

THE NATIONAL GLASS ASSOCIATION PRESENTS

BEC

CONFERENCE™

25TH
Anniversary

WHERE WE'VE BEEN & WHERE WE'RE GOING

MARCH 5-7, 2023 | LAS VEGAS | GLASS.ORG

FACADES OF THE FUTURE



Daniel Sutton
Vitro Architectural
Glass



Matt Price
Deceuninck | MPS



Adrian Lowenstein
Skyline Windows

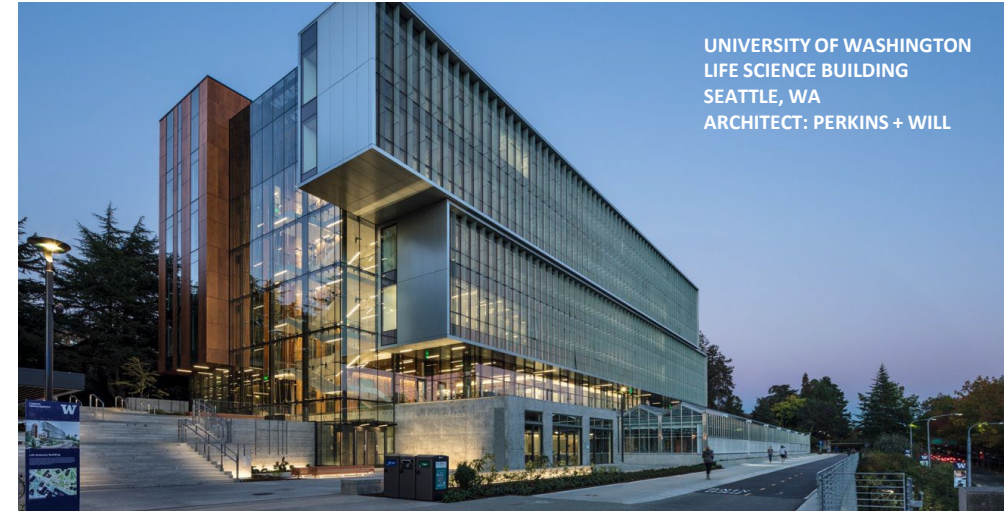
FACADES OF THE FUTURE

Vacuum Insulating Glass Technology



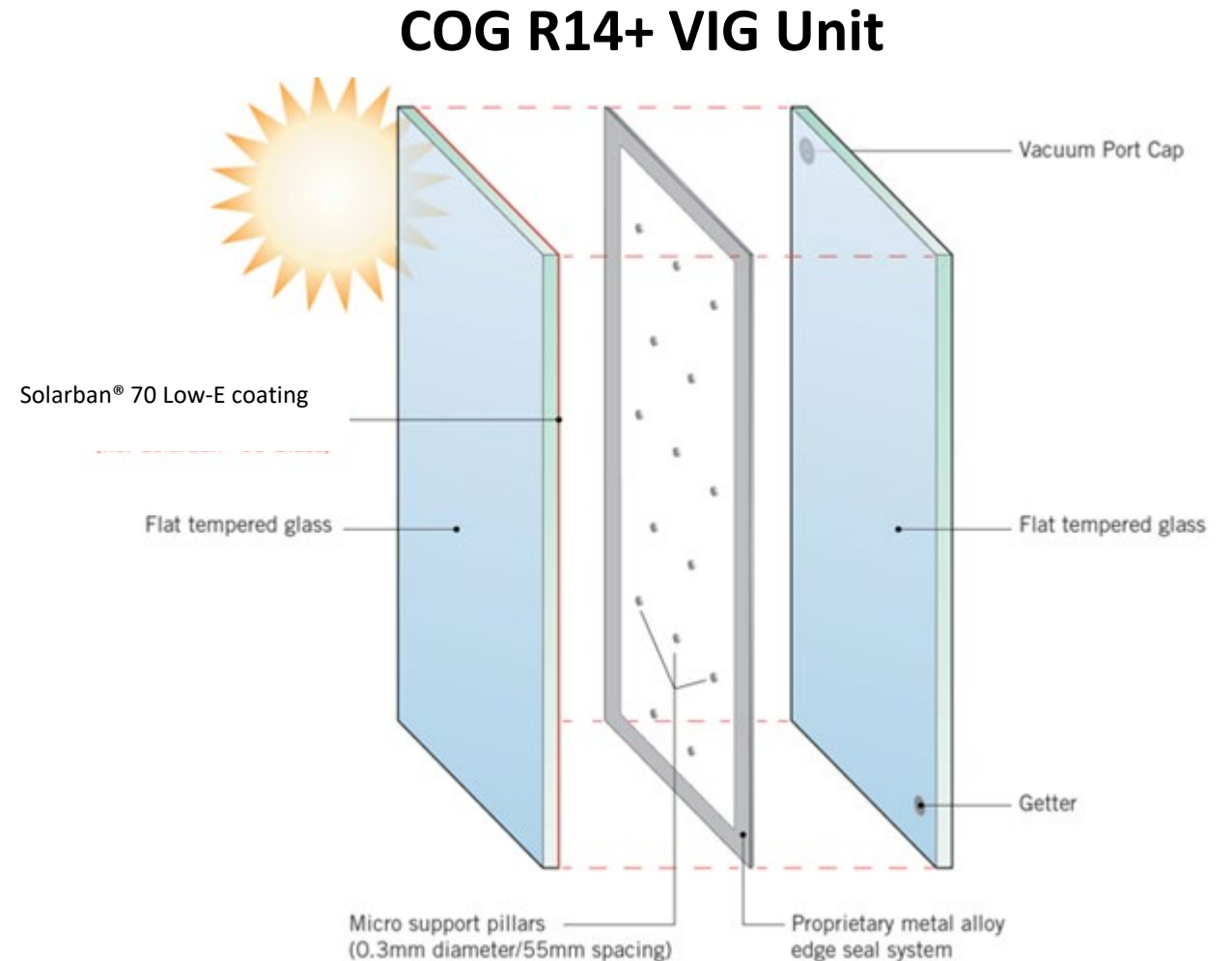
VITRO ARCHITECTURAL GLASS

- Formed in 2016 when Vitro acquired PPG Glass
- North America's largest and most trusted glass manufacturer
- Produces many of the commercial glass industry's most often specified products, including:
 - *Solarban*® low-e glasses
 - *Starphire Ultra-Clear*® glass
 - Performance-tinted glasses
 - *VacuMax*™ Vacuum Insulating Glass (VIG)
- Based in Mexico with five U.S. production facilities
- 500 patents registered throughout history



VACUUM INSULATING GLASS (VIG) UNITS

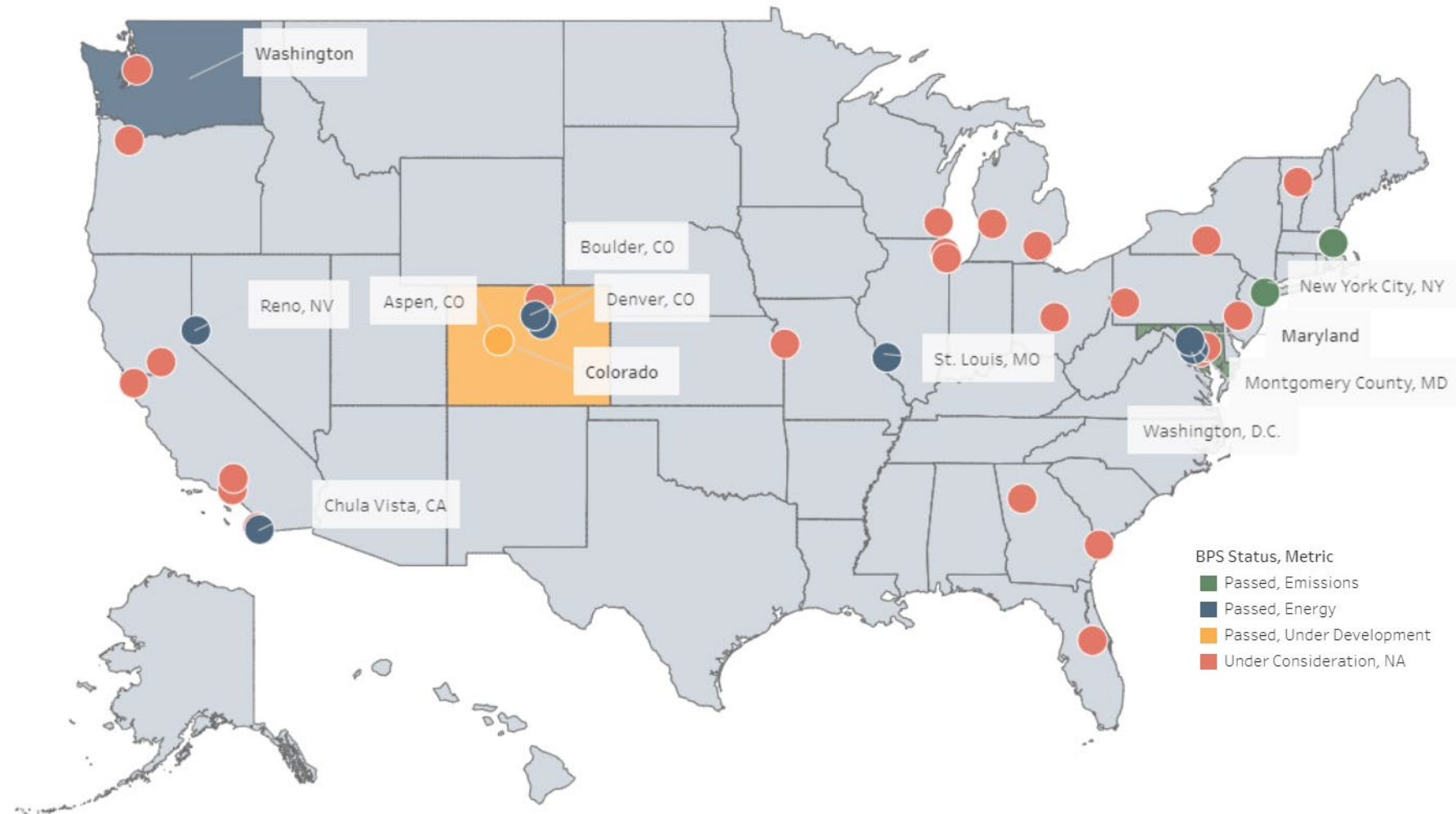
- **Components**
 - Glass
 - Coating Surfaces
 - Edge Seal
 - Micro Support Pillars
 - Vacuum Space
 - Getter
 - Vacuum Port



BUILDING PERFORMANCE STANDARDS

Members of the National BPS Coalition have committed to passing an existing building performance policy by Earth Day 2024.

Many cities and states have passed standards. Those in **red** are under consideration to implement standards.



EXISTING GLAZING CHALLENGES

- Requires use of inert gas
- Requires the use of multiple low-e coatings
- Thermal performance limitations in a dual pane setting
- Triple-glazed IGUs require stronger framing systems to account for the added weight
- Not suitable for every application

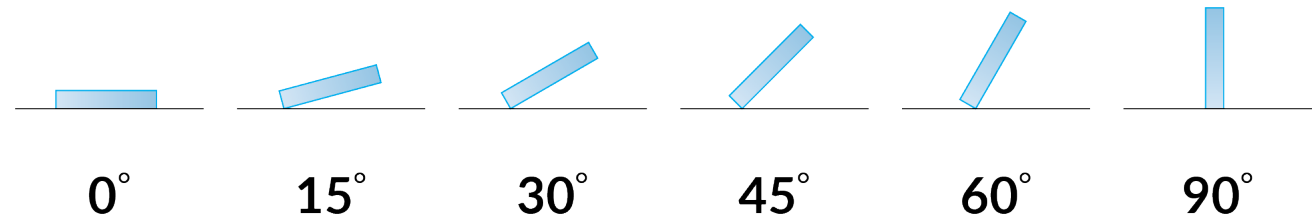


WHY THIS TECHNOLOGY IS IMPORTANT

Highly Adaptable

- Heat transfer coefficient of VIG remains constant regardless of whether it's mounted horizontally or with an angle.
- VIG supports larger window-to-wall ratios without sacrificing performance or comfort.
- There is no expansion or contraction with VIG units as the result of elevation changes due to the vacuum space.

U-Value (Btu/hr/ft ² /°F) of Different Types of Glass	0°	15°	30°	45°	60°	90°
4mm +0.3 V+4mm VIG	0.07	0.07	0.07	0.07	0.07	0.07
6mm+12 Air+6mm Insulating Glass	0.43	0.42	0.40	0.37	0.33	0.29



STRATEGIES

- VIG units can be incorporated into virtually any glazing system, window frame or curtainwall application
- Ideal for:
 - Retrofits
 - New Commercial Construction
 - New Residential Windows
 - Ultra-High-End Residential Replacements
 - Renovations of Historic Structures
 - Skylights



INNERGY AP

Deceuninck North America

Matt Price, Sheldon Kahan

WHO IS DECEUNINCK?

- Global leader in PVC window & door extrusions
- Founded in 1937
- Publicly traded on Belgian stock exchange
 - Production in 13 countries
 - 3,600 employees
 - 4,000 customers in 91 countries
 - Globally : More than \$800MM sales
- Driven by 3 core values/pillars
 - Reliability, Innovation & Sustainability



DECEUNINCK NORTH AMERICA

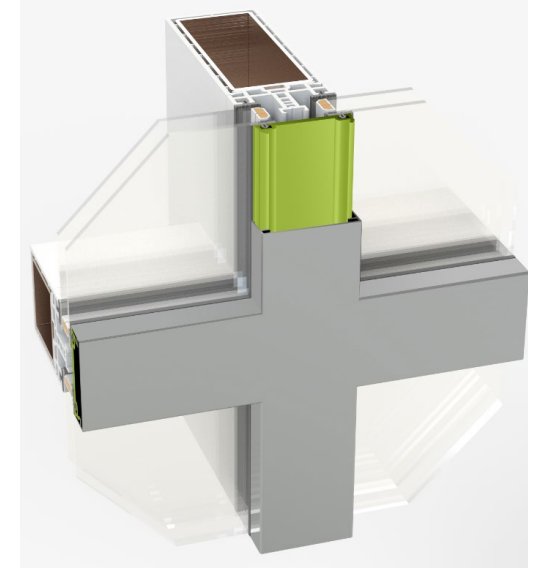
- HQ in Monroe, Ohio
 - 2nd plant in Fernley, Nevada
- Presence in USA since 1969
- 2022 Sales over \$236 million
- ~600 employees
- Servicing window & door manufacturers in USA & Canada
 - Customers produce over 8 million windows & doors annually
- Integrated supplier
 - Product Design & Engineering, Tool & Die making, Material Science, Compounding, Extrusion, Customer Support & Technical Service
- Websites
 - www.DeceuninckNA.com
 - www.Innergy-AP.com



INNERGY AP PRODUCTS

- Window & door reinforcements
- Mullions
- Curtain wall components
- Hybrid window components
- Door components
- Pressure Plates

- Custom designed & exclusive



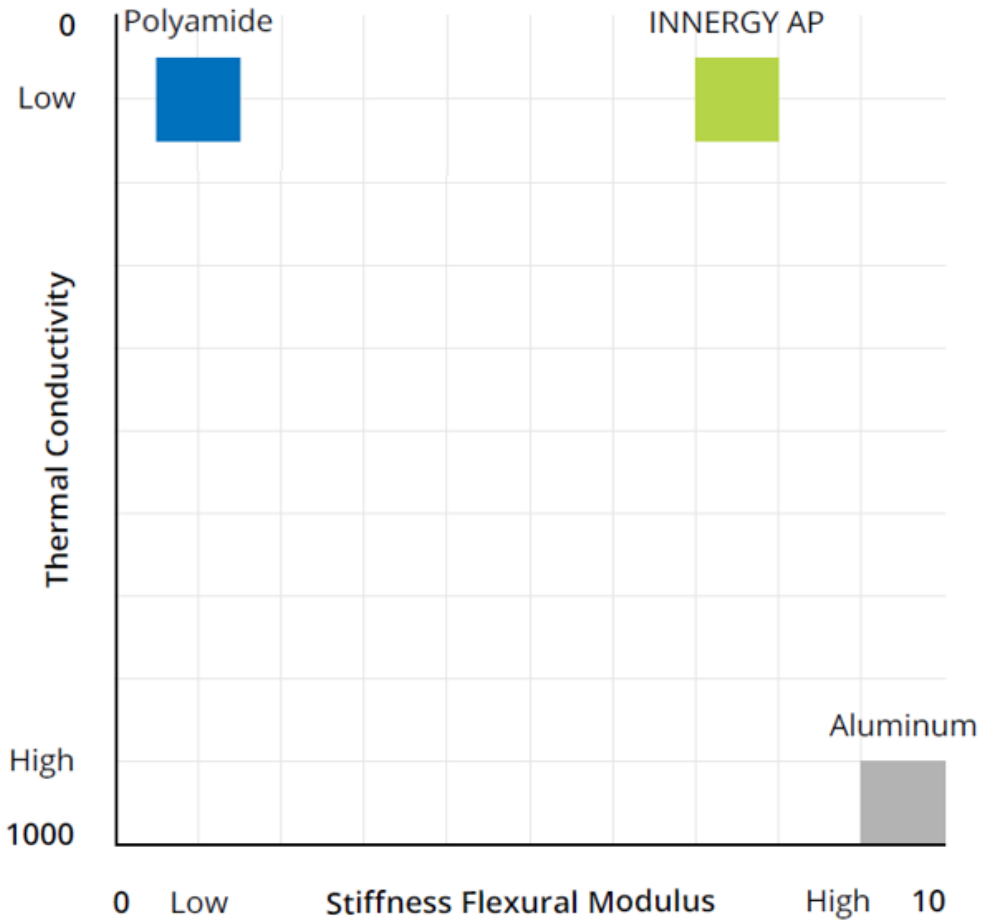
THE MATERIAL TECHNOLOGY BEHIND INNERGY AP

- Combines metal like stiffness AND energy efficiency
- Advanced composite material technology
- 80% continuous glass fiber strands/rovings; 20% Covestro polyurethane resin by weight
- Pultrusion manufacturing process
- Watch [Rovex Pultrusion Video](#)



Strong	Tough	Resistant	Stable
Metal-like stiffness & strength	Highly resistant to fatigue failure	Extremely low thermal conductivity	Resistant to temperature extremes
High tensile & compression strength	Extreme abrasion resistance	Non hydroscopic- near zero water absorption	Low thermal expansion & contraction
Virtually no creep or permanent set	Excellent impact resistance	Near zero electrical conductivity	High chemical & salt water resistance

MATERIAL PERFORMANCE COMPARISON



Material	Thermal Conductivity (BTU-in/hr-ft ² °F)	Stiffness Flexural Modulus (Mpsi)
Innergy AP/ Rovex	1.5	7.5
Aluminum	1109	10
Polyamide	1.6	0.7

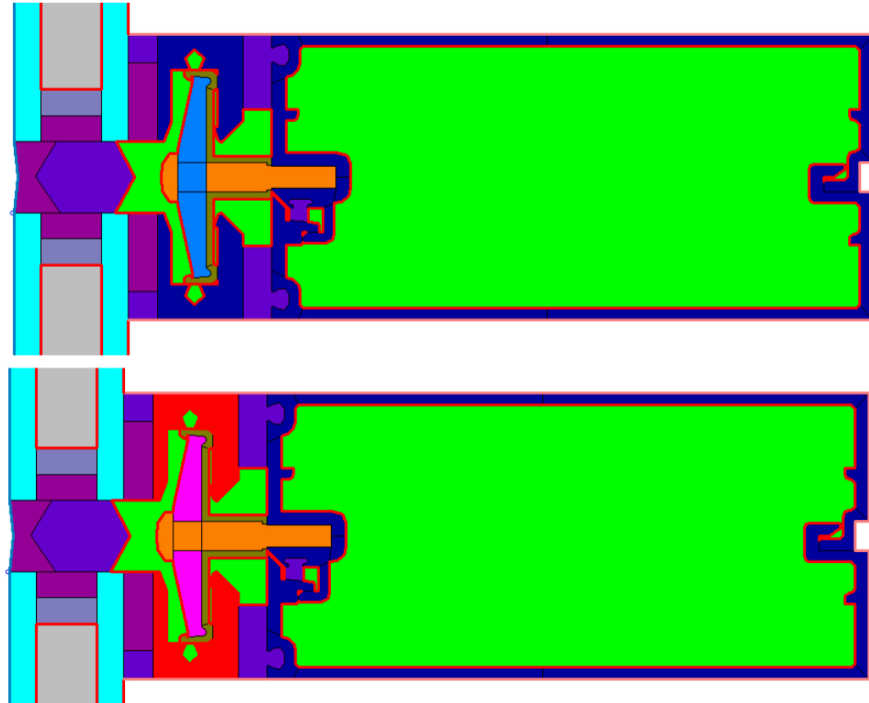
MATERIAL ATTRIBUTE COMPARISON

MATERIAL	ATTRIBUTE					
	Stiffness Flexural Modulus (Mpsi)	Specific Gravity	Density (lbs/in3)	Stiffness to Weight (FM/SG)	Thermal Coefficient of Expansion (μin/in-°F)	Thermal Conductivity (BTU-in/hr-ft2-°F)
ROVEX® / INNERGY® AP	7.5	2.10	0.076	3.6	3.6	1.522
Aluminum	10.0	2.72	0.098	3.7	13	1109.357
Polyamide-6.6 Fiberglass	0.7	1.3	0.047	0.5	11-17	1.596
Polyester Fiberglass	1.6-3.5	1.84-2.00	0.066-0.072	1.8	3-11	2-5
Steel-Mild	29.0	7.85	0.284	3.7	6.5	346.674
Wood-Pine	1.3	0.47	0.017	2.8	2.78	1.116
Vinyl	0.4	1.45	0.052	0.3	33	1.179
Epoxy Carbon Fiber	19.6-25.0	1.48-1.60	0.053-0.058	15.6	1-2	3.5-5.5

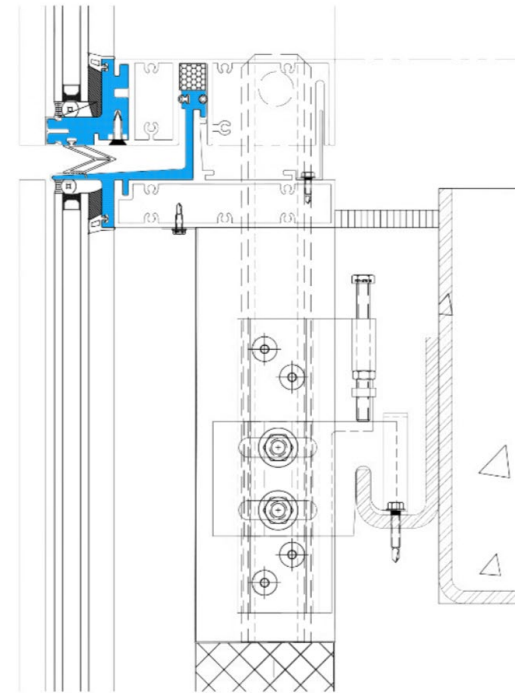
Technical data for materials other than Rovex® are provided for reference only. Although every effort has been made to ensure that the information is correct, no warranty is given as to its completeness or accuracy.

REPRESENTATIVE THERMAL ANALYSIS

Sample THERM Model Snips, Intermediate Vertical w/ TPS spacer, Aluminum top and Rovlex bottom:



Technical Information (per NFRC 100)
COG U-Value = 0.235 BTU/(hr•ft²•°F)
System U-Value = 0.283 BTU/(hr•ft²•°F)
Condensation Resistance = 59.1



Representative Customer Sample

INNERGY AP



INNERGY AP



QUESTIONS & CONVERSATION FACADES OF THE FUTURE



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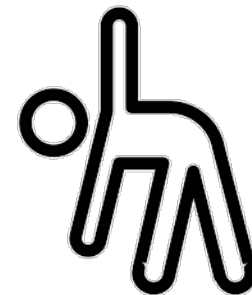
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THE CODE CONNECTION: CREDIT FOR ADVANCED PRODUCTS

- Energy codes set minimum requirements, but there is also credit for advanced products going beyond the code minimum.
- Higher performance in the glass and/or frame components =
 - More flexibility in the overall product design to meet the U-factor requirements.
 - Gives the architect and building owner *more allowable window area*.
 - Gives the architect more options to meet the new additional energy credit requirements.
 - Potential tax incentives for the building owner.



THE CODE CONNECTION: CREDIT FOR ADVANCED PRODUCTS

- **Additional Energy Credits:**

- Both ASHRAE 90.1-2022 and 2024 IECC have new “additional energy credits” requirements.
- Must demonstrate compliance with main code and earn a certain amount of extra points, choosing from advanced options across envelope, HVAC, lighting, renewable energy, etc.
- Advanced performance products beyond the base code will help the architect earn points and give them more flexibility in their overall design.

- **179D Energy Efficient Commercial Buildings Tax Deduction:**

- High performance windows can help the building owner achieve the very significant 179D tax deduction.
- Incentive for going 25-50% beyond ASHRAE 90.1-2019: **\$0.50 to \$1.00 / ft²** as the baseline; increase by **5x** to **\$2.50 to \$5.00 / ft²** if prevailing wage and registered apprenticeship requirements are met. *Floor area, not window area!*
- Difficult to earn with HVAC or lighting alone – also need an efficient envelope.

THE CODE CONNECTION: NGA RESOURCES

- IC Value Engineering task group > Glazing Playbook
- New IGU Technologies for Carbon Reduction and Zero Net Energy
glass.org/ondemand-webinars#energy