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CAN-BEST
Established 1985

TEST REPORT

Performance Evaluation of
Double Sliding Window
"Type B"
Performed in Accordance with:
AAMA/WDMA/CSA101/I.S.2/A440-11
& CSA A440S1-09

Report No.: L17-540-4830
Report Date: May 8, 2017

Prepared for:
Falbo Aluminum Products
66 Rivalda Rd.
Toronto, ON M9M 2M3
Canada

Overall Performance Rating

Class R-PG45: Size tested 1770 mm x 1390 mm-Type HS
Class R-PG45: Size tested 69.69 in x 54.72 in-Type HS
Positive Design Pressure: 2160 Pa (45.11 psf)
Negative Design Pressure: 2160 Pa (45.11 psf)
Water Penetration Resistance, With Screen: 730 Pa (15.24 psf), Without Screen: 620 Pa (12.95 psf)
Canadian Air Infiltration/Exfiltration: A3
Forced Entry Resistance: Grade 10

Respectfully submitted by:

CANADIAN BUILDING ENVELOPE
Science and Technology (CAN-BEST)

Tests Supervised by:

James R. Scott, P.Eng.
Test Supervisor

Person in Responsible Charge:

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Director, Research and Testing Services

1. *This report does not constitute certification of the test product. The reported test results refer only to the specimen tested. No representation is made that other samples of similar design will feature like performance.*
2. *This report was prepared for the consideration of the addressee only. It shall not be used by any other party without the written consent of CAN-BEST.*
3. *This report may not be reproduced or quoted in partial form without the approval of CAN-BEST.*

1. INTRODUCTION

Canadian Building Envelope Science and Technology (CAN-BEST) was retained by Falbo Aluminum Products to test one Double Sliding Window. Testing was conducted in accordance with the performance requirements outlin in AAMA/WDMA/CSA101/I.S.2/A440-11 'North American Fenestration Standard/Specification for Windows, Doors, and Skylights'. Where applicable, testing was carried out in accordance with the corresponding ASTM standard test method or the CSA A440 S1-09 'Canadian Supplement to AAMA/WDMA/CSA101/I.S.2/A440 North American Fenestration Standard/ Specification for windows, doors, and skylights'

This report covers tests carried out on one specimen of specific dimensions. Product performance is affected by variations in its dimensions, assembly details and installation method. The reader is advised to ensure product conformity with all the details of the test sample described in the following section.

No conclusions regarding glass structural performance may be drawn from the reported results.

2. SAMPLE DESCRIPTION

Designation:	"Type B"	
Type:	Double Sliding Window, 1770 mm wide by 1390 mm high (69.69 in by 54.72 in)	
Sampling:	Sampling of the test specimen was carried out by the Client.	
Specimen Details:	Details of specimen construction as provided by the client and verified by CAN-BEST are included in Appendix A. (2 pages)	
Drawings:	*Vertical and horizontal sections*	*2 pages*
	Bill of materials	*1 page*
	Copy of the above drawing(s), stamped "Canadian Building Envelope Science and Technology", is enclosed with this report.	

3. TEST RESULTS

Detailed test results are presented in Tables (1.1) and (1.2) for the Gateway and Optional Performance requirements respectively.

Notes:

1. This report does not constitute certification of this product, which may only be granted by an Accredited Certification Agency.

2. The reported results were secured by using the designated test methods and they (DO) indicate compliance with the performance requirements of the referenced publication.

3. The product tested is detailed in drawings, which were supplied by the manufacturer and annexed to this report. Any other descriptions were supplied verbally by the manufacturer. The general descriptions in this report are for reference only.

TABLE (1.1): Test Results, Gateway Performance Requirements **Class R-PG15-HS**
Gateway Size: 1600 mm x 1100 mm (63.0 in x 43.3 in)
Test Size: 1770 mm x 1390 mm (69.69 in x 54.72 in)

Test Start Date: April 5, 2017 Test Finish Date: April 11, 2017

Test	Specifications	Test Results	Rating
Operating Force **9.3.1**	Maximum allowable forces, N (lb): *Initiate:* 90(20.25) *Maintain:* 45(10.13) *Lock:* 100 (22.50)	Measured Operation Forces, N (lb): *Initiate:* 50 (11.20) *Maintain:* 40 (9.00) *Lock:* 22 (5.00)	**PASS**
Air Leakage Resistance **9.3.2** *ASTM E283*	Rate of air leakage shall be less than or equal to the following: ***l/s/m² (cfm/ft²)*** *Cdn A2 (Inf./Exf.)* 1.5 (0.30) *Cdn A3 (Inf./Exf.)* 0.5 (0.10) *Cdn Fixed (Inf./Exf.)* 0.2 (0.04) Test Pressure, Pa (psf): 75 (1.57)	Surface Area, m^2 (ft^2) 2.460 (26.48) Measured Air Flow, l/s (cfm): *Infiltration:* 0.82 (1.74) *Exfiltration:* 0.94 (2.01) Rates of Air Flow, $l/s/m^2$ (cfm/ft^2): *Infiltration:* 0.33 (0.07) *Exfiltration:* 0.38 (0.08)	**PASS** Canadian **A3**
Water Resistance **9.3.3** *ASTM E 547*	No leakage past innermost plane following four pressure cycles, each five minutes "ON" and one minute "OFF". Test Pressure, Pa (psf): 140 (2.86) *(Equivalent to wind speed of 33 mph)*	No leakage past innermost plane was observed. ***Test*** ***Result*** *With Screen* *OK* *Without Screen* *OK*	**PASS**
Uniform Load Deflection **9.3.4.2** *ASTM E 330*	Report net deflections at the following test pressure: Test Pressure, Pa (psf): 720 (15.04) *(Equivalent to wind speed of 77 mph)*	Measured net deflections, mm (in): Span = 1370 (53.94) *Inward:* 8.9(0.352) *Outward:* 8.8(0.347)	**REPORT ONLY**
Uniform Load Structural **9.3.4.3** *ASTM E 330*	No glass breakage or permanent damage to window components at the following test pressure, Pa(psf). Net Permanent Deflection to be less than 0.4% of span, or 5.5 mm (0.216 in). Test Pressure, Pa (psf): 1080 (22.56) *(Equivalent to wind speed of 0 mph)*	Measured net permanent deflection of Meeting Stiles, mm (in): Span = 1370 (53.94) ***Deflection*** ***% Span*** *Inward:* 0.1(0.005) 0.01 *Outward:* 0.2(0.006) 0.01	**PASS**

TABLE (1.1): Test Results, Gateway Performance Requirements, Continued — **Class R-PG15-HS**
Gateway Size: 1600 mm x 1100 mm (63.0 in x 43.3 in)
Test Size: 1770 mm x 1390 mm (69.69 in x 54.72 in)

Test Start Date: April 5, 2017 — Test Finish Date: April 11, 2017

Test	Specifications	Test Results	Rating
Forced Entry Resistance **9.3.5** *ASTM F 588*	No entry shall be gained during the following sequence of disassembly, load tests and hardware and sash manipulation tests: ***Disassembly T1:*** 5 minutes ***Loads: N (lbf)*** L1: 667 (150) L2: 333 (75) L3: 111 (25) ***Manipulation T1:*** 5 minutes	No entry was gained following the specified sequence of testing. ***Test*** — ***Results*** *Disassembly T1:* — *OK* *L1:* — *OK* *L2:* — *OK* *L3:* — *OK* *Manipulation T1:* — *OK*	**Grade 10**
Deglazing Test *ASTM E 987* **9.3.6.3**	No disengagement of glazing material from sash frame under the test load application indicated below: Test Loads, N (lbf): Stiles: 320 (71.94) Rails: 230 (51.70)	Measured Sash Deglazing (in): ***Member*** — ***Deglazing*** — ***%*** *Left Stile:* 1.17 (0.046) 9% *Right Stile:* 1.07 (0.042) 8% *Top Rail:* 0.91 (0.036) 7% *Bottom Rail:* 0.79 (0.031) 6%	**PASS**
Screen Strength **Cdn. Suppl. 5.1**	No disengagement or deformation, of the screen or fastening, after application of test load. Test Load, N (lbf): 60 (13.50)	No disengagement or deformation was observed after application of test load	**PASS**

TABLE (1.2): Test Results, Optional Performance Requirements — **Class R-PG45-HS**
Gateway Size: 1600 mm x 1100 mm (63.0 in x 43.3 in)
Test Size: 1770 mm x 1390 mm (69.69 in x 54.72 in)

Test Start Date: April 5, 2017 — Test Finish Date: April 11, 2017

Test	Specifications	Test Results	Rating
Water Resistance **9.3.3** *ASTM E 547*	No leakage past innermost plane following four pressure cycles, each five minutes "ON" and one minute "OFF". Test Pressure, Pa (psf): 620 (12.95) *(Equivalent to wind speed of 77 mph)*	No leakage past innermost plane was observed. ***Test*** — ***Max Pressure, Pa (psf)*** *With Screen* — *730 (15.24)* *Without Screen* — *620 (12.95)*	**PASS**
Uniform Load Deflection **9.3.4.2** *ASTM E 330*	Report net deflections at the following test pressures, Pa (psf): Inward Pressure: 2200 (45.91) Outward Pressure: 2200 (45.99) *(Equivalent to wind speed of 134 mph)*	Measured net deflections, mm(in): Span = 1370 (53.94) *Inward:* 28.1 (1.105) *Outward:* 29.5 (1.160)	**REPORT ONLY**
Uniform Load Structural **9.3.4.3** *ASTM E 330*	No glass breakage or permanent damage to window components, at Test Pressures, Pa (psf). Net Permanent Deflection to be less than 0.4% of span, or 5.5 mm (0.216 in). Inward Pressure: 3320 (69.42) Outward Pressure: 3240 (67.65) *(Equivalent to wind speed of 202 mph)*	Measured net permanent deflection of Meeting Stiles, mm(in): Span = 1370 (53.94) ***Deflection % Span*** *Inward:* 5.2(0.205) 0.38 *Outward:* 3.1(0.123) 0.23	**PASS**

* *Water Penetration Resistance Testing was carried out at pressure differentials equal to, and exceeding, the specified limit for U.S. applications.*

4. Modifications: The following modifications were performed on the specimen during testing in order to attain the reported results:

Water Resistance: Two drainage slots 57 x 5 mm were added to the exterior sill track.

Two drainage slots 20 x 5 mm were cut from the sealant between the flashing and the sill.

Revision Log:

Rev. No	Change	Date	Apprv. By
-	Original report issued	May. 8, 2017	EA

TEST SAMPLE DESCRIPTION Model: "Type B" HORIZONTAL SLIDER WINDOW

Item	Type, Material, Part #	Qty*	Size (W x H x D)	Location, Fastening, Seals, Comments
Frame	Horizontal Slider, Aluminum		1755 x 1390 x 128 (69.1" x 54.7" x 5.0")	Two primary operable sashes, one secondary operable sash, one secondary fix panel
Sash	Lift-out, Aluminum	1	855 x 1335 x 20 (33.7" x 52.6" x 0.8")	Primary sash, interior channel
	Lift-out, Aluminum	1	853 x 1336 x 20 (33.6" x 52.6" x 0.8")	Primary sash, exterior channel
	Lift-out, Aluminum	1	852 x 1338 x 20 (33.5" x 52.7" x 0.8")	Secondary sash, interior channel
Joinery				
Frame	Mechanical, Butt corners			Mechanically fastened with four # 8 x 1" screws per corner, sealed with butyl tape and flexible sealant prior to assembly
Sash	Mechanical, Butt corners			Mechanically fastened with one #8 x 1 screw per corner, sealed with flexible sealant prior to assembly
Installation	Wood buck			Mechanically fastened with three #10 x 2½" screws on jambs, frame perimeter sealed with polyurethane foam, and flexible sealant at exterior perimeter
Glazing				
Sash	Single-pane, Annealed glass			Glass thickness: 4 (0.16")
Fixed panel	Single-pane, Annealed glass			Glass thickness: 4 (0.16")
Glazing Method	Channel glazed			
	Glazing Gasket, flexible PVC	1 row		Glazing perimeter, each pane
Reinforcing	None			
Thermal Break	Hollow Section, PVC	1 row	15.5 (0.6") wide gap	Frame perimeter, crimped in place
Weatherstrips				
Primary Sash	Pile with fin	2 rows	Height: 3 (0.12")	Pull stile, top and bottom rails, interior and exterior faces, end sealed
	Pile with high fin	1 row	Height: 5.7 (0.22")	Meeting stiles, at interlock
Secondary Sash	Pile with no fin	2 rows	Height: 2.9 (0.11")	Inner sash, pull stile, top and bottom rails, interior and exterior faces
	Pile with no fin	1 row	Height: 2.5 (0.10")	Inner sash, meeting stile, at interlock

The above descriptions were provided by the manufacturer. Items and/or material properties were verified by CAN-BEST for general conformity only.

* Quantity is total unless otherwise specified

Item	Type, Material, Part #	Qty*	Size (W x H x D)	Location, Fastening, Seals, Comments
Drainage	Drain Slot	6	57 x 5 (2.2" x 0.20")	Sill, exterior channel, interior , 160 mm, 470 mm, 750 mm from the ends
	Drain Slot	6	57 x 5 (2.2" x 0.20")	Sill, exterior face, 160 mm, 470 mm, 750 mm from the ends
	Drain Slot	2	20 x 5 (0.8" x 0.20")	Sill, screen channel
	Drain Holes	2	Diameter: 6 (0.24")	Sill, exterior channel, at the ends, drained below the sill to flashing space
	Drain slots	2	20 x 5 (0.8" x 0.20")	Cut from exterior sealant, at the ends of sill flashing
Add-Ons				
Sash Adapter	Channel Section, Aluminum	1		Each pull jamb, full length, primary channel, sealed at the ends following assembly, each fastened with two #8 x ½" screws
Hardware				
Lock	Spring loaded latch, Metal	1		Each pull stile, primary sash, centre
Roller	Plastic	2		Ends of each bottom rail
Safety Lock	Metal	1		Head, exterior channel, 740 mm from fixed jamb
Screen			820 x 1310 x 9 (32.3" x 51.6" x 0.35")	Half screen, Exterior, Supported on 4 sides, Corner Keys: Interior Metal Crimped, Frame: Extruded Aluminum, Mesh: fiberglass, Spline: T
Swivel clip	Plastic	6		Each side, centre

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FALBO ALUMINUM SYSTEMS LTD.

Manufacturer of Storm Windows & Doors, Thermal Windows & Patio Doors.Vinyl & Aluminum

GP-2 Thermally Broken Alum. Windows

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Report No.:	L17-540-4830
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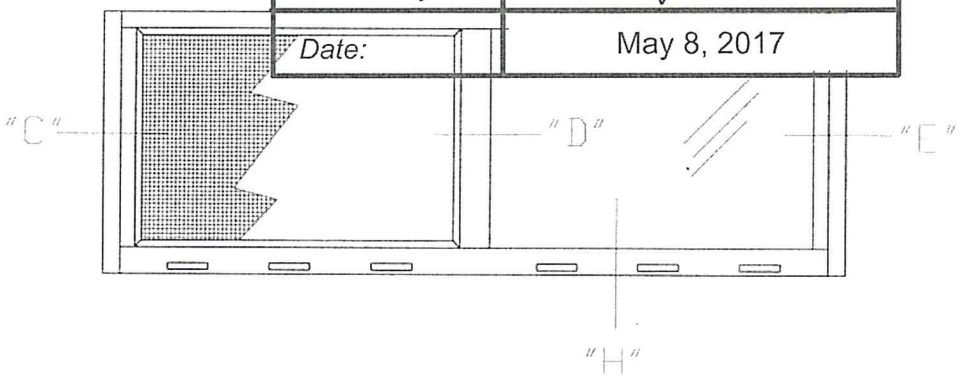

SIDE SLIDER

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FALBO ALUMINUM SYSTEMS LTD.

Manufacturer of Storm Windows & Doors, Thermal Windows & Patio Doors,Vinyl & Aluminum

GP-2 Thermally Broken Alum. Windows

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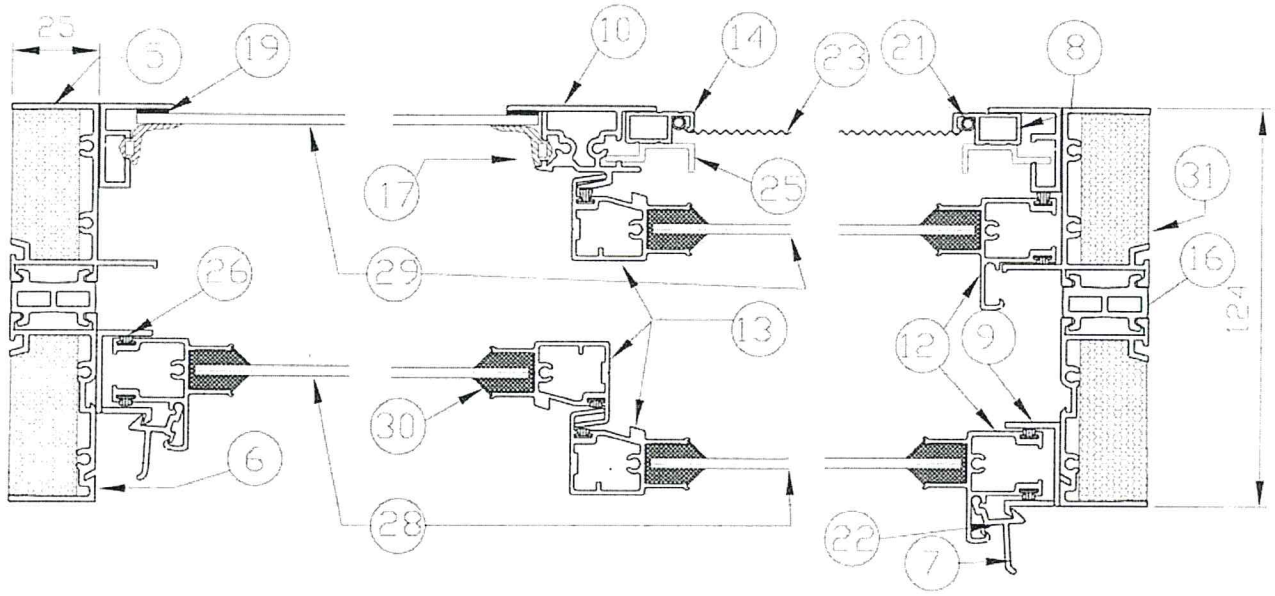

SECTION DETAIL "C"

SECTION DETAIL "D"

SECTION DETAIL "E"

SIDE SLIDER - HORIZONTAL CROSS SECTION

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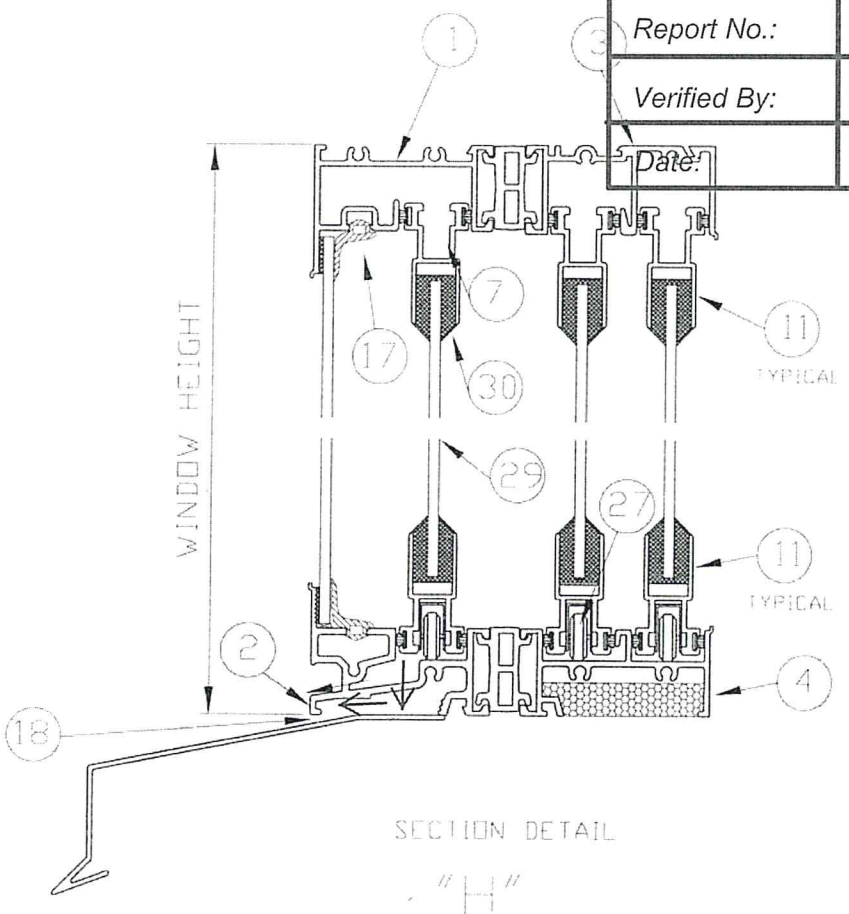
Manufacturer of Storm Windows & Doors, Thermal Windows & Patio Doors,Vinyl & Aluminum

GP-2 Thermally Broken Alum. Windows

SECTION DETAIL "I"



SECTION DETAIL "H"

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VERTICAL CROSS SECTION

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FALBO ALUMINUM SYSTEMS LTD.

Manufacturer of Storm Windows & Doors, Thermal Windows & Patio Doors,Vinyl & Aluminum

GP-2 List of Materials

ITEM	DESCRIPTION	DIE NUMBER
1	EXTERIOR HEADER -SIDE SLIDER	AS-61063
2	EXTERIOR SILL -SIDE SLIDER	AH-58511
3	INTERIOR HEADER -SIDE SLIDER	AS-58176
4	INTERIOR SILL - SIDE SLIDER	AS-58175
5	EXTERIOR JAMB / HEADER - COMBINATION	AS-58174
6	INTERIOR JAMB / HEADER - COMBINATION	AS-58172
7	SAFETY LOCK	WL-001-ALY
8	EXTERIOR SCREEN CHANNEL	AS-63077
9	INTERIOR SASH CHANNEL	AS-27413
10	CENTER BAR - SIDE SLIDER	AH-63076
11	TOP AND BOTTOM SASH - SIDE SLIDER	AS-27504
12	PULL RAIL - SIDE SLIDER	AS-29310
13	INTERLOCK SASH - SIDE SLIDER	AH-33203
14	SCREEN RAIL	AH-27438
15	SASH LOCK	AS-27414
16	FRAME THERMOBREAK	M-107
17	PUSH-IN SPLINE	M-296
18	EXTERIOR SEALANT - DRAIN HOLE EACH VERTICAL	
19		
20		
21	SCREEN SPLINE	S-316
22	SASH LOCK SPRING	SB-00
23	INSECT SCREEN MESH	FIBREG
24		
25	PVC SCREEN LOCK CLIP	# 88
26	WEATHERSTRIPPING PILE WITH FIN SCHLEGEEL	RFCF018715-4P-GY
27	SASH ROLLER	120-027-STM
28	SEALED UNIT	
29	SINGLE GLASS	4mm CLEAR
30	SASH GLAZING SPLINE	V-704
31	STYROFOAM INSULATION	PROFILE1+2

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