

# SOUTHWEST RESEARCH INSTITUTE®

6220 CULEBRA RD. 78238-5166 • P.O. DRAWER 28510 78228-0510 • SAN ANTONIO, TEXAS, USA • (210) 684-5111 • WWW.SWRI.ORG  
CHEMISTRY AND CHEMICAL ENGINEERING DIVISION  
FIRE TECHNOLOGY DEPARTMENT  
WWW.FIRE.SWRI.ORG  
FAX (210) 522-3377



## EVALUATION OF THE EXTERNAL FIRE RESISTANCE CHARACTERISTICS OF ROOF COVERING SYSTEMS IN GENERAL ACCORDANCE WITH ASTM E 108-10a, *STANDARD TEST METHODS FOR FIRE TESTS OF ROOF COVERINGS: CLASS B BURNING BRAND TESTING*

**SAMPLE ID:** VELUX® VS / VSE Deck Mounted Skylight

**REVISED FINAL REPORT**  
Consisting of 13 Pages

**SwRI® Project No. 01.15210.01.317e[1]**  
**Test Date: February 3, 2010**  
**Report Date: March 18, 2010**

**Prepared for:**

**Architectural Testing, Inc.**  
**130 Derry Court**  
**York, PA 17406**

**Prepared By:**

*B.A.*

**John Marshall Sharp**  
**Engineer**  
**Fire Testing Services Section**

**Approved By:**

**Barry L. Badders, Jr., P.E.**  
**Manager**  
**Fire Testing Services Section**

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## 1.0 INTRODUCTION

This report presents the results of an investigation of the external fire resistance characteristics of the VELUX® VS / VSE Deck Mounted Skylight roof covering system in general accordance with Class B requirements of ASTM E 108-10a, *Standard Test Methods for Fire Tests of Roof Coverings*. The objective of this standard is to measure the relative fire resistance characteristics of roof coverings under a simulated fire originating outside the building. This standard is used to measure and describe the properties of materials, products, or assemblies in response to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire hazard or fire risk of materials, products, or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire risk assessment that takes into account all of the factors, pertinent to an assessment of the fire hazard of a particular end use. The results apply specifically to the specimens tested, in the manner tested, and not to the entire production of these or similar materials, nor to the performance when used in combination with other materials. This final report was revised to correct the material description throughout the report from “VSE / VCE” to “VS / VSE”.

## 2.0 CLASSIFICATION CRITERIA

Class B tests are applicable to roof coverings that are effective against moderate test exposure, afford a moderate degree of fire protection to the roof deck, do not slip from position, and do not present a flying brand hazard. To be regarded as Class B, a roofing system shall meet the requirements for a total of six tests: two Burning Brand tests, two Spread of Flame tests, and two Intermittent Flame tests. Each Class B Burning Brand test requires two Class B burning brands to be placed on the test deck. The brands must be positioned at locations considered most vulnerable to fire penetration. Each Class B Intermittent Flame test requires eight 2-min exposures to a  $1400\text{ }^{\circ}\text{F} \pm 50\text{ }^{\circ}\text{F}$  flame with a 2-min interval between each exposure. Each Class B Spread of Flame test requires a single 10-min exposure to a  $1400\text{ }^{\circ}\text{F} \pm 50\text{ }^{\circ}\text{F}$  flame. All tests are performed in the presence of a  $1056 \pm 44\text{-ft/min}$  air velocity.

In order to meet acceptance criteria in accordance with ASTM E 108-10a, a roof covering material shall meet the following conditions when subjected to the particular class of fire tests:

1. At no time during or after the Intermittent Flame, Spread of Flame, or Burning Brand tests shall:
  - Any portion of the roof covering material be blown or fall off the test deck in the form of flaming or glowing brands that continue to glow after reaching the floor,
  - The roof deck be exposed (except for roof coverings restricted to use over noncombustible deck), or

- Portions of the roof deck fall away in the form of particles that continue to glow after reaching the floor.
2. At no time during the Class A, B, or C Intermittent Flame or Burning Brand tests shall there be sustained flaming of the underside of the deck. If flaming does occur, conduct another series of tests, during which no sustained flaming shall occur.
  3. During the Spread of Flame tests, the flaming shall not spread beyond 6 ft (1.8 m) for Class A, 8 ft (2.4 m) for Class B, or 13 ft (4.0 m, the top of the deck) for Class C. There shall be no significant lateral spread of flame from the path directly exposed to the test flame.

### 3.0 TEST INFORMATION

**Client:** Architectural Testing, Inc.

**SwRI Project No.:** 01.15210.01.317e

#### Test Specimen

Identification: *VELUX® VS / VSE Deck Mounted Skylight*

Date Received: January 14, 2010

Description: The deck mounted skylight was tested as is with no plywood decking due to its size.

Dimensions: The glass portion of the skylight exceeded the size of the standard ASTM E 108 roof deck of 40 in. wide × 52 in. long

Surveillance: N/A

Color: Grey metal framing with clear glass

Storage Conditions: Ambient conditions

Exposure: N/A

#### Test Details

Test Date: February 3, 2010

Test Location: Southwest Research Institute's (SwRI) Fire Technology Department in San Antonio, Texas

Witnesses: Mr. Eric Miller representing Architectural Testing, Inc.

Calibration Details: See Appendix A

Tests Conducted: ASTM E 108-10a: Class B Burning Brand

Slope: 5:12

Observations: Selected photos taken during the test are presented in Appendix B. Observations made during each test can be found in Appendix C. A schematic of the skylight is shown in Appendix D.

Other Details: N/A

Deviations: The test deviated from the standard in that the ambient air temperature recorded was below the minimum allowable temperature during testing.

#### **4.0 RESULTS**

Architectural Testing, Inc.'s, *VELUX® VS / VSE Deck Mounted Skylight* was tested in general accordance with Class B requirements of ASTM E 108-10a. The sample passed the test. Observations made during the test are presented in Appendix C.

#### **5.0 CONCLUSION**

SwRI's Fire Technology Department performed testing in general accordance with ASTM E 108-10a on Architectural Testing, Inc.'s, *VELUX® VS / VSE Deck Mounted Skylight* on February 3, 2010. Based on the test results, the *VELUX® VS / VSE Deck Mounted Skylight* roof covering system met the acceptance criteria for one Class B Burning Brand test in general accordance with ASTM E 108-10a.

**APPENDIX A**  
**CALIBRATION DATA**  
**(Consisting of 1 Page)**

### Calibration Data

**Calibration Date: February 3, 2010**

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Air Velocity (ft/min):	Right	1049
	Center	1099
	Left	1059
Flame Temperature (°F):	2-min Average	1411

**APPENDIX B**  
**SELECTED TEST PHOTOGRAPHS**  
**(Consisting of 2 Pages)**

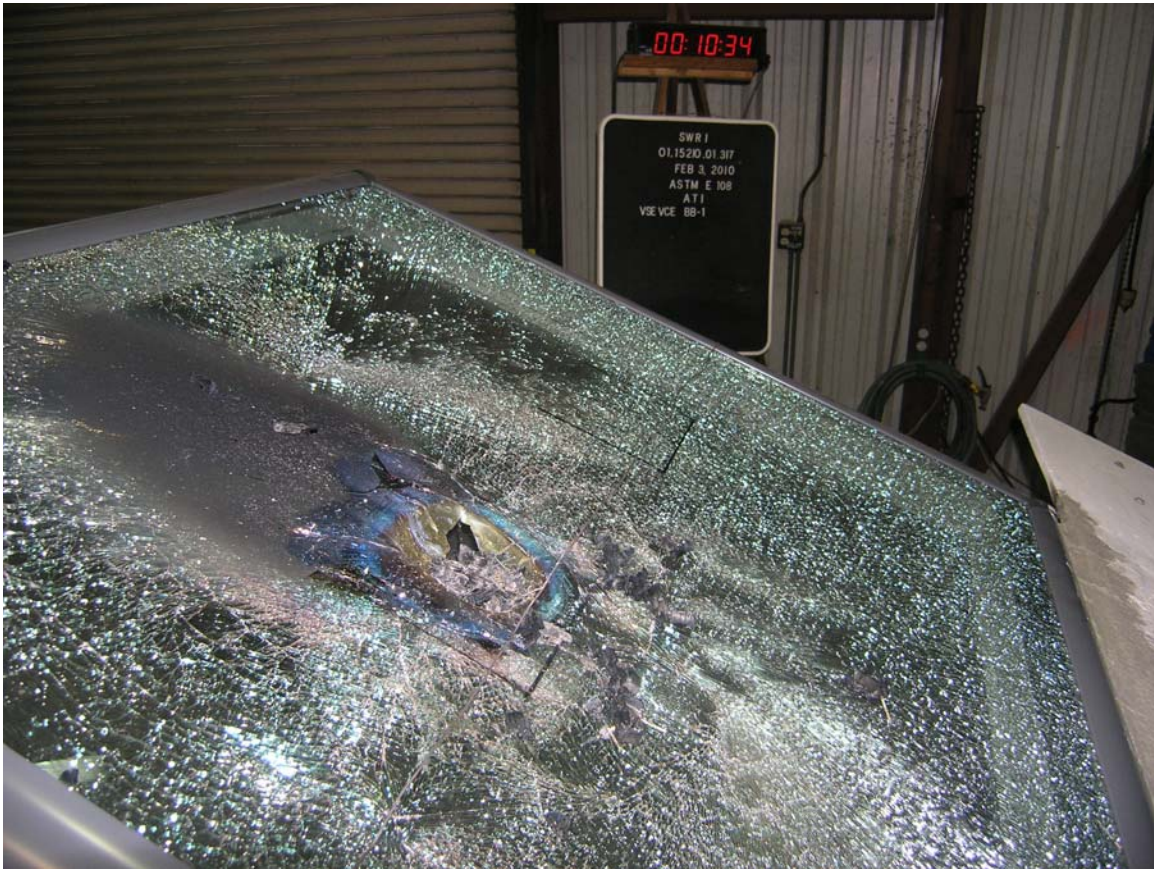


**Figure B-1. Skylight prior to Start of Test.**



**Figure B-2. Pieces of Bottom Layer of Glass Fall onto Screen.**





**Figure B-3. Shattered Top Layer of Glass.**



**Figure B-4. Condition of Sample at End of Test.**

**APPENDIX C**  
**TEST OBSERVATIONS**  
**(Consisting of 1 Page)**

**Class B Burning Brand Test**  
**February 3, 2010**

Test ID No.: BB 5  
Specimen ID: *VELUX® VS / VSE Deck Mounted Skylight*  
Ambient Air Temperature: 51 °F (10.6 °C)  
Brand Weights: 1-538 g (1.19 lb)      2-533 g (1.18 lb)

<b>TIME MIN:S</b>	<b>OBSERVATIONS</b>
00:00	Start of test; brand No. 1 placed on skylight.
04:25	Crack causes blowout of bottom layer of glass.
06:05	Top layer of glass shatters.
15:08	Brand No. 2 placed onto skylight.
30:00	Test stopped. No failure conditions exist. <b>PASS</b>

**APPENDIX D**  
**SCHEMATIC OF SKYLIGHT**  
**(Consisting of 1 Page)**



# VS/VSE



**ENGLISH:** VS/VSE Deck Mounted Skylight Installation Instructions

**ESPAÑOL:** Instrucciones de instalación para tragaluz VS/VSE montado sobre tablero

**FRANÇAIS:** Instruction d'installation du puits de lumière VS/VSE à cadre intégré monté directement sur la toiture

