SHAPING A BETTER TOMORROW
NOVEMBER 11-12, 2024

SGH

Windows of Opportunity: Enhancing Building Owners' Strategies for Window Inspection and Maintenance

12 November 2024

2024 Midwest Healthcare Engineering
CONFERENCE & TRADE SHOW

SPEAKERS

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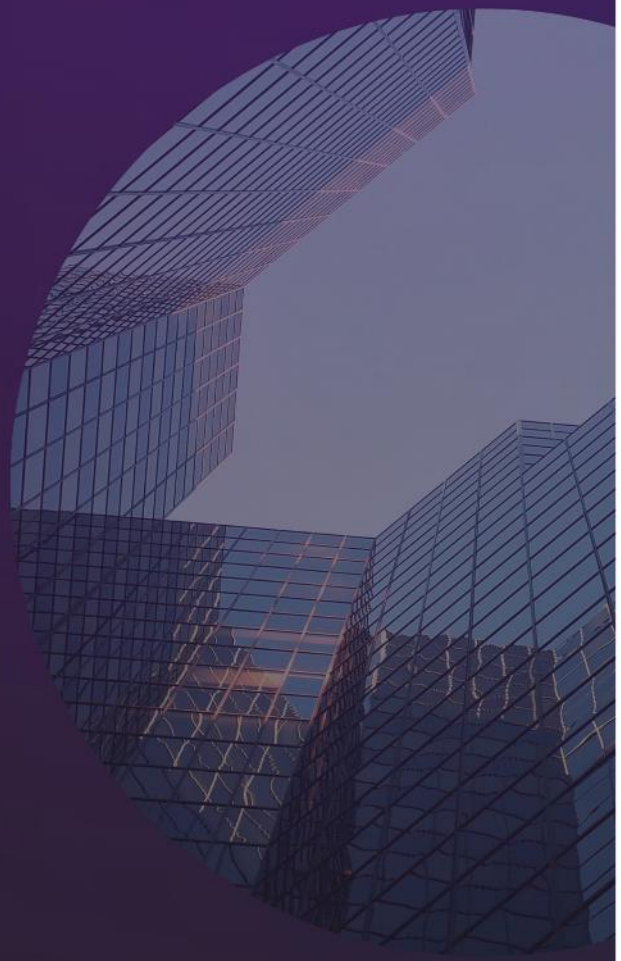
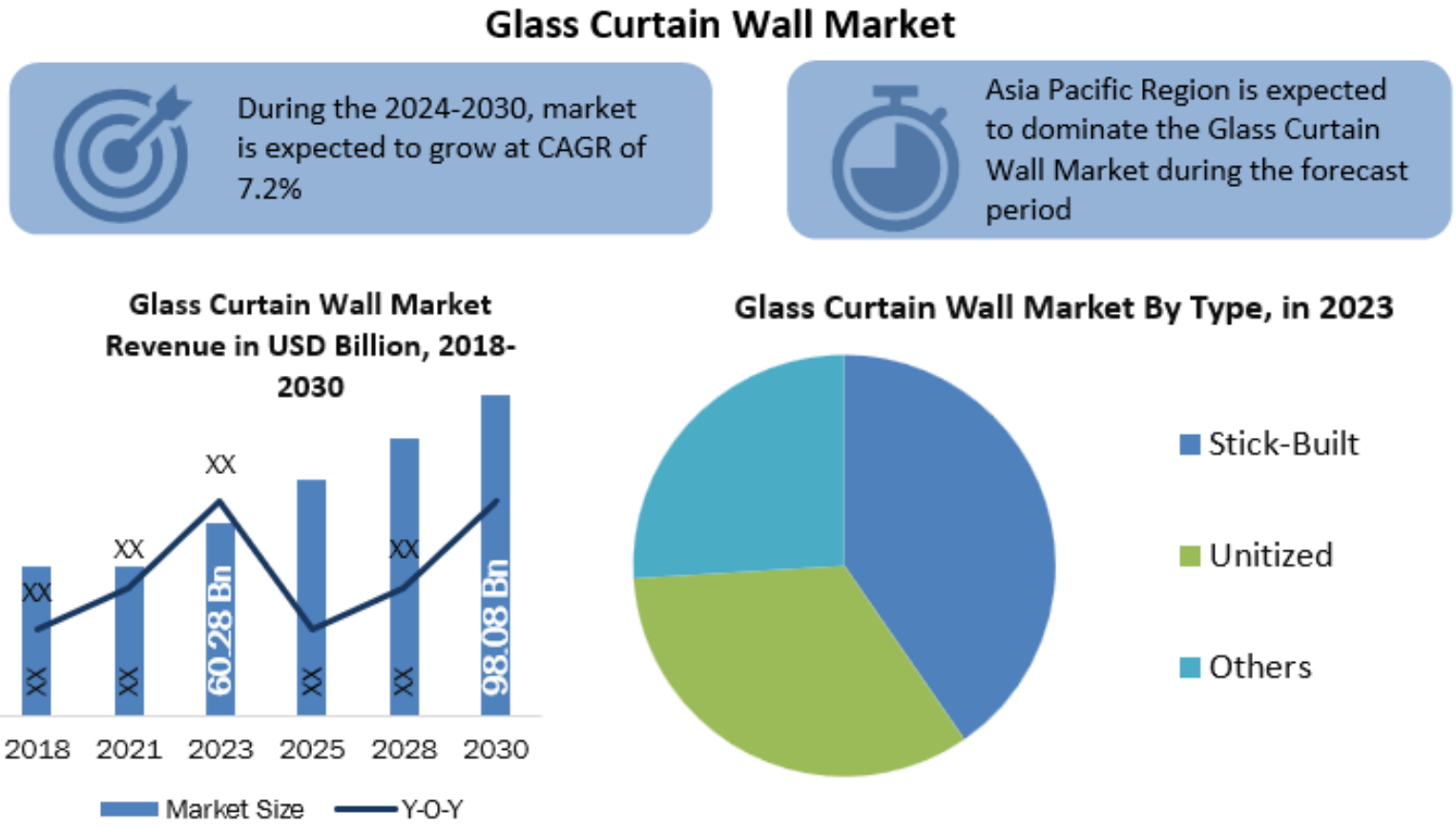


2024 Midwest Healthcare Engineering
CONFERENCE & TRADE SHOW

AGENDA

- Introduction to Glazed Wall Systems
- Common Observations for Insulated Glass Units (IGUs)
- Takeaways

Glazed Wall Systems



(Graphic: Stellar Market Research)

North American Glass Curtain Wall Market estimated **> $8.4 Billion in 2023**

(Stellar Market Research, 2023)

Glass Production

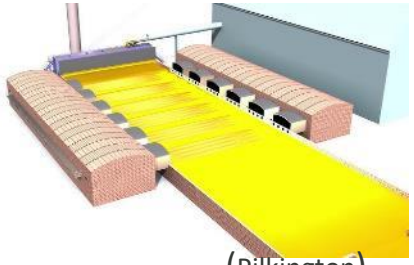
(ASC Process Systems)

Raw Material

Glass Processing

Construction

Float Glass



(Pilkington)

IGU Fabrication

Operation

Glass Production (ASC Process Systems)

Raw Material

Glass Processing

Construction

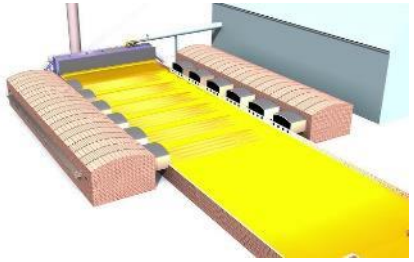
☑ QA/QC

☑ QA/QC

☑ QA/QC

☐ MAINTENANCE

Float Glass

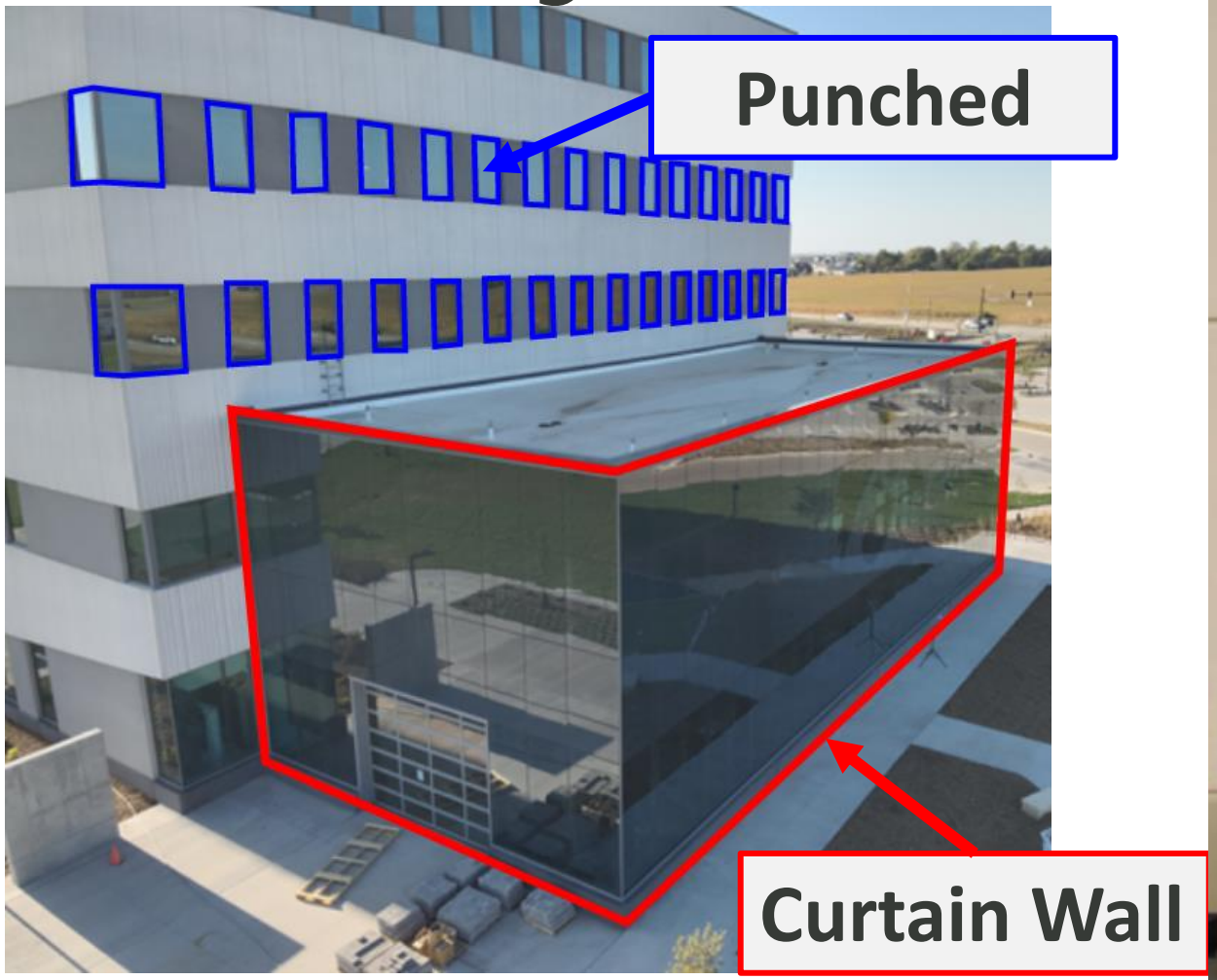


(Pilkington)

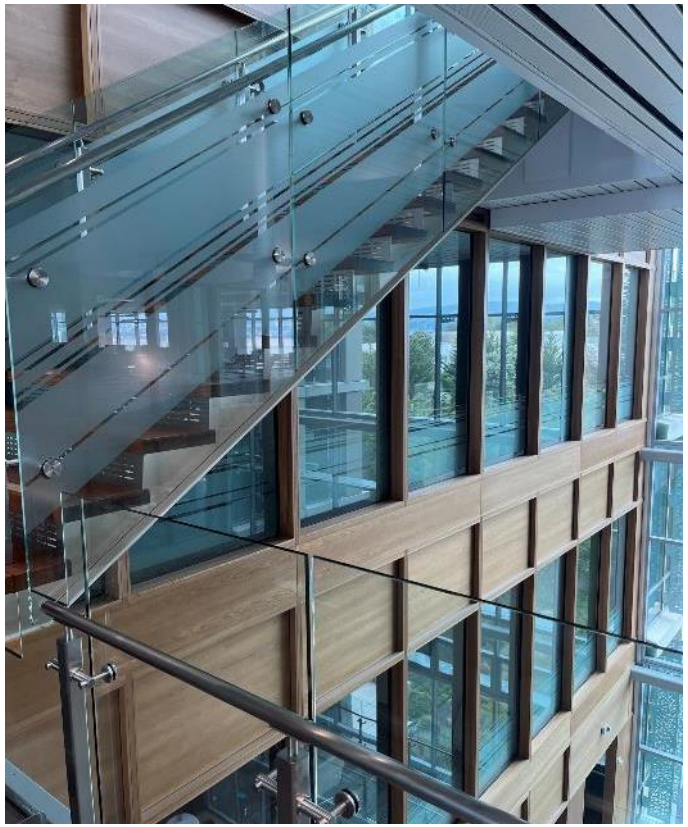
IGU Fabrication

Operation

Glazed Wall Systems

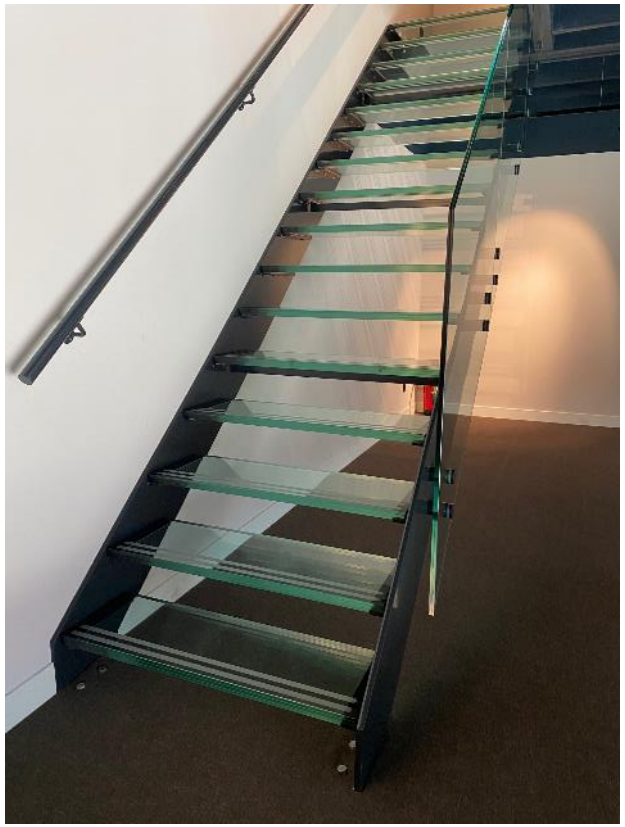


Glass In Other Applications



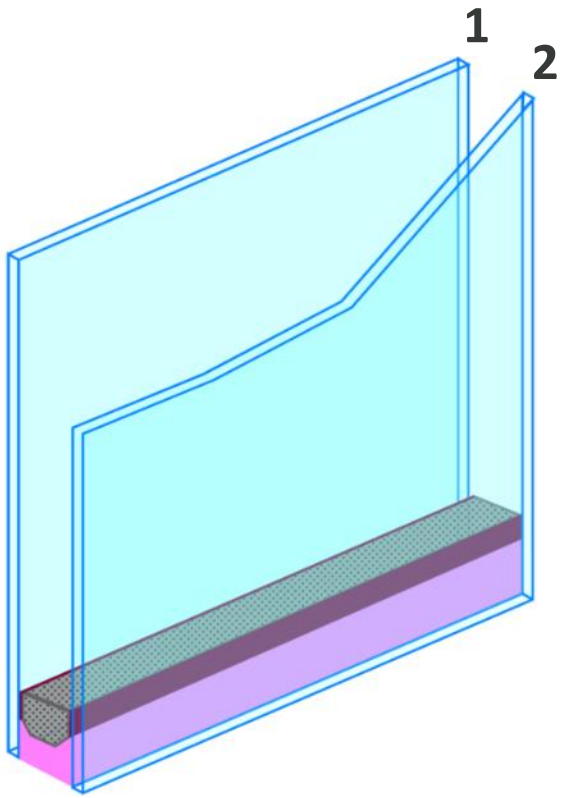
Guardrails

Canopies

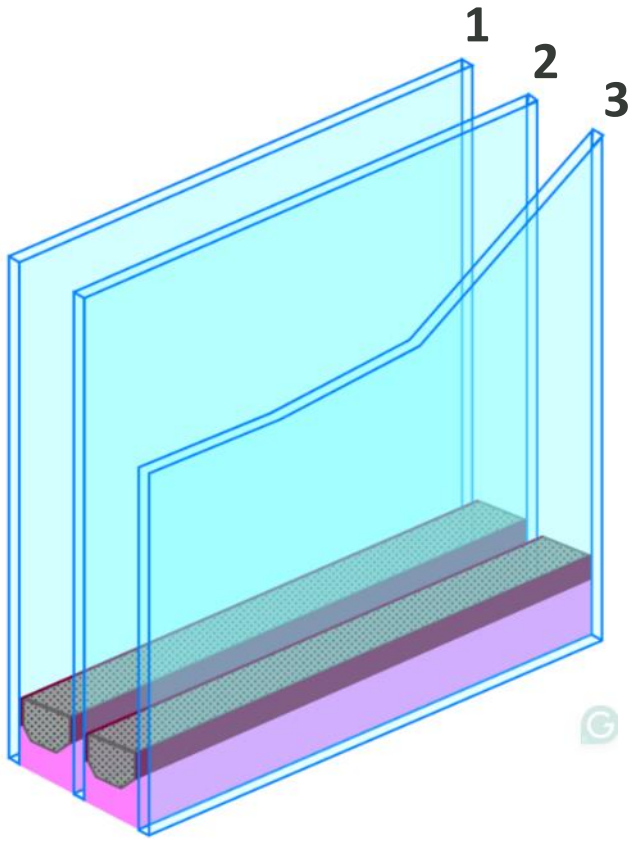


Stairs

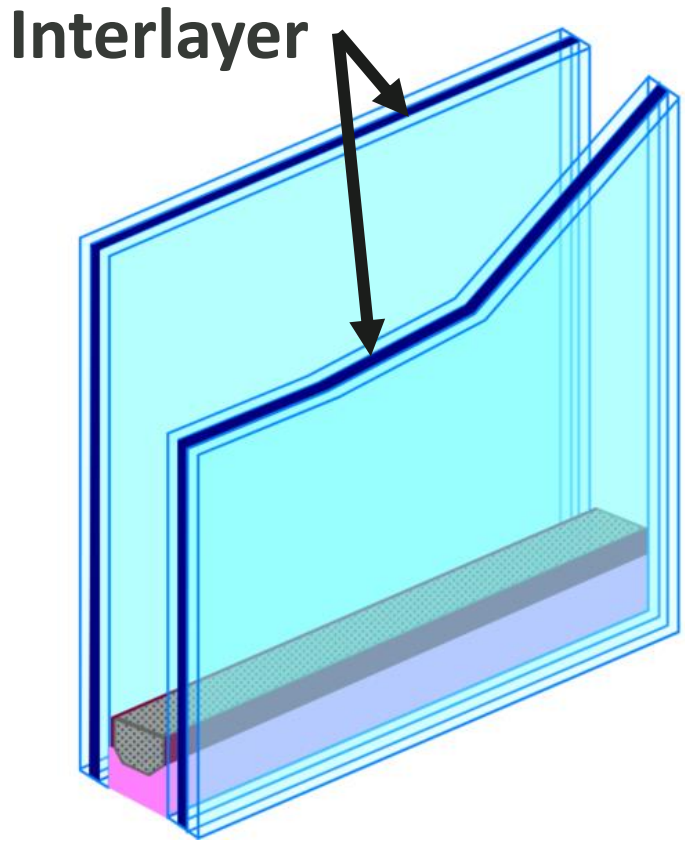
Insulated Glass Units



Double Glazed IGU



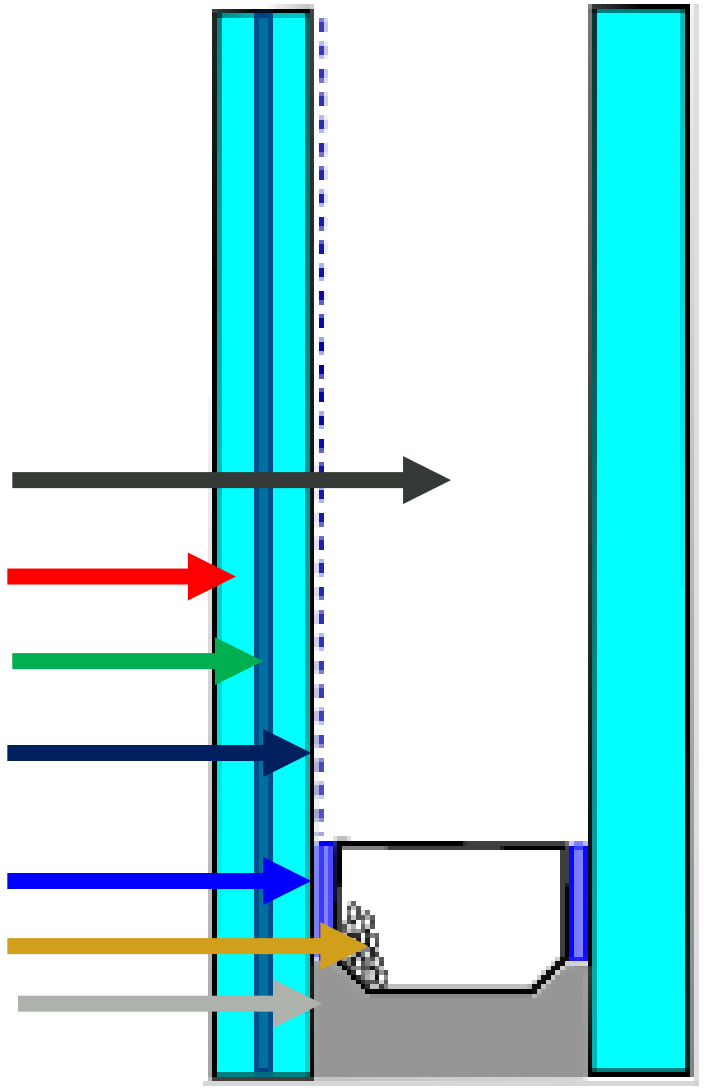
Triple Glazed IGU



Laminated IGU

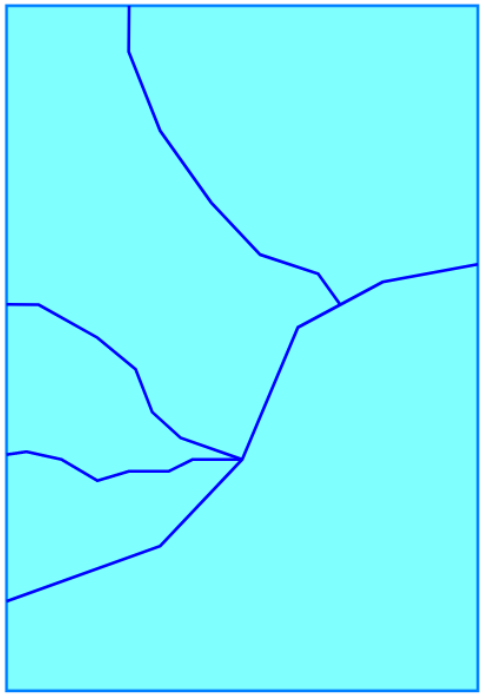
IGU Makeup

- Glass
- Spacer bar with Desiccant
- Primary seal
- Secondary seal
- Coatings
- Interlayer
- Air space

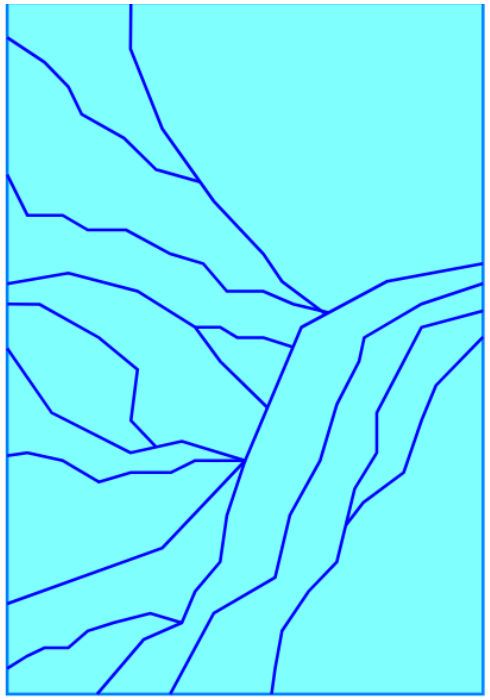


Glazed Wall Systems

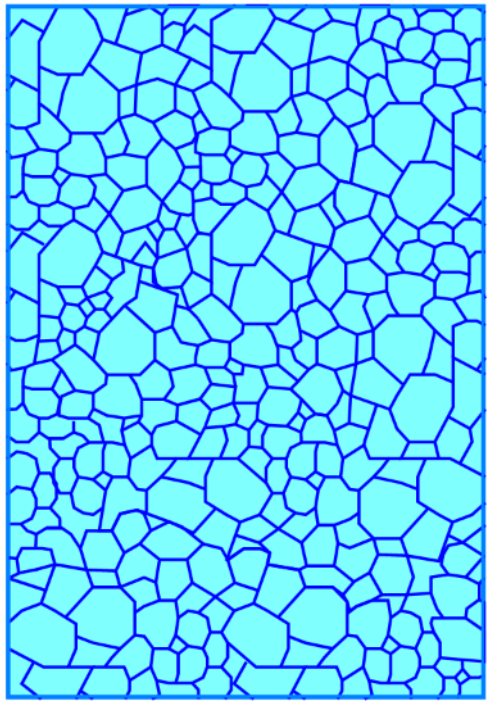
Annealed
Less than 3,500 psi



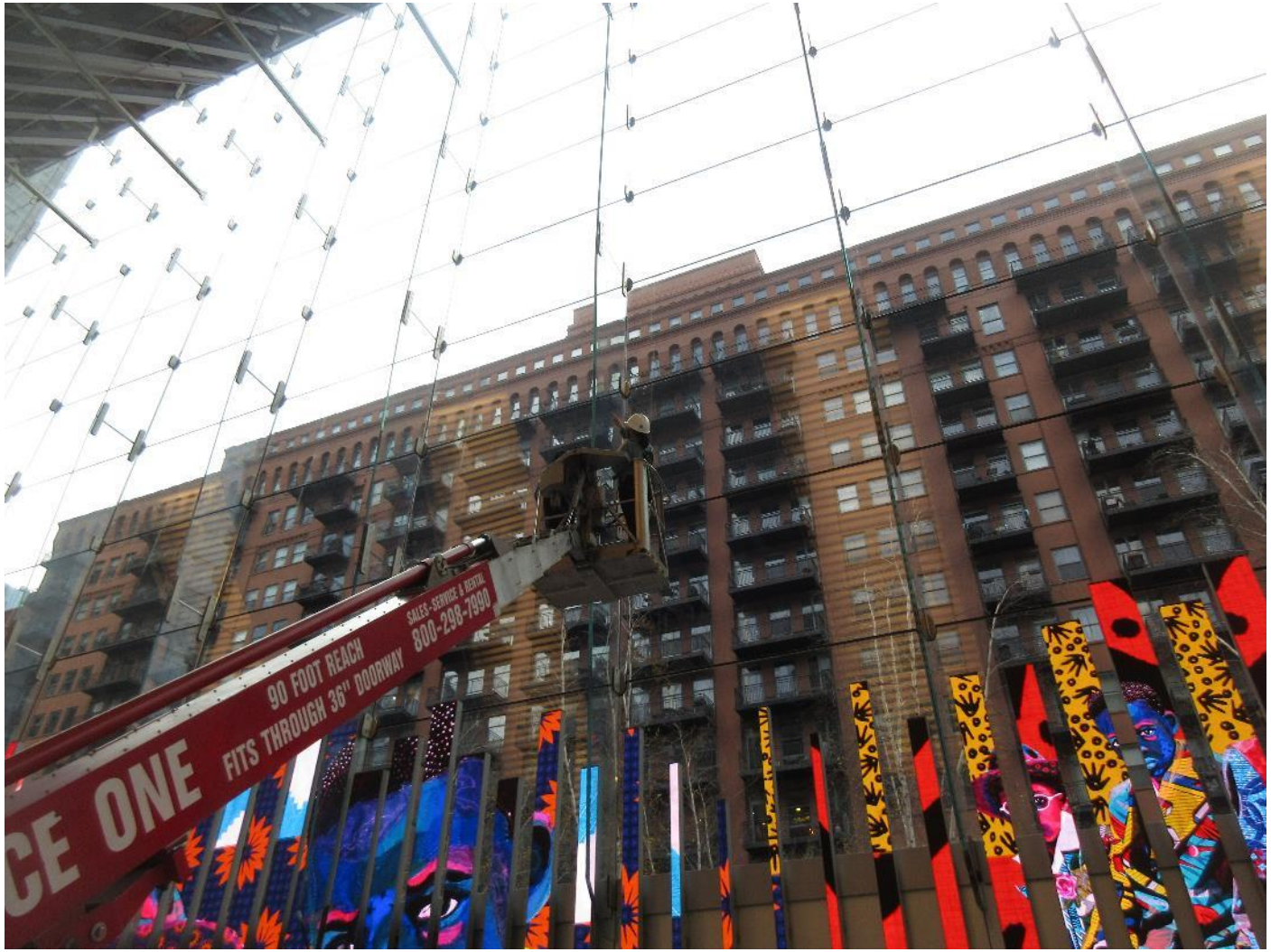
Heat Strengthened
3,500 – 7,500 psi



Fully Tempered
More than 10,000 psi

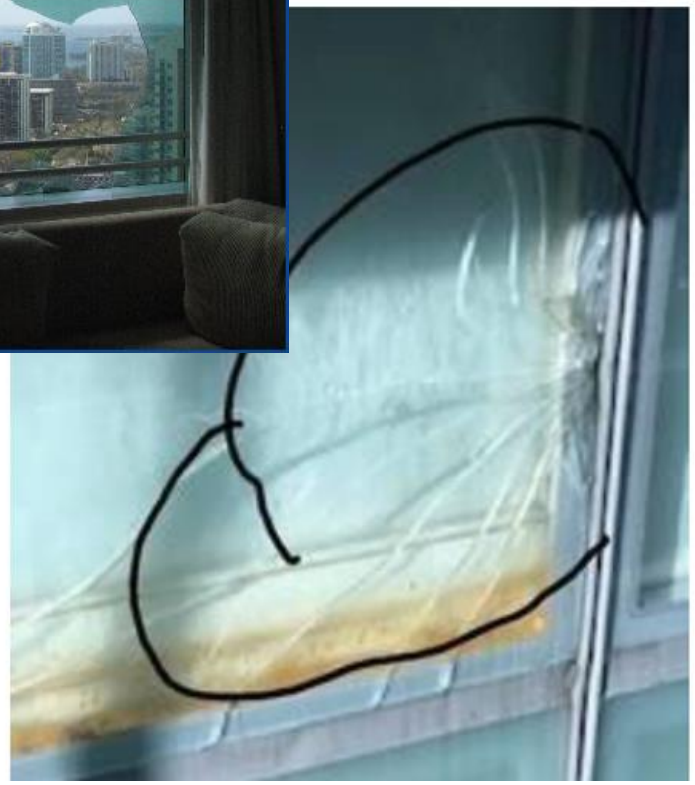


Observations



Cracking

- Cracking may result from multiple factors:
  - Impact
  - Edge flaws or defects
  - Thermal
- Size of glass shards varies based on the type of glass (annealed, heat strengthened, fully tempered)

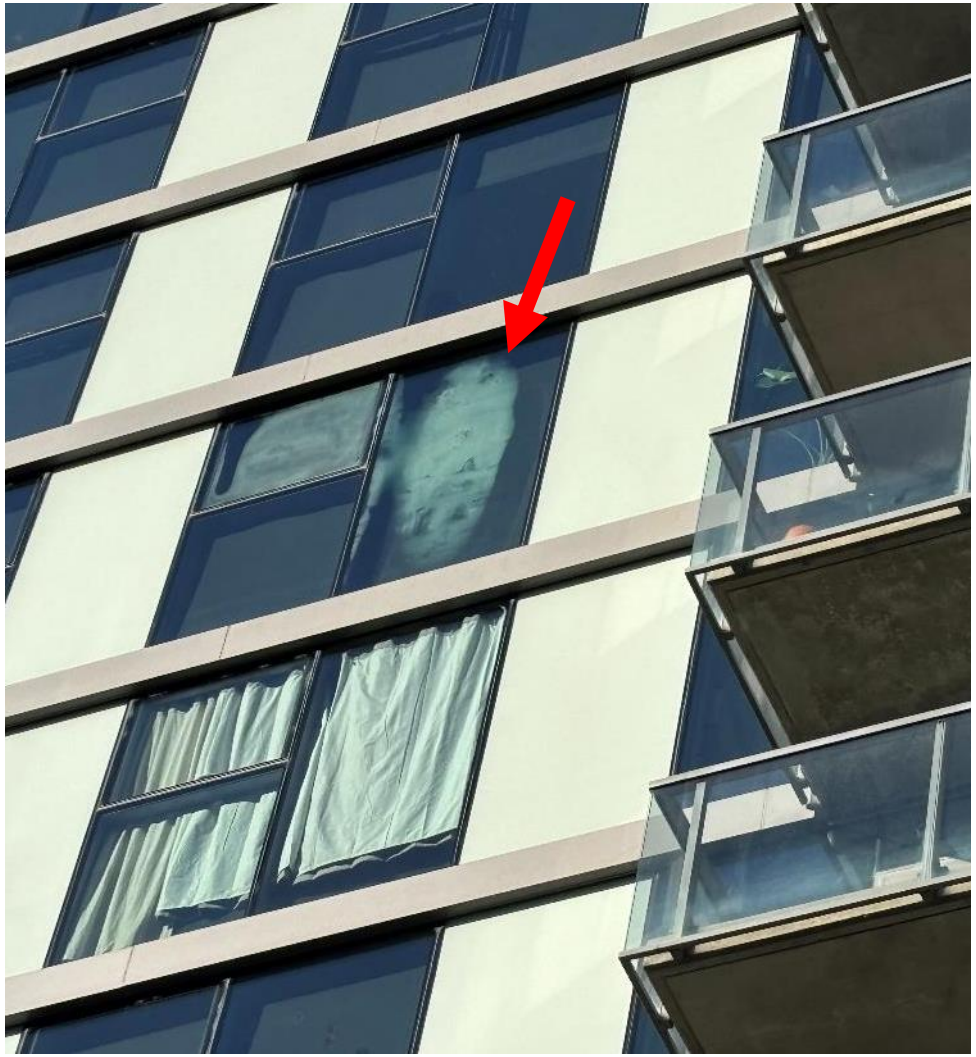


Nickle Sulfide (NiS) Induced Breakage

- Spontaneous breakage phenomenon in tempered glass only
- Predicting breakage is not feasible
- Distinct “cat-eye” origin
- Small black dot (NiS inclusion) at interface of origin
- Consider saving the origin for testing to confirm NiS

Hermetic Seal Failures

- Desiccant typically installed in the spacer bar absorbs moisture within the air space
- When the desiccant is spent (i.e., can no longer absorb moisture) may have condensation within air space
- In cold months, condensation may appear as frost.
- Low-e coating may corrode.



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Hermetic Seal Failures

- Gaps in the secondary or primary sealant.
- Air exchange through the capillary tube

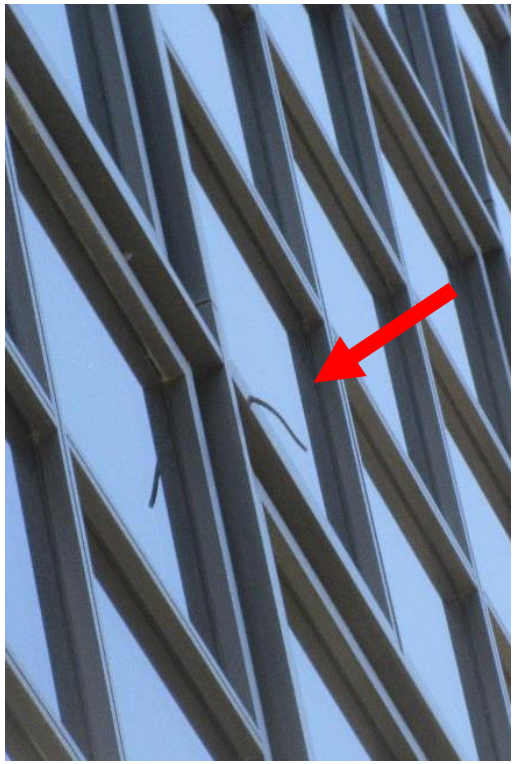
Gaps in primary sealant

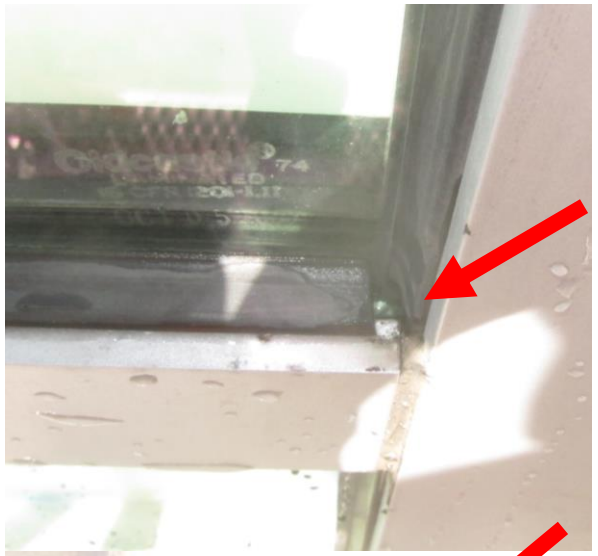
Uncrimped capillary tube

Improper secondary sealant mixing

Weather Seal & Gasket Failures

- Failed sealants or loose gaskets
- Increases glass edge exposure to elements
- May result in glass-to-metal contact
- May trap water adjacent to glass edge





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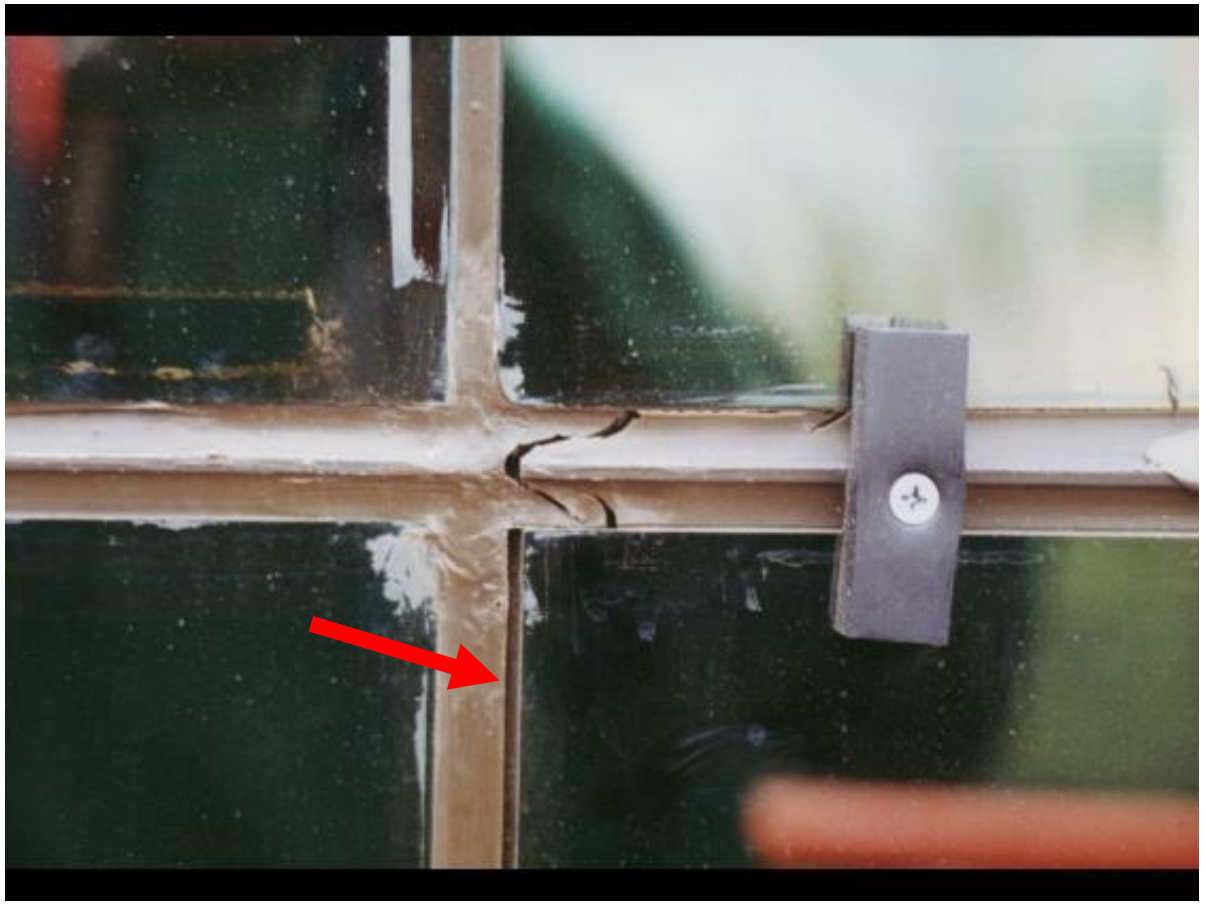
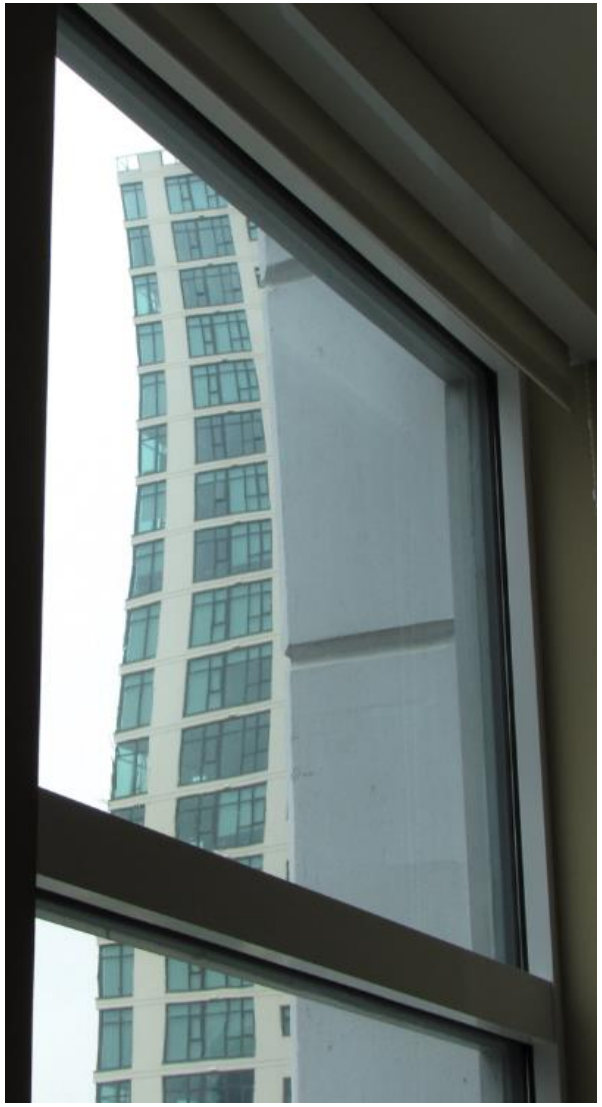


Optical Distortion

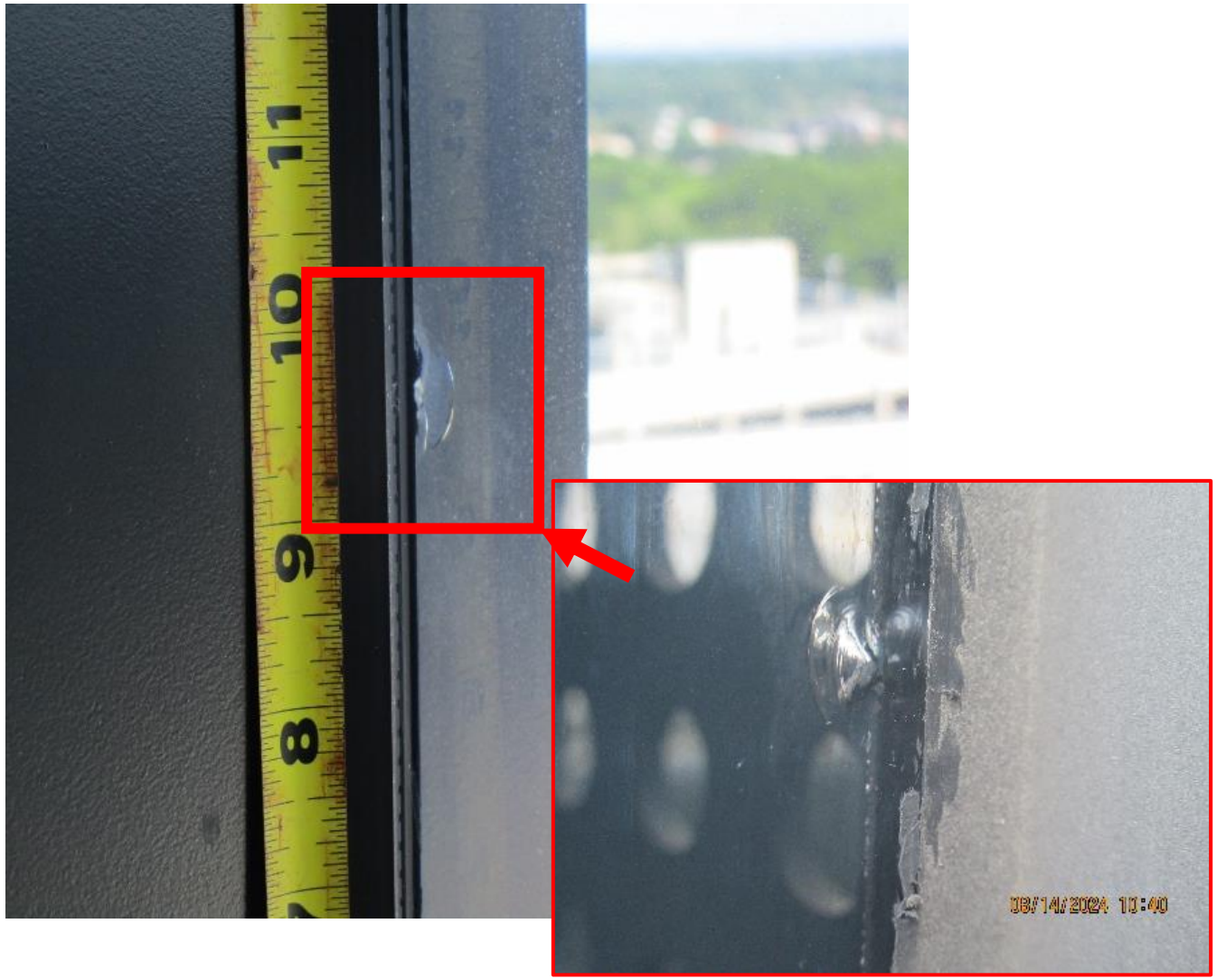
- Roller wave
- Lense effect
- Does not have an adverse effect on glass performance



(TheGlassBlog)

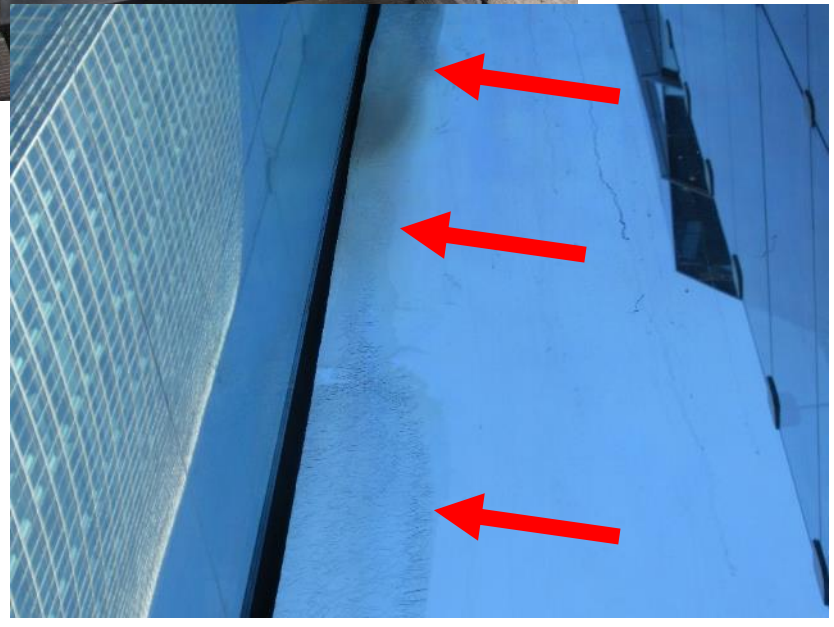
Edge Flaws

- Clam shell chips along perimeter of glass
- Weaken the glass strength at the flaw
- May result in cracking if glass is overstressed



Interlayer Discoloration

- Level of apparentness varies
- May be related to incompatibility between interlayer and adjacent materials
- May be related to improper lamination
- Discoloration tends to worsen over time



Interlayer Delamination

- Loss of bond between the interlayer and glass lite
- Typically occurs around the edge of glass
- PVB Interlayers – Appears as a fingering or burst pattern
- Ionoplast Interlayers - Smooth edges, sheen or discoloration at the delamination

Take Aways From An Owner's Perspective

- Set expectations for service (life) and visual optics
- Consider access for window maintenance
- Perform routine window inspections (outside and inside) by a licensed professional
- Document observations and window failures
- Utilize non-destructive investigation tests to confirm window observations
- Consider repair options are limited after installation. Replacement may be required.

QUESTIONS

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