
3M Renewable Energy
Attn: Paul Neumann
3M Center, 235-3D-02
St. Paul, MN 55144

Date: January 23, 2015
Author: Josh Garrison
Report Number: ESP016970P.4 Final B

3M SCOTCHSHIELD ULTRA 800 AGED SAMPLES

It is our policy to retain components and sample remnants for a minimum of 30 days from the report date, after which time they may be discarded. The data herein represents only the item(s) tested. This report shall not be reproduced, except in full, without prior permission of Element Materials Technology.

EAR Controlled Data: This document contains technical data whose export and re-export/retransfer is subject to control by the U.S. Department of Commerce under the Export Administration Act and the Export Administration Regulations. The Department of Commerce's prior written approval may be required for the export or re-export/retransfer of such technical data to any foreign person, foreign entity or foreign organization whether in the United States or abroad.

This project shall be governed exclusively by the General Terms and Conditions of Sale and Performance of Testing Services by Element Materials Technology. In no event shall Element Materials Technology be liable for any consequential, special or indirect loss or any damages above the cost of the work.
INTRODUCTION:

The following report presents the results of impact testing of aged organic coated glass in accordance with the ANSI Z97.1-2009, National Standard of Canada CAN/CGSP-12.1-M90 and CPSC 1201 standards. Testing was requested by Paul Neumann of 3M Renewable Energy. The samples were received on June 4, 2014 and testing was completed by Josh Garrison on October 24, 2014.

SUMMARY OF RESULTS:

3M Scotchshield Ultra 800 film when applied to nominal 1/8” annealed glass **Complies** with the safety glazing impact requirements of ANSI Z97.1-2009 (Class A), CAN/CSGB-12.1-M90 and CPSC 1201 (Category II).

TEST METHODS AND RESULTS:

Aging Test
Place four of the organic-coated glass specimens positioned vertically and spaced at least one inch apart in the chamber. Raise the temperature to 140°F +/- 5°F within 3 hours and maintain for 21 hours. Change the chamber conditions to 100°F +/- 5°F and 95% +/- 5% relative humidity in three hours and maintain for 21 hours. This represents one complete cycle. Expose the specimens to 10 complete cycles. At the completion of the tenth cycle, change the chamber conditions to 0°F +/- 5°F in three hours and maintain for 21 hours.

Impact Test
Specimens were kept at a temperature of 70-80°F for a minimum of four hours preceding the test. Specimens were impacted alternating on the film side and the glass side, as noted in the tables in the following results section. Each specimen was struck once within ½ inch of center, with a shot bag constructed in accordance with the specifications referenced, swinging in a pendulum arc, from a drop height shown below.

<table>
<thead>
<tr>
<th>Sample Identification</th>
<th>Impact Side</th>
<th>Total Thickness Inches</th>
<th>Drop Height Inches</th>
<th>Weight of All Lost Particles (grams)</th>
<th>Weight of Largest Piece (grams)</th>
<th>Results/Size of Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>Glass</td>
<td>0.133</td>
<td>48</td>
<td>180</td>
<td>7</td>
<td>Pass – No tears / No openings</td>
</tr>
<tr>
<td>#2</td>
<td>Film</td>
<td>0.132</td>
<td>48</td>
<td>134</td>
<td>1</td>
<td>Pass – No tears / No openings</td>
</tr>
<tr>
<td>#3</td>
<td>Glass</td>
<td>0.131</td>
<td>48</td>
<td>253</td>
<td>12</td>
<td>Pass – No tears / No openings</td>
</tr>
<tr>
<td>#4</td>
<td>Film</td>
<td>0.133</td>
<td>48</td>
<td>116</td>
<td>3</td>
<td>Pass – No tears / No openings</td>
</tr>
</tbody>
</table>
EAR-CONTROLLED DATA

CALIBRATED TEST EQUIPMENT:

- PT-171-020 Digital Caliper  
  Calibration Due: 11/07/2014
- PT-173-018 Sartorius Scale  
  Calibration Due: 08/27/2014
- PT-177-012 Tape Measure  
  Calibration Due: 02/07/2018

DISPOSITION OF SAMPLE:

Samples were destroyed during testing and were disposed of immediately.

Prepared by:

Josh Garrison
Product Evaluation Technician

Reviewed by:

Brian S. Escherich
Operations Manager