
Install: attach then adjust, reducing error and rework.

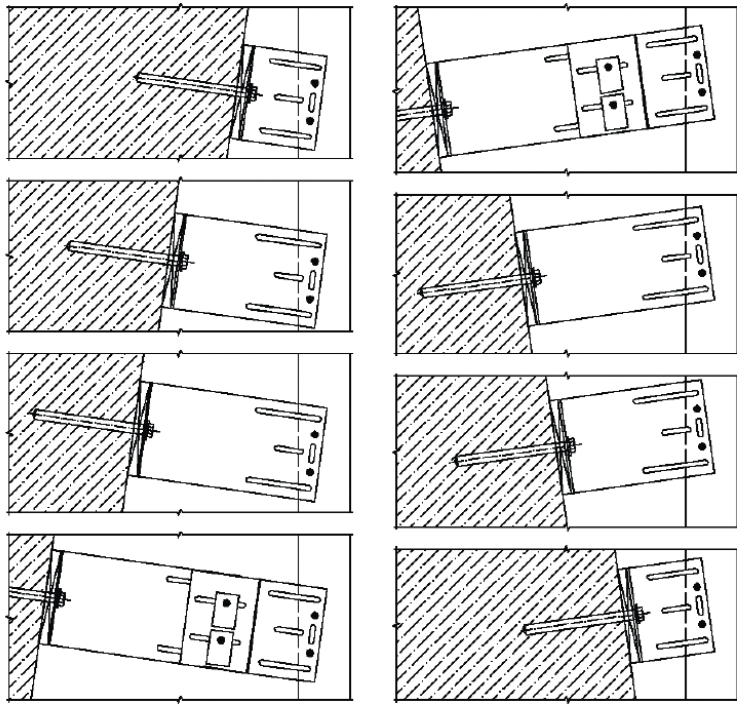
Reduce compromises on site,

“Build What Is Designed, Easily”

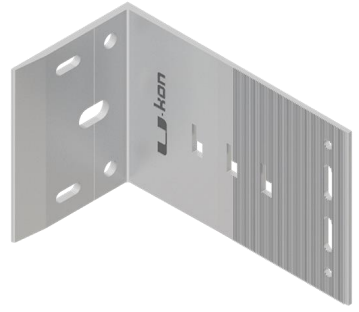








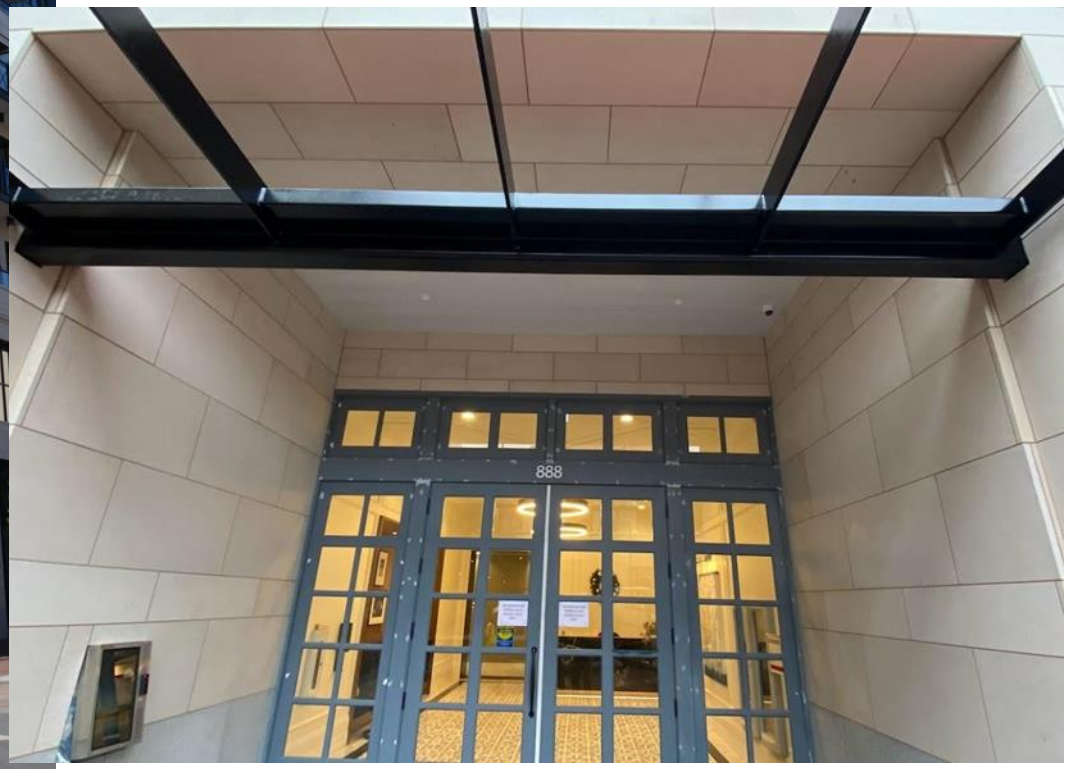
WITHOUT EXTENSION



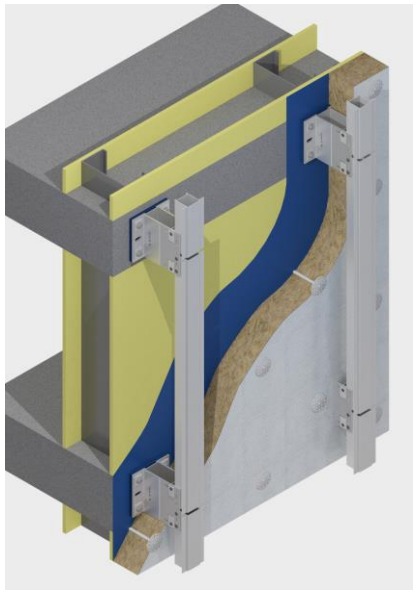
WITH EXTENSION

Victoria BC Stone Install

- 3” out of true ground to roof
- Adjusted with U-Kon Subsystem.



Thermal Performance Explained



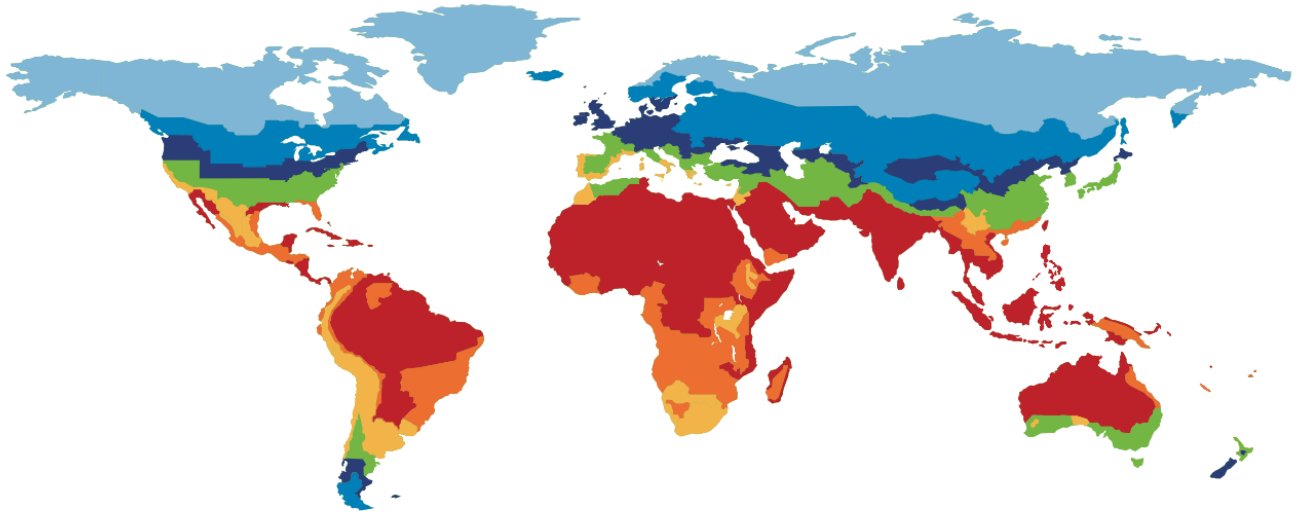
Vertical Spacing **in**	Exterior Insulation Thickness **in**	Exterior Insulation Nominal R-Value	Aluminum Bracket Assembly Effective R-Value	Stainless Steel Bracket Assembly Effective R-Value	Assembly Effective R-Value (Stainless steel Bracket HIGH)*
24	4	R-16.8	R-14.3	R-17.7 (20%)	
24	5	R-21.0	R-16.0	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 System

Passive House Institute



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Innovation

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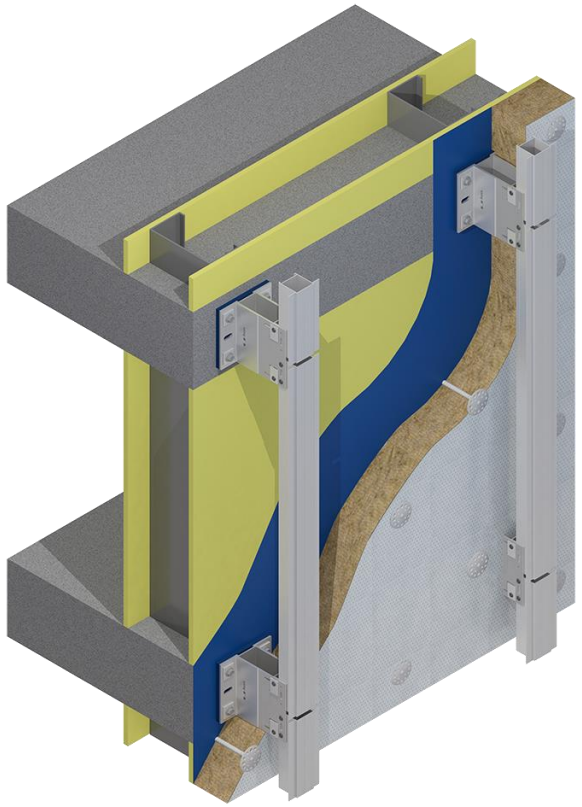
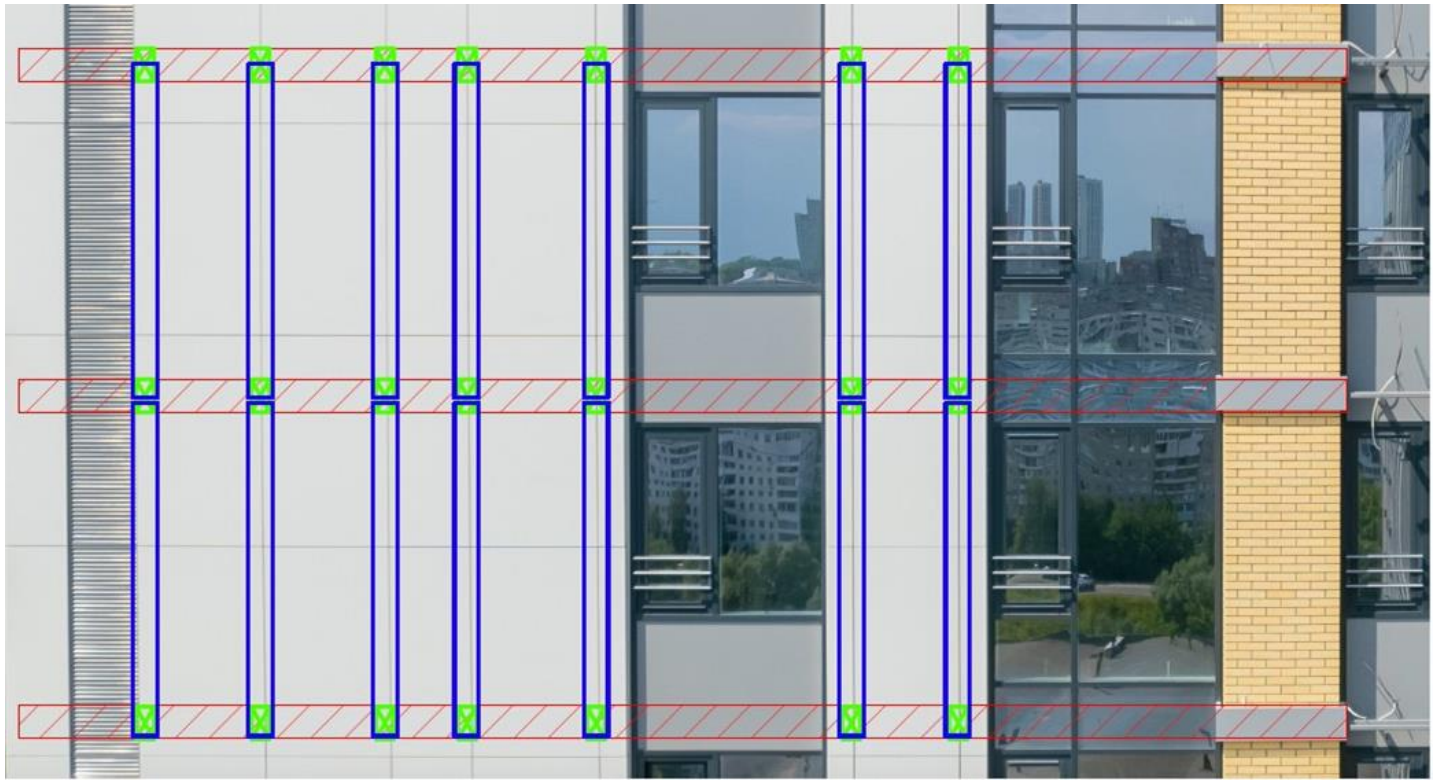
Innovative System: Slab-To-Slab

Reduce wall brackets, easy alignment, unload studs.





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

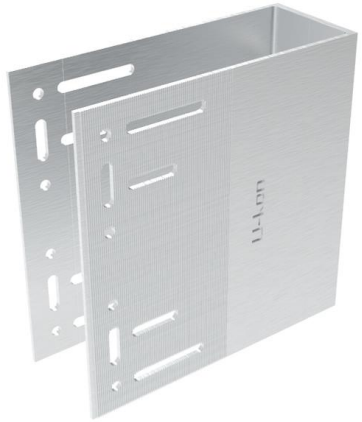
Slab to Slab attachment methods

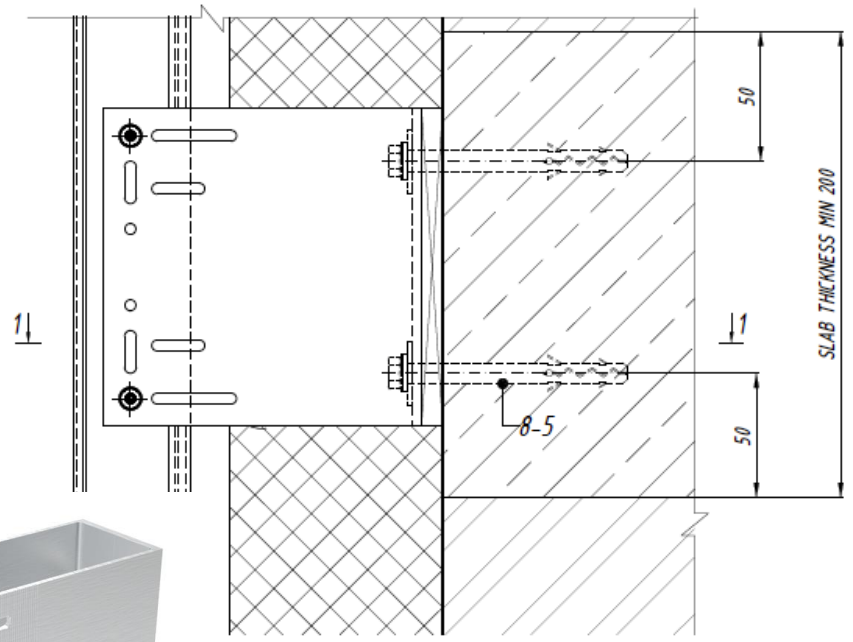
IDEAL SOLUTION FOR RENOVATION

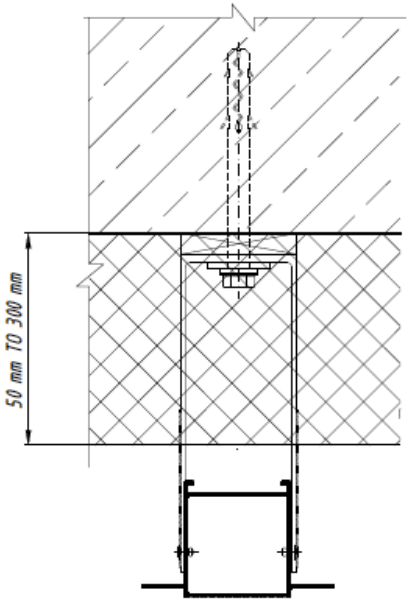
- WHEN WE DO NOT HAVE GOOD/STRONGE BACKUP WALL
- WHEN WE NEED MINIMIZE THERMAL BRIDGING
- WHEN WE NEED TO PROVIDE FAST INSTALLATION

Slab to Slab attachment methods

WEAK POINT – EXISTING SLAB CONNECTION
SLAB THICKNESS MORE THEN 200 mm

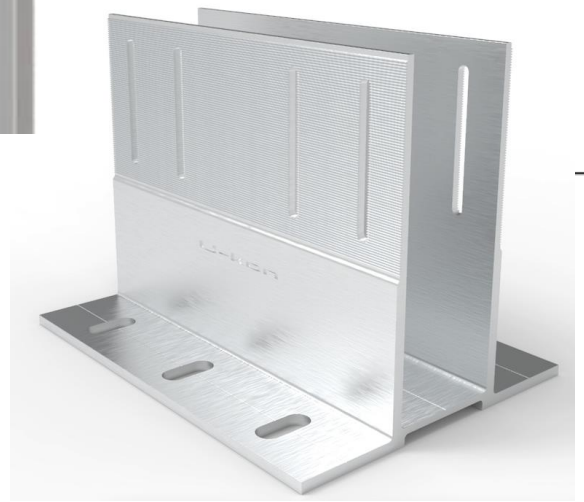


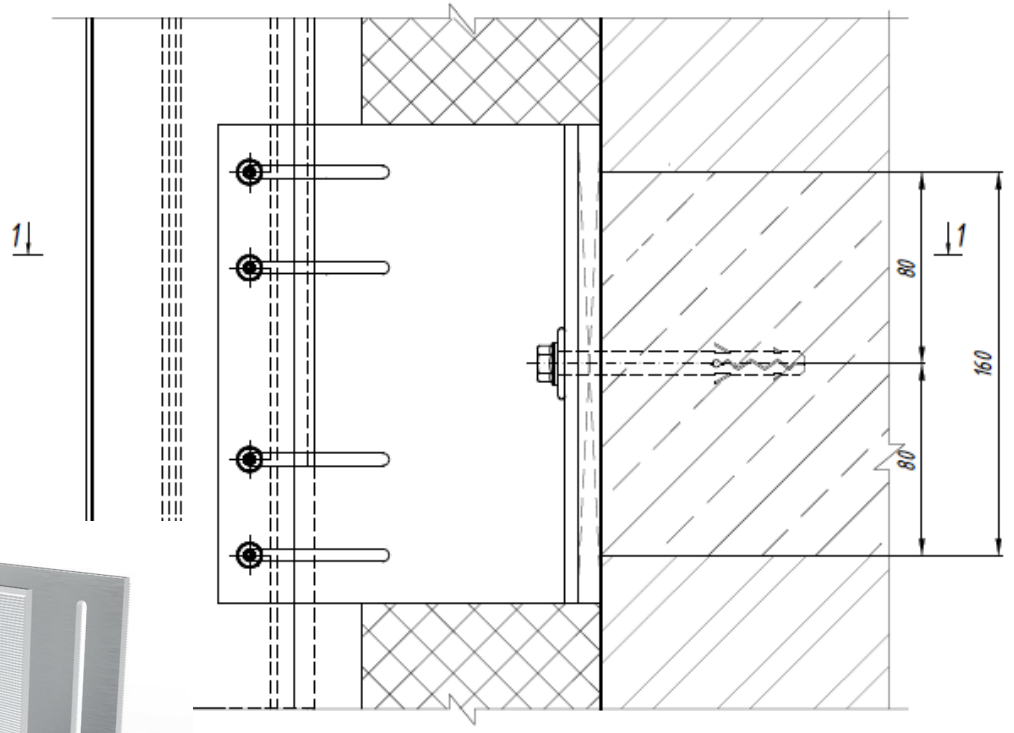


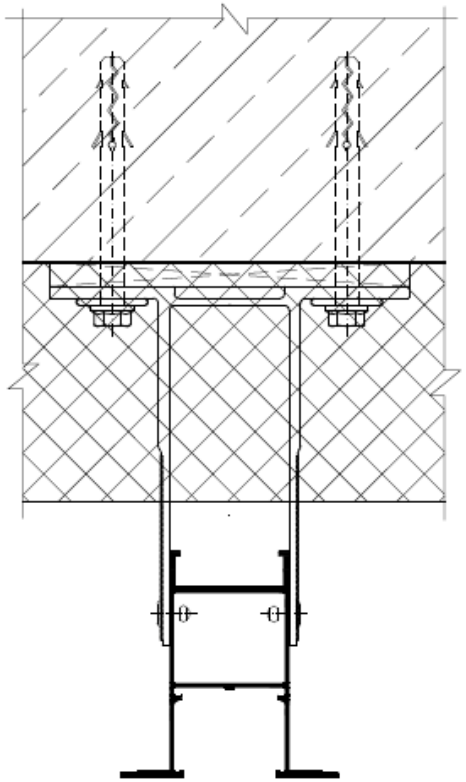


Slab to Slab attachment methods

WEAK POINT – EXISTING SLAB CONNECTION
SLAB THICKNESS LESS THEN 200 mm







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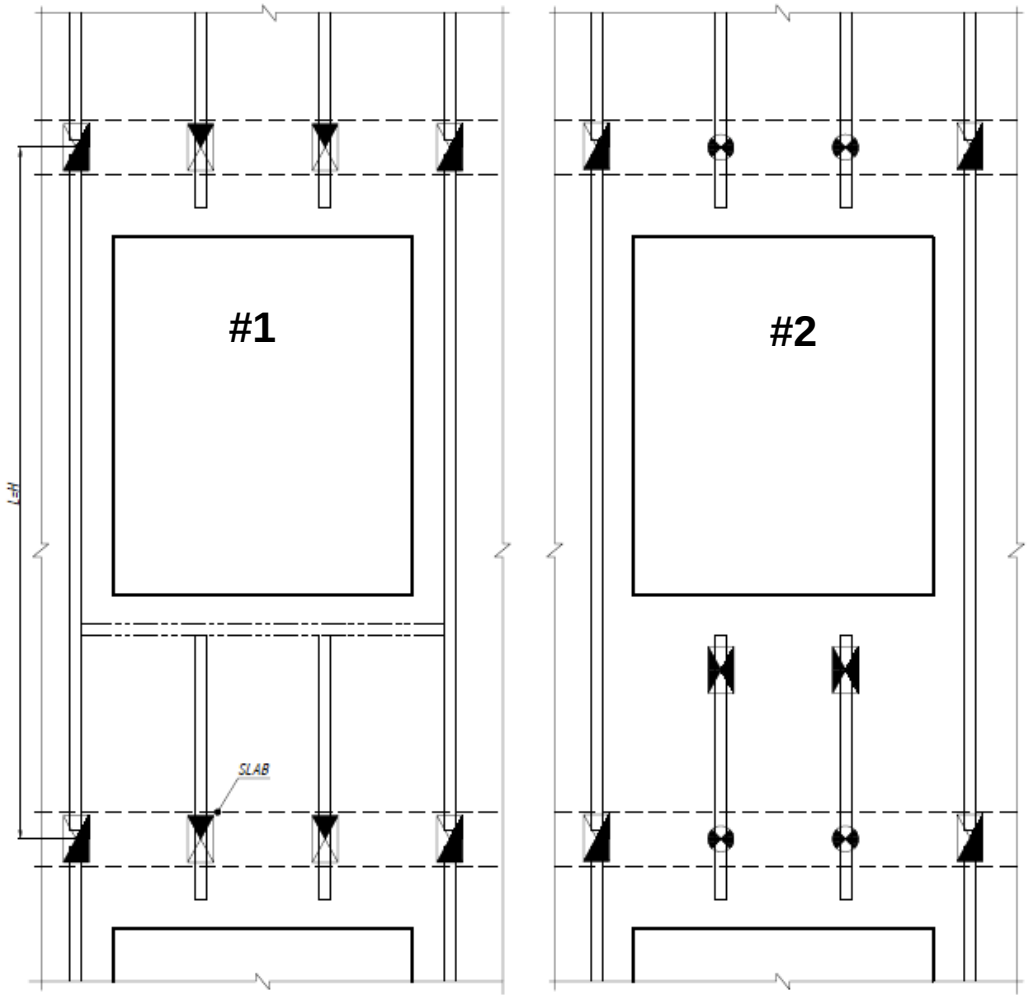
Slab to Slab attachment methods

HOW CAN WE INSTALL SLAB TO SLAB SYSTEM WHEN WE HAVE WINDOWS IN A MIDDLE?



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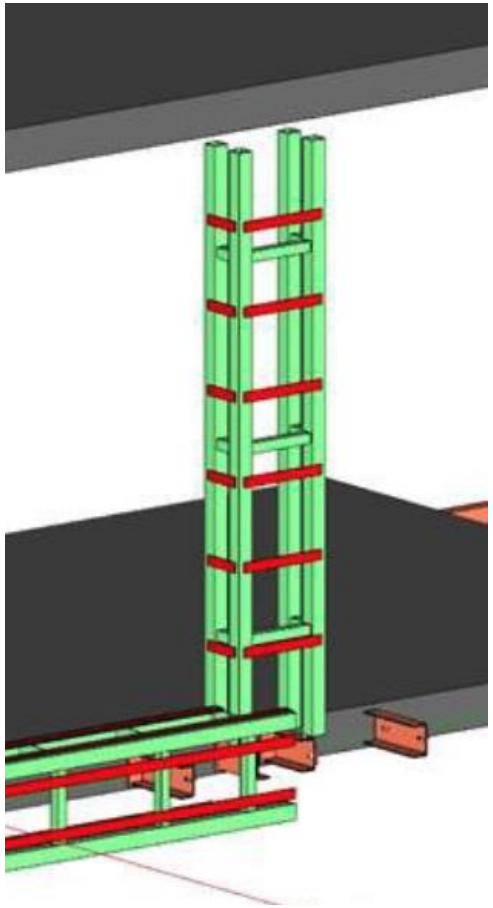
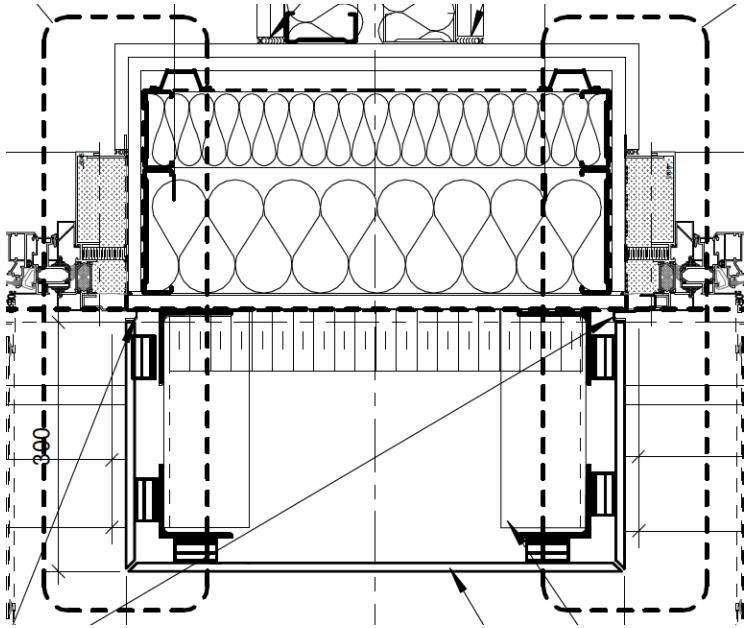
One more story – remove HSS

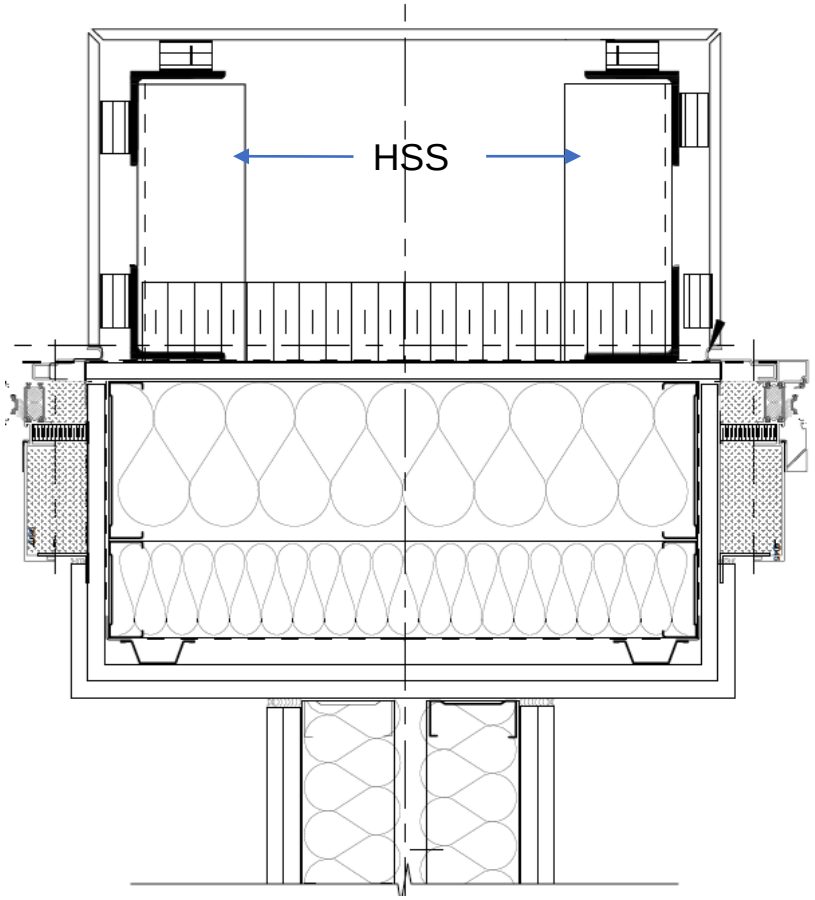


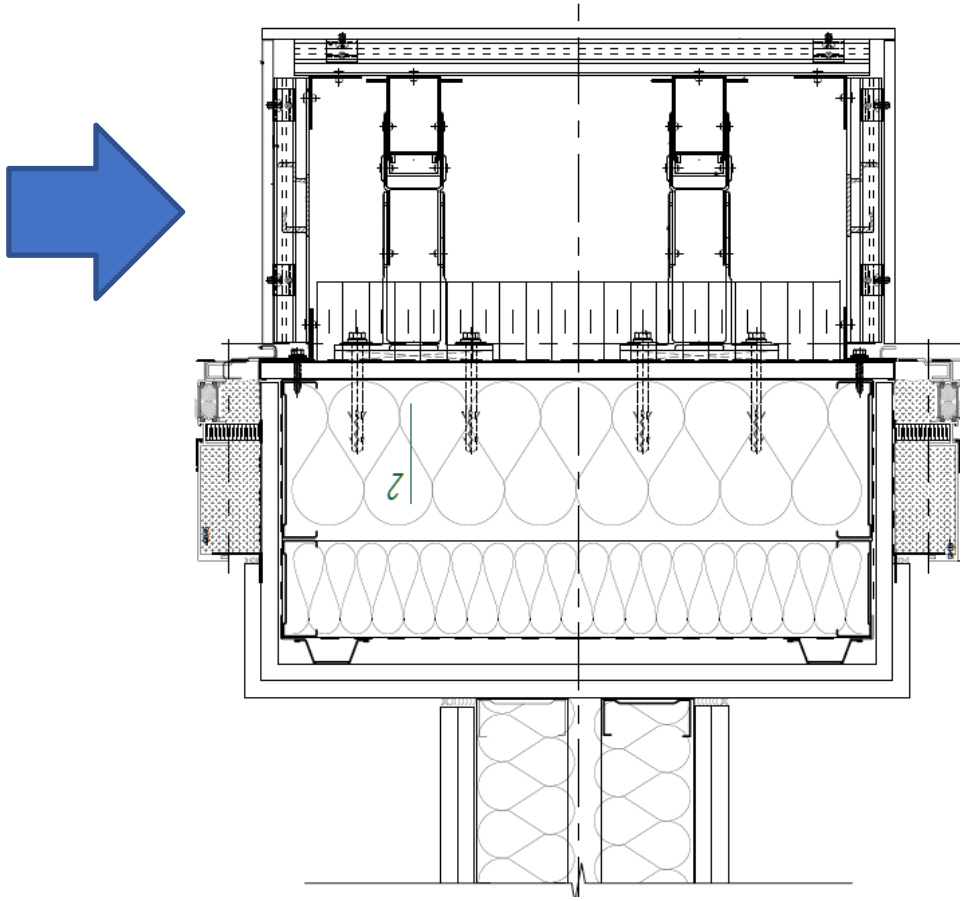


Original design

Column

Value Engineering: Replace HSS

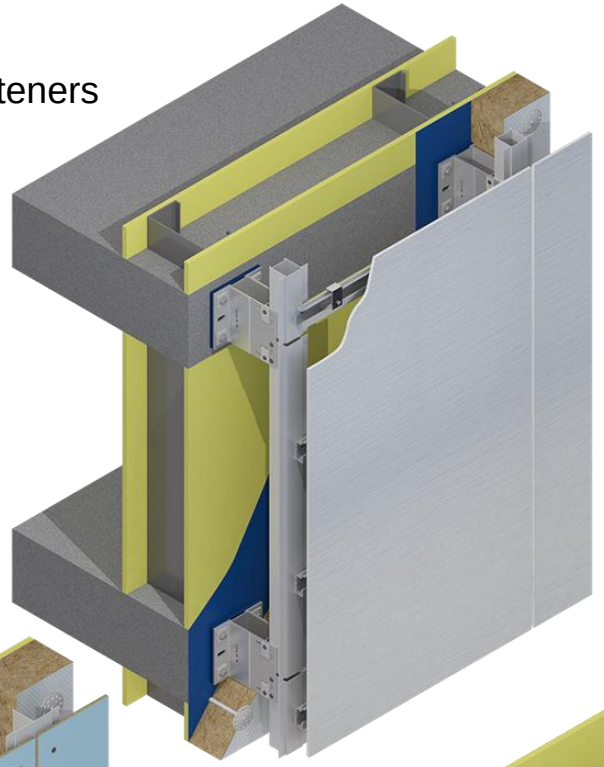




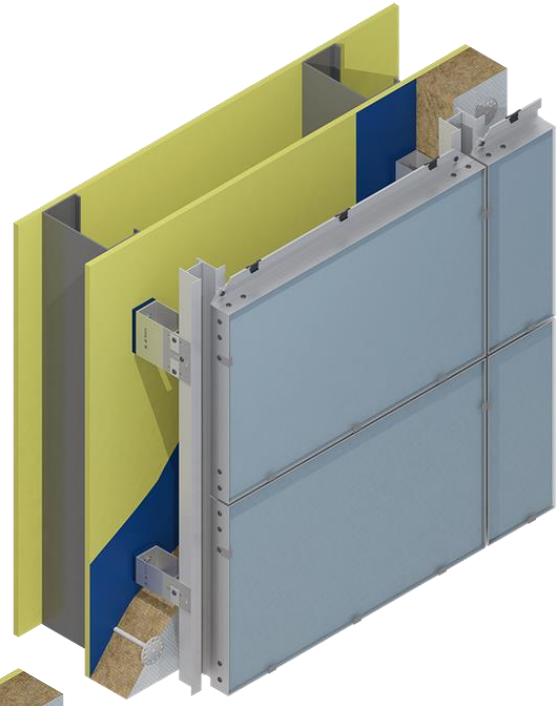
Proposed design – (plan view)

Building Block #3
Cladding Attachments

Concealed Fasteners



BIPV



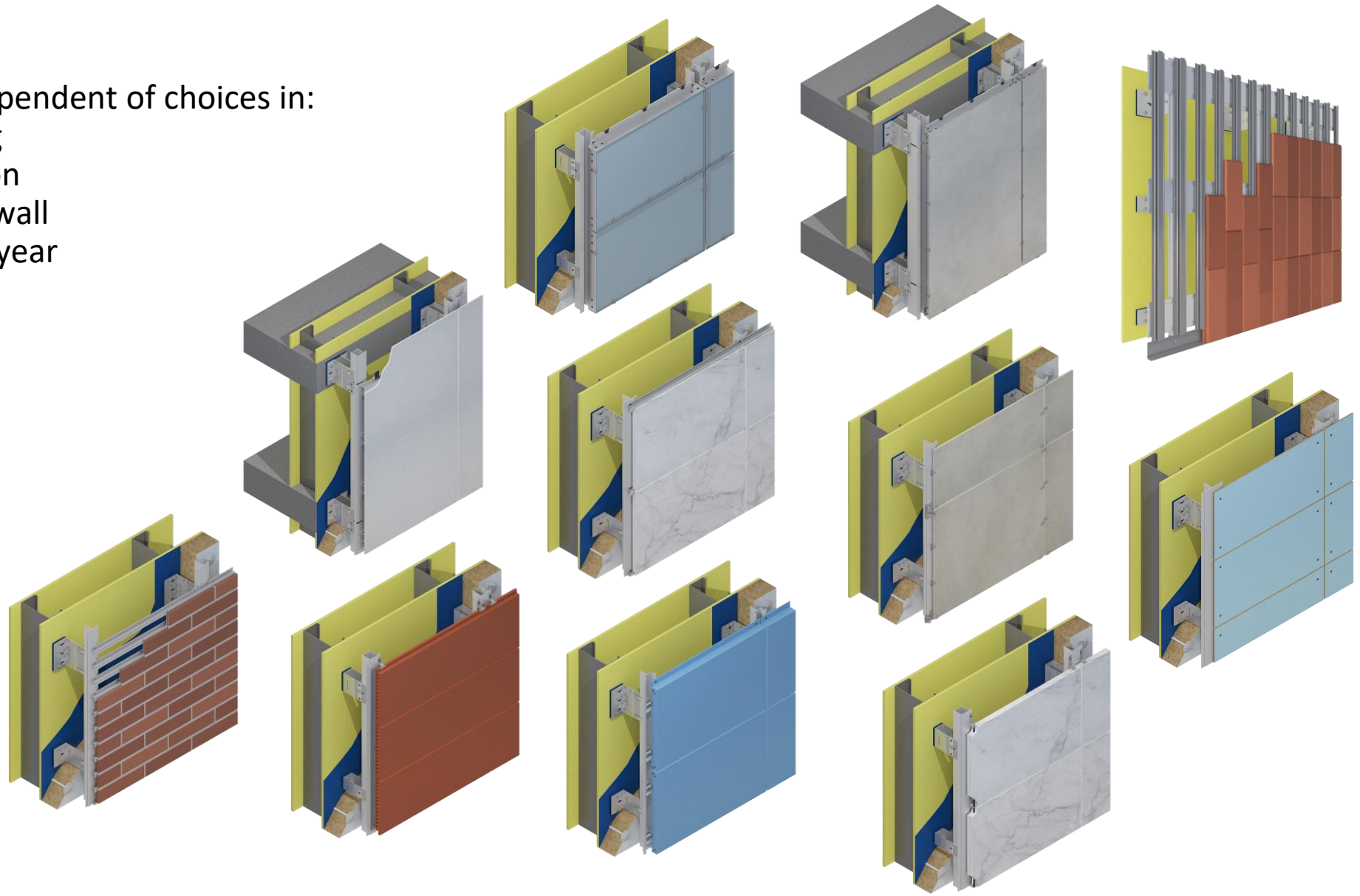
Simple Front Fastened

Specialized; Kerf for Stone

Subsystem Independence

Systems independent of choices in:

- Cladding
- Insulation
- Backup wall
- Time of year
- Location
- ……



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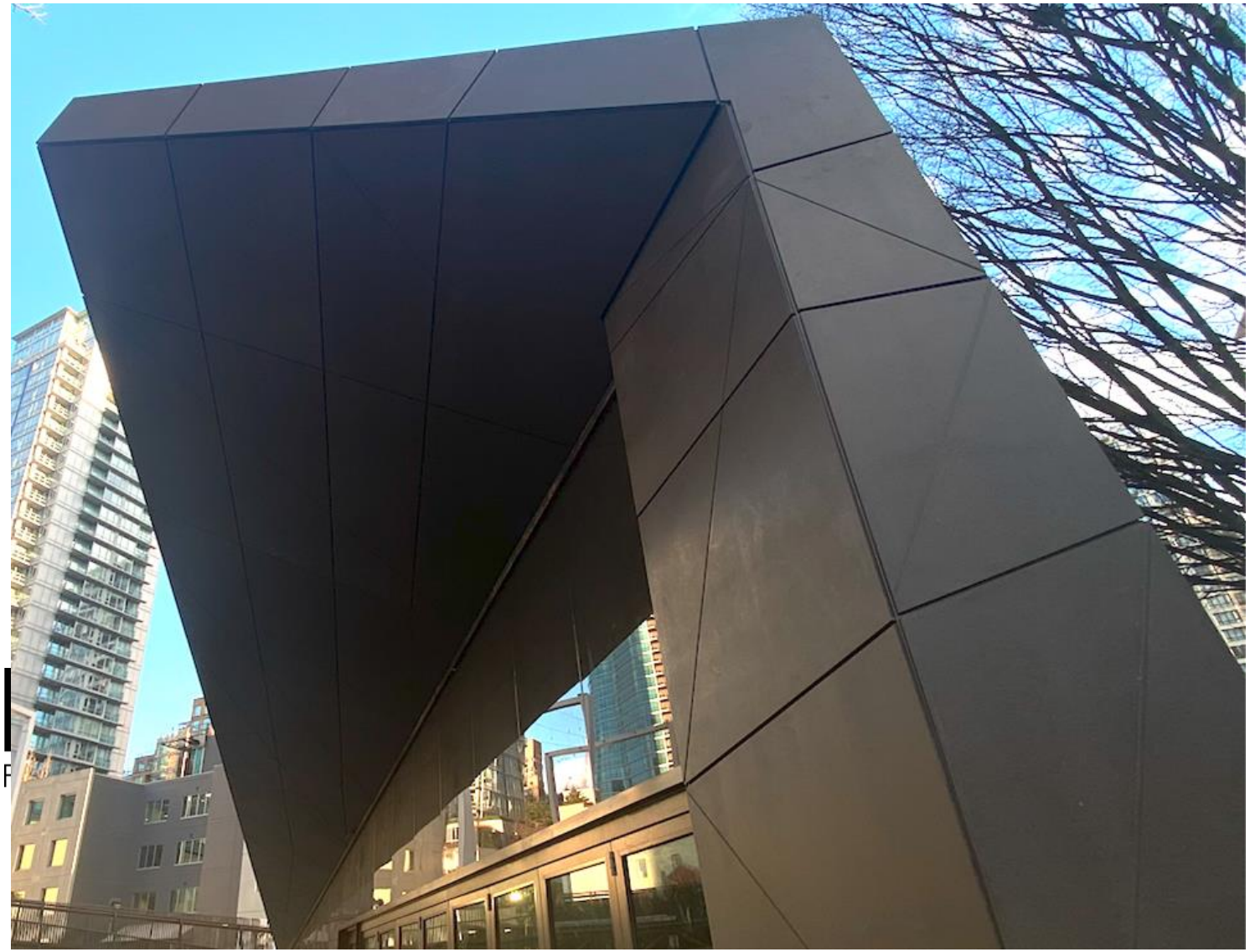
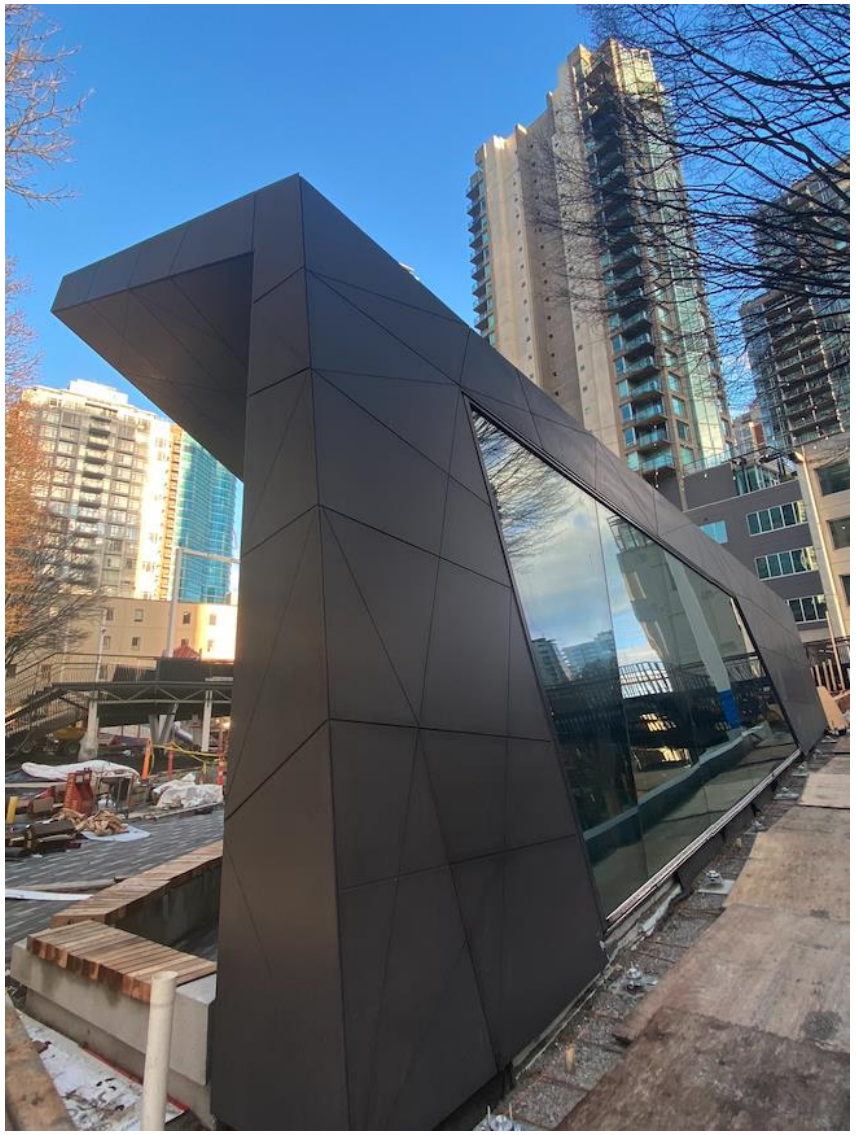
Under Cut Anchors and FRC

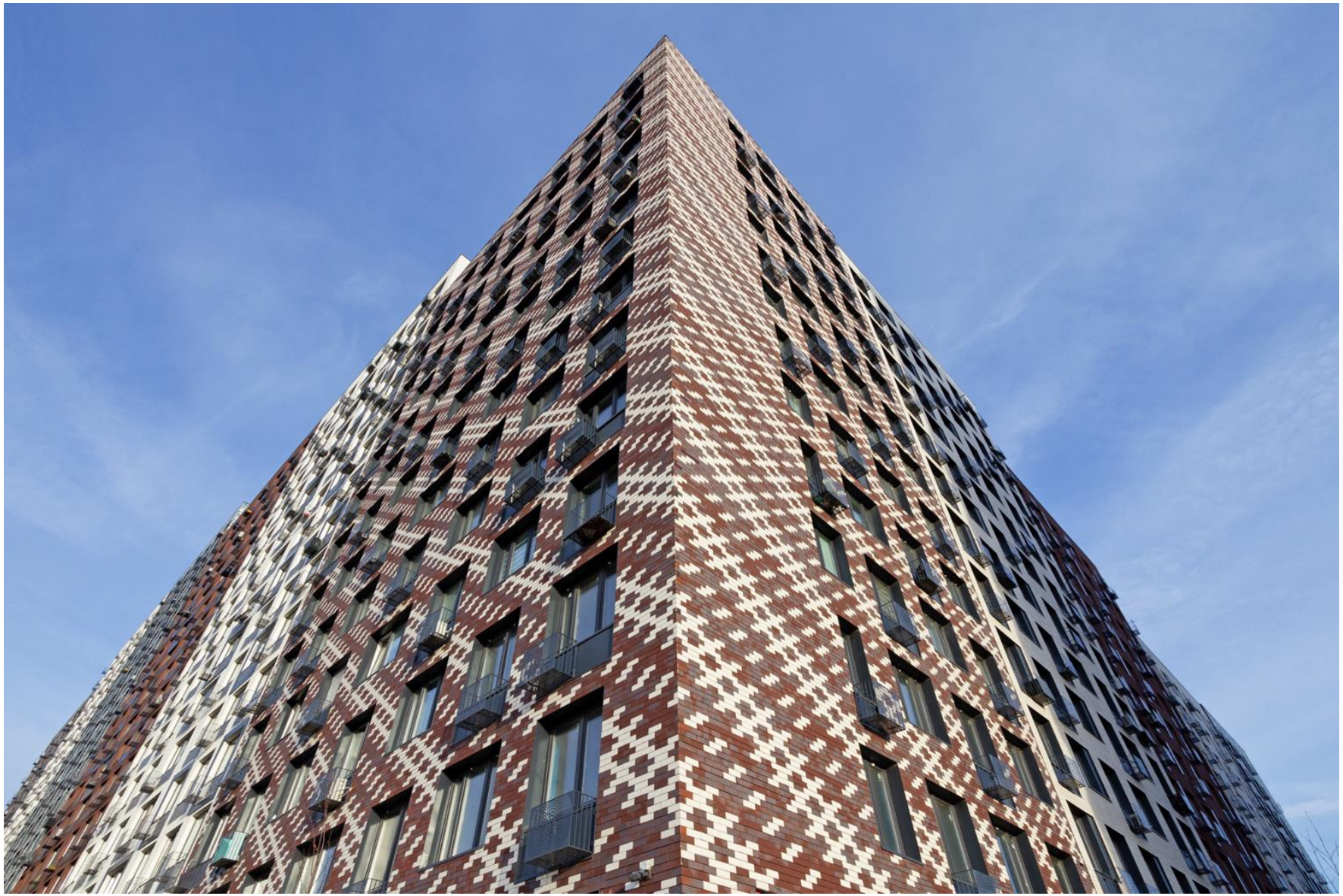
Undercut Anchors System





Innovative Configuration: Building Integrated PV (BIPV)

Smart Klinker: Mechanically Attached Brick



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Terra Cotta Systems for all Manufacturers

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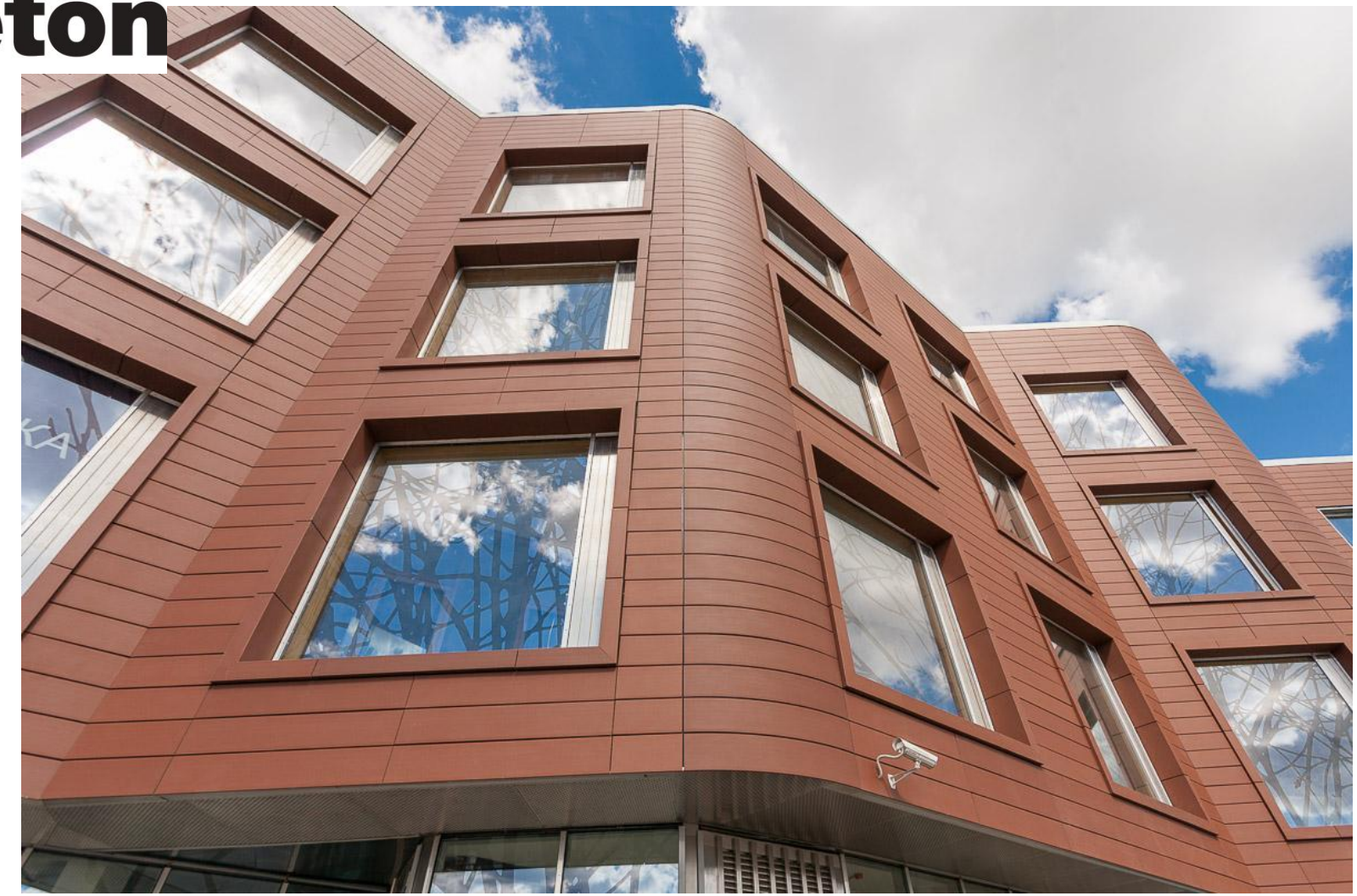
Argeton



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Visible Fasteners

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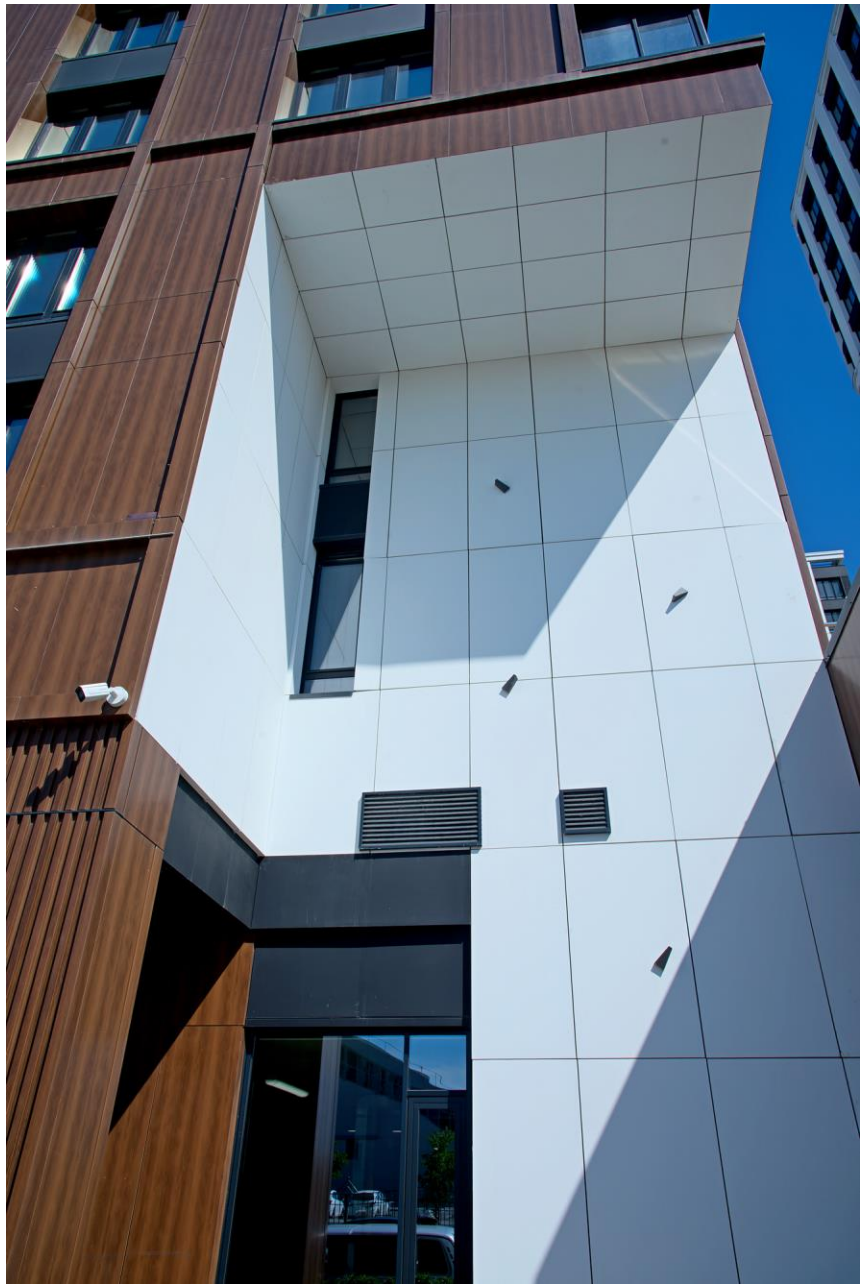

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FACADE SYSTEMS INC.

Argeton

CERACLAD
Rain Screen Exterior Siding System

CORIUM

DEKTON FACADES
designed by COSENTINO

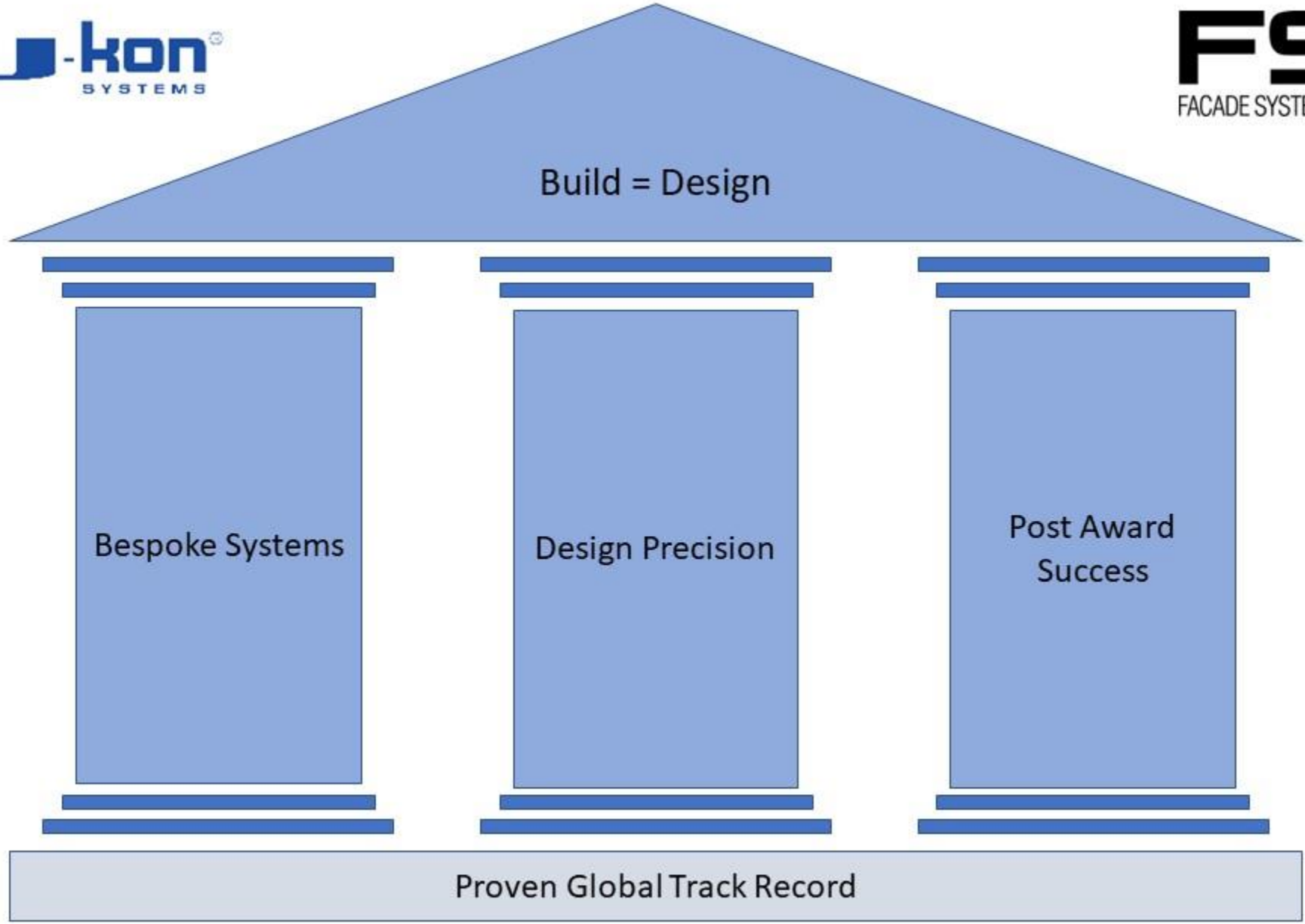
U-kon SYSTEMS

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.

SMART KLINKER

What Else Do You Need??

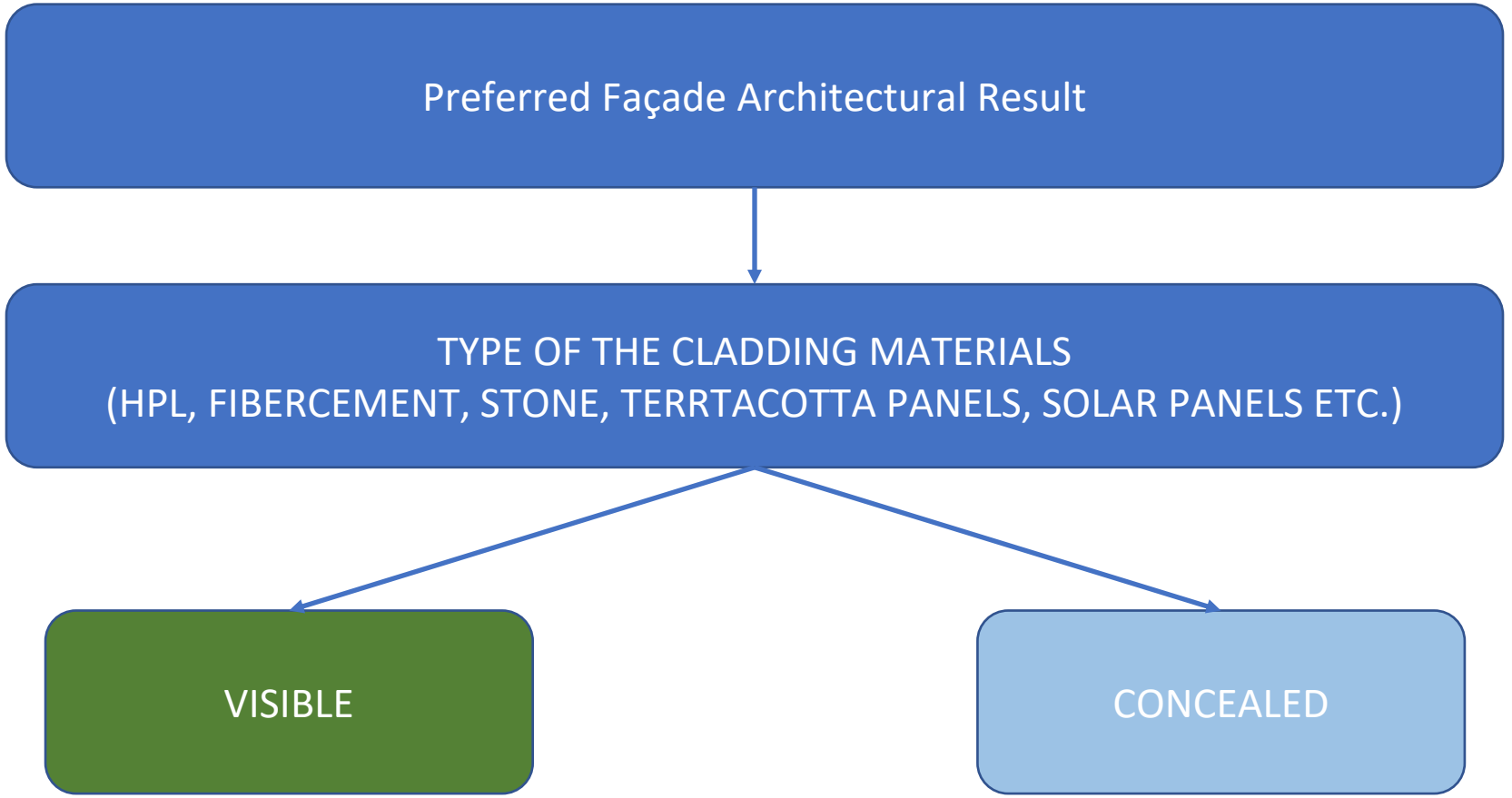

Build = Design
Bespoke Systems
Design Precision
Post Award Success
Proven Global Track Record

What is next?

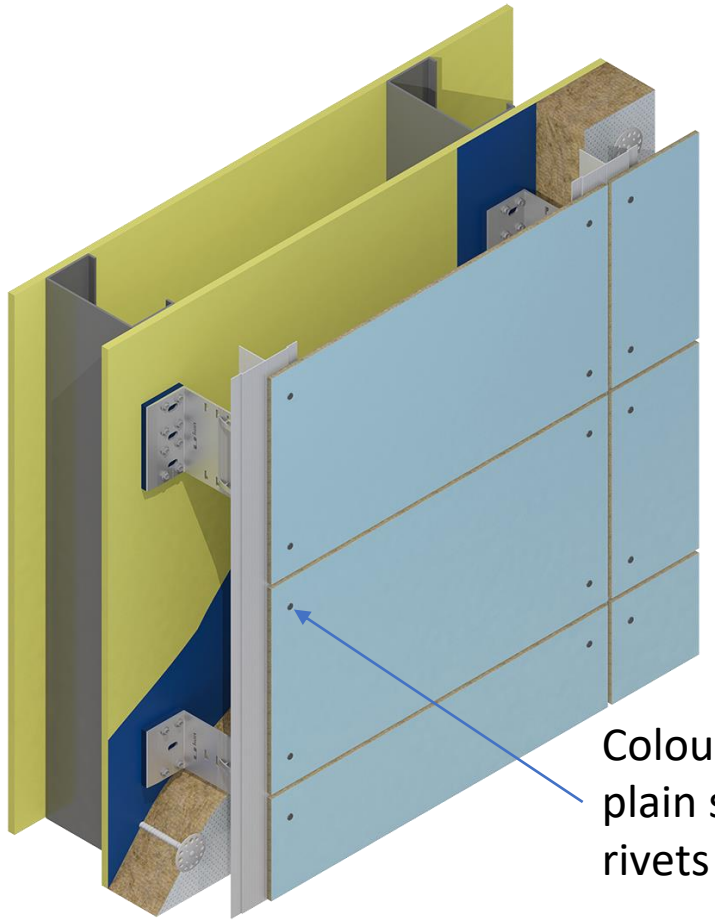
- Tells us your woes, challenges, and curiosities about high performance facades. You can help us help you or guide us on our next webinar.
- Under no obligation, let's review a project at any stage and discuss some ideas.
- or just give us a call. We love learning.

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.

Building Block #3 – Cladding Attachment



Simple System: Visible Fasteners

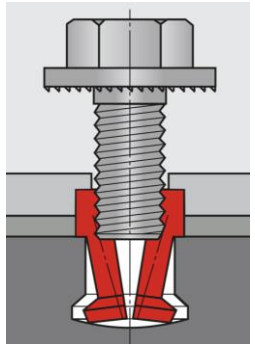


The system is a simple, economical and frequently used system for visible fixing of flat facade material like aluminum composite panels, sheets, HPL, fiber cement corrugated and standing seam metal panels.

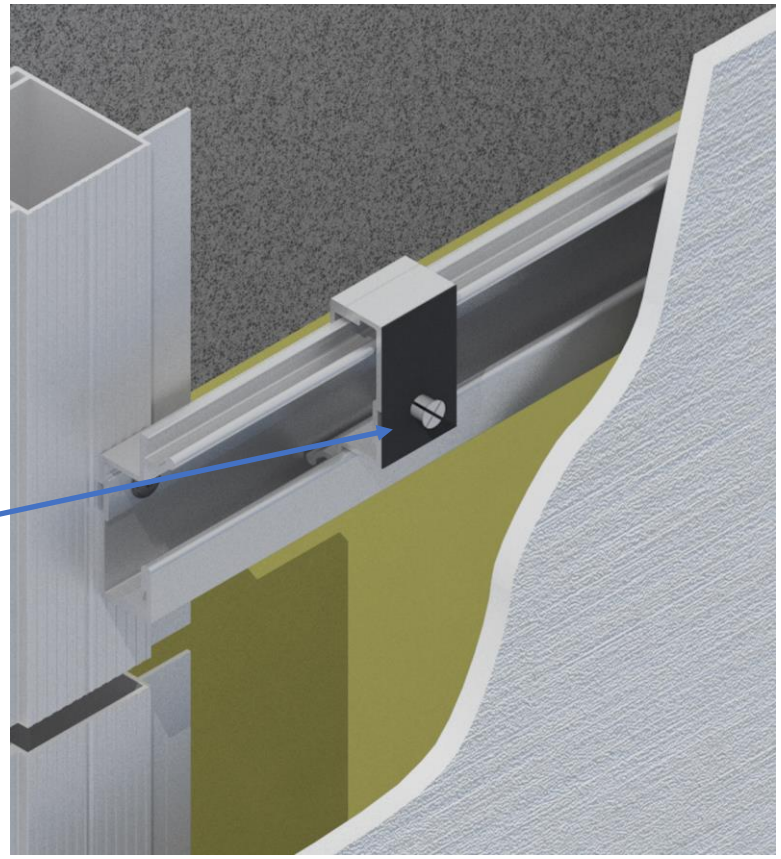
Simple System: Undercut Anchors System

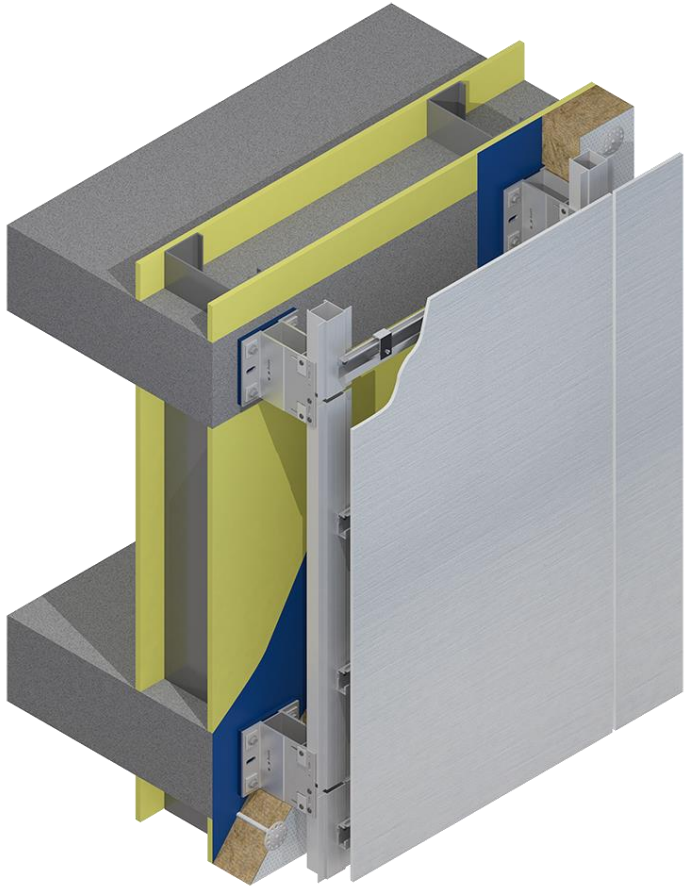
fischer

KEIL



Location of under cut anchor, typical 2’ spacing





FSi FACADE SYSTEMS INC.

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

Innovative Systems: Kerf System for Heavy Facades

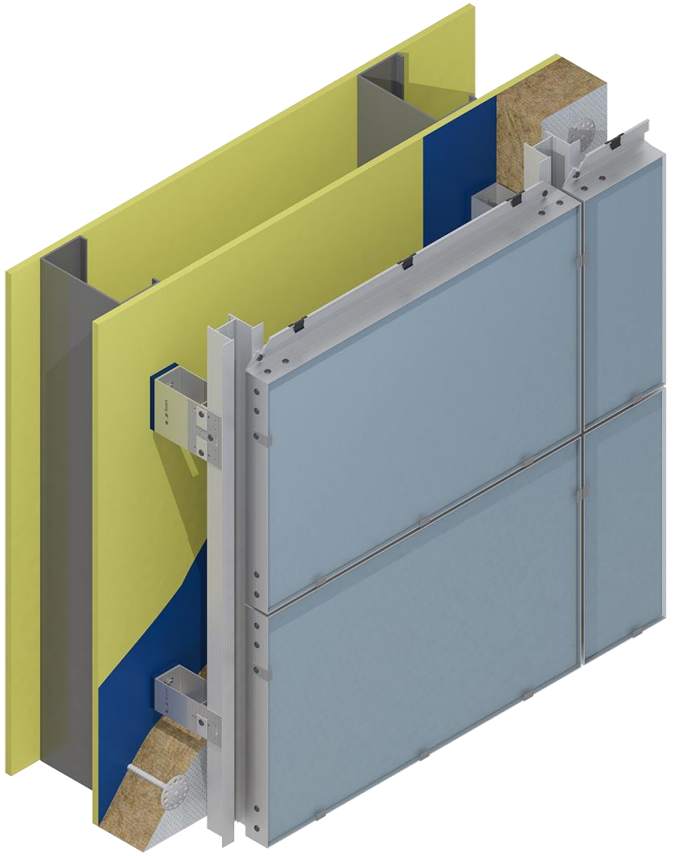
The system is designed for concealed way of fastening the natural stone.

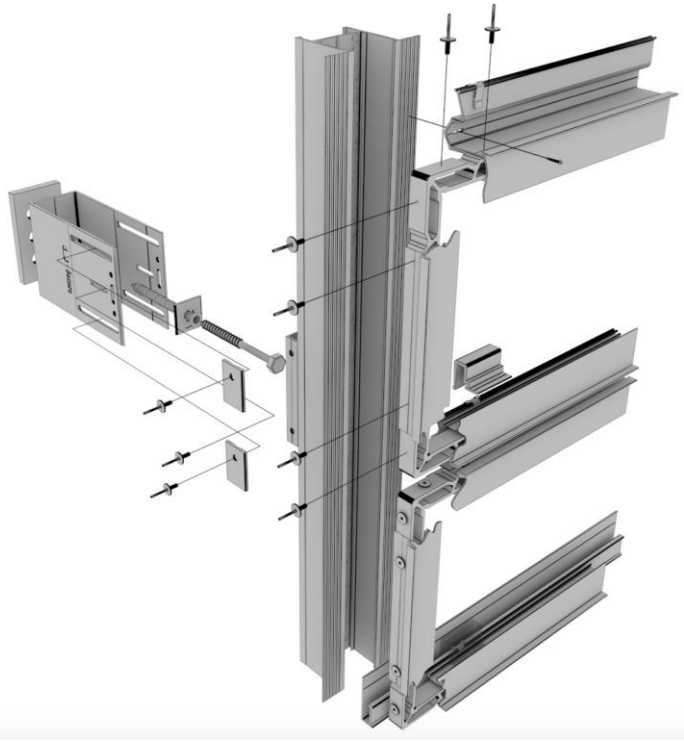
The cladding is fixed to the system of vertical and horizontal profiles.

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.

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

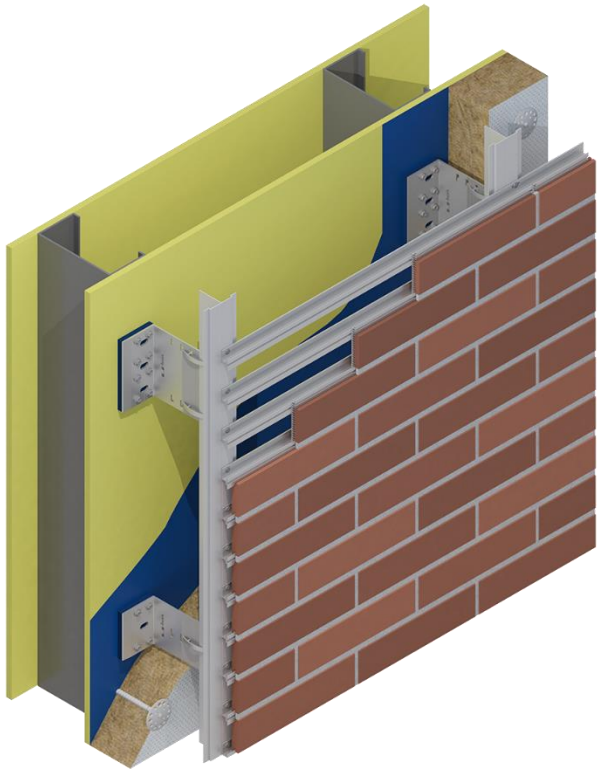
This system is designed for invisible fixing of glass, ceramic, and photovoltaic solar panels. The system can withhold a large format of panels that have a thickness between 3.5 mm to 8 mm.
The cladding panel is glued into the frame of aluminum profiles. Special stainless steel safety clips are installed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

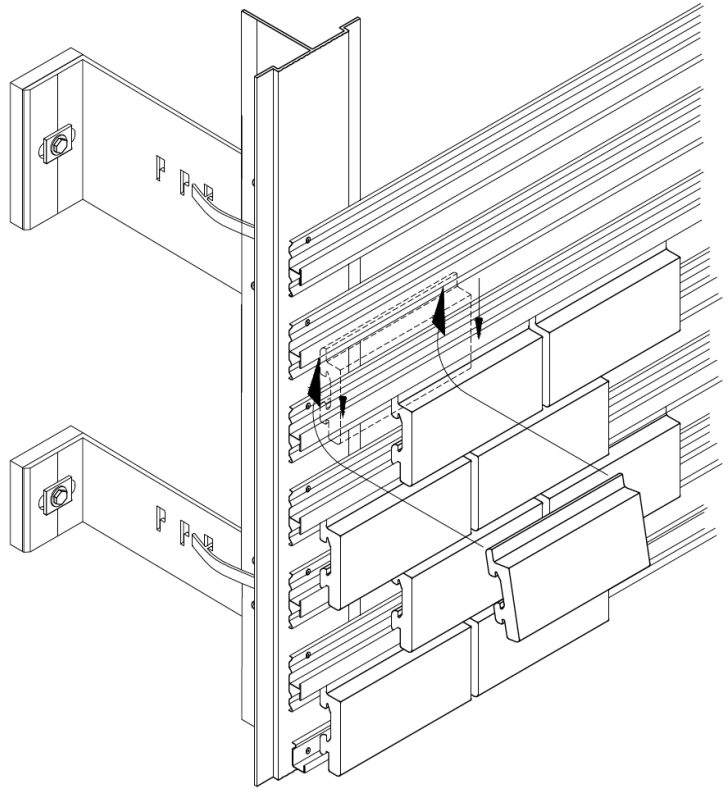




Smart Klinker: Mechanically Attached Brick

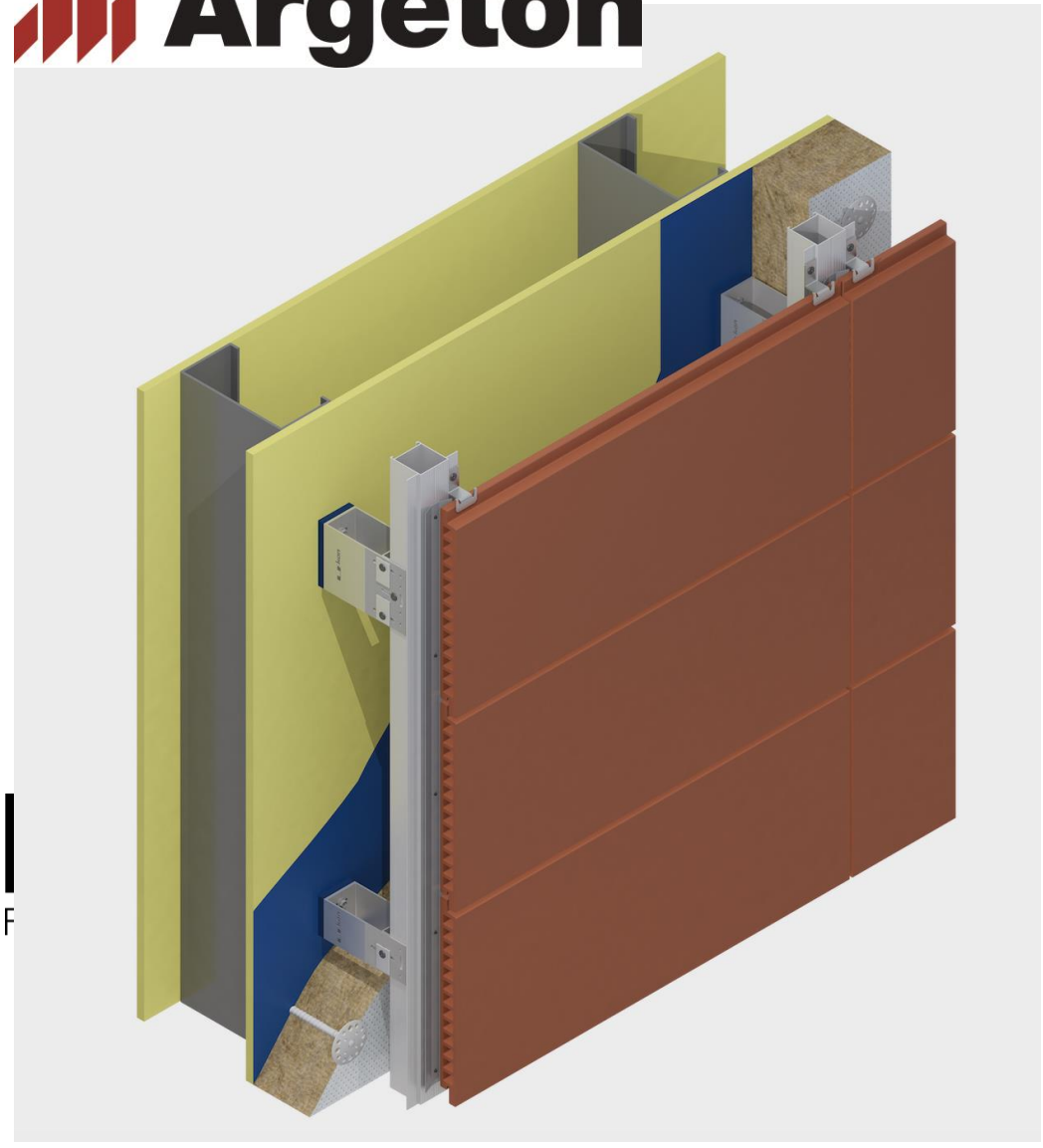
This system is designed for invisible fixing of thin brick. The brick veneer can be
installed with or without grouting.
Brick veneer without grouting:
Cladding panels are installed on horizontal rails,
the shelves of which engage with grooves in the horizontal ends of the panels.
Horizontal and vertical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

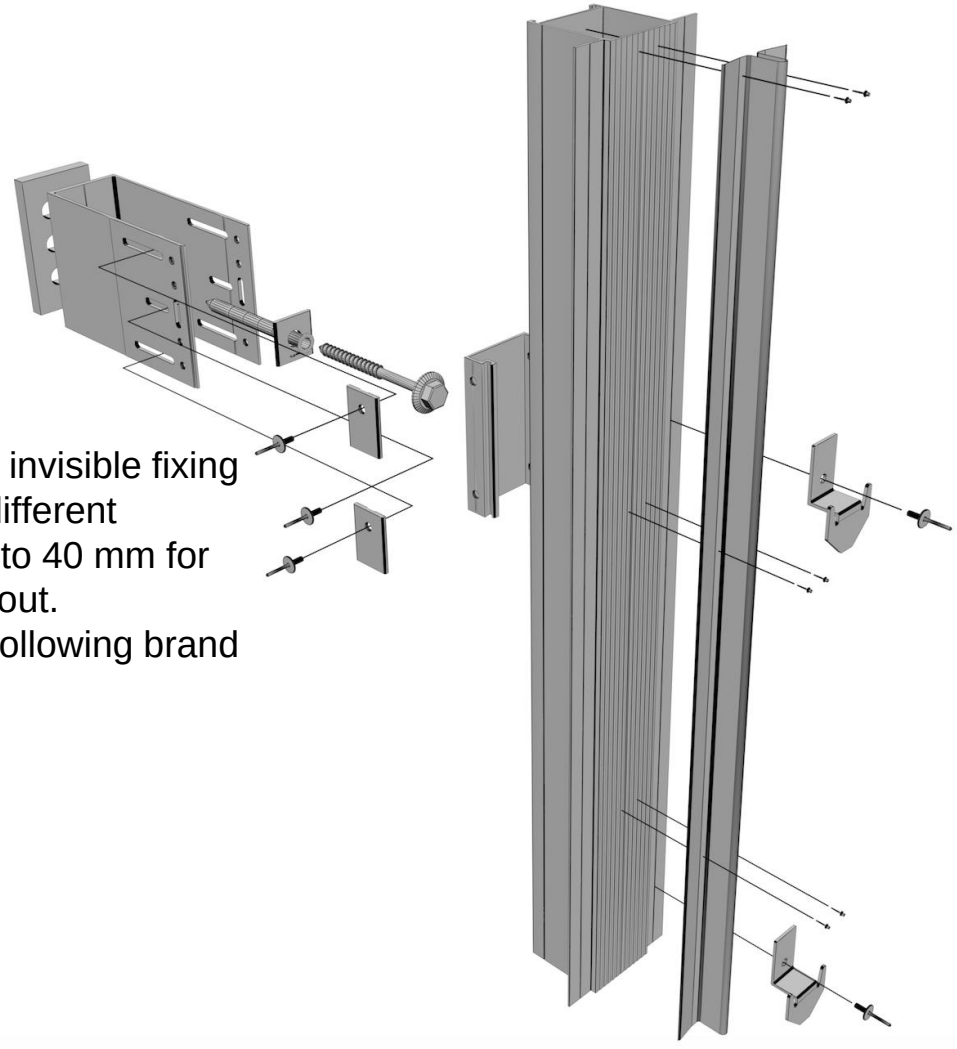




Terra Cotta Systems for all Manufacturers

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