



# A'24 MN

The Minnesota Conference  
on Architecture

November 11-13, 2024



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# Cold Weather Construction & Considerations

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Kelley Casey – Owner's Representative  
Casey Gordon – General Contractor  
Ryan Krug – Enclosure Consultant

**A'24  
MN**





**There is no such thing as bad weather,  
only inappropriate clothing.**





INAPPROPRIATE MATERIALS



UNFORTUNATE TIMING



INAPPROPRIATE DETAILING





INAPPROPRIATE MATERIALS



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INAPPROPRIATE DETAILING



Cast stone, concrete block, and limestone veneer are consumables for deicing salts and constant wetting







INAPPROPRIATE MATERIALS



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INAPPROPRIATE MATERIALS

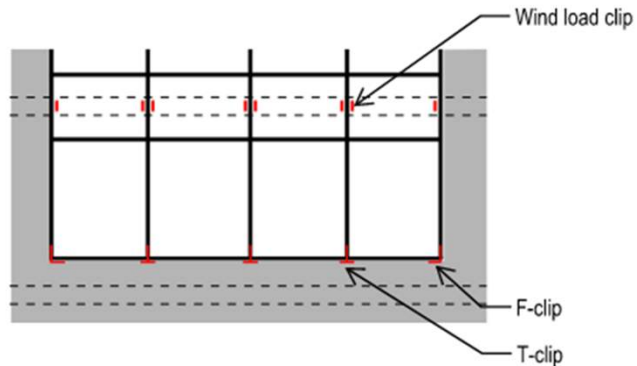


UNFORTUNATE TIMING



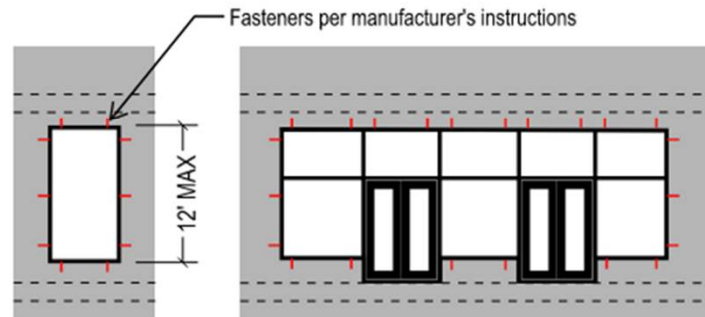
INAPPROPRIATE DETAILING

## CURTAINWALL

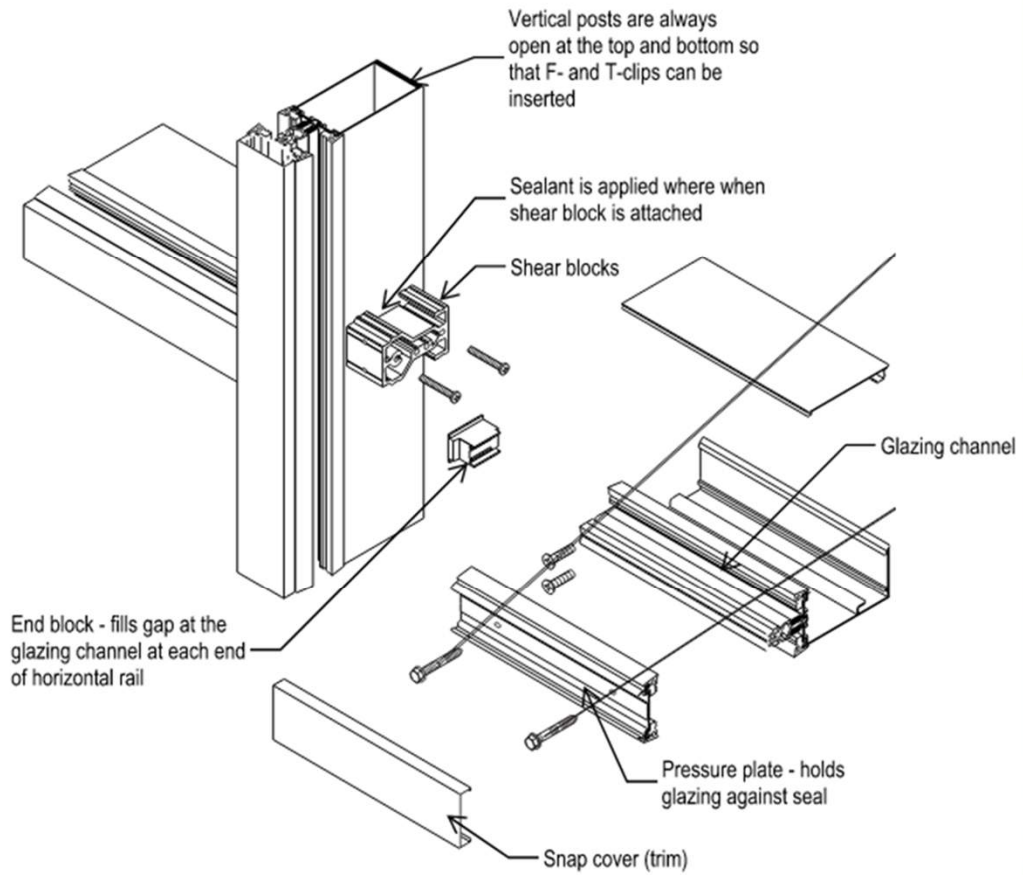


- Can span multiple floors
- Water is managed at glazing pocket
- Hollow vertical frames extends from bottom of rough opening to top

## STOREFRONT



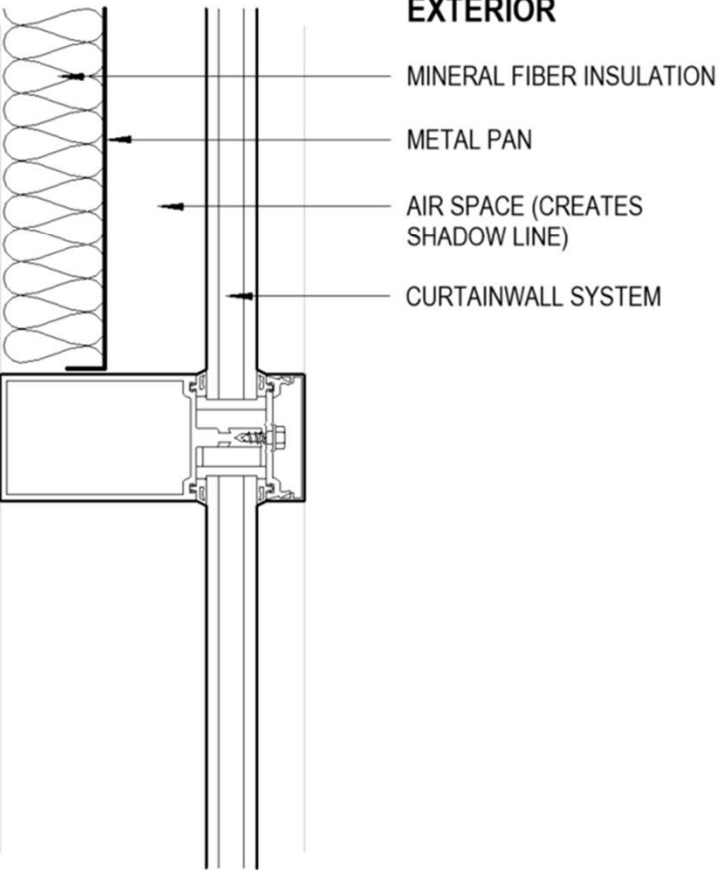
- Can only span one floor
- Water is managed at frame

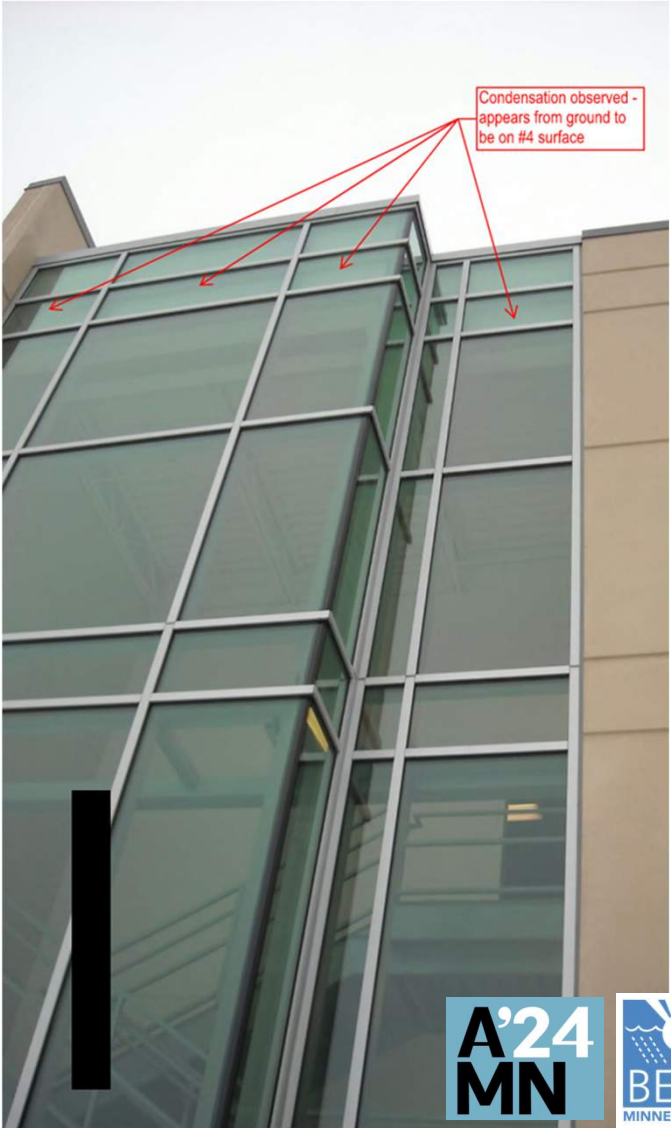


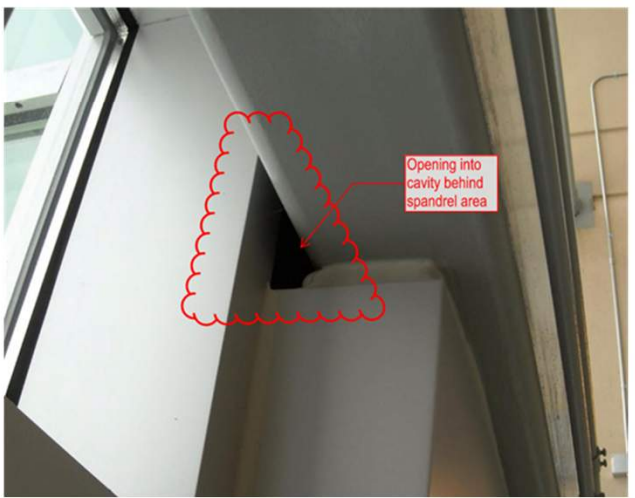
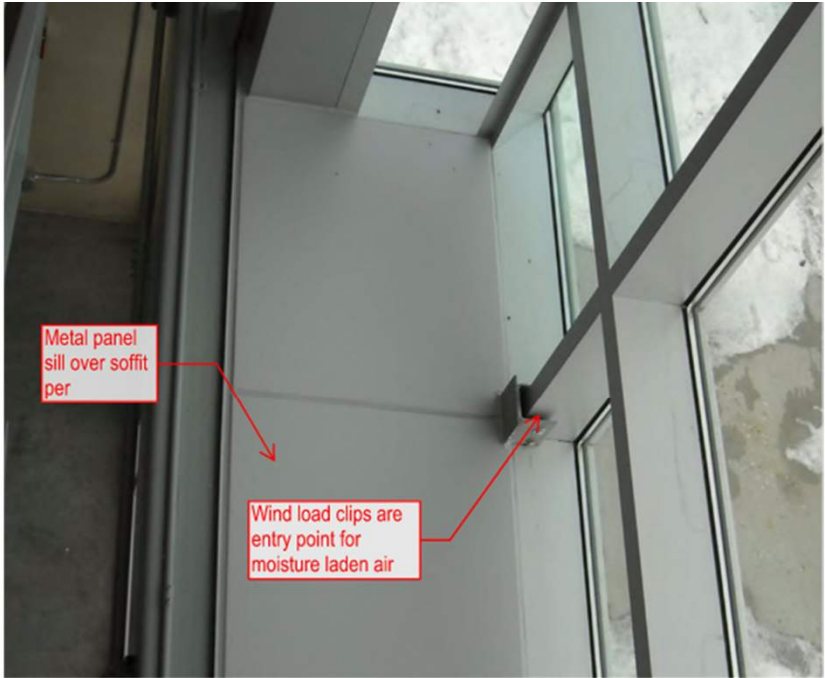
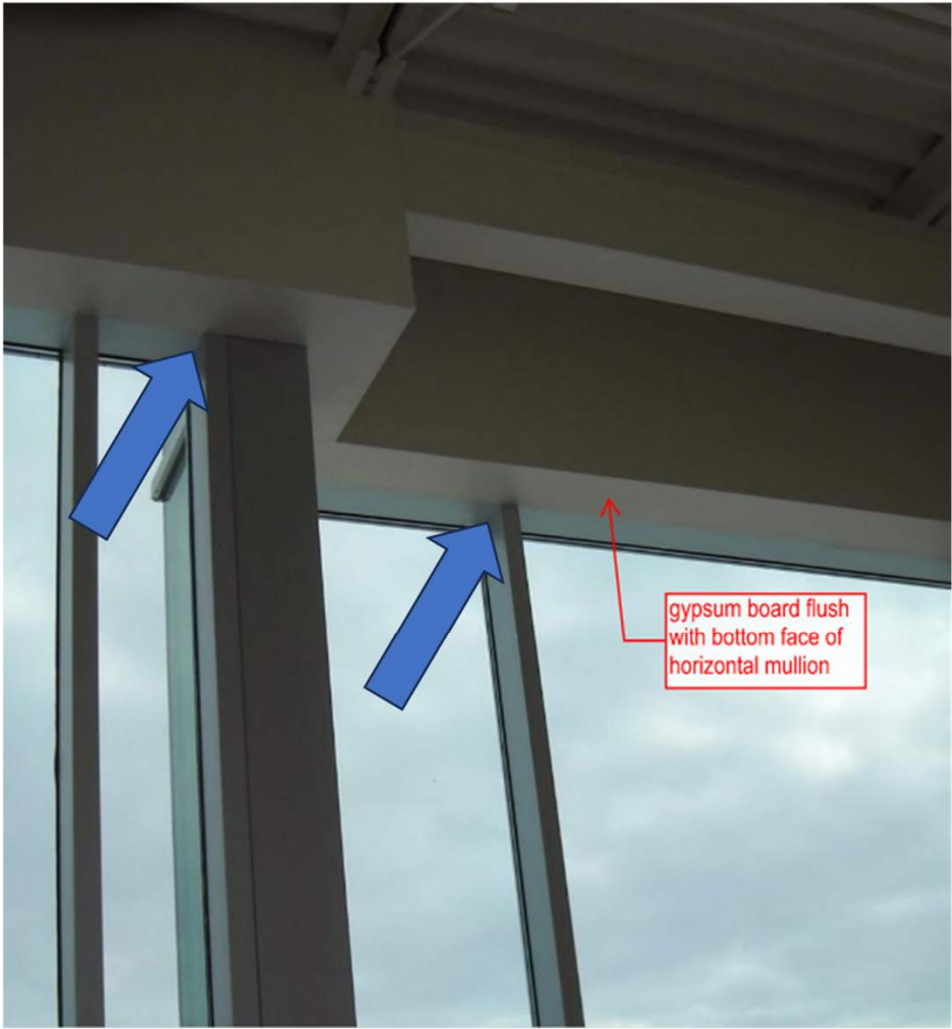
Kawneer



# SHADOW BOX DETAIL

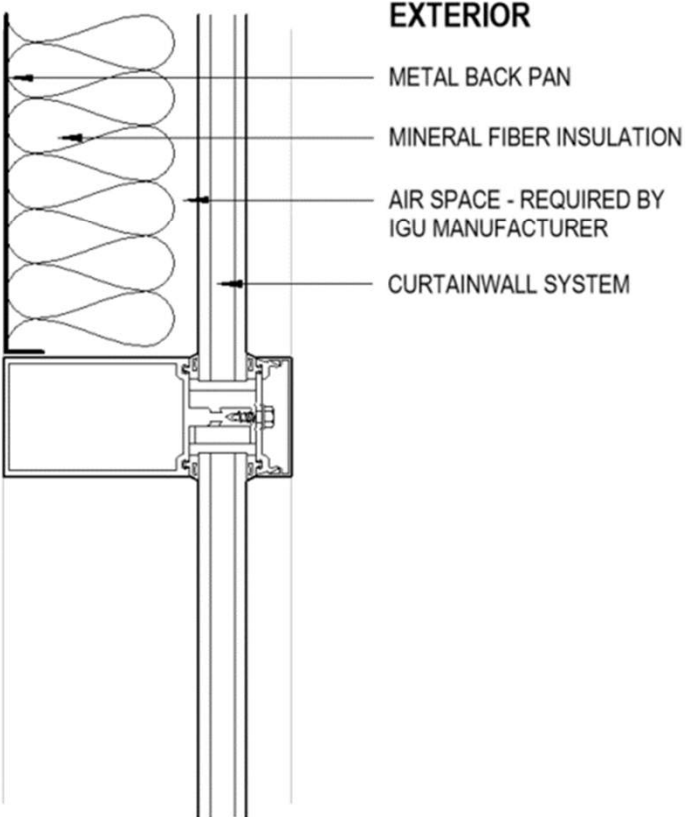








# GLAZED SPANDREL DETAIL





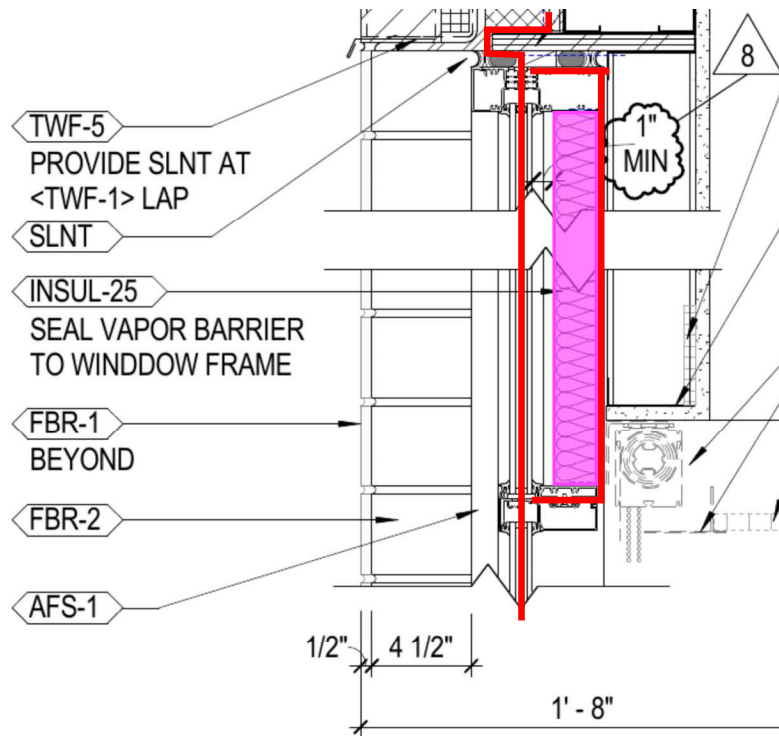
# Spandrel Condensation Monitoring



# GLAZED SPANDREL DETAIL

UBIM  
PORT

FOR



5

TYPICAL WINDOW HEAD/SLAB EDGE AT FBR

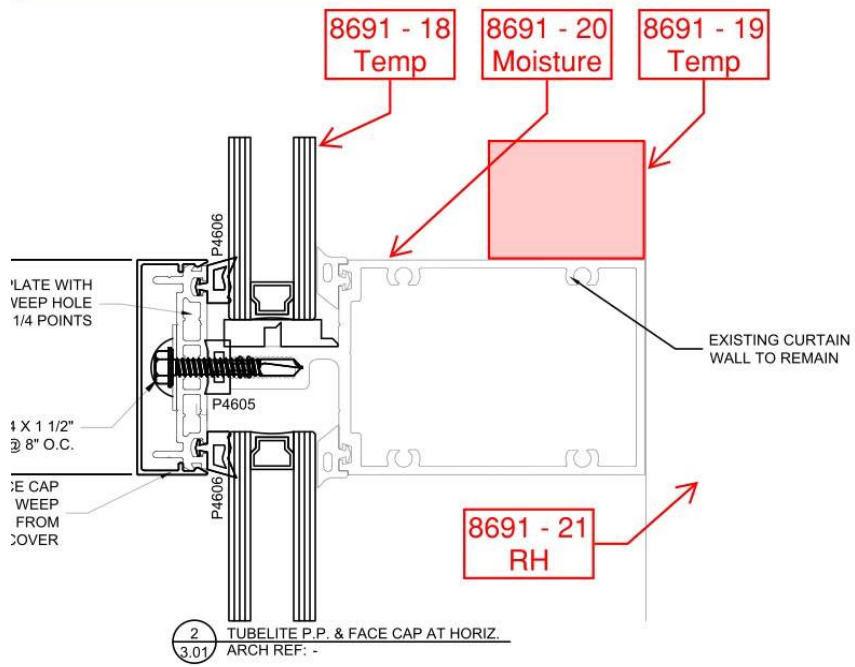
1 1/2" = 1'-0"



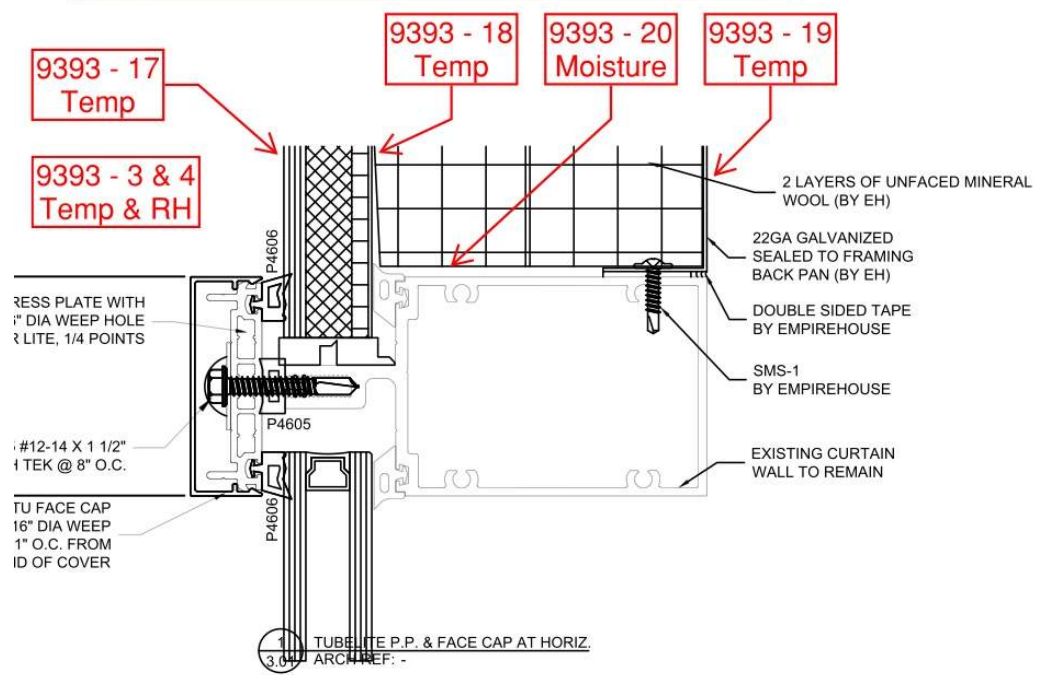
# GLAZED SPANDREL DETAIL



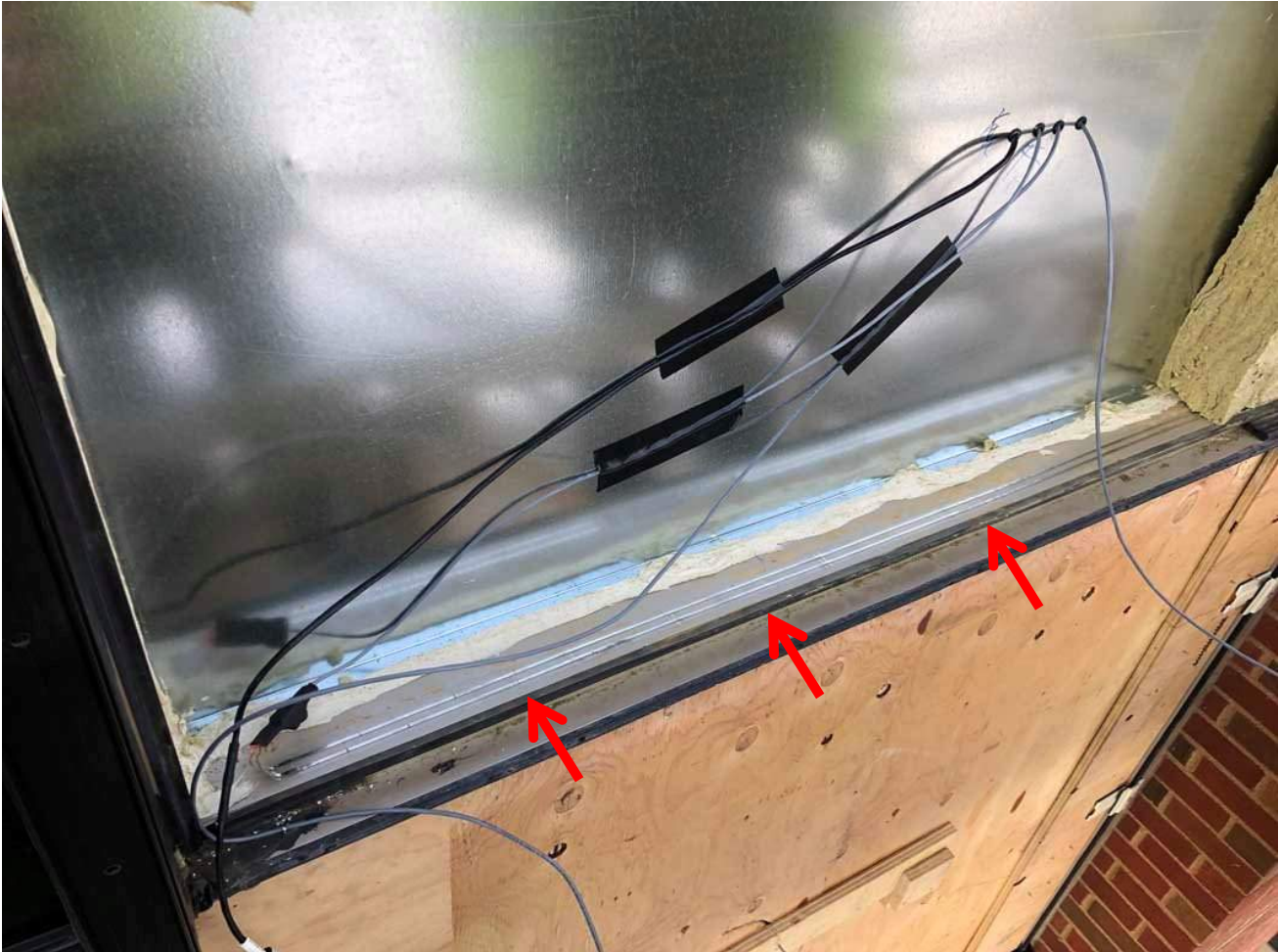
**Existing Condition - Location and Sensor Number**



**Remediated Condition - Location and Sensor Number**

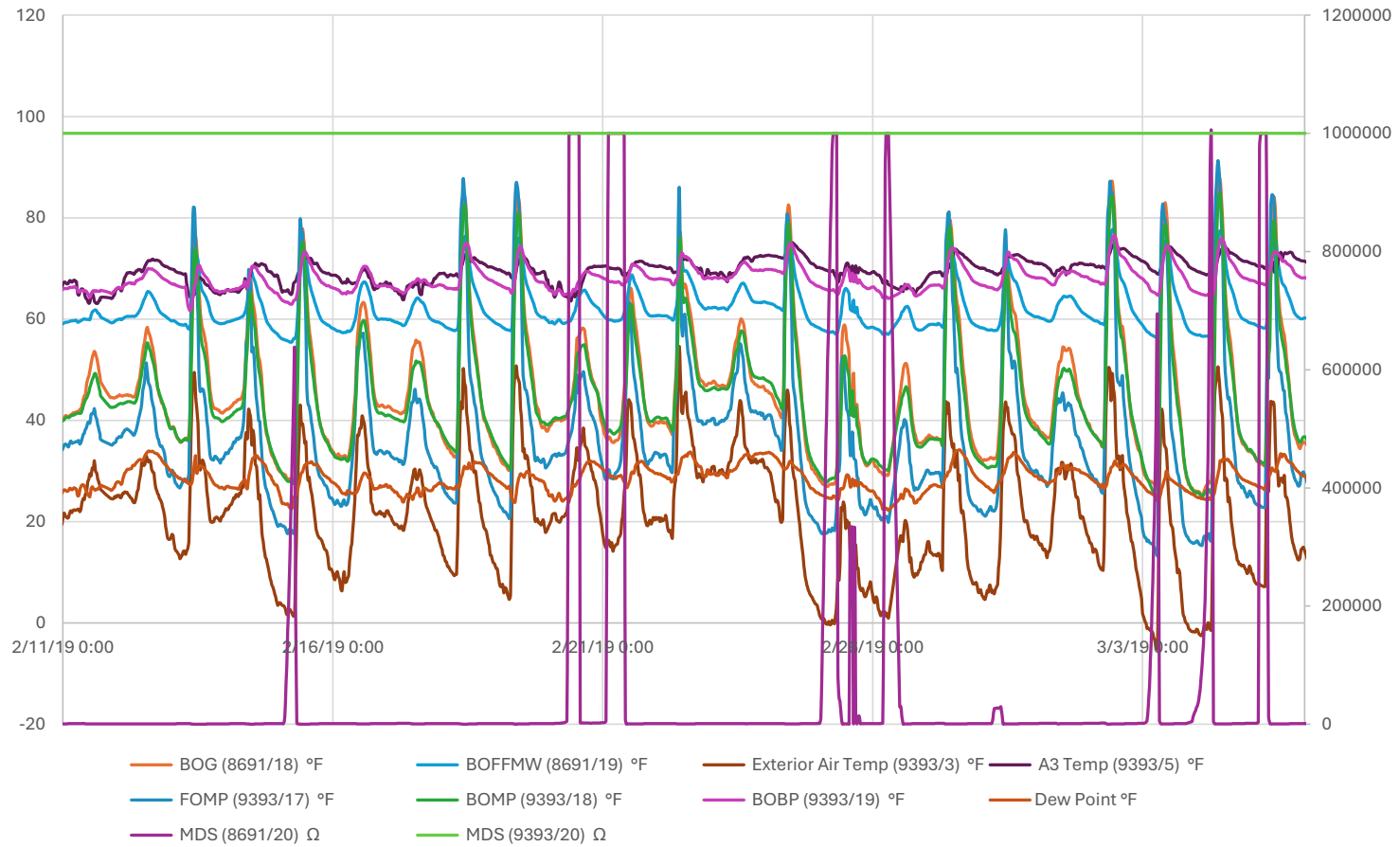


# GLAZED SPANDREL DETAIL



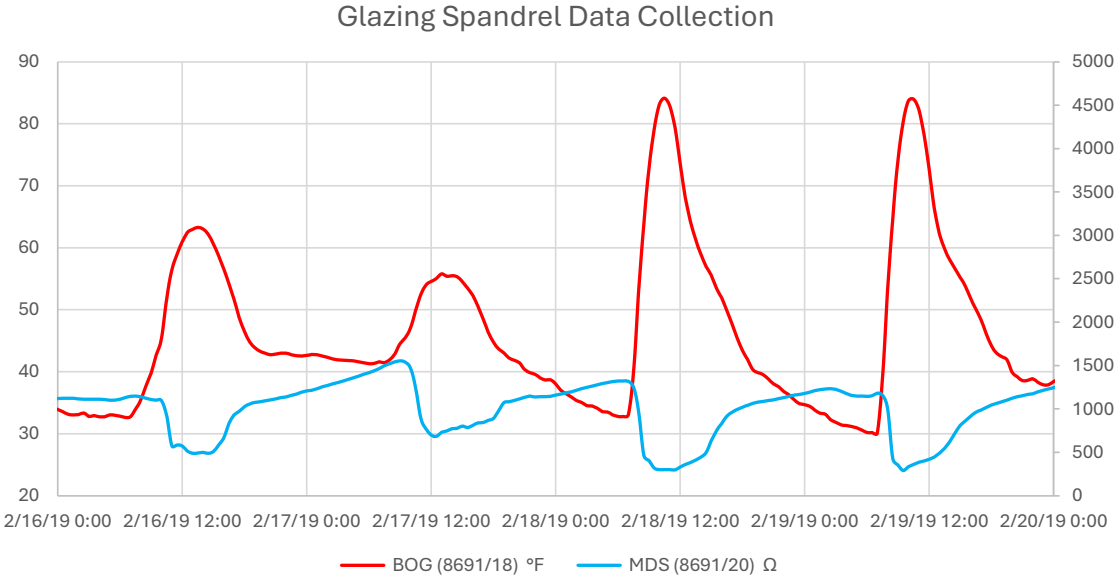
# GLAZED SPANDREL DETAIL

## Glazing Spandrel Data Collection



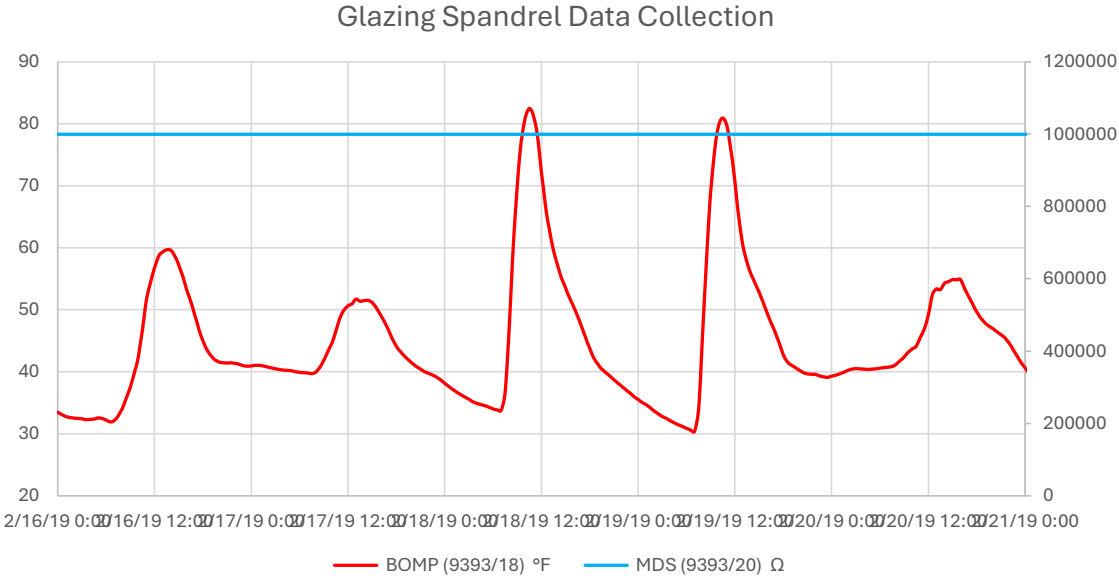
# GLAZED SPANDREL DETAIL

## Data at Existing Condition



# GLAZED SPANDREL DETAIL

## Data at Remediated Condition







INAPPROPRIATE MATERIALS



UNFORTUNATE TIMING



INAPPROPRIATE DETAILING





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INAPPROPRIATE DETAILING



OPE – FORGOT ABOUT WINTER!





# Designing for Winter





# Dial in the Specification

- Consider an enclosure system specification section
- **Include low temp basis of design materials**
- Avoid language prohibiting silicone sealant installation below 40 degrees
  - Consider additional destructive and non-destructive testing to validate installation.
- **Ask for a cold weather enclosure plan.**
- Require chain of custody in shipping and storage.
  - Tattle tails or monitoring.



**WARNING! TEMPERATURE-MONITORED SHIPMENT**

Temperature not below \_\_\_ °C or \_\_\_ °F  
Upon receipt of shipment, immediately open and inspect ColdMark® indicator.

**If ColdMark temperature indicator is VIOLET:**

1. Do not refuse shipment
2. Make notation on delivery receipt and inspect for damage
3. Complete the inspection report sticker and file with your Bill of Lading

**Inspection Report**

Date Received: \_\_\_\_\_ Date Inspected: \_\_\_\_\_ Indicator Activated:  Yes  No

Inspector: \_\_\_\_\_  
Carrier: \_\_\_\_\_

**ShockWATCH®**

ColdMark, ShockWatch, and ShockWatch products are used as part of a program to monitor compliance to USDA, FDA, HACCP, and HACCP temperature guidelines. The ColdMark indicator is not a substitute for a thermometer. ColdMark is a registered trademark of ShockWatch, Inc.

[www.coldmark.com](http://www.coldmark.com)



# Develop a Cold Weather Enclosure Plan - GC

Hint: Low temp requirements typically start at **40 degrees (Air and Surface)**

## Schedule review

- What enclosure work is happening between October and May?
- What interior work is happening during temp protection

**Detail review** – Complete a pencil test and BIM overlays

- Look for gaps in any layer of the enclosure system: Air, Vapor, Water, and Thermal

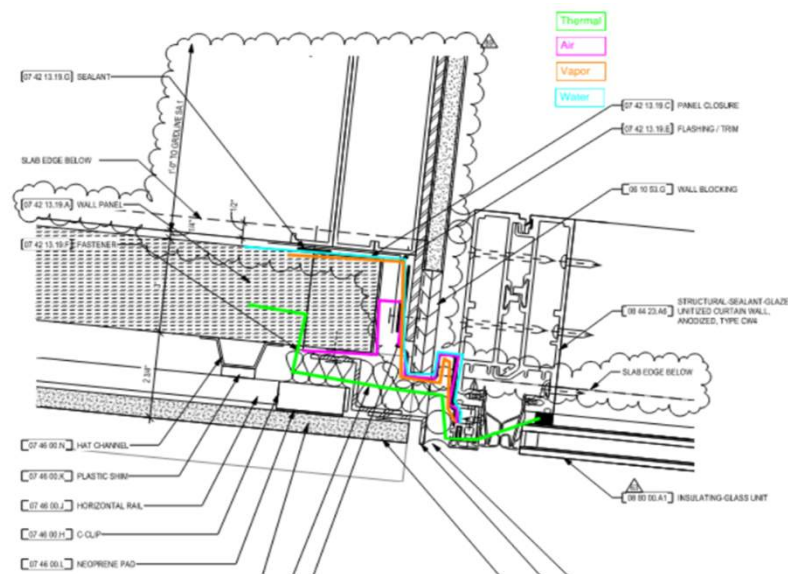
## Material review

## Material Storage

## Temporary Heat and Protection

## Enclosure consultant Review

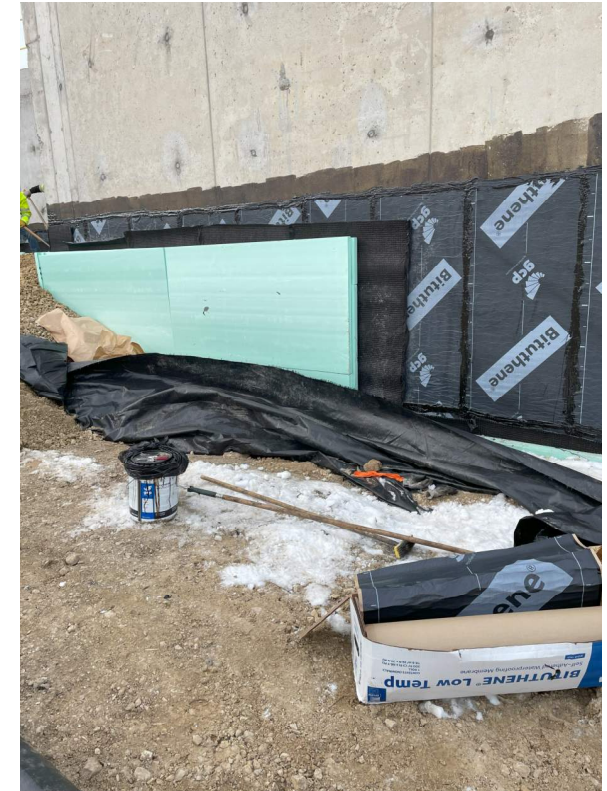
## Chain of custody





## Material Review – Low Temp Products Must Be Included

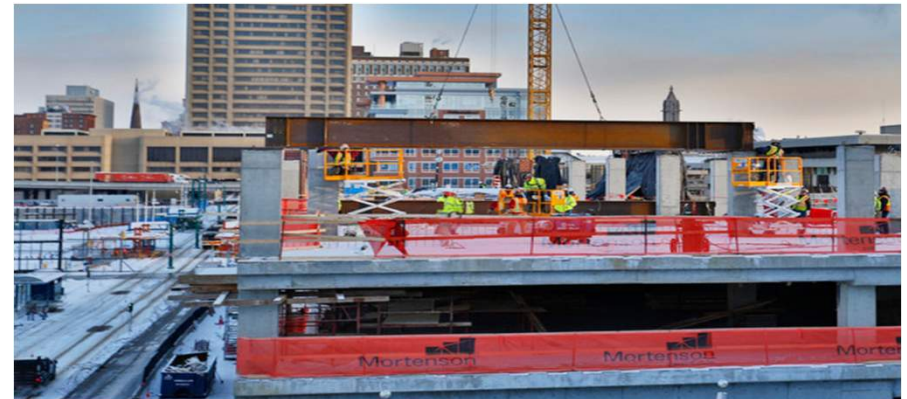
- Contractor should always submit the low temp version
  - Don't assume the plan and weather will go perfectly
- Review installation requirements
- **Are there additional steps for the low temp materials?**
  - Some low temp products require additional detailing and primers.
  - Does the install schedule account for the extra steps?
- **Make sure products meet NFPA 285, when required.**
- **Low temp materials often won't meet low VOC requirements**



# Material Review – Understand the Different Systems

## Product Examples

- GCP Perm-a-barrier VPL-40 degrees versus VPL LT-20 degrees (spray applied)
- Carlisle CCW 705-40 degrees versus CCW 705 XLT-15 degrees (peel and stick)
  - CCW 705 HT-40 degrees (higher in-service temp)
- 3M 3015VP good down to 0 degrees (peel and stick)



# Temporary Heat and Protection

- Understand the duration.
- Avoid adding moisture into the temp enclosures, ie gas heaters.
  - Use electric or exchangers
- Evaluate the planned construction activities during temp heat. Drywall, concrete.
- Do you need to tent the entire building.
- Evaluate the process to terminate temp heating.



Typical Temp Enclosure



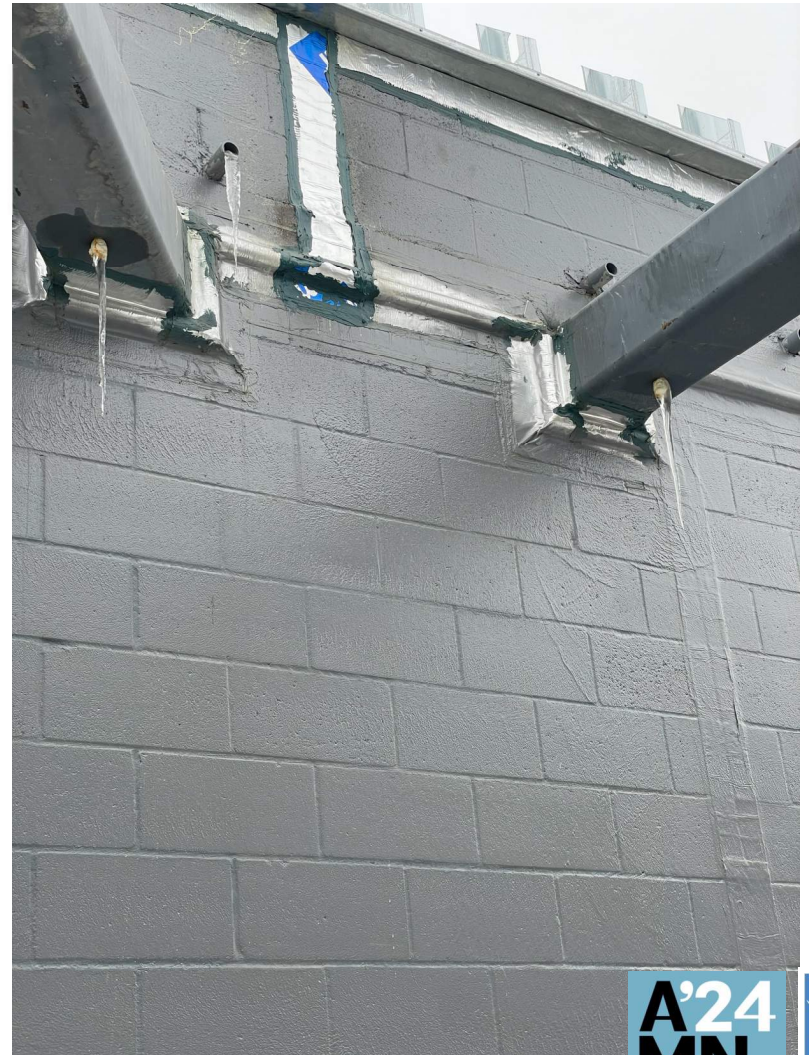
Insulated Temp Enclosure

# Risks of Temporary Heat

usage of temporary heat



Vapor drive through uninsulated walls and building components



# Moisture Drive through CMU

MOISTURE DRIVE THROUGH CMU



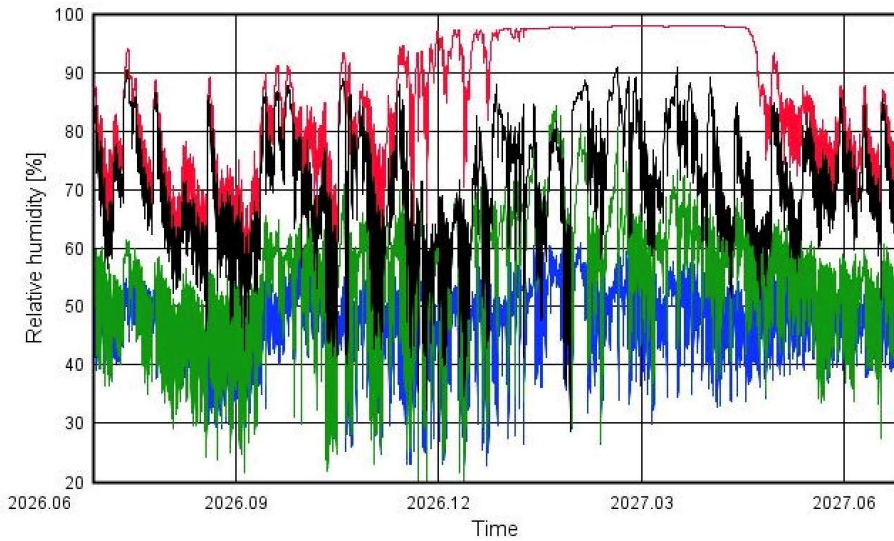
# Moisture Drive through Sheathing



# Get help from an Enclosure Consultant

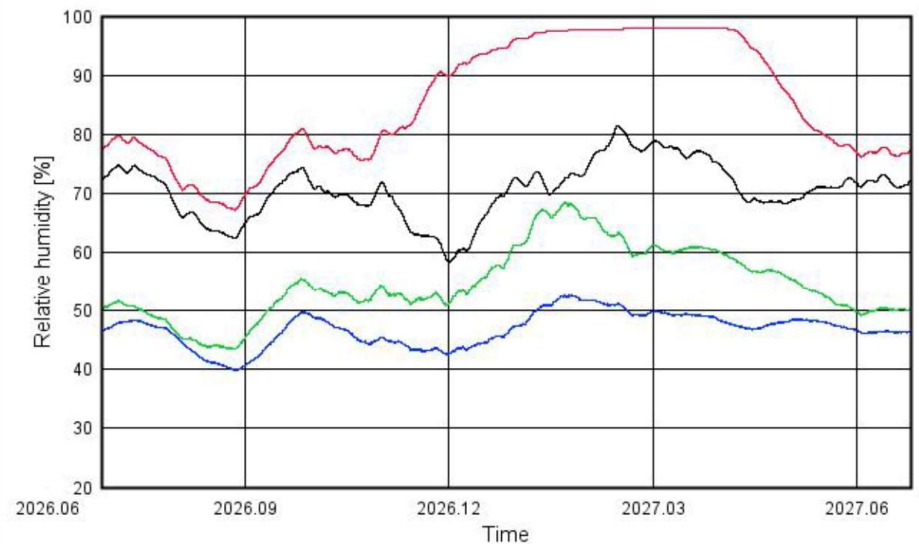
- Use WUFI model to evaluate the vapor pressure during construction.
- Find max allowable humidity to avoid damaging vapor drive.
- Monitor the temp and humidity in the temporary enclosure. Dehumidify as required.

Relative Humidity at Sheathing



— Existing Assembly — Impermeable AWB — Painted Exterior Siding — Interior vapor retarder

Relative Humidity at Sheathing (Time-Average)



— Existing Assembly — Impermeable AWB — Painted Exterior Siding — Interior vapor retarder



# Consider Prefabricated Exterior Wall Panels

- Use to solve for vapor drive during winter construction.
- Significant schedule savings.
- Must be baked into the design. Schematic Design decision.





# Winter Protection



Waterproofing Damage



Waterproofing Damage



Roofing Night Seals

# Testing Requirements

What water-based testing is required in the specification?

- Flood and/or spray testing
- Must be administered above freezing



AAMA 501.2 Hose Test



# Low Temp Install Problems



Low Adhesion –  
Asphaltic Products



Condensation

# Thermal Bridging

Protection of building components that bridge the transition between the winter cold and the occupied spaces within

## General Contractor VDC Trick

- Turn off everything except structure and enclosure models.
- Highlight all the parts that penetrate the enclosure.



# Construction Administration – Trust but Verify

- Know the storage requirements.
- Know the installation requirements.
- Note the temp, humidity, dew point and weather conditions.
- Get surface temp readings on walls where products are being installed.
- Indicate temp and humidity levels in the temp heated spaces.
- Ask about material cure times
- Look for areas of potential thermal transfer.
  - Start at the end of summer







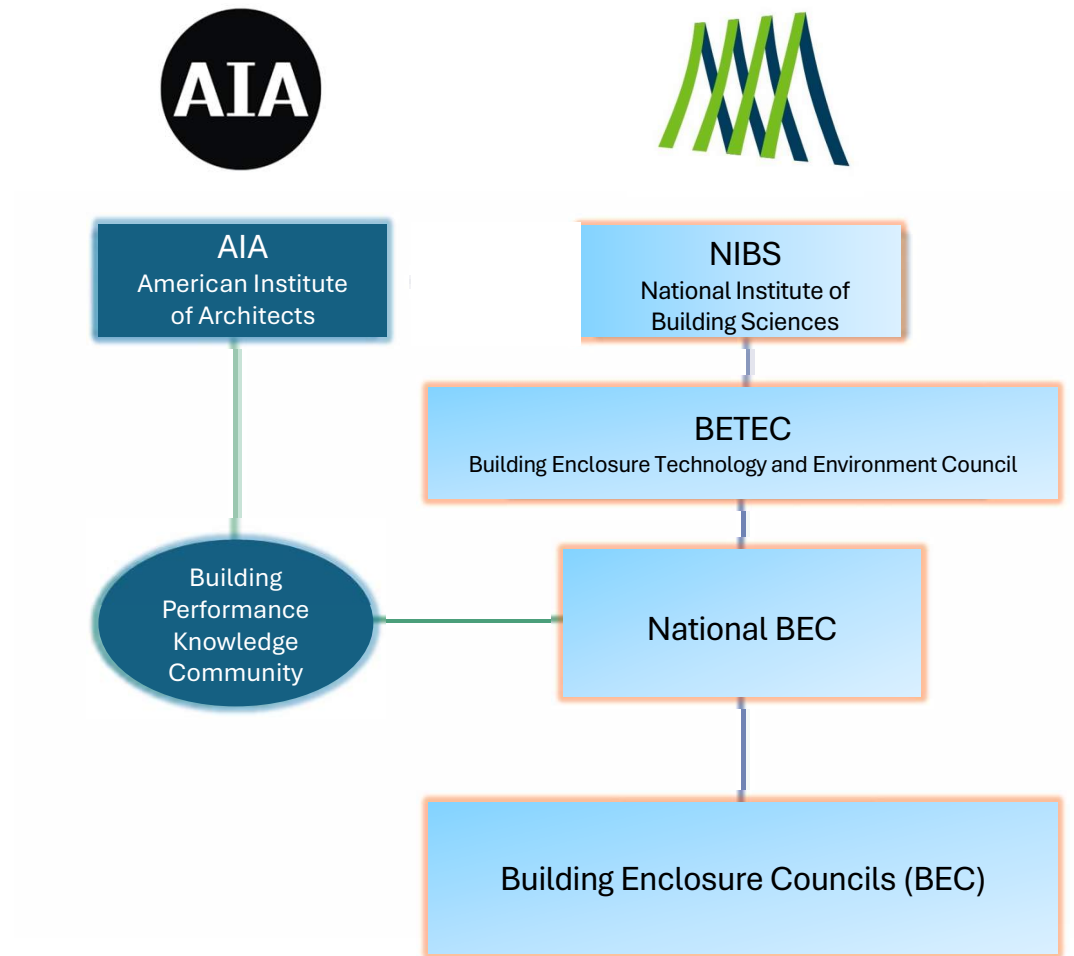
# Building Enclosure Council



To increase awareness of building enclosure design as a critical aspect of the successful construction of buildings and to foster the education of building industry professionals regarding proper design, construction, and maintenance of building enclosures.

The Building Enclosure Councils (BECs) are independent organizations and/or subcommittees cooperating with the AIA, NIBS and BETEC.

# RELATIONSHIP



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## TODAY'S PRESENTERS



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