

**PERFORMANCE TESTS IN ACCORDANCE WITH
AAMA/WDMA/CSA 101/I.S.2/A440-08**



Report No.:

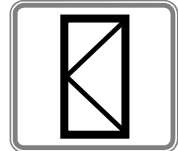
AI-03820-B4 (Reissue-10)

Manufactured under licence by:

**DOMINION DOORS AND WINDOWS LTD.
130 PENNSYLVANIA AVE. UNIT 8
CONCORD, ONTARIO
L4K 4A8**

Test Report Summary:

Product type: PVC Casement Window
Product series/model: GP327 Series Casement Window, 3 1/4" & 4 1/2" Frames



Primary product designator: **Class CW-PG60-C Size tested 998 x 1798 (39 x 71)**

Optional secondary designator: Positive Design pressure (DP) = 2880 Pa (60.0 psf)
Negative design pressure (DP) = -2880 Pa (-60.0 psf)
Water penetration resistance test pressure = 730 Pa (15.0 psf)
Canadian air infiltration / exfiltration level = A3 Level

Test completion date: 04/08/2013
Report date: 05/06/2013
Reissue date: 08/22/2013
Number of pages: 8

CAN/CSA A440-00 ratings: **A3 / B7 / C4 / F20 / S1**

Note: Reference must be made to Air-Ins Inc. complete report for test specimen description and detailed test results.

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PERFORMANCE TESTS IN ACCORDANCE WITH AAMA/WDMA/CSA 101/I.S. 2/A440-08

1.0 INTRODUCTION

Air-Ins Inc. laboratory was retained by " **Acrylon Plastics** " to test a window according to the performance levels in the AAMA/WDMA/CSA 101/I.S.2/A440-08 Standard. The original report issued to " **Acrylon Plastics** " is hereby reissued to " **Dominion Doors and Windows Ltd.** " for their use as an under licence product manufacturer. The sample components and manufacturing are documented in section 2.0.

Note concerning the use of units of measurement in this report:

According to the AAMA/WDMA/CSA 101/I.S.2/A440-08 Standard, the use of SI (metric) units is the standard, while IP (Imperial) values given in parentheses are for reference purposes only, and are inexact rounded values. Section 5.0 contains testing results converted to IP units for the sake of convenience only. The only exception to using Si values is in the Performance Grade (PG) portion of the product designation.

Note concerning drawings:

The drawings reviewed for the production of this report are stamped and are on file at Air-Ins Inc. The availability of individual drawings will be at the discretion of the client.

2.0 DESCRIPTION OF THE SPECIMEN TESTED

Type: Casement, type A of AAMA/WDMA/CSA 101/I.S. 2/A440-08.
- Number of sashes: (1) outward-opening sash with rotary operator

Model: GP327 Series Casement Window, 3 1/4" & 4 1/2" Frames

Assembly drawings: - GP327 (3-1/4") - Casement Window No Brick Molding
- Battant PVC 1 section- dimension 1000x1800 (parts list)

Performance Evaluation: GP327 Series Casement Window, 3 1/4" & 4 1/2" Frames



Drawings reviewed: Part nos.: GP327NF, GP382, GP329, GP345 and GP346.

Date of CSA audit: 11/01/2011

Date(s) of sample reception: 11/15/2011, 12/05/2012 and 04/03/2013

Date(s) of testing: 11/22/2011, 12/14/2012 and 04/08/2013

For items marked with *, please refer to Section 3.0, for detailed alterations

Test specimen installation (test buck):

- Material: 2" x 6" Pine
- Rough opening clearances: None
- Fastening: #8 x 2" screws; (3) per head and sill and (7) per jamb, through wood test buck frame into PVC.
- Sealing detail: Sealant between test buck and specimen on exterior side only.

Frame:

- Material: Extruded PVC
- Joinery type: Thermally welded mitre joints
- Perimeter: Part no. GP327NF
- Reinforcement: None
- Weatherstripping: None
- Sealant: Sealant under the operator.
- Drainage: None
- Overall dimensions: 998 mm (39.29") W x 1798 mm (70.78") H

Sash:

- Material: Extruded PVC
- Joinery type: Thermally welded mitre joints
- Perimeter: Part no. GP382
- Glazing stops: Part no. GP329

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- Reinforcement: None
- Weatherstripping: Exterior: coextruded fin; not welded at corners, cut (notched 10 mm (0.39") each) at lower rail.
Intermediate: compression bulb; co-extruded; welded corners. Interior: compression bulb; co-extruded, welded corners.
- Sealant: Sealant 51 mm x 51 mm (2" x 2") at corners of exterior glazing gasket and 3 X 100 mm (4") at 1/4 height of each stiles exterior glazing gasket, before laying glass unit. Sealant between glazing and lower rail, full width and up 152 mm (6") each stile. Sealant at each corner before horizontal glazing stops installation. Sealant each corner on top of horizontal glazing stops before installing vertical glazing stops.
- Drainage: (2) rectangular openings 19 mm x 4.5 mm (0.75" x 0.18") under sealed unit and (2) rectangular openings 16 mm x 3.1 mm (0.63" x 0.12") under the sash in the PVC.
- Overall dimensions: 958 mm (37.71") W x 1758 mm (69.21") H

Hardware:

- Multi-point lock: (1) 6-C7010-35-0-27 (Ferco)
- Tie bar: (1) 6-C2715-16-0-0 (Ferco)
- Keepers: (5) 6-C2423-53-0-7(Ferco); (3) #10 x 1/2" pan
- Hinges: (2) 14-97-00-03 (Truth); (4) screws #8 x 3/4"
(2) 14-97-00-04 (Truth); (4) screws #8 x 3/4"
- Snubbers: Frame: (4) GP346 (Acrylon), 100 mm (4") length with (3) staples. Sash: (4) GP345 (Acrylon), 100 mm (4") length with (4) staples.
- Track: (1) 11576-92 (Truth); (2) screws #8 x 3/4"
- Roto-operator: (1) 50-10-00-011 (Truth); (2) screws #8 x 3/4"
- Stud bracket: (1) 12511-92 (Truth); (2) screws #8 x 3/4"

Performance Evaluation: GP327 Series Casement Window, 3 1/4" & 4 1/2" Frames



Glazing: (Legend: C= Clear, Tt= Tinted, LE= Low-E, S= Surface #, A= Annealed, T= Tempered)

- Type: Double glazed sealed unit
- Total thickness: 20.8 mm (0.81")
- Glass thickness: Ext: 3.9 mm (0.15")/ Int: 3.9 mm (0.15")
- Air space gap width: 13.0 mm (0.51")
- Type of glass: Ext: C-A / Int: C-A
- Type of spacer: "Ultimate"
- Type of sealant: Dual-sealed
- Type of filling gas: Air
- Glass retention: Glazing stops
- Glazing seals: Exterior face (Dry sealed): (1) coextruded fin and (1) nib. Interior face (Dry sealed): (2) coextruded fins.
- Grid description: None
- Setting blocks: (2) at lower rail, (3) per stile and (2) at top rail.
- Daylight opening: 840 mm (33.07") W x 1640 mm (64.56") H

Screen:

- Frame material: Rolled aluminum
- Mesh material: Fiberglass
- Anchoring method: Integrated rubber tabs on corner brackets
- Auxiliary parts: (2) nylon handles
- Overall dimensions: 898 mm (35.35") W x 1700 mm (66.93") H

3.0 ALTERATION(S)

Alteration(s) performed in the laboratory on tested specimen to meet the reported performances:

Air Leakage Resistance & Water Leakage Resistance Tests:

- (1) Reduction of sash dimension (1.5 mm) on both ways to achieve higher water penetration resistance (DP100).



4.0 **TEST BENCH INFORMATION**

Information regarding the Test Bench and related instrumentation used for testing:

Testing was performed on Air-Ins Inc. test bench identified as TB28-DC. The calibration of this test bench was done as per Article 9.0 of ASTM E283, *Standard Test Method for Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors*, and ASTM E331 *Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Uniform Static Air Pressure Difference* and ASTM E547 *Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors and Curtain Walls by Cycling Static Air Pressure Difference*.

Latest calibration of this test bench and related equipment dates to January, 2013.



5.0 RESULTS OF PERFORMANCE TESTS

5.1 TEST SPECIMEN PRIMARY TESTING

TEST	<div style="border: 1px solid black; padding: 5px; display: inline-block; font-weight: bold; font-size: 1.5em;">CW</div> CLASS SPECIFICATIONS	TEST RESULTS	GRADE OR COMMENT
Operating Force Test	<u>U.S. (only) requirements:</u> Force to initiate motion: Reported only Force to maintain motion < 45 N (10 lbf) Force to latch < 100 N (22.5 lbf) <u>Canadian (only) requirements:</u> Force to initiate motion: (normal use) < 60 N (13 lbf) (cleaning/maintenance) < 70 N (15 lbf) Force to maintain motion: (normal use) < 30 N (7 lbf) (cleaning/maintenance) < 45 N (10 lbf) Force to latch < 100 N (22.5 lbf) AAMA/WDMA/CSA 101/I.S.2/A440-08 par. 5.3.1.1 & ASTM-E2068-00 (2008)	Measured to initiate = 12.5 N (2.8 lbf) Measured to maintain = 20.9 N (4.7 lbf) Measured to latch = 66.7 N (15 lbf)	Passed
Air Leakage Resistance Test	$Q_{inf} \leq 1.5 \text{ l/s-m}^2 @ 75 \text{ Pa}$ $(\leq 0.3 \text{ cfm/ft}^2 @ 1.57 \text{ psf})$ AAMA/WDMA/CSA 101/I.S.2/A440-08 par. 5.3.2.1 & ASTM-E283-04	Surface: 1.80 m ² (19.38 ft ²) $Q_{inf} = 0.06 \text{ l/s-m}^2 @ 75 \text{ Pa}$ $(0.01 \text{ cfm/ft}^2 @ 1.57 \text{ psf})$	Passed
	<u>Canadian air infiltration/exfiltration level:</u> A2: $Q_{inf} \& \text{ exf} \leq 1.5 \text{ l/s-m}^2 @ 75 \text{ Pa}$ $(\leq 0.3 \text{ cfm/ft}^2 @ 1.57 \text{ psf})$ A3: $Q_{inf} \& \text{ exf} \leq 0.5 \text{ l/s-m}^2 @ 75 \text{ Pa}$ $(\leq 0.1 \text{ cfm/ft}^2 @ 1.57 \text{ psf})$ AAMA/WDMA/CSA 101/I.S.2/A440-08 par. 5.3.2.2 & ASTM-E283-04	$Q_{inf} = 0.06 \text{ l/s-m}^2 @ 75 \text{ Pa}$ $(0.01 \text{ cfm/ft}^2 @ 1.57 \text{ psf})$ $Q_{exf} = 0.08 \text{ l/s-m}^2 @ 75 \text{ Pa}$ $(0.02 \text{ cfm/ft}^2 @ 1.57 \text{ psf})$ $Q_{avg} = 0.07 \text{ l/s-m}^2 @ 75 \text{ Pa}$ $(0.01 \text{ cfm/ft}^2 @ 1.57 \text{ psf})$	A3 level
Water Resistance Test	No water infiltration under a minimum pressure differential of 220 Pa (4.50 psf) AAMA/WDMA/CSA 101/I.S.2/A440-08 par. 5.3.3.2 & ASTM-E547-00 (2009)	No water infiltration under a pressure differential of 730 Pa (15.00 psf) with and without screen.	100
Uniform Load Deflection Test	No member shall deflect more than 1/175 of its span at 1440 Pa (30.00 psf) minimum class level and at optional Design Pressure (DP) performance level. AAMA/WDMA/CSA 101/I.S.2/A440-08 par. 5.3.4.2 & ASTM-E330-02 (2010)	Net deflection measured on the sash stile: 2.19 mm @ -1440 Pa (0.08 " @ -30.00 psf) 0.40 mm @ +1440 Pa (0.02 " @ +30.00 psf) 4.76 mm @ -2880 Pa (0.19 " @ -60.00 psf) 0.68 mm @ +2880 Pa (0.03 " @ +60.00 psf) Allowed $\leq 9.45 \text{ mm (0.37 ")}$	60

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Uniform Load Structural Test	Permanent deformation $\leq 0.3\%$ of the member span at minimum class level of 2160 Pa (45.00 psf) and at optional Structural Test Pressure (STP) levels. <i>AAMA/WDMA/CSA 101/I.S.2/A440-08 par. 5.3.4.3 & ASTM-E330-02 (2010)</i>	Permanent deformation measured on the sash stile: 0.17 mm @ -2160 Pa (0.01 " @ -45.00 psf) 0.10 mm @ +2160 Pa (0.00 " @ +45.00 psf) 0.29 mm @ -4320 Pa (0.01 " @ -90.00 psf) 0.31 mm @ +4320 Pa (0.01 " @ +90.00 psf) Allowed ≤ 4.96 mm (0.19 ")	60
Forced-Entry Resistance Test	All windows shall be tested according to ASTM F588-07 performance level 10. <i>AAMA/WDMA/CSA 101/I.S.2/A440-08 par. 5.3.5</i>	Grade 30 of ASTM F588-07 $T_1 = 10$ min., $L_1 = 1112$ N (250 lbf), $L_2 = 556$ N (125 lbf)	Passed

5.2 TEST SPECIMEN AUXILIARY TESTING

TEST	<div style="border: 1px solid black; padding: 5px; display: inline-block; font-weight: bold; font-size: 1.5em;">CW</div> CLASS SPECIFICATIONS	TEST RESULTS	GRADE OR COMMENT
Welded Corner Test	When loaded to failure, the break shall not extend along the entire weld line. <i>AAMA/WDMA/CSA 101/I.S.2/A440-08 par. 5.3.6.2</i>	For each corner detail (sash and frame) the breakage does not extend along the entire weld line.	Passed
Sash Vertical Deflection Test	Vertical deflection $< 2\%$ of sash width under a load of 270 N (60 lbf) <i>AAMA/WDMA/CSA 101/I.S.2/A440-08 par. 5.3.6.4.3</i>	Allowed: 17.20 mm (0.67 ") Measured: 2.8 mm (0.11 ")	Passed
Distributed Load Test	No damage to hardware under a uniform load of 300 Pa (6.2 psf) <i>AAMA/WDMA/CSA 101/I.S.2/A440-08 par. 5.3.6.6.2</i>	No permanent deformation under a uniform load of 300 Pa (6.2 psf)	Passed
Insect Screen Test	<u>Canadian (only) requirements:</u> Insect screens shall be tested in accordance with ASTM E1748 in the outward direction only under a load of 60 N (13 lbf). <i>A440S1-09 Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440 par. 5.1</i>	No screen disengagement or permanent deformation under a 60 N (13 lbf) load.	Passed



6.0 CONCLUSION

Based on the tests results, the window described in this report meets the requirements of the AAMA/WDMA/CSA 101/I.S. 2/A440-08 Standard regarding performance testing (article 5.0).

Detailed assembly drawings showing wall thickness of all members, corner construction and hardware application are on file and have been compared to the sample submitted.

The above results were secured by using the designated test methods and they indicate compliance with the performance requirements of the referenced specification. The test records from this evaluation will be retained for a minimum of four (4) years from the date of report issuance. This report does not constitute certification of this product, which may only be granted by a certification agency.

Note on the Limitation of Liability:

Due care was taken in performing the testing sequence and in reporting the results related to the test specimen received for evaluation. Through acceptance of this report, the Client agrees to exempt Air-Ins Inc. employees and owners from all liability claims and demands arising from any matter related to or concerning the quality and execution of the performance evaluation contained in this report.

7.0 REVISION LOG

Rev. #	Date	Page(s)	Revision(s)