

CLIENT: ACRO Aluminum Inc.
5430 275 Street
Langley, BC
V4W 3X7
Canada

Summary Report No: BUR0323-DW-A

Issue Date: April 3, 2024

SAMPLE ID: ACRO Aluminum Inc. 8000 Series Vent Window.

SAMPLE DESCRIPTION: Width: 1257 mm; Height: 800 mm. See page 3 for full description.

SAMPLING DETAIL: Test sample from ACRO Aluminum Inc. was submitted directly to QAI.

DATE OF RECEIPT: Samples were received at QAI Burnaby, BC Division on April 2, 2024.

TESTING PERIOD: Testing was conducted on April 2, 2024.

LOCATION: QAI Laboratories Ltd., Burnaby, BC, Canada.

AUTHORIZATION: Proposal 23MT11171, signed by Brent Friesen, dated January 3, 2024.

TEST PROCEDURE: Testing was performed following the methods and requirements outlined in the following standards:

- ASTM E283-19 - *Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen*, 2019.
- ASTM E331-00(2016) - *Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference*, 2000.
- ASTM E330/E330-14 *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Air Pressure Difference (ASTM E330)*.

CONCLUSIONS:

- Maximum air leakage recorded at ± 75 Pa ($\sim \pm 1.57$ psf) = 0.133 L/s/m² (0.026 cfm/ft²).
- Maximum pressure differential achieved without water penetration 720 Pa (~ 15.04 psf).
- Maximum pressure differential achieved during structural performance testing without breakage 3360 Pa (~ 70.18 psf).

CONTENTS: Summary report pages 1 through 11.

Prepared By

**Signed for and on behalf of
QAI Laboratories, Ltd**



**Daniel Silva Zuleta
Project Manager**

**Neil Dumont
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1.0 PRODUCT DESCRIPTION

8000 Series Vent Window		
Frame:	Description:	Aluminum main frame profile. Thermally broken aluminum frame nosing profile. Frame dimensions: Width: 1257 mm; Height: 800 mm.
	Joints:	Main frame – Butt joints. Frame nosing – Miter cut corners.
Sash:	Description:	Thermally broken aluminum sash profile. Sash dimensions: Width: 1104 mm; Height: 646 mm.
	Joints:	Mitre cut corners.
Weather-stripping:	Frame:	None.
	Sash:	<ul style="list-style-type: none"> Four lengths of bulb-seal gaskets inserted in the interior-most T-slot of the sash profile. Miter cut corners. Four lengths of bulb-seal gaskets inserted in the exterior-most T-slot of the sash profile. Miter cut corners.
Drainage:	Frame:	Two 1” slots cut through the frame nosing sill. One slot centered at 5-1/2” from the inner face of either jamb.
	Sash:	None.
Glazing:	Description:	Two 6mm tempered glass panes. Overall IGU width of 25 mm.
Hardware:	Locking Lever:	Two locking levers on the bottom rail. One lever lock centered at 8” from the outer edge of either stile, each was fastened with two #10 x 3/4” countersunk machine screws.
	Keepers:	Two keepers on the sill, clipped to the frame nosing, aligned to the locking levers.
	Hinges:	Two awning hinges used, one along each jamb/stile. Each hinge was centered at 8-1/2” from the inner face of the head.

2.0 SAMPLES INSTALLATION

The wooden test buck frames were constructed of nominal 2” x 12 and nominal 2” x 6 wood framing. The nominal 2” x 12” wood framing was used to create the outer perimeter of the test buck while the nominal 2” x 6” wood framing was used to create the inner perimeter of the test buck to achieve the required distance from the test apparatus.

For more details on the installation, refer to the vertical and horizontal cross-sectional drawings.

TABLE 1: TEST CONDITIONS

Test Conditions	
Date of Testing:	April 2, 2024
Test Location:	QAI Laboratories, Burnaby, BC
Ambient Temperature:	21.8°C (71.2 °F)
Ambient Pressure:	102.1 kPa (14.8 psi)
Sample Size:	1257 mm x 800 mm (~ 50 in x 32 in) – Width x Height

This summary report includes tests performed on a specimen of specific dimensions. Actual product performance may be affected by variations in the window’s dimensions, assembly details, and installation method. The drawings supplied by the client were not verified by QAI for the window unit tested and are shown in Appendix A.

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3.0 ASTM E283 – AIR LEAKAGE RESISTANCE TESTING

TEST PROCEDURE

The sample was pressurized to ± 75 Pa ($\sim \pm 1.57$ psf) and ± 300 Pa ($\sim \pm 6.27$ psf) with a vacuum and the air leakage was recorded when the pressure stabilized.

TEST REQUIREMENTS

The air leakage measured at pressure differentials of ± 75 Pa ($\sim \pm 1.57$ psf) must not exceed **1.0 L/s/m² (0.2 cfm/ft²)**.
 The air leakage measured at pressure differentials of ± 300 Pa ($\sim \pm 6.27$ psf) does not have a limit and was only reported.

TEST RESULTS

TABLE 2: AIR LEAKAGE RESISTANCE TEST – SUMMARY OF RESULTS OF THE 8000 SERIES VENT WINDOW

Test Pressure Differential	Air Leakage over Sample Area	Test Results
+75 Pa ($\sim +1.57$ psf)	0.133 L/s/m ² (0.026 cfm/ft ²)	Pass (Infiltration)
-75 Pa (~ -1.57 psf)	0.089 L/s/m ² (0.018 cfm/ft ²)	Pass (Exfiltration)
+300 Pa ($\sim +6.27$ psf)	0.235 L/s/m ² (0.046 cfm/ft ²)	Reported Only (Infiltration)
-300 Pa (~ -6.27 psf)	0.273 L/s/m ² (0.054 cfm/ft ²)	Reported Only (Exfiltration)

4.0 ASTM E331 – WATER PENETRATION RESISTANCE TESTING

TEST PROCEDURE

The exposed face of the samples was sprayed with water supplied at 4.38 L/m²·min (0.014 cfm/ft²) uniformly across the surface. Simultaneously, a positive pressure load was applied to the sample using a vacuum. The test was run at a pressure differential of 720 Pa (~ 15.04 psf) for 24 minutes duration. During water application, QAI observed the assembly for any visible signs of water on the unexposed test assembly side.

TEST REQUIREMENTS

Water shall not penetrate through to the unexposed face of the sample during testing.

TEST RESULTS:

TABLE 3: WATER PENETRATION RESISTANCE TEST – SUMMARY OF RESULTS OF THE 8000 SERIES VENT WINDOW

Test Pressure Differential	Test Duration	Water Supply Rate	Test Results	Additional Comments
720 Pa (~15.04 psf)	24 minutes	4.38 L/m ² ·min (0.014 cfm/ft ²)	Pass	No water penetration observed.

NOTE: The window frame was sealed to the test buck along the entire perimeter on the interior side and was not evaluated for water penetration at the frame corner joints.

5.0 ASTM E330 – STRUCTURAL PERFORMANCE OF EXTERIOR WINDOWS TESTING

TEST PROCEDURE

Testing was conducted in accordance with ASTM E330/E330M-14 Procedure A. One deflection gauge was located at midspan of the locking side rail and two gauges were located at 51mm (2”) from locking rail corners, one per corner.

A pre-load of 50% of design pressure was applied and sustained for 10 seconds. After 10 seconds, the pressure difference across the specimen was released followed by recovery period of 1 to 5 minutes to allow stabilization of the test specimen after which the displacement was recorded prior to the first pressure cycle.

Following, 100% of design pressure was applied and sustained for 10 seconds. The under-pressure deflection measurements were taken after a 10 second pressure hold period. Then, the pressure difference across the specimen was released, and after a 1-minute recovery period deformation readings were taken, and the sample was observed for damage, and the permanent set was measured after the 1-minute recover period. Following, the direction of the applied pressure was reversed, and the previous steps were repeated.

The deflection of the test specimen was calculate using the following formula:

$$\text{Deflection} = (DMDI - DMDP) - \left(\frac{(DTGI - DTGP) + (DMDI - DMDP)}{2} \right)$$

The deformation of the test specimen was calculate using the following formula:

$$\text{Deformation} = (DMDI - D MDF) - \left(\frac{(DTGI - DTGF) + (DMDI - D MDF)}{2} \right)$$

Where,

DTGI = Recorded displacement of the gauge at the left section after pre-load.

DMDI = Recorded displacement of the gauge at mid-span after pre-load.

DBGI = Recorded displacement of the gauge at the right section after pre-load.

DTGP = Recorded displacement of the gauge at the left section at design pressure.

DMDP = Recorded displacement of the gauge at mid-span at design pressure.

DBGP = Recorded displacement of the gauge at the right section at design pressure.

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DTGF = Recorded displacement of the gauge at the left section after recovery.
 DMDF = Recorded displacement of the gauge at mid-span after recovery.
 DBGF = Recorded displacement of the gauge at the right section after recovery.

TEST REQUIREMENTS

The measured deflection shall not be equal or greater to L/175. The allowable deflection limit is 7.2 mm (0.283 in).
 The measured deformation shall not be equal or greater to L * 0.3%. The allowable deformation limit is 3.8 mm (0.149 in)

Where,

L is the length of the measured member, noted at 1257 mm (49.5 in).

TEST RESULTS:

TABLE 4: STRUCTURAL PERFORMANCE OF EXTERIOR WINDOWS TEST – SUMMARY OF RESULTS OF THE 8000 SERIES VENT WINDOW

Ultimate Load kPa (~psf)	Deflection mm (in)	Deformation mm (in)	Pass / Fail	Comments
3.36 (~70.18)	0.9 mm (0.036 in)	0.1 mm (0.002 in)	Pass	No failure observed.
4.32 (~90.23)	N/A	N/A	Fail	The fasteners used for the locks pull through the sash, making the sash disengage.

6.0 NOTES

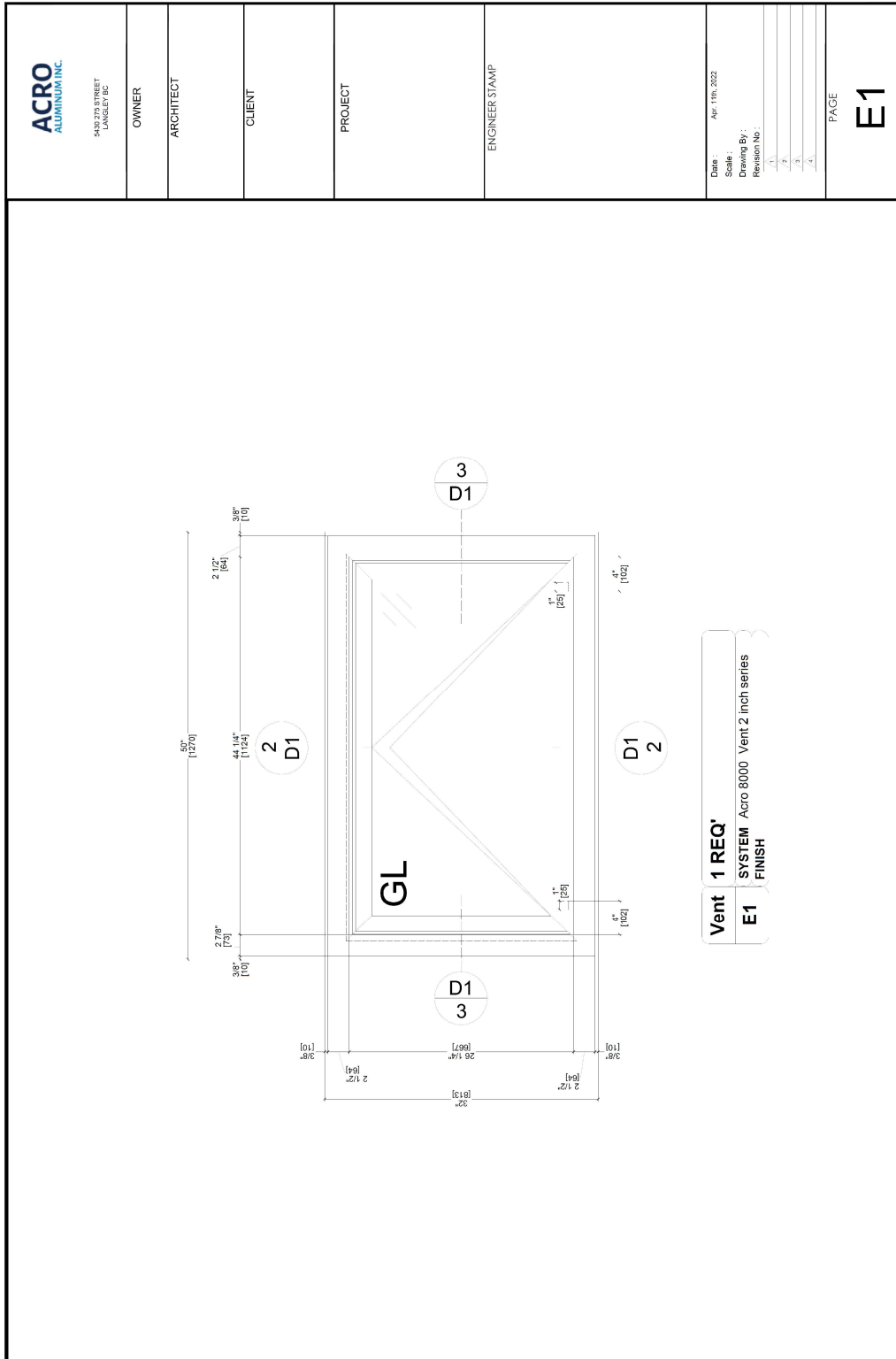
- This summary report is not a test report and should not be used in place of a test report since no dissection and profile confirmation took place. This summary report is not a confirmation of certification; certified products will be marked with a QAI logo. The results previously stated relate only to the product tested. Should you have any questions, please do not hesitate to contact QAI Laboratories Ltd. at 604-527-8378.
- Products not installed according to the installation method described in this report may not perform to an equivalent performance level.
- Testing records will be retained by QAI Laboratories for a period of minimum of four years from the original test date.

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APPENDIX A
(Drawings and photographs specifications)

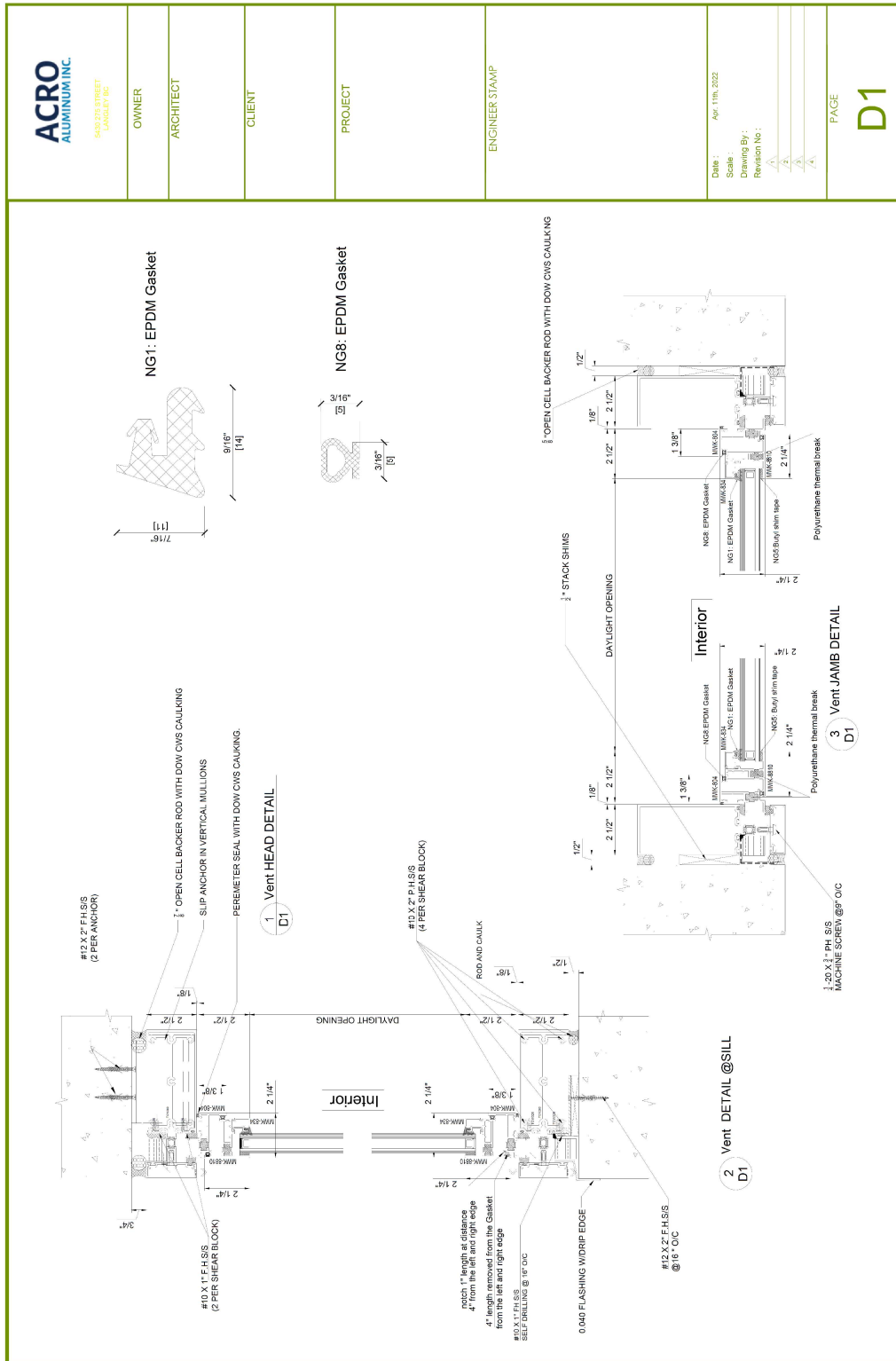
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Elevation Drawing



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Vertical and Horizontal Cross-Sectional Drawings



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Sample Photographs

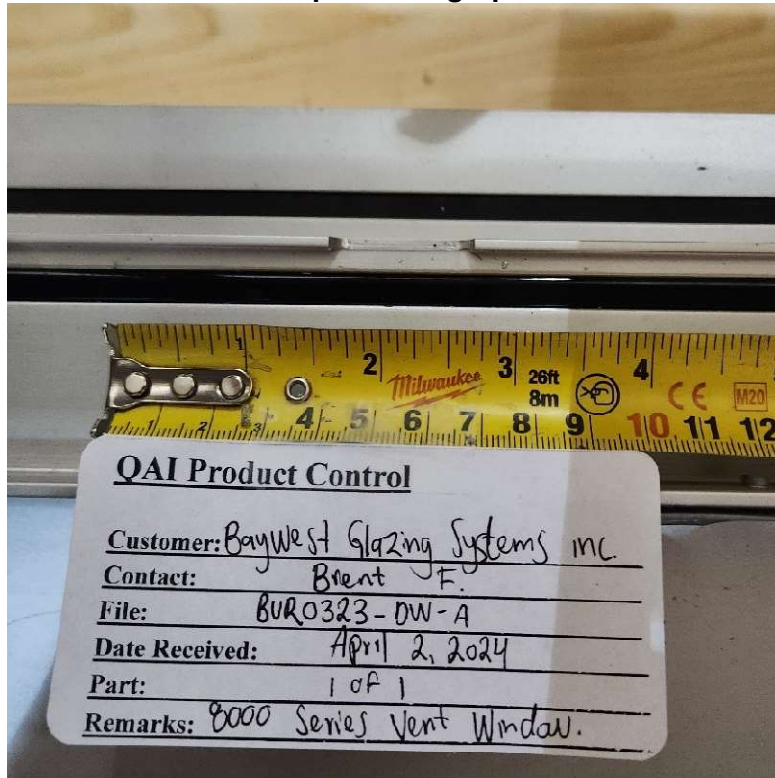


Figure 1: Drainage through the sill.



Figure 2: Lever lock and keeper.

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REPORT REVISION HISTORY

Date	Revision	Change Description	Initials
April 3, 2024	0	Original Report: ACRO Aluminum Inc. 8000 Series Vent Window.	DSZ

*****<END OF REPORT>*****