



Element Materials Technology  
3922 Delaware Avenue  
Des Moines, IA  
50313-2542 USA

P 515 266 5101  
F 515 262 1910  
T 888 786 7566  
info.desmoines@element.com  
element.com

---

**Impact Testing of Organic coated Glass in  
accordance with ANSI Z97.1-2009, CAN/CSGB-12.1-  
M90 and CPSC 1201**

3M Renewable Energy  
Attn: Paul Neumann  
3M Center, 207-1W-08  
Maplewood, MN 55144

Date: April 4, 2014  
Author: Josh Garrison  
Report Number: ESP016248P.1

**3M SCOTCHSHIELD ULTRA 600**

---

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.

This certificate shall not be reproduced, except in full, without the written approval of the laboratory.

**EAR-CONTROLLED DATA**
**INTRODUCTION:**

The following report presents the results of impact testing of 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 Company. The samples were received on March 11, 2014 and testing was completed by Josh Garrison on March 17, 2014.

**SUMMARY OF RESULTS:**

3M Scotchshield Ultra 600 film when applied to nominal 1/4" and 1/8" annealed glass **Complies** with the safety glazing impact requirements of ANSI Z97.1-2009, CAN/CSGB-12.1-M90 and CPSC 1201.

**TEST METHODS AND RESULTS:**
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.

3M Scotchshield Ultra 600 6 Mil – 1/4" Annealed Glass						
Sample Identification	Impact Side	Total Thickness Inches	Drop Height Inches	Weight of 10 Largest Pieces (grams)	Weight of Largest Piece (grams)	Results/Size of Opening
#1	Film	0.227	48	30	7	Pass – No tears / No openings
#2	Glass	0.227	48	22	11	Pass – No tears / No openings
#3	Film	0.227	48	38	7	Pass – No tears / No openings
#4	Glass	0.227	48	11	2	Pass – No tears / No openings

**EAR-CONTROLLED DATA**

<b>3M Scotchshield Ultra 600            6 Mil – 1/8" Annealed Glass</b>						
Sample Identification	Impact Side	Total Thickness Inches	Drop Height Inches	Weight of 10 Largest Pieces (grams)	Weight of Largest Piece (grams)	Results/Size of Opening
#1	Film	0.123	48	19	7	Pass – No tears / No openings
#2	Glass	0.123	48	35	5	Pass – 2" horizontal tear, sphere did not pass through
#3	Film	0.122	48	10	1	Pass – No tears / No openings
#4	Glass	0.123	48	31	7	Pass – 1" horizontal tear, sphere did not pass through

**CALIBRATED TEST EQUIPMENT:**

- |                                    |                             |
|------------------------------------|-----------------------------|
| • PT-173-032 Starrett Micrometer   | Calibration Due: 11/07/2014 |
| • PT-170-016 Chatillon Force Gauge | Calibration Due: 03/21/2014 |
| • PT-173-018 Sartorius Scale       | Calibration Due: 09/04/2014 |
| • 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**