

THERMAL SIMULATION IN ACCORDANCE WITH CSA A440.2-19

UL Laboratory Canada Inc.

Submitted to:

Report No.:
AT-01208

Skyreach Group Inc.
112A Snidercroft Road
Concord ON, Canada
L4K 2K1

Report Summary

Operation Type: FIXD
Series/Model: 8100 Fixed Window
Report Date: 2024-10-29
Revision Date: N/A
Simulation Date : 2024-10-29
Number of Pages: 6

Note: Reference must be made to UL Laboratory Canada Inc. complete report for specimen description and detailed simulation results.

Simulated by:



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THERMAL SIMULATION IN ACCORDANCE WITH CSA A440.2-19

1 INTRODUCTION

UL Laboratory Canada Inc. has been retained by Skyreach Group Inc. to evaluate *a fixed window* in accordance with ANSI/NFRC 100 Procedure for Determining Fenestration Product U-Factors, ANSI/NFRC 200 Solar Heat Gain Coefficient and Visible Transmittance and NFRC 500 Procedure for Determining Fenestration Product Condensation Resistance Values. The product components and manufacturing details are documented in section 4 of this report. Rounding is per NFRC 601 NFRC Unit and Measurement Policy. All imperial values are for reference only. Appendix A of this report includes drawings and information of the product.

Simulations were conducted in full compliance with CSA requirements. Air infiltration test results were taken from report number TF-00369-C1 from UL Laboratory Toronto

2 SPECIFICATION

CSA A440.2-19:	Fenestration energy performance
ANSI/NFRC 100-2023:	Procedure for Determining Fenestration Product U-Factors
ANSI/NFRC 200-2023:	Solar Heat Gain Coefficient and Visible Transmittance
NFRC 101-2023:	Procedure for Determining Thermophysical Properties of Materials for Use in NFRC-Approved Software
NFRC 500-2017:	Procedure for Determining Fenestration Product Condensation Resistance Values
NFRC 601-2020:	NFRC Unit and Measurement Policy
WINDOW 7:	Software by Lawrence Berkeley National Laboratory
THERM 7:	Software by Lawrence Berkeley National Laboratory
IGDB v.101.0:	International Glazing Database by Lawrence Berkeley National Laboratory

3 DISCLAIMER

Data required for this evaluation were taken from the best available sources and every effort was taken to accurately perform the simulation documented in this report. Because of the large amount of input data and analysis it is possible that errors or omissions could occur. Neither UL Laboratory Canada Inc. nor any of its employees shall be held responsible for any loss or damage resulting directly or indirectly from any default, error or omission.

4 PRODUCT DESCRIPTION

4.1 OPERATOR TYPE:

FIXD, Fixed

4.2 SERIES/MODEL:

8100 Fixed Window

4.3 FRAME:

4.3.1	Material:	AT, Aluminum w/ Thermal breaks - All members
4.3.2	Finish:	Anodized Aluminum
4.3.3	Reinforcement:	None
4.3.4	Weatherstripping:	None
4.3.5	Continuous Hardware:	No hardware was required to be modeled
4.3.6	Overall dimensions:	1200 mm W. x 1500 mm H. (47.24 "x 59.06")

4.4 SASH(ES)

4.4.1	Material:	NA, Not applicable
4.4.2	Sash 1:	N/A
4.4.3	Sash 2:	N/A
4.4.4	Sash 3:	N/A
4.4.5	Sash 4:	N/A

4.5 GLAZING METHOD:

4.5.1	Exterior face:	EPDM gasket
4.5.2	Interior face:	EPDM gasket

4.6 SPACER:

Spacer type:	Material:	Primary sealant:	Secondary sealant:
Chromatech Ultra (TS-D)	Vinyl and Stainless Steel	Polyisobutylene	Polysulphide

4.7 GRID:

4.7.1	Grid:	None
4.7.2	Material and finish:	N/A
4.7.3	Standard NFRC Grid Pattern:	N/A

4.8 GLAZING:

4.8.1	Filling Technique:	Single probe
4.8.2	Capillary tube:	No
4.8.3	Gas fill percentage:	90% Argon, 10% Air
4.8.4	Comment:	None

5 SIMULATION RESULTS

Table 1: Center of glazing results

ID	Name	Insulating Glass Unit												U factor		SHGC	VT
		Emissiviti es	Glass 1		Gap 1		Glass 2		Gap 2		Glass 3		Tint				
			Type	mm	mm	gas	Type	mm	mm	gas	Type	mm					
1	5mm-ClrCGI-Arg90-180#3	0.068 (#3)	Clear	5.0	16.00	Arg90	Cardinal180	5.0					CL	1.52	0.27	0.66	0.78
2	5mm-272#2-Arg90-ClrCGI	0.042 (#2)	Cardinal 272	5.0	16.00	Arg90	Clear	5.0					CL	1.46	0.26	0.41	0.71
3	5mm-ClrXYG-Arg90-S1.16#3	0.076 (#3)	Clear	4.8	16.00	Arg90	Optilite S1.16	4.8					CL	1.53	0.27	0.59	0.79
4	5mm-ClrCGI-Arg90-ClrCGI-Arg90-180#5	0.068 (#5)	Clear	5.0	12.00	Arg90	Clear	5.0	12.00	Arg90	Cardinal180	5.0	CL	1.05	0.18	0.59	0.71
5	5mm-272#2-Arg90-ClrCGI-Arg90-ClrCGI	0.042 (#2)	Cardinal 272	5.0	12.00	Arg90	Clear	5.0	12.00	Arg90	Clear	5.0	CL	1.06	0.19	0.37	0.64
6	5mm-ClrXYG-Arg90-ClrCGI-Arg90-S1.16#5	0.076 (#5)	Clear	4.8	12.00	Arg90	Clear	5.0	12.00	Arg90	Optilite S1.16	4.8	CL	1.06	0.19	0.54	0.72

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Table 2: Overall fenestration products results

ID	Option Name	Insulating Glass Unit					Overall Product					
		W7 COG ID	Spacer	Grid	Grid Size	Tint	U Factor		SHGC	VT	CR	ER CSA
							W/m2-K	Btu/hr-ft2-F				
1	CH_5mm-ClrCGI-Arg90-180#3	1	TS-D	N		CL	1.80	0.32	0.55	0.64	59	32
2	CH_5mm-272#2-Arg90-ClrCGI	2	TS-D	N		CL	1.75	0.31	0.34	0.58	59	21
3	CH_5mm-ClrXYG-Arg90-S1.16#3	3	TS-D	N		CL	1.81	0.32	0.49	0.65	59	28
4	CH_5mm-ClrCGI-Arg90-ClrCGI-Arg90-180#5	4	TS-D	N		CL	1.36	0.24	0.48	0.58	65	38
5	CH_5mm-272#2-Arg90-ClrCGI-Arg90-ClrCGI	5	TS-D	N		CL	1.36	0.24	0.31	0.53	66	28
6	CH_5mm-ClrXYG-Arg90-ClrCGI-Arg90-S1.16#5	6	TS-D	N		CL	1.37	0.24	0.44	0.59	65	35

*** Air tightness values from TF-00369-C1**

Infiltration: 0.052 l/s.m²

Exfiltration: 0.056 l/s.m²

**** ER calculated using metric U Factor.**

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6 REVISION LOG

Revision Number	Revision Date	Description
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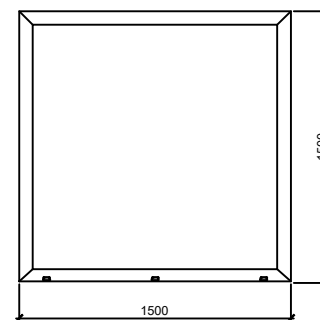
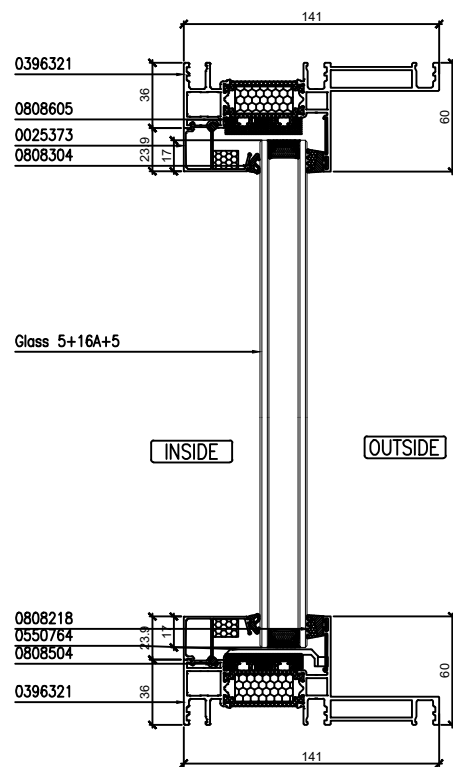
APPENDIX A: DRAWINGS AND PRODUCT INFORMATION

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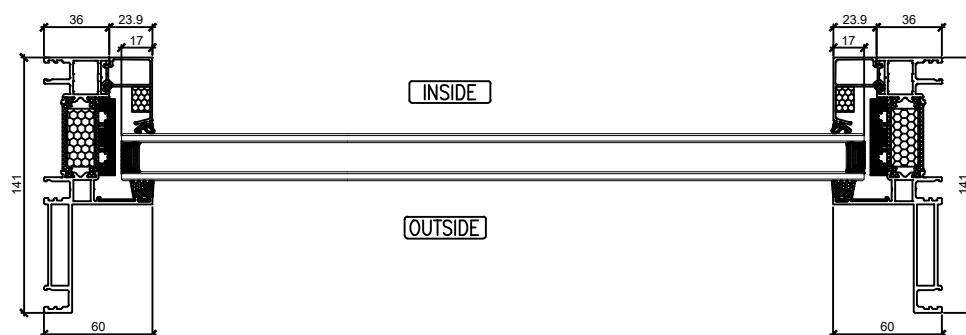
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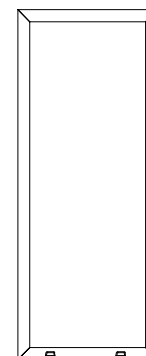
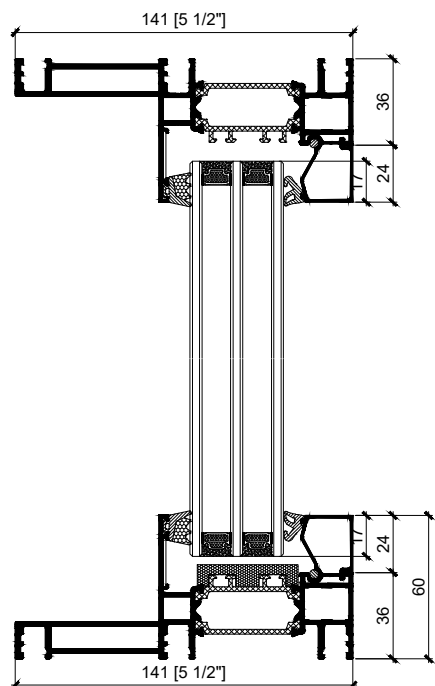
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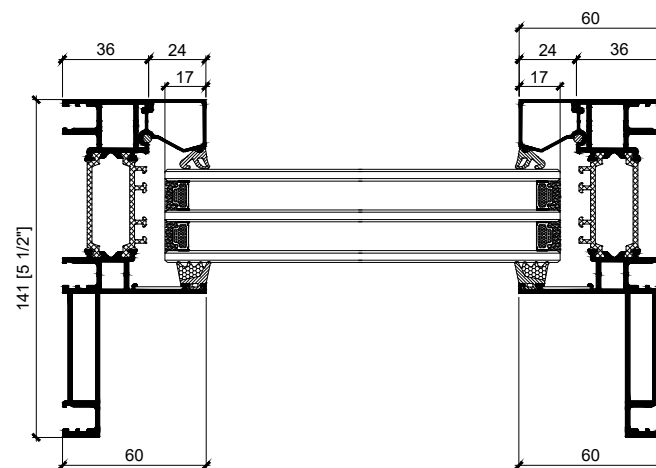
Fixed Window



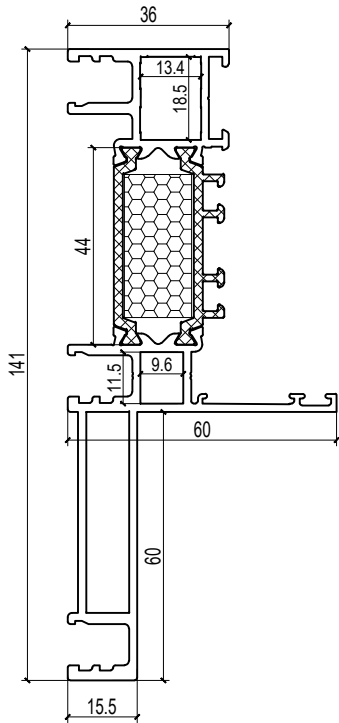
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		REVISION	00	DATE	May 2024
		SCALE	1:2	PAGE	E1



Fixed window

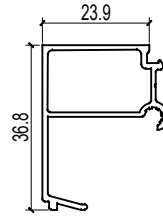


8100 Aluminum Fixed Window Profile



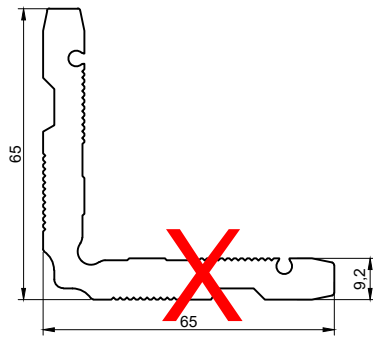
Window Frame

Aluminum
Alloy
(Anodized)

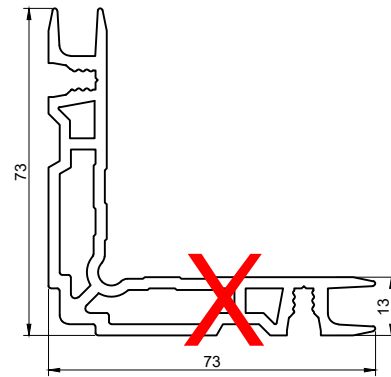


Glazing Bead

Aluminum
Alloy
(Anodized)



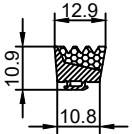


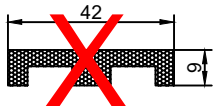
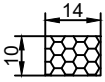
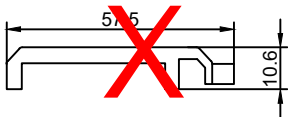
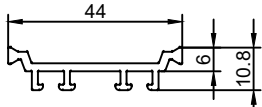
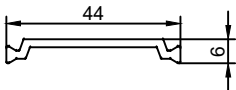
9mm Angular Code



13mm Angular Code

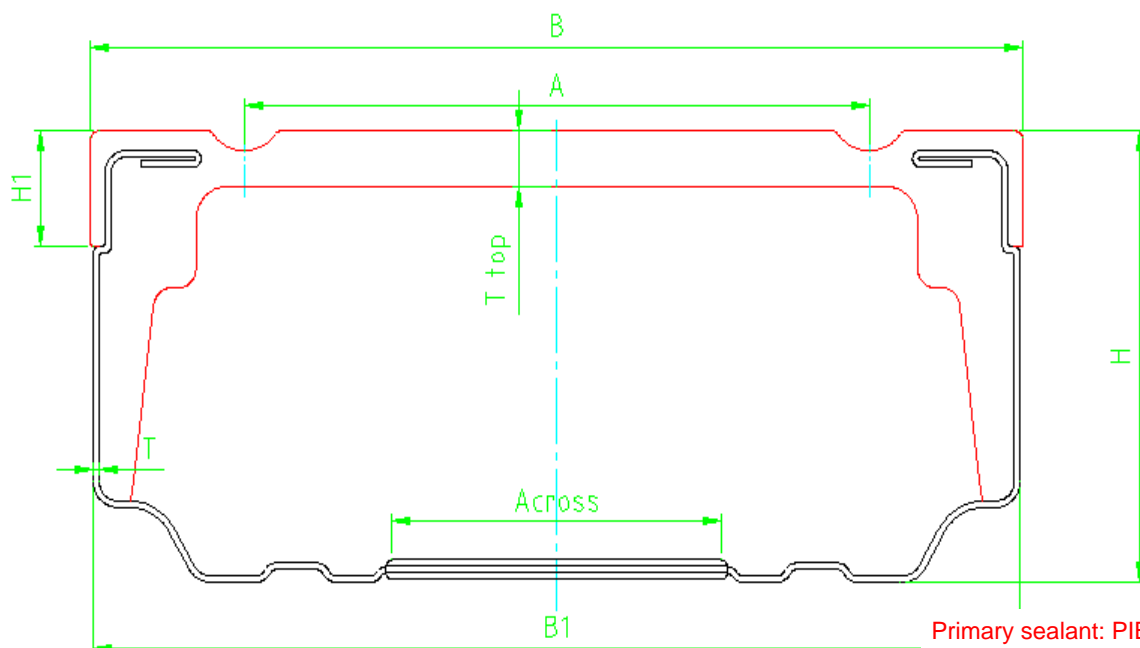
X : NOT SIMULATED

8100 Aluminum Fixed Window Accessories Profile

0808218	Exterior Glazing Gasket	0808304	Interior Glazing Gasket
	EPDM		EPDM
0808504	Round bar adhesive strip	0808605	ES81 Foam
	EPDM		PE
0971014	Obturator sponge	0550764	Glass Pallet
	Polyurethane Foam Obturator sponge		PA66
0965748	Heat-insulating strip	0965747	Heat-insulating strip
	PA66GF25		PA66GF25

X : NOT SIMULATED

1. Spacer properties



Primary sealant: PIB
 Second sealant: Polysulfide
 Second sealant height: 5mm

1.1 Cross section and tolerances

Spacer bar / cavity available	H - 0.05 +0.15 [mm]	H1 +/- 0.3 [mm]	Back Corrugation Across	B -0.30 +0.10 [mm]	B1 -0.05 +0.25 [mm]	A +/- 0.1 [mm]	Volume Desiccant Grace 551 g/m	T top -0.05 +0.15 [mm]
CUS 8	6.85	1.8	NO	7.6	7.5	2.45	22,4	0.85
CUS 10	6.85	1.8	NO	9.6	9.5	4,45	31,0	0.85
CUS 12	6.85	1.8	YES	11.6	11.5	6,45	39,5	0.85
CUS 13	6.85	1.8	YES	12.6	12.5	7,45	43,8	0.85
CUS 14	6.85	1.8	YES	13.6	13.5	8,45	48,1	0.85
CUS 15	6.85	1.8	YES	14.6	14.5	9,45	52,4	0.85
CUS 16	6.85	1.8	YES	15.6	15.5	10,45	56,6	0.85
CUS 18	6.85	1.8	YES	17.6	17.5	12,45	65,2	0.85
CUS 20	6.85	1.8	YES	19.6	19.5	14,45	73,7	0.85
CUS 22	6.85	1.8	YES	21.6	21.5	16,45	82,3	0.85
CUS 24	6.85	1.8	YES	23.6	23.5	18,45	90,8	0.85
CUS 26	6.85	1.8	YES	25.6	25.5	20,45	99,4	0.85

T steel is 0,104 mm for all sizes.

EN 1279-6 reference to table A.2 & A.5 – Note. Present list is valid until old norm expire 31.01.2019.

Ref. No.	EN Ref.	Description/specification	Internal test method
Further Spacer properties			
1.2	2.3 2.4	Geometry/shape The spacer geometry is shown in the cross section picture above. On enquiry a specific drawing can be delivered. Tolerances above.	Slide gauge and inspection drift
1.3	2.2	Length and straightness Standard length is 6,000 mm +/- 10 mm. Straightness deviation up to 15 mm/m at room temperature.	Steel ruler. Visual.

1.4	2.7	Undesired openings The spacer is tight as the backside is one uninterrupted piece of material. Plastic and steel are extruded together.	Process validation.
1.5	2.6	Perforation. See comments below ** Controlled perforation hole size, measured with airflow for optimal performance.	Air flow meter.
2.0 Spacer material			
2.1		Material for calculations Steel material used according to DIN EN 10088 type 1.4372 (AISI 201) or similar grades. Thermal conductance $\lambda_s = 15 \text{ W/mK}$ at 20 °C. These values are to be used for calculations.	<i>Documented by supplier.</i>
2.2	2.5	Surface The surface is clean and do not undergo any treatment with chemicals. Colours similar to RAL 9004, 9016, 7035, 7040, 8003 and 8016.	Visual test & Adhesion test.
2.3		Tolerances of the steel material The wall thickness of the spacer "S" is standard 0.104 mm.	Micro meter.
2.4		Lubrication During the forming of the spacer lubrication is used. The lubrication will evaporate fully leaving no volatile elements.	Adhesion test.
2.5	2.8	Volatile elements Volatile elements are tested according to EN 1279-6 annex G.	Weight loss test. M_v measured

** 1.5.1 Level of perforation

The ROLLTECH standard perforation will reduce the absorption of aqueous vapour to be no less than 1.0 weight % over a period of 24 hours (16 mm cavity tested by Grace Davidson Europe) - relative to the spacer size. The perforation is targeted EN 1279 - 6 annex A – specified maximum preload $H_2O \leq 3 \%$.

** 1.5.2 Function of the perforation

The perforation holes are until a certain particle size able to detain dust from the desiccant. This point is particular related to the performance of the bending machine and to the desiccant quality. An incorrect adjustment of the bending tool can cause damage to the perforation.

3.0 Quality aspects

3.1 Quality management

ROLLTECH A/S is certified according to DS EN ISO 9001.

3.2 Tests of the product

Processes and routines are established to secure the quality of the delivered material. During production the spacers are continuously monitored through systematic and random checks. Data will be available for a period of 5 years.

3.3 Quality agreement

ROLLTECH A/S fulfil the requirements of EN 1279 - 6 annex A. Specific quality agreement can be made to reduce inspection and test of the incoming material according to EN1279-6 part 5.2.6.

4.0 Customer focus and warranty

On all spacers ROLLTECH offers a 5 years' product warranty. The warranty covers free exchange of spacers in case of a defect. The spacers must have been stored, installed and used according to present norms and technical standards. Special solutions and **usage that are not standardized** will need prior approval in writing from ROLLTECH in order to be covered. Related to temperature standardized condition for IG is -30° to 80°C.

4.1 Storage and use

To secure the performance of the spacers, the stock conditions must be acceptable. Broken packaging, humidity and variation in temperature will have an effect on the spacer in general. Make sure the spacer is conditioned at room temperature before use.

Preferred conditions will be a room temperature over 15°C and humidity RH of minimum 45%
Avoid having an environment with a high concentration of dust.

General handling and attention according to safety data sheet for the spacer. Use gloves when handling the spacer/frames and make sure there is exhausting when cutting the spacer.

It is recommended to check out and control all the specific points above.

4.2 Adhesion check

When preparing samples for adhesion test according to EN1279-6 F3.2.2 make sure the spacer backside is covered and in full contact with the sealant (no air bubbles). When pulling the samples make sure to support the spacer fully inside to avoid deformation. If the spacer deforms the adhesion test will be affected. Written procedure can be delivered up on request. Curing time according to instruction from sealant manufacturer.

4.3 Pressure

Deformation by pressure such as wind load and weight load by horizontal installation can be provided.

4.4 System performance

The user (here the IG producer) must secure the whole system consisting of spacer, connector/corner key, bending machine, desiccant, butyl and sealant works well together in the chosen setup. Focus on compatibility, adhesion, dust and corner quality.

After handling and transport of the frames, it's important to check if the connector/corner keys are still in the correct position, if not there is a significant risk for desiccant dust inside the IG unit. Foam behind the connector/corner can be used to avoid such problems.

4.5. Cleaning the plastic surface

If for some reason the plastic surface is defiled by dust from other materials it can be cleaned again by the use of water or air. Dust can easily be removed with antistatic loaded compressed air or a moist cloth. Chemicals are not recommended. In case of specific cleaning needs make sure to test compatibility between materials.

4.6 UV stability

The plastic used is an organic material with UV stabilizer in order to minimize the ageing effect caused by sun light.

The material is tested for 3.000 hours according to EN ISO 4892-1 & EN 4892-2 method A, cycle 1. Evaluation is done according to grey scale index.

APPENDIX B: STRUCTURAL TEST REPORT

Report No: **AT-01208**

8100 Fixed Window

Simulation in accordance with CSA-A440.2-19

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**PERFORMANCE TESTING IN ACCORDANCE WITH
AAMA/WDMA/CSA 101/I.S.2/A440-11 (NAFS 2011) & CSA A440S1-17
AAMA/WDMA/CSA 101/I.S.2/A440-17 (NAFS 2017) & CSA A440S1:19
AAMA/WDMA/CSA 101/I.S.2/A440-22 (NAFS 2022)**

PRODUCT MANUFACTURER	
SKYREACH GROUP INC. 112A Snidercroft Rd. Concord, Ontario L4K 2K1 905-761-9988	
REPORT TF-00369-C1	
TEST REPORT SUMMARY	
Product type	Fixed Window
Product series/model	8100 Aluminum Fixed Window
Primary designator	Class CW – PG60: Size tested 1506 x 1506 mm (~59 x 59 in) – Type FW
Optional secondary designator	Positive design pressure (DP) = 2880 Pa (~60.15 psf) Negative design pressure (DP) = -2880 Pa (~-60.15 psf) Water penetration resistance test pressure = 720 Pa (~15.04 psf) Canadian air infiltration/ exfiltration level = Fixed Level (NAFS-11)
Option(s)	None

See UL Laboratory Canada Inc. complete report TF-00369-C1 for test specimen description and detailed test results.

Test laboratory location	UL Laboratory Canada Inc. (7 Underwriters Rd. Toronto, ON, M1R 3A9, Canada)		
Test completion date	2024-10-08	Number of pages	5 pages & 1 appendix
Report date	2024-11-10	Revision date	-

Prepared by:



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6.0 CONCLUSION..... 5

7.0 REVISION LOG 5

APPENDIX: DRAWINGS, SEALANT, DRAINAGE DETAILS & BILL OF MATERIALS

The results relate only to the product(s) in this report. This report shall not be reproduced, except in full, without the written approval of UL Laboratory Canada Inc.

1.0 INTRODUCTION

UL Laboratory Canada Inc. was retained by "**SKYREACH GROUP INC.**" to evaluate the performance of a fenestration product according to AAMA/WDMA/CSA 101/I.S.2/A440-11 (NAFS 2011) Standard and its Canadian Supplement CSA A440S1-17, AAMA/WDMA/CSA 101/I.S. 2/A440-17 (NAFS 2017) Standard and its Canadian Supplement CSA A440S1:19, and AAMA/WDMA/CSA 101/I.S. 2/A440-22 (NAFS 2022) Standard. 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 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 UL Laboratory Canada Inc. The availability of individual drawings will be at the discretion of the client.

2.0 DESCRIPTION OF THE SPECIMEN(S) TESTED

Model

8100 Aluminum Fixed Window

Product type

FW – (Fixed window)

Operation mode

Fixed

Drawings (Appendix)

Assembly Drawings & Bill of Materials

Drawings (Others)

0025373, 0396321

Date of sample reception

2024-10-01

Date(s) of testing

2024-10-08

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Test specimen installation (test buck)

Material: Spruce, Pine, Fir (SPF) (~2" x 10")

R.O. clearances: None.

Fastening: Sill/Head: None / Jamb: Fastened with (3) # 8 x 2" screws at center and 125 mm (4.92") from the ends, fastener holes covered with plastic caps.

Sealing detail: Exterior and interior frame perimeter sealed with sealant.

Frame

Material: Extruded Aluminum

Joinery type: Mitred joints mechanically fastened with (2) aluminum corner keys per corner, corners sealed with sealant.

Reinforcement: None

Thermal Break: (2 Rows) Plastic, frame perimeter.

Weatherstripping: None.

Sealant: Glazing stop corners sealed with sealant.

Drainage: Drain Slots with Eye-Lid Covers: (3) 33 mm x 8 mm (1.30" x 0.31"), sill, exterior face, at center and 143 mm (5.63") from the ends.

Glazing: Double glazed sealed unit 26 mm (1.02") / Nominal glass thickness: 5 mm (0.20") / Air space gap: 16 mm (0.63") / Type of glass: Tempered with LowE / Type of spacer: Aluminum Spacer / Type of sealant: Dual-sealed / Type of filling gas: Argon / Glass retention: Extruded aluminum glazing stop with closed cell foam, interior perimeter / Glazing seals: Closed cell foam: (2 Rows) Inner glazing cavity perimeter at glazing stop; Close cell foam along inner glazing cavity perimeter. Glazing Gasket: (1 Row) Interior and exterior glazing cavity perimeters / Grid description: None / Setting blocks: Sill: (3) 100 mm (3.94") long, at center and 205 mm (8.07") from the ends / Daylight opening: 1373 mm (54.06") W x 1373 mm (54.06") H

Overall dimensions: 1506 mm (59.29") W x 1506 mm (59.29") H

3.0 ALTERATION(S)

Alteration(s) performed in the laboratory on tested specimen to meet the reported performances: None.

4.0 TEST BENCH INFORMATION

Test bench identification: TB-AWS-10. 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*. The last calibration of this test bench and related equipment was performed in September 2024.

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5.0 RESULTS OF PERFORMANCE TESTS

SPECIFICATIONS	TEST RESULTS
<p><u>U.S. Air Leakage Resistance Test</u> R – LC – CW Classifications: $Q_{inf} \leq 1.5 \text{ l/s-m}^2 \text{ @ } 75 \text{ Pa}$ AW Classification: $Q_{inf} \leq 0.5 \text{ l/s-m}^2 \text{ @ } 300 \text{ Pa}$</p> <p><u>Canadian air infiltration/exfiltration level</u> R – LC – CW Classifications: FIXED: $Q \leq 0.2 \text{ l/s-m}^2 \text{ @ } 75 \text{ Pa}$ AW Classification: FIXED: $Q \leq 0.2 \text{ l/s-m}^2 \text{ @ } 300 \text{ Pa}$</p> <p>AAMA/WDMA/CSA 101/I.S.2/A440-11 par. 9.3.2 A440S1-09 & A440S1-17 Canadian Supplements par. 5.3 ASTM-E283-04 (2012)</p>	<p>Class CW – U.S. Requirements (NAFS-11)</p> <p>Fixed Level – Canadian Requirements (NAFS-11)</p> <p>Surface: 2.27 m^2</p> <p>$Q_{inf} = 0.05 \text{ l/s-m}^2 \text{ @ } 75 \text{ Pa}$ $Q_{ext} = 0.06 \text{ l/s-m}^2 \text{ @ } 75 \text{ Pa}$</p>
<p><u>Air Leakage Resistance Test</u> R – LC Classifications: $Q_{inf} \leq 1.5 \text{ l/s-m}^2 \text{ @ } 75 \text{ Pa}$</p> <p>Canadian air infiltration/exfiltration level: FIXED: $Q \leq 0.2 \text{ l/s-m}^2 \text{ @ } 75 \text{ Pa}$ CW Classification: $Q \leq 0.5 \text{ l/s-m}^2 \text{ @ } 75 \text{ Pa}$ AW Classification: $Q_{inf} \leq 0.5 \text{ l/s-m}^2 \text{ @ } 300 \text{ Pa}$ $Q_{ext} \leq 0.5 \text{ l/s-m}^2 \text{ @ } 75 \text{ Pa}$</p> <p>AAMA/WDMA/CSA 101/I.S.2/A440-17 par. 9.3.2 A440S1-19 Canadian Supplement par. 5.4 ASTM-E283-04 (2012)</p>	<p>Class CW – Passed (NAFS-17)</p> <p>Surface: 2.27 m^2</p> <p>$Q_{inf} = 0.05 \text{ l/s-m}^2 \text{ @ } 75 \text{ Pa}$ $Q_{ext} = 0.06 \text{ l/s-m}^2 \text{ @ } 75 \text{ Pa}$</p>
<p><u>(NAFS-22)</u> <u>Air Leakage Resistance Test</u> R – LC – Classifications: $Q_{inf} \leq 1.5 \text{ l/s-m}^2 \text{ @ } 75 \text{ Pa}$ CW Classification: $Q \leq 1.0 \text{ l/s-m}^2 \text{ @ } 75 \text{ Pa}$ AW Classification: $Q_{inf} \leq 1.5 \text{ l/s-m}^2 \text{ @ } 300 \text{ Pa}$ $Q_{ext} \leq 1.0 \text{ l/s-m}^2 \text{ @ } 75 \text{ Pa}$ AAMA/WDMA/CSA 101/I.S.2/A440-22 par. 8.3.2. ASTM-E283-19</p>	<p>Class CW (NAFS-22)</p> <p>Surface: 2.27 m^2</p> <p>$Q_{inf} = 0.05 \text{ l/s-m}^2 \text{ @ } 75 \text{ Pa}$ $Q_{ext} = 0.06 \text{ l/s-m}^2 \text{ @ } 75 \text{ Pa}$</p>

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SPECIFICATIONS	TEST RESULTS
<p>Water Resistance Test No water infiltration under a minimum pressure differential: Designation LW: 0 Pa (0 psf) Class R: 140 Pa Class LC: 180 Pa Class CW: 220 Pa Class AW: 390 Pa</p> <p>AAMA/WDMA/CSA 101/I.S.2/A440-11 par. 9.3.3. A440S1-09 & A440S1-17 Canadian Supplements par. 5.4 AAMA/WDMA/CSA 101/I.S.2/A440-17 par. 9.3.2 A440S1-19 Canadian Supplement par. 5.5 AAMA/WDMA/CSA 101/I.S.2/A440-22 par. 8.3.3. Classes R, LC & CW: ASTM-E547-00 (2009 & 2016) Class AW: ASTM-E547-00 (2009 & 2016) & ASTM-E331-00 (2009 & 2016)</p>	<p>Class CW – U.S. & Canadian Requirements</p> <p>No water infiltration under the minimum test pressure for the class.</p> <p>No water infiltration at an optional test pressure differential of:</p> <p>220 Pa - U.S. & Canadian Requirements 580 Pa - U.S. & Canadian Requirements 720 Pa - Canadian requirements only</p>
<p>Uniform Load Deflection Test Member deflection at a minimum design pressure (DP) and at optional DP: Class R: 720 Pa – Reported only Class LC: 1200 Pa – Reported only Class CW: Limited to L/175 at 1440 Pa Class AW: Limited to L/175 at 1920 Pa</p> <p>AAMA/WDMA/CSA 101/I.S.2/A440-11 par. 9.3.4 AAMA/WDMA/CSA 101/I.S.2/A440-17 par. 9.3.4 AAMA/WDMA/CSA 101/I.S.2/A440-22 par. 8.3.4.2 ASTM-E330-02 (2010) & ASTM-E330-14</p>	<p>DP 60 – Class CW</p> <p>Net deflection measured on the jamb (Gateway): 0.06 mm @ –1440 Pa 0.14 mm @ +1440 Pa</p> <p>Net deflection measured on the jamb (DP 60): 0.04 mm @ –2880 Pa 0.25 mm @ +2880 Pa</p> <p>Span: 1430 mm Allowed ≤ 8.18 mm</p>
<p>Uniform Load Structural Permanent deformation is limited at a minimum structural test pressure (STP) and at optional STP of: Class R: ≤ 0.4% (L) at 1080 Pa Class LC: ≤ 0.4% (L) at 1800 Pa Class CW: ≤ 0.3% (L) at 2160 Pa Class AW: ≤ 0.2% (L) at 2880 Pa</p> <p>AAMA/WDMA/CSA 101/I.S.2/A440-11 par. 9.3.4 AAMA/WDMA/CSA 101/I.S.2/A440-17 par. 9.3.4 AAMA/WDMA/CSA 101/I.S.2/A440-22 par. 8.3.4.3 ASTM-E330-02 (2010) & ASTM-E330-14 (2021)</p>	<p>STP 60 – Class CW Permanent deformation measured on the jamb (Gateway): 0.07 mm @ –2160 Pa 0.24 mm @ +2160 Pa</p> <p>Permanent deformation measured on the jamb (STP 60): 0.01 mm @ –4320 Pa 0.19 mm @ +4320 Pa</p> <p>Span: 1430 mm Allowed ≤ 4.29 mm</p>
<p>Forced-Entry Resistance All windows shall be tested according to ASTM F588-07 & ASTM F588-14 Grade 10.</p> <p>AAMA/WDMA/CSA 101/I.S.2/A440-11 par. 9.3.5 AAMA/WDMA/CSA 101/I.S.2/A440-17 par. 9.3.5 AAMA/WDMA/CSA 101/I.S.2/A440-22 par. 8.3.5</p>	<p>Passed</p> <p>Grade 40</p> <p>T₁=10 min., L₁=1334 N, L₂=667 N & L₃=267 N</p>

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6.0 CONCLUSION

The fenestration product described in this report was tested in accordance with the AAMA/WDMA/CSA 101/I.S.2/A440-11 (NAFS 2011) Standard and its Canadian Supplement CSA A440S1-17, AAMA/WDMA/CSA 101/I.S. 2/A440-17 (NAFS 2017) Standard and its Canadian Supplement CSA A440S1:19, and AAMA/WDMA/CSA 101/I.S. 2/A440-22 (NAFS 2022) Standard, regarding performance testing. The above results were secured by using the designated test methods and the performance requirements of the referenced specification.

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 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 UL Laboratory Canada 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. The Decision Rule is based on Simple Acceptance (Measurement Uncertainty is not taken into account when making a statement of conformity).

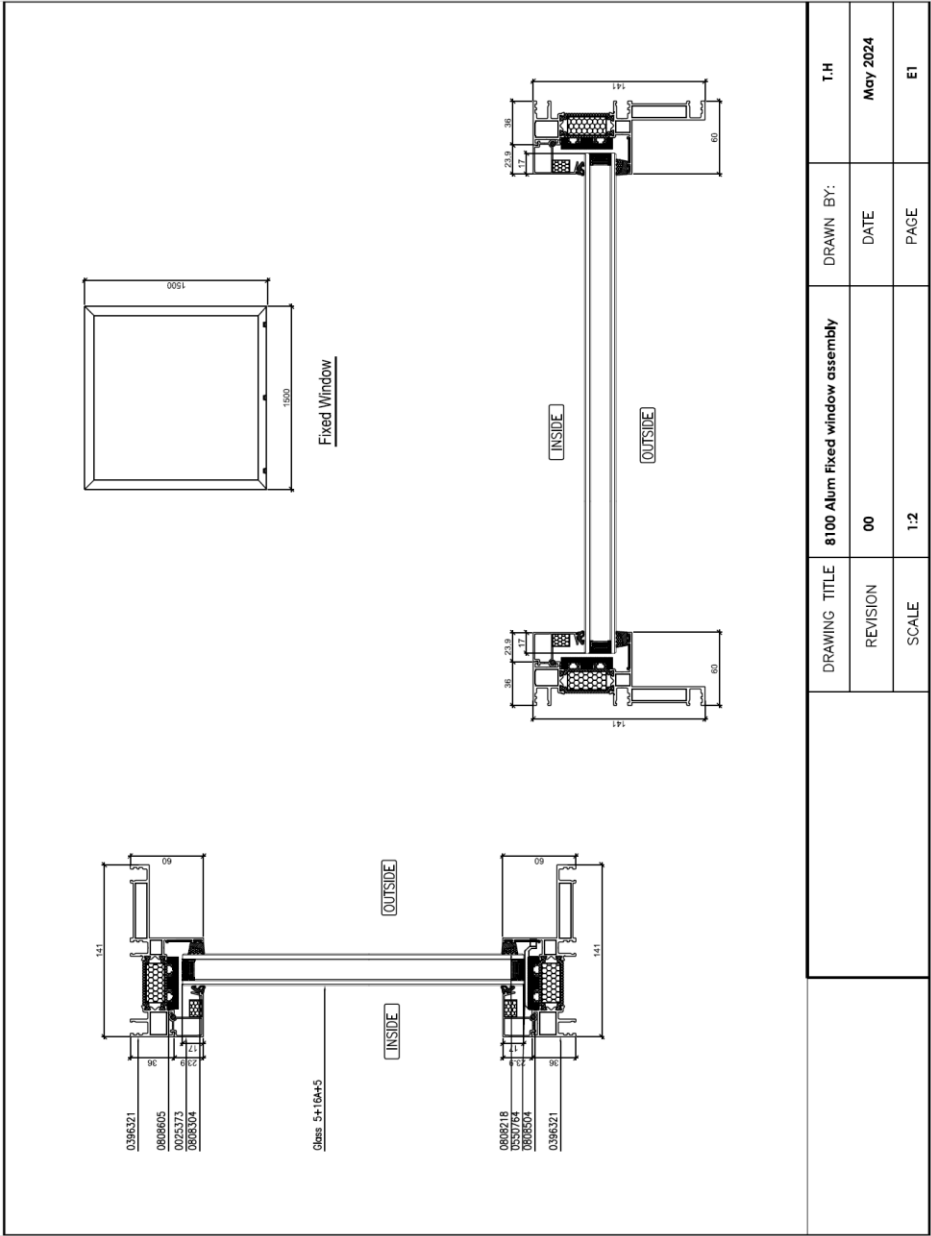
7.0 REVISION LOG

Rev. #	Date	Page(s)	Revision(s)
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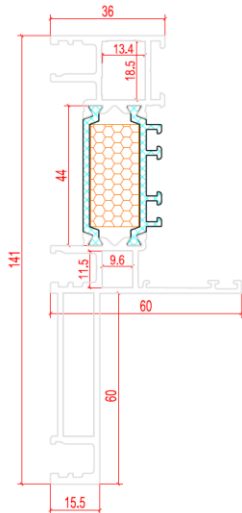
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APPENDIX
DRAWINGS, SEALANT, DRAINAGE DETAILS & BILL OF MATERIALS

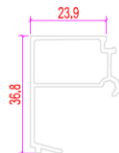
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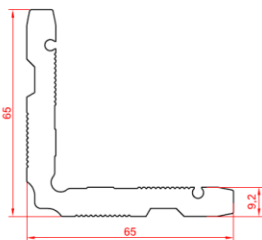
8100 Aluminum Fixed Window Profile



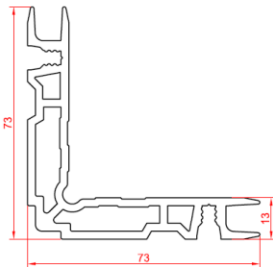
Window Frame



Glazing Bead



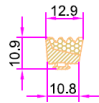


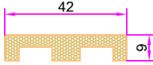

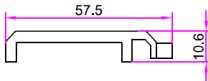
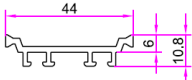
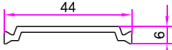
9mm Angular Code



13mm Angular Code

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8100 Aluminum Fixed Window Accessories Profile

0808218	Exterior Glazing Gasket	0808304	Interior Glazing Gasket
	EPDM		EPDM
0808504	Round bar adhesive strip	0808605	ES81 Foam
	EPDM		PE
0971014	Obturator sponge	0550764	Glass Pallet
	Obturator sponge		PA66
0965748	Heat-insulating strip	0965747	Heat-insulating strip
	PA66GF25		PA66GF25

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8100 Series Fixed Window BOM					
Date: 08/06/2024 (M/D/Y)					
No	Item	Description	Qty	Size(W x H x D)(mm)	Location:
1	Frame	Thermal broken aluminum	1	1500x1500x141	
3	Joinery	Mitre-cut, assembly with corner keys			
4	Installation	Wood buck			Fastened with #8 x 2.5" screws (2 per jamb and head), perimeter sealed w/ foam sealant
5	Glazing	Double-pane IGU, Tempered glass	1		Glass thickness: 5mm
6	Glazing Method	Laid in glazed	1	1414x1414	Interior perimeter
		Glazing stop, Aluminum extrusion			
7	Reinforcement	None			
8	Weatherstrips	None			
9	Drainage	3 Drainages in sill		34x8	
10	Hardware	None			
11	Screen	None			

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