



OSHA FALL PROTECTION TEST REPORT

Rendered to:

VELUX America LLC

SERIES/MODEL: FCM 4646 0004B

PRODUCT TYPE: Fixed Glass Glazed Curb Mount Skylight

Report No: 90752.03-109-44

Test Date: 07/27/09

Report Date: 01/09/18

Record Retention Date: 07/27/13



OSHA FALL PROTECTION TEST REPORT

Rendered to:

VELUX America LLC
P.O. Box 5001
Greenwood, South Carolina 29648-5001

Report No.: 90752.03-109-44
Test Dates: 07/27/09
Report Date: 01/09/18
Record Retention Date: 07/27/13

Project Summary: Architectural Testing, Inc. was originally contracted by VELUX America LLC to perform testing on one Series/Model FCM 4646 0004B, fixed glass glazed curb mount skylight. The test specimen description and results are reported herein. The test specimen was supplied by the client.

Test Specification: The test specimen was tested to assess compliance with Occupational Safety and Health Administration/U.S. Department of Labor Regulations (Standards- 29 CFR)-1910.23(e)(8). A 200 lbf weight, fabricated from a bag filled with sand, was placed on the center of the glass for a minimum of 60 seconds and then dropped from increasing heights above the skylight starting at 2' until permanent visible damage was noted. All impact load drops were noted, and the resulting damage was recorded.

EVALUATION SCOPE:

- A. Intertek Building & Construction (B&C) was contracted by VELUX America LLC, 1418 Evans Pond Road on December 4, 2017 to evaluate the OSHA fall protection testing to the most recent referenced document. 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.

- B. Intertek Building & Construction (B&C) was contracted by VELUX America LLC, 1418 Evans Pond Road on December 4, 2017 to evaluate the Cal/OSHA fall protection testing to the most recent referenced document. 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."

Test Specimen Description:

Series/Model: FCM 4646 0004B

Product Type: Fixed Glass Glazed Curb Mount Skylight

Overall Size: 1301 mm (51-1/4") wide by 1295 mm (51") long

Fixed Daylight Opening Size: 1207 mm (47-1/2") by 1207 mm (47-1/2")

Overall Area: 1.68 m² (18.06 ft²)

Finish: All aluminum was coated.

Weatherstripping: A custom shaped flexible thermoplastic elastomer gasket with mitered and welded corners.

Glazing Detail: The unit was glazed with 18.4 mm (23/32") thick insulating glass, constructed from a sheet of 3.9 mm (5/32") thick clear tempered glass outboard, a sheet of 5.8 mm (7/32") thick laminated glass inboard, and an aluminum box spacer system. The laminated glass was constructed from two sheets of 2.5 mm (3/32") thick clear heat strengthened glass and a 0.030" thick PVB interlayer. The glass was set from the interior against a bead of silicone.

Frame Construction: Frame members were constructed of roll-formed aluminum with mitered, keyed, and sealed corners, secured using one 3/8" long "T" nail at each end of all members into the ASA corner key. A custom shaped flexible thermoplastic elastomer installation gasket with mitered and thermally welded corners was secured to the frame members using one 3/8" long "T" nail at each end and spaced 6" on center. The gasket serves as a glazing retainer for shipment.

Installation: The unit was installed into a Spruce-Pine-Fir wood buck with a 3-1/2" high curb. The outside dimensions of the curb were 49-1/2" x 49-1/2". The frame was set against the wood curb and while compressing the gasket between the glass and the curb, it was secured through the pre-drilled holes in the exterior leg of all the frame members with 8 x 1-3/4" long self-tapping pan head screws, located 5" from each corner and one midspan, into the wood curb. The unit was anchored in accordance with the installation instructions provided by the manufacturer. The test frame was placed on the floor and leveled prior to testing.

Test Results: The results are tabulated as follows:

<u>Test Method</u>	<u>Load Location</u>	<u>Results</u>
<u>OSHA Safety Drop Test</u>		
200 lbf at rest	Center of glass	No visible damage
400 lbf-ft (2' drop height)	Center of glass	No visible damage
800 lbf-ft (4' drop height)	Center of glass	No visible damage
1200 lbf-ft (6' drop height)	Center of glass	No visible damage
1600 lbf-ft (8' drop height)	Center of glass	No visible damage
2000 lbf-ft (10' drop height)	Center of glass	See Note #1

***Note #1:** At the 10' drop height the glass failed, breaking the exterior sheet of tempered glass, and causing no damage to the laminated glass. The weight did not fall through the skylight.*

***General Note:** All testing was performed in accordance with the referenced regulation.*

CONCLUSION:

The specimen was evaluated in accordance with Occupational Safety and Health Administration (OSHA)/U.S. Department of Labor Regulations Standard 29 CFR §1910.29(e)(1) to be capable of supporting twice the maximum intended load, up to (800) ft-lb.

The specimen was evaluated in accordance with California Code of Regulations, Title 8, Section 3212 §(b) to be capable of safely supporting loads exceeding 400 ft-lb.

Drawing Reference: The test specimen drawings have been reviewed by Architectural Testing and are representative of the test specimen reported herein.

List of Official Observers:

<u>Name</u>	<u>Company</u>
Michael D. Stremmel, P.E.	Architectural Testing, Inc.
Aaron M. Shultz	Architectural Testing, Inc.

Detailed drawings, data sheets, representative samples of test specimens, a copy of this report, or other pertinent project documentation will be retained by Architectural Testing, Inc. for a period of four years from the original test date. At the end of this retention period, such materials shall be discarded without notice and the service life of this report will expire.

Results obtained are tested values and were secured by using the designated test methods. If test specimen contains glazing, no conclusions of any kind regarding the adequacy or inadequacy of the glass in the test specimen can be made. This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC:

Eric M. Brennan
Project Manager

Timothy J. McGill
Manager – Product Testing

AMS:dem/vlm/abo

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix-A: Test Equipment (1)
- Appendix-B: Photographs (2)
- Appendix-C: Drawing (1)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	01/09/18	N/A	Original report issue

This report produced from controlled document template ATI 00168, revised 03/05/09.

Appendix A
Test Equipment

Instrument	Manufacturer	Asset #
200 lbf Weight Bag	Architectural Testing, Inc.	Architectural Testing, Inc.
Quick Release	N/A	Architectural Testing, Inc.

Appendix B
Photographs



Photo No. 1
Specimen Before Testing

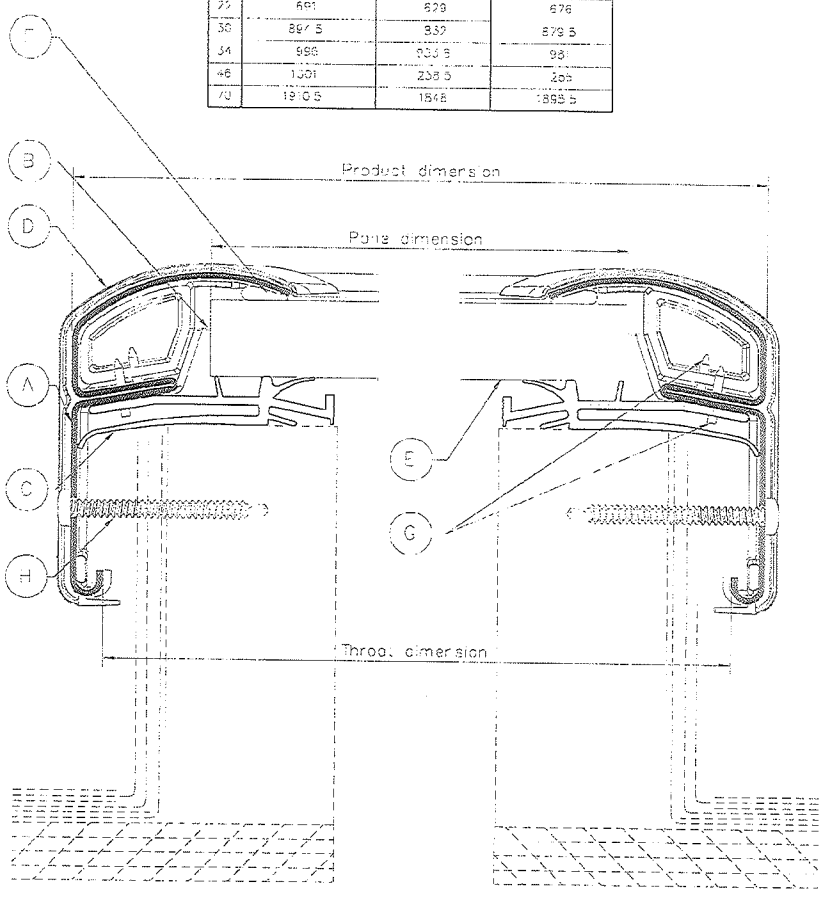


Photo No. 2
Specimen After Testing

Appendix C

Drawing

Code	Product dimensions	Pane dimensions	Throat dimensions
4	488	426	473
25	661	629	676
30	897.5	837	878.5
34	986	933.5	981
46	1301	1233.5	1286
70	1870.5	1818	1888.5



HORIZONTAL CROSS-SECTION
(TYPICAL FOR VERTICAL CROSS-SECTION)

ITEM	QTY.	PART/COMPONENT	COMPONENT NO.	DESCRIPTION	DRAWING NO.			COMMENTS
					Sheet	Quantity	Rev.	
A	2	Outer Frame	30219222	Roll formed Aluminum - Clear Gray	21	30219222	000000	Profile drawing
					21	30219222	000001	Cutting and marking drawing
B	4	Pane Gasket	4033392	Resil. Color white (Not visible from view)	21	30219222	000000	Placement of gasket. Part assembly drawing
					21	3033392	000000	Commonly drawing
C	1	Inner frame casing	30337222XX	TPE Extruder extruded Color Black	21	30337222	000000	Commonly drawing
					21	30337222	000001	Welding drawing
D	4	Corner Key	3033380	ASA-Lucan E 778 T or equivalent Color NCS S-7800-N (grey)	21	30337222	000000	Spotting and punching drawing
					21	30337222	000001	Placement drawing
E	4	Panel	N/A	Panels and Spacer Bars	21	3033380	000000	Commonly drawing
					21	3033380	000001	Spotting drawing (Back Side-10/21/87)
F	1	Sealant	308005 308010	Base for Outer Frame Sealant Catalyst for Outer Frame Sealant	21	30434110	000001	Placement of Panel Assembly drawing
					21	309001	000001	Material specification - a two-part silicone sealant

ITEM	PART/COMPONENT	COMPONENT NO.	DESCRIPTION	DRAWING NO.			COMMENTS
				Sheet	Quantity	EXPOSED	
G	Panel	471020		21	471020	000000	Commonly drawing
H	Wood Screw	308136	PH w/ank point #8 #8-8 SS Finish Black Zinc	21	308136	000000	1.75" length

GENERAL NOTES:
 Reference Drawings include 21 FCMCER 040 B1 xx for "A21" CM List of Parts (PROPRIETARY).
 A copy of this drawing plus any other supplemental documentation regarding these skylight models will be maintained at the Skylight Technical Release in the following category location - Technical Data/Submital Data/ Certification List of Parts / Compliance Documents.
 Horizontal and Vertical Cross-Section part sizes, materials and assembly are identical.
 Dimensions and Quantities shown on this drawing are for Monocore Size FCM model skylight is:
 V = Visible
 NV = Non-Visible

Item F Quantities See Note below		
Size	Code	Fasteners
430	14	
446	15	
2222	16	
2239	16	
2234	12	
2246	12	
2270	20	
3030	16	
3046	15	
3434	20	
4646	20	

Item G Quantities Mounting Screw		
Size	Code	Fasteners
1430	12	
1446	12	
2225	12	
2230	12	
2234	12	
2446	12	
2270	14	
3030	14	
3046	14	
3434	14	
4646	14	

* Note:
 T-Nail quantity totals include (2) T-Nails per Corner Key, allowing for a total of (8) T-Nails for Corner Keys of each skylight. Remaining T-Nails secure the Inner Frame Gasket.



Test sample complies with these details.
 Deviations are noted.
 Report# 90752-01-109-44
 Date 7/27/09 Tech AS

DRAWING NO. 471020 SCALE 3/4"=1'-0" DATE 7/27/09 DESIGNED BY: JLD CHECKED BY: JLD	NET 1418 Cedar Point Drive, 110, Fox, NJ 07041 908-466-1400 South Orange, NJ 07061
PROJECT: _____ CLIENT: _____ DRAWING NO. _____ SHEET NO. _____	A21 FCM Product Certification Typical Arrangement with Product List of Parts