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PERFORMANCE EVALUATION OF THE WINDSPEC INC., "WINDSPEC 575 FRAMELESS GLAZING VENT" WINDOW UNIT IN ACCORDANCE WITH NAFS - AAMA/WDMA/CSA 101/I.S.2/A440-08

Report to:	Windspec Inc. 1310 Creditstone Road Concord, Ontario L4K 5T7
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Report No.:	12-06-M0547-14P 7 Pages, 1 Appendix
Proposal No.:	12-006-09659
Date:	May 31, 2013

1.0 INTRODUCTION

At the request Windspec Inc., Exova was retained to conduct the performance evaluation of an aluminum awning window identified as the "575 Frameless Glazing Vent" Window in accordance with NAFS - AAMA/WDMA/CSA 101/I.S.2/A440-08 Windows Standard as outlined in proposal number 12-006-09659.

Exova Specimen No.:	12-06-M0547-14
Type:	Aluminium Awning Window
Model:	575 Frameless Glazing Vent
Overall Window Size:	1,500 mm (wide) x 900 mm (high)
Glazing Size:	1,200 mm (wide) x 790 mm (high)
Frame Material:	Al (Aluminium)
Reinforcement:	No
Thermal Break:	Yes
Glazing Engagement	Not Applicable
Glazing:	6mm clear / ½" Spacer / 6mm clear
Glazing Type:	Framless Glazing sealed with Structural Sealant
Spacer Type:	½" Spacer
Setting Blocks:	None. Frameless Unit
IGMAC No.:	N/A

Location of Lever:

Lever: Mid-Point at Head of Sash.
Locks: 220 mm from the edge of sash. Total of two (2).

Note: Details and drawings as provided by the manufacturer for the above unit have been included in Appendix A.

2.0 PROCEDURE

The Building Performance Centre at Exova Mississauga evaluated the above window unit in accordance with the procedures of the NAFS - AAMA/WDMA/CSA 101/I.S.2/A440-08 Window test standard. The following specific test program was conducted:

- Operating Force — Section 5.3.1
- Air Leakage Resistance — Section 5.3.2
- Water Penetration Resistance — Section 5.3.3
- Uniform Load Tests — Section 5.3.4
- Forced Entry Resistance Test — Section 5.3.5
- Projected Hardware Load Test — Section 5.3.6.6.6

3.0 RESULTS

Table 1- Summarized Testing Results in Accordance with NAFS - AAMA/WDMA/CSA 101/I.S.2/A440-08 Exova Specimen No.: 12-06-M0547-14

Test	Requirements	Test Results	Rating
Air Leakage Resistance (Clause: 5.3.2) **Test Date:** May 21, 2013	**Maximum Allowable Air Leakage:** 1.5 L/s m^2 @ 75 Pa Canadian Air Infiltration / Exfiltration Levels (CW-Class): A2 Level: < 1.5 L/s m^2 A3 Level: < 0.5 L/s m^2 Fixed Level: < 0.2 L/s m^2	Infiltration Q = 0.08 L/s m^2 Exfiltration Q = 0.08 L/s m^2 Average Q = 0.08 L/s m^2 @ 75 Pa Unit Area = 1.350 m^2	**Meets Gateway:** AP-CW **Canadian Level:** A3
As Per Client Request **Optional Air Leakage Resistance** (Clause: 5.3.2) **Test Date:** May 21, 2013	**Maximum Allowable Air Leakage:** 1.5 L/s m^2 @ 300 Pa Canadian Air Infiltration / Exfiltration Levels (CW-Class): A2 Level: < 1.5 L/s m^2 A3 Level: < 0.5 L/s m^2 Fixed Level: < 0.2 L/s m^2	Infiltration Q = 0.19 L/s m^2 Exfiltration Q = 0.22 L/s m^2 Average Q = 0.19 L/s m^2 @ 75 Pa Unit Area = 1.126 m^2	**Meets Gateway:** AP-CW **Canadian Level:** A3
Water Penetration Resistance (Clause 5.3.3) **Test Date:** May 21, 2013	**Gateway Performance Requirements for AP-CW25:** Pressure: 260 Pa **Optional Performance Requirements for AP-CW100 (US / CAN):** Pressure: 730 Pa **Requirement:** No water leakage or penetration at specified pressure differential	No water penetration occurred at pressure differential of 260 Pa. Meets AP-CW25 Class for Water Penetration Resistance (with/without screen). No water penetration occurred at pressure differential of 730 Pa. Meets AP-CW100 Class for Water Penetration Resistance (with/without screen). Screen is internally mounted and does not interfere with seals.	**Meets Gateway:** AP-CW25 **Highest Class Achieved:** AP-CW100 (US / CAN)

Table 1 (Continued) - Summarized Testing Results in Accordance with NAFS - AAMA/WDMA/CSA 101/I.S.2/A440-08
Exova Specimen No.: 12-06-M0547-14

Test	Requirements	Test Results	Rating
Uniform Load Deflection Test at Design Pressure (Clause 5.3.4.2) **Test Date:** May 28, 2013	**Gateway Performance Design Pressure for AP-CW25:** +/- 1,440 Pa **Requirements:** - No permanent damage - Report Residual Sash Deflection - Report Net Deflection Results **Optional Performance Requirements for AP-CW70 (US / CAN):** +/- 3,360 Pa	Glazing Length (*L)* = 1,200 mm Allowable (*L/175)* = 6.9 mm Net Deflection at Design Pressure: + 3,360 Pa = 1.8 mm - 3,360 Pa = 2.5 mm Residual Deflection: + 3,360 Pa = 0.1 mm - 3,360 Pa = 0.2 mm - No Permanent Damage Observed - Window Operates - Window Meets *L/175* deflection requirement	**Meets Gateway:** AP-CW25 **Highest Class Achieved:** AP-CW70 (US / CAN)
Uniform Load Structural Test at 150% Design Pressure (Clause 5.3.4.3) **Test Date:** May 28, 2013	**Gateway Performance Structural Pressure for AP-CW25:** +/- 2,160 Pa **Requirements:** - No permanent damage - Report Residual Sash Deflection - Glazing Length = 1,200 mm - Allowable residual = 0.3% of Sash Length **Optional Performance Requirements for** **AP-CW70 (US / CAN):** +/- 5,040 Pa	Allowable residual = 3.6 mm Residual Deflection: + 5,040 Pa = 0.1 mm (0.01%) - 5,040 Pa = 0.1 mm (0.01%) - No Permanent Damage Observed - Window Operates	**Meets Gateway:** AP-CW25 **Highest Class Achieved:** AP-CW70 (US / CAN)

Table 1 (Continued) - Summarized Testing Results in Accordance with NAFS - AAMA/WDMA/CSA 101/I.S.2/A440-08 Exova Specimen No.: 12-06-M0547-14			
Test	**Requirements**	**Test Results**	**Rating**
Operating Force (Clause 5.3.1.1.1) **Test Date:** May 21, 2013	**Performance Requirements to Latch Products (CAN/US):** Open / Close shall be less than 100 N **Operation Force Requirements for Lever Type Operators (CAN):** Force on the mid-point(s) of operating handle to initiate motion. (Fic) from fully closed < 60 N (Fio) from fully open < 60 N Force on the mid-point of operating handle to maintain motion. (Fmc) from fully closed < 30 N (Fmo) from fully open < 30 N **Operation Force Requirements for CW Lever Type Operators (US):** Force on the mid-point(s) of operating handle to initiate motion. (Fic) from fully closed & (Fio) from fully open : Report Only Force on the mid-point of operating handle to maintain motion. (Fmc) from fully closed < 135 N (Fmo) from fully open < 135 N	**Measured Force to Initiate Operation :** (Fic) =35.3 N (Fio) = 29.1 N (Fmc) = 22.2 N (Fmo) = 20.5 N **Inside Location** Left Latch (Open) = 24.9 N Left Latch (Close) = 30.3 N Right Latch (Open) = 31.6 N Right Latch (Close) = 37.7 N	Meets the Requirements for Canadian and US Operating Force Specification
Projected Hardware Load Test Pressure (Clause 5.3.6.6.6 **Test Date:** May 30, 2013	Sash opened to 45°, or to limit of its travel, whichever is less. Apply concentrated load of 15 N to unrestricted edge, zero deflection measuring device, increase load to 70 N for 60+/- 5 sec. Measure vertical deflection = d Maximum allowable d = No deflection limit for CW, report deflection reading only No signs of failure, permanent deformation or breakage.	**Measured Deflection:** d = 0.3 mm Lite closed properly with no signs of failure, permanent deformation or breakage.	**Pass**

Table 1 (Continued) - Summarized Testing Results in Accordance with NAFS – AAMA/WDMA/CSA 101/I.S.2/A440-08 Exova Specimen No.: 12-06-M0547-14

Test	Requirements	Test Results	Rating
Forced Entry Resistance Clause 5.3.5 (ASTM F 588) **Test Date:** May 31, 2013 Type B Window	Initial Preparation : Remove all exterior screws, glazing retainers or other fasteners which can be removed using common tools , within a period of five (5) minutes Op # 1 Hand Manipulation Op # 2 Tool Manipulation Static Loading L1 = 890 N (200 lbf) L2 = 445 N (100 lbf) L3 = 155 N (35 lbf) Test B1 Applied Load L2 & L2 Test B2 Applied Load L1, L2 & L2 Test B3 Applied Load L1, L2 & L2 Repeat Op # 1 Hand Manipulation Op # 2 Tool Manipulation Window assembly capable of restraining, delaying, or frustrating forced entry	No Removable Exterior Fixtures No entry gained No entry gained Resisted Applied Load L2 & L2 Resisted Applied Load L1, L2 & L2 Resisted Applied Load L1, L2 & L2 Repeat No entry gained No entry gained Window assembly capable of restraining, delaying, or frustrating forced entry	**Pass, Grade 20**

4.0 MODIFICATIONS

Modifications were made to Windspec Inc., "*575 Frameless Glazing Vent*" Window Unit, Exova Specimen No.: 12-06-M0547-14 during testing to achieve the results stated in this report.

- Bulb seal corner joints were sealed with generic silicone.

5.0 CONCLUSIONS

Based on the results of the testing summarised in Table 1, Windspec Inc, "*575 Frameless Glazing Vent*" Window Unit, Exova Specimen No.: 12-06-M0547-14 met the following requirements as outlined in the NAFS - AAMA/WDMA/CSA 101/I.S.2/A440-08 Window Standard:

Class Performance Rating

• Operating Force	Pass
• Air Leakage Resistance	AP-CW: 75 Pa (1.6 PSF) (A3 Level Canadian)
• Air Leakage Resistance (Optional)	AP-CW: 300 Pa (6.2 PSF) (A3 Level Canadian)
• Water Penetration Resistance	AP-CW100: 730 Pa (15.0 PSF)
• Uniform Load Tests	AP-CW70
• Forced Entry Resistance Test	Grade 20
• Projected Hardware Test	Pass

Class Product Designation

- Class CW—PG70-AP 1,500 mm x 900 mm (60" x 36") – Type AP

Product Manufacturer:	Windspec Inc.
Product Type:	Awning Window
Product series/model:	575 Frameless Glazing Vent
Primary product designator:	Class CW—PG70-AP 1,500 mm x 900 mm (60" x 36") – Type AP
Optional Secondary designator:	Air Leakage Resistance = A3 Level Canadian Water Penetration Resistance = 730 Pa (15.0 PSF) Negative Design Pressure (DP) = - 3,360 Pa (-70.0 PSF) Positive Design Pressure (DP) = + 3,360 Pa (+70.0 PSF) Test Completion Date: May 31, 2013

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