

AGENDA

AGENDA

- Introduction to Cascadia Windows & Doors
- Overview of Building Performance in a Changing Climate
- Characteristics of High-Performance Fenestration
- Project Case Studies



FIBERGLASS INNOVATION

COMMERCIAL & MULTI-FAMILY

Windows & Window Wall Storefront Glazing

RESIDENTIAL

Fixed & Operable Windows Swing & Sliding Doors Passive House Windows & Doors

THERMAL SPACER

Exterior Cladding Assemblies Low-sloped Roofs & Soffits



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THERMAL SPACER

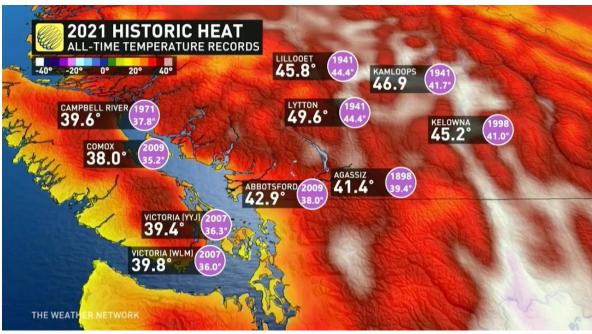
Exterior Cladding Assemblies Low-sloped Roofs & Soffits





THE NEW NORMAL

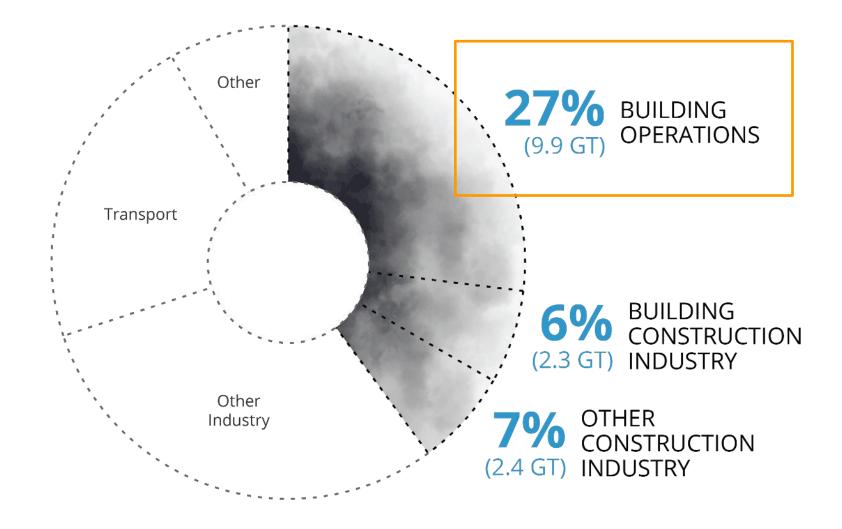




June 23, 2025 June 18, 2021

HOW DO OUR BUILDINGS FACTOR INTO THE CHANGING WORLD?

A CHANGING WORLD. A CHANGING INDUSTRY.



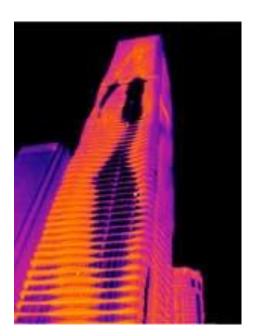
WHERE IS THE BUILDING OPERATIONS ENERGY GOING?

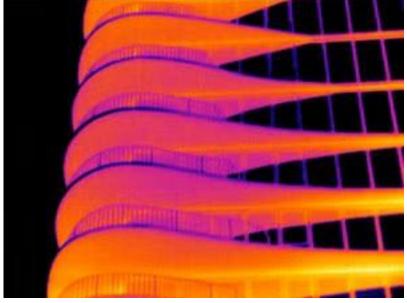
POOR WINDOW PERFORMANCE





POOR WALL PERFORMANCE









30%
TO
50%

OF A BUILDING'S HEATING & COOLING ENERGY IS LOST THROUGH WINDOWS

BY IMPROVING THE WINDOW FRAME, YOU IMPROVE THE OVERALL PERFORMANCE OF THE ENTIRE WINDOW









A CHANGING WORLD. A CHANGING INDUSTRY.

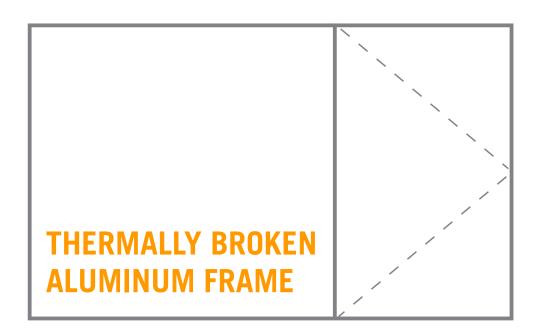


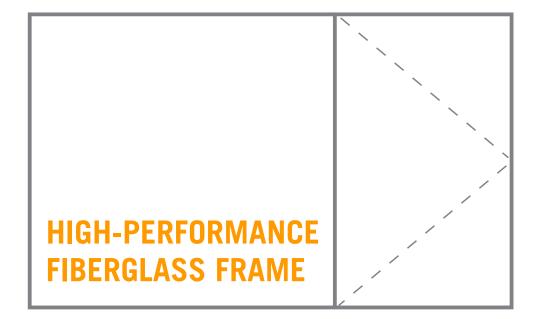


A CHANGING WORLD. A CHANGING INDUSTRY.











0.5 Btu/h·ft²·F | 2.84 W/m²·K

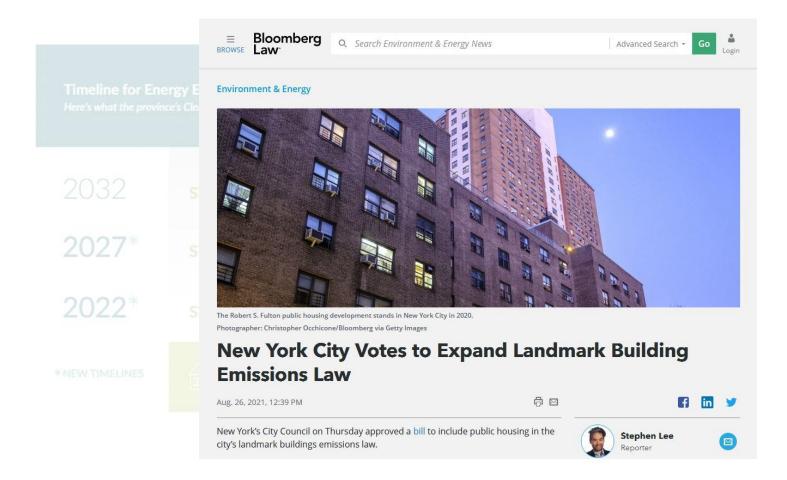


0.24 Btu/h·ft²·F | 1.36 W/m²·K

REGULATORY RESPONSE



REGULATORY RESPONSE



REGULATORY RESPONSE



Massachusetts cities embrace voluntary green building codes

Since state lawmakers approved an optional stretch code early last year, 45 municipalities covering about 30% of the state's population have adopted the guidelines.

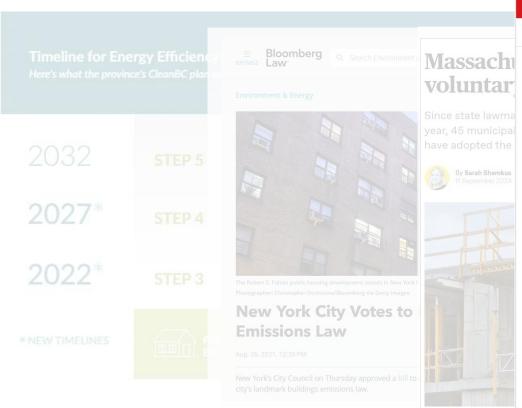


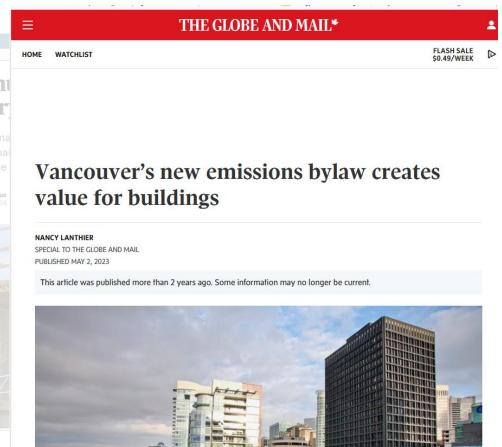




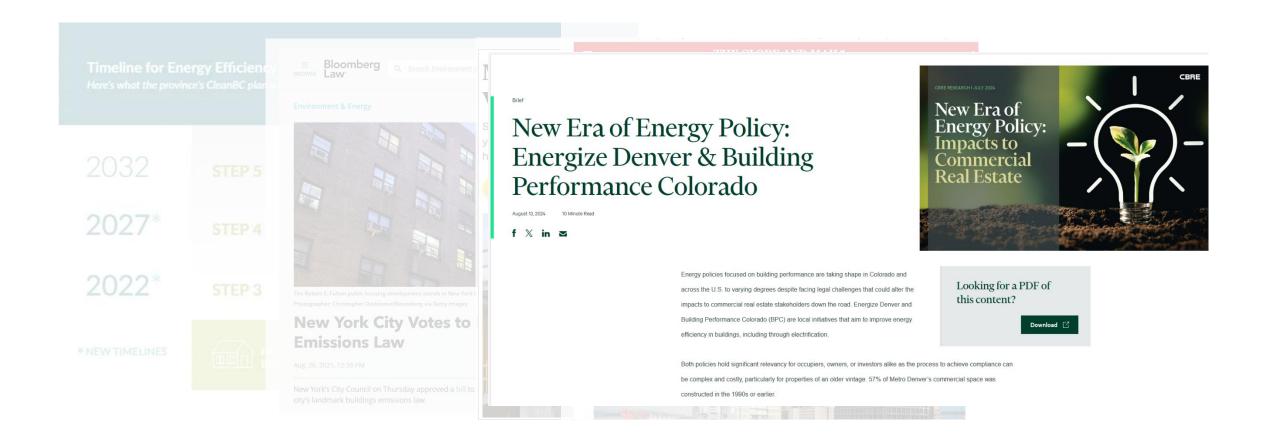
A CHANGING WORLD. A CHANGING INDUSTRY.

REGULATORY RESPONSE





REGULATORY RESPONSE



INCENTIVIZING PERFORMANCE



























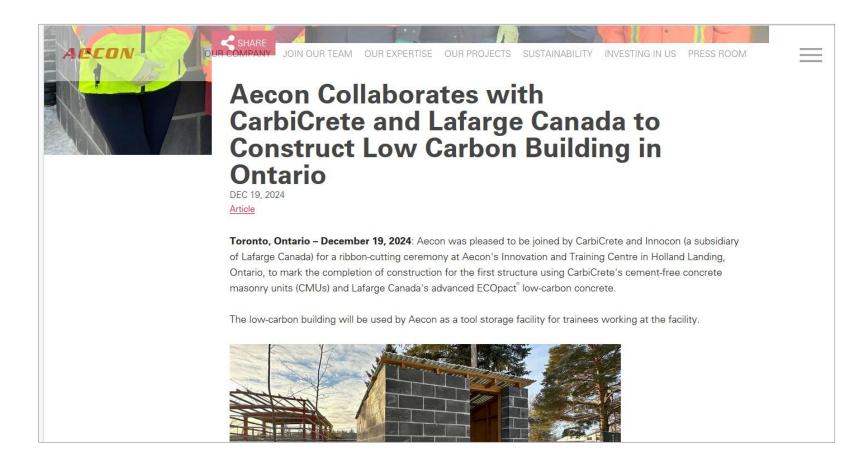




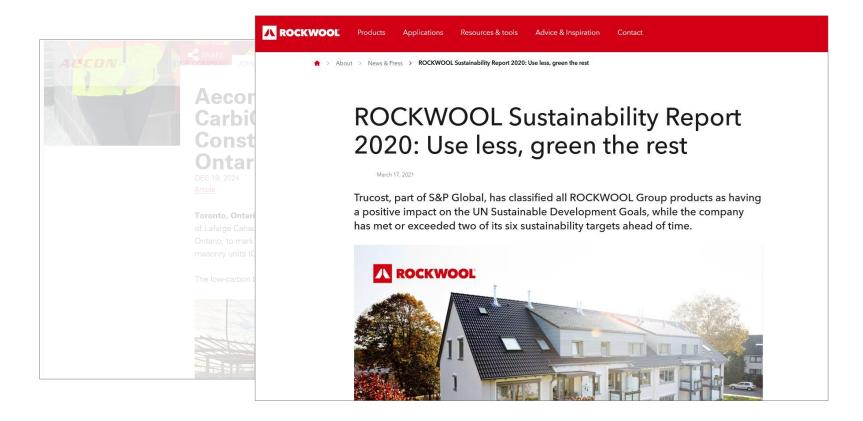




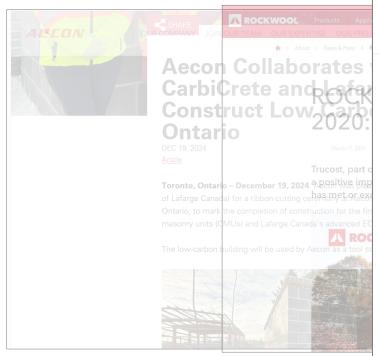
INDUSTRY RESPONSE



INDUSTRY RESPONSE



INDUSTRY RESPONSE





CASCADIA WINDOWS & DOORS PUBLISHES EPDS UNDER NEW PRODUCT CATEGORY RULE

CONTACT US Q

Cascadia Windows & Doors announced the publication of Environmental Product Declarations (EPDs) for its Universal Series Windows, Doors and Window Wall, utilizing the new Fenestration Assemblies Product Category Rule (PCR) released in December 2023. Company officials said that hitting this milestone makes it the first window manufacturer in the world to issue an EPD in accordance with the new PCR. Doing so underscores the company's commitment to transparency and the transition to high-performance building design, they added. These EPDs follow a Cascadia Clip EPD, published in February 2024.

"This is a very important milestone for the Universal Series and the company as a whole," says Mike Battistel, president of Cascadia Windows & Doors. "It's another testament to our commitment to providing the industry with accurate, detailed product information."

The new PCR, which prescribes standardized rules and methods for calculating and reporting the environmental impacts of products, allows for greater accuracy and consistency in the evaluation of a product's lifecycle impacts, particularly to report embodied carbon impacts.

"Over the last five years, architects and designers have been hungry for embodied carbon and environmental impact data for fenestration products," explains Battistel. "But we—and others in the industry—were concerned about using the original PCR from 2015 which was significantly out of date. We didn't want to use that PCR to develop our current EPDs if we were not going to provide accurate and up to date information to the industry."

INDUSTRY RESPONSE





Services Clients Projects About Jobs News Contact

ERG's EPD Ecosystem Quality Labeling Initiative

ERG will launch a coalition to continue the mission of the U.S. Environmental Protection Agency's Construction Material Opportunities to Reduce Emissions (C-MORE) program, specifically the program's efforts to improve the quality of EPDs. The coalition will establish a consistent and transparent reporting framework for construction material EPDs in support of efforts to scale the use of EPDs in procurement and policy.

Product- and facility-specific EPDs are being used in the construction sector to support procurement decisions based on a product's embodied carbon. Despite adherence to international and product category-specific standards governing EPD development, there are still concerns related to the transparency, comparability, and quality of EPDs. These concerns



UPDATING OUR VIEW OF WINDOWS

CHANGING HOW WE SEE WINDOWS

WHOLE-BUILDING APPROACH

Rethinking our approach to building design, performance, and operation

HIGH-PERFORMANCE WINDOWS

Leveraging high-performance windows to gain design flexibility

INTEGRATING COMPONENTS

Gaining additional performance through installation best-practices

UPDATING OUR VIEW OF WINDOWS

CONTINUING EDUCATION PRESENTATION

WHOLE-BUILDING APPROACH

PREVIOUS ENERGY CODES



SEPARATE ASSEMBLY R-VALUES



ONE ENERGY USE LIMIT

CHANGING HOW WE SEE WINDOWS

WHOLE-BUILDING APPROACH

Rethinking our approach to building design, performance, and operation

HIGH-PERFORMANCE WINDOWS

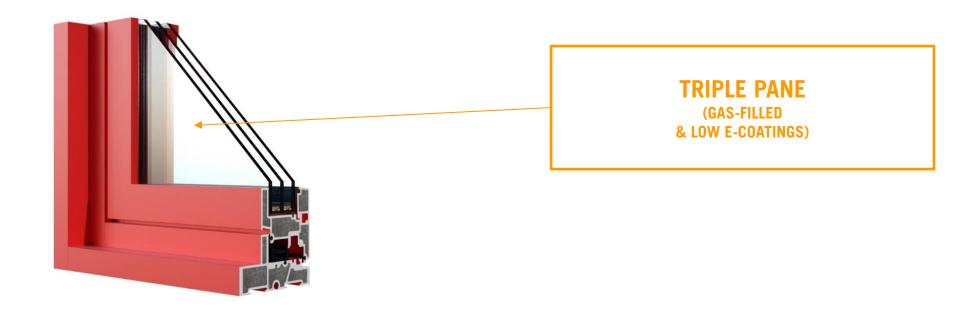
Leveraging high-performance windows to gain design flexibility

INTEGRATING COMPONENTS

Gaining additional performance through installation best-practices

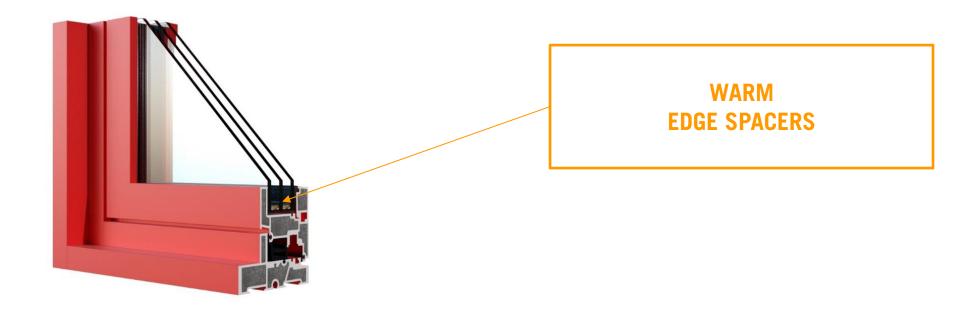
HIGH-PERFORMANCE WINDOW STRATEGY

SUMMARY OF GOOD WINDOW DESIGN



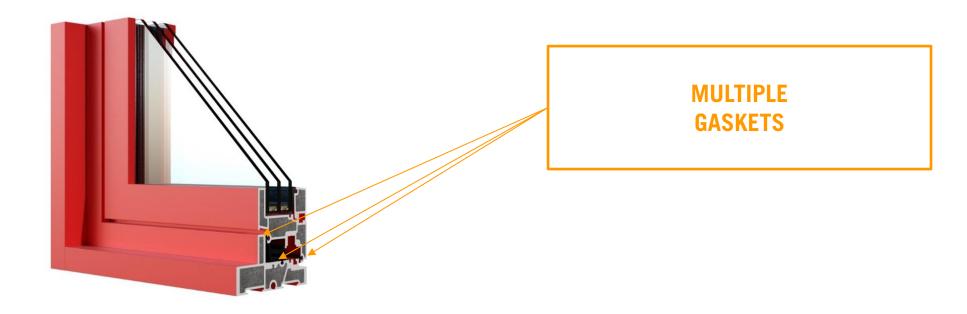
HIGH-PERFORMANCE WINDOW STRATEGY

SUMMARY OF GOOD WINDOW DESIGN



TRIPLE PANE
(GAS-FILLED
& LOW E-COATINGS)

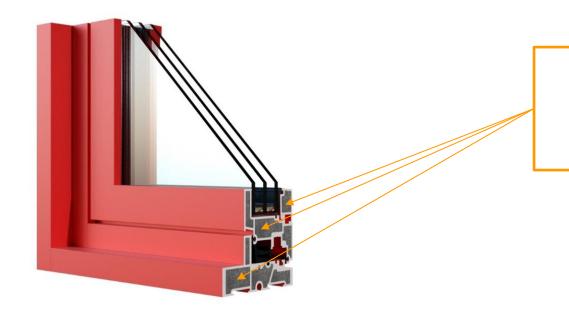
SUMMARY OF GOOD WINDOW DESIGN



TRIPLE PANE
(GAS-FILLED
& LOW E-COATINGS)

WARM EDGE SPACERS

SUMMARY OF GOOD WINDOW DESIGN



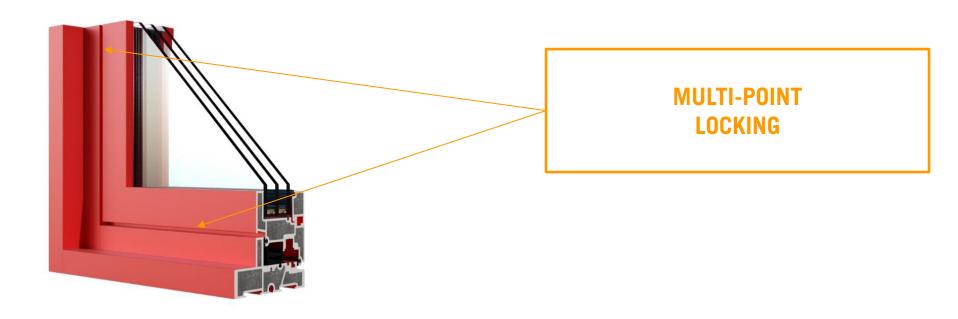
INSULATED FRAME

(LOW CONDUCTIVITY &/OR THERMAL BREAKS)

TRIPLE PANE
(GAS-FILLED
& LOW E-COATINGS)

WARM EDGE SPACERS MULTIPLE GASKETS

SUMMARY OF GOOD WINDOW DESIGN

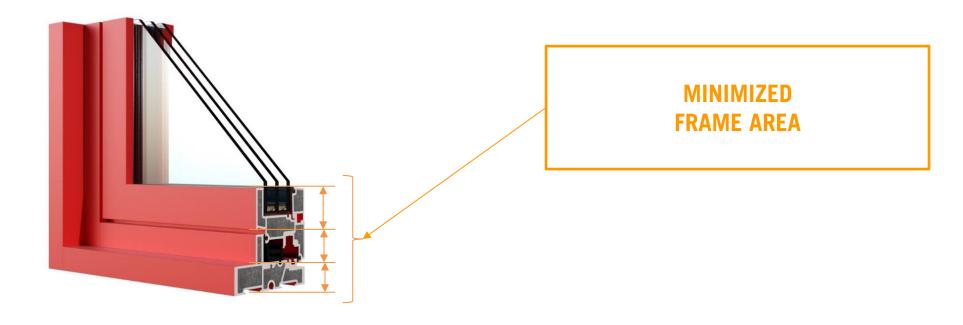


TRIPLE PANE
(GAS-FILLED
& LOW E-COATINGS)

WARM EDGE

MULTIPLE GASKETS NSULATED FRAME
(LOW CONDUCTIVITY
&/OR THERMAL BREAKS)

SUMMARY OF GOOD WINDOW DESIGN



TRIPLE PANE
(GAS-FILLED
& LOW E-COATINGS)

NARM EDGE SPACERS MULTIPLE GASKETS (LOW CONDUCTIVITY &/OR THERMAL BREAKS)

MULTI-POINT Locking MINIMIZED RAME AREA UPDATING OUR VIEW OF WINDOWS CONTINUING EDUCATION PRESENTATION

MORE GLAZING AREA





HIGH PERFORMANCE WINDOWS WILL LET YOU...

- 1. INCREASE GLAZING AREA FOR MORE VIEWS AND LIGHT
- 2. REDUCE MECHANICAL SYSTEM PLACEMENT AND SIZE
 - Smaller system
 - Less ductwork
 - Less floor space for central system (it's smaller)
- 3. INCREASE USEABLE FLOOR SPACE IN SUITES
- 4. REDUCE INSULATION REQUIREMENTS ELSEWHERE
 - Tricky details
 - Insulated concrete projections, etc.
 - Exterior insulation on wood frame
- 5. INSTALLATION COST SAVINGS
 - Compared to triple glazing in other frames

6. REDUCE FUTURE OPERATING COSTS

(DOLLARS + CARBON)

UPDATING OUR VIEW OF WINDOWS

CHANGING HOW WE SEE WINDOWS

WHOLE-BUILDING APPROACH

Rethinking our approach to building design, performance and operation

HIGH-PERFORMANCE WINDOWS

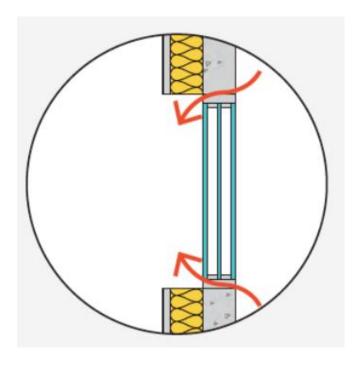
Leveraging high-performance windows to gain design flexibility

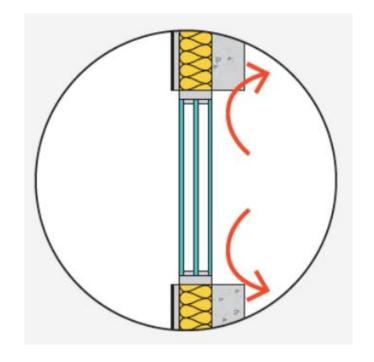
INTEGRATING COMPONENTS

Gaining additional performance through installation best-practices

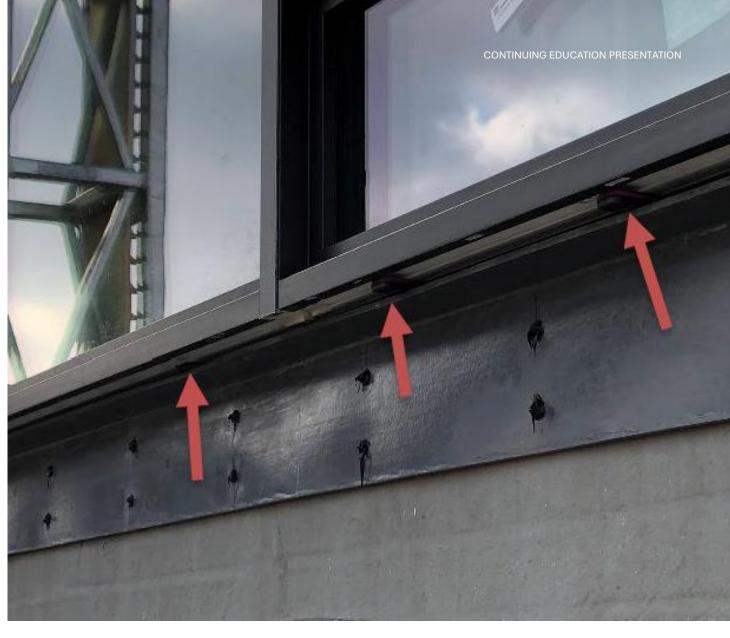
UPDATING OUR VIEW OF WINDOWS

THE FUTURE OF INSTALLATION?

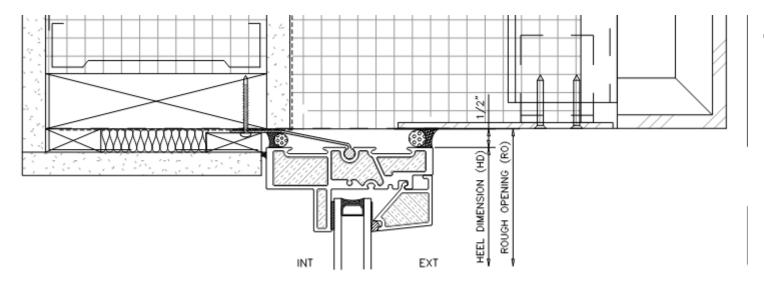


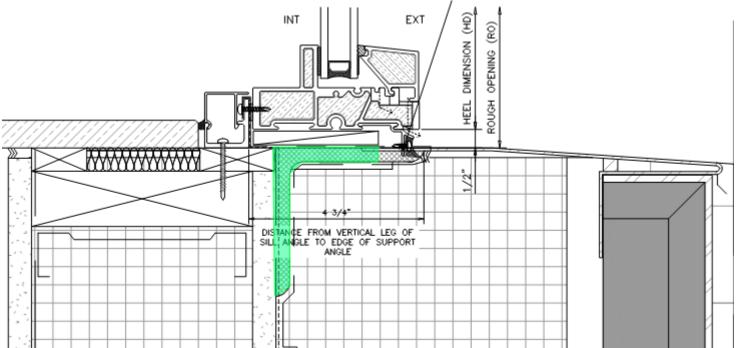




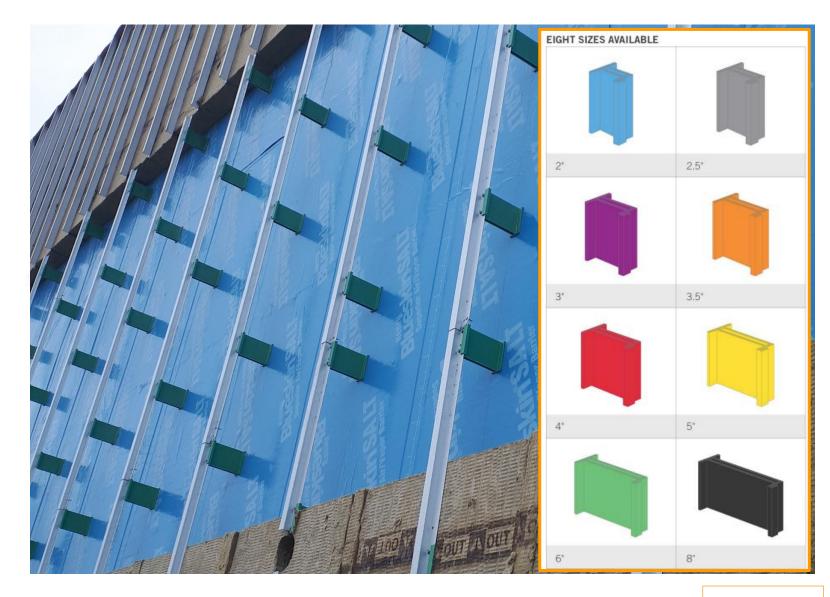


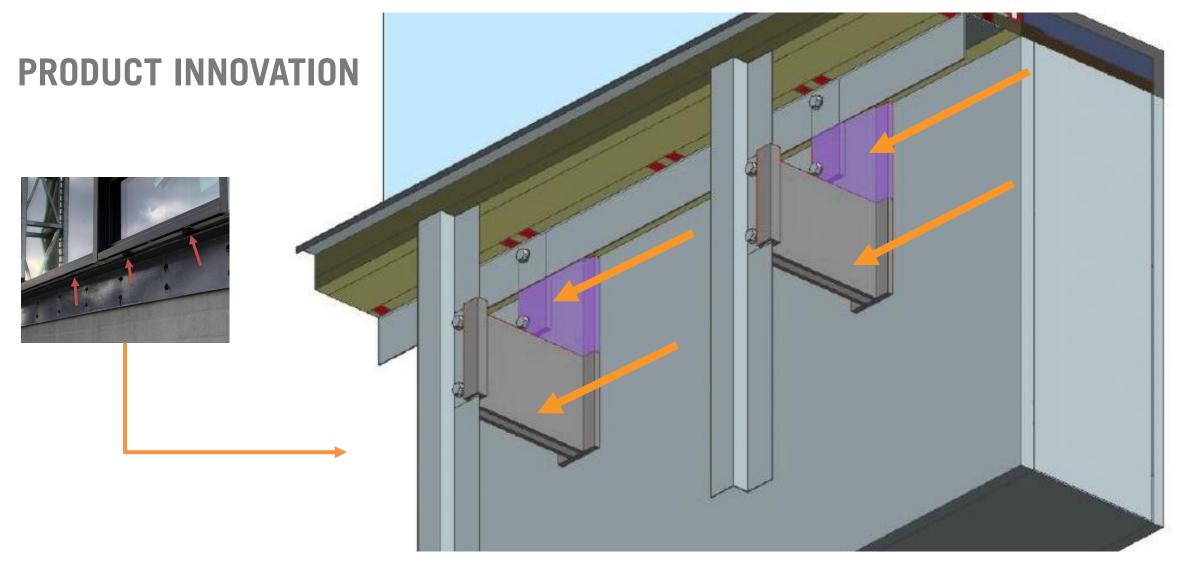
A WINDOW INTO DESIGN FLEXIBILITY



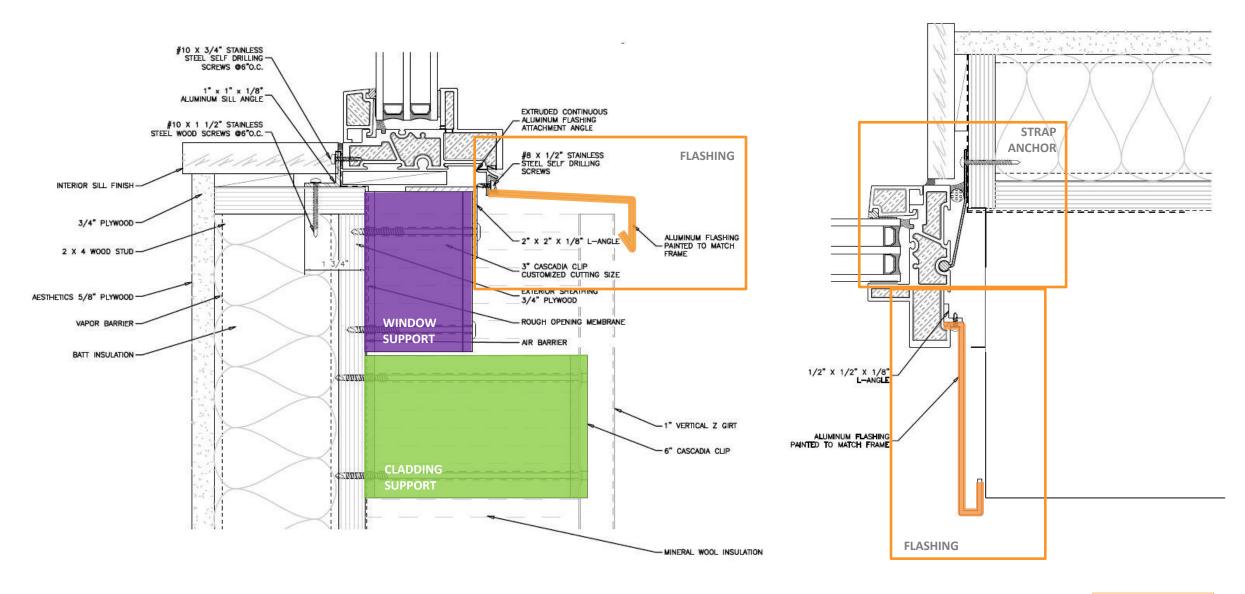








Images courtesy of ERA Architects, Morrison Hershfield / Stantec



GLADSTONE VILLAGE SOCIAL HOUSING

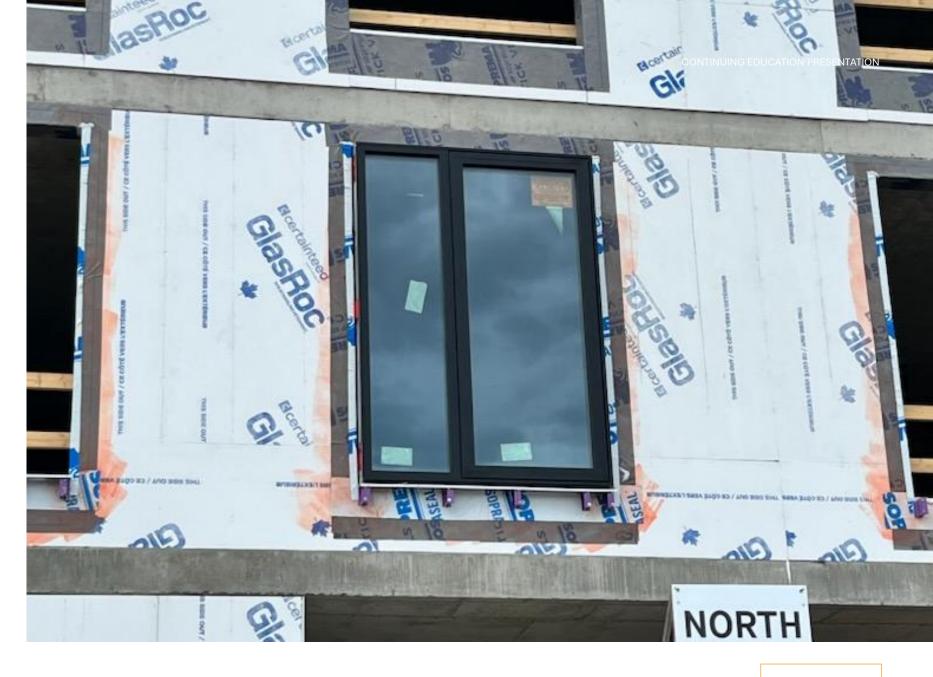
Ottawa, ON





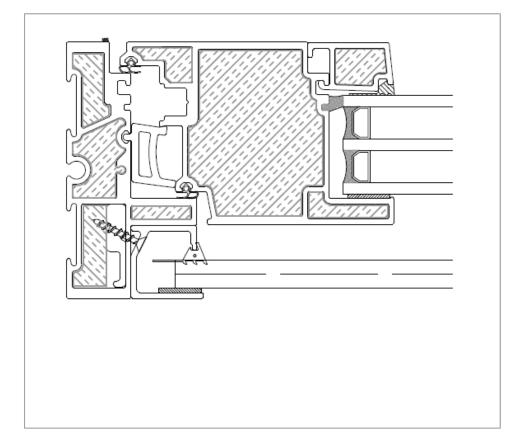
GLADSTONE VILLAGE SOCIAL HOUSING

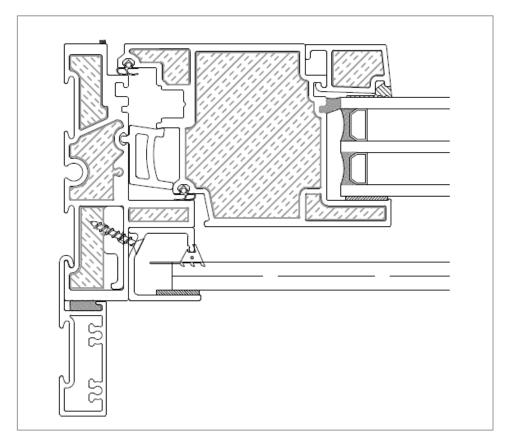
Ottawa, ON



UPDATING OUR VIEW OF WINDOWS CONTINUING EDUCATION PRESENTATION

INTEGRATED COMPONENTS





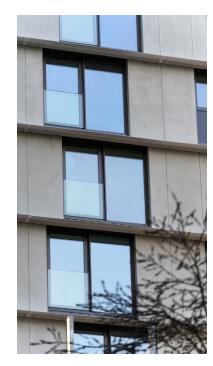
JULIET BALCONY - WINDOW APPLICATION DETAIL

JULIET BALCONY - WINDOW WALL APPLICATION DETAIL

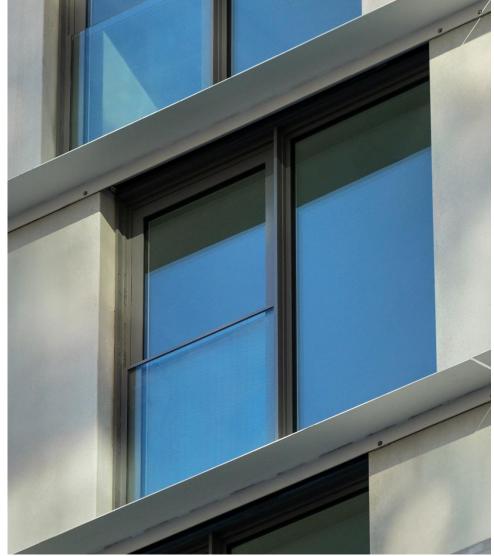
UPDATING OUR VIEW OF WINDOWS CONTINUING EDUCATION PRESENTATION

COAL HARBOUR PASSIVE HOUSE

Vancouver, BC









ART RUTKIN ELEMENTARY SCHOOL

Tigard, OR

ENGINEER/DESIGNER

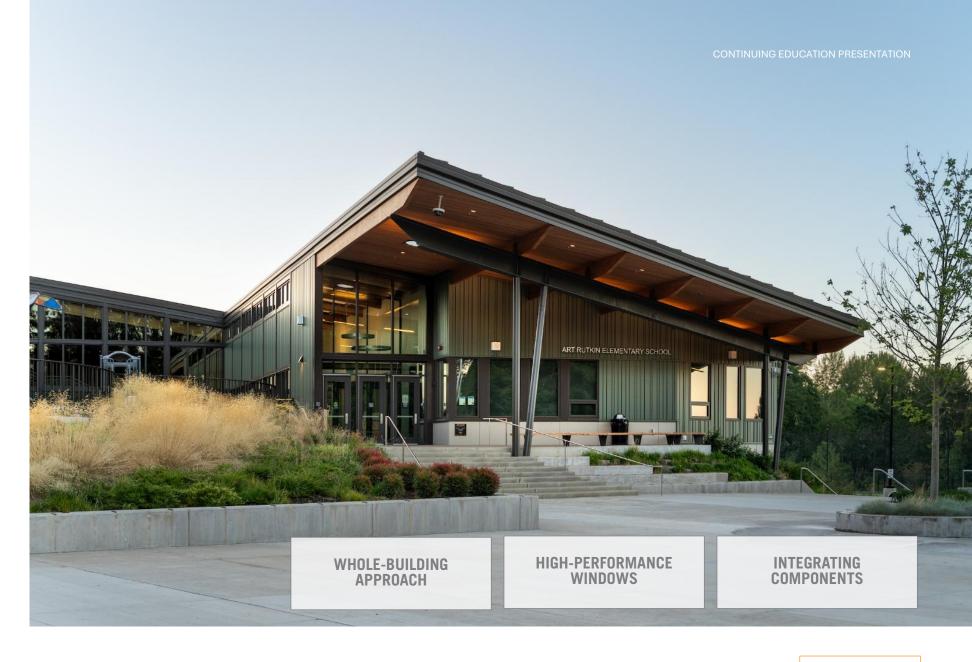
Bora Architecture

CONTRACTOR

P&C Construction

OWNER

Tigard-Tualatin School District



ART RUTKIN ELEMENTARY SCHOOL





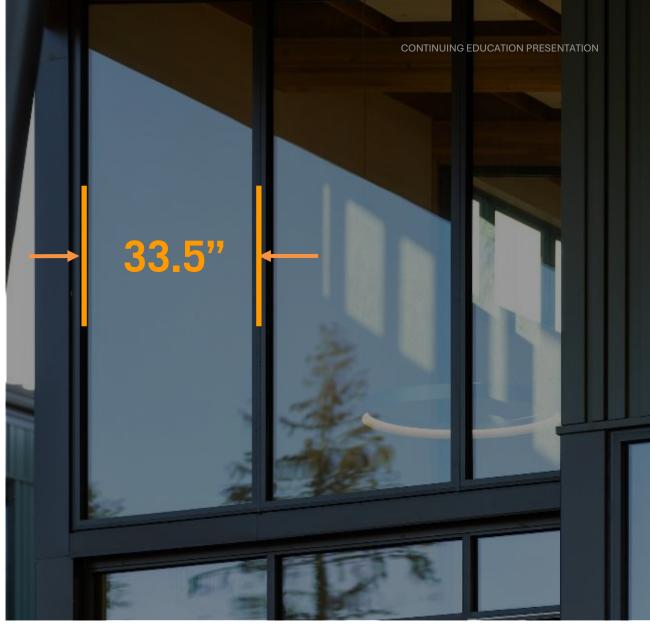
ART RUTKIN ELEMENTARY SCHOOL



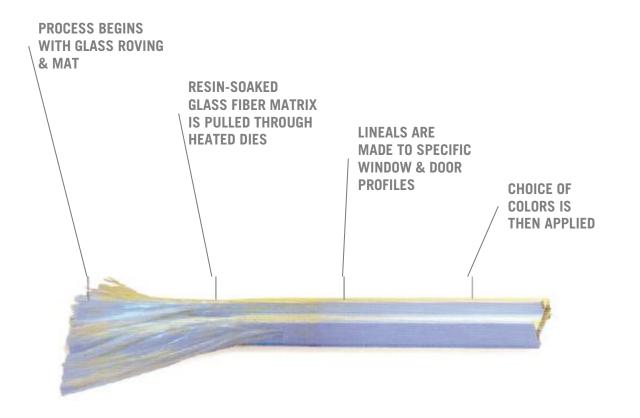


ART RUTKIN ELEMENTARY SCHOOL





MANUFACTURING PROCESS

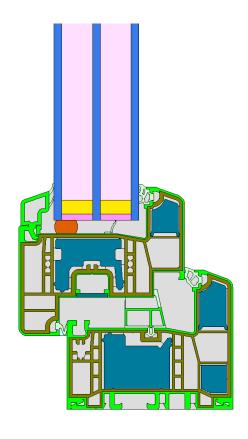


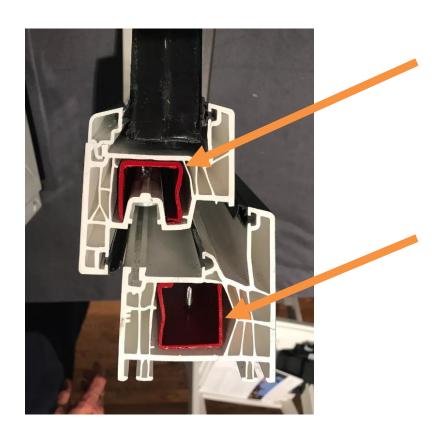




A WINDOW INTO DESIGN FLEXIBILITY

VINYL WINDOW – INTERNAL STEEL REINFORCING





PACIFIC PROMENADE ENVELOPE REHABILITATION

Vancouver, BC

ENGINEER/DESIGNER

Sense Engineering

CONTRACTOR

DuraSeal

OWNER

Strata

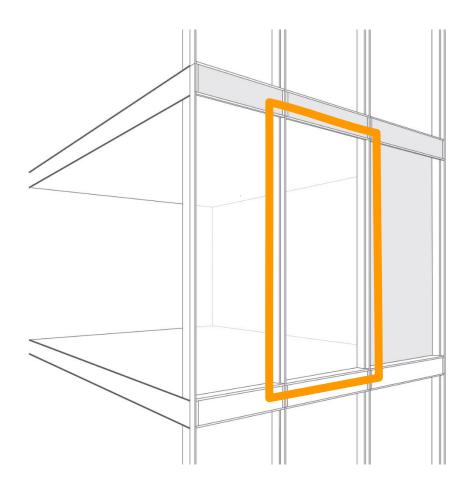


PACIFIC PROMENADE





WINDOW WALL



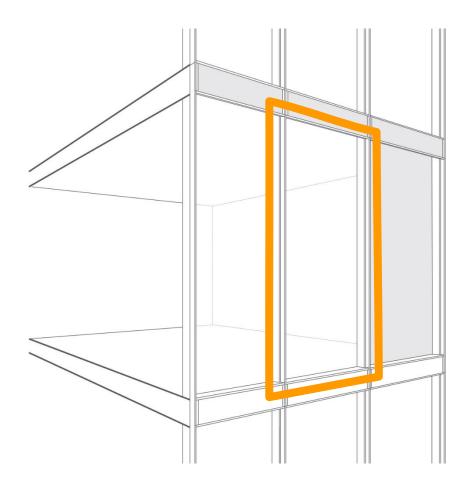
VISION GLASS

R-4.1

0.24 Btu/h·ft²·F | 1.36 W/m²·K

DOUBLE-GLAZED HIGH-PERFORMANCE FIBERGLASS FRAME

WINDOW WALL

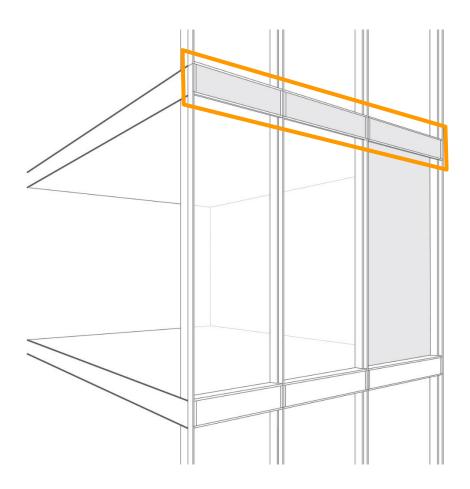








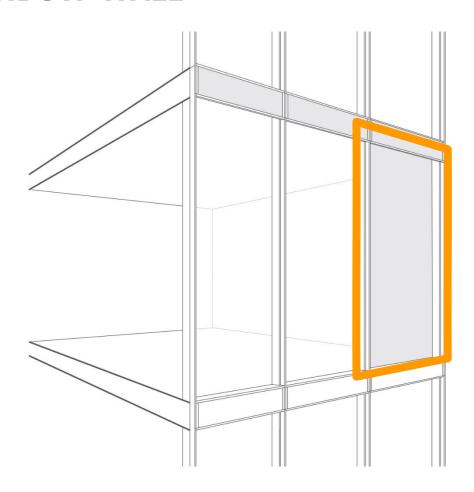
WINDOW WALL



OPAQUE AREAS



WINDOW WALL

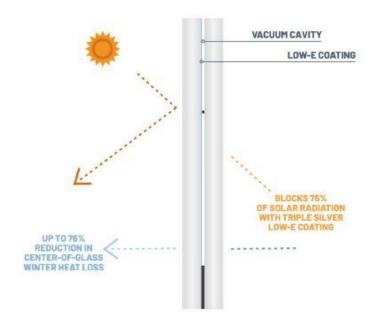




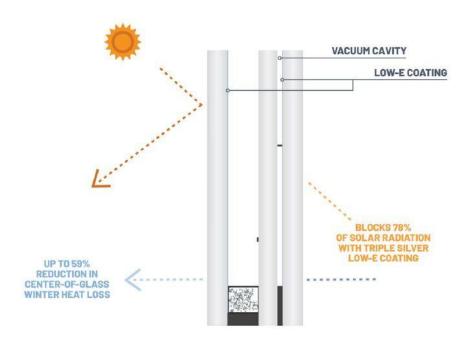


GLASS INNOVATION

VACUUM INSULATING GLASS (VIG)



VIG UNIT



IGU + VIG UNIT

GLASS-ONLY REPLACEMENT (VIG)

TYPICAL WINDOW R-VALUE

R-1 - R-2

EXISTING IGU

PROJECTED VIG WINDOW R-VALUE

R-3 - R-4

SINGLE PANE VACUUM INSULATED GLASS (VIG)



FIBERGLASS WINDOWS + VIG

CURRENT FIBERGLASS R-VALUE

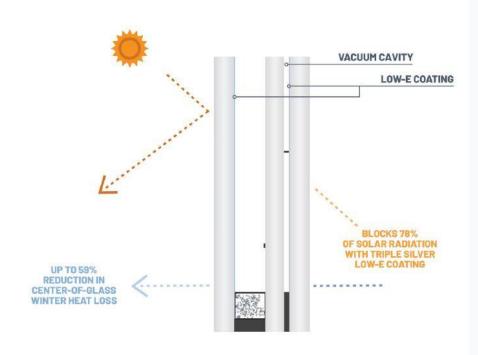
R-7.1

STANDARD TRIPLE GLAZED IGU

PROJECTED FIBERGLASS R-VALUE

R-11+

VACUUM INSULATED GLASS (VIG) UNIT

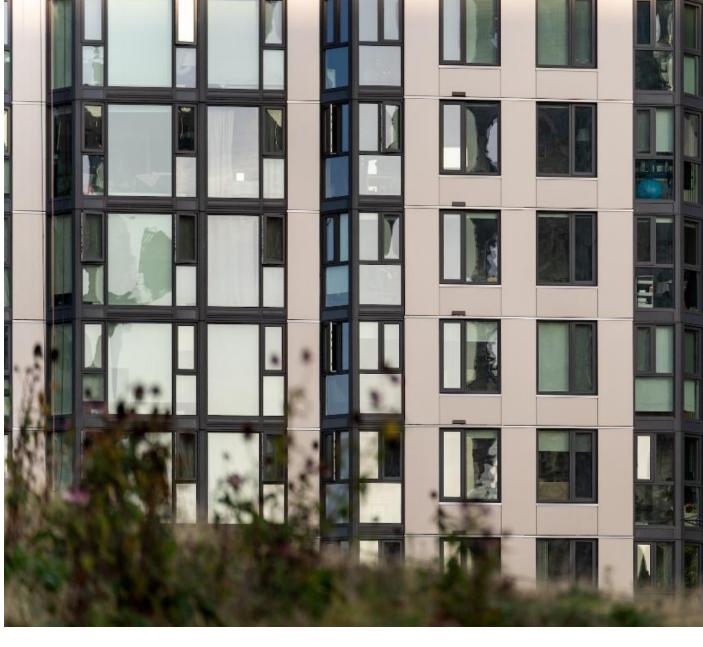




PACIFIC PROMENADE







PACIFIC PROMENADE

INSURANCE DISCOUNT OFFERED FOR EXTENSIVE WATER TESTING

ONSITE WATER TESTS COMPLETED

≈20
PRODUCTS TESTED

PASSED

PACIFIC PROMENADE





WHAT IS COMMERCIAL GRADE?

- Large format (full height)
- Withstand high +/- pressure loads with low air leakage
- Withstand wind driven rain with no water leaks
- Withstand extreme temperature ranges (resist condensation)
- Withstand building movement, large deflections during service life as well as seismic event
- Extreme hardware durability
- Suitable for non-combustible projects
- All of this and maintain air and water tightness, operability and thermal performance!



THESIS HEAD OFFICE

Portland, OR

ARCHITECT

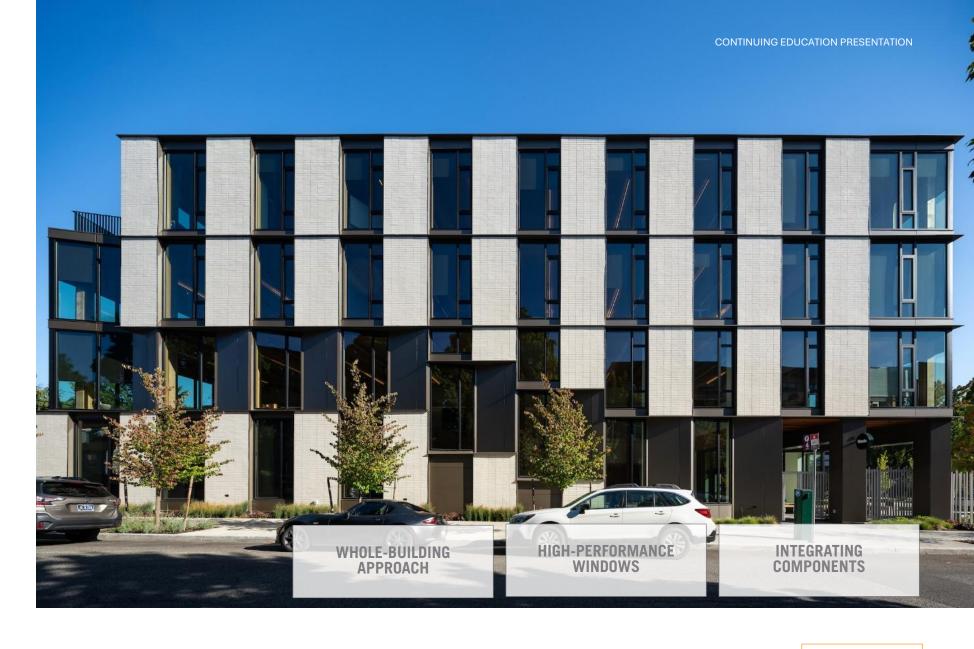
Lever Architecture

CONTRACTOR

Swinerton

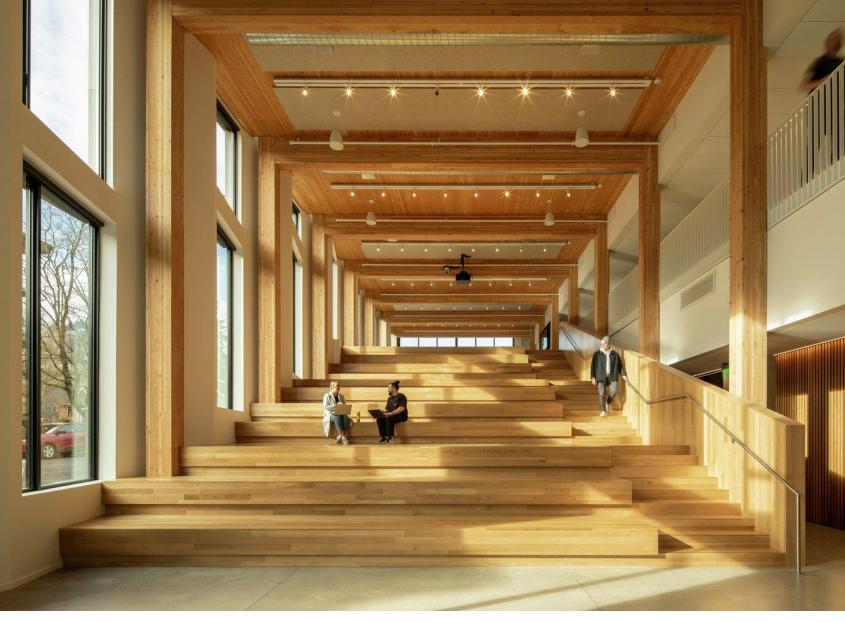
OWNER

Thesis



THESIS HEAD OFFICE

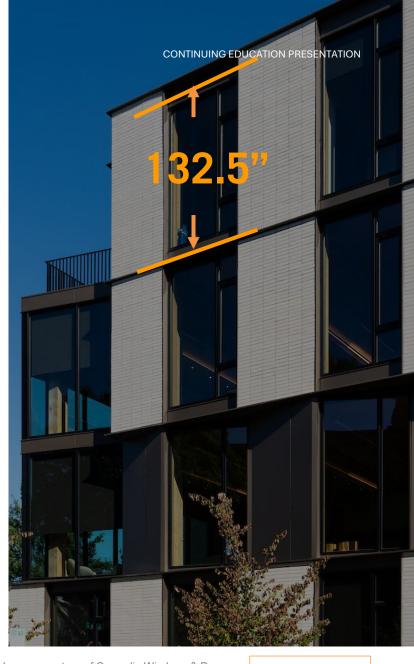




THESIS HEAD OFFICE



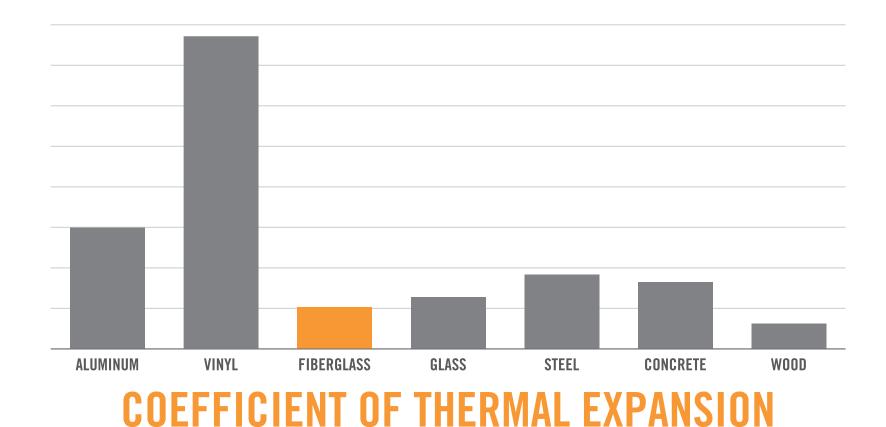








LONGEVITY & DURABILITY



POOR LONGEVITY & DURABILITY

ABOVE ≈160°F DARK VINYL CAN PLASTICIZE

(DIRECT SUNLIGHT + AMBIENT TEMPERATURE)

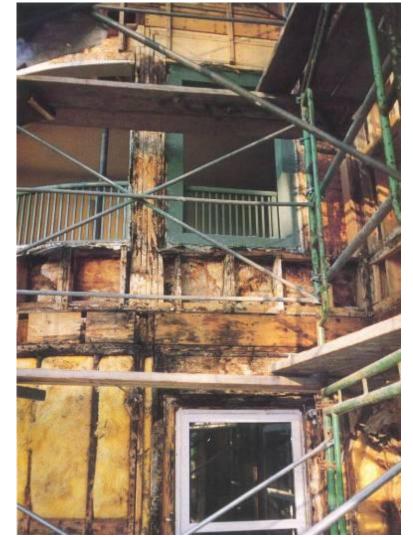


PERMANENT DEFORMATION





IMPACTS OF SHORT LIFESPANS







THESIS HEAD OFFICE







Portland, OR

ARCHITECT

Bora Architects

CONTRACTOR

Hoffman Construction

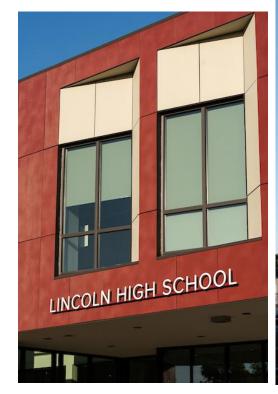
OWNER

Lincoln High School











FRAME TYPES - LIFESPAN

VINYL / UPVC



PHOTO CREDIT: EUROLINE WINDOWS

ALUMINUM



PHOTO CREDIT: GLO EUROPEAN WINDOWS

FIBERGLASS



PHOTO CREDIT: CASCADIA WINDOWS & DOORS

FRAME TYPES - LIFESPAN

VINYL / UPVC



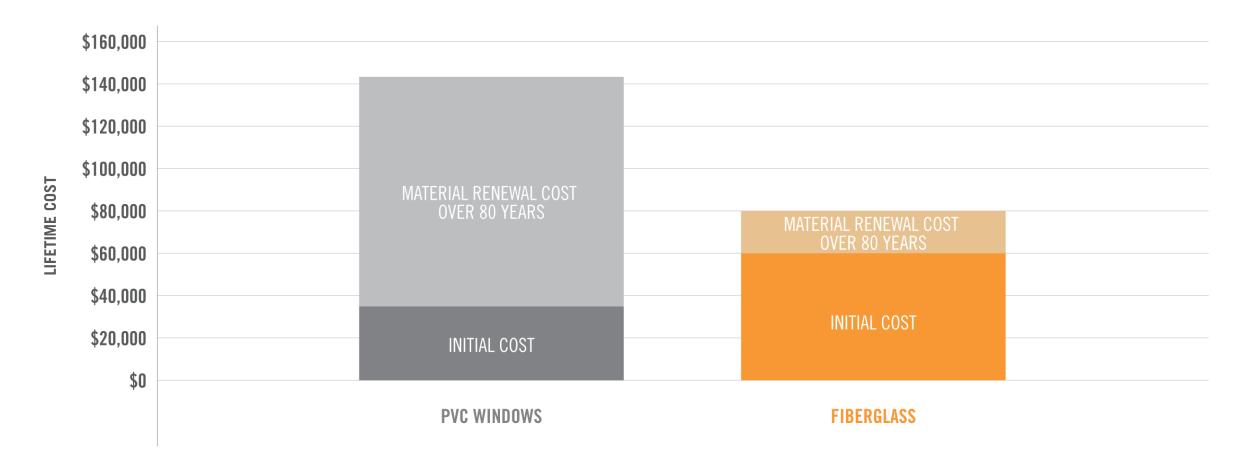
ALUMINUM



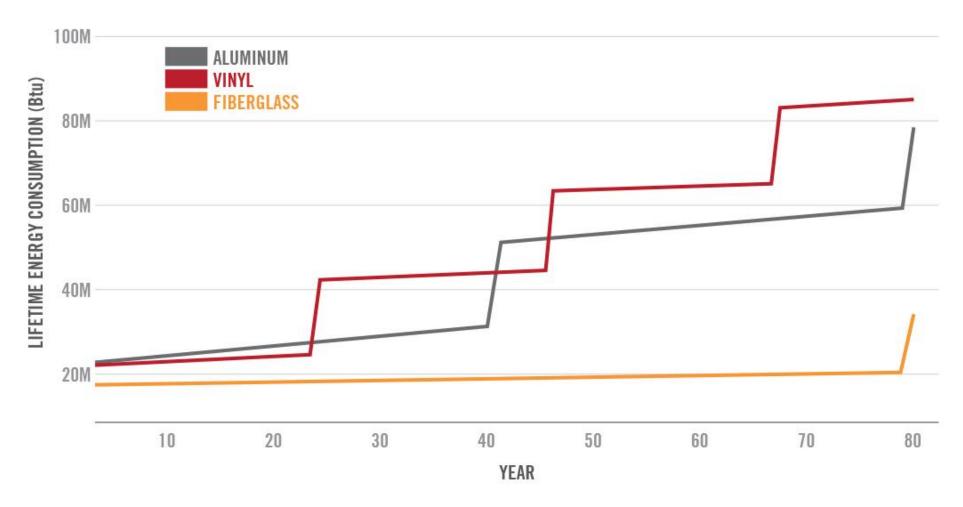
FIBERGLASS



FRAME TYPES - LIFESPAN



LIFECYCLE COMPARISON

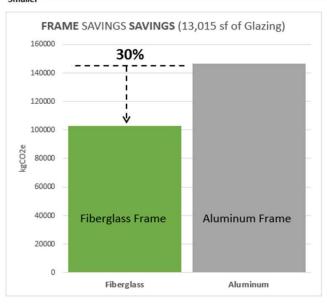


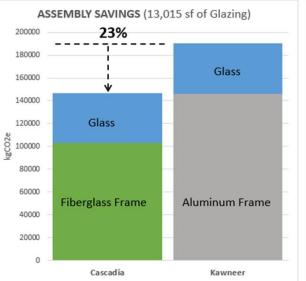
VITALMETRICS (IERS LLC.)

CALCULATING EMBODIED CARBON

Fiberglass vs. Aluminmum Glazing - SCALES OF ANALYSIS









Key assumptions:

Fiberglass data based on study: "Research on the impacts of Innovative Fenestration Materials on the Embodied and Operating Carbon of Buildings." PDF link: https://sustain.ubc.ca/sites/default/files/2022-018_Research%20on%20the%20impacts%20of%20Innovative%20Fenestration%20Materials_Zargar.pdf

Aluminum frame based on Kawneer Fixed & Ribbon Aluminum Windows EPD. This is in liue of comparing against Kawneer storefront product EPD --- this EPD better matched up with the window size and frame ratio from the Cascadia study - EPD link:

All-Timber Structure and Hybrid Timber Structure cases from KPFF study sent on 10/5. Athena LCA study, Cradle to Grave, structure only, includes biogenic carbon

Glazing comparisons are Cradle to Gate, A1-A3 only with no replacement cycles

Images courtesy - Confidential

IMPORTANT FACTORS ABOUT EPD DATA

ASK FOR DATA

Embodied carbon data is becoming a key performance metric informing product selection.

CHECK THE PCR

Different manufacturers used different Product Category Rules (PCR) (i.e. declared units, ISO standards, etc).

CHECK THE DATE

Environmental Product Declarations (EPDs) are valid for 5-years, then must be renewed.

CONFIRM STAGE

Different manufacturers use different Lifecycle Stages for Environmental Product Declarations (EPDs).





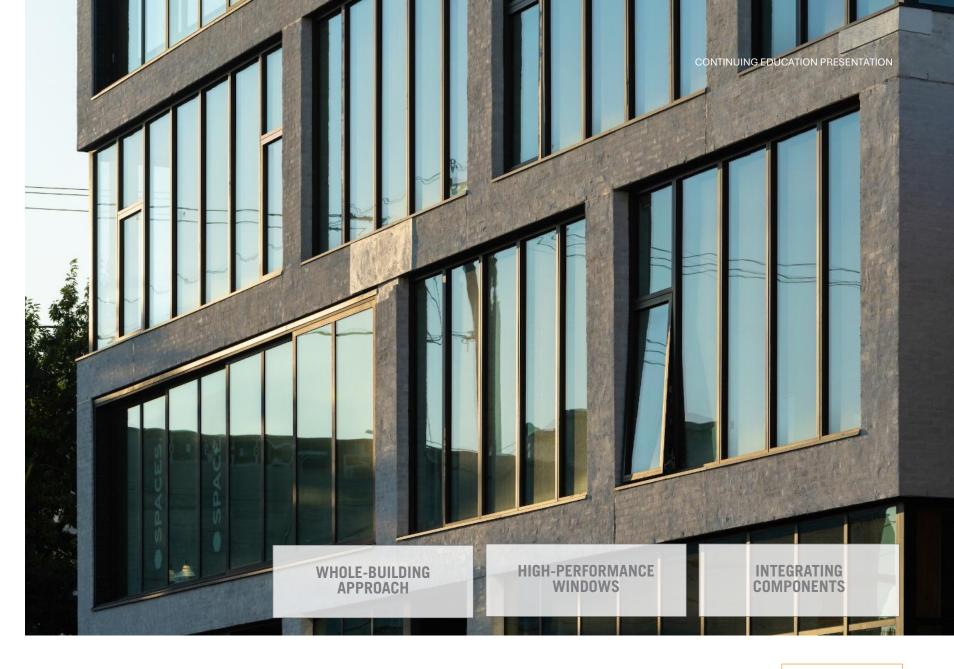


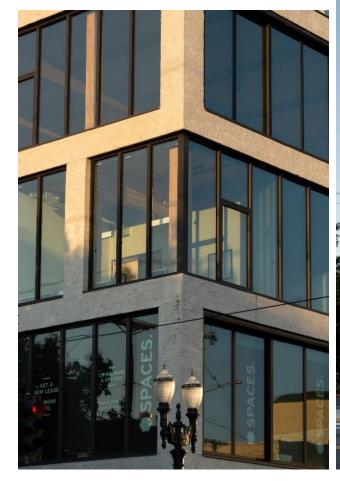
Portland, OR

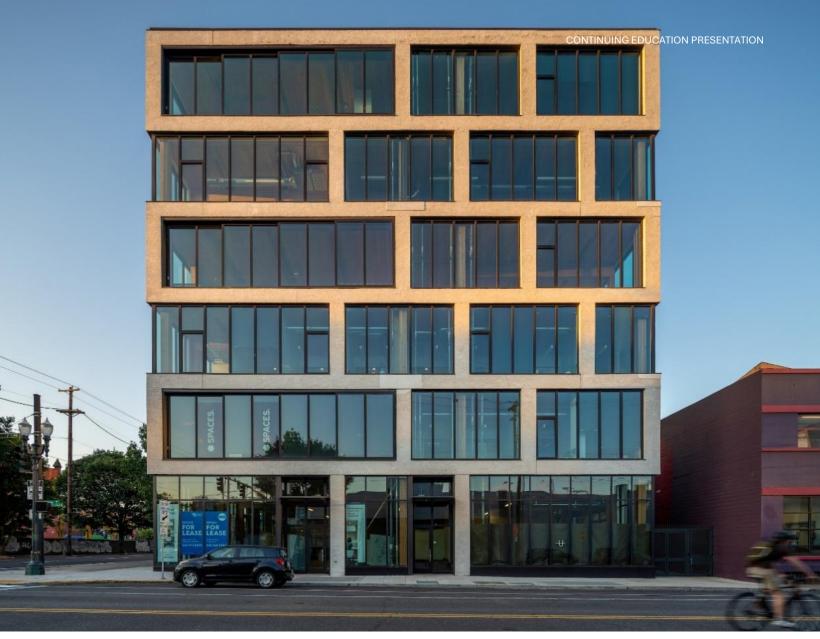
ARCHITECT Hacker

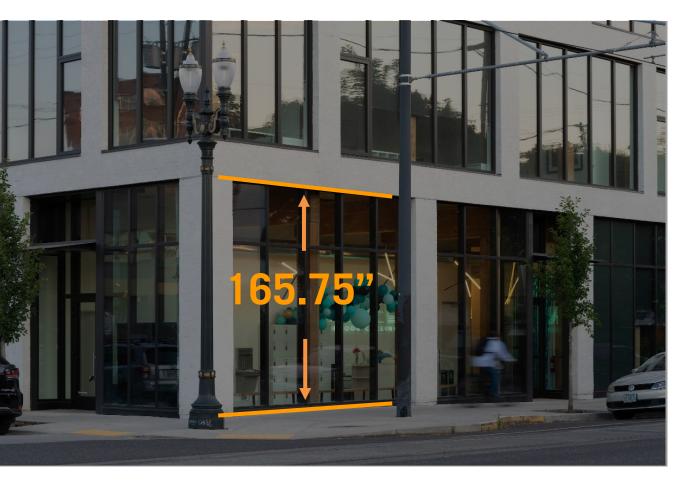
CONTRACTOR

Andersen Construction











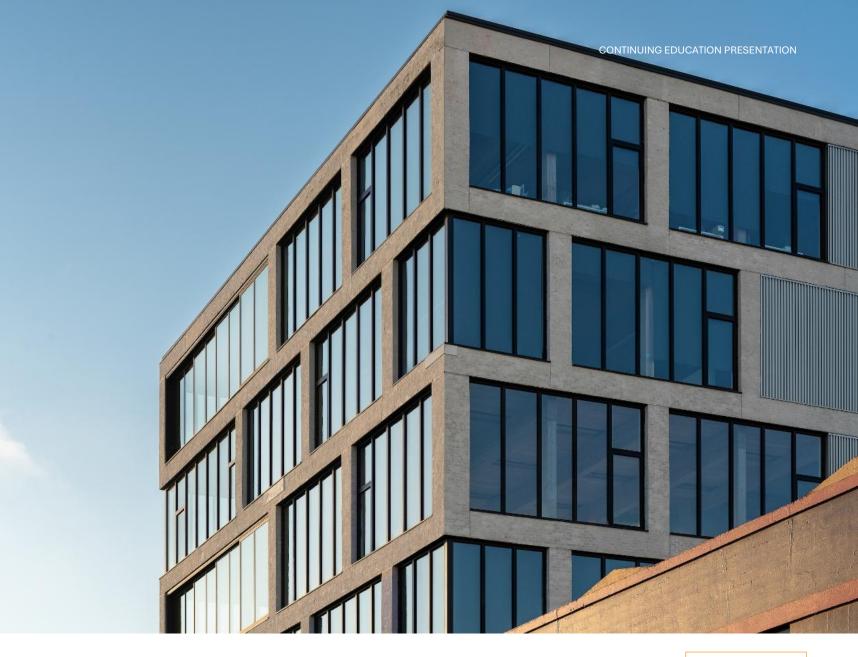












CHIPPENDALE ROAD

West Vancouver, BC

ARCHITECT

BattersbyHowat Architects

CONTRACTOR

Beedie



CHIPPENDALE ROAD











CHIPPENDALE ROAD





CHIPPENDALE ROAD





WINDOW FRAMES

	STRENGTH	THERMAL PERFORMANCE	LONGEVITY	LOW CARBON IMPACT	WILDFIRE RESISTANCE
ALUMINUM		X		X	
VINYL / PVC	X		X	X	X
FIBERGLASS					





KEY TAKEAWAYS CONTINUING EDUCATION PRESENTATION

KEY TAKEAWAYS

WINDOWS HAVE HUGE IMPACT

Type + Location + Installation

Often the weakest link in a building's envelope, a little extra attention on windows can have large overall impact

PAY ATTENTION TO PRODUCT DETAILS

Modeled vs Real-World

Ensure you're verifying general product details and performance within the context of your project

HIGH-PERFORMANCE = HIGH FLEXIBILITY

Line Items vs End Goal

Use a whole-building approach to the high-performance to save costs and increase project flexibility.

QUESTIONS CONTINUING EDUCATION PRESENTATION

QUESTIONS?

BUSH SCHOOL - NEW UPPER SCHOOL

Seattle, WA



ARCHITECT

Mithun

CONTRACTOR

Sargent Construction

OWNER

Bush School



PASSIVE HOUSE US (PHIUS) APPROACH

THERMAL CONTROL



HIGH-PERFORMANCE



THERMAL BRIDGE

AIR CONTROL



AIR-TIGHTNES



BALANCED VENTUATION

RADIATION CONTROL



HIGH PERFORMANCE GLAZING



SHADING & DAYLIGHTING

MOISTURE CONTROL

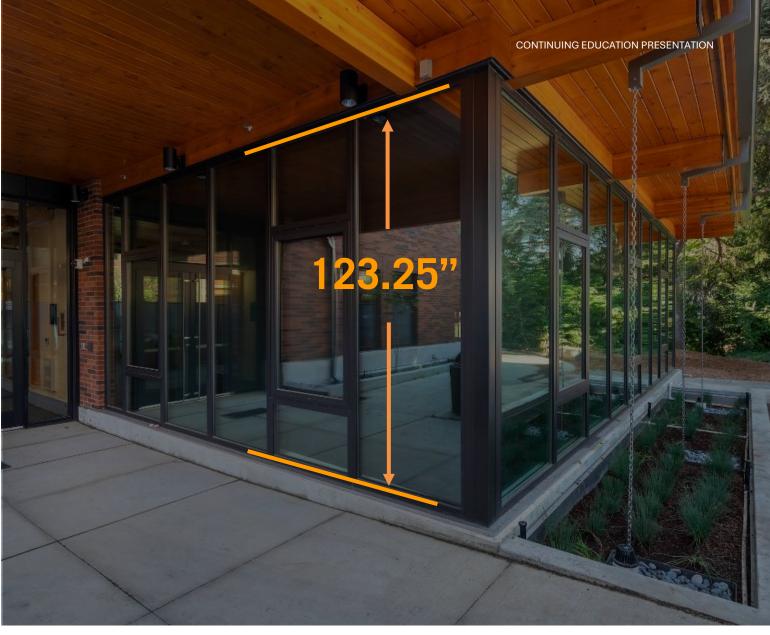


MATERIAL MOISTURE

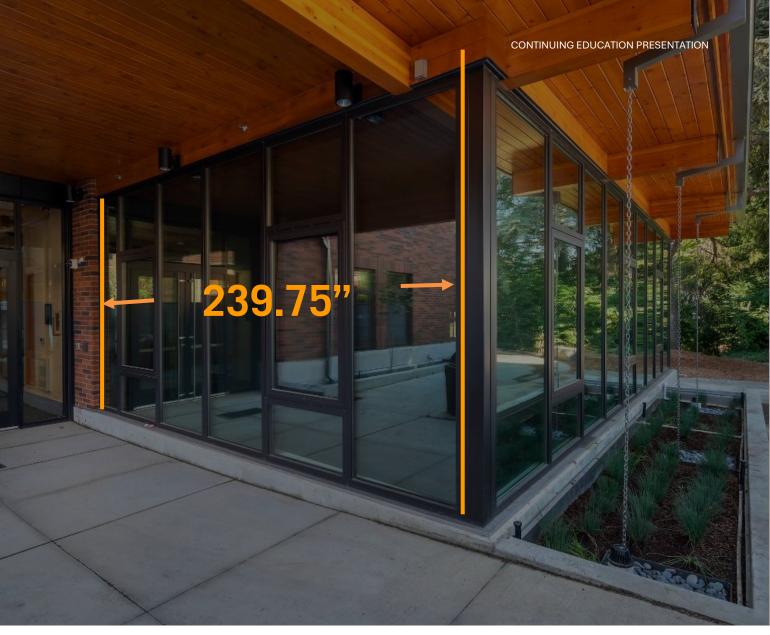


AIR HUMIDIT





















Portland, OR

ARCHITECT

Lever Architecture

CONTRACTOR

Walsh Construction

OWNER

Meyer Memorial Trust









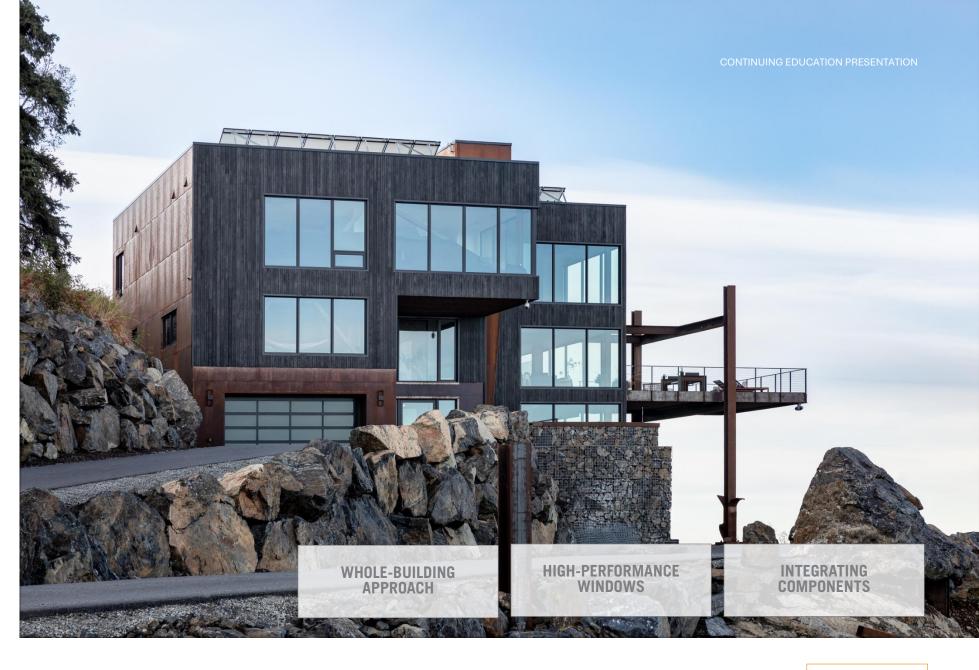




EAGLE RIVER RESIDENCE

Anchorage, AK





A WINDOW INTO DESIGN FLEXIBILITY

CONTINUING EDUCATION PRESENTATION

EAGLE RIVER RESIDENCE







A WINDOW INTO DESIGN FLEXIBILITY

CONTINUING EDUCATION PRESENTATION

EAGLE RIVER RESIDENCE





ABOUT CASCADIA WINDOWS & DOORS











2021 -

2017 - DECLARE LABEL
International Living Future Institute

2020 INTERNAL DISCUSSIONS FOR EPD DEVELOPMENT

Issues with existing PCR identified

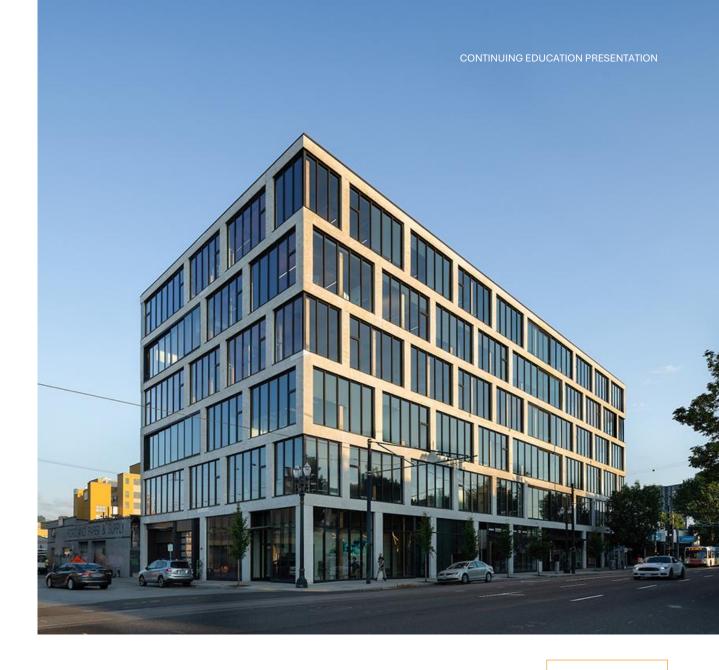
CASCADIA JOINS PCR WORKING GROUP
Observer role providing feedback

FENESTRATION ASSEMBLIES PCR PUBLISHEDUsing latest North American standards and new

functional units based off NFRC (2023 – 2028)

2024 — CASCADIA WINDOW, WINDOW WALL & DOORS EPD PUBLISHED

World's First EPD Published Using Fenestration Assemblies PCR



CLIP EPD JOURNEY

2015 - DECLARE LABEL

International Living Future Institute

2020 - INTERNAL DISCUSSIONS FOR EPD DEVELOPMENT

2021 — RAINSCREEN ASSOCIATION OF NORTH AMERICA

Working Group Established

SUSTAINABLE MINDS ENGAGED

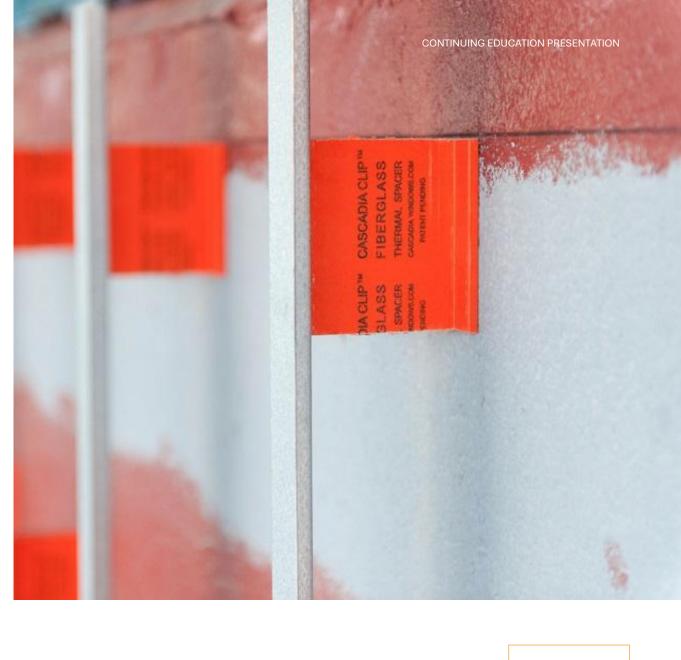
Development of Product Category Rule (PCR) Part B

PCR PART B PUBLISHED

Cladding Support Components & Systems (2022 – 2027)

2022 CASCADIA CLIP EPD PUBLISHED

World's First EPD Published Using Cladding Support Components & Systems PCR



HIGH-PERFORMANCE CHARACTERISTICS



TIMELINE - ROAD TO THE NEW NORMAL

THE CODE-CHANGE IS NOW ACCEPTED FOR THE UPCOMING 2020 NBC

ALTERNATE SOLUTIONS (AS) REFERENCE FUTURE CODE CONFORMANCE AND SUCCESSFUL TEST

Documents have become "cookie-cutter"

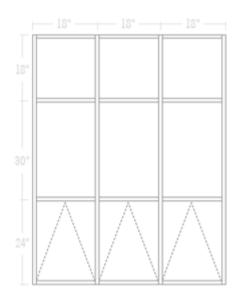
AFTER NBC 2020 ADOPTION IN PROVINCES

CANADA CATCHES UP TO THE REST OF THE WORLD

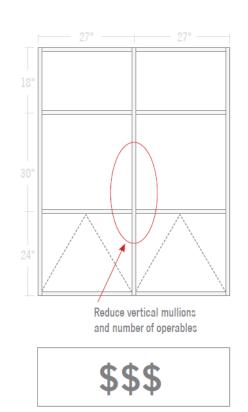


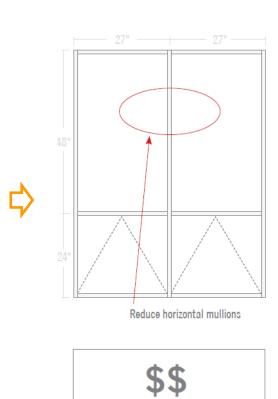
OPTIMIZING WINDOWS

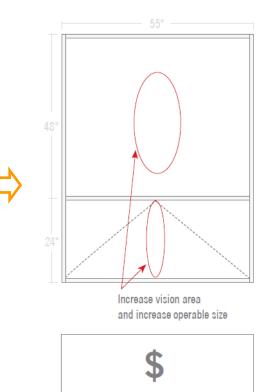
Reduce Mullions



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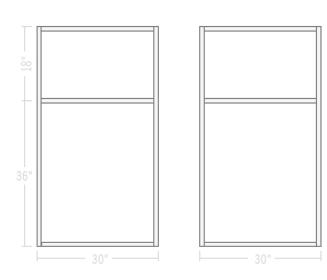






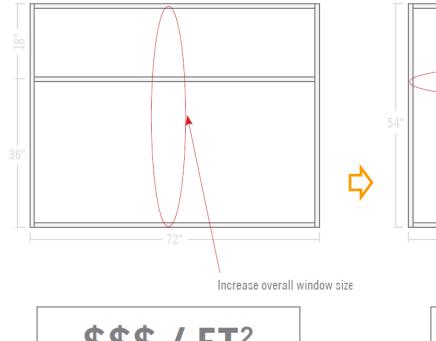
OPTIMIZING WINDOWS

Increase Window Size

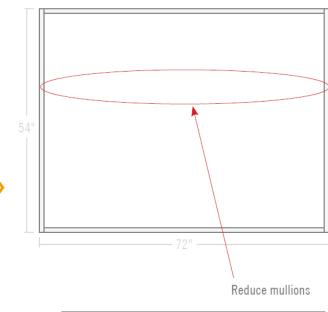


\$\$\$\$ / FT²





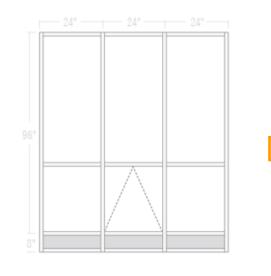


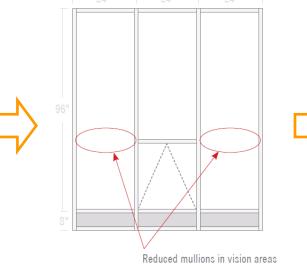


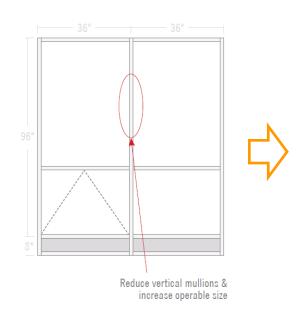
\$\$ / FT²

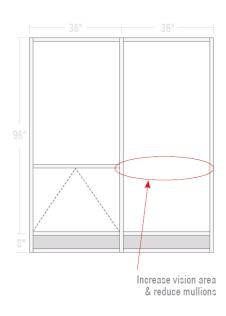
OPTIMIZING WINDOWS

Window Wall









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COMMON QUESTIONS

What color options exist for fiberglass windows?

- Unlimited custom color options
- 10 standard colors
- AAMA 625 performance
- Dual color frames available
- Non-toxic, waterborne paint manufactured in North America

STANDARD WINDOW COLORS Update 2020



