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 lb 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:

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

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:

<table>
<thead>
<tr>
<th>Name</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michael D. Stremmel, P.E.</td>
<td>Architectural Testing, Inc.</td>
</tr>
<tr>
<td>Aaron M. Shultz</td>
<td>Architectural Testing, Inc.</td>
</tr>
</tbody>
</table>
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**

<table>
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<th>Date</th>
<th>Page(s)</th>
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<td>01/09/18</td>
<td>N/A</td>
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This report produced from controlled document template ATI 00168, revised 03/05/09.
Appendix A

Test Equipment

<table>
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<tr>
<th>Instrument</th>
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Appendix B

Photographs

Photo No. 1
Specimen Before Testing

Photo No. 2
Specimen After Testing
Appendix C

Drawing