Glazing

A shortened and modified version of Chris Makepeace’s
Presentation created by
Alberta Infrastructure

Pierre-Michel Busque, P.Eng.
Busque Engineering Ltd.
Window Components
Glazing Types

- **Storefront**
- **Punch Windows:** interior, exterior, pocket glazed
- **Window Wall**
- **Curtain Wall:** stick built, unitized
- **Skylights:** t-bar, face sealed, drained
Types of Operable Lites

- Vertical pivot
- Vertical single hung
- Horizontal single slider
- Hopper
- Awning
- Casement
STOREFRONT

Only meant for use in areas protected from rain
INTERIOR GLAZED
Punch Windows
Where to place the thermal break???

- Bridging the cavity
- Back in the opening
- In plane with the structure
INTERIOR GLAZED

Exterior
Typical eastern installation
Notch out shim to allow for flashing thickness
INTERIOR GLAZED

- Straight through
- Metal bracket
Gaskets and tapes

Wet or Dry

Ensure proper compression of gaskets and tapes
Sealing around clip is difficult at best.
Heal bead to maintain air seal due to drainage holes.
Vancouver Examples
Window Walls
Sill Pan Flashings

• The double edge sword…….
ISOMETRIC ASSEMBLY

of an

STICK BUILT-EXTERIOR
GLAZED SYSTEM
VERTICAL MULLION
cut back screw spline of vertical to allow for continuous tie-in of membrane on box face

VERTICAL MULLION
shear blocks

VERTICAL MULLION
seal butt joint with butyl tape
leave long for inspection

HORIZONTAL MULLIONS
slide deflection anchor into top of vertical tube section

anchor must be designed not to interfere with screws which extend into the tube from fastening of shear blocks
tilt window frame into opening

fasten anchor to structural wall

STRUCTURAL WALL
Structural connectors for the shelf angle must be designed not to disrupt the continuity of the air barrier.
membrane applied from seal of wall to tube face of glazing rabbet

AIR BARRIER MEMBRANE
Sequence of Membrane Installation

AIR BARRIER MEMBRANE
holes in anti-rotation channels allow screws to be inserted to the back leg of the section for mechanical fastening of membrane
mechanically fasten insulation tight up against the membrane surface
air space between the insulation and the exterior cladding
seal corner junctions with sealant or heat welding

installed length must be greater than opening to accommodate shrinkage

KEYED-IN NEOPRENE GASKET
METAL FLASHING
SEALED UNITS
stainless steel screws

keyed-in neoprene gaskets

thermal keyed-in break

PRESSURE PLATES
cover cap complete with openings for drainage. sized to allow for thermal expansion
At Sill
BASE PLATE ANCHOR

non-corrosive fastener
secure vertical mullions with non-corrosive screws

seal but joint of aluminum section with butyl tape
TUBE SECTIONS

- Secure vertical mullions with non-corrosive screws
- Seal but joint of aluminum section with butyl tape

Cut back screw spline of vertical in shop to allow for continuous tie-in of membrane on box face.
AIR BARRIER MEMBRANE

membrane applied from seal of wall to tube face of glazing rabbet
Sequence of Membrane Installation

SILL #1

JAMB #2

HEAD #3

SILL #1
ANTI-ROTATION CHANNELS

holes in anti-rotation channels allow screws to be inserted to the back leg of the section for mechanical fastening of membrane.
mechanically fasten insulation tight up against the membrane surface
EXTERIOR CLADDING

air space between the insulation and the exterior cladding
NEOPRENE CORNER PLUGS

*seal corner plugs with sealant*
(ensure sealant does not block drainage or retain water at corners)
KEYED-IN NEOPRENE GASKET

installed length must be greater than opening to accommodate shrinkage

seal corner junctions with sealant or heat welding
NEOPRENE
SETTING BLOCKS

6mm minimum neoprene setting blocks at 1/4 points or as recommended for size of glazing
SLOPED METAL FLASHING

flashing sloped to ensure proper water shedding
PRESSURE PLATES

drainage slot

thermal keyed-in break

keyed-in neoprene gaskets

stainless steel screws
- Three drainage slots per horizontal
  (no holes or drainage slots in vertical pressure plates)

- Thermal brake of screw spline should just be visible through drainage holes so that holes are low enough to drain the glazing rabbet
COVER CAPS

cover cap complete with openings for drainage. sized to allow for thermal expansion
Curtain Walls
Deep Thoughts

Ask them to put the angle the other way
Unitized Curtain Walls
Unitized Curtain Walls
Unitized Curtain Walls
Unitized Curtain Walls
Unitized Curtain Walls
SKYLIGHTS
HISTORY
Exterior seals have to be 100% perfect!

Sealed units and joints are exposed to water which penetrates the face seal.
Design accepts some water entry.

Drainage could be easily blocked between setting blocks and overlaps of framing.
Setting blocks were positioned to increase drainage.
Setting blocks were positioned to increase drainage.
Drainage of these systems minimizes blockage potential and ensures free flow of water out of the system to the exterior.
Surface tension will cause a small amount of water to cling to the other side of the gutter.
A slightly larger amount of water will cling to the underside of the drip edge.
Only with sufficient water does the system drain properly.
Only with sufficient water does the system drain properly.
INSTALLATION
T-Bar Skylights

Dumb-sloping a flashing toward a wall AND not realizing that the horizontal coupler of the skylight is the cause of the leak
T-Bar Skylights

Air Tightness????
T-Bar Skylights

Wind Load Resistance????
Thinking like a Pessimist

Building Envelope Professional

Failure mode: Unaware of how the glazing system drains, the designer unknowingly designs the t-bar skylight to drain in the wall assembly.
Equation

Roofer - Consultant + Curtain Wall = Leak