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# VELUX AMERICA LLC
# TEST REPORT

**SCOPE OF WORK**
OSHA FALL PROTECTION AND CALIFORNIA TITLE 28 TESTING ON DOME SKYLIGHTS WITH DYNAMIC AND TRADITIONAL DOME TYPES AND GLAZING CONFIGURATIONS FOR DECK-MOUNT AND CURB-MOUNT UNITS

**REPORT NUMBER**
N2827.01-550-47

**TEST DATE(S)**
01/24/22 - 01/27/22

**ISSUE DATE**
03/16/22

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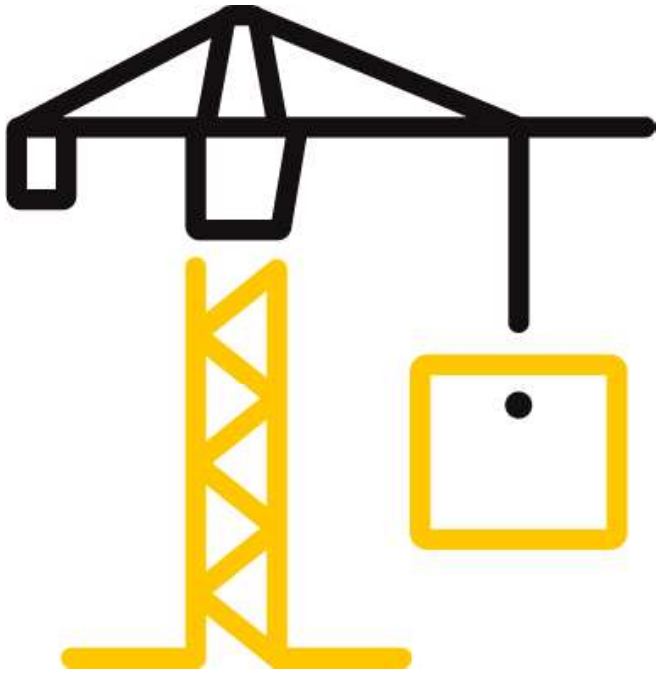

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# TEST REPORT FOR VELUX AMERICA LLC

Report No.: N2827.01-550-44
Date: 03/16/22

## REPORT ISSUED TO

**VELUX America LLC**
1418 Evans Pond Road
P.O. Box 5001
Greenwood, South Carolina 29648-5001

## SECTION 1

## SCOPE

Architectural Testing, Inc. (an Intertek company) dba Intertek Building & Construction (B&C) was contracted by VELUX America LLC, 1418 Evans Pond Road, P.O. Box 5001, Greenwood, South Carolina 29648-5001 to evaluate the OSHA fall protection testing to the most recent referenced documents. A total of 20 separate design styles of skylights were evaluated on wood curb decks only as noted below, for a total of 40 tests. This testing is intended to cover both curb-mount (wood) and deck-mount domed skylight products. Reference Intertek Report M7571.01-550-44R1 and Test Plan IP01-073021 for consideration of determining deck-mount equivalency per the WDMA Hallmark Certification Program.

Results obtained are tested values and were secured by using the designated test method(s). Testing was conducted at the VELUX America LLC facility in Greenwood SC. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

Occupational Safety and Health Administration (OSHA)/U.S. Department of Labor Regulations Standard 29 CFR §1910.29 – Fall protection systems and falling object protection-criteria and practices. Section 1910.29(e)(1) requires a cover to be capable of supporting, without failure, at least twice the maximum intended load that may be imposed on the cover at any one time.

California Code of Regulations, Title 8, Section 3212 §(b), which states, "covers shall be capable of safely supporting the greater of 400 lbs or twice the weight of the employees, equipment and materials that may be imposed on any one square foot area of the cover at any time."

For INTERTEK B&C:

| | | | |
|---|---|---|---|
| **COMPLETED BY:** | Austin Viness | **REVIEWED BY:** | James Blakely |
| **TITLE:** | Technician | **TITLE:** | Regional Manager |
| **SIGNATURE:** | Digitally Signed by: Brock Viness | **SIGNATURE:** | Digitally Signed by: James Blakely |
| **DATE:** | 03/16/22 | **DATE:** | 03/16/22 |

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## SECTION 2
**SUMMARY OF PRODUCTS TESTED**

| TEST SPECIMEN | CATEGORY | DOME TYPE | PRODUCT CODE | GLAZING LAYERS |
|---|---|---|---|---|
| 1 | Impact Modified Acrylic (IMA) | Dynamic | DMD2/CMD2 6096 S1N2 | 2 |
| 2 | | Traditional | DMT2/CMT2 6096 S1N2 | 2 |
| 3 | Polycarbonate | Dynamic | DMD2/CMD2 6096 P1C2 | 2 |
| 4 | | Dynamic | DMD2/CMD2 6096 P1P2 | 2 |
| 5 | | Dynamic | DMD2/CMD2 7272 P1P2 | 2 |
| 6 | | Dynamic | DMD2/CMD2 6096 P1H1 | 2 |
| 7 | | Traditional | DMT2/CMT2 4896 P1C2 | 2 |
| 8 | | Traditional | DMT2/CMT2 6096 P1P2 | 2 |
| 9 | | Traditional | DMT2/CMT2 6096 P1H1 | 2 |
| 10 | | Dynamic | DMD3/CMD3 6096 P1C2 | 3 |
| 11 | | Dynamic | DMD4/CMD4 6096 P1L2 | 2 |
| 12 | Acrylic | Traditional | DMT2/CMT2 4896 A1A1 | 2 |
| 13 | | Pyramid | DMP2/CMP2 4896 A1A1 | 2 |
| 14 | IR Blocking Acrylic | Dynamic | DMD2/CMD2 6096 E2A1 | 2 |
| 15 | | Dynamic | DMD3/CMD3 6096 E2A1 | 3 |
| 16 | | Dynamic | DMD4/CMD4 4896 E2L2 | 2 |
| 17 | | Dynamic | DMD4/CMD4 6096 E2L2 | 2 |
| 18 | | Traditional | DMT2/CMT2 4896 E2A1 | 2 |
| 19 | | Traditional | DMT3/CMT3 4896 E2A1 | 3 |
| 20 | | Traditional | DMT4/CMT4 4896 E2L2 | 2 |

Note: As provided per VELUX America LLC Testing Plan

## SECTION 3
**TEST REGULATION(S)**

The specimens were evaluated in accordance with the following:

1. **Occupational Safety and Health Administration/U.S. Department of Labor Regulations (Standards – 29CFR) – 1910.29**

2. **California Code of Regulations, Title 8, Section 3212**

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## SECTION 4
### MATERIAL SOURCE/INSTALLATION

All test specimens were provided by the client. Representative samples of the test specimen(s) were identified and marked at the VELUX America LLC facility where the testing was witnessed. Samples were marked by the Intertek representative, packaged for shipment by VELUX America LLC, and were shipped to the Intertek Lithia Springs GA location where they will be retained by Intertek B&C for a minimum of four years from the test completion date.

Each test specimen was installed onto framework consisting of Southern Yellow Pine 2x8s creating the curb and frame, and 4x4 legs to support the frame. 6x6 test frames had 4 legs; 5x8 and 4x8 frames had 6 legs: one each corner and midspan of long span. Installation of the tested product was performed by VELUX America LLC personnel. The specimen was installed per VELUX America LLC product installation manual into a wood buck.

| LOCATION | ANCHOR DESCRIPTION | ANCHOR SPACING |
|---|---|---|
| Aluminum frame to wood curb | Screw fastened through predrilled holes in the extruded aluminum frame | Predrilled holes in the aluminum frame were located nominally 8” from each corner and nominally 12” on center from corner holes along length of span; Nominal 6’x6’ sizes had 6 anchors points per side; Nominal 4’x8’ sizes had 5 anchor points per short span and 8 anchor points per long span; Nominal 4’x8’ sizes had 4 anchor points per short span and 8 anchor points per long span. Screws used to fasten were #8x1-3/4” FH. |

## SECTION 5
### EQUIPMENT

Calibration Certificates were provided for the following:

- Scale (Ohaus) Certificate # 3381-013120-01 dated 8/11/2021, Serial #B950772644, Next Service Date 02/11/2022, capacity 5000 lbs.
    - Impact Bag 1: 102 lbs.
    - Impact Bag 2: 202 lbs.
    - Impact Bag 3: 404 lbs.
- Load Cell (Loadstar) Certificate Calibration Date 8/12/2021, Recalibration Due Date 08/12/2022, Serial # F213131779
- Calibrated Tape Measure (mm), ID #A11E2545, Calibration Date May 2021, Recalibration Date May 2022

Other

- 50 lb. sandbags
- iPhone used to monitor time of test

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## SECTION 6
**LIST OF OFFICIAL OBSERVERS (ALL TESTS)**

| NAME | COMPANY |
|---|---|
| Mike Rhoden | VELUX America LLC |
| Greg Collins | VELUX America LLC |
| Daniel J. Wise | Intertek B&C |
| Brock Viness | Intertek B&C |

## SECTION 7
**TEST PROCEDURE(S)**

**Static Load Testing:** A specified weight (load) was applied using nominal 50 lb. sandbags arranged uniformly on a wood skid with a calibrated load cell attached from the skid to the load foot using a steel rod. Total weight of sand on the skid was approximately 1400 lbs. The loading was applied to the test specimen using a forklift to incrementally lower the weighted skid and measuring the weight of load using a calibrated load cell. The load was placed at the center of the glazing for a minimum of 60 seconds. The foot used to apply the load to the surface of the glazing was fabricated from nominal ½" plywood and measured nominally 13-1/4" wide by 30" long (2.8 $ft^2$).

**Dynamic Load Testing:** A weighted bag was dropped from a designated height. After impact the bag was removed, and the test unit was inspected for any signs of damage. Per client request, weighted bags of either 102 lbs, 202 lbs or 404 lbs were dropped from varying heights above the skylight at the specified heights and bag weight. The highest load resulting in passing was recorded. In some cases, testing was stopped prior to product failure.

## SECTION 8
**TEST SPECIMEN DESCRIPTION**

**Product Type**: Fixed Domed Skylight with One-Piece Extruded Aluminum Frame

**Series/Model Specimen 1:** IMA Dynamic DMD2/CMD2 6096 S1N2 (2 Glazing Layers)*
**Series/Model Specimen 2:** IMA Traditional DMT2/CMT2 6096 S1N2 (2 Glazing Layers)*
**Series/Model Specimen 3:** Polycarbonate Dynamic DMD2/CMD2 6096 P1C2 (2 Glazing Layers)*
**Series/Model Specimen 4:** Polycarbonate Dynamic DMD2/CMD2 6096 P1P2 (2 Glazing Layers)*
**Series/Model Specimen 5:** Polycarbonate Dynamic DMD2/CMD2 7272 P1P2 (2 Glazing Layers)*
**Series/Model Specimen 6:** Polycarbonate Dynamic DMD2/CMD2 6096 P1H1 (2 Glazing Layers)*
**Series/Model Specimen 7:** Polycarbonate Traditional DMT2/CMT2 4896 P1C2 (2 Glazing Layers)*
**Series/Model Specimen 8:** Polycarbonate Traditional DMT2/CMT2 6096 P1P2 (2 Glazing Layers)*
**Series/Model Specimen 9:** Polycarbonate Traditional DMT2/CMT2 6096 P1H1 (2 Glazing Layers)*
**Series/Model Specimen 10:** Polycarbonate Dynamic DMD3/CMD3 6096 P1C2 (3 Glazing Layers)*
**Series/Model Specimen 11:** Polycarbonate Dynamic DMD4/CMD4 6096 P1L2 (2 Glazing Layers)*
**Series/Model Specimen 12:** Acrylic Traditional DMT2/CMT2 4896 A1A1 (2 Glazing Layers)*

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**Series/Model Specimen 13:** Acrylic Pyramid DMP2/CMP2 4896 A1A1 (2 Glazing Layers)*
**Series/Model Specimen 14:** IR Blocking Dynamic DMD2/CMD2 6096 E2A1 (2 Glazing Layers)*
**Series/Model Specimen 15:** IR Blocking Dynamic DMD3/CMD3 6096 E2A1 (3 Glazing Layers)*
**Series/Model Specimen 16:** IR Blocking Dynamic DMD4/CMD4 4896 E2L2 (2 Glazing Layers)*
**Series/Model Specimen 17:** IR Blocking Dynamic DMD4/CMD4 6096 E2L2 (2 Glazing Layers)*
**Series/Model Specimen 18:** IR Blocking Traditional DMT2/CMT2 4896 E2A1 (2 Glazing Layers)*
**Series/Model Specimen 19:** IR Blocking Traditional DMT3/CMT3 4896 E2A1 (3 Glazing Layers)*
**Series/Model Specimen 20:** IR Blocking Traditional DMT4/CMT4 4896 E2L2 (2 Glazing Layers)*
***** This test report alone does not establish equivalency.

***Unless otherwise noted the following descriptions apply to all specimens.***

**Test Specimens (nominal 6096): 1, 2, 3, 4, 6, 8, 9, 10, 11, 14, 15, 17**

| **OVERALL AREA**: | **WIDTH** | | **LENGTH** | |
|---|---|---|---|---|
| 4.3 m² (46.3 ft²) | **millimeters** | **inches** | **millimeters** | **inches** |
| Overall | 1661.2 | 65-1/2 | 2578.1 | 101-1/2 |
| Rough Opening | 1524.0 | 60 | 2438.4 | 96 |

**Test Specimens (nominal 4896): 7, 12, 13, 16, 18, 19, 20**

| **OVERALL AREA**: | **WIDTH** | | **LENGTH** | |
|---|---|---|---|---|
| 3.5 m² (37.7 ft²) | **millimeters** | **inches** | **millimeters** | **inches** |
| Overall | 1358.9 | 53-1/2 | 2578.1 | 101-1/2 |
| Rough Opening | 1219.2 | 48 | 2438.4 | 96 |

**Test Specimens (nominal 7272): 5**

| **OVERALL AREA**: | **WIDTH** | | **LENGTH** | |
|---|---|---|---|---|
| 3.9 m² (41.7 ft²) | **millimeters** | **inches** | **millimeters** | **inches** |
| Overall | 1968.5 | 77-1/2 | 1968.5 | 77-1/2 |
| Rough Opening | 1828.8 | 72 | 1828.8 | 72 |

**Frame Construction**:

| **MEMBER** | **MATERIAL** | **DESCRIPTION** |
|---|---|---|
| Frame | 6063/T5 Aluminum | Extruded (one piece) |

| **CORNERS** | **JOINERY TYPE** | **DETAIL** |
|---|---|---|
| All corners | Mitered | Welded |

**Reinforcement**: No reinforcement was utilized.

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**Weatherstripping**:

| DESCRIPTION | QUANTITY | LOCATION |
|---|---|---|
| Low- or High-Profile PVC Extruded Custom-shaped Lineal with 4 Rows of Dual-durometer Fin (note two different but similar profiles were used and was dependent upon glazing layers) | 1 Row | Located around the interior perimeter of the aluminum frame |

**Glazing:** *No conclusions of any kind regarding the adequacy or inadequacy of the glazing in any glazed test specimen(s) can be made.*

***Glazing method:*** The glazing was set from the exterior onto one of the following: 1) a rigid PVC low-profile lineal (double glazing) or 2) a rigid PVC high-profile lineal (triple glazing) against the 2x4 wood curve. The glazing was secured from the exterior using the extruded aluminum frame that is attached to the PVC lineal with co-extruded fins (part # 320293) using a specified number of six lobe truss head SST #10-16X5/8" AB tapping screws (part # 320291) every 12" from corner screws set at 8" from corner. Glazing layers were separated by a double-sided foam tape (part #320296). A single silicone bead is applied around the entire perimeter of the dome sealing the aluminum frame to the outer dome and another on the interior sealing the innermost dome to the PVC inner PVC frame lineal.

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| SPECIMEN | GLASS TYPE | SPACER TYPE | LITE 1 | LITE 2 | LITE 3 |
|---|---|---|---|---|---|
| 1 | IMA | Double-sided adhesive foam | 0.150 clear smooth 100% IMA | 0.118 50% white prismatic IMA | N/A |
| 2 | IMA | Double-sided adhesive foam | 0.150 clear smooth 100% IMA | 0.118 50% white prismatic IMA | N/A |
| 3 | Polycarbonate | Double-sided adhesive foam | 0.118 clear smooth Luxguard PC | 0.118 white prismatic PC | N/A |
| 4 | Polycarbonate | Double-sided adhesive foam | 0.118 clear smooth Luxguard PC | 0.118 white smooth PC | N/A |
| 5 | Polycarbonate | Double-sided adhesive foam | 0.118 clear smooth Luxguard PC | 0.118 white smooth PC | N/A |
| 6 | Polycarbonate | Double-sided adhesive foam | 0.118 clear smooth Luxguard PC | 0.118 Satin Ice acrylic | N/A |
| 7 | Polycarbonate | Double-sided adhesive foam | 0.118 clear smooth Luxguard PC | 0.118 white prismatic PC | N/A |
| 8 | Polycarbonate | Double-sided adhesive foam | 0.118 clear smooth Luxguard PC | 0.118 white smooth PC | N/A |
| 9 | Polycarbonate | Double-sided adhesive foam | 0.118 clear smooth Luxguard PC | 0.118 Satin Ice acrylic | N/A |
| 10 | Polycarbonate | Double-sided adhesive foam | 0.118 clear smooth Luxguard PC | 0.118 clear smooth PC | 0.118 white prismatic PC |
| 11 | Polycarbonate | Double-sided adhesive foam | 0.118 clear smooth Luxguard PC | 10 mm Lumira flat panel | N/A |
| 12 | Acrylic | Double-sided adhesive foam | 0.118 clear smooth acrylic | 0.118 clear smooth acrylic | N/A |

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| SPECIMEN | GLASS TYPE | SPACER TYPE | LITE 1 | LITE 2 | LITE 3 |
|---|---|---|---|---|---|
| 13 | Acrylic | Double-sided adhesive foam | 0.118 clear smooth acrylic | 0.118 clear smooth acrylic | N/A |
| 14 | IR Blocking Acrylic | Double-sided adhesive foam | 0.118 Satin Sky 2 acrylic | 0.118 clear smooth acrylic | N/A |
| 15 | IR Blocking Acrylic | Double-sided adhesive foam | 0.118 Satin Sky 2 acrylic | 0.118 clear smooth acrylic | 0.118 clear smooth acrylic |
| 16 | IR Blocking Acrylic | Double-sided adhesive foam | 0.118 Satin Sky 2 acrylic | 10 mm Lumira flat panel | N/A |
| 17 | IR Blocking Acrylic | Double-sided adhesive foam | 0.118 Satin Sky 2 acrylic | 10 mm Lumira flat panel | N/A |
| 18 | IR Blocking Acrylic | Double-sided adhesive foam | 0.118 Satin Sky 2 acrylic | 0.118 clear smooth acrylic | N/A |
| 19 | IR Blocking Acrylic | Double-sided adhesive foam | 0.118 Satin Sky 2 acrylic | 0.118 clear smooth acrylic | 0.118 clear smooth acrylic |
| 20 | IR Blocking Acrylic | Double-sided adhesive foam | 0.118 Satin Sky 2 acrylic | 10 mm Lumira flat panel | N/A |

**Glazing DLO (daylight opening size):**

| LOCATION | QUANTITY | DAYLIGHT OPENING | | GLAZING BITE |
|---|---|---|---|---|
| | | millimeters | inches | |
| 6096 Specimens | 1 | 1524 x 2438 | 60 x 96 | Nom. 1" |
| 4896 Specimens | 1 | 1219 X 2438 | 48 X 96 | Nom. 1” |
| 7272 Specimens | 1 | 1829 X 1829 | 72 X 72 | Nom. 1” |

**Drainage**:

| METHOD | SIZE | QUANTITY | LOCATION |
|---|---|---|---|

N/A

**Hardware**:

| DESCRIPTION | QUANTITY | LOCATION |
|---|---|---|

N/A

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## SECTION 9
## TEST RESULTS

Testing was performed indoors in an environmentally controlled warehouse space. The temperature during testing was approximately 21°C (69F) for each day of testing. The results are tabulated as follows for OSHA CFR 1910.29 and California Title 8 loading.

**SPECIMEN 1: IMA Dynamic DMD2/CMD2 6096 S1N2 (2 Glazing Layers); Dome 1: 0.150 clear smooth 100% IMA, Dome 2: 0.118 50% white prismatic IMA**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Dynamic | 100 | 200 lbf-ft (2' drop height) | Center of dome | Pass |
| 2 | Dynamic | 100 | 400 lbf-ft (4' drop height) | Center of dome | Pass |
| 1 | Static | N/A | 200 lbf | Center of dome | Pass |
| 2 | Static | N/A | 400 lbf | Center of dome | Pass |
| 3 | Static | N/A | 600 lbf | Center of dome | Pass |
| 4 | Static | N/A | 800 lbf | Center of dome | Pass |

Note: Dynamic drop test performed under Job #N2827.01-550-44

**SPECIMEN 2: IMA Traditional DMT2/CMT2 6096 S1N2 (2 Glazing Layers); Dome 1: 0.150 clear smooth 100% IMA, Dome 2: 0.118 50% white prismatic IMA**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Dynamic | 200 | 400 lbf-ft (2' drop height) | Center of dome | Pass |
| 2 | Dynamic | 200 | 600 lbf-ft (3' drop height) | Center of dome | Pass |
| 3 | Dynamic | 200 | 800 lbf-ft (4' drop height) | Center of dome | Pass |
| 4 | Dynamic | 400 | 1200 lbf-ft (3' drop height) | Center of dome | Pass |
| 5 | Dynamic | 400 | 1600 lbf-ft (4' drop height) | Center of dome | Pass |
| 1 | Static | N/A | 200 lbf | Center of dome | Pass |
| 2 | Static | N/A | 400 lbf | Center of dome | Pass |
| 3 | Static | N/A | 600 lbf | Center of dome | Pass |
| 4 | Static | N/A | 800 lbf | Center of dome | Pass |
| 5 | Static | N/A | 1000 lbf | Center of dome | Pass |

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**SPECIMEN 3: Polycarbonate Dynamic DMD2/CMD2 6096 P1C2 (2 Glazing Layers); Dome 1: 0.118 clear smooth Luxguard PC, Dome 2: 0.118 white prismatic PC**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Dynamic | 400 | 800 lbf-ft (2' drop height) | Center of dome | Pass |
| 2 | Dynamic | 400 | 1200 lbf-ft (3' drop height) | Center of dome | Pass |
| 3 | Dynamic | 400 | 1600 lbf-ft (4' drop height) | Center of dome | Pass |
| 1 | Static | N/A | 400 lbf | Center of dome | Pass |
| 2 | Static | N/A | 600 lbf | Center of dome | Pass |
| 3 | Static | N/A | 800 lbf | Center of dome | Pass |
| 4 | Static | N/A | 1000 lbf | Center of dome | Pass |

**SPECIMEN 4: Polycarbonate Dynamic DMD2/CMD2 6096 P1P2 (2 Glazing Layers); Dome 1: 0.118 clear smooth Luxguard PC, Dome 2: 0.118 white smooth PC**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Dynamic | 400 | 800 lbf-ft (2' drop height) | Center of dome | Pass |
| 2 | Dynamic | 400 | 1200 lbf-ft (3' drop height) | Center of dome | Pass |
| 3 | Dynamic | 400 | 1600 lbf-ft (4' drop height) | Center of dome | Pass |
| 1 | Static | N/A | 400 lbf | Center of dome | Pass |
| 2 | Static | N/A | 600 lbf | Center of dome | Pass |
| 3 | Static | N/A | 800 lbf | Center of dome | Pass |
| 4 | Static | N/A | 1000 lbf | Center of dome | Pass |

**SPECIMEN 5: Polycarbonate Dynamic DMD2/CMD2 7272 P1P2 (2 Glazing Layers); Dome 1: 0.118 clear smooth Luxguard PC, Dome 2: 0.118 white smooth PC**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Dynamic | 400 | 800 lbf-ft (2' drop height) | Center of dome | Pass |
| 2 | Dynamic | 400 | 1200 lbf-ft (3' drop height) | Center of dome | Pass |
| 3 | Dynamic | 400 | 1600 lbf-ft (4' drop height) | Center of dome | Pass |
| 4 | Dynamic | 400 | 2000 lbf-ft (5' drop height) | Center of dome | Pass |
| 1 | Static | N/A | 400 lbf | Center of dome | Pass |
| 2 | Static | N/A | 600 lbf | Center of dome | Pass |
| 3 | Static | N/A | 800 lbf | Center of dome | Pass |
| 4 | Static | N/A | 1000 lbf | Center of dome | Pass |

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**SPECIMEN 6: Polycarbonate Dynamic DMD2/CMD2 6096 P1H1 (2 Glazing Layers); Dome 1: 0.118 clear smooth Luxguard PC, Dome 2: 0.118 Satin Ice acrylic**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Dynamic | 400 | 800 lbf-ft (2' drop height) | Center of dome | Pass |
| 2 | Dynamic | 400 | 1200 lbf-ft (3' drop height) | Center of dome | Pass |
| 1 | Static | N/A | 100 lbf | Center of dome | Pass |
| 2 | Static | N/A | 200 lbf | Center of dome | Pass |
| 3 | Static | N/A | 300 lbf | Center of dome | Pass |
| 4 | Static | N/A | 400 lbf | Center of dome | Pass |
| 5 | Static | N/A | 500 lbf | Center of dome | Pass |
| 6 | Static | N/A | 600 lbf | Center of dome | Pass |
| 7 | Static | N/A | 700 lbf | Center of dome | Pass |
| 8 | Static | N/A | 800 lbf | Center of dome | Pass |
| 9 | Static | N/A | 900 lbf | Center of dome | Pass |
| 10 | Static | N/A | 1000 lbf | Center of dome | Pass |

**SPECIMEN 7: Polycarbonate Traditional DMT2/CMT2 4896 P1C2 (2 Glazing Layers); Dome 1: 0.118 clear smooth Luxguard PC, Dome 2: 0.118 white prismatic PC**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Dynamic | 400 | 800 lbf-ft (2' drop height) | Center of dome | Pass |
| 2 | Dynamic | 400 | 1200 lbf-ft (3' drop height) | Center of dome | Pass |
| 3 | Dynamic | 400 | 1600 lbf-ft (4' drop height) | Center of dome | Pass |
| 1 | Static | N/A | 400 lbf | Center of dome | Pass |
| 2 | Static | N/A | 600 lbf | Center of dome | Pass |
| 3 | Static | N/A | 800 lbf | Center of dome | Pass |
| 4 | Static | N/A | 1000 lbf | Center of dome | Pass |

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**SPECIMEN 8: Polycarbonate Traditional DMT2/CMT2 6096 P1P2 (2 Glazing Layers); Dome 1: 0.118 clear smooth Luxguard PC, Dome 2: 0.118 white smooth PC**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Dynamic | 400 | 800 lbf-ft (2' drop height) | Center of dome | Pass |
| 2 | Dynamic | 400 | 1200 lbf-ft (3' drop height) | Center of dome | Pass |
| 3 | Dynamic | 400 | 1600 lbf-ft (4' drop height) | Center of dome | Pass |
| 1 | Static | N/A | 400 lbf | Center of dome | Pass |
| 2 | Static | N/A | 600 lbf | Center of dome | Pass |
| 3 | Static | N/A | 800 lbf | Center of dome | Pass |
| 4 | Static | N/A | 1000 lbf | Center of dome | Pass |

**SPECIMEN 9: Polycarbonate Traditional DMT2/CMT2 6096 P1H1 (2 Glazing Layers): Dome 1: 0.118 clear smooth Luxguard PC, Dome 2: 0.118 Satin Ice acrylic**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Dynamic | 400 | 800 lbf-ft (2' drop height) | Center of dome | Pass |
| 2 | Dynamic | 400 | 1200 lbf-ft (3' drop height) | Center of dome | Pass |
| 1 | Static | N/A | 100 lbf | Center of dome | Pass |
| 2 | Static | N/A | 200 lbf | Center of dome | Pass |
| 3 | Static | N/A | 300 lbf | Center of dome | Pass |
| 4 | Static | N/A | 400 lbf | Center of dome | Pass |
| 5 | Static | N/A | 500 lbf | Center of dome | Pass |
| 6 | Static | N/A | 600 lbf | Center of dome | Pass |
| 7 | Static | N/A | 700 lbf | Center of dome | Pass |
| 8 | Static | N/A | 800 lbf | Center of dome | Pass |
| 9 | Static | N/A | 900 lbf | Center of dome | Pass |
| 10 | Static | N/A | 1000 lbf | Center of dome | Pass |

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**SPECIMEN 10: Polycarbonate Dynamic DMD3/CMD3 6096 P1C2 (3 Glazing Layers); Dome 1: 0.118 clear smooth Luxguard PC, Dome 2: 0.118 clear smooth PC, Dome 3; 0.118 white prismatic PC**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Dynamic | 400 | 800 lbf-ft (2' drop height) | Center of dome | Pass |
| 2 | Dynamic | 400 | 1200 lbf-ft (3' drop height) | Center of dome | Pass |
| 3 | Dynamic | 400 | 1600 lbf-ft (4' drop height) | Center of dome | Pass |
| 4 | Dynamic | 400 | 2000 lbf-ft (5’ drop height) | Center of dome | Pass |
| 1 | Static | N/A | 400 lbf | Center of dome | Pass |
| 2 | Static | N/A | 600 lbf | Center of dome | Pass |
| 3 | Static | N/A | 800 lbf | Center of dome | Pass |
| 4 | Static | N/A | 1000 lbf | Center of dome | Pass |

**SPECIMEN 11: Polycarbonate Dynamic DMD4/CMD4 6096 P1L2 (2 Glazing Layers); Dome 1: 0.118 clear smooth Luxguard PC, Dome 2: 10 mm Lumira flat panel**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Dynamic | 400 | 800 lbf-ft (2' drop height) | Center of dome | Pass |
| 2 | Dynamic | 400 | 1200 lbf-ft (3' drop height) | Center of dome | Pass |
| 1 | Static | N/A | 400 lbf | Center of dome | Pass |
| 2 | Static | N/A | 600 lbf | Center of dome | Pass |
| 3 | Static | N/A | 800 lbf | Center of dome | Pass |
| 4 | Static | N/A | 1000 lbf | Center of dome | Pass |

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**SPECIMEN 12: Acrylic Traditional DMT2/CMT2 4896 A1A1 (2 Glazing Layers); Dome 1: 0.118 clear smooth acrylic, Dome 2: 0.118 clear smooth acrylic**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Dynamic | 100 | 100 lbf-ft (1' drop height) | Center of dome | Pass |
| 2 | Dynamic | 100 | 200 lbf-ft (2' drop height) | Center of dome | Pass |
| 3 | Dynamic | 100 | 300 lbf-ft (3' drop height) | Center of dome | Pass |
| 4 | Dynamic | 100 | 400 lbf-ft (4' drop height) | Center of dome | Pass |
| 1 | Static | N/A | 100 lbf | Center of dome | Pass |
| 2 | Static | N/A | 200 lbf | Center of dome | Pass |
| 3 | Static | N/A | 300 lbf | Center of dome | Pass |
| 4 | Static | N/A | 400 lbf | Center of dome | Pass |
| 5 | Static | N/A | 500 lbf | Center of dome | Pass |
| 6 | Static | N/A | 600 lbf | Center of dome | Pass |
| 7 | Static | N/A | 700 lbf | Center of dome | Pass |
| 8 | Static | N/A | 800 lbf | Center of dome | Pass |
| 9 | Static | N/A | 900 lbf | Center of dome | Pass |
| 10 | Static | N/A | 1000 lbf | Center of dome | Pass |

**SPECIMEN 13: Acrylic Pyramid DMP2/CMP2 4896 A1A1 (2 Glazing Layers); Dome 1: 0.118 clear smooth acrylic, Dome 2: 0.118 clear smooth acrylic**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Static | N/A | 100 lbf | Center of dome | Pass |
| 2 | Static | N/A | 200 lbf | Center of dome | Pass |
| 3 | Static | N/A | 300 lbf | Center of dome | Pass |
| 4 | Static | N/A | 400 lbf | Center of dome | Pass |
| 5 | Static | N/A | 500 lbf | Center of dome | Pass |

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**SPECIMEN 14: IR Blocking Dynamic DMD2/CMD2 6096 E2A1 (2 Glazing Layers); Dome 1: 0.118 Satin Sky 2 acrylic, Dome 2: 0.118 clear smooth acrylic**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Dynamic | 100 | 100 lbf-ft (1' drop height) | Center of dome | Pass |
| 2 | Dynamic | 100 | 200 lbf-ft (2’ drop height) | Center of dome | Pass |
| 3 | Dynamic | 100 | 300 lbf-ft (3' drop height) | Center of dome | Pass |
| 1 | Static | N/A | 100 lbf | Center of dome | Pass |
| 2 | Static | N/A | 200 lbf | Center of dome | Pass |
| 3 | Static | N/A | 300 lbf | Center of dome | Pass |
| 4 | Static | N/A | 400 lbf | Center of dome | Pass |
| 5 | Static | N/A | 500 lbf | Center of dome | Pass |
| 6 | Static | N/A | 600 lbf | Center of dome | Pass |
| 7 | Static | N/A | 700 lbf | Center of dome | Pass |
| 8 | Static | N/A | 800 lbf | Center of dome | Pass |
| 9 | Static | N/A | 900 lbf | Center of dome | Pass |
| 10 | Static | N/A | 1000 lbf | Center of dome | Pass |

**SPECIMEN 15: IR Blocking Dynamic DMD3/CMD3 6096 E2A1 (3 Glazing Layers); Dome 1: 0.118 Satin Sky 2 acrylic, Dome 2: 0.118 clear smooth acrylic, Dome 3: 0.118 clear smooth acrylic**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Dynamic | 200 | 200 lbf-ft (1' drop height) | Center of dome | Pass |
| 2 | Dynamic | 200 | 400 lbf-ft (2' drop height) | Center of dome | Pass |
| 1 | Static | N/A | 100 lbf | Center of dome | Pass |
| 2 | Static | N/A | 200 lbf | Center of dome | Pass |
| 3 | Static | N/A | 300 lbf | Center of dome | Pass |
| 4 | Static | N/A | 400 lbf | Center of dome | Pass |
| 5 | Static | N/A | 500 lbf | Center of dome | Pass |
| 6 | Static | N/A | 600 lbf | Center of dome | Pass |
| 7 | Static | N/A | 700 lbf | Center of dome | Pass |
| 8 | Static | N/A | 800 lbf | Center of dome | Pass |
| 9 | Static | N/A | 900 lbf | Center of dome | Pass |
| 10 | Static | N/A | 1000 lbf | Center of dome | Pass |

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**SPECIMEN 16: IR Blocking Dynamic DMD4/CMD4 4896 E2L2 (2 Glazing Layers); Dome 1: 0.118 Satin Sky 2 acrylic, Dome 2: 10 mm Lumira flat panel**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Static | N/A | 100 lbf | Center of dome | Pass |
| 2 | Static | N/A | 200 lbf | Center of dome | Pass |
| 3 | Static | N/A | 300 lbf | Center of dome | Pass |
| 4 | Static | N/A | 400 lbf | Center of dome | Pass |
| 5 | Static | N/A | 500 lbf | Center of dome | Pass |
| 6 | Static | N/A | 600 lbf | Center of dome | Pass |
| 7 | Static | N/A | 700 lbf | Center of dome | Pass |
| 8 | Static | N/A | 800 lbf | Center of dome | Pass |
| 9 | Static | N/A | 900 lbf | Center of dome | Pass |
| 10 | Static | N/A | 1000 lbf | Center of dome | Pass |

**SPECIMEN 17: IR Blocking Dynamic DMD4/CMD4 6096 E2L2 (2 Glazing Layers); Dome 1: 0.118 Satin Sky 2 acrylic, Dome 2: 10 mm Lumira flat panel**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Static | N/A | 100 lbf | Center of dome | Pass |
| 2 | Static | N/A | 200 lbf | Center of dome | Pass |
| 3 | Static | N/A | 300 lbf | Center of dome | Pass |
| 4 | Static | N/A | 400 lbf | Center of dome | Pass |
| 5 | Static | N/A | 500 lbf | Center of dome | Pass |
| 6 | Static | N/A | 600 lbf | Center of dome | Pass |
| 7 | Static | N/A | 700 lbf | Center of dome | Pass |

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**SPECIMEN 18: IR Blocking Traditional DMT2/CMT2 4896 E2A1 (2 Glazing Layers); Dome 1: 0.118 Satin Sky 2 acrylic, Dome 2: 0.118 clear smooth acrylic**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Dynamic | 100 | 100 lbf-ft (1' drop height) | Center of dome | Pass |
| 2 | Dynamic | 100 | 200 lbf-ft (2' drop height) | Center of dome | Pass |
| 3 | Dynamic | 100 | 300 lbf-ft (3' drop height) | Center of dome | Pass |
| 4 | Dynamic | 100 | 400 lbf-ft (4' drop height) | Center of dome | Pass |
| 5 | Dynamic | 100 | 500 lbf-ft (5' drop height) | Center of dome | Pass |
| 1 | Static | N/A | 100 lbf | Center of dome | Pass |
| 2 | Static | N/A | 200 lbf | Center of dome | Pass |
| 3 | Static | N/A | 300 lbf | Center of dome | Pass |
| 4 | Static | N/A | 400 lbf | Center of dome | Pass |
| 5 | Static | N/A | 500 lbf | Center of dome | Pass |
| 6 | Static | N/A | 600 lbf | Center of dome | Pass |
| 7 | Static | N/A | 700 lbf | Center of dome | Pass |
| 8 | Static | N/A | 800 lbf | Center of dome | Pass |
| 9 | Static | N/A | 900 lbf | Center of dome | Pass |
| 10 | Static | N/A | 1000 lbf | Center of dome | Pass |

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**SPECIMEN 19: IR Blocking Traditional DMT3/CMT3 4896 E2A1 (3 Glazing Layers); Dome 1: 0.118 Satin Sky 2 acrylic, Dome 2: 0.118 clear smooth acrylic, Dome 3: 0.118 clear smooth acrylic**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Dynamic | 100 | 100 lbf-ft (1' drop height) | Center of dome | Pass |
| 2 | Dynamic | 100 | 200 lbf-ft (2' drop height) | Center of dome | Pass |
| 3 | Dynamic | 100 | 300 lbf-ft (3' drop height) | Center of dome | Pass |
| 4 | Dynamic | 100 | 400 lbf-ft (4' drop height) | Center of dome | Pass |
| 5 | Dynamic | 100 | 500 lbf-ft (5' drop height) | Center of dome | Pass |
| 1 | Static | N/A | 100 lbf | Center of dome | Pass |
| 2 | Static | N/A | 200 lbf | Center of dome | Pass |
| 3 | Static | N/A | 300 lbf | Center of dome | Pass |
| 4 | Static | N/A | 400 lbf | Center of dome | Pass |
| 5 | Static | N/A | 500 lbf | Center of dome | Pass |
| 6 | Static | N/A | 600 lbf | Center of dome | Pass |
| 7 | Static | N/A | 700 lbf | Center of dome | Pass |
| 8 | Static | N/A | 800 lbf | Center of dome | Pass |
| 9 | Static | N/A | 900 lbf | Center of dome | Pass |
| 10 | Static | N/A | 1000 lbf | Center of dome | Pass |

**SPECIMEN 20: IR Blocking Traditional DMT4/CMT4 4896 E2L2 (2 Glazing Layers); Dome 1: 0.118 Satin Sky 2 acrylic, Dome 2: 10 mm Lumira flat panel**

| TEST | TEST METHOD | BAG (LB) | LOAD | LOAD LOCATION | RESULTS |
|---|---|---|---|---|---|
| 1 | Static | N/A | 100 lbf | Center of dome | Pass |
| 2 | Static | N/A | 200 lbf | Center of dome | Pass |
| 3 | Static | N/A | 300 lbf | Center of dome | Pass |
| 4 | Static | N/A | 400 lbf | Center of dome | Pass |
| 5 | Static | N/A | 500 lbf | Center of dome | Pass |
| 6 | Static | N/A | 600 lbf | Center of dome | Pass |

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## SECTION 10
## CONCLUSION

Each unit of the products that are identified in this report were evaluated in accordance with Occupational Safety and Health Administration (OSHA)/ U.S. Department of Labor Regulations Standard 29 CFR §1910.29(e)(1) and California Code of Regulations, Title 8, Section 3212 §(b) to determine compliance with these regulations. Results for each product type are noted in this report and identifies their level of compliance.

## SECTION 11
## DRAWINGS

The test specimen drawings have been reviewed by Intertek B&C and are representative of the test specimen(s) reported herein. Test specimen construction was verified by Intertek B&C per the drawings included in this report. Any deviations are documented herein or on the drawings.