intertek
Total Quality. Assured.

SNO-SAFE SNOW GUARDS, LLC
TEST REPORT

SCOPE OF WORK
SHEAR PERFORMANCE TESTING OF ALUMINUM AND POLYCARBONATE SNOW GUARDS

REPORT NUMBER
L2292.01-106-31 R0

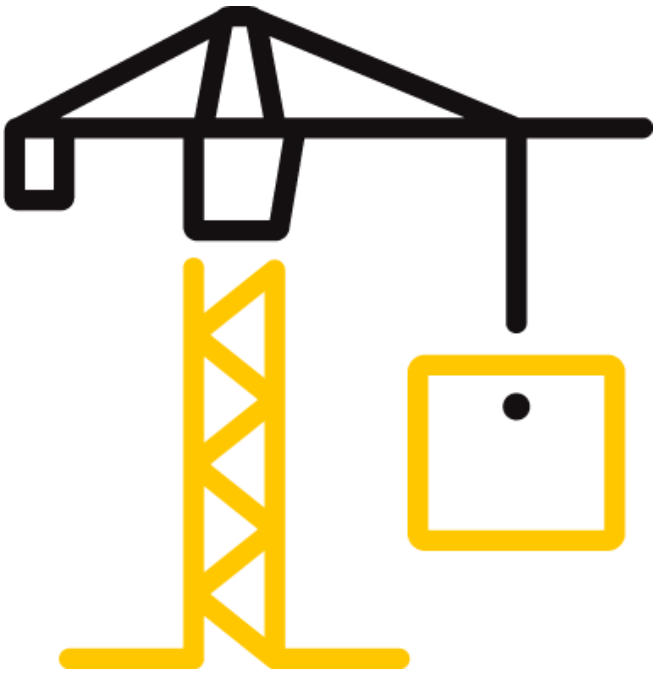
TEST DATES
08/20/20 - 02/16/21

ISSUE DATE
02/25/21

RECORD RETENTION END DATE
02/16/25

PAGES
16

DOCUMENT CONTROL NUMBER
ATI 00231 (09/05/17)
RT-R-AMER-Test-2827



130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

TEST REPORT FOR SNO-SAFE SNOW GUARDS, LLC
Report No.: L2292.01-106-31 R0
Date: 02/25/21

REPORT ISSUED TO

SNO-SAFE SNOW GUARDS, LLC
P.O. Box 541
Chicopee, Massachusetts

SECTION 1

SCOPE

Products: Aluminum and Polycarbonate Snow Guards

Intertek Building & Construction (B&C) was contracted by Sno-Safe Snow Guards, LLC to evaluate aluminum and polycarbonate snow guards in accordance with client specified Shear Performance Testing. Results obtained are tested values and were secured by using the designated test methods. Testing was conducted at the Intertek B&C test facility in York, Pennsylvania.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

For INTERTEK B&C:

COMPLETED BY:	Joshua A. Kennedy	**REVIEWED BY:**	Joseph M. Brickner
TITLE:	Technician III Materials Laboratory	**TITLE:**	Laboratory Supervisor Materials Laboratory
SIGNATURE:	Joshua A Kennedy Digitally Signed by: Joshua Kennedy	**SIGNATURE:**	Joseph M. Brickner Digitally Signed by: Joseph M. Brickner
DATE:	02/25/21	**DATE:**	02/25/21

JAK:jmb/als

Total Quality. Assured.

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

SECTION 2
SUMMARY OF TEST RESULTS

PRODUCT	ATTACHMENT DETAIL	AVERAGE MAXIMUM FORCE
Aluminum	Adhesion only	1,440 lb_f
	Adhesion and fasteners	2,620 lb_f
Polycarbonate	Adhesion only	1,220 lb_f
	Adhesion and fasteners	2,280 lb_f

SECTION 3
TEST METHOD

The specimens were evaluated in accordance with the client specified shear property instructions.

SECTION 4
MATERIAL SOURCE

The snow guard materials were provided by Sno-Safe Snow Guards, LLC. The following were received in acceptable condition on 7/14/2020:

- 24, nominally 12-inch square by 0.75-inch thick plywood
- Five (5), 10.3-oz tubes of SB-190 Everseal clear sealant
- 12, nominally 5-inch high by 2-inch wide by 0.25-inch thick grey aluminum snow guards
- 12, nominally 5-inch high by 2-inch wide by 0.25-inch thick clear polycarbonate snow guards

Refer to the product description photos in Section 10. The material was tested as received with the exception of curing the materials after attachment. Representative materials/test specimens will be retained by Intertek B&C for a minimum of four years from the test completion date.

SECTION 5
LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Joshua A. Kennedy	Intertek B&C
Joseph M. Brickner	Intertek B&C

intertek
Total Quality. Assured.

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

TEST REPORT FOR SNO-SAFE SNOW GUARDS, LLC
Report No.: L2292.01-106-31 R0
Date: 02/25/21

SECTION 6
TEST PROCEDURE

All conditioning of test specimens and test conditions were at standard laboratory conditions unless otherwise reported. Refer to the test photos in Section 10 and datasheets in Section 11. Calibration certificates available upon request.

Shear Properties
The shear load of the snow guards was determined utilizing a SATEC UTM (ICN: Y002011) equipped with a 5,000 lb_f load cell (ICN: 65607) operating at a crosshead speed of 2.0 in/min. The snow guards were installed to a plywood board with an attached metal roofing panel using only adhesive for one set of five and using adhesive and fasteners for a second set of five. The snow guard assemblies were allowed to cure for 180 days after assembly at standard conditions prior to testing.

SECTION 7
TEST SPECIMEN DESCRIPTIONS

TEST PROCEDURE	NUMBER OF SPECIMENS	NOMINAL SPECIMEN DIMENSIONS	VISUAL CHARACTERISTICS
Shear Properties	5 - Aluminum per attachment detail	5 x 2 x 0.25 inch	Clear Adhesion
			Grey Fasteners
	5 - Polycarbonate per attachment detail		Clear Adhesion
			Grey Fasteners

SECTION 8
TEST RESULTS

Shear Properties

Aluminum Guard - Adhesive Only

SPECIMEN NO.	PEAK FORCE (lb_f)	DISPLACEMENT AT PEAK FORCE (in)	SHEAR MODULUS (psi)	FAILURE MODE
1	1,450	0.088	40,000	Shear Adhesion
2	1,540	0.088	41,400	Shear Adhesion
3	1,390	0.082	37,200	Shear Adhesion
4	1,550	0.105	29,600	Shear Adhesion
5	1,280	0.092	39,000	Shear Adhesion
Average	**1,440**	**0.091**	**37,400**	

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

TEST REPORT FOR SNO-SAFE SNOW GUARDS, LLC
Report No.: L2292.01-106-31 R0
Date: 02/25/21

Aluminum Guard - Adhesive and Fasteners

SPECIMEN NO.	PEAK FORCE (lb_f)	DISPLACEMENT AT PEAK FORCE (in)	SHEAR MODULUS (psi)	FAILURE MODE
1	2,630	0.152	36,700	Guard Rupture
2	2,550	0.180	36,700	Guard Rupture
3	2,640	0.180	34,700	Guard Rupture
4	2,660	0.228	35,000	Guard Rupture
5	2,620	0.105	36,400	Guard Rupture
Average	**2,620**	**0.169**	**35,900**	

Polycarbonate Guard - Adhesive Only

SPECIMEN NO.	PEAK FORCE (lb_f)	DISPLACEMENT AT PEAK FORCE (in)	SHEAR MODULUS (psi)	FAILURE MODE
1	1,320	0.152	18,000	Shear Adhesion
2	1,260	0.113	24,600	Shear Adhesion
3	1,160	0.115	20,500	Shear Adhesion
4	798	0.044	22,300	Guard Rupture
5	1,560	0.142	26,000	Shear Adhesion
Average	**1,220**	**0.113**	**22,300**	

Polycarbonate Guard - Adhesive and Fasteners

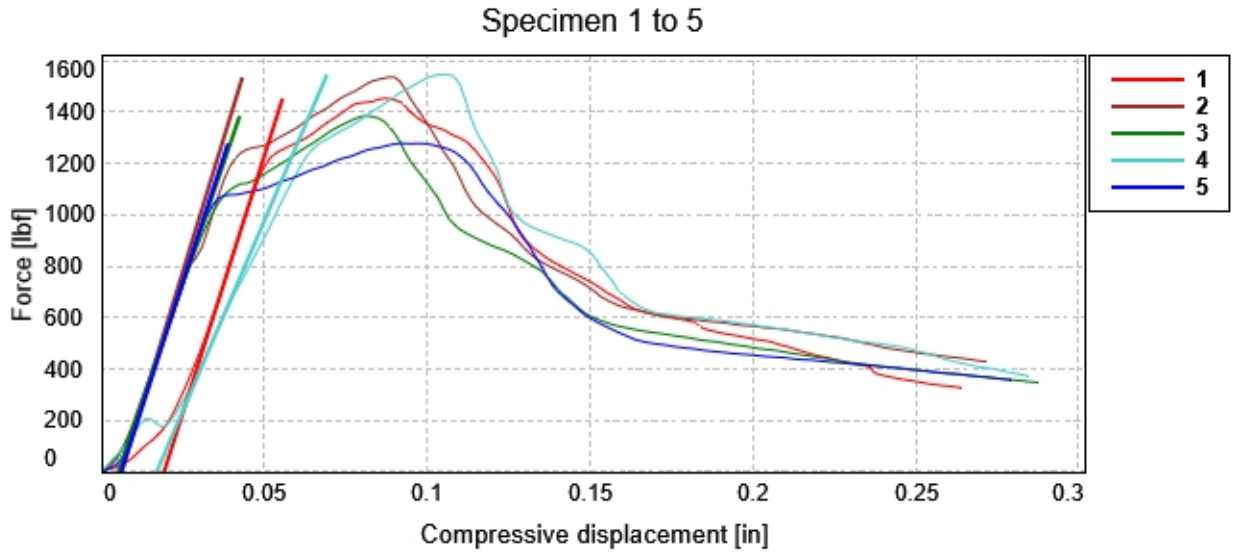
SPECIMEN NO.	PEAK FORCE (lb_f)	DISPLACEMENT AT PEAK FORCE (in)	SHEAR MODULUS (psi)	FAILURE MODE
1	2,170	0.195	29,500	Guard Rupture
2	2,210	0.243	29,300	Guard Rupture
3	2,680	0.338	26,900	Guard Rupture
4	2,400	0.233	24,100	Guard Rupture
5	1,980	0.165	28,200	Guard Rupture
Average	**2,280**	**0.235**	**27,600**	

SECTION 9
CONCLUSION

The requested test method does not contain specific performance requirements. Results are reported as obtained.

Custom Shear

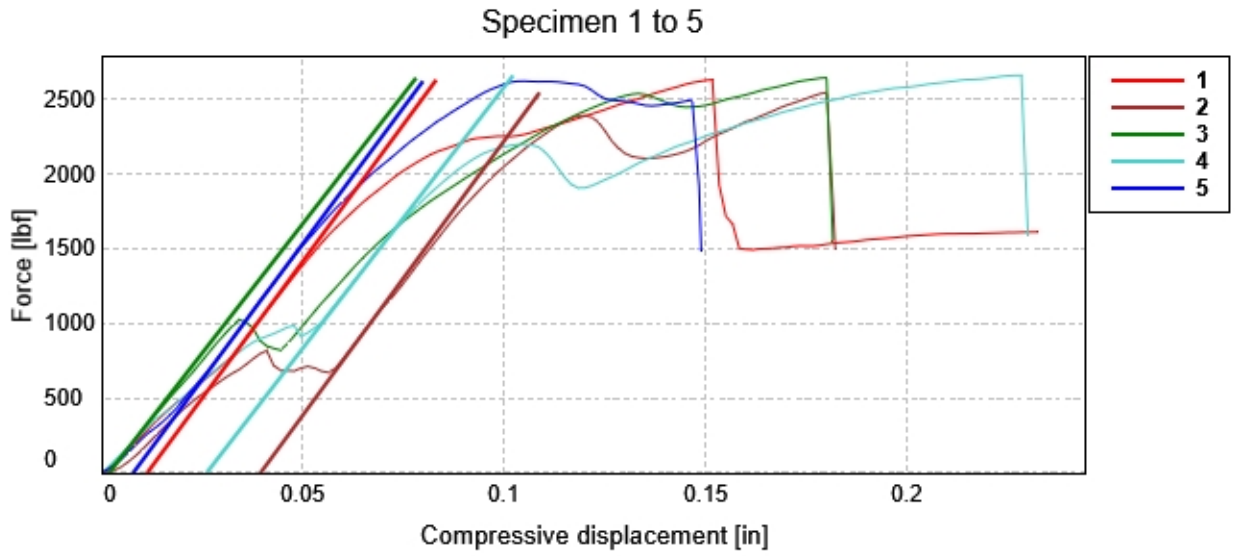
Intertek-ATI Project	L2292.01-106-31
Client Name	Sno-Safe Snow Guards, LLC
Sample Description	Aluminum Snow Guard, 180-Day Cure
Attachment	Adhesion Only
Load Cell / ICN	5,000 lbf / 65607
UTM Frame / ICN	SATEC 50UD / Y002011
Temperature	71.1 F
Humidity	47.2 %
Technician	Josh K.



	Specimen	Test Speed [in/min]	Maximum Load [lbf]	Deflection [in]	Shear Modulus [psi]	Failure Mode
1	A-A-1	1.00	1450	0.088	40000	Shear Adhesion
2	A-A-2	2.00	1540	0.088	41400	Shear Adhesion
3	A-A-3	2.00	1390	0.082	37200	Shear Adhesion
4	A-A-4	2.00	1550	0.105	29600	Shear Adhesion
5	A-A-5	2.00	1280	0.092	39000	Shear Adhesion
Mean		1.80	1440	0.091	37400	
Std Dev		0.45	111.67	0.01	4641.37	

Custom Shear

Intertek-ATI Project	L2292.01-106-31
Client Name	Sno-Safe Snow Guards, LLC
Sample Description	Aluminum Snow Guard, 180-Day Cure
Attachment	Adhesion and Fasteners
Rate 1	2.00 in/min
Load Cell / ICN	5,000 lbf / 65607
UTM Frame / ICN	SATEC 50UD / Y002011
Temperature	73.1 F
Humidity	46.8 %
Technician	Josh K.

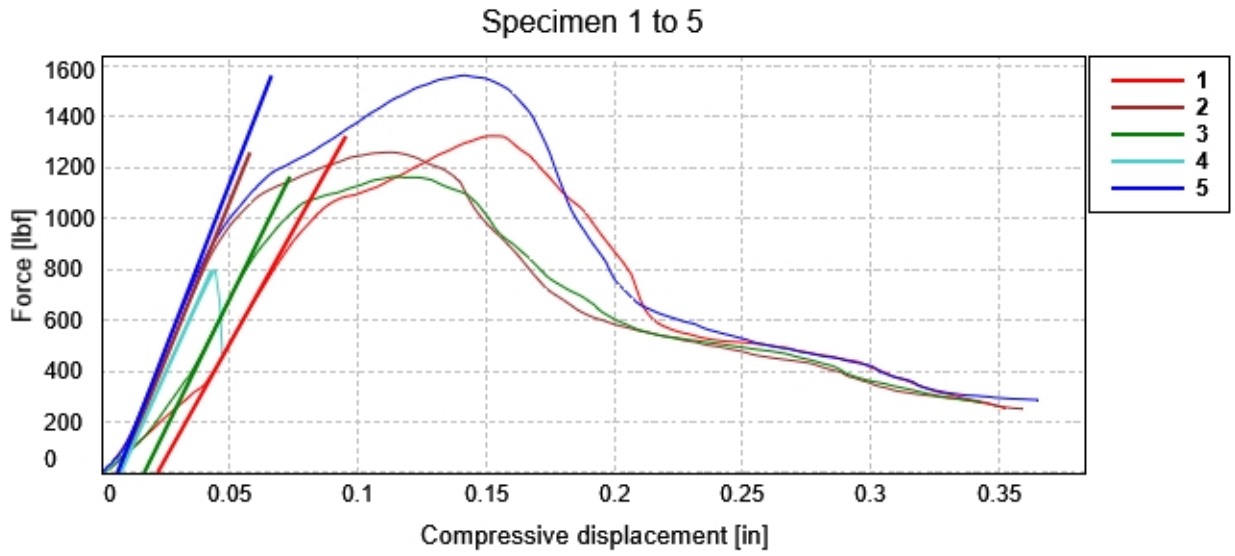


	Specimen	Maximum Load [lbf]	Deflection [in]	Shear Modulus [psi]	Failure Mode
1	A-F-1	2630	0.152	36700	Guard Rupture
2	A-F-2	2550	0.180	36700	Guard Rupture
3	A-F-3	2640	0.180	34700	Guard Rupture
4	A-F-4	2660	0.228	35000	Guard Rupture
5	A-F-5	2620	0.105	36400	Guard Rupture
Mean		2620	0.169	35900	
Std Dev		44.30	0.05	993.49	

intertek
Total Quality. Assured.

Custom Shear

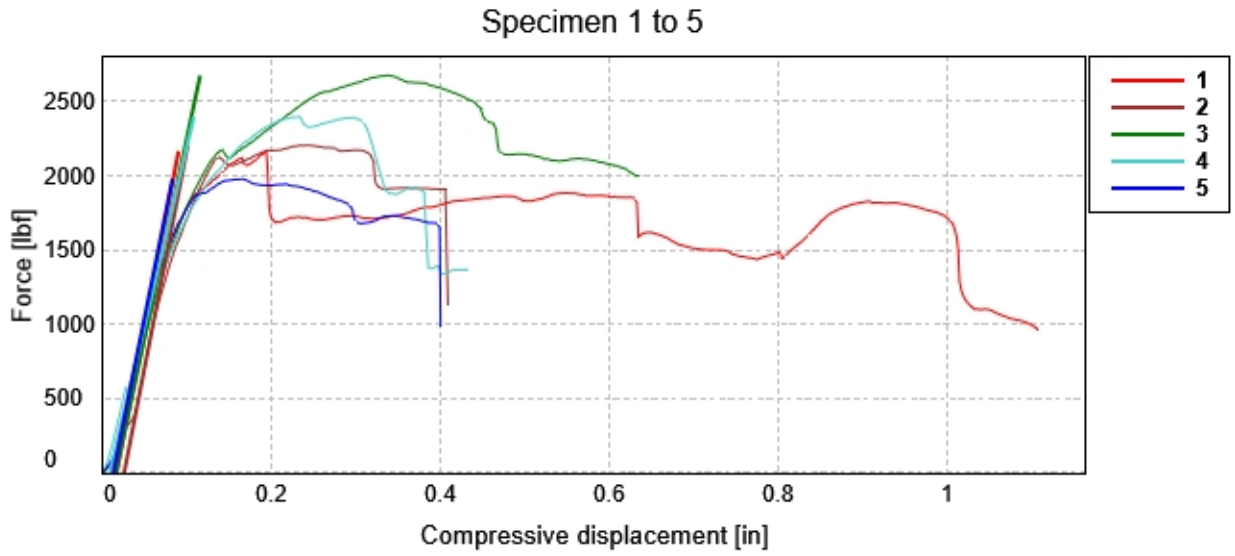
Intertek-ATI Project	L2292.01-106-31
Client Name	Sno-Safe Snow Guards, LLC
Sample Description	Polycarbonate Snow Guard, 180-Day Cure
Attachment	Adhesion Only
Rate 1	2.00 in/min
Load Cell / ICN	5,000 lbf / 65607
UTM Frame / ICN	SATEC 50UD / Y002011
Temperature	71.0 F
Humidity	47.3 %
Technician	Josh K.



	Specimen	Maximum Load [lbf]	Deflection [in]	Shear Modulus [psi]	Failure Mode
1	P-A-1	1320	0.152	18000	Shear Adhesion
2	P-A-2	1260	0.113	24600	Shear Adhesion
3	P-A-3	1160	0.115	20500	Shear Adhesion
4	P-A-4	798	0.044	22300	Guard Rupture
5	P-A-5	1560	0.142	26000	Shear Adhesion
Mean		1220	0.113	22300	
Std Dev		278.30	0.04	3198.16	

Custom Shear

Intertek-ATI Project	L2292.01-106-31
Client Name	Sno-Safe Snow Guards, LLC
Sample Description	Polycarbonate Snow Guard, 180-Day Cure
Attachment	Adhesion and Fasteners
Rate 1	2.00 in/min
Load Cell / ICN	5,000 lbf / 65607
UTM Frame / ICN	SATEC 50UD / Y002011
Temperature	73.2 F
Humidity	46.7 %
Technician	Josh K.



	Specimen	Maximum Load [lbf]	Deflection [in]	Shear Modulus [psi]	Failure Mode
1	P-F-1	2170	0.195	29500	Guard Rupture
2	P-F-2	2210	0.243	29300	Guard Rupture
3	P-F-3	2680	0.338	26900	Guard Rupture
4	P-F-4	2400	0.233	24100	Guard Rupture
5	P-F-5	1980	0.165	28200	Guard Rupture
Mean		2280	0.235	27600	
Std Dev		264.06	0.07	2226.87	

130 Derry Court
York, Pennsylvania 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
www.intertek.com/building

SECTION 12
REVISION LOG

REVISION #	DATE	PAGES	REVISION
0	02/25/21	N/A	Original Report Issue