



A PEAK BEHIND THE CURTAIN ...

 **EllisDon**

**SYNERGY**  
PARTNERS







# OUTLINE

Stick/Unitized Systems

Material Compatibility & Adhesion Issues

Fabrication & Installation Issues

Shadow Boxing

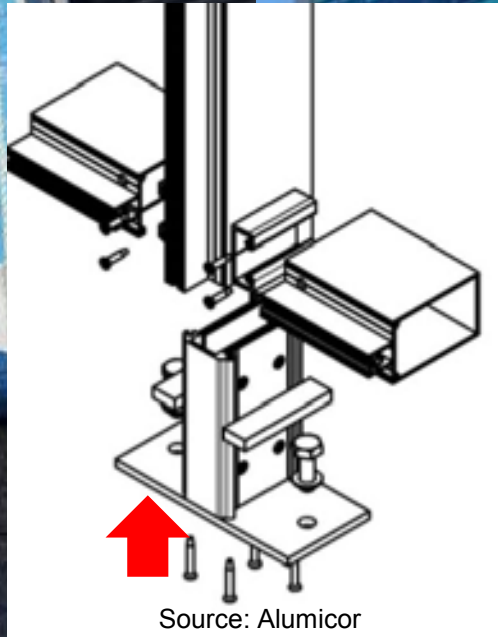
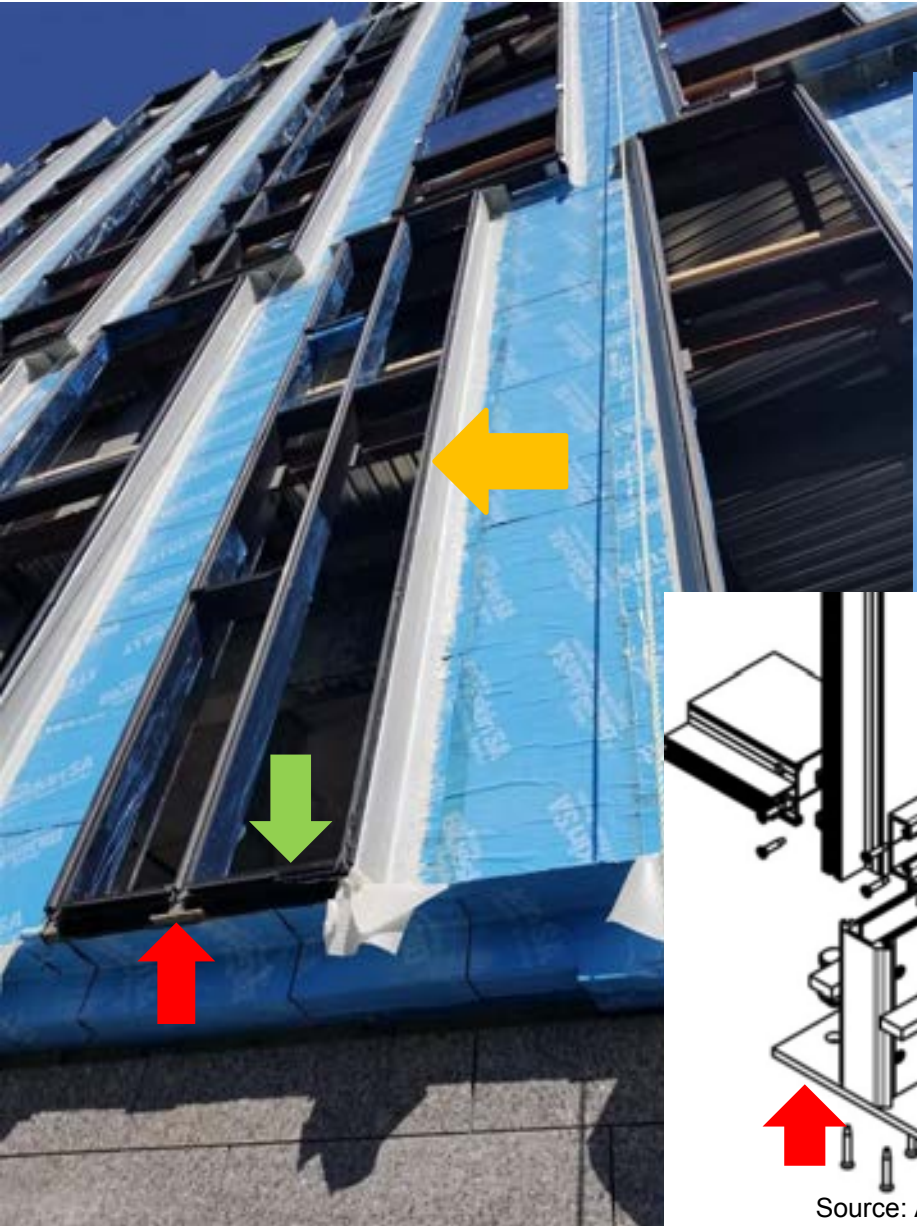
Glass Issues

Foreign Procurement

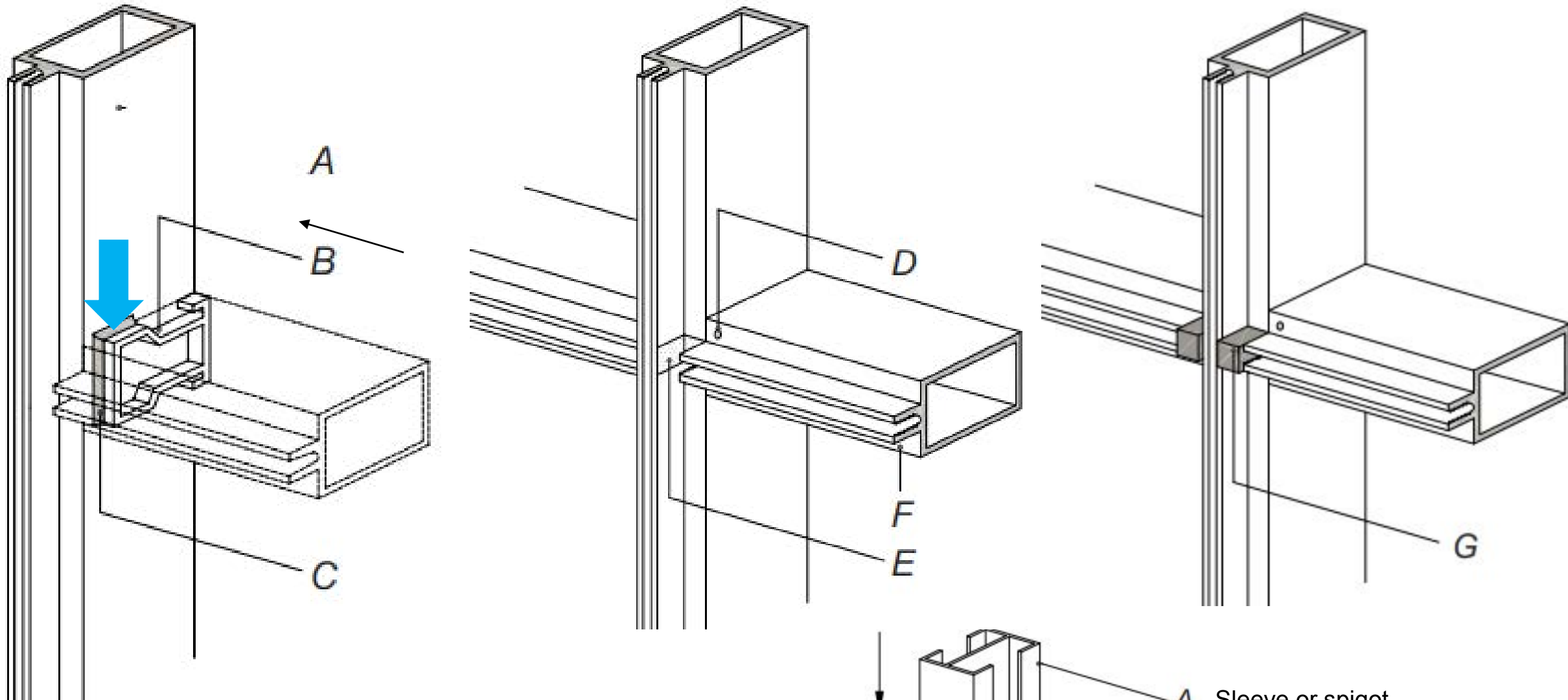
Industry Trends

# Stick Systems

Anchors, Vertical Mullions, Rails, Backpans/Spandrels, IGUs

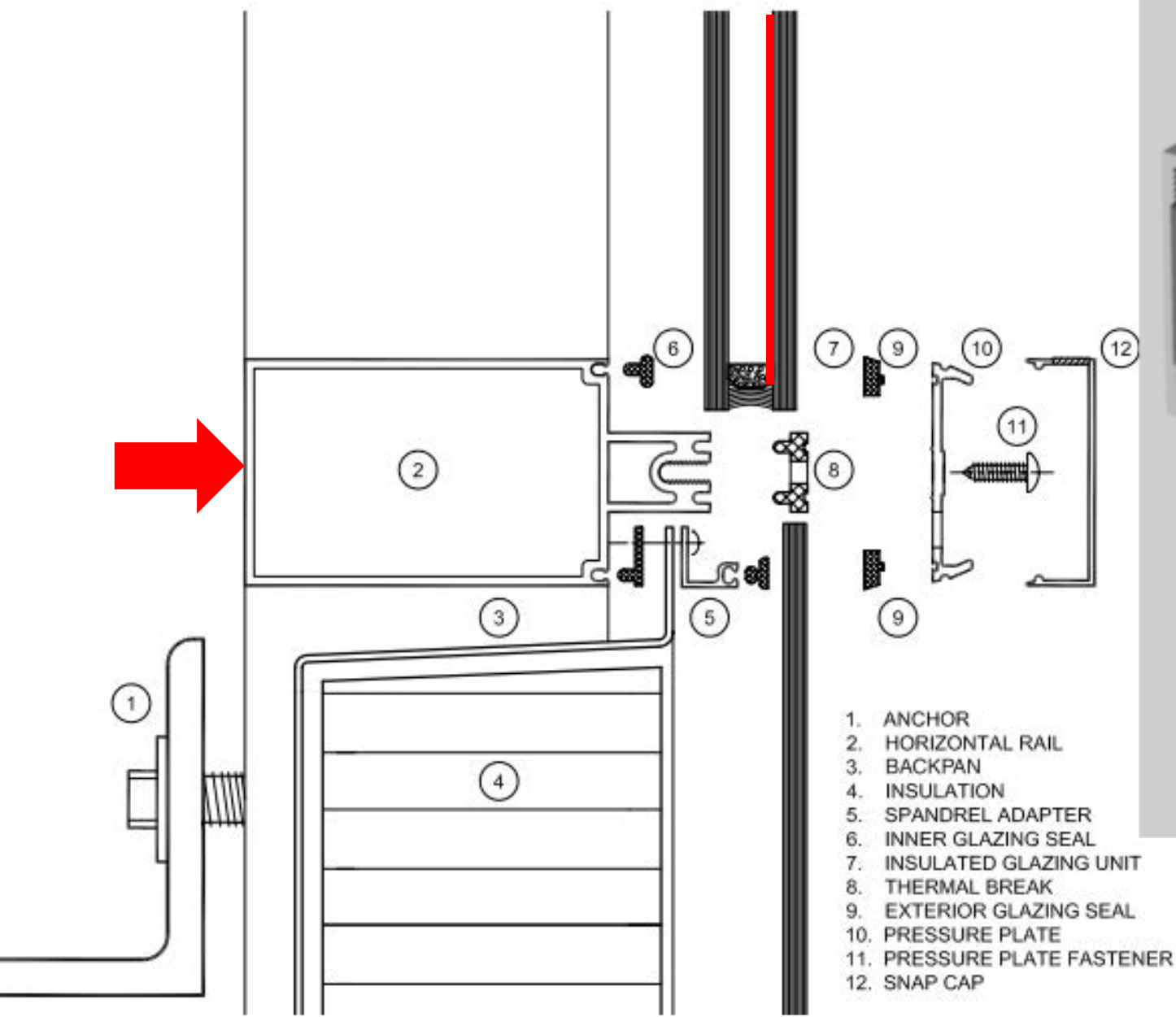






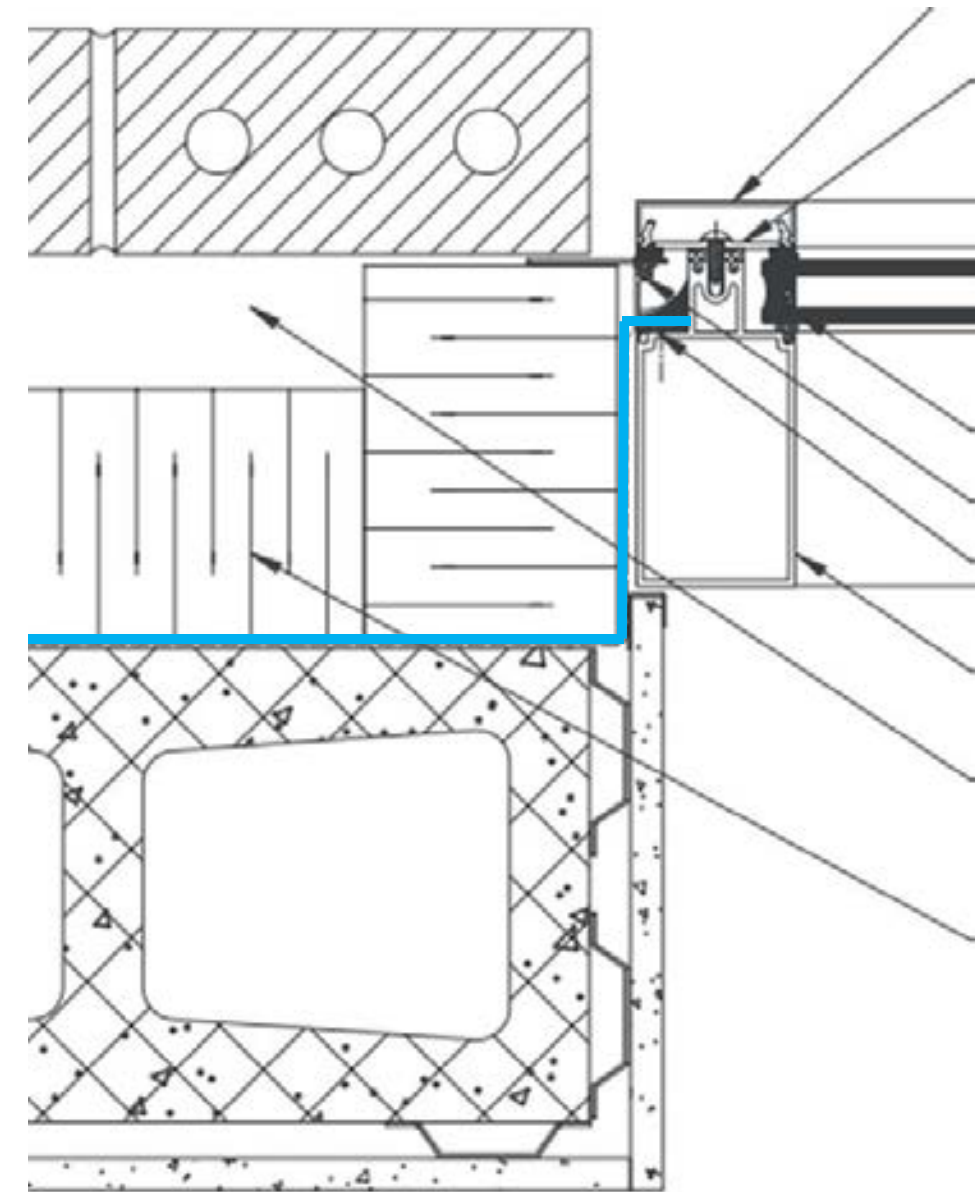
Note air/water seal location between mullions and rails

- A Sleeve or spigot
- B Bond-Breaker Tape and seal at Expansion Joint

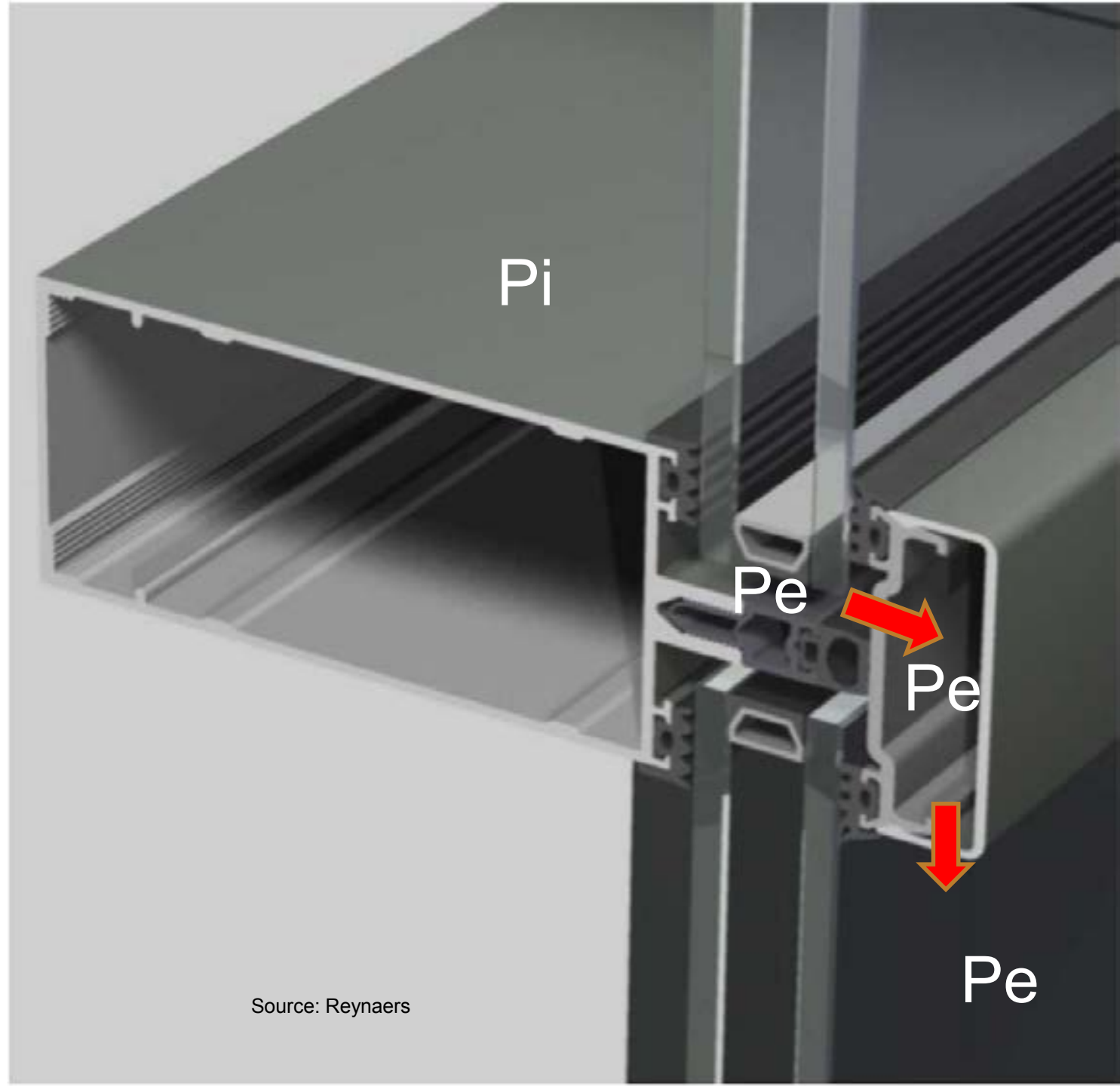


Source: Reynaers

# Air Flow and Rainwater Control



Source: CMHC Best Practice Guide



Source: Reynaers



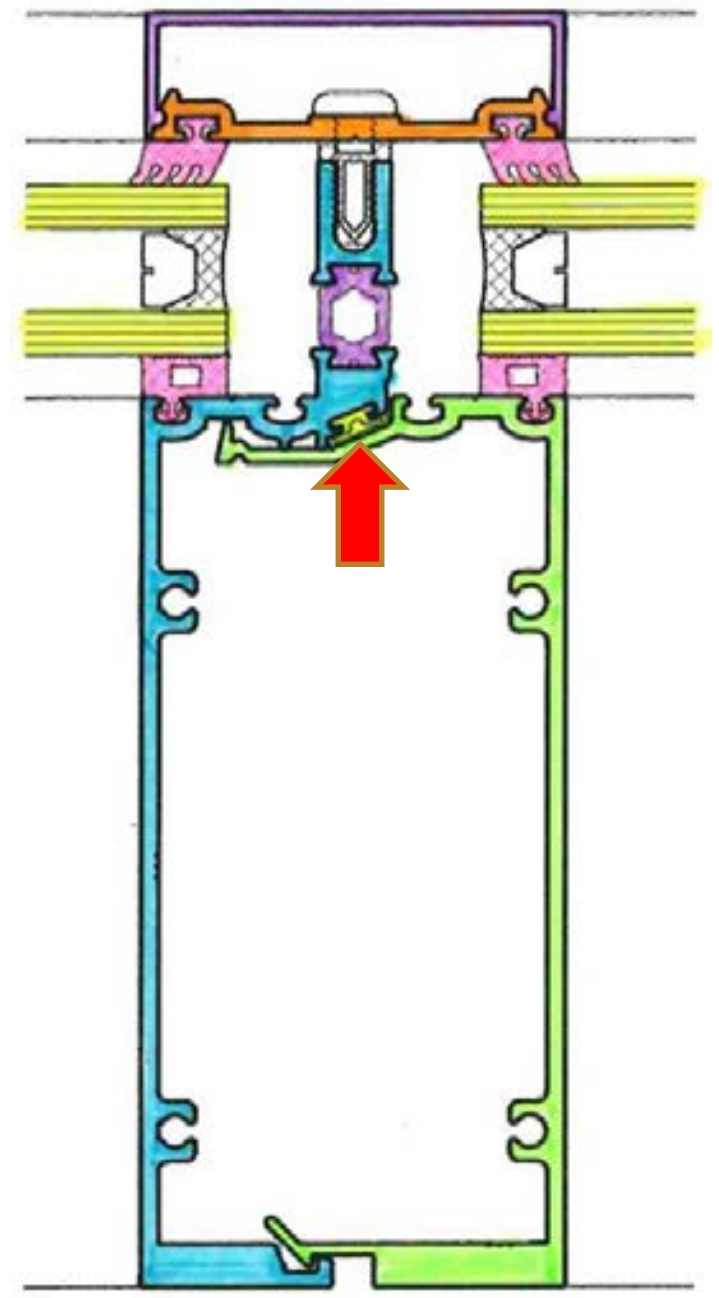
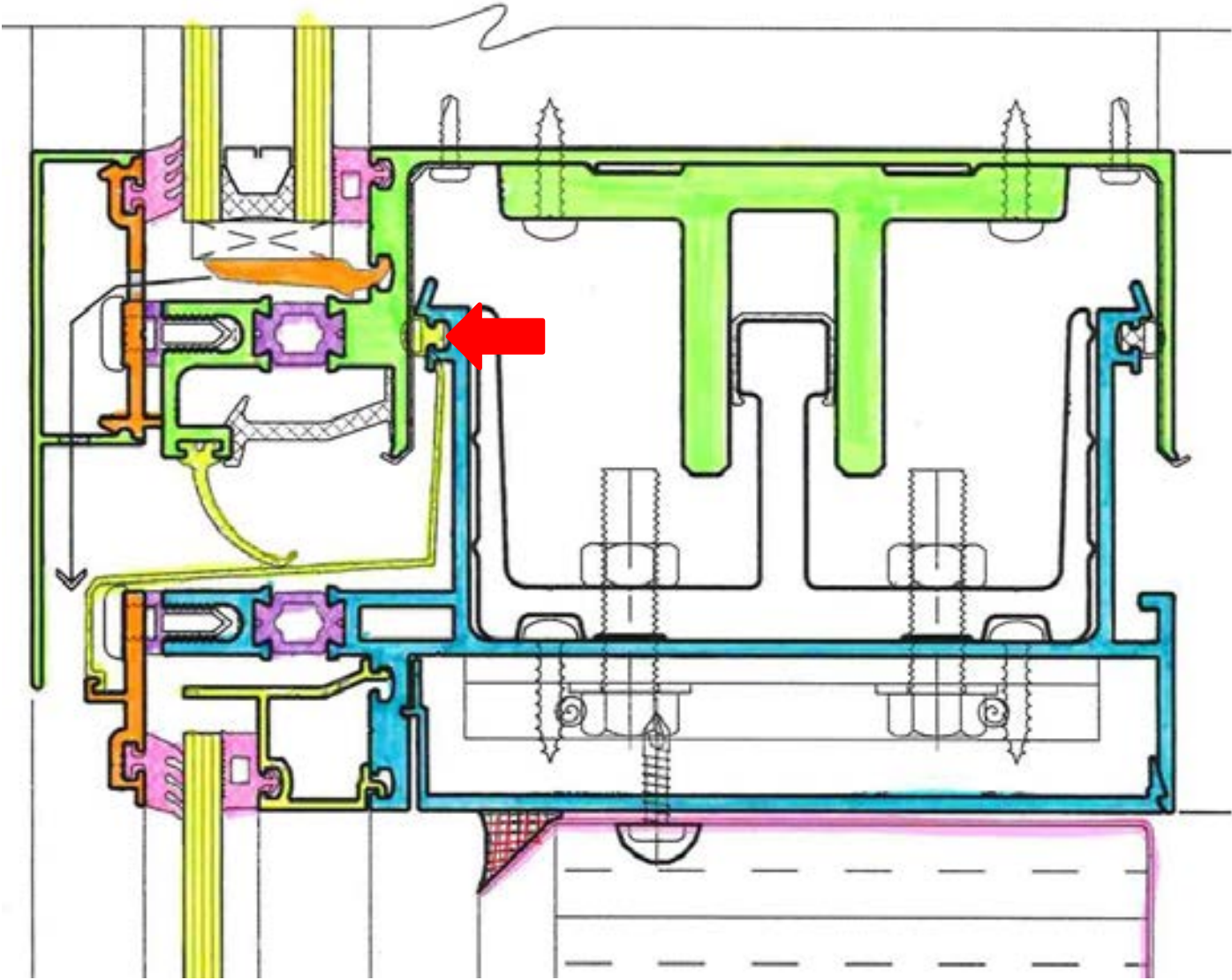


Unitized  
Systems



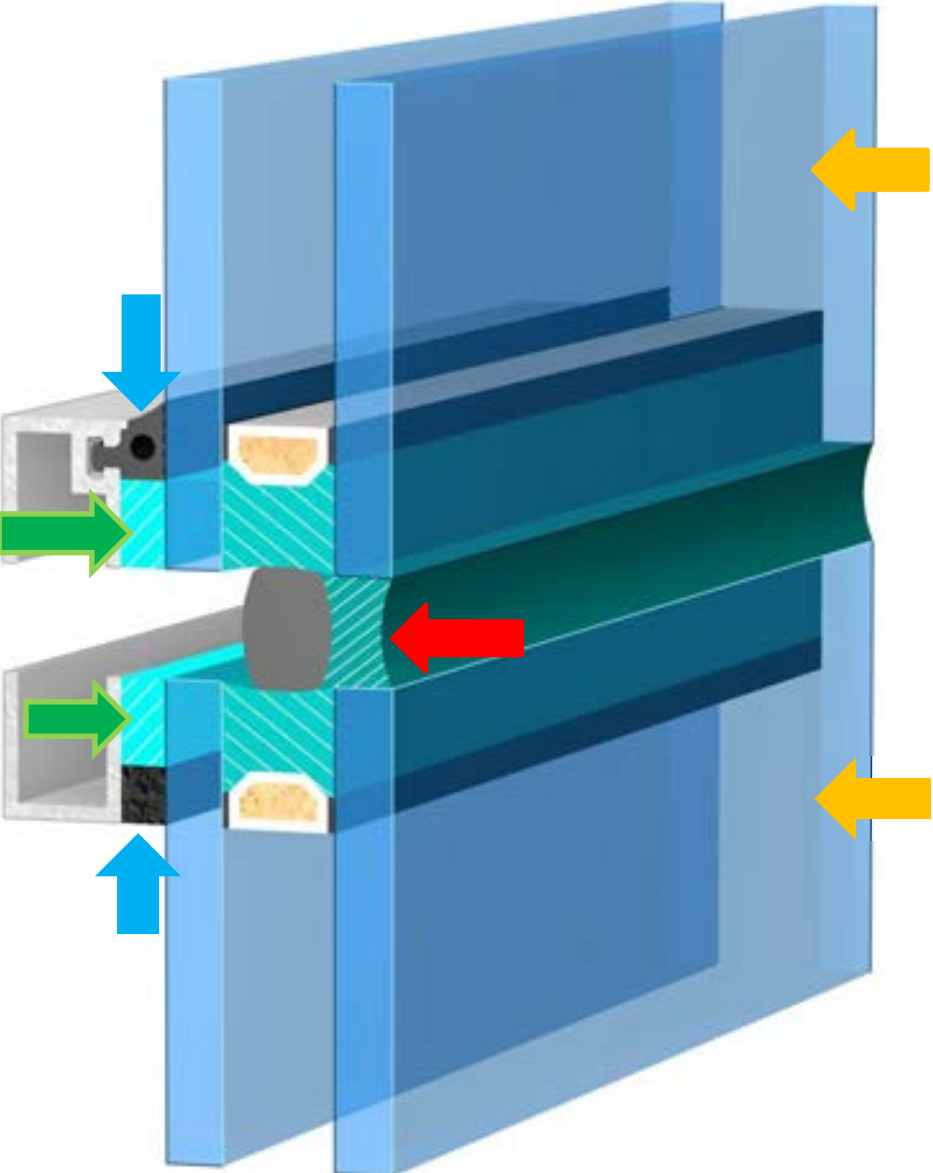


# Unitized Systems (Captured)



Source: Alumicor

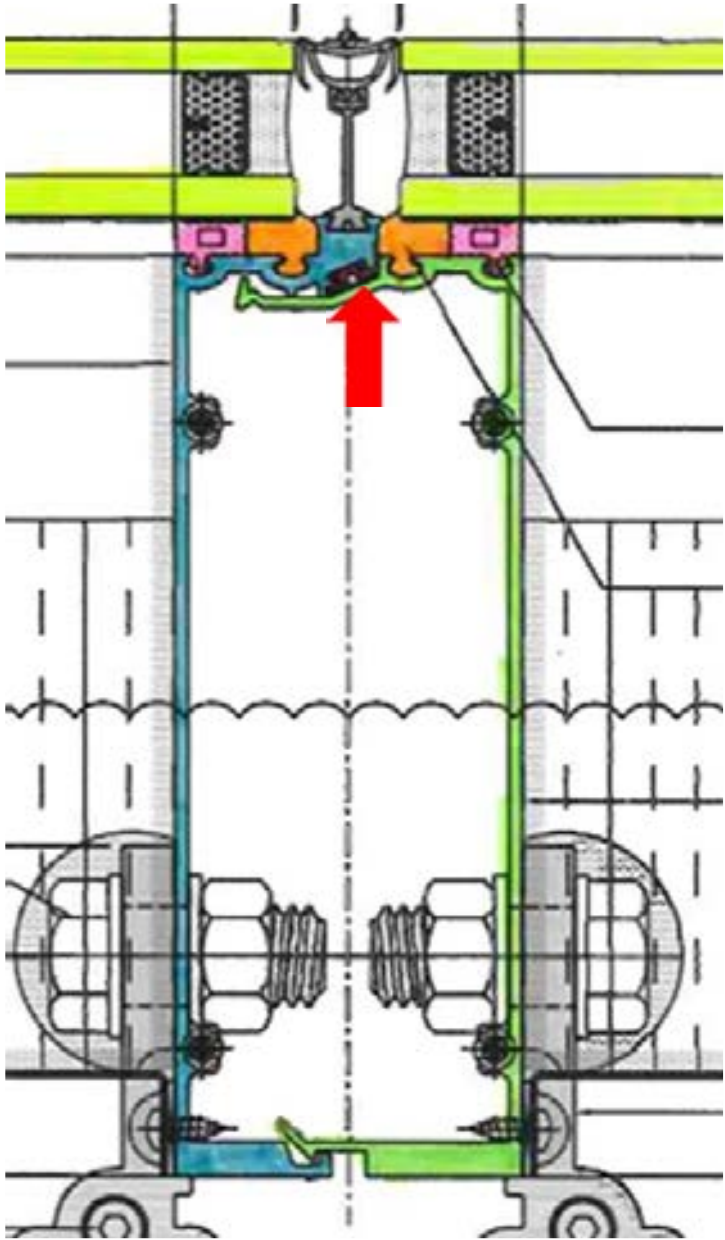
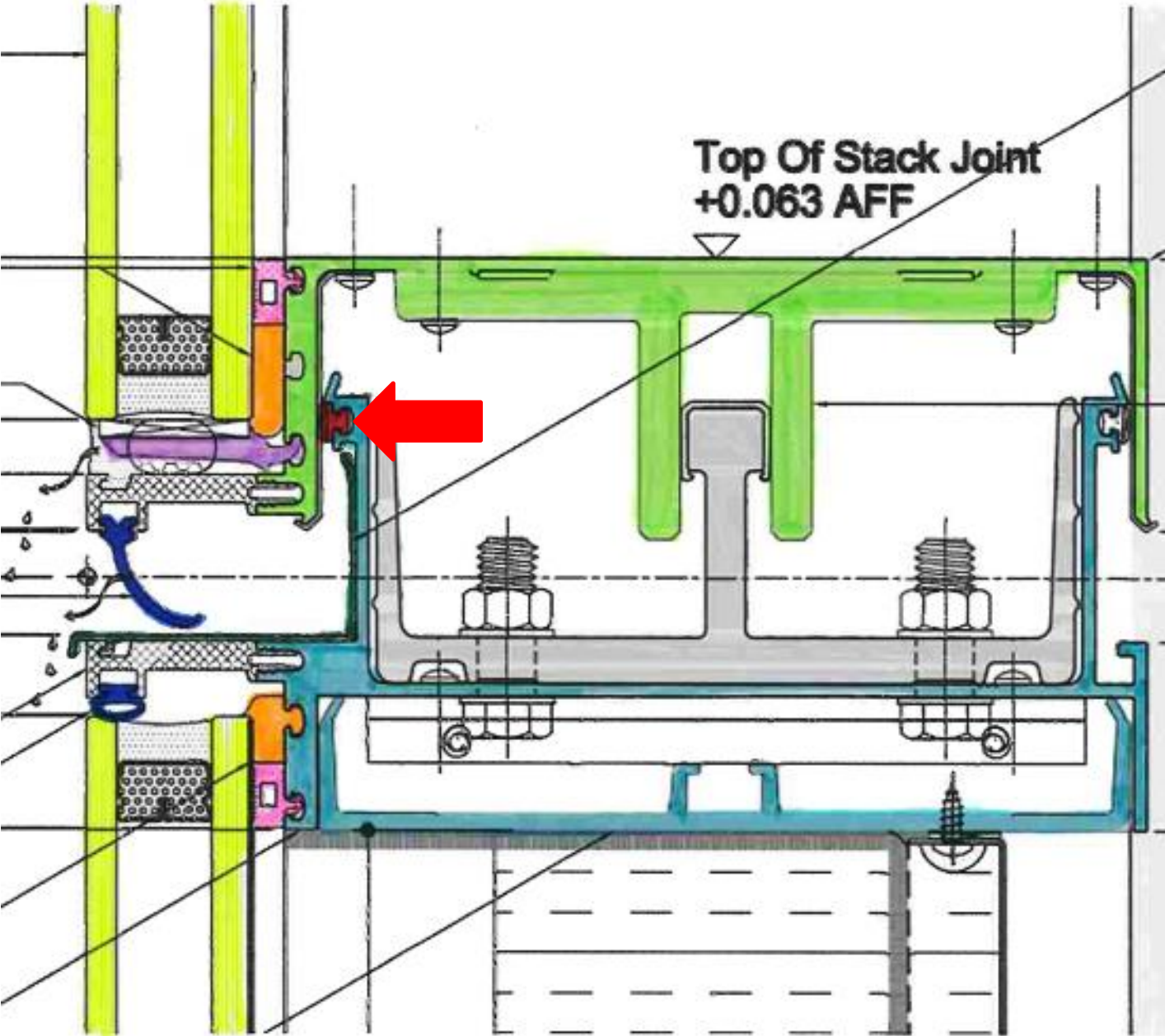
# Structural Silicone Systems (SSG, 2 & 4 sided)



Courtesy: The Dow Chemical Co. **Weather Seal, IGUs, Structural Silicone, Silicone Compatible Tape or Gasket**



# Unitized Systems (SSG)

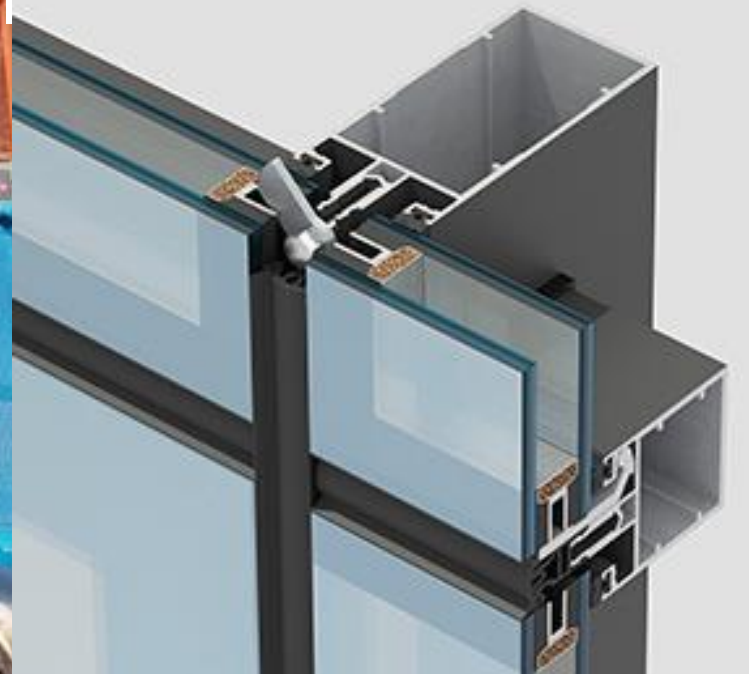
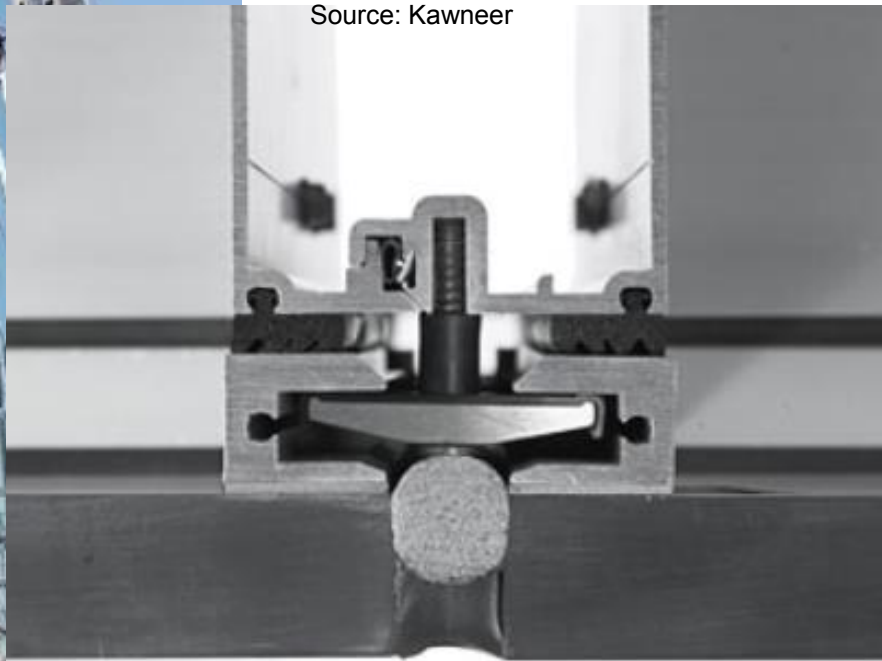




# Toggle/Cassette Systems



Source: Kawneer



Source: Aluminco





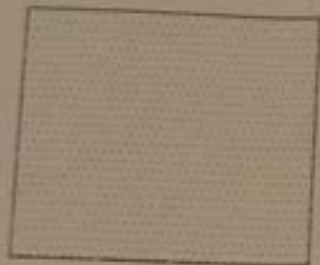
Material Compatibility & Adhesion Issues



Field De-glazing

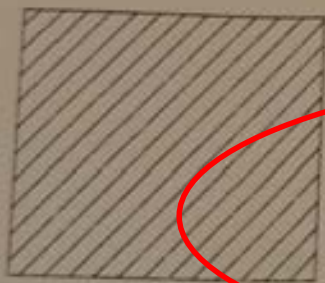






### TRIPLE GLAZE UNITS

EXTERIOR - 6mm GREY HEAT STRENGTHENED  
13mm STAINLESS STEEL SPACER BAR c/w ARG  
MIDDLE: 6mm CLEAR HEAT STRENGTHENED c/w  
13mm STAINLESS STEEL SPACER BAR c/w ARG  
INTERIOR - 6mm CLEAR ANNEALED



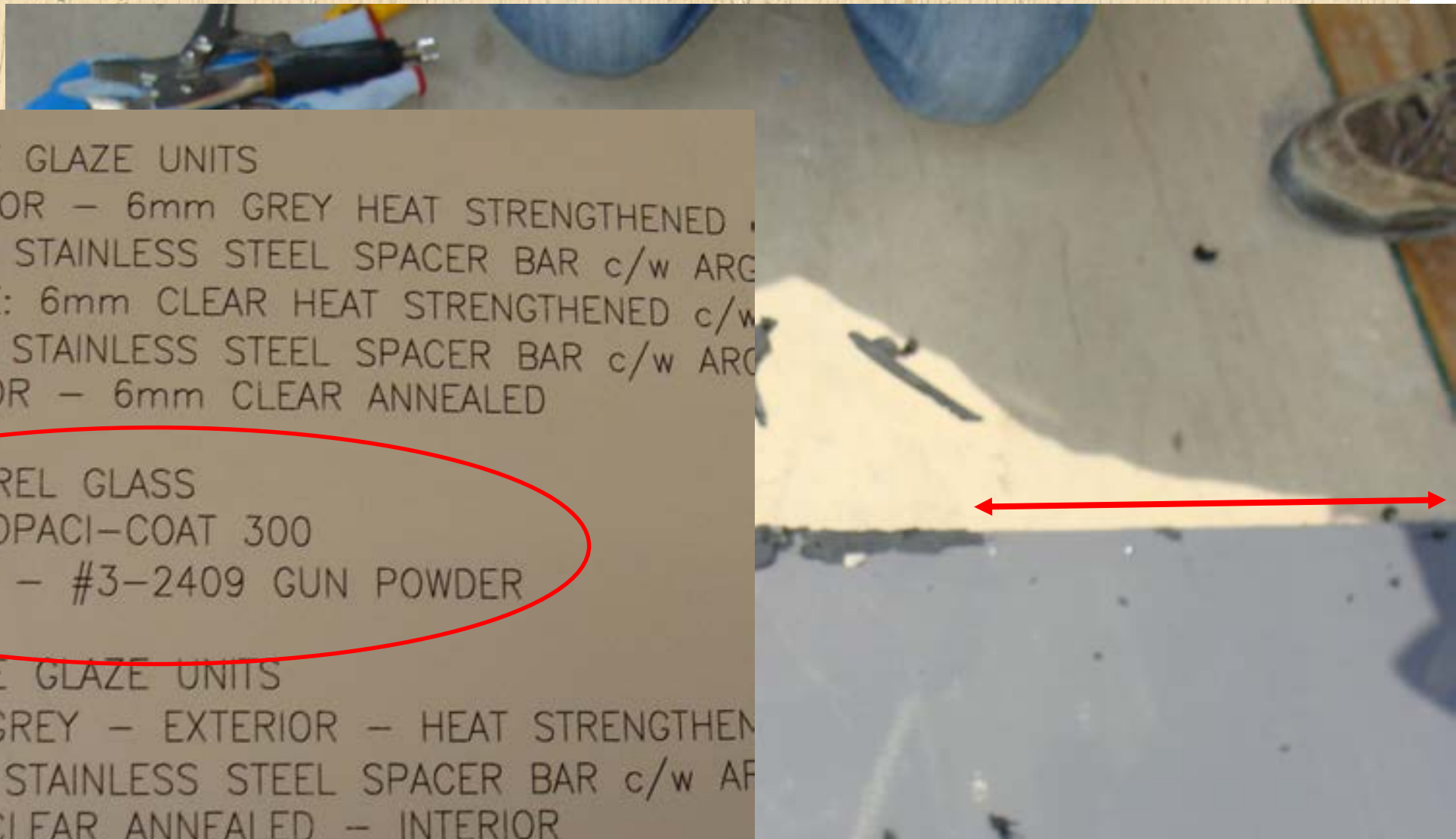
### SPANDREL GLASS

6mm OPACI-COAT 300  
COLOR - #3-2409 GUN POWDER



### DOUBLE GLAZE UNITS

6mm GREY - EXTERIOR - HEAT STRENGTHEN  
13mm STAINLESS STEEL SPACER BAR c/w AF  
6mm CLEAR ANNEALED - INTERIOR





Trial & Error

DRY WIPED  
Aug 18/09

995

995

E

SAFETY  
had before  
Additional in  
WARNING!  
IRRITATED O  
INGESTED S  
THROUGH S  
Coccatelins-H  
CAS# 064742-0  
CAS# 064742-1  
CAS# 064742-2

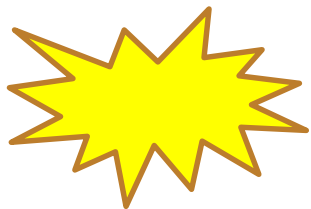
**Don't  
Forget  
To  
Ask  
For....**

Sealant Manufacturer  
Prequalification Testing Including:

Adhesion Testing

Compatibility Testing

Non-Staining Testing

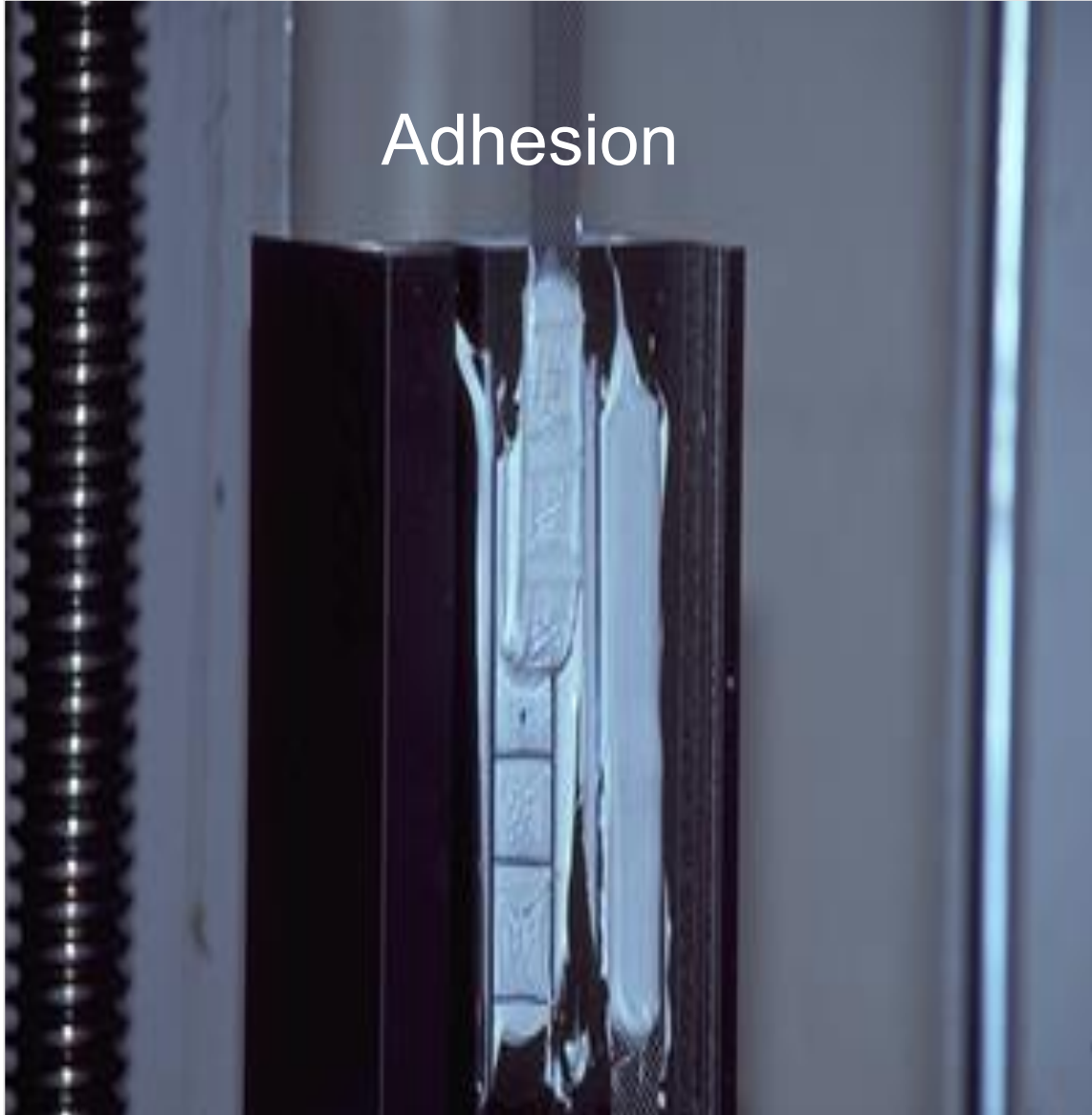


**TAKES 4 TO 6 WEEKS!**



# Lab Testing

Adhesion

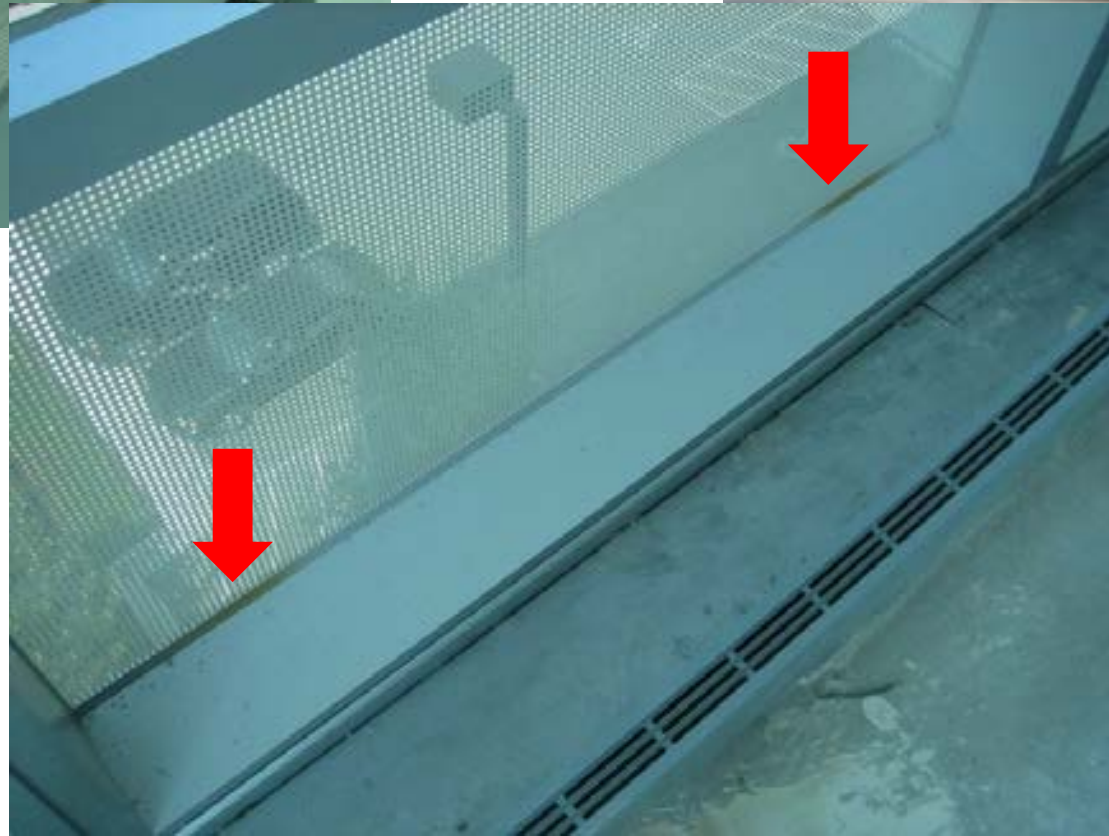
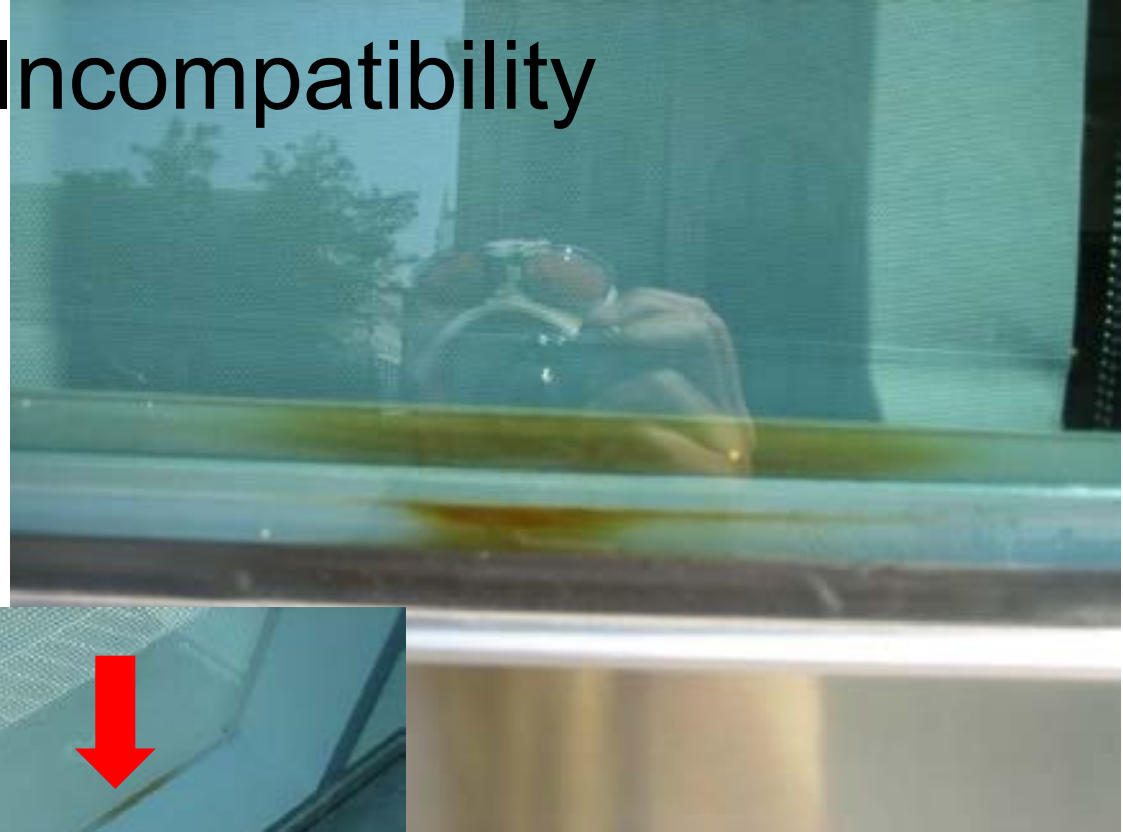


Compatibility



Courtesy of The  
Dow Chemical Co.

# Silicone and EPDM Incompatibility

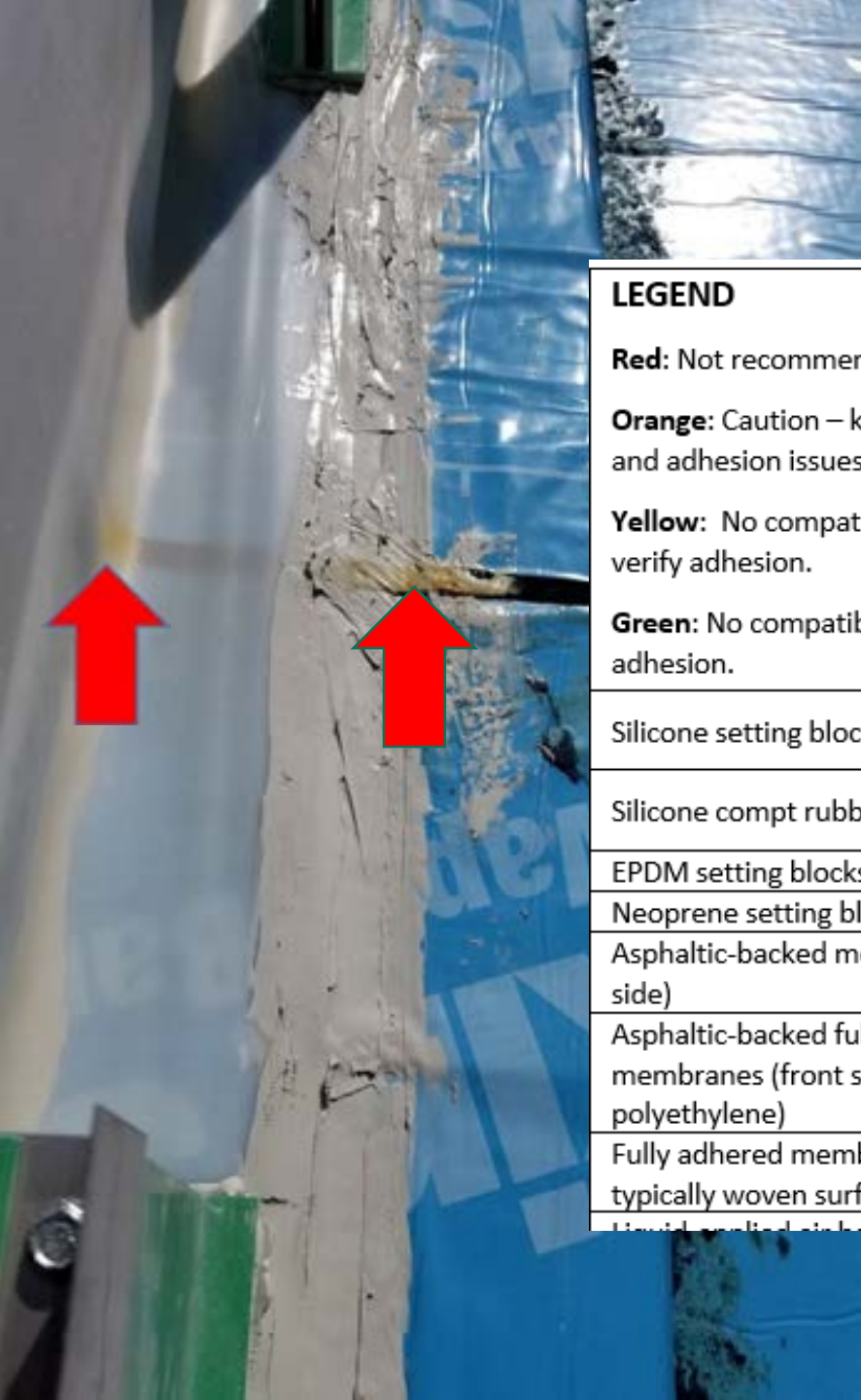


Courtesy of The  
Dow Chemical Co.



# Structural Silicone QC - Plant





LEGEND	Silicone sealant (neutral cure)	Silicone sealant (acid cure)	Polyurethanes	Hybrids and Polyethers	Polysulfide	Thermoplastics	Acrylics	Butyl	Comments.
	Red: Not recommended.	Orange: Caution – known compatibility and adhesion issues.	Yellow: No compatibility issues but verify adhesion.	Green: No compatibility issues, good adhesion.					
Silicone setting blocks and gaskets	Green	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Organic sealants will not adhere to silicone blocks and gaskets
Silicone comp rubber (SCR)	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	75% no compatibility issues but 25% lighter colored sealants will discolor (aesthetic issue)
EPDM setting blocks and gaskets	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Green	Lighter colored sealants will discolor
Neoprene setting blocks and gaskets	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Green	Lighter colored sealants will discolor
Asphaltic-backed membranes (back side)	Orange	Red	Orange	Orange	Red	Red	Orange	Green	Lighter colored sealants will discolor
Asphaltic-backed fully adhered membranes (front side typically polyethylene)	Yellow	Red	Red	Red	Red	Red	Yellow	Yellow	Most sealants will not adhere, test to verify
Fully adhered membranes (breathable, typically woven surface)	Yellow	Red	Red	Red	Red	Red	Red	Yellow	Most sealants will not adhere, test to verify
Liquid applied membrane (concrete)	Green	Yellow	Green	Green	Green	Green	Yellow	Yellow	Most sealants cannot and need adhesion



# LESSONS

Ensure Pre-Qualification Testing has been Completed by Sealant Manufacturer

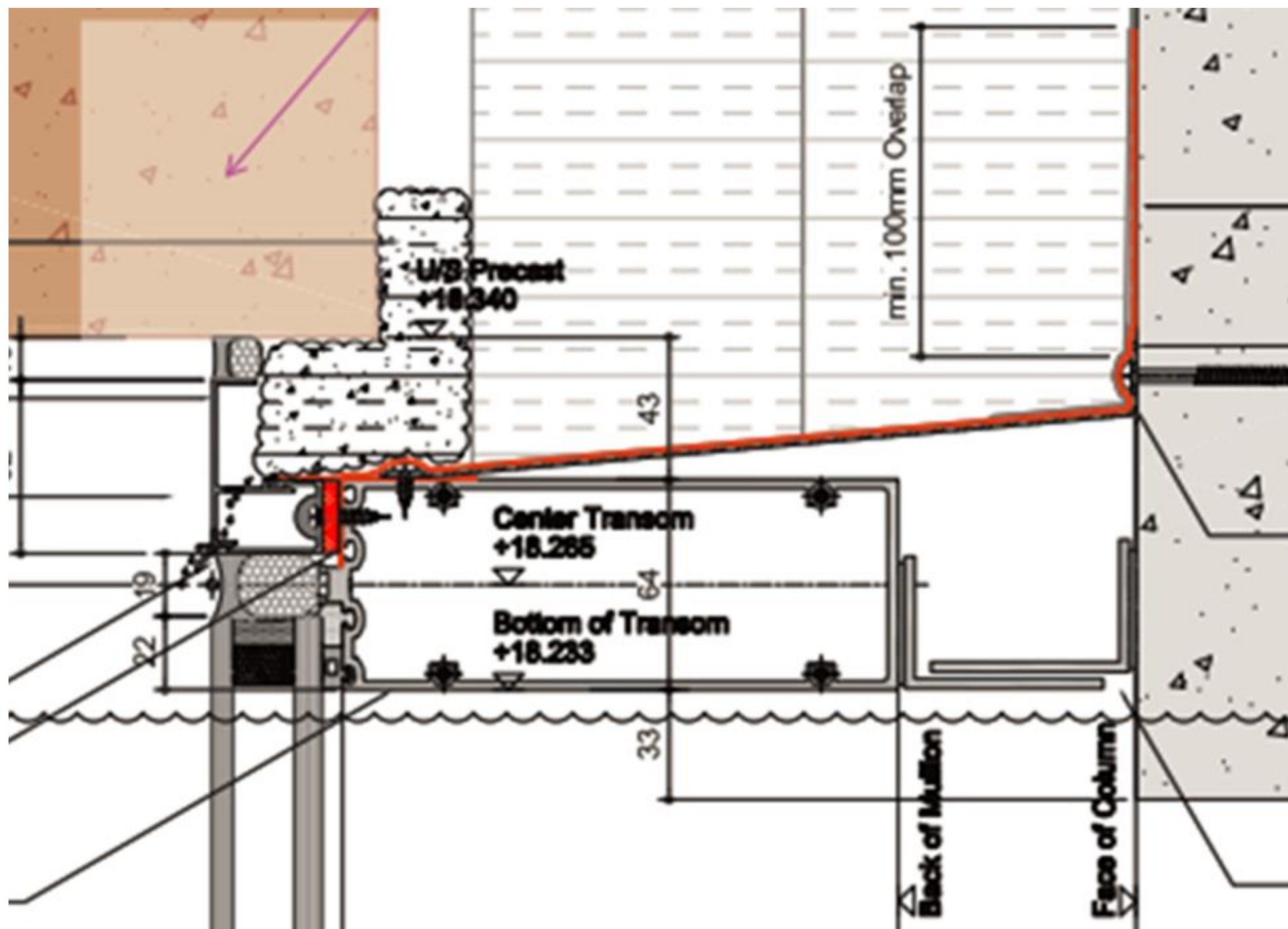
Review In-Plant QC testing

Perform Cut-Tests or Full De-Glaze for Field-Applied SSG

# Fabrication Issues





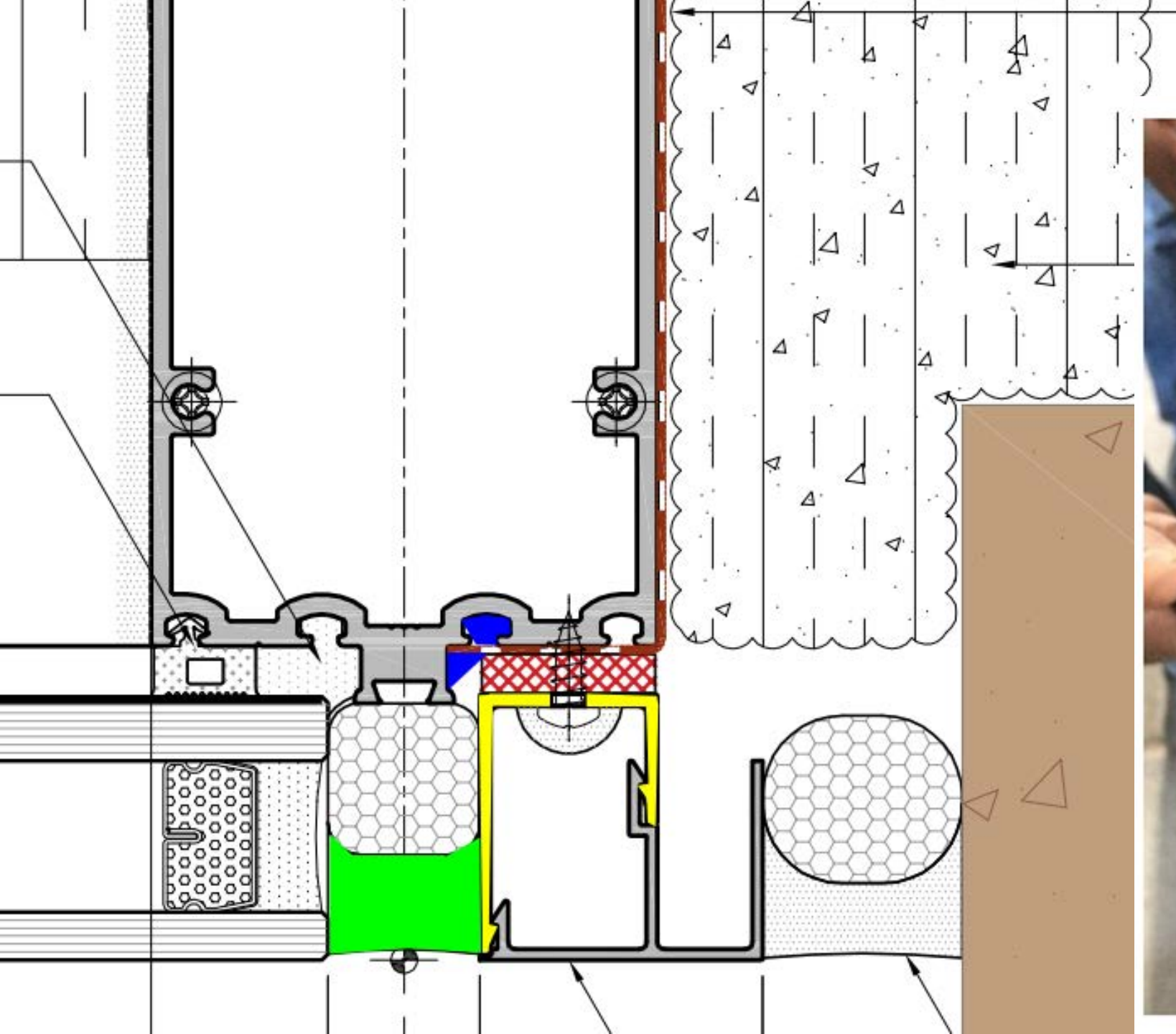














# LESSONS

Understand Material Limitations

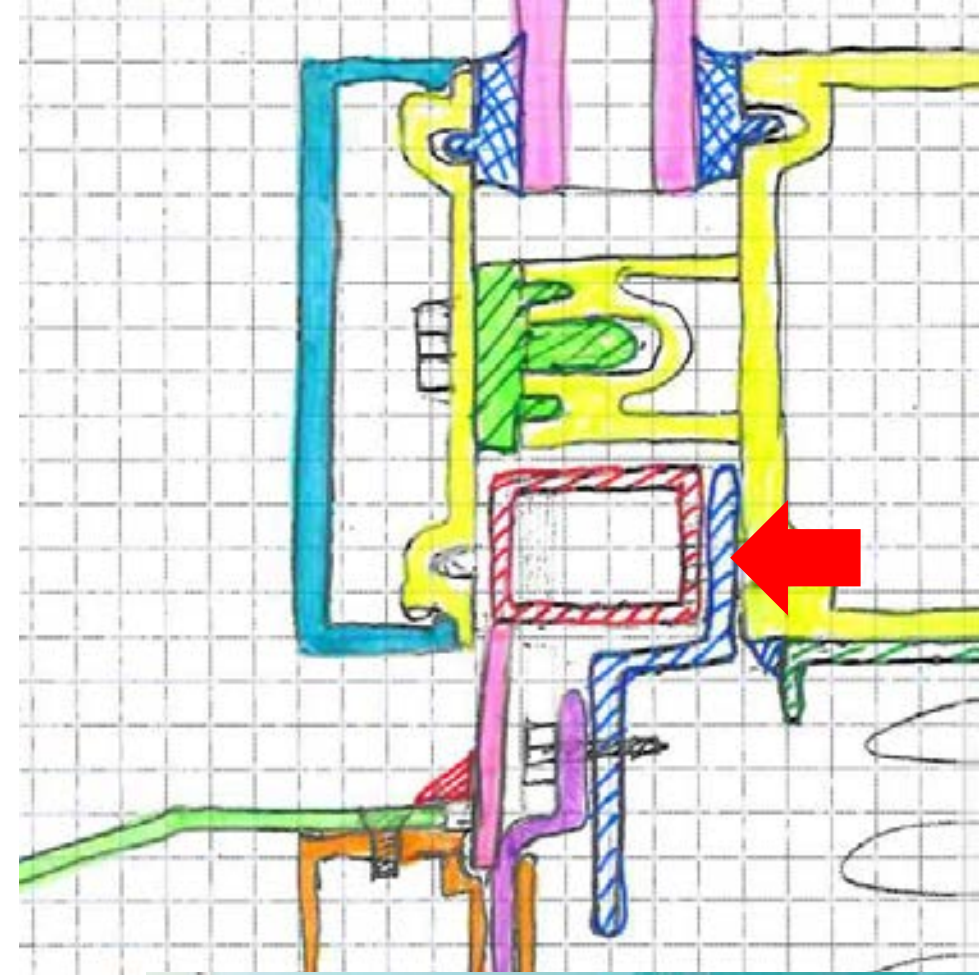
Validate Integrity of Installation with Field Testing Early in the Process

# Poor Exterior Rainwater Shedding

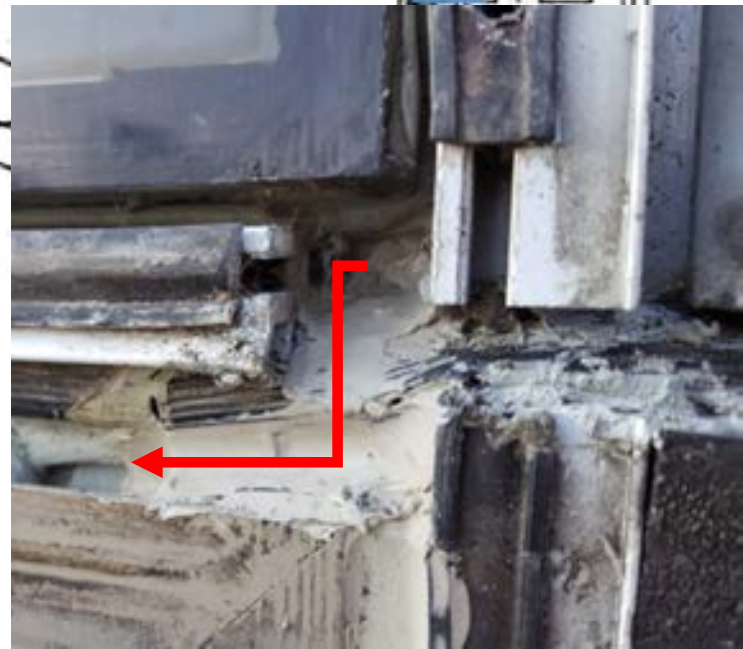
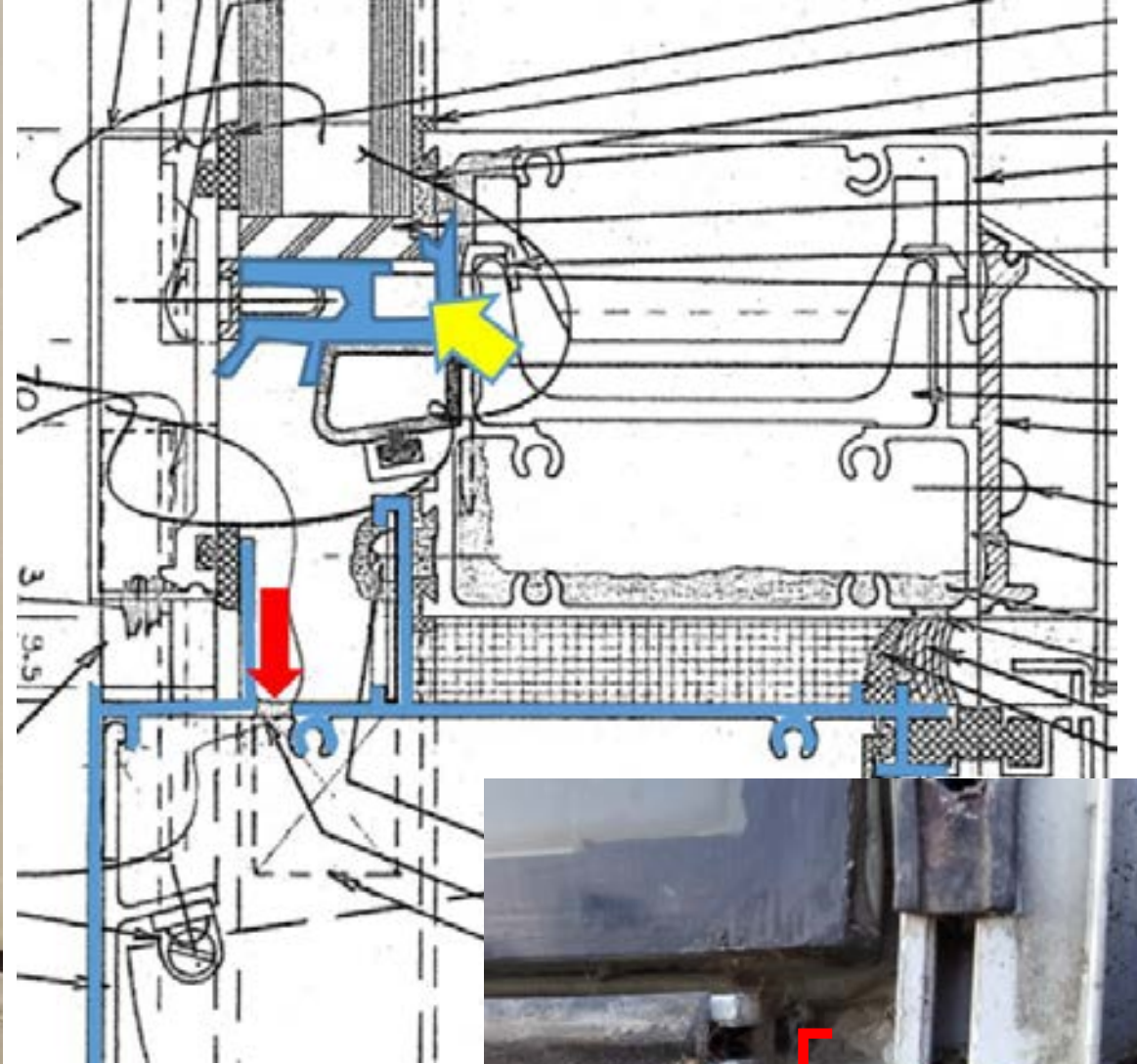
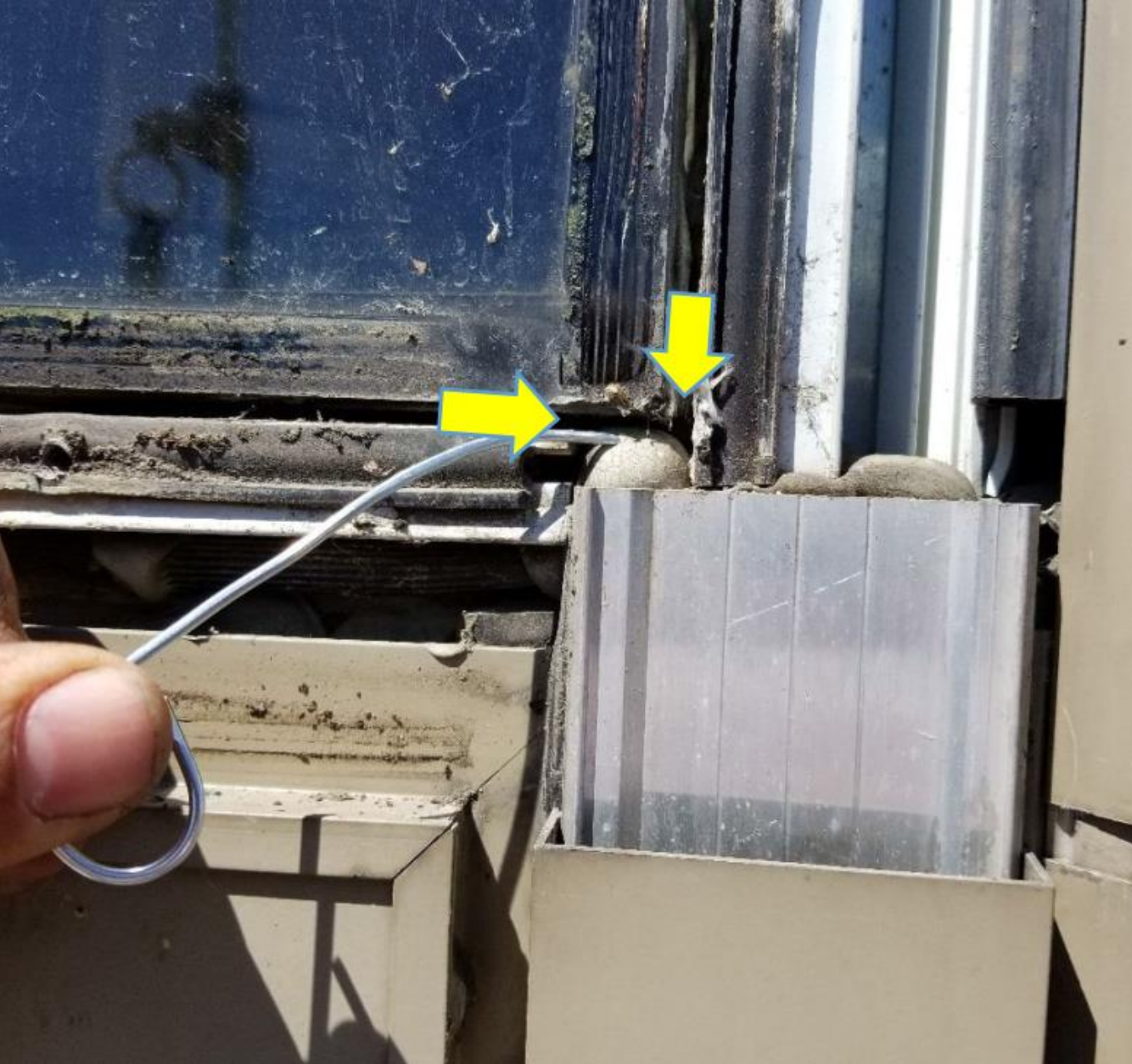




# Poor Exterior Rainwater Shedding



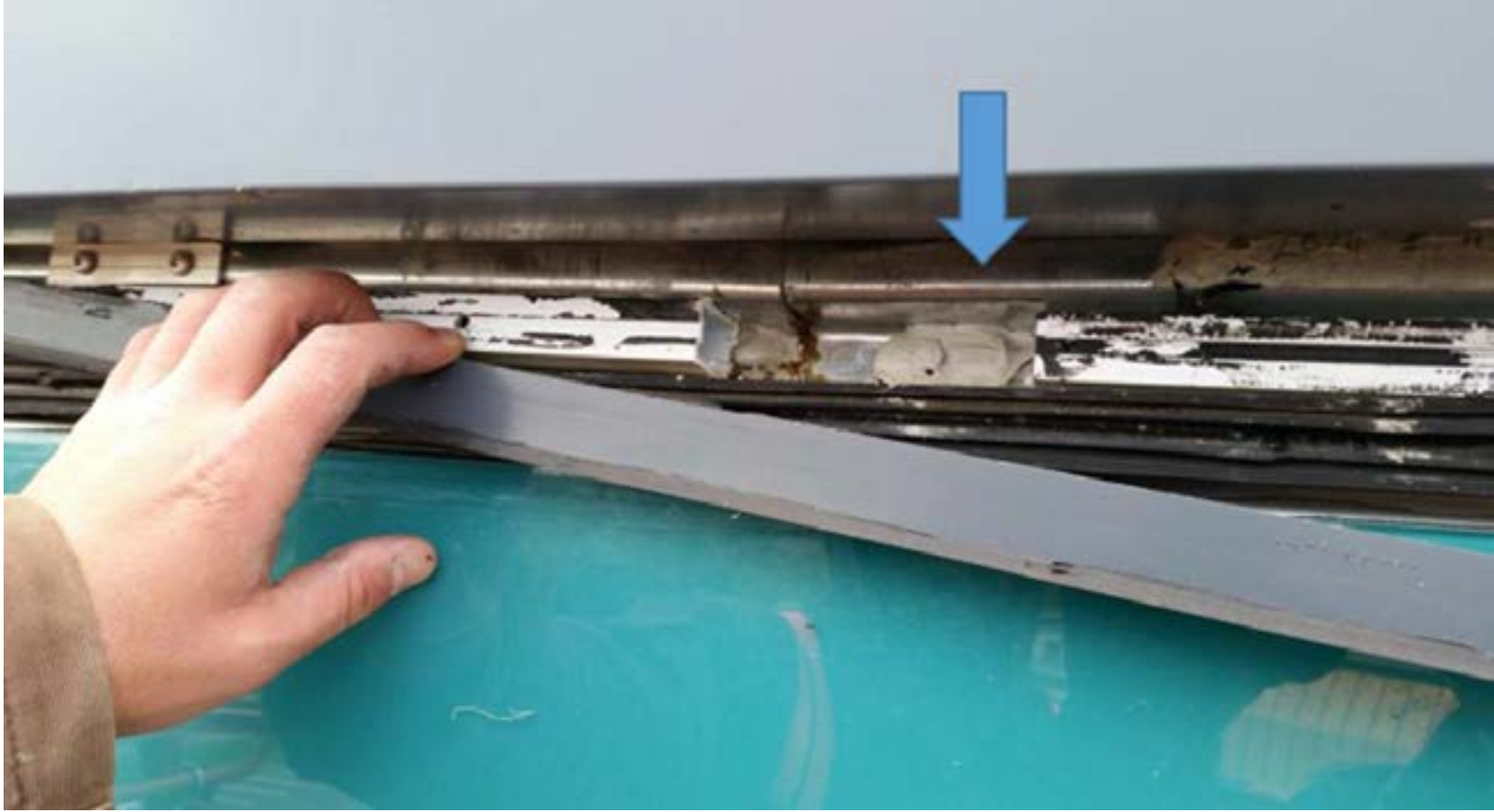




Obstructed drainage



Obstructed drainage







Discontinuous  
Inner Seals







# LESSONS

Provide Effective Water-Shedding Details

Provide Unobstructed Drainage Paths

Provide Continuous Inner Air/Water Seals





Installation Issues –  
Field Applied SSG







The preferred method























# Installation Issues – IGU Support



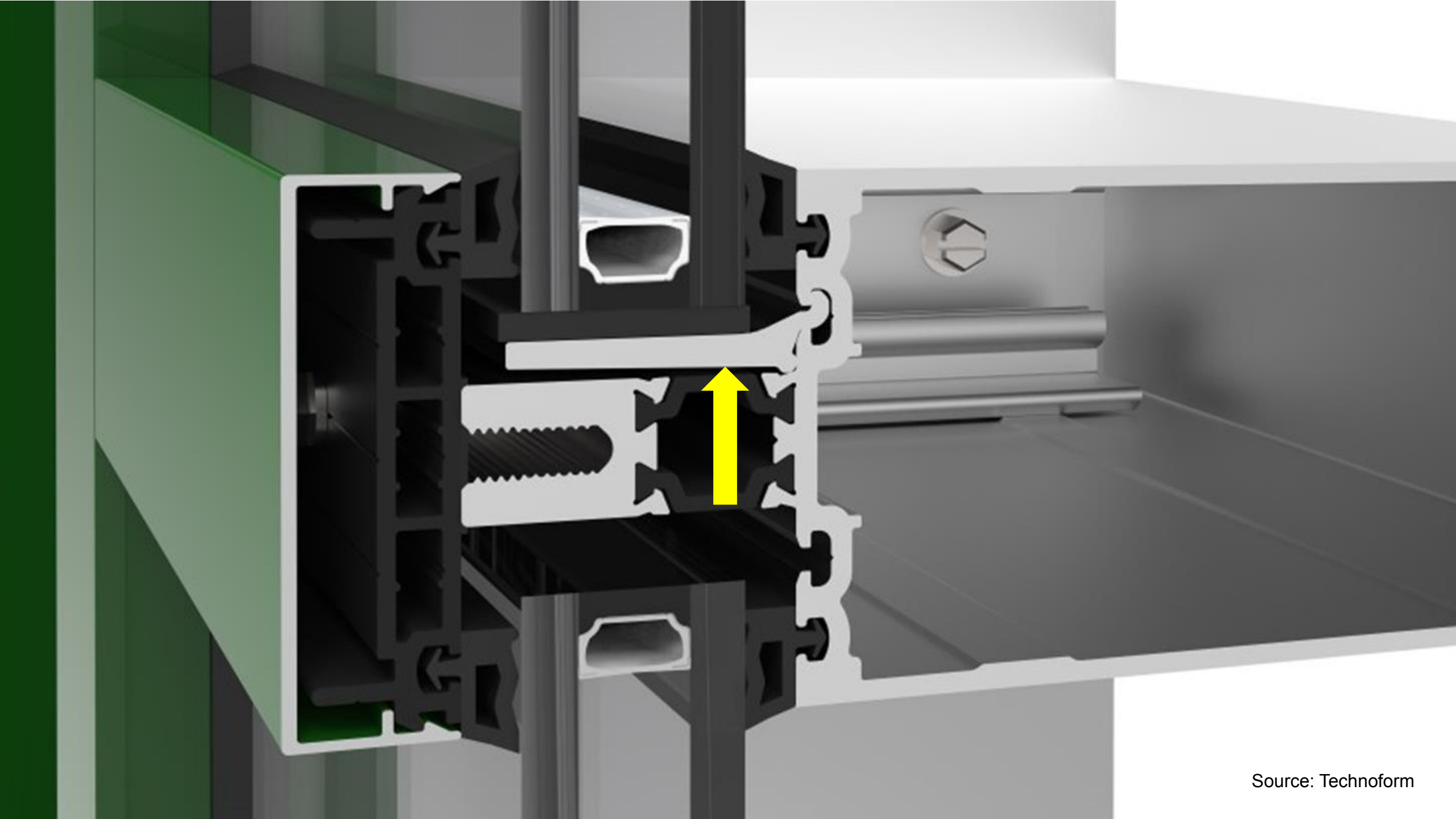












# LESSONS

Higher degree of field oversight and testing required with field applied SSG

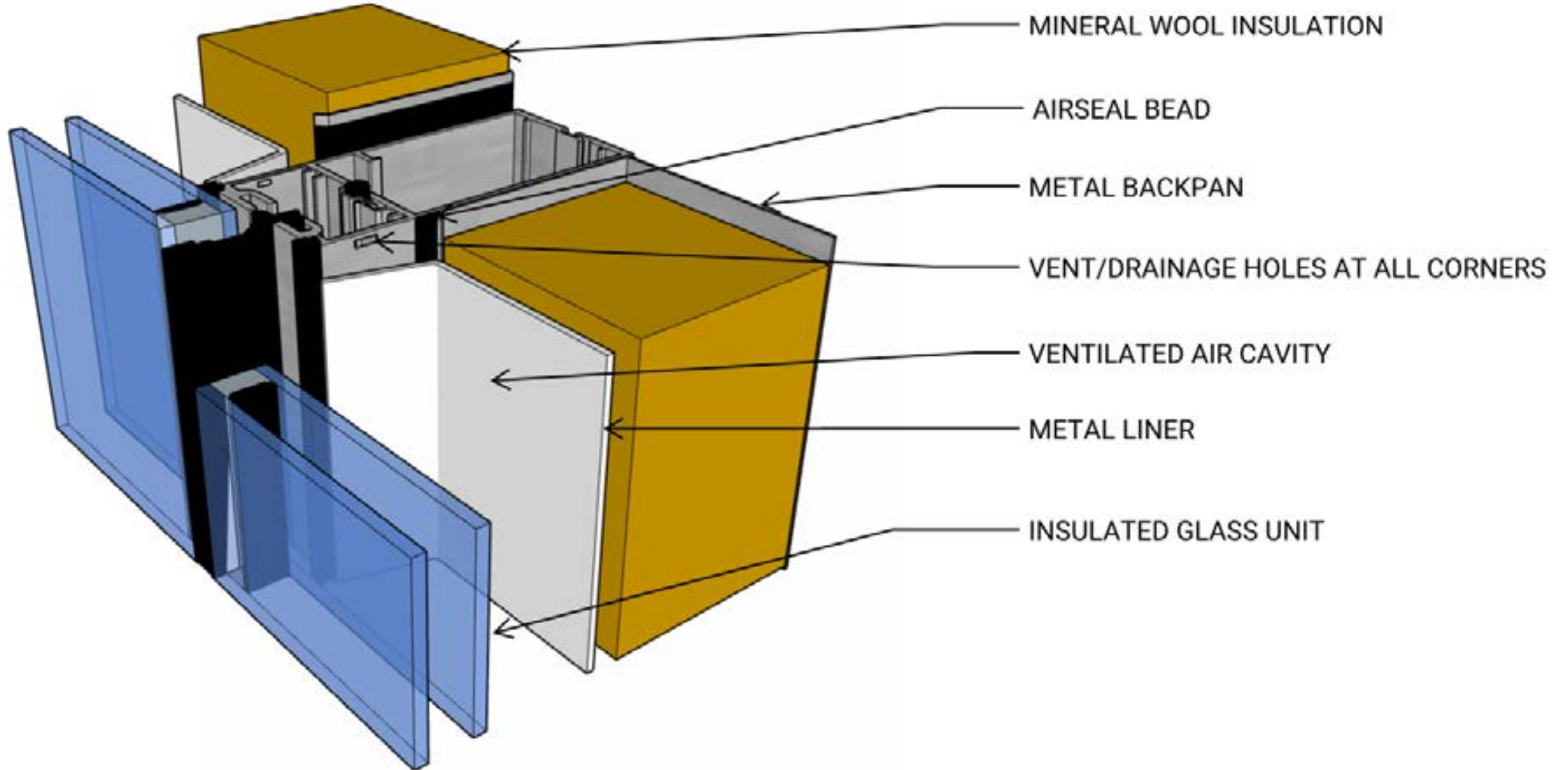
Understand component support strategies



# Shadow Boxing



# Shadow Box Assembly







It's a Different Story in a Cold Climate...







So where's the moisture coming from?





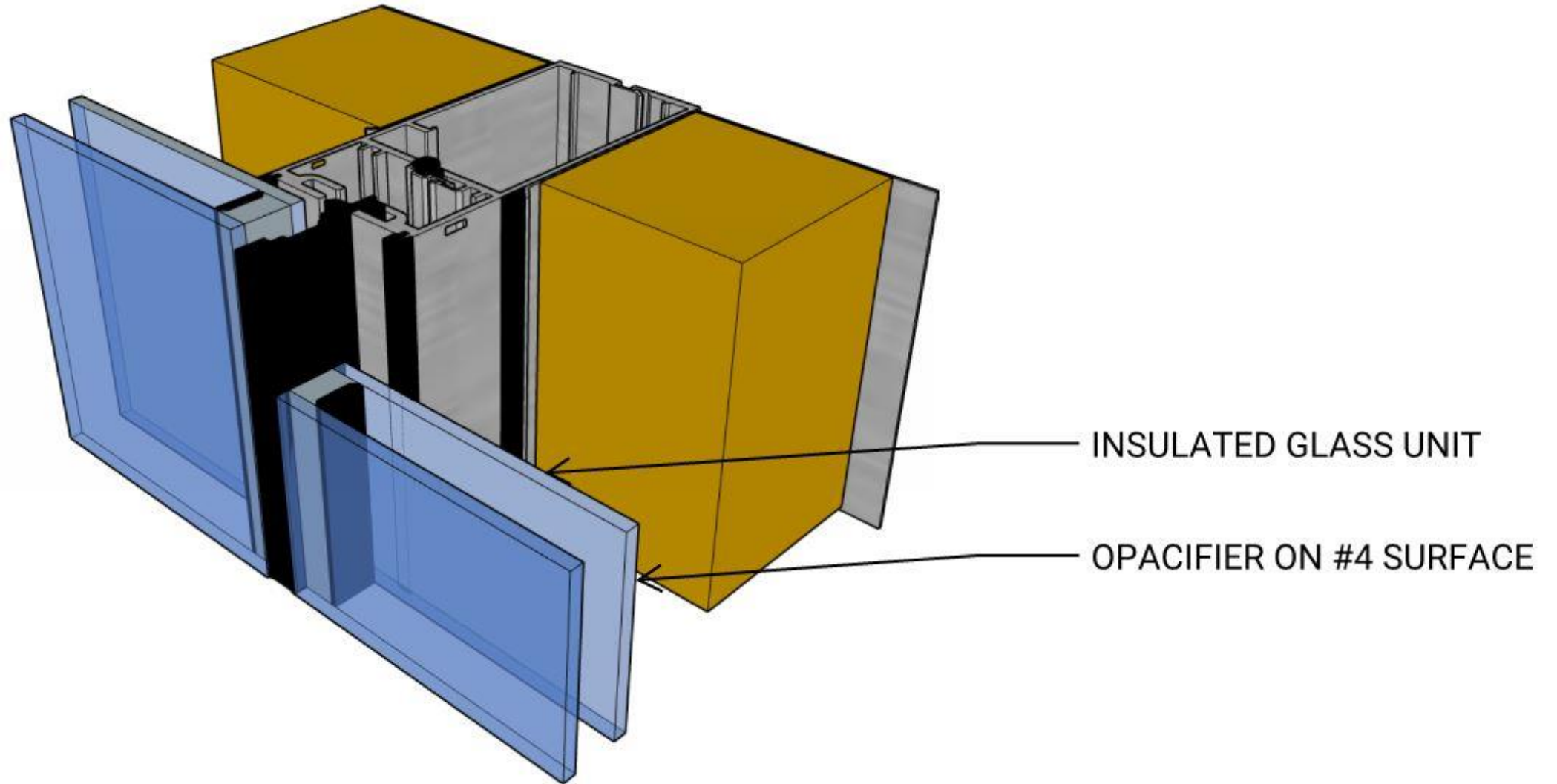








# 'Pseudo' Shadow Box



# LESSONS

Shadow Box Assemblies are Risky in Cold Climates

Consider 'Pseudo' Shadow Box Approach Option

Use a Lighter More Reflective Metal Liner or Apply Pattern to Glass

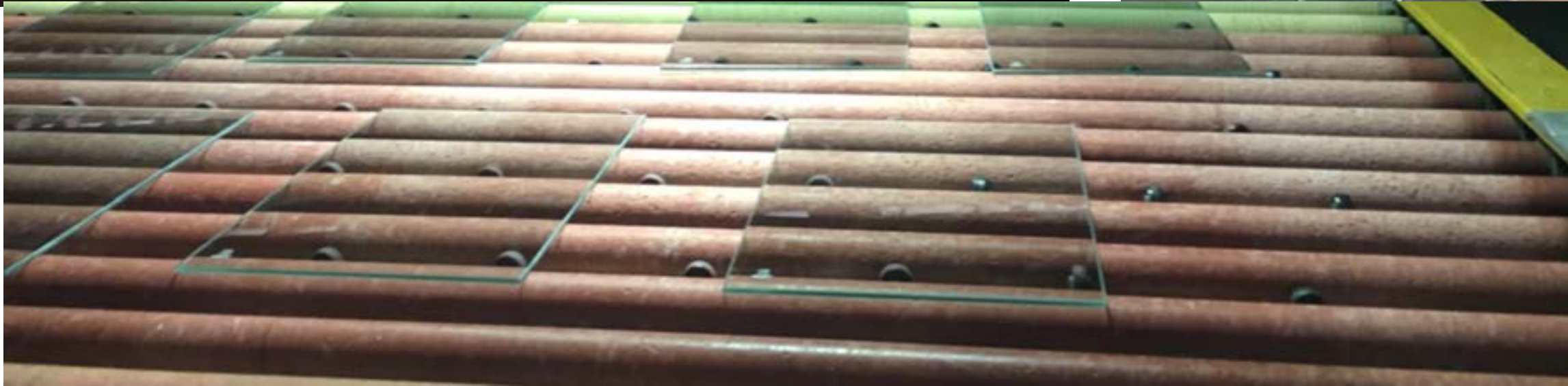
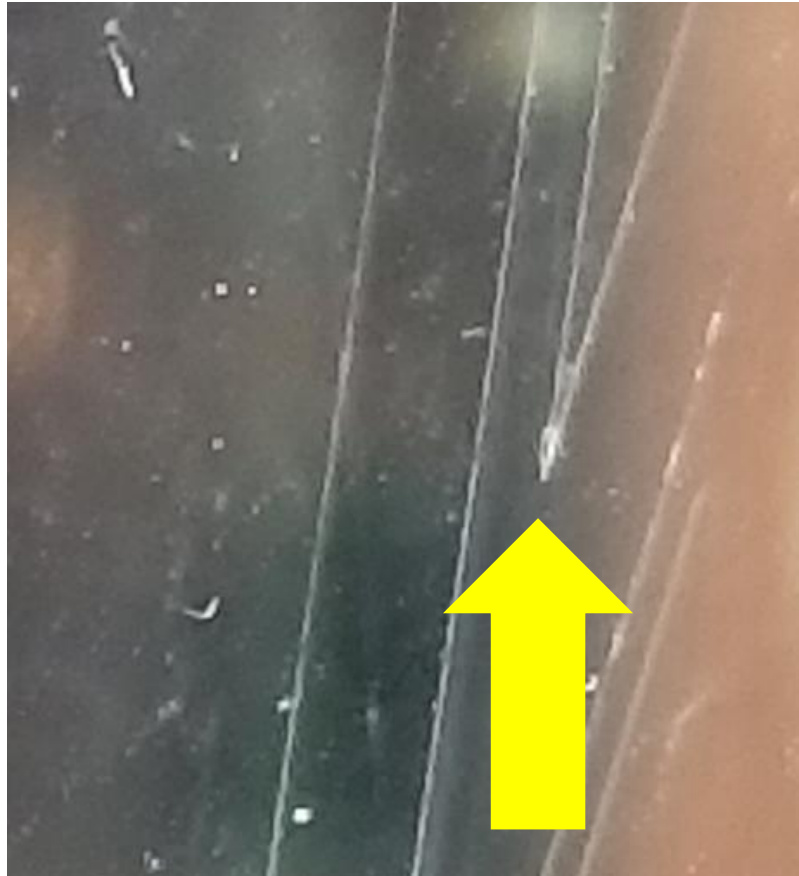
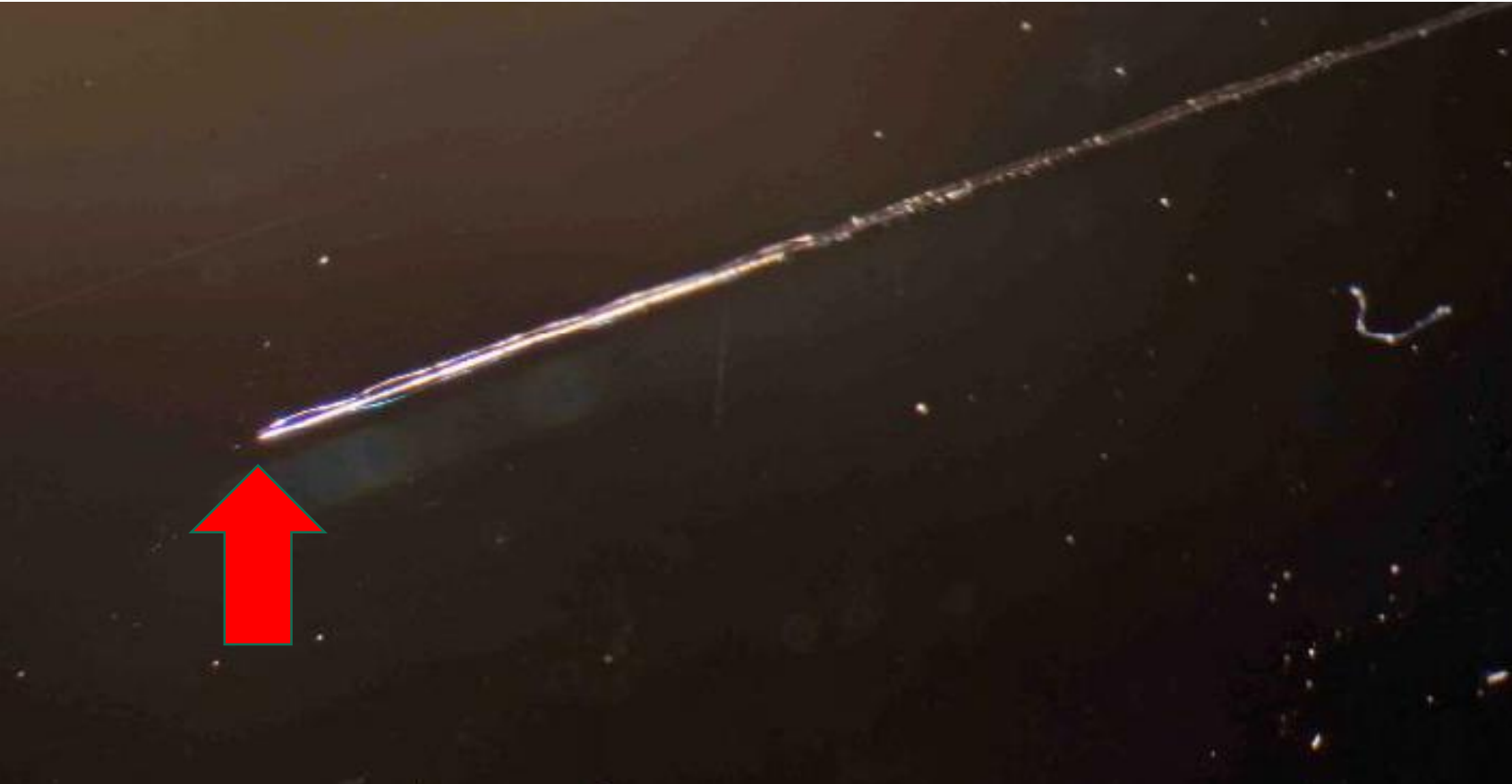
Manage Mechanical Systems Appropriately



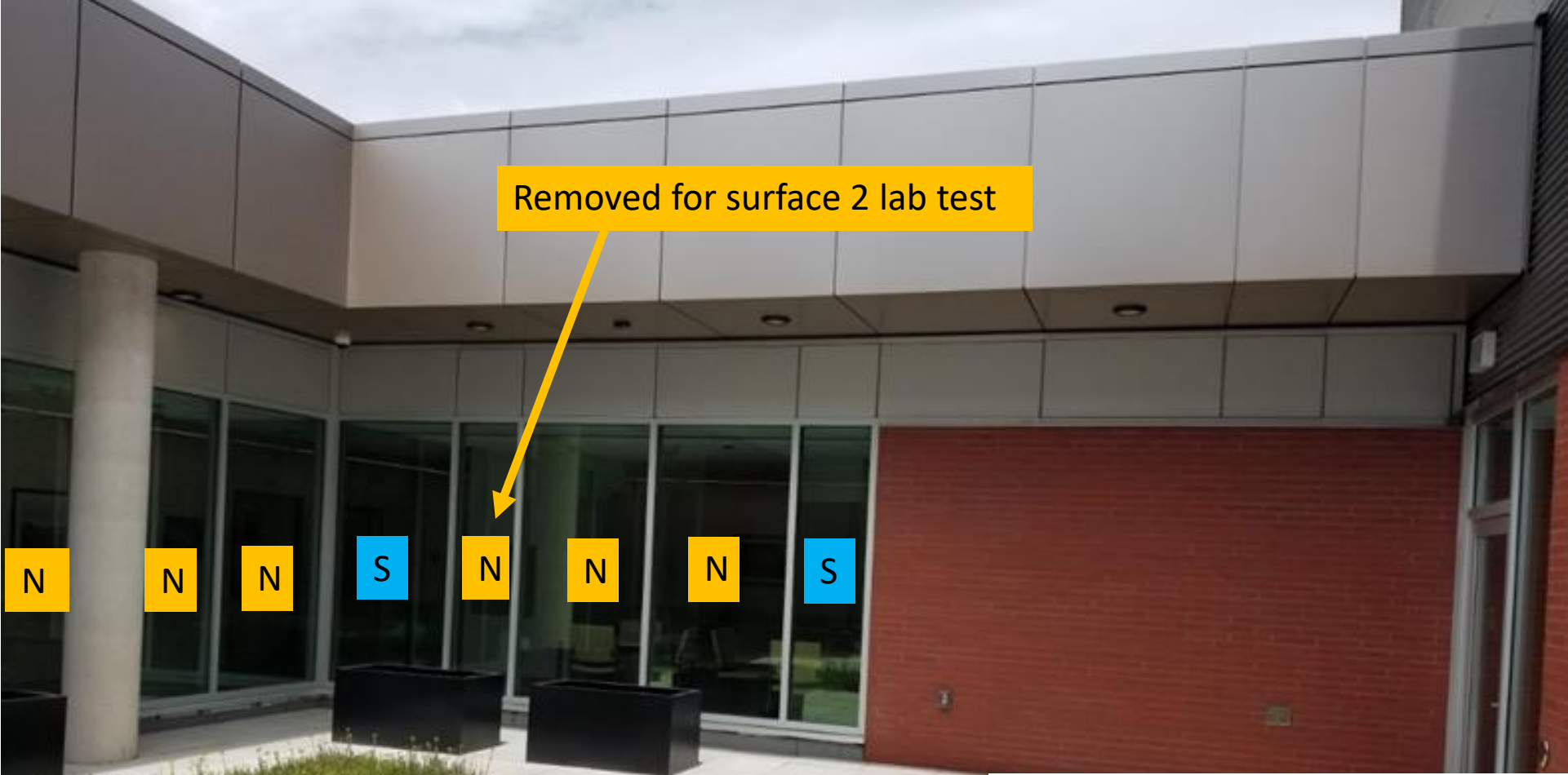


Glass issues -  
Scratches









Laminated/Tempered



Low E #3

Tempered



Roller Side #2



Laminated/Tempered



Low E #2

Tempered



Roller Side #1





## Glass Issues - Colour



- Low-e consistently on Surface #3 and same product
- Same PVB interlayer
- All outer tinted grey lites from same batch
- No correlation between tin side and air side of glass

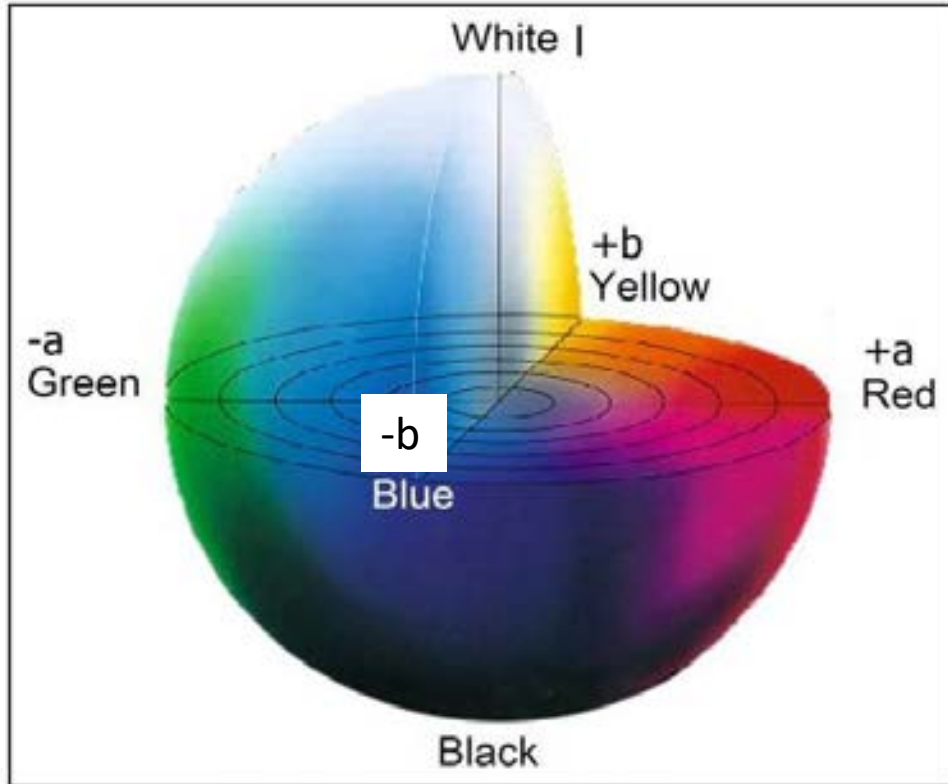


Figure No. 1 - CIELAB Colour Specification

$$\Delta E = \sqrt{(\Delta L^*)^2 + (\Delta a^*)^2 + (\Delta b^*)^2}$$

L\* represents:  
a\* represents:  
b\* represents

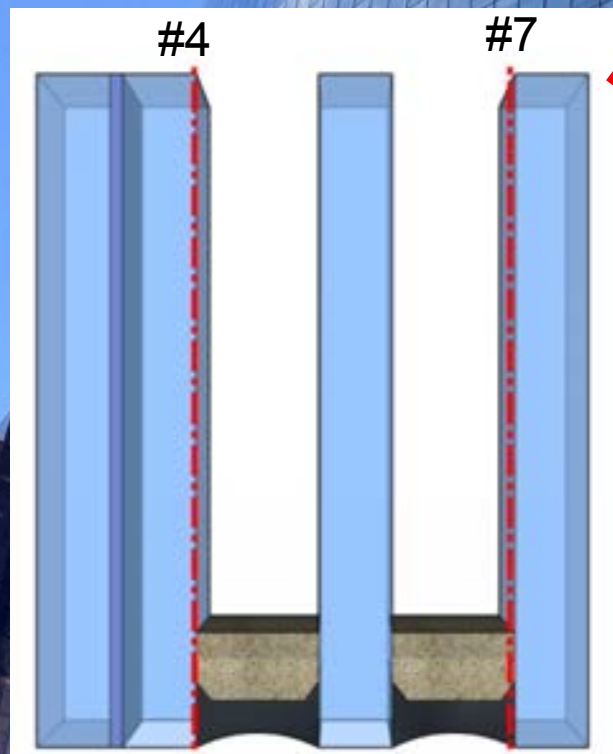
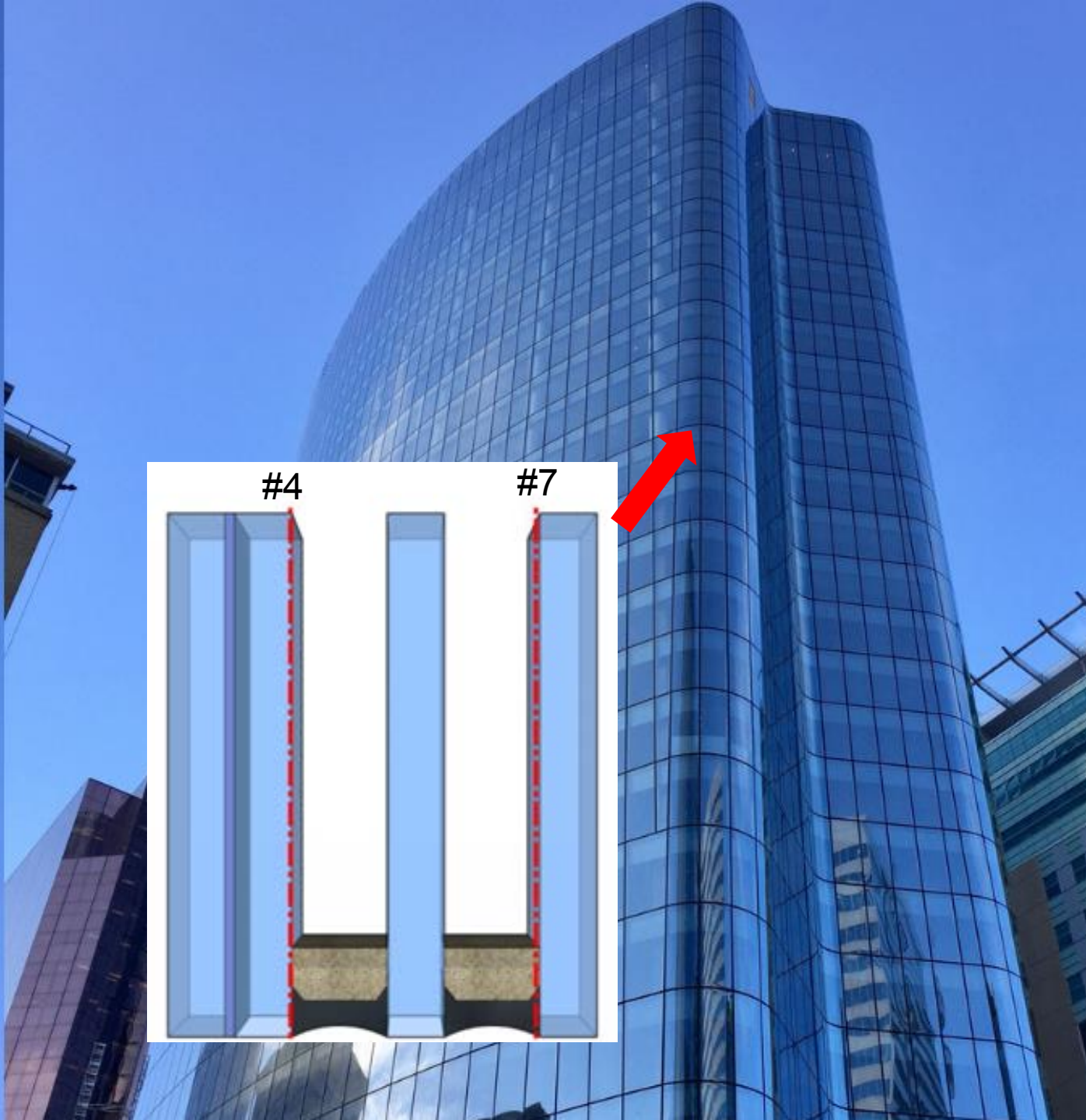
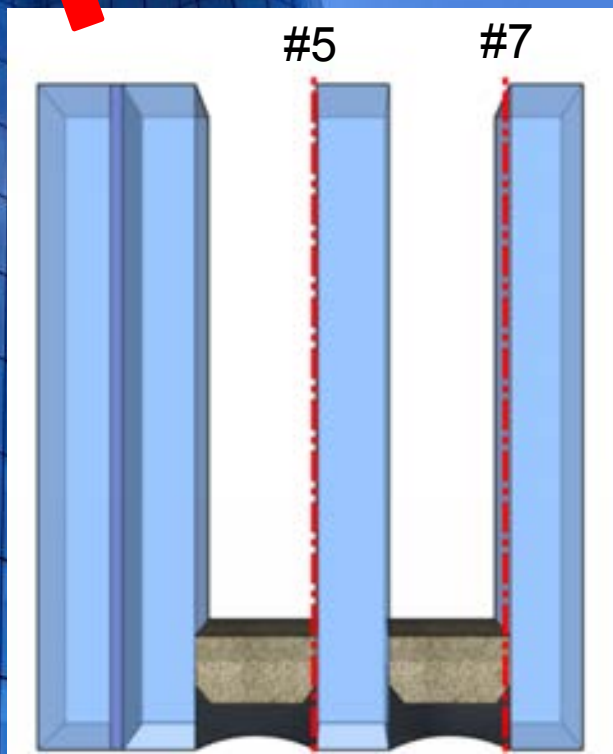
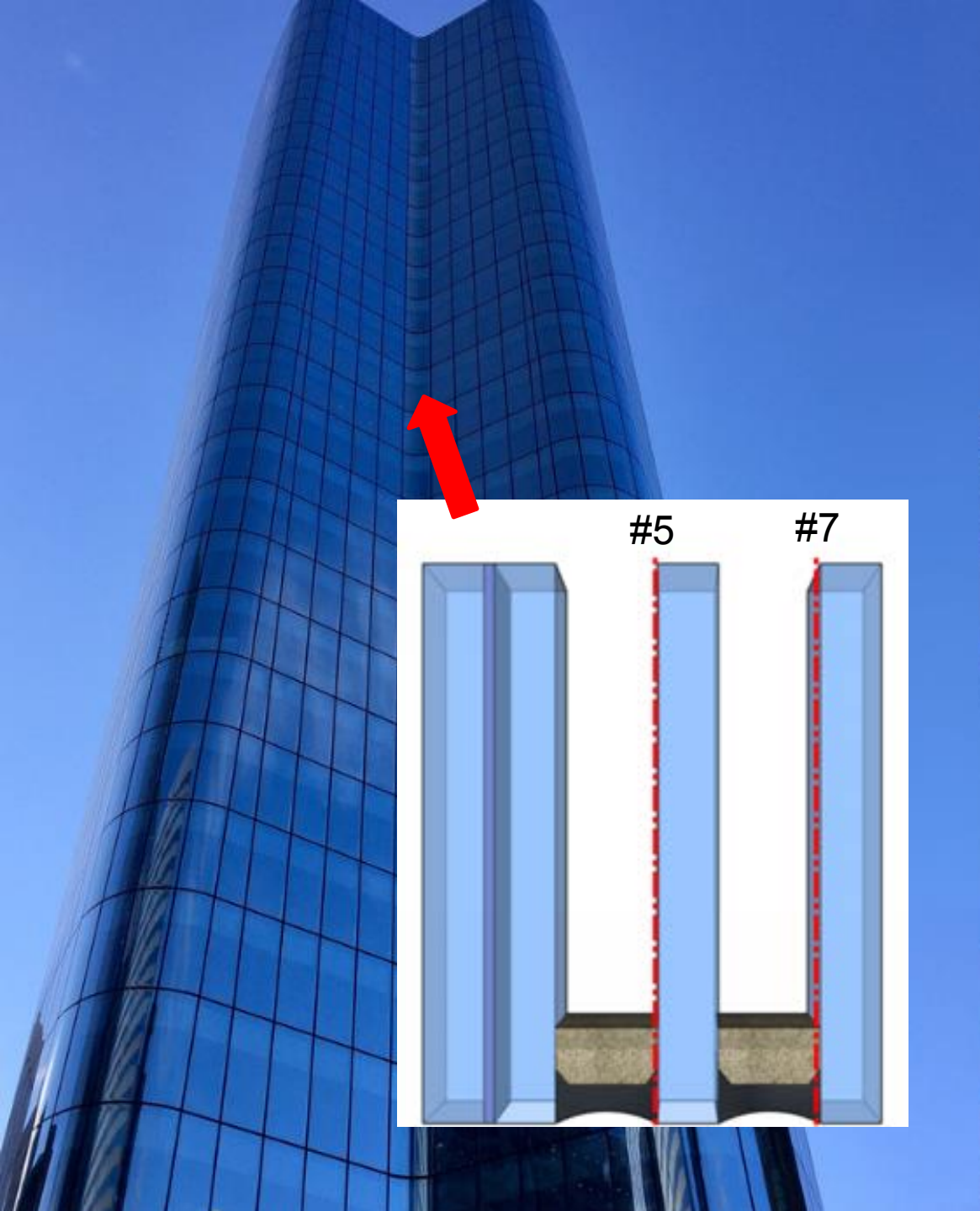
Lightness varying from 0 (Black) to 100 (White)  
Colour varying in "+" values (Red) to "-" values (Green)  
Colour varying in "+" values (Yellow) to "-" values (Blue)

- 0 < ΔE < 1
- 1 < ΔE < 2
- 2 < ΔE < 3.5
- 3.5 < ΔE < 5
- 5 < ΔE

observer does not notice  
only experienced observer can notice the difference  
unexperienced observer also notices the difference  
clear difference in colour is noticed  
observer notices two different colours

Spectrophotometer - ASTM C1736 / ASTM D2244, Delta E < 4.5  
Delta E measured at 2.6 (inconsistency in low-e coating)





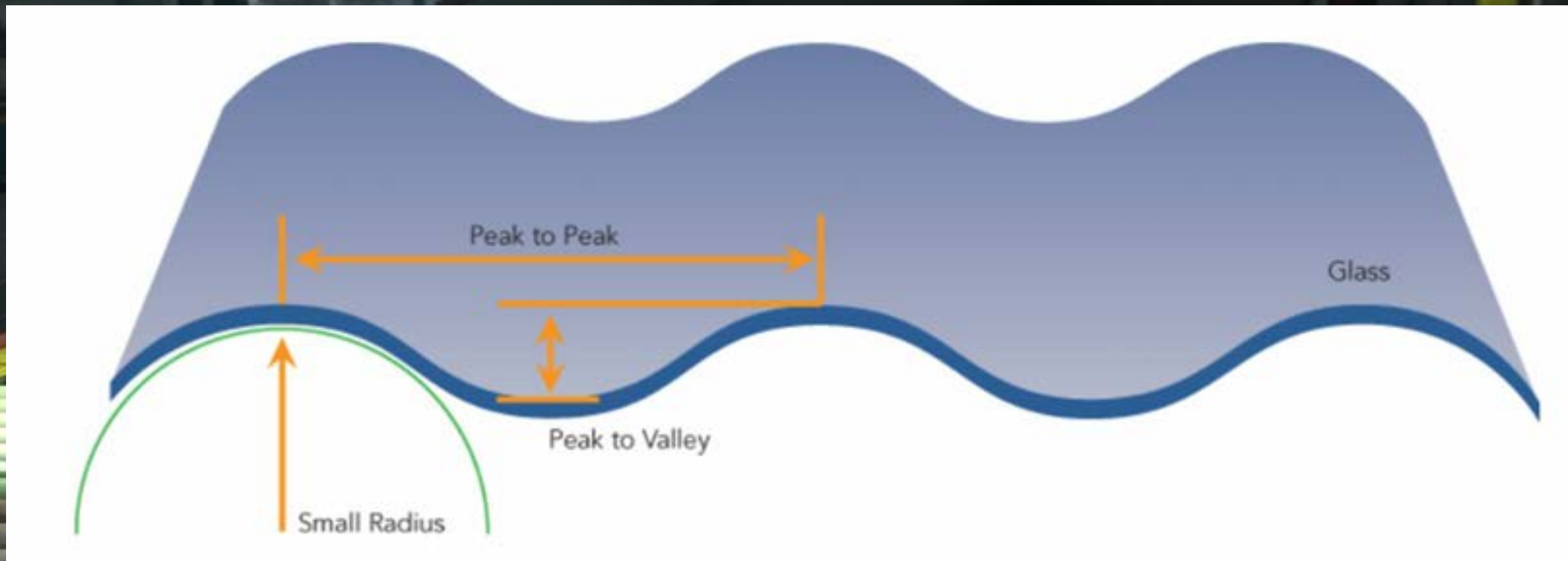




# Distortion









Horizontal Roller Wave Distortion



Vertical Roller Wave Distortion









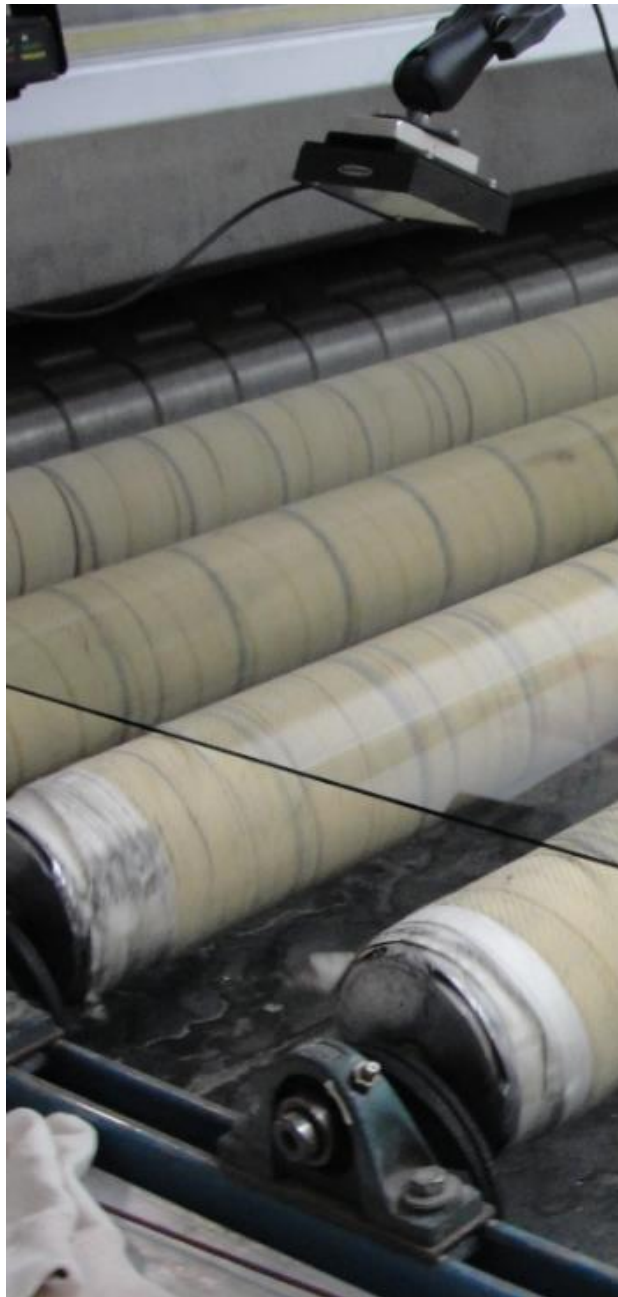














# LESSONS

Be Careful with Cleaning Heat Treated Glass

Specify Colour and Roller Wave Tolerances

Full Size Mock-Ups

Exercise Care with Novel Coating Combinations

面积 (m <sup>2</sup> ) Square Meters	209.352	净重 (KG) Net Weight	3
质量等级 Quality Grade	一等品	质检工号 Q.C	
保护层 Protection	1	装箱类别 Package Type	3
生产日期 Production Date	2018年01月27日 时 分		
基片备注 Substrate Note	膜系编码中前两位数字代表基片颜色 代码为：00-超白、01-白玻、02-绿玻 灰、23-欧洲灰		

保质期：至生产(包装)之日起6个月

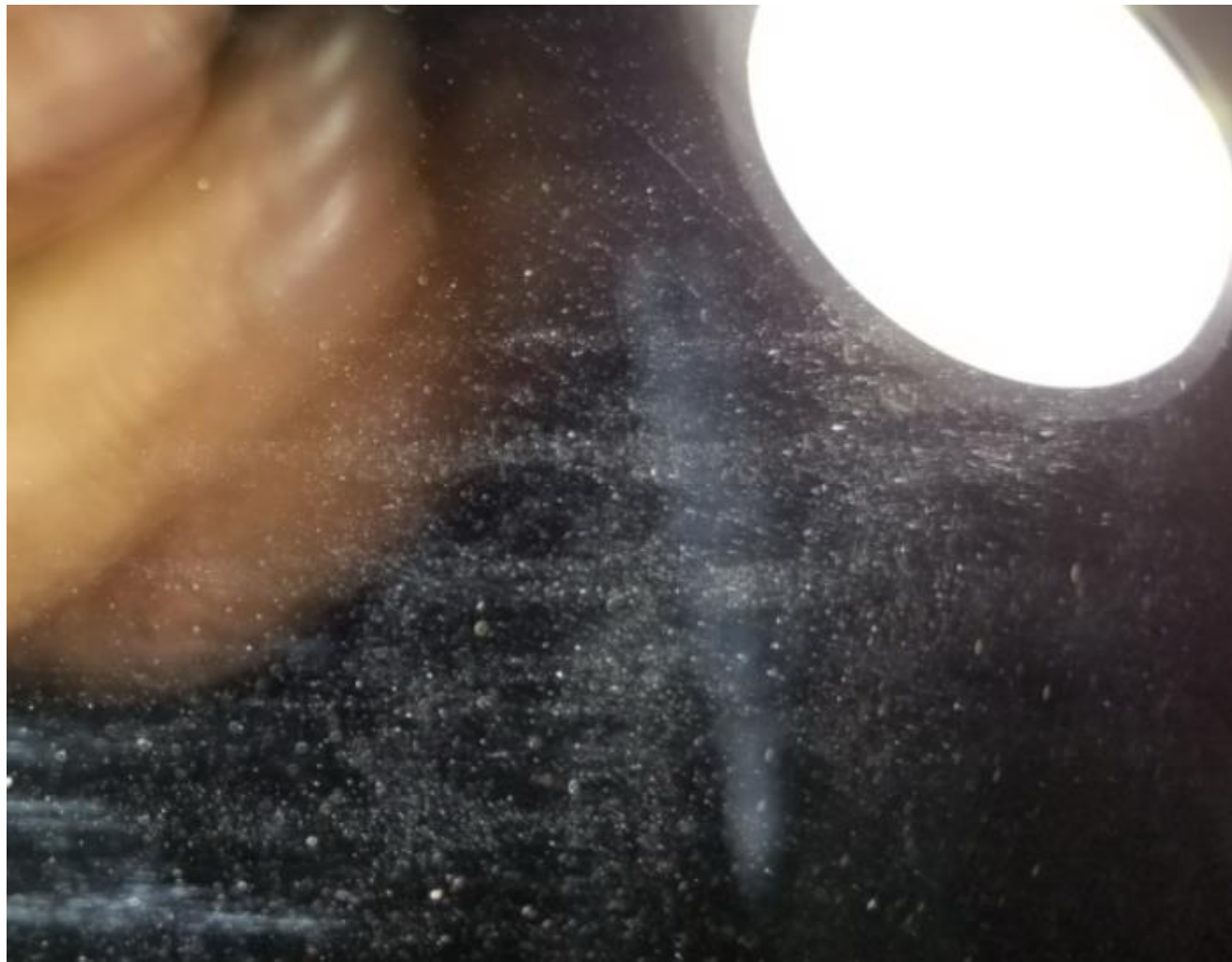
检验结

镀膜玻璃使用说明书  
尊敬的客户，感谢您选用我司可钢化玻璃





Hands Off!!







# LESSONS

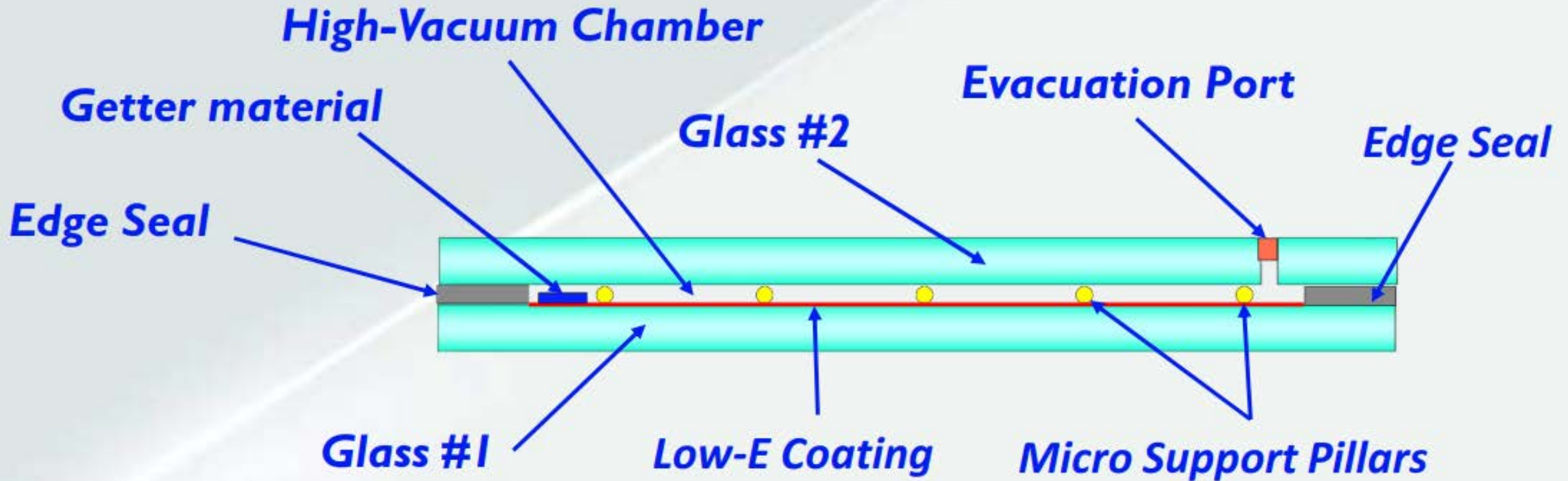
“You get what you inspect, not what you expect”

- Bryan Hubbs

If you're buying foreign product, Live in the Plant!



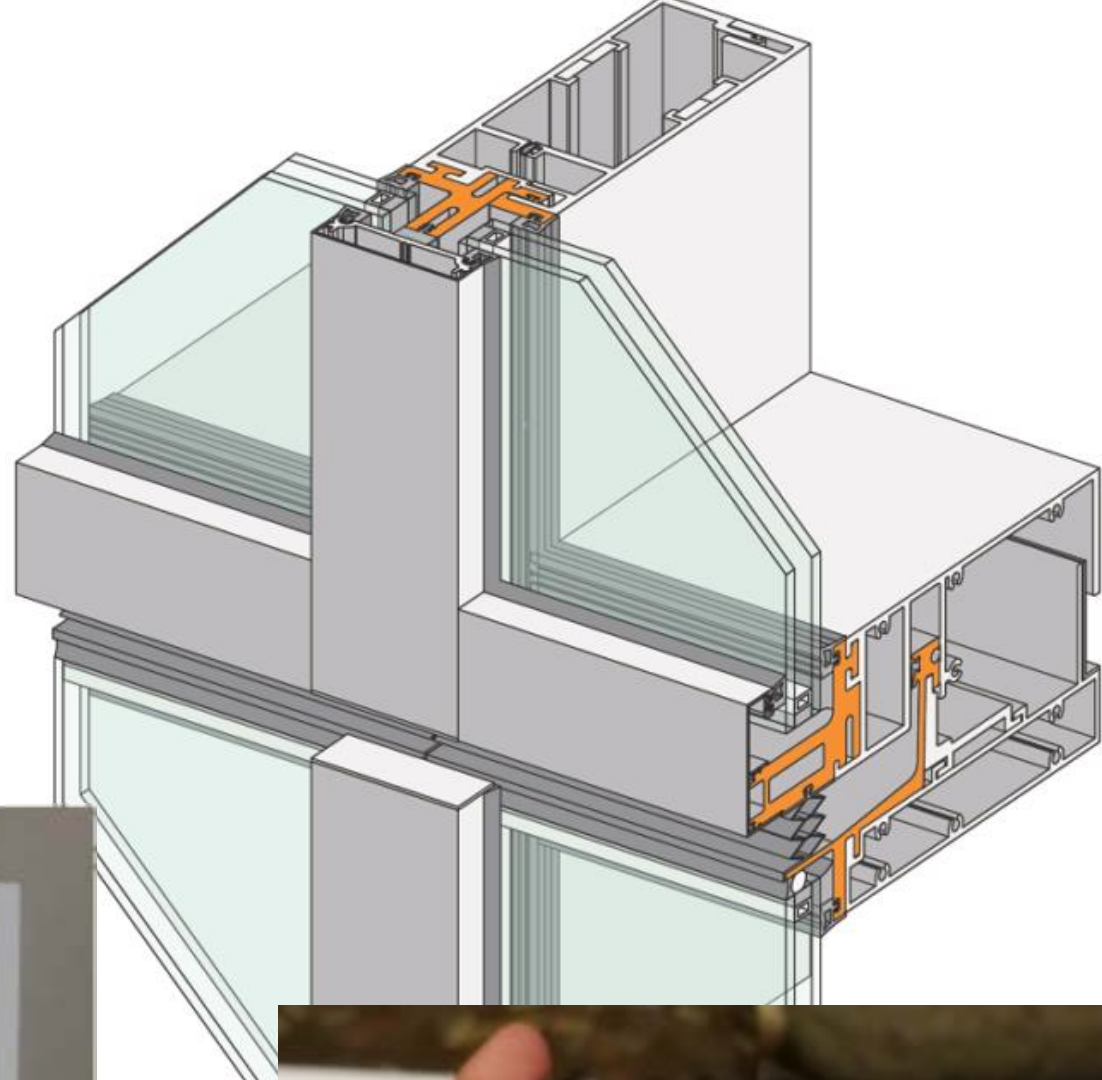
# Industry Trends



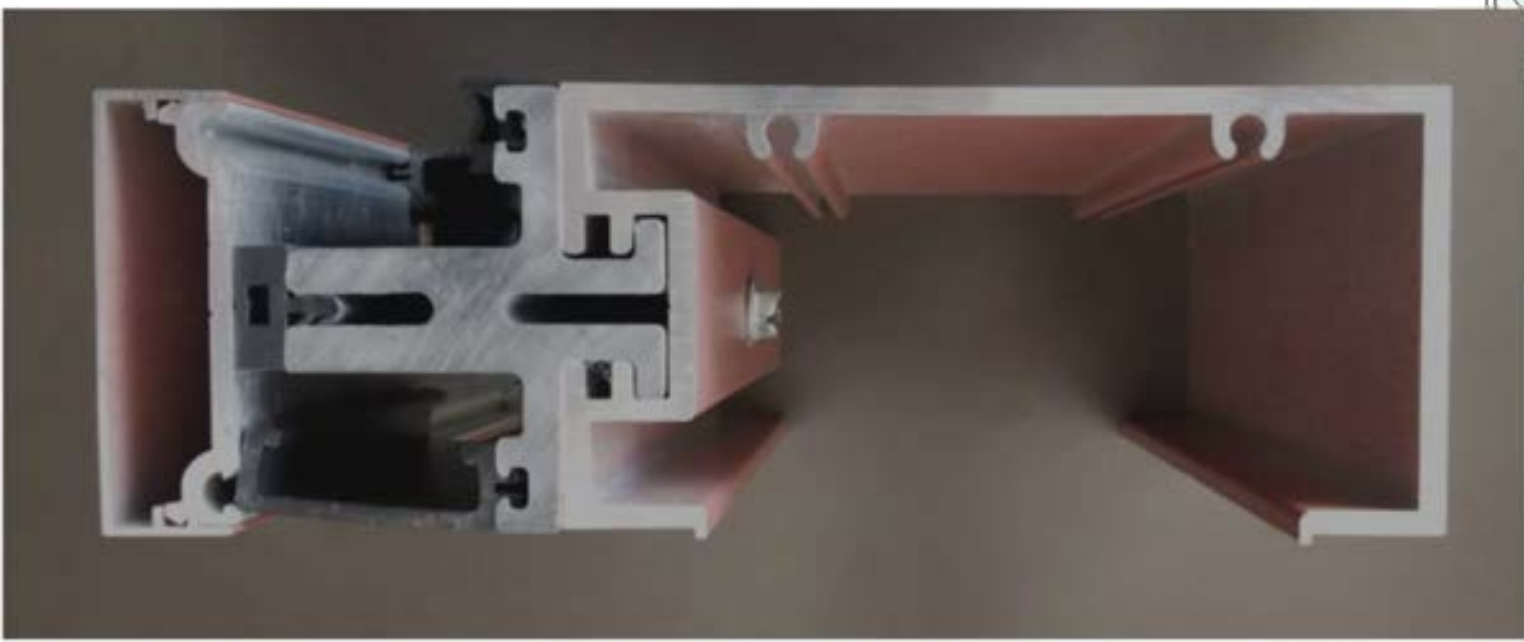
Makeup	Thickness	U-Value (R)	SHGC	VLT
Standalone VIG	5/16" / 8.3mm	0.07 (15.4)*	0.37	70%
Hybrid, DS	1 1/8" / 28.5mm	0.06 (18.0)*	0.27	56%
Hybrid, TS	1 1/8" / 28.5mm	0.05 (18.3)	0.22	50%



Source: GlasCurtain Inc.



Source: GlassCan





# HIGHER PERFORMANCE?



R2-3



R3-4



R19 to ??



Courtesy of Island  
Exterior Fabricators



cold formed steel  
frame and/or  
aluminum extrusion

sheathing

AVB material

mineral wool insulation

air space

punched windows  
within a variety of  
cladding types

install and connect like  
curtain wall

size limited to  
transport







quality of fabrication

schedule

gasketed system eliminates exterior work/  
maintenance

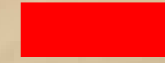
higher thermal performance

single source

less waste

less labour

safety



lacking mature supply chain

cost

some limitations in building geometry

hybrid wall system

commitment at design concept stage



# Questions?

Want to know more?

[rquattrociocchi@ellisdon.com](mailto:rquattrociocchi@ellisdon.com)  
[dderose@synergypartners.ca](mailto:dderose@synergypartners.ca)

 **EllisDon**

**SYNERGY**  
PARTNERS