

**THERMAL SIMULATION REPORT**

**REPORT NUMBER: 3179893TOR-013D ER**

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**EVALUATION CENTER**

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**RENDERED TO Artistic**

**Skylight Domes Ltd.  
255 Regina Rd. Vaughan,  
Ontario L4L 8M3**

PRODUCT EVALUATED: Model GV-PVCSR Glass Self-Flashing Vent  
Skylight

EVALUATION PROPERTY: Energy Performance

**Report of a Model GV-PVCSR Glass Self-Flashing Vent Skylight for  
compliance with the applicable requirements of the following criteria:  
CSA A440.2-09 Fenestration energy performance.**

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**1 Table of Contents**

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|          |   |          |
|----------|---|----------|
| <b>1</b> | <b>Table of Contents.....</b>                               | <b>2</b> |
| <b>2</b> | <b>Introduction.....</b>                                    | <b>3</b> |
| <b>3</b> | <b>Sample and Assembly Description.....</b>                 | <b>3</b> |
| <b>4</b> | <b>Simulation and Evaluation Methods.....</b>               | <b>4</b> |
| <b>5</b> | <b>Glazing Options and Energy Rating (ER) Results .....</b> | <b>4</b> |

**Report of a Model GV-PVCSR Glass Self-Flashing Vent Skylight for compliance with the applicable requirements of the following criteria: CSA A440.2-09 *Fenestration energy performance.***

## 2 Introduction

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Intertek has conducted thermal performance simulations on a Model GV-PVCSR Glass Self-Flashing Vent Skylight. Thermal performance simulations were conducted in accordance with the standard methods of CSA A440.2-09 "Fenestration energy performance".

## 3 Sample and Assembly Description

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- Model: Type:**
- GV-PVCSR Vented Skylight
- Manufacturer:**
- Aluminum capped vented glass skylight.
- Simulated Size:**
- Artistic Skylight Domes Ltd., 255 Regina Rd., Vaughan, Ontario L4L 8M3
- Frame:**
- 1200 mm × 1200 mm
  - Extruded vinyl main frame members (Extrusion Profiles Die No. 329C) with mitred and welded corners. The frame was complete with an integral nailing fin.
- Sash:**
- Members: Extruded painted aluminum alloy members having mitred corners
  - Aluminum Cap - Extruded painted aluminum alloy cap members (Bon L Die No. PA-37250) having welded mitred corners
  - A painted aluminum alloy cap was modeled. It is Intertek's professional opinion that the painted cap can also be used to represent an unpainted (buffed) aluminum alloy cap.
- Weather-stripping:**
- The exterior face of the frame was single weather-stripped with a co-extruded flexible vinyl glazing gasket.
  - The interior face of the sash was single weather-stripped with kerf-inserted flexible vinyl bulb having butted corners.
- Glazing Method:**
- Laid in glazed on the interior on a rubber glazing gasket, the corners of the glazing gasket and retained with the extruded aluminum capping on the exterior. Double-sided adhesive backed closed cell foam tape was sandwiched between the exterior face of the sealed unit and the back side of the aluminum capping.
- Glazing Spacers:**
- A1-D – Aluminum spacer with PIB primary seal and Polysulphide secondary seal
  - A9-D – Warm Edge aluminum spacer with polymer cap. PIB primary seal and Polysulphide secondary seal
  - ZR-S – Edgetech Superspacer (standard), backed with PIB
- Drawings:**
- Plan and Cross-Section Drawing:
    - Artistic Skylights Drawing model: GV-PVCSR, No Date
  - Cross-Section Details:
    - Extrusion Profiles Inc, Die # 329C, Titled "SELF FLASHING FRAME" Dated January 9, 2004
    - Bon L Canada Inc. Die # PA-37250, Titled "Artistic Skylight", Dated November 1, 1995
    - Spectra Aluminum Products, Die # SS-1631, Titled "Sash Frame", Rev. A, Dated November 14, 2000
    - Vinyl Profiles Limited Drawing, Titled "Artistic Skylight Domes – Sash Thermal Cover", No date.
    - Spectra Aluminum Products, Die # SS-3831, Titled "Big Retaining Frame PA-30833", Rev. B, Dated Mar 12/10
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#### 4 Simulation and Evaluation Methods

The skylight was simulated according to CSA A440.2-09 using specialized computer simulation software developed by the Lawrence Berkeley National Laboratory. THERM 6.3 was used to model two-dimensional heat-transfer effects in the skylight and evaluate its energy efficiency and local temperature patterns. WINDOW 6.3 was used for analyzing and calculating total skylight thermal performance indices (i.e. U-values, solar heat gain coefficients, etc). The simulation was performed using software that is consistent with the ISO 15099 standard. Skylight unit profiles were drawn into the simulation program using the electronic files from AutoCAD supplied by the client.

#### 5 Glazing Options and Energy Rating (ER) Results

The Model GV-PVCSR Glass Self-Flashing Vented Skylight achieved the following U-Value, Solar Heat Gain Coefficient (SHGC) and Energy Rating (ER) when simulated in accordance with CSA A440.2-09.

| ID | Manufacturer Product Code | Frame and Glazing Details  | Low Emissivity     | Gap /Fill       | Spacer            | Overall U-Factor (W/m <sup>2</sup> .°C) | SHGC <sub>w</sub> | Visual Transmittance (VT) | NRCan Energy Star® Zone |     |
|----|---------------------------|--|--------------------|-----------------|-------------------|---|-------------------|---------------------------|-------------------------|-----|
| 25 | GV-PVCSR-GRD01            | Dual Glazing<br>Exterior - 4 mm GRD 71/38 Clear (S#2)<br>Interior - 4 mm Clear   | ID#3234<br>ID#3014 | 0.027           | 12.7 mm<br>AR 90% | A1-D                                    | 2.80              | 0.36                      | 0.64                    | A   |
| 30 | GV-PVCSR-LOF01            | Dual Glazing<br>Exterior - 4 mm Pilk. NA Eclipse Adv. Bronze (S#2)<br>Interior - 4 mm Pilk. NA Energy Adv. Clear (S#2) | ID#9908<br>ID#9922 | 0.209/<br>0.164 | 12.7 mm<br>AR 90% | A9-D                                    | 2.67              | 0.33                      | 0.30                    | A   |
| 32 | GV-PVCSR-GRD02            | Dual Glazing<br>Exterior - 4 mm GRD 71/38 Clear (S#2)<br>Interior - 7 mm Laminated Clear                               | ID#3234<br>ID#610  | 0.027           | 12.7 mm<br>AR 90% | ZF-S                                    | 2.77              | 0.35                      | 0.63                    | A   |
| 26 | GV-PVCSR-GRD03            | Dual Glazing<br>Exterior - 4 mm GRD 71/38 Clear (S#2)<br>Interior - 4 mm GRD 71/38 Clear (S#4)                         | ID#3234<br>ID#3234 | 0.027/<br>0.027 | 12.7 mm<br>AR 90% | ZF-S                                    | 2.37              | 0.33                      | 0.55                    | ABC |
| 28 | GV-PVCSR-PPG01            | Dual Glazing<br>Exterior - 4 mm PPG SolarBan 70XL Clear (S#2)<br>Interior - 4 mm PPG Sungate 500 Clear (S#4)           | ID#5433<br>ID#5244 | 0.018/<br>0.215 | 12.7 mm<br>AR 90% | A9-D                                    | 2.49              | 0.24                      | 0.54                    | AB  |
| 29 | GV-PVCSR-CIG01            | Dual Glazing<br>Exterior - 4 mm CIG LoE <sup>3</sup> 366 Clear (S#2)<br>Interior - 4 mm Clear                          | ID#2155<br>ID#2002 | 0.022           | 12.7 mm<br>AR 90% | A9-D                                    | 2.79              | 0.26                      | 0.59                    | A   |

| ID | Manufacturer Product Code | Frame and Glazing Details   | LOWE Emissivity               | Gap /Fill       | Spacer              | Overall U-Factor (W/m <sup>2</sup> .°C) | SHGC <sub>w</sub> | Visual Transmittance (VT) | NRCan Energy Star® Zone |      |
|----|---------------------------|---|-------------------------------|-----------------|---------------------|---|-------------------|---------------------------|-------------------------|------|
| 31 | GV-PVCSR-PPG02            | Dual Glazing<br>Exterior - 4 mm PPG SolarBan 70XL Clear (S#2)<br>Interior - 7 mm Laminated PPG SG 500 Clear (S#4)       | ID#5433<br>ID#604             | 0.018/<br>0.215 | 12.7 mm<br>AR 90%   | A9-D                                    | 2.48              | 0.24                      | 0.54                    | AB   |
| 27 | GV-PVCSR-GRD04            | Triple Glazing<br>Exterior - 4 mm GRD 71/38 Clear (S#2)<br>Middle - 4 mm GRD IS-15 Clear (S#4)<br>Interior - 4 mm Clear | ID#3234<br>ID#3328<br>ID#3014 | 0.027/<br>0.149 | 2×12.7 mm<br>AR 90% | ZF-S                                    | 1.97              | 0.31                      | 0.54                    | ABCD |

Notes:

The WINDOW 6.3 output data sheets are attached to this report. Refer to Appendix B.  
As per CSA A440.2-09, skylights do not receive Energy Ratings (ERs).


**INTERTEK**

Energy Rating Simulations by Claudio Sacilotto

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