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CERTIFICATION TESTING INSPECTION

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TEST REPORT # **T1248-2B**

DATE: July 31, 2018

CLIENT: **Artistic Skylight Domes**
255 Regina Road
Woodbridge, Ontario
L4L 8M3
Contact: Nenzio Ferrazzo

Summary of Results:

PRODUCT MANUFACTURER:	Artistic Skylight Domes
PRODUSCT TYPE:	SKP- Unit Skylight (glazed with plastic)
PRODUCT SERIES/MODEL:	FF5252
PRODUCT DESIGNATORS:	SKP – PG70: Size tested 1303 x 1303 mm (~51 x 51 in) SKP – PG3360 (SI): Size tested 1303 x 1303 mm- Unit Skylight (glazed with plastic)
OPTIONAL SECONDARY DESIGNATION:	Positive Design Pressure (DP) = 3360 Pa (70 psf) Negative Design Pressure (DP) = -3360 Pa (-70 psf) Water Penetration Resistance Test Pressure = 720 Pa (15 psf) Canadian Air Infiltration / Exfiltration = Fixed Level
TEST COMPLETION DATE:	July 27, 2018

SAMPLE ID: Model FF5252

SAMPLE DESCRIPTION: Aluminum Fixed Dome Curb Mount Skylight
Width: 1303 mm (51-5/16″); Length: 1303 mm (51-5/16″); See pages 5 for full description.

SAMPLING PROCEDURES: See page 2 for the sampling procedure.

DATE OF RECEIPT: June 7, 2018

DATE(S) OF TESTING: July 9 to July 27, 2018.

TESTING REQUESTED: **Testing to the mandatory requirements of AAMA/WDMA/CSA 101/I.S.2/A440-17 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 A5.

TESTING PERFORMED AT: QAI Laboratories Ltd., Toronto.

Tested by: David Wren

Reported by

David Wren
Senior Technician

Reviewed by

Lawrence Gibson
Executive VP

Sampling Plan/Procedures:

One unused, Aluminum Fixed Skylight 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 from July 9 to July 27, 2018 as being representative of the model covered in this report.

Test Conditions:

QAI Laboratories Ltd. (QAI) was retained by Artistic Skylight Domes to perform testing in accordance with the mandatory test requirements of AAMA/WDMA/CSA 101/I.S.2/A440-17 NAFS - North American Fenestration Standard / Specification for windows, doors and skylights on a representative sample of a 1303 mm (51-5/16″) x 1303 mm (51-5/16″) curb-mounted aluminum fixed skylight having an acrylic dome.

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 Artistic Skylight Domes were verified by QAI for the unit tested and are shown in Appendix A.

The test specimen was installed by the client into a simulated wood roof deck test section, complete with curb, as described below. A large bead of silicone sealant was applied to the top of the curb around its perimeter prior to the sample installation. The silicone seal was sandwiched between the aluminum skylight base frame and the top surface of the curb once the skylight was installed. The skylight base was fastened to the side of the curb using #10 x 2″ long hex-head self-drilling tek screws (Master Gripper MDP #JS1000) complete with a neoprene washer bonded to a flat stainless steel washer. There were four fasteners per each of the four sides of the skylight base, spaced nominally 355 mm (14″) apart o/c.

The simulated wood roof deck test section measured nominally 2490 mm (98″) square. It was fabricated from 2x6 SPF wood framing sheathed with 15.9 mm (5/8″) plywood. A centrally located curb was fastened to the deck surface and underlying framing, and was fabricated from 2x8 SPF lumber. The inside of the curb was open to below, the opening measuring 1175 mm (46-1/4″) square. The underlying framing of the deck section consisted of a 2x6 perimeter frame, two doubled-up 2x6 members spanning two opposing sides of the perimeter frame, these doubled up 2x6 members being centrally located, spaced 1175 mm (46-1/4″) apart. Two doubled-up 2x6 members spanned the above mentioned full-length 2x6 members, and were centrally located and spaced 1175 mm (46-1/4″) apart as well. These doubled-up 2x6's were aligned with, and supported, the above mentioned curb. The plywood sheathing was further supported by 2x6 members spanning the full-length doubled-up 2x6 members and the parallel adjacent perimeter 2x6 members, three per side nominally 590 mm (23-1/4″) apart on centre. The deck surface and curb were covered with an impermeable self-adhered membrane, the membrane covering the top and sides of the deck, continuing up the sides of the curb and wrapping around the top edge of the curb. The roof deck test section was supported on legs, the surface of the deck nominally 1220 mm (48″) from the floor.

The underside of the test deck was enclosed beneath the curb opening with a chamber fabricated from 2x4 SPF framing and OSB sheathing. The chamber was sealed so that positive and negative test pressures could be applied to it and the associated skylight. The chamber also provided access for observations during the water penetration resistance test.

Product Ratings:

Table 1: Summary of test results

Test Name	AAMA/WDMA/CSA 101/I.S.2/A440-17 NAFS - North American Fenestration Standard / Specification for windows, doors and skylights Result:
Air Leakage Resistance Test (ASTM E283) Test Date and Time: July 16/18 9 am Temperature During Test: 26.0ºC Barometric Pressure During Test: 982 kPa	Pressure differential = 75 Pa Fixed Level Requirement = Max. 0.2 L/s/m^2 (0.04 cfm/ft^2) Infiltration result = 0.148 L/s/m^2 (0.029 cfm/ft^2) - Fixed Level Exfiltration result = 0.083 L/s/m^2 (0.016 cfm/ft^2) - Fixed Level
Water Penetration Resistance Test (ASTM E547) Test Date and Time: July 28/18 12 pm Temperature During Test: 24.0ºC Water Application Rate: 1.492 L/min Orientation: Skylight Horizontal	Maximum pressure differential = 720 Pa (DP 100 – 15 psf) Observations: No leakage or trapped water.
Water Penetration Resistance Test (ASTM E547) Test Date and Time: July 28/18 9 am Temperature During Test: 24.0ºC Water Application Rate: 1.492 L/min Orientation: Skylight at 5% slope	Maximum pressure differential = 720 Pa (DP 100 – 15 psf) Observations: No leakage or trapped water.
Uniform Load Deflection Test at Design Pressure (ASTM E330 – Procedure A) Test Date and Time: July 19/18 5:30 pm Temperature During Test: 24.5ºC Load Duration (+ve WL): 60 sec. Load Duration (-ve WL): 10 sec. Use of Tape or Film: No Effect of Tape/Film: N/A	Maximum pressure differential = 3360 Pa (DP 70 - 70 psf) Component Measured: Retainer cap Span = 1308 mm (51.5") Maximum Deflection (+ve WL)= 0.23 mm (0.009") Maximum Residual Deflection (+ve WL) = -0.51 mm (-0.020") Maximum Deflection (-ve WL)= -0.43 mm (-0.017") Maximum Residual Deflection (-ve WL) = 0.28 mm (0.011") Observations: No damage.
Uniform Load Structural Test (ASTM E330 – Procedure A) Test Date and Time: July 20/18 8 am Temperature During Test: 25.0ºC Load Duration (+ve WL): 60 sec. Load Duration (-ve WL): 10 sec. Use of Tape or Film: No Effect of Tape/Film: N/A	Design pressure = 3360 Pa (DP 70) Component Measured: Retainer cap Span = 1308 mm (51.5") Maximum pressure differential (+ve WL)= 6720 Pa (140 psf) Maximum Residual Deflection (+ve WL) = -0.74 mm 0.029) Maximum pressure differential (-ve WL)= 5040 Pa (105 psf) Maximum Residual Deflection (-ve WL) = -3.63 mm (-0.143") Observations: No damage. Maximum Allowable Residual Deflection = 3.92 mm (0.155")

Performance Classification: N/A for Skylights
Performance Grade: PG 70
Maximum Size Tested: 1303 mm wide x 1303 mm high (51-5/16" x 51-5/16")

Primary Designator:
SKP – PG70: Size tested 1300 x 1300 mm (~51 x 51 in)
SKP – PG3360 (SI): Size tested 1300 x 1300 mm- Unit Skylight (glazed with plastic)

Secondary Designator:
Positive Design Pressure (DP) = 3360 Pa (70 psf)
Negative Design Pressure (DP) = -3360 Pa (-70 psf)
Water Penetration Resistance Test Pressure = 720 Pa (15 psf) - Horizontal and at 5% slope
Canadian Air Infiltration / Exfiltration = Fixed Level

Note: AAMA/WDMA/CSA 101/I.S.2/A440-17, 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.

Description:

Aluminum Fixed Dome Curb Mount Skylight		
Frame:	Description:	Extruded aluminum curb frame members (Artistic Skylight Domes Drawing No. SD.01 dated 25/03/15, File No. ART15-2503). Frame dimensions: Width: 1303 mm (51-5/16″), Length: 1303 mm (51-5/16″).
	Joints:	Corners were mitred and welded along the vertical joints of the down-turned leg on both the interior and exterior of the corner joints. Along the horizontal portion of the corner, the joint was welded along the underside. Along the top side of the horizontal portion of the joint, the joint was tack welded adjacent to the outside vertical edge. The upstanding portion of the inside corner was also welded along the vertical portion of the joint. The top exterior corners were cut off at a 45º angle, the corners sealed with silicone (GE SCS2000 structural silicone) following assembly.
Condensation Gutter/Thermal Break:	Description:	Extruded PVC combination condensation gutter and thermal break (Artistic Skylight Domes Drawing titled ”SMALL FF THERMAL BREAK- DOMES” dated January 27, 2016) was fitted to the top surface of the curb frame and secured to it using #8 x 12.7 mm (1/2″) long pan head self-drilling tek screws complete with a neoprene washer bonded to a flat stainless steel washer. There were five fasteners per side located on nominally 230 mm (9″) to 305 mm (12″) centres. The combination condensation gutter and thermal break frame was complete with a co-extruded flexible vinyl fin along its lower exterior edge, and a combination co-extruded flexible vinyl bulb and fin along its upper exterior edge. Thermal Break dimensions: Width: 1303 mm (49-3/4″), Length: 1303 mm (49-3/4″).
	Joints:	Corners were mitred and welded.
Glazing Method:	Interior:	Laid-in glazed on the co-extruded flexible vinyl bulb and fin of the combination condensation gutter and thermal break frame, the corners of the bulb and fin sealed with silicone.
	Exterior:	Extruded aluminum retainer cap frame (AFP Part# AFP 492) was fitted to the curb frame on the exterior, the aluminum cap retainer being sealed to the underlying acrylic dome glazing using butyl shim tape (Tremco Polyshim II) measuring 9.5 mm (3/8") in width and 3.8 mm (0.150") in thickness with a 3.2 mm (1/8") diameter shim. The shim tape was applied to the perimeter of the opening along the underside of the retainer cap. A continuous silicone backbead (GE SCS2000 structural silicone) was applied to the underside of the retainer cap along the outer perimeter of the butyl shim tape prior to retainer cap installation. Corners of the retainer cap frame were mitred and welded. The retainer cap was fastened to the sides of the curb frame using five #8 x 12.7 mm (1/2″) pan head self-drilling tek screws per side spaced nominally 280 mm (11″) apart on centre. The lower edge of the cap was sealed to the side of the curb frame around the perimeter with silicone sealant (GE SCS2000 structural silicone). This silicone bead was not applied to the joint for approximately 25 mm (1") adjacent to the frame weep holes. The cut-off curb frame corners were also sealed to the cap retainer with this silicone.
Glazing:	Description:	Two formed 4.8 mm (3/16″) thick acrylic domes, 6 mm (1/4″) apart at the edges and sealed together using butyl shim tape (Tremco Polyshim II) measuring 9.5 mm (3/8") in width and 7.1 mm (0.280") in thickness with a 6.4 mm (1/4") diameter shim. backed up by a continuous perimeter silicone seal (GE SCS2000 structural silicone).
Drainage:	Condensation Gutter/Thermal Break	Two 4.8 mm (3/16”) holes (through the upstanding exterior leg of the condensation gutter, see attached drawing) drained each side of the condensation gutter to the cavity formed by the curb frame and the retainer cap (frame cavity). These holes were located nominally 51 mm (2″) on center from each end.
	Frame:	One 4.8 mm (3/16”) hole (see attached drawing) per side at mid-width drained the frame cavity to the exterior

MODIFICATIONS:

- Frame weeps added, 4.8 mm (3/16") diameter, mid-width of each curb frame member.
- Retainer cap sealed to underlying curb frame about perimeter, open curb frame corners sealed as well.
- Curb to curb frame seal changed from closed cell foam gasket to silicone sealant.

CONCLUSION:

QAI Laboratories Ltd., with lab facilities located in Toronto, Ontario, performed testing in accordance with AAMA/WDMA/CSA 101/I.S.2/A440-17 NAFS - North American Fenestration Standard / Specification for windows, doors and skylights on a representative sample of an Artistic Skylight Domes Model FF5252 Aluminum Fixed Dome Curb Mount Skylight.

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.

Report Revision History

Date	Revision	Change Description	Initials
July 31, 2018	0	Original Report	DW