

TEST REPORT # T1086-7b

DATE: April 2, 2017

CLIENT: **Winspia Windows (Canada) Inc.**
#150 880 Belgrave Way
Delta, British Columbia
V3M 5Y8
Contact: Jay Kim

SAMPLE ID: Aluminum Lift & Slide Door w/ Multipoint

SAMPLE DESCRIPTION: Width: 3098 mm; Height: 2402 mm; See pages 4 - 6 for full description.

SAMPLING PROCEDURES: See page 2 for the sampling procedure.

DATE OF RECEIPT: February 17, 2017

DATE(S) OF TESTING: March 7, 2017 - March 10, 2017

TESTING REQUESTED: **Testing to the mandatory requirements of AAMA/WDMA/CSA 101/I.S.2/A440-11 NAFS - North American Fenestration Standard / Specification for windows, doors and skylights**

TEST RESULTS: See page 3 for the test results.

CONTENTS: Test report pages 1 through 8, appendix A1 through A36.

TESTING PERFORMED AT: QAI Laboratories Ltd., Burnaby

Reported by

Reviewed by

Igor Vranjes
Project Manager

Lawrence Gibson
Executive VP

Sampling Plan/Procedures:

One unused, Aluminum Lift & Slide Door w/ Multipoint was provided by the client as a typical production sample and examined at the QAI laboratory to determine compliance with the submitted documentation, then tested on March 7, 2017 - March 10, 2017 as being representative of the model covered in this report.

Test Conditions:

QAI Laboratories Ltd. (QAI) was retained by Winspia Windows (Canada) Inc. to perform testing in accordance with the mandatory test requirements of AAMA/WDMA/CSA 101/I.S.2/A440-11 NAFS - North American Fenestration Standard / Specification for windows, doors and skylights on a representative sample of a 3098 mm x 2402 mm Aluminum Lift & Slide Door w/ Multipoint.

This report includes tests performed on a specimen of specific dimensions. Actual product performance may be affected by variations in the products dimensions, assembly details and installation method. The drawings supplied by Winspia Windows (Canada) Inc. were verified by QAI for the unit tested and are shown in Appendix A.

The test specimen was installed by the manufacturer into a wood test buck as described below. A bead of silicone sealant was applied between the frame and the wooden test buck around the entire perimeter on both exterior and interior sides. The specimen was fastened to the wood test buck using seventeen evenly spaced #10 x 2-15/16" countersink screws around inner perimeter of frame – six at the sill, five at the locking-side jamb, and six at the in-active slab jamb. The specimen was also fastened to the wood test buck using six evenly spaced #10 x 3-15/16" countersink screws at head, going through "top rail" profile, frame, and into the wood test buck. All screw heads were sealed with silicone.

The wooden test buck consisted of nominal 2" x 6" stud framing. The center of the wooden test buck was built with a rough opening measuring approximately 1/2" larger than the test specimen in width and height. Thirty-eight 1/4" x 1" x 3-15/16" PVC setting blocks were used as shims around the perimeter of the specimen. Twelve evenly spaced shims were used along the head and the sill and seven shims evenly spaced shims were used along each jamb.

Product Ratings:

Table 1: Summary of test results

Test Name	AAMA/WDMA/CSA 101/I.S.2/A440-11 NAFS - North American Fenestration Standard / Specification for windows, doors and skylights Result:
Operating Force Test (ASTM E2068)	Pass
Air Leakage Resistance Test (ASTM E283)	Pressure differential = 75 Pa A3 Level Infiltration result = 0.413 L/s/m ² (0.081 cfm/ft ²) – A3 Level Exfiltration result = 0.384 L/s/m ² (0.075 cfm/ft ²) – A3 Level
Water Penetration Resistance Test (ASTM E547)	Maximum pressure differential = 330 Pa (DP 45 – 6.75 psf)
Uniform Load Deflection Test (ASTM E330 – Procedure A)	Maximum pressure differential = 1440 Pa (DP 30 – 30 psf) Deflection limit = 13.1 mm (0.5171") Maximum deflection = 8.1 mm (0.3195")
Uniform Load Structural Test (ASTM E330 – Procedure A)	Design pressure = 1920 Pa (DP 40) Maximum pressure differential = 2880 Pa (60.0 psf)
Forced-entry Resistance Test (ASTM F588/F842)	Pass

Performance Classification: CW ^a
Performance Grade: PG 30 ^a
Maximum Size Tested: 3098 mm wide x 2402 mm tall (122.1" x 94.5")

Primary Designator:

Class CW – PG30: Size tested 3098 x 2402 mm (122.1 x 94.5 in) – Sliding Door (Type SD)
 Class CW – PG1440 (SI): Size tested 3098 x 2402 mm – Sliding Door (Type SD)

Secondary Designator:

Positive Design Pressure (DP) = 1440 Pa (30 psf)
 Negative Design Pressure (DP) = -1440 Pa (-30 psf)
 Water Penetration Resistance Test Pressure = 330 Pa (6.75 psf)
 Canadian Air Infiltration / Exfiltration = A3 Level

Note: AAMA/WDMA/CSA 101/I.S.2/A440-11, Clause 9.2.5: The air, water and structural tests were performed on test specimens installed per the method outlined in the test conditions section of this report. The test procedures are designed to test the performance of the test specimen only and are not used to test the performance of the installation, in particular the perimeter sealant joint and the anchoring of the assembly. However, products not installed according to the installation method described in this report may not perform to an equivalent performance level.

^a The following test was not completed: - Deglazing Test (Clause 9.3.6.3)

Description:

Aluminum Lift & Slide Door w/ Multipoint		
Frame:	Description:	<p>Jamb and head consisting of two aluminum profiles from Winspia:</p> <ul style="list-style-type: none"> - "Frame out" profile, shape #WS-300. - "Frame in" profile, shape #WS-301. - Polyamid "frame cover" profile from Dong Shin Tech, shape #DSP1-177, clipped into jamb profiles. - Aluminum "top rail" profile from Winspia, shape #WS-302, along length of head on interior, fastened to "frame in" profile using five #8 x 2" countersink screws spaced approximately 25" apart. Also fastened using screws mentioned in Test Conditions section of page 2. Each screw sealed with silicone. - Aluminum "bottom rail" profile from Winspia, shape #WS-276, along length of sill on interior, clipped into "frame in" profile using. - Aluminum "wind screen bar" profile from Winspia, shape #WS-334, along head on exterior from left jamb (looking from exterior) to in-active slab, fastened to "frame out" profile using five #8 x 3/4" self-tapping countersink screws spaced approximately 14" apart. Each screw head sealed with silicone. Joint with "frame out" profile also sealed with silicone. <p>Frame dimensions: Width: 3098 mm, Height: 2402 mm</p>
	Joints:	<p>Corners mitre joined. Each joint fastened together using two #11 x 2-3/4" countersink screws penetrating horizontally from jamb and into head/sill, and two #11 x 2-3/4" countersink screws penetrating diagonally from sill/head into jamb.</p> <p>All joints sealed with silicone.</p>
Active Slab:	Description:	<p>Slab consisting of two aluminum profiles from Winspia:</p> <ul style="list-style-type: none"> - "Vent out" profile, shape #UM-1378. - "Vent in" profile, shape #UM-1379. <p>Two profiles joined by thermal break.</p> <p>Sash dimensions: Width: 1555 mm, Height: 2307 mm</p>
	Joints:	<p>Mitre joined and fastened using corner key (see picture in Appendix A).</p> <p>All joints sealed with silicone.</p>
	Reinforcement:	<p>16-gauge galvanized steel hollow bar reinforcement inserted into slab profiles along length of interlock-side stile. Fastened to inside of slab profile using silicone.</p> <p>See profile picture in Appendix A.</p>
In-active Slab:	Description:	<p>Slab consisting of two aluminum profiles from Winspia:</p> <ul style="list-style-type: none"> - "Vent out" profile, shape #UM-1378. - "Vent in" profile, shape #UM-1379. <p>Two profiles joined by thermal break.</p> <p>Sash dimensions: Width: 1555 mm, Height: 2307 mm</p>
	Joints:	<p>Corners mitre joined and fastened using corner key (see picture in Appendix A). All joints sealed with silicone.</p> <p>Slab attached to polyamid "fix vent" profile from Dong Shin Tech, shape #DSP-1318, between in-active slab and "frame out" profile at jamb, head, and sill. Two strips of PVC "air tightness gasket" from Dae Yang Tech, shape #WSG-003, used between each side of stile and "fix vent" profile. Slab fastened to frame using evenly spaced #10 x 3-1/2" self-tapping countersink screws – six at bottom rail, eight at jamb-side stile, and six at top rail. Each screw penetrated from sealed unit side of slab, through "vent in" profile, "fix vent" profile, and into "frame out" profile.</p>
	Reinforcement:	<p>16-gauge galvanized steel hollow bar reinforcement inserted into slab profile along length of interlock-side stile. Fastened to inside of slab profile using silicone.</p> <p>See profile picture in Appendix A.</p>

Aluminum Lift & Slide Door w/ Multipoint (continued)		
Interlock:	Description:	<p><u>Active slab:</u> Modified aluminum "meeting stile cover" profile from Winspia, shape #UM-1382, along length of active slab interlock stile. Joint with slab on interior side sealed with silicone bead. Fastened to "vent in" profile using foam tape and ten #8 x 1" self-tapping pan-head screws, spaced approximately 10" apart, going through modified "meeting stile cover" profile, foam tape, and into "vent in" profile. Fastened to "vent out" profile using nine #7 x 1-1/4" self-tapping countersink screws, spaced approximately 11" apart, going through modified "meeting stile cover" profile, "vent out" profile, and into reinforcement. Modified polyamid "vent meeting stile" profile from Dong Shin Tech, shape #DSP1-268, clipped into inner face of modified "meeting stile cover" profile.</p> <p><u>In-active slab:</u> Aluminum "meeting stile cover" profile from Winspia, shape #UM-1382, along length of in-active slab interlock stile. Joint with slab on exterior side sealed with silicone bead. Fastened to "vent in" profile using seven #7 x 1-1/4" self-tapping countersinks screws, spaced approximately 14" apart, going through "meeting stile cover" profile, "vent meeting stile" profile, "vent in" profile, and into reinforcement. Polyamid "vent meeting stile" profile from Dong Shin Tech, shape #DSP1-268, clipped into inner face of "meeting stile cover" profile.</p>
Weather-stripping	Frame:	<p>PVC "frame cover gasket" from Dae Yang Tech, shape #WSG-004, inserted into kerf in "frame in" profile, along entire length of each jamb (excluding keeper locations). Strip of double-fin, mole hair, pile weather-stripping inserted into kerf along interior face of "wind screen bar" profile (see appendix A).</p>
	Sash:	<p><u>Active slab:</u> Two strips of PVC "air tightness gasket" profile from Dae Yang Tech, shape #WSG-003, inserted into kerfs along lengths of bottom rail and locking-side stile – one strip on either end of slot for locking assembly. Corners butt-joined and sealed to slab using silicone. Two strips of PVC "air tightness gasket" profile from Dae Yang Tech, shape #WSG-008, inserted into kerfs along length of top rail – one strip on either end of slot in slab profile. Corners butt-joined with other gasket and sealed to slab using silicone. Strips of double-fin, mole hair pile weather-stripping inserted along perimeter of slab as well (see picture in Appendix A).</p>
	Interlock:	<p><u>Active slab interlock:</u> One strip of double-fin mole hair pile weather-stripping inserted into kerf on exterior face of modified "meeting stile cover" profile. One strip of PVC "air tightness gasket" profile from Dae Yang Tech, shape #WSG-005, inserted into kerf on "vent meeting stile" profile.</p> <p><u>In-active slab interlock:</u> One strip of PVC "air tightness gasket" profile from Dae Yang Tech, shape #WSG-006, inserted into kerf on interior side of in-active slab interlock. Top and bottom of gasket sealed to interlock using silicone. One strip of double-fin, mole hair, pile weather-stripping inserted into kerf alongside "air tightness gasket". One strip of PVC "air tightness gasket" profile from Dae Yang Tech, shape #WSG-005, inserted into kerf on "vent meeting stile" profile.</p>
Glazing Method:	Interior Seal: (glazing bead)	Aluminum "double glazing bead" profile from Winspia, shape #WS-297, around perimeter of sealed unit. Corners butt joined and sealed using silicone. PVC "glazing inner gasket" profile from Dae Yang Tech, shape #WSG-002 inserted along each length of glazing bead. Corners butt joined.
	Exterior Seal: (glazing gasket)	One strip of PVC "glazing out gasket" from Dae Yang Tech, shape #WSG-001, inserted into slab profile around perimeter. Strip butt joined to itself at midpoint of top rail.

Aluminum Lift & Slide Door w/ Multipoint (continued)		
Glazing Method: (continued)	Setting Blocks:	<p><u>Active sash:</u> Two 7/16" x 1" x 3-15/16" assemblies consisting of three different thickness setting blocks each at bottom rail. Centered 12" from either stile inner edge. Foam backer rod and silicone bead around entire perimeter of sealed unit.</p> <p><u>In-active sash:</u> Two 5/16" x 1" x 3-15/16" assemblies consisting of three different thickness setting blocks each at bottom rail. Centered 12" from either stile inner edge. Foam backer rod and silicone bead around entire perimeter of sealed unit.</p>
Glazing:	Description:	Two 5 mm thick tempered glass panes. 23.8 mm overall thickness.
Drainage:	Frame:	<p>Six 5/16" x 1-5/16" drainage slots machined into most-exterior face of aluminum sill, centered 7-1/2", 30-1/2", 53", 69", 92", and 113" from left jamb inner edge (looking from exterior). Two 7/16" diameter drainage holes machined into "frame cover" profile and through "frame out" profile on interior side of sill, centered 11" and 50" from interlock.</p>
	Sash:	None.
Hardware:	Locks:	<p>Multipoint locking assembly from Siwon E&S inserted into kerf on locking-side stile of active slab, along entire length. Assembly consisted of a gear, part #SF-135B/RO, corner drive, part #SF-135B/ROD (HALF), and rollers, part #CROL0091. Roller description below. Two locking points along multipoint assembly track aligned with keepers locations on frame. Fastened to stile using six #9 x 2" and one #10 x 2" self-tapping countersink screws going through locking assembly track and into stile profile.</p>
	Keepers:	Two keepers from Siwon E&S, part #SF/135B/STRIKER, on locking-side jamb, centered 8-1/2" and 65-1/4" from sill inner edge. Each keeper fastened to jamb using two #8 x 1" countersink screws going into "frame in" profile.
	Rollers:	Two sets of two wheel lifting rollers from Siwon E&S, part #CROL0091. Locking-side corner of roller system clipped into locking-side stile multipoint assembly. Rollers and track fastened to bottom rail using four #8 x 1" countersink screws – two at each set of rollers (see pictures in Appendix A for more details).
	Lever Handle:	Aluminum lever handle from Siwon E&S, part #CHAN012 (RIGHT) / CHAN014 (LEFT), on interior side of locking-side stile, centered 40" from bottom of slab. Fastened to stile using three #8 x 1" countersink screws going into slab profile.

CONCLUSION:

QAI Laboratories Ltd., with lab facilities located in Coquitlam, British Columbia, performed testing in accordance with AAMA/WDMA/CSA 101/I.S.2/A440-11 NAFS - North American Fenestration Standard / Specification for windows, doors and skylights, on a representative sample of a Winspia Windows (Canada) Inc. Aluminum Lift & Slide Door w/ Multipoint.

Test results in this report may not be reproducible in the field. Test results relate only to those products tested.

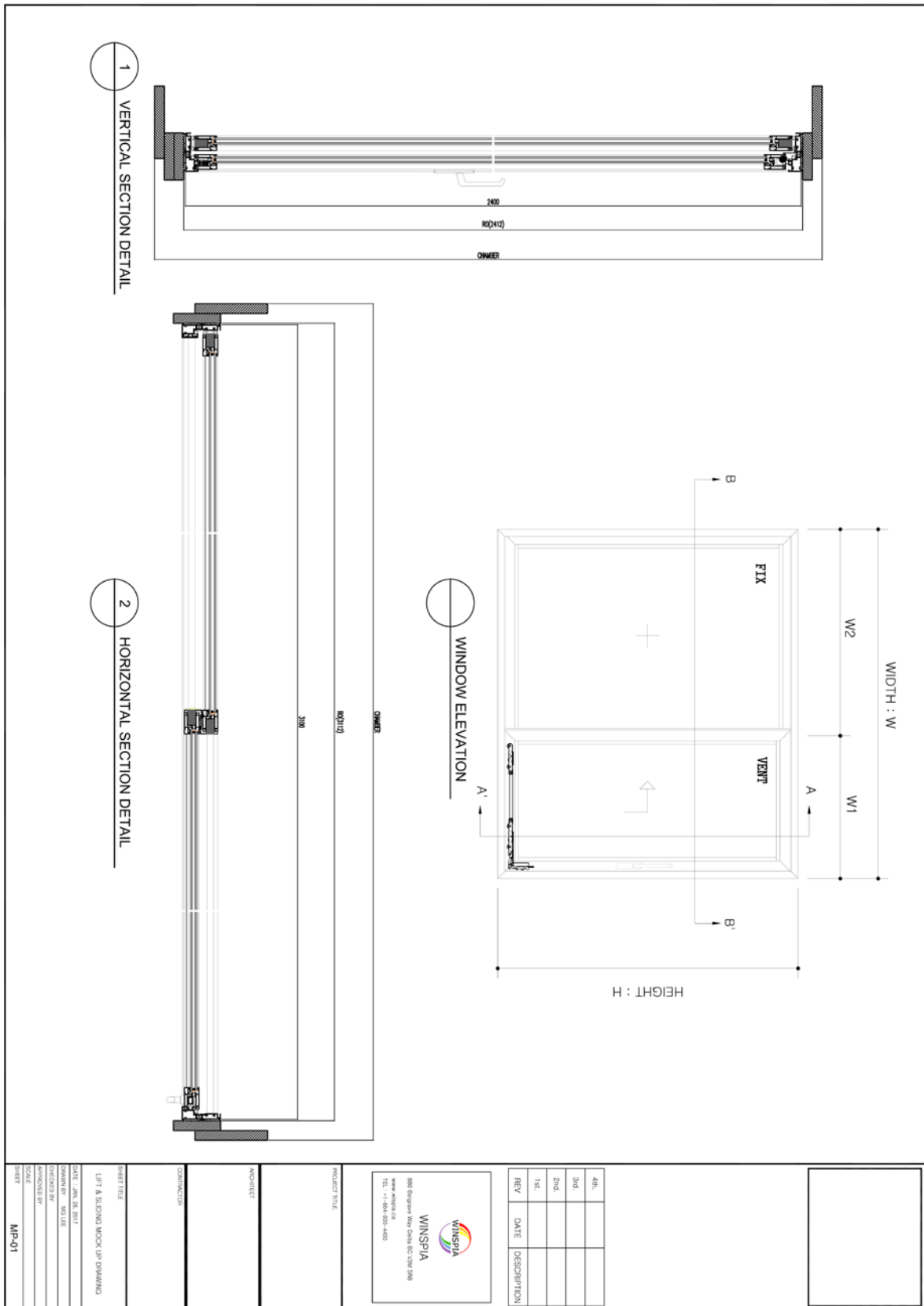
See Table 1 for a summary of test results and window ratings. The sample tested was found to comply with the applicable requirements and obtained test results as reported in Table 1 of this report.

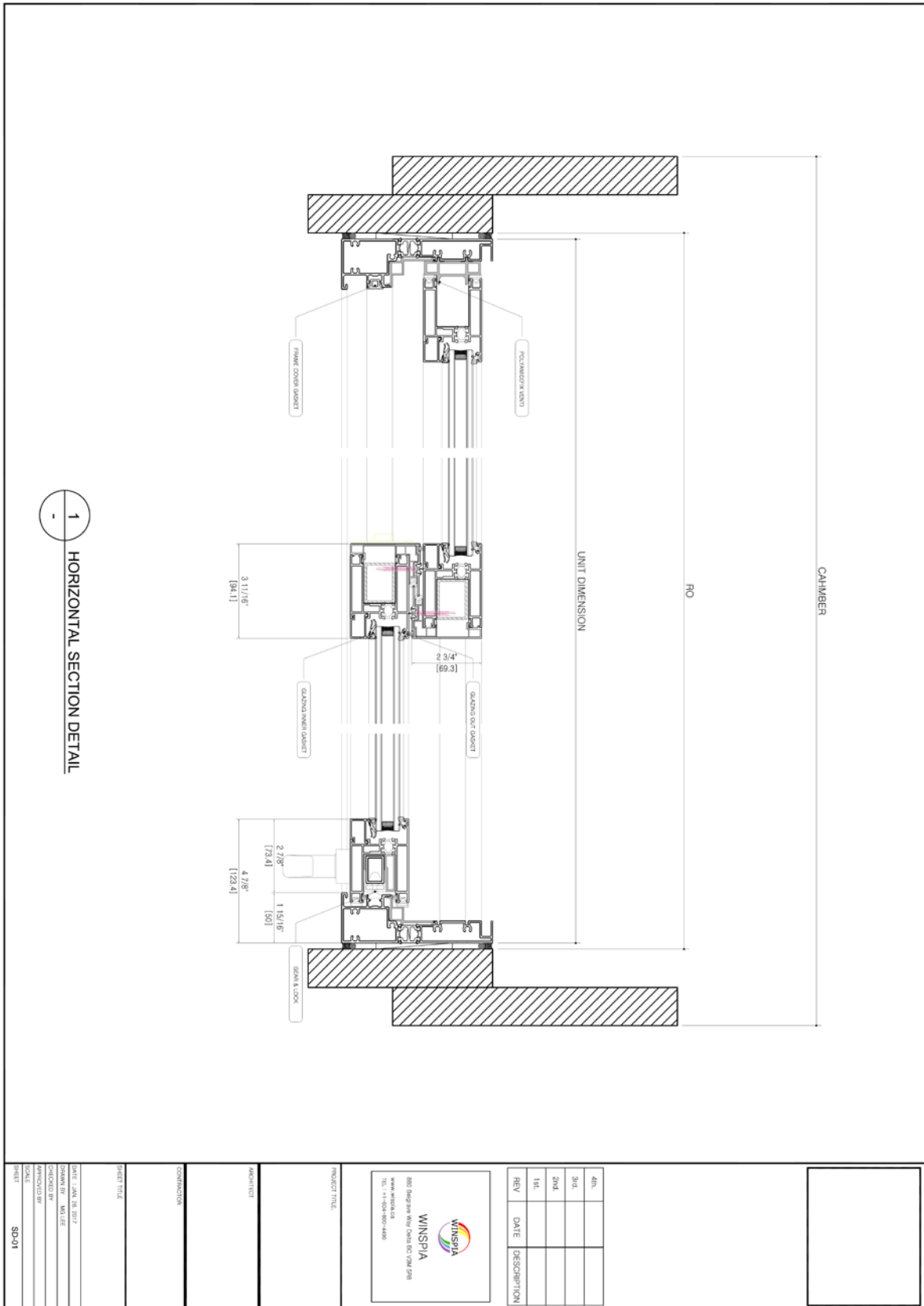
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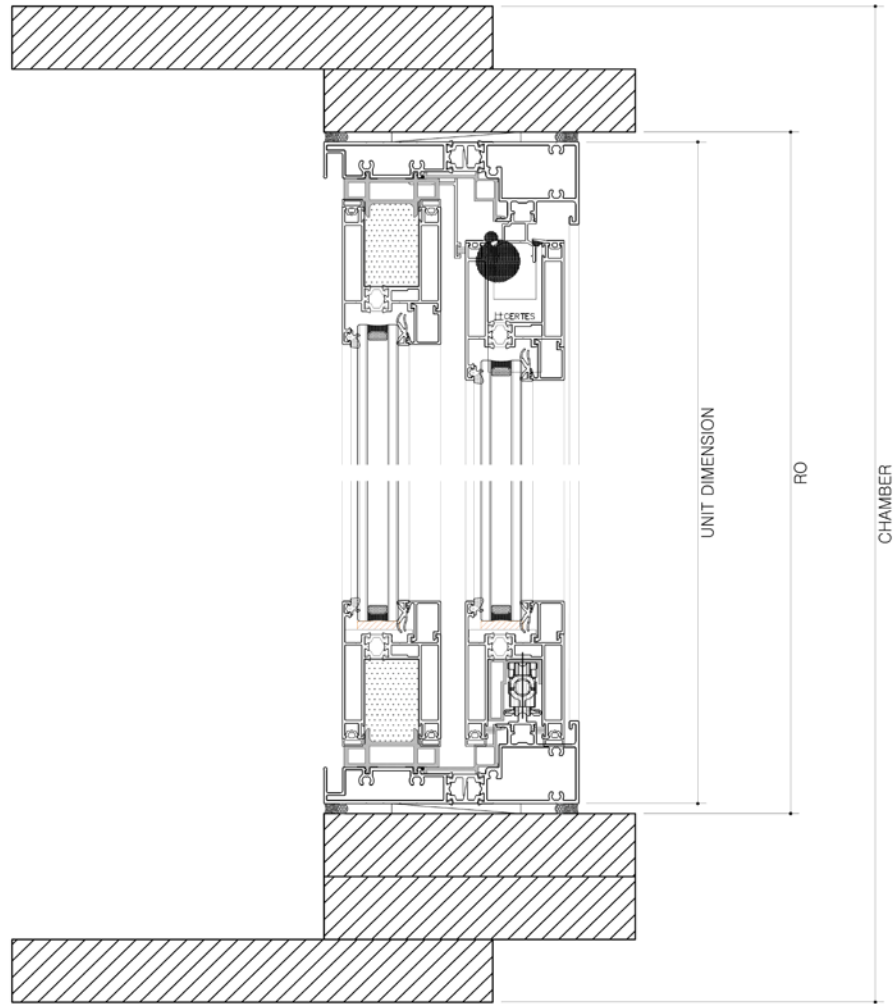
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April 2, 2017	1	Original Report	IV

APPENDIX A

Page	Title
A1	Elevation drawing
A2-A3	Cross-sectional assembly drawings
A4-A24	Cross-sectional part drawings
A25-A36	Sample pictures

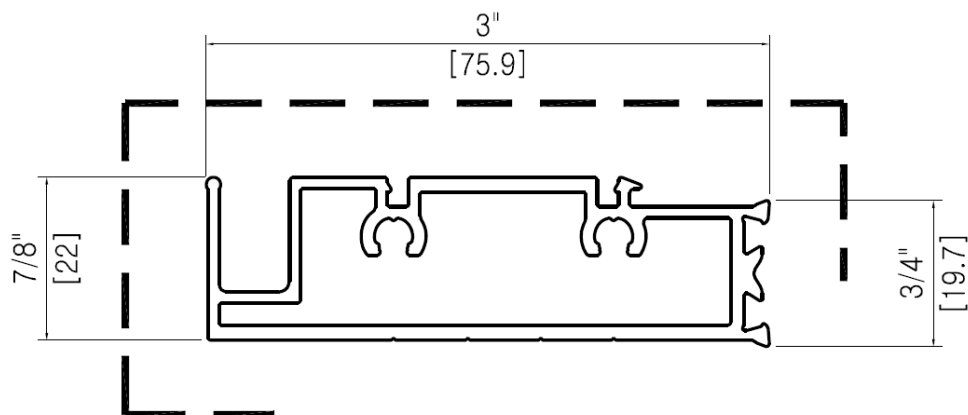




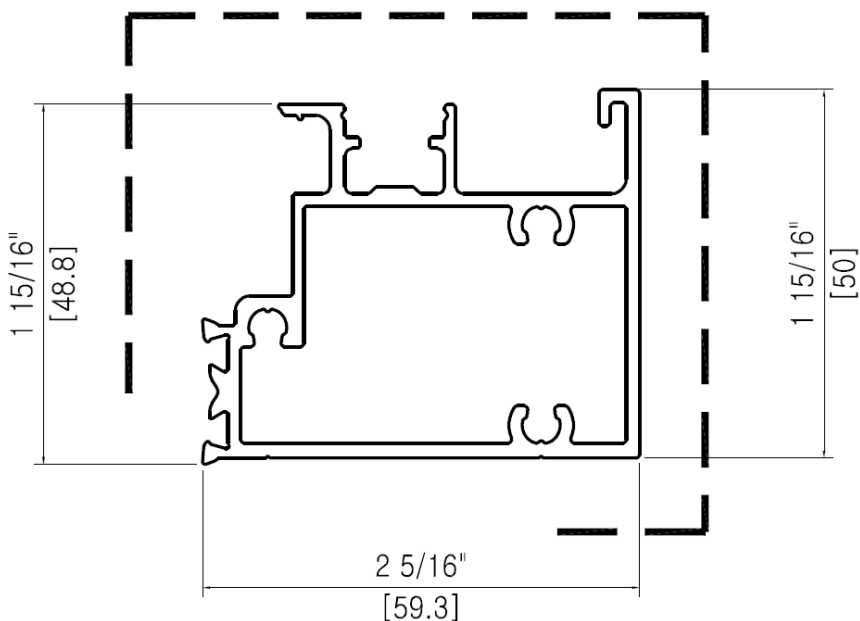


1 VERTICAL SECTION DETAIL

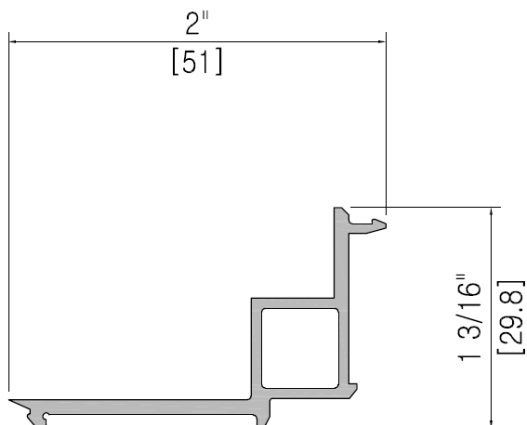
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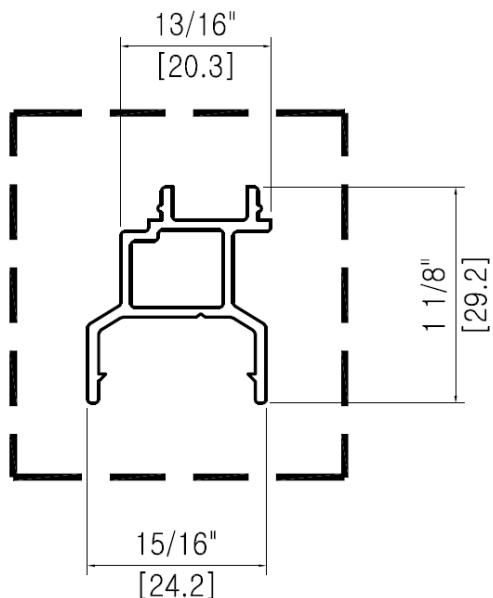
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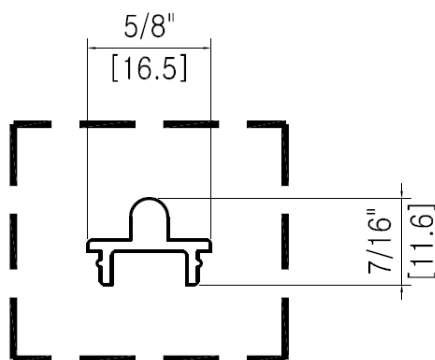
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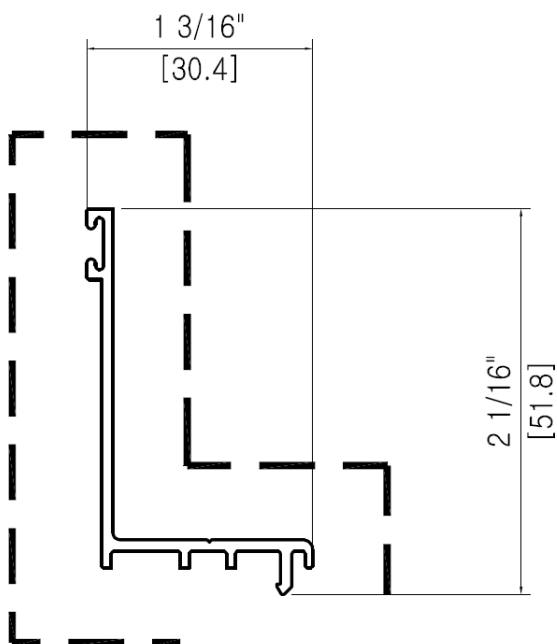
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MANUFACTURE	DONG SHIN TECH		
ALLOY & TEMP	POLYAMID		



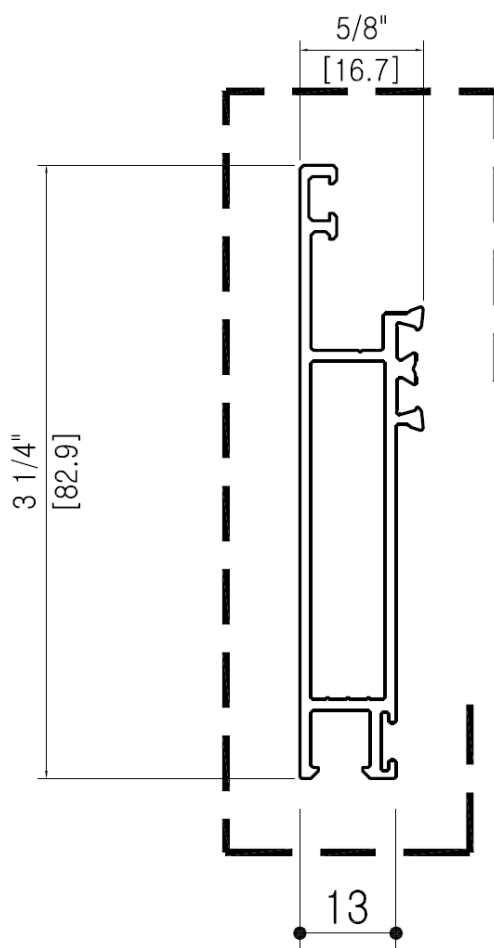
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ALLOY & TEMP	AL 6063-T5		



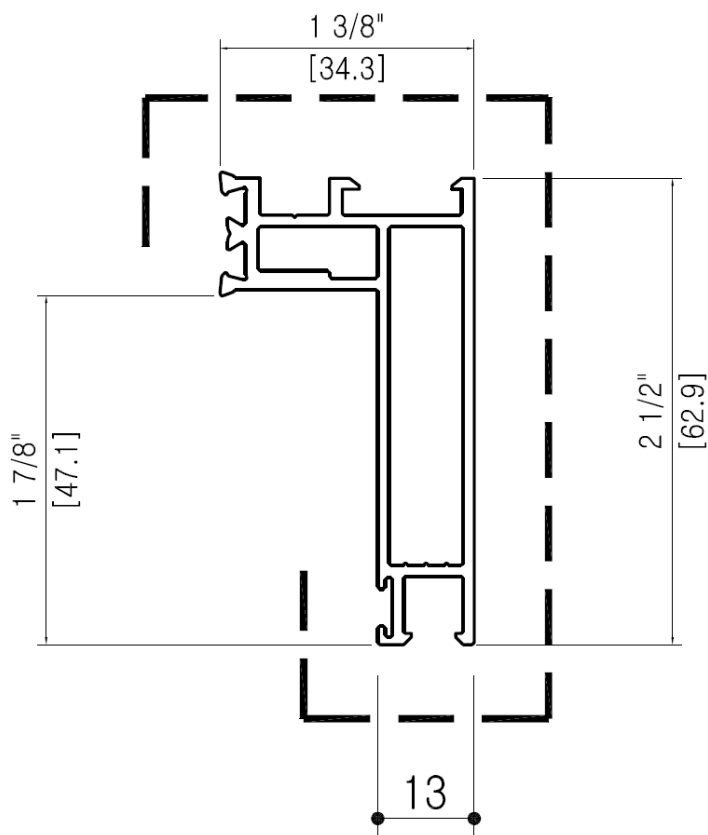
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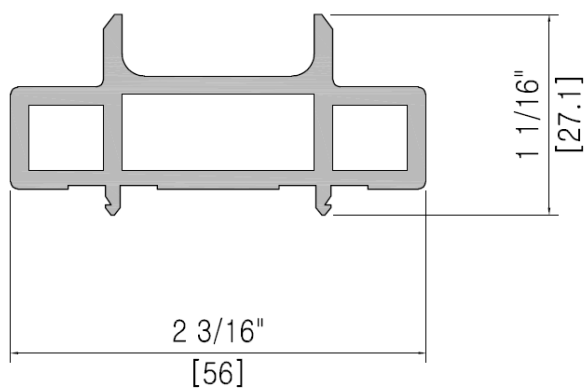
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MANUFACTURE			
ALLOY & TEMP			



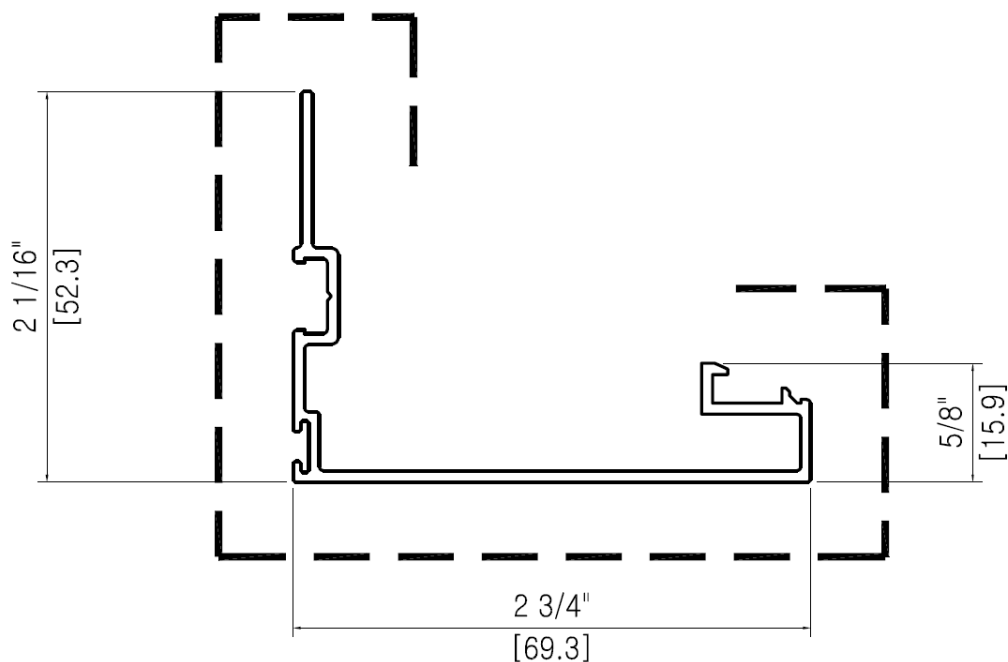
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ALLOY & TEMP	AL 6063-T5		



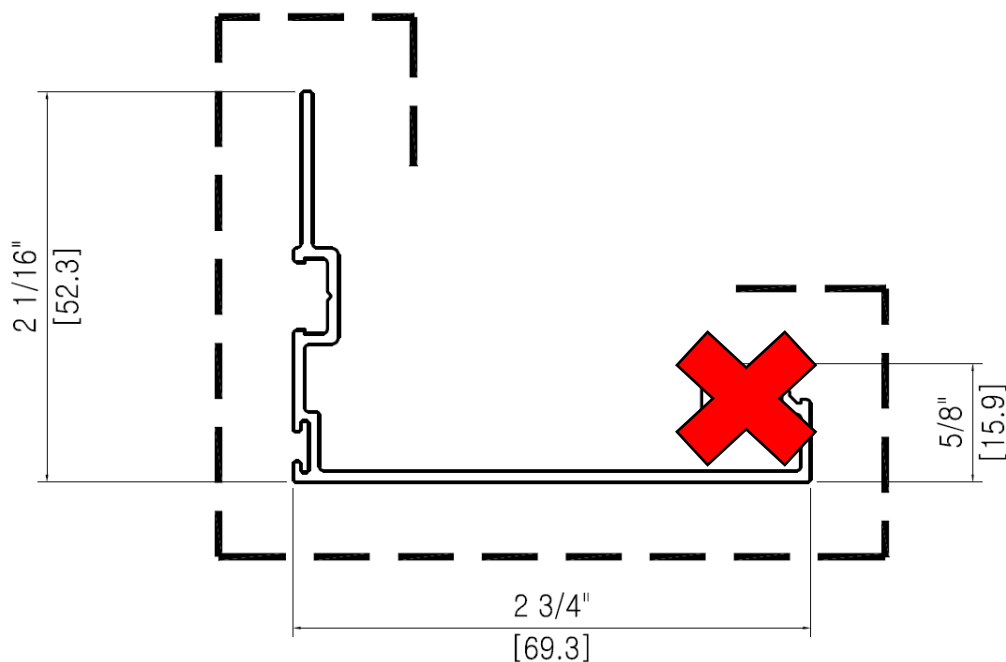
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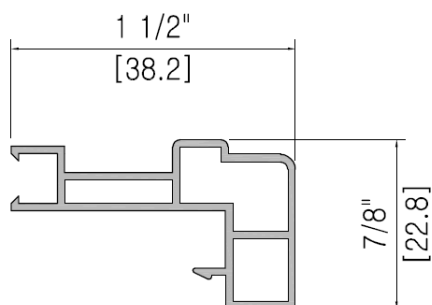
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ALLOY & TEMP	POLYAMID		



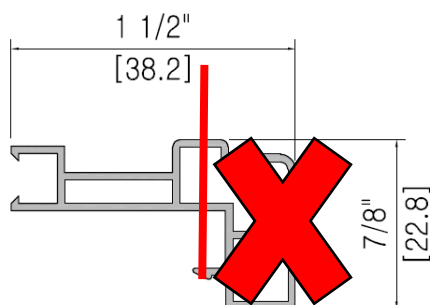
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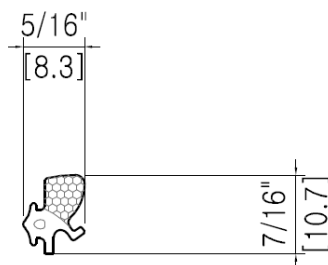
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	Modified Meeting Stile Cover		



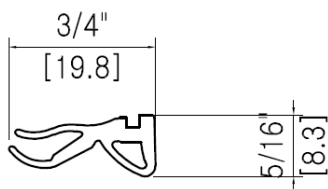
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MANUFACTURE	DONG SHIN TECH		
ALLOY & TEMP	POLYAMID		



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MANUFACTURE	DONG SHIN TECH		
ALLOY & TEMP	POLYAMID		
Modified Vent Meeting Stile			

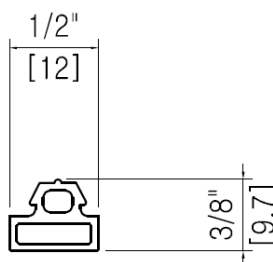


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ALLOY & TEMP	EPDM		

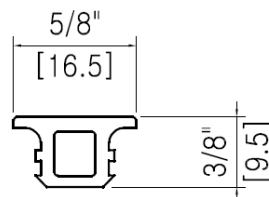


STGA-05

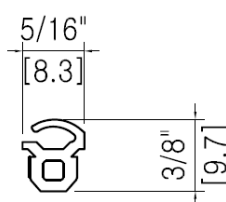
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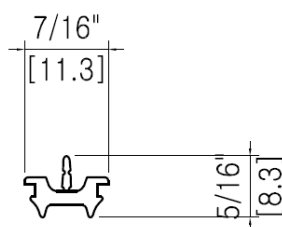
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ALLOY & TEMP	EPDM		



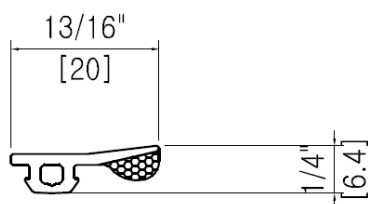
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ALLOY & TEMP	EPDM		



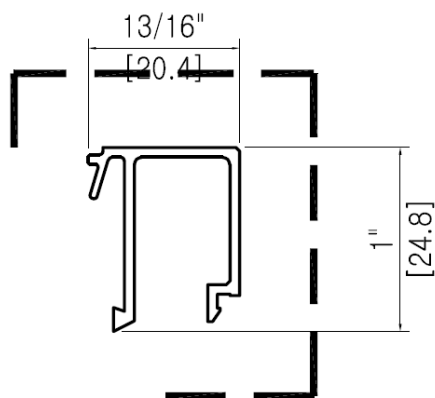
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MANUFACTURE	DAE YANG TECH		
ALLOY & TEMP	EPDM		



SHAPE NAME	AIR TIGHTNESS GASKET	SHAPE NO.	WSG-006
MANUFACTURE	DAE YANG TECH		
ALLOY & TEMP	EPDM		



SHAPE NAME	AIR TIGHTNESS GASKET	SHAPE NO.	WSG-008
MANUFACTURE	DAE YANG TECH		
ALLOY & TEMP	EPDM		



SHAPE NAME	DOUBLE GLAZING BEAD	SHAPE NO.	WS-297
MANUFACTURE			
ALLOY & TEMP	AL 6063-T5		



Figure 1: Corners of frame, slab, glazing bead. Silicone between buck and specimen.



Figure 2: Drainage slot at sill exterior.



Figure 3: Drainage hole at sill interior.



Figure 4: Fiber drain plug used in drainage holes at sill interior.

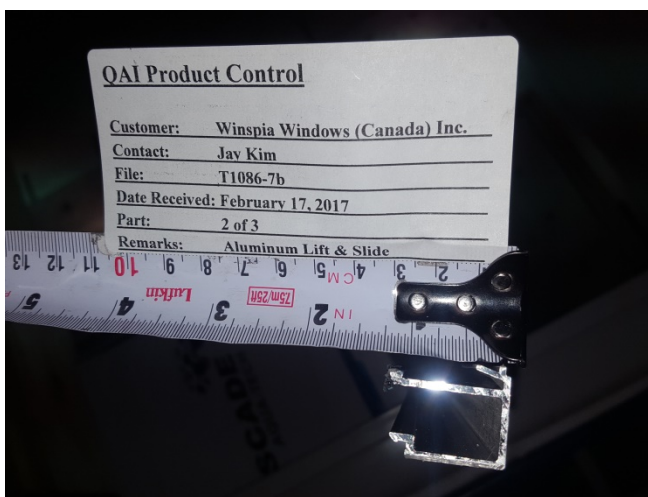


Figure 5: Interior "double glazing bead" profile.



Figure 6: Silicone bead and foam backer rod, setting block assembly at bottom rail.



Figure 7: Setting blocks making up one setting block assembly, active slab.



Figure 8: Setting blocks making up one setting block assembly, in-active slab.



Figure 9: Top locking point of multipoint assembly, active slab.



Figure 10: Middle third of multipoint assembly, active slab.



Figure 11: Bottom third of multipoint assembly, active slab.



Figure 12: Handle.



Figure 13: Keeper at locking-side jamb. Gasket on jamb around keeper.



Figure 14: Rollers at bottom of active slab, locking-side corner.



Figure 15: Rollers at bottom of active slab, locking-side corner.



Figure 16: Rollers at bottom of active slab, interlock-side corner.



Figure 17: Rollers at bottom of active slab, interlock-side corner.



Figure 18: Gear at middle of multipoint assembly.



Figure 19: All gasket profiles.



Figure 20: Slot at bottom of active slab interlock.



Figure 21: Modified "meeting stile cover" fastened to active slab.



Figure 22: Modified “meeting stile cover” fastened to active slab. Pile weather-strip.



Figure 23: Modified “meeting stile cover” profile.



Figure 24: “Meeting stile cover” fastened to in-active slab. Weather-stripping.

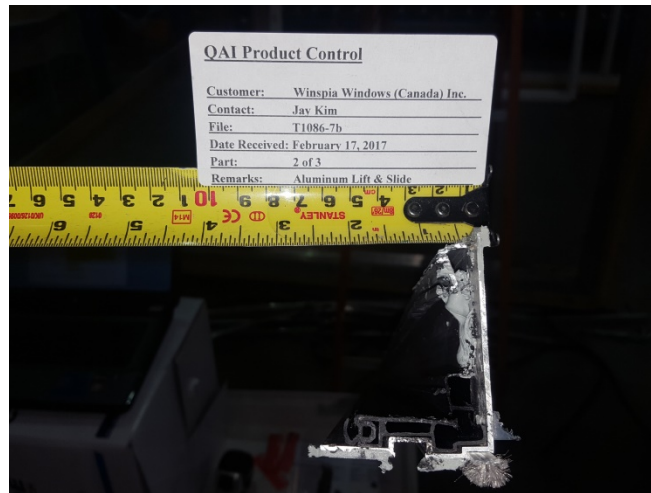


Figure 25: "Meeting stile cover" profile with "vent meeting stile" profile inserted.

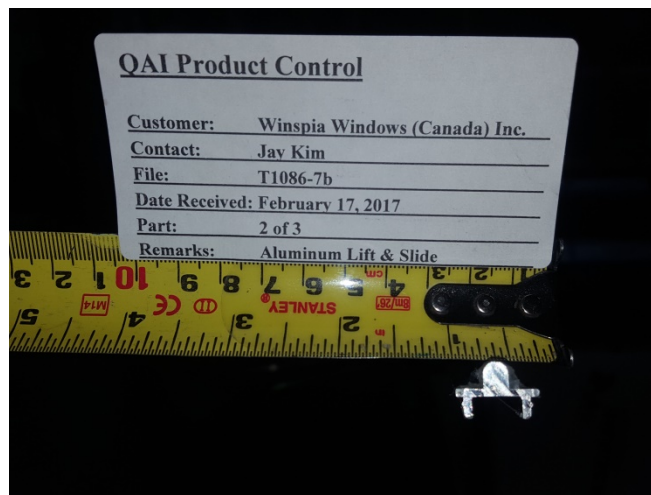


Figure 26: "Bottom rail" profile.



Figure 27: "Top rail" profile.



Figure 28: "Wind screen bar" profile with pile weather-strip.



Figure 29: Screw fastening frame to buck.



Figure 30: Reinforcement profile.

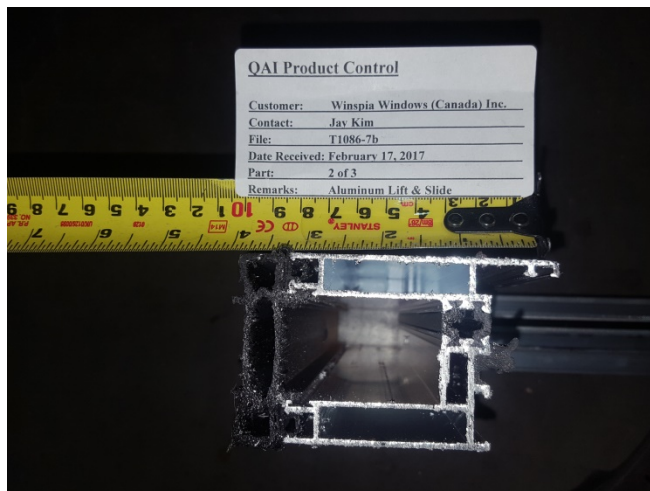


Figure 31: "Fix vent" profile at bottom of in-active slab.



Figure 32: Slab profile consisting of "vent out" and "vent in" profiles.

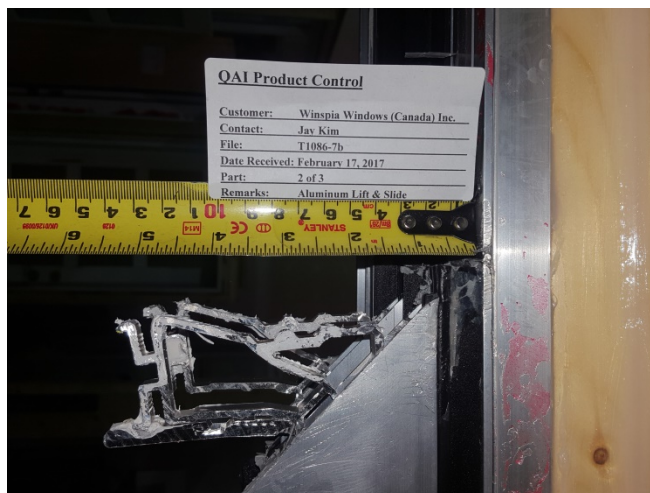


Figure 33: Corner key at slab corner joints.

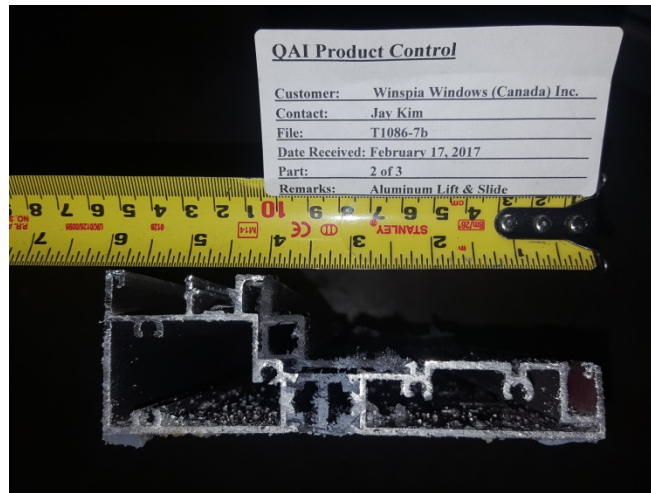


Figure 34: Frame profile consisting of “frame in”, “frame out”, and “frame cover” profiles.



Figure 35: Fasteners at frame corner joints.



Figure 36: Shim at jamb.

<END>