NFRC 102-2014 THERMAL PERFORMANCE
TEST REPORT

Rendered to:

AMERICAN GARAGE DOOR SUPPLY, INC.

SERIES/MODEL: Survivor Series
TYPE: Polycarbonate Garage Door

Summary of Results	
Standardized Thermal Transmittance (U-Factor)	0.56

Reference must be made to Report No. E6039.01-201-46, dated 03/25/15 for complete test specimen description and data.

849 Western Avenue North
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NFRC 102-2014 THERMAL PERFORMANCE TEST REPORT

Rendered to:

AMERICAN GARAGE DOOR SUPPLY, INC.
1225 Industrial Park Drive SE
Bemidji, Minnesota 56601

Report Number:	E6039.01-201-46
Test Date:	03/13/15
Report Date:	03/25/15

Test Sample Identification:

Series/Model: Survivor Series

Type: Polycarbonate Garage Door

Overall Size: 87" x 84-3/8" (2210 mm x 2143 mm) (Non-Standard Size)

Test Sample Submitted by: Client

Test Procedure: U-factor tests were performed in a Guarded Hot Box in accordance with NFRC 102-2010, *Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems* . Garage door was installed and tested per the NFRC 102 installation and testing requirements.

Test Results Summary:

Standardized U-factor (U_{st}): 0.56 Btu/hr·ft^2·F (CTS Method)

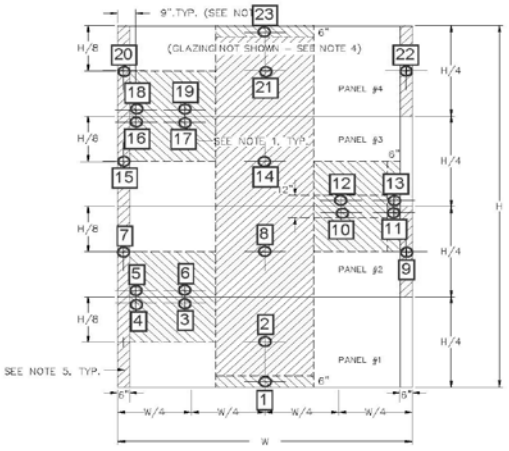
Test Sample Description:

Frame:

Material:	AL: Aluminum (Non-thermally broken)		
Size:	87" x 84-3/8" (Non-Standard Size)		
Exterior Color:	Gray	**Exterior Finish:**	Anodized
Interior Color:	Gray	**Interior Finish:**	Anodized
Corner Joinery:	Square Cut / Screws / Unsealed		

Panels:

Material:	Aluminum frame with five wall polycarbonate infill		
Size:	87" x 21" (x4)		
Daylight Opening:	83" x 18-3/4" (x4)	**Glazing Method:**	Exterior
Exterior Color:	Clear	**Exterior Finish:**	N/A
Interior Color:	Clear	**Interior Finish:**	N/A
Corner Joinery:	Square Cut / Screws / Unsealed		



#	Interior (F)	Exterior (F)
1	27.20	19.36
2	36.86	2.61
3	50.96	5.09
4	50.24	5.39
5	46.89	-
6	48.74	-
7	22.42	12.83
8	37.22	1.77

#	Interior (F)	Exterior (F)
9	21.94	13.88
10	50.59	4.62
11	51.53	4.50
12	44.02	5.16
13	48.24	6.16
14	37.79	2.60
15	23.19	11.87
16	53.41	5.60

#	Interior (F)	Exterior (F)
17	51.20	5.42
18	50.65	5.85
19	49.84	4.88
20	25.05	14.87
21	42.14	3.13
22	27.28	16.89
23	41.35	20.21

Average Interior Surface Temperature 51.20 F
Average Exterior Surface Temperature 8.22 F

Test Sample Description: (Continued)

Weatherstripping:

Description	Quantity	Location
Hollow bulb sweep	1	Bottom rail

Hardware:

Description	Quantity	Location
Hinges	9	Panel joints, one per edge and one centered (3 total each joint)

Drainage:

Drainage Method	Size	Quantity	Location
No drainage			

Thermal Transmittance (U-factor)

Measured Test Data

Heat Flows

1. Total Measured Input into Metering Box (Q_{total})	2392.30	Btu/hr
2. Surround Panel Heat Flow (Q_{sp})	53.31	Btu/hr
3. Surround Panel Thickness	4.00	inches
4. Surround Panel Conductance	0.0461	Btu/hr·ft^2·F
5. Metering Box Wall Heat Flow (Q_{mb})	120.15	Btu/hr
6. EMF vs Heat Flow Equation (equivalent information)	0.0202*EMF + 25.290	
7. Flanking Loss Heat Flow (Q_{fl})	48.95	Btu/hr
8. Net Specimen Heat Loss (Q_s)	2169.89	Btu/hr

Areas

1. Test Specimen Projected Area (A_s)	50.98	ft^2
2. Test Specimen Interior Total (3-D) Surface Area (A_h)	56.93	ft^2
3. Test Specimen Exterior Total (3-D) Surface Area (A_c)	52.14	ft^2
4. Metering Box Opening Area (A_{mb})	68.75	ft^2
5. Metering Box Baffle Area (A_{b1})	60.57	ft^2
6. Surround Panel Interior Exposed Area (A_{sp})	17.77	ft^2

Test Conditions

1. Average Metering Room Air Temperature (t_h)	69.82	F
2. Average Cold Side Air Temperature (t_c)	-0.40	F
3. Average Guard/Environmental Air Temperature	70.97	F
4. Metering Room Average Relative Humidity	14.44	%
5. Metering Room Maximum Relative Humidity	14.90	%
6. Metering Room Minimum Relative Humidity	13.30	%
7. Measured Cold Side Wind Velocity (Perpendicular Flow)	15.06	mph
8. Measured Warm Side Wind Velocity (Parallel Flow)	0.05	mph
9. Measured Static Pressure Difference Across Test Specimen	0.00" ± 0.04"	H_2O

Average Surface Temperatures

1. Metering Room Surround Panel	65.17	F
2. Cold Side Surround Panel	0.14	F

Results

1. Thermal Transmittance of Test Specimen (U_s)	0.61	Btu/hr·ft^2·F
2. Standardized Thermal Transmittance of Test Specimen (U_{st})	0.56	Btu/hr·ft^2·F

Thermal Transmittance (U-factor)

Calculated Test Data

CTS Method

1.	Warm Side Emittance of Glass (e_1)	0.84	
2.	Cold Side Emittance of Glass	0.84	
3.	Warm Side Frame Emittance*	0.80	
4.	Cold Side Frame Emittance*	0.80	
5.	Warm Side Sash/Panel/Vent Emittance*	0.90	
6.	Cold Side Sash/Panel/Vent Emittance*	0.90	
7.	Warm Side Baffle Emittance (e_{b1})	0.92	
8.	Cold Side Baffle Emittance (e_{b2})	N/A	
9.	Equivalent Warm Side Surface Temperature	40.60	F
10.	Equivalent Cold Side Surface Temperature	7.84	F
11.	Warm Side Baffle Surface Temperature	70.04	F
12.	Cold Side Baffle Surface Temperature	N/A	F
13.	Measured Warm Side Surface Conductance (h_h)	1.46	Btu/hr·ft^2·F
14.	Measured Cold Side Surface Conductance (h_c)	5.17	Btu/hr·ft^2·F
15.	Test Specimen Thermal Conductance (C_s)	1.30	Btu/hr·ft^2·F
16.	Convection Coefficient (K_c)	0.31	Btu/(hr·ft^2·F$^{1.25}$)
17.	Radiative Test Specimen Heat Flow (Q_{r1})	1099.82	Btu/hr
18.	Conductive Test Specimen Heat Flow (Q_{c1})	1070.06	Btu/hr
19.	Radiative Heat Flux of Test Specimen (q_{r1})	21.58	Btu/hr·ft^2·F
20.	Convective Heat Flux of Test Specimen (q_{c1})	20.99	Btu/hr·ft^2·F
21.	Standardized Warm Side Surface Conductance (h_{sth})	1.21	Btu/hr·ft^2·F
22.	Standardized Cold Side Surface Conductance (h_{stc})	5.28	Btu/hr·ft^2·F
23.	Standardized Thermal Transmittance (U_{st})	0.56	Btu/hr·ft^2·F

Test Duration

1. The environmental systems were started at 16:29 hours, 03/12/15.
2. The test parameters were considered stable for two consecutive four hour test periods from 01:25 hours, 03/13/15 to 09:25 hours, 03/13/15.
3. The thermal performance test results were derived from 05:25 hours, 03/13/15 to 09:25 hours, 03/13/15.

The reported Standardized Thermal Transmittance (Ust) was determined using CTS Method, per Section 8.2(A) of NFRC 102.

**Stated per NFRC 101*

The sample was inspected for the formation of frost or condensation, which may influence the surface temperature measurements. The sample showed no evidence of condensation/frost at the conclusion of the test.

“This test method does not include procedures to determine the heat flow due to either air movement through the specimen or solar radiation effects. As a consequence, the thermal transmittance results obtained do not reflect performances which are expected from field installations due to not accounting for solar radiation, air leakage effects, and the thermal bridge effects that have the potential to occur due to the specific design and construction of the fenestration system opening. The latter can only be determined by in-situ measurements. Therefore, it is important to recognize that the thermal transmittance results obtained from this test method are for ideal laboratory conditions and should only be used for fenestration product comparisons and as input to thermal performance analyses which also include solar, air leakage and thermal bridge effects.”

The test sample was installed in a vertical orientation, the exterior of the specimen was exposed to the cold side. The direction of heat transfer was from the interior (warm side) to the exterior (cold side) of the specimen. The ratings were rounded in accordance to NFRC 601, NFRC Unit and Measurement Policy. The data acquisition frequency is 5 minutes.

Required annual calibrations for the Intertek-ATI 'thermal test chamber' (ICN N000235) in St. Paul, Minnesota were last conducted in October 2014 in accordance with Architectural Testing Inc. calibration procedure. A CTS Calibration verification was performed December 2013. A Metering Box Wall Transducer and Surround Panel Flanking Loss Characterization was performed October 2014.

"Ratings included in this report are for submittal to an NFRC licensed IA for certification purposes and are not meant to be used for labeling purposes. Only those values identified on a valid Certification Authorization Report (CAR) are to be used for labeling purposes."

Architectural Testing, Inc. will service this report for the entire test record retention period. Test records that are retained such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be retained by Architectural Testing, Inc. for the entire test record retention period. The test record retention end date for this report is March 13, 2019.

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 tested. This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For Intertek-ATI

Tested By:

Digitally Signed by: Greg Borchers

Gregory S. Borchers
Thermal Technician

Reviewed By:

Digitally Signed by: Daniel A. Johnson

Daniel A. Johnson
Director – Regional Operations
Individual-In-Responsible-Charge

GSB:gsb
E6039.01-201-46

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix-A: CTS Calibration Data (1)
- Appendix-B: Surround Panel Wiring Diagram (1)
- Appendix-C: Baffle Wiring Diagram (1)
- Appendix-D: Drawings (1)

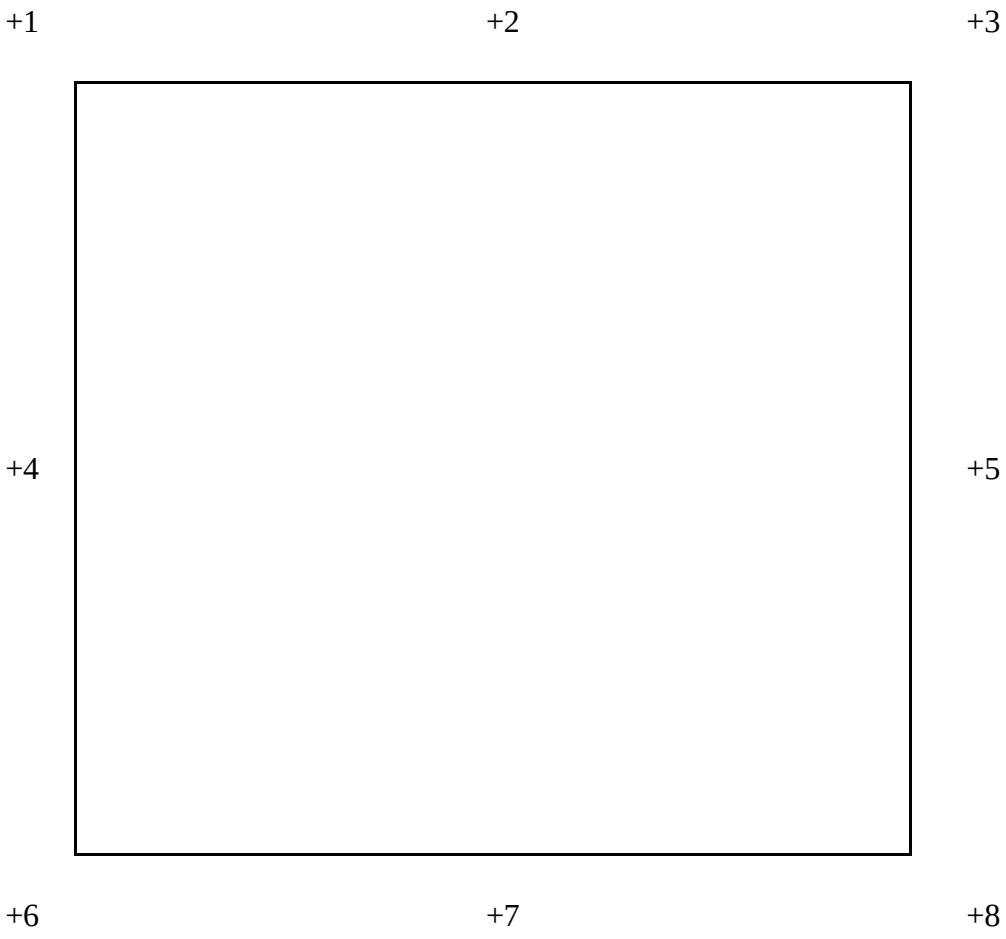
Revision Log

Rev. #	Date	Page(s)	Revision(s)
01-R0	03/25/15	All	Original Report Issue. Work requested by Greg Johnson of American Garage Door Supply, Inc.

Appendix A: CTS Calibration Data

2.	CTS Size	43.05	ft^2
3.	CTS Glass/Core Conductance	0.40	$Btu/hr \cdot ft^2 \cdot F$
4.	Warm Side Air Temperature	69.80	F
5.	Cold Side Air Temperature	-0.20	F
6.	Warm Side Average Surface Temperature	55.01	F
7.	Cold Side Average Surface Temperature	3.76	F
8.	Convection Coefficient (K_c)	0.31	$Btu/(hr \cdot ft^2 \cdot F^{1.25})$
9.	Measured Cold Side Surface Conductance (h_c)	5.17	$Btu/hr \cdot ft^2 \cdot F$
10.	Measured Thermal Transmittance	0.29	$Btu/hr \cdot ft^2 \cdot F$

Appendix B: Surround Panel Wiring Diagram



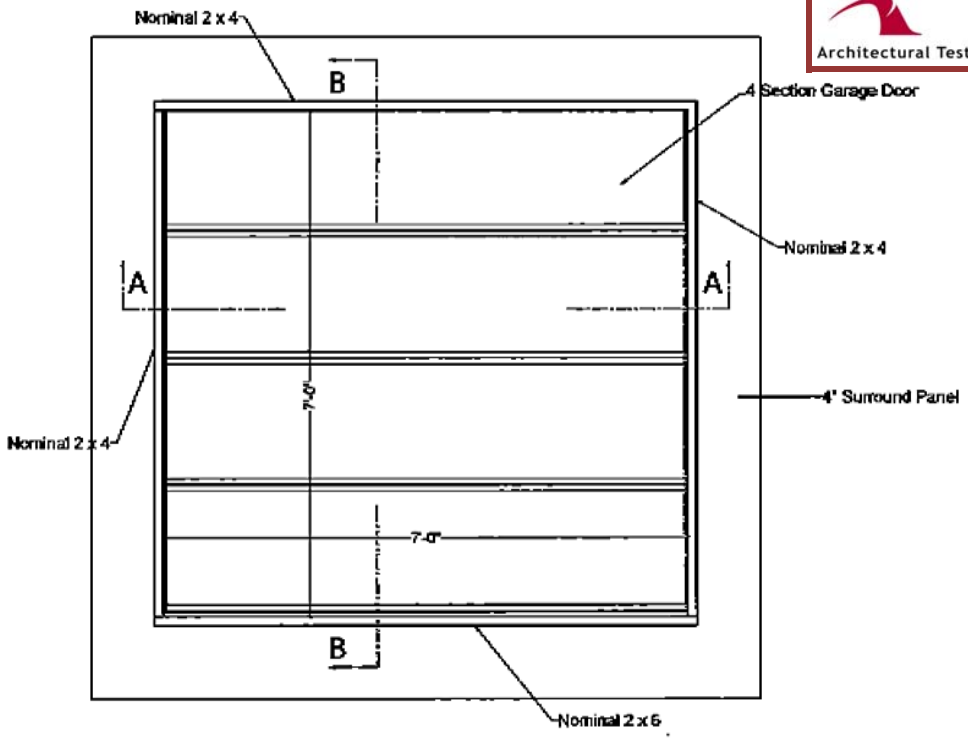
Appendix C: Baffle Wiring Diagram

+1	+2	+3	+4	+5	+6
+7	+8	+9	+10	+11	+12
+13	+14	+15	+16	+17	+18
+19	+20	+21	+22	+23	+24
+25	+26	+27	+28	+29	+30

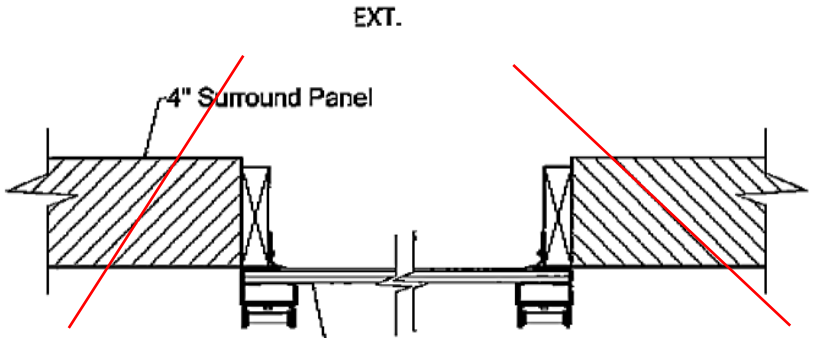
Appendix D: Drawings

Architectural Testing

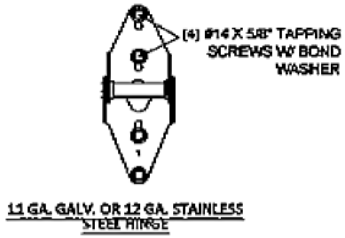
Report #: E6039
Date: 4/10/15
Verified by:

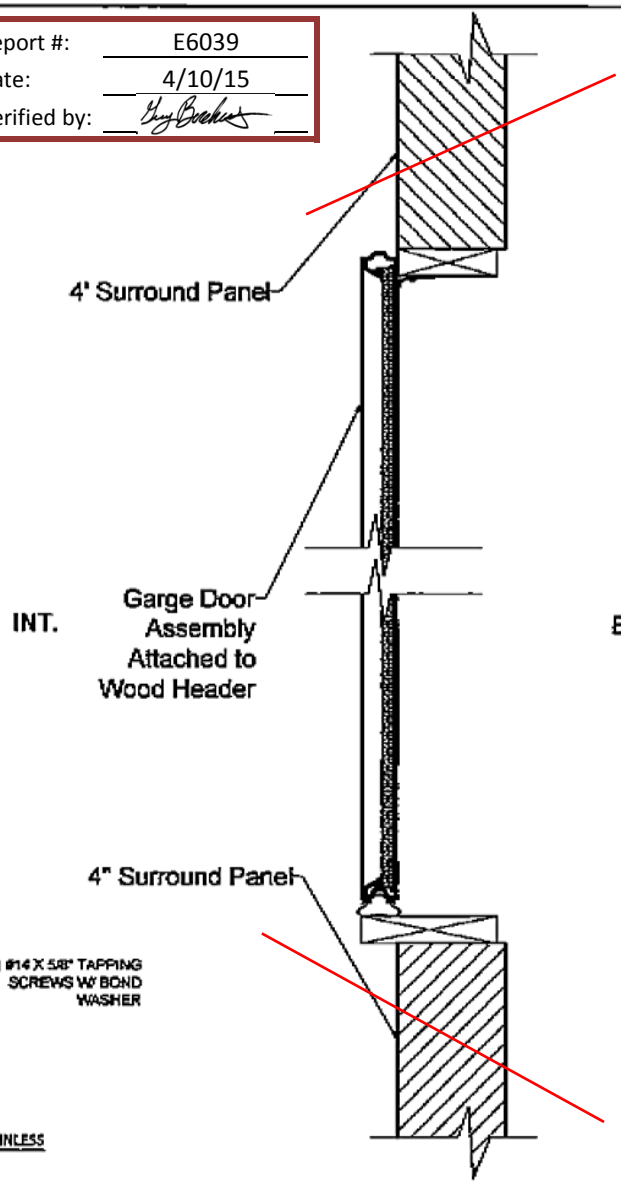


EXTERIOR ELEVATION



SECTION A-A





SECTION B-B

American garage door supply inc.™
1225 Industrial Park Dr.
Bemidji, MN 56601
Tel: 800-233-1487
Fax: 218-751-6551

THERMAL TESTING

Description:			
Drawn By: PEB	Date: 02/06/15	Scale: None	Dwg. Size A
Checked By:	Date:	Sheet 1 of 1	
DWG. No.		Rev. No. 01	