ALL SEASONS DOOR & WINDOW, INC. *Report No: NCTL-110-8058-5S*
NFRC THERMAL TEST SUMMARY REPORT *Expiration Date: 03/31/06*

Test Specimen		NFRC Code
Manufacturer :	*All Seasons Door & Window, Inc.*	
Series/Model :	*A 200*	
Window Type :	*Vertical Slider - Double Hung*	*VSDH*
Frame Composition :	*Aluminum w/ thermal breaks*	*AT*
Sash/Vent/Panel Composition :	*Aluminum w/ thermal breaks*	*AT*
Thermal Break Mat'l :	*Poured Urethane*	
Overall Size :	*48" wide by 72" high*	
Glazing Description	*7/8" Overall w/Low E and Argon*	
No. of Glazing Layers (including films):	*2*	*2*
Primary Glazing :	*Double Glazed*	*DG*
Spacer Type :	*Aluminum*	*A1*
Gap Fill 1:	*Argon*	*ARG*
Gap Fill 2:	*Not Applicable*	
Gap Fill 3:	*Not Applicable*	
Glass/Film Thicknesses (ext to int):	*0.126", 0.122"*	
Air Gap 1:	*0.624"*	
Air Gap 2:	*Not Applicable*	
Air Gap 3:	*Not Applicable*	
Secondary Glazing:	*Not Applicable*	
Low Emissivity Coatings:		
Emissivity 1:	*0.204 on Surface #3*	
Emissivity 2:	*None*	
Emissivity 3:	*None*	

Procedure: *Standardized Thermal Transmittance (U_{st}) was determined using the NFRC Test Procedure with a temperature of 70°± 0.5°F on the room side of the specimen and 0°± 0.5°F on the weather side of specimen. The net air leakage across the test specimen was 0.0 cfm.*

Test Results: *Results of the test period 1901-2101 on 03/16/02 using the Equivalent CTS Procedure:*

Thermal transmittance at test conditions (U_s) :	*0.53*	*BTU/hr/ft²/°F*
Standardized thermal transmittance of test specimen (U_{st}) :	***0.52***	***BTU/hr/ft²/°F***

Reference should be made to Thermal Performance Test Report Number NCTL-110-8058-5 for complete specimen description and test data.

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MARC A. CRAMER
Technician

THERMAL PERFORMANCE TEST REPORT

Report No: NCTL-110-8058-5
Test Date: 03/16/02
Report Date: 08/15/02
Expiration Date: 03/31/06

Client: *All Seasons Door & Window, Inc.*
28 Edgeboro Road
East Brunswick, NJ 08816

Test Specimen: *All Seasons Door & Window, Inc.'s Series "A 200" Tilt Double Hung Aluminum Prime Window with Low E and Argon.*

Test Method: *"NFRC Test Procedure for Measuring the Steady State Thermal Transmittance of Fenestration Systems (April 1997 edition)".*

TEST SPECIMEN DESCRIPTION

General: *The test specimen was a one-over-one tilt double hung aluminum prime window measuring 48" wide by 72" high overall. The top sash measured 44-3/8" wide by 36" high. The bottom sash measured 45-1/16" wide by 35-3/8" high. The frame and sash were thermally broken using poured urethane thermal barriers, debridged to various dimensions between 3/32" and 3/16". Both sash were removable via a double spiral balance with locking tilt shoe located in each jamb track. One (1) metal sweep lock was located at 11-1/2" from each end of the interior meeting rail. The full length keeper was extruded onto the exterior meeting rail. One (1) extruded aluminum spring-loaded snap-lock was located at midspan of the head. The full length keeper was extruded onto the top rail. One (1) metal lockable tilt latch was located at each end of the top rail and interior meeting rail. One (1) stamped metal pivot bar was fastened with one (1) screw at each end of the exterior meeting rail and bottom rail. A rigid vinyl sash stop was snap-fitted at the top of each interior jamb track and bottom of each exterior jamb track. The frame and sash were of double screw butt-type corner construction.*

Glazing: *Both sash were channel glazed using sealed insulating glass with a flexible vinyl glazing bead. The overall insulating glass thickness was 7/8" (measured 0.872") consisting of two (2) lites of double strength (average thickness 0.124") annealed glass and one (1) argon-filled space created by a desiccant-filled aluminum spacer system. An AFG "Comfort E2" pyrolytic type low emissivity coating (e=0.204 per client) was applied to glazing surface no. 3.*

Weatherseals: *A single strip of center fin weatherstrip (0.210" high) was located at the head, sill, top rail and exterior meeting rail. Double strips of center fin weatherstrip (0.210" high) were located at the interior meeting rail and all sash stiles. A single strip of dual leaf flexible vinyl weatherstrip was located at the bottom rail.*

Weeps: *No apparent weeps employed.*

Interior & Exterior Surface Finish: *Brown painted aluminum.*

Sealant: *The frame and sash corners were sealed with a silicone sealant.*

Screen: *No screen employed.*

SPECIMEN PREPARATION PRIOR TO TEST

The test specimen was pre-conditioned at ambient laboratory conditions prior to the test. The surround panel-to-specimen interfaces were sealed with a non-reflective tape. The specimen was sealed on the exterior with a caulk sealant resulting in a measured net air leakage of 0.0 cfm per square foot.

TEST PARAMETERS

Tests to determine the Standardized Thermal Transmittance (U_{st}) of the specimen were performed in the guarded hot box apparatus located at the York, PA facility. The most recent calibration of the hot box apparatus was in May, 2001. The thermal performance evaluations were completed in accordance with the NFRC Test Procedure using a dynamic wind perpendicular to the specimen on the weather side and simulated natural convection on the room side. A zero static pressure differential (0.00" ± 0.04" H_2O) was maintained across the specimen during the test by pressurizing the metering box on the room side. Data was collected over two successive 2 hour periods after 4 hours of steady state conditions as defined in section 5.2.1.A of the NFRC Test Procedure were achieved. The test was considered completed when the data of the successive 2 hour periods also satisfied the criteria defined in section 5.2.1.A of the NFRC Test Procedure.

Glass Thickness and Glazing Deflection

	Glass Thicknesses	*Glazing Deflection Before Test*	*Glazing Deflection During Test*
Top Sash	*0.12", 0.12"*	*0.02"*	*0.03"*
Bottom Sash	*0.12", 0.12"*	*0.00"*	*0.03"*

Measured Areas

Test Specimen Projected Area :	*24.00 ft²*
Test Specimen Interior Exposed (Wetted) Surface Area :	*26.04 ft²*
Test Specimen Exterior Exposed (Wetted) Surface Area :	*26.91 ft²*
Metering Box Opening Area :	*54.39 ft²*
Metering Box Baffle Area :	*46.44 ft²*
Exposed Area of Mods to Surround Panel Opening:	*0.21 ft²*
Surround Panel Interior Exposed Area :	*30.18 ft²*

THERMAL TRANSMITTANCE & CONDUCTANCE

The test chamber environmental systems were initiated at 1445 on 03/14/02. The test conditions were considered stable for two consecutive two hour test periods from 1701 to 1901 and 1901 to 2101 on 03/16/02. The thermal performance test results were derived from the 1901 to 2101 test period.

Test Conditions

Average Room Side Air Temperature t_I	*70.0*	*°F*
Average Weather Side Air Temperature, t_{II}	*0.3*	*°F*
Average Guard Box Air Temperature	*74.4*	*°F*
Metering Box Average Relative Humidity	*1*	*%*
Measured Weather Side Wind Velocity	*14.3*	*mph*
Static Pressure Difference Across Specimen	*0.0*	*" H_2O*

Heat Flows

Heat Input Rate to Metering Box	*1048.9*	*BTU/hr*
Surround Panel Heat Flow	*114.4*	*BTU/hr*
Heat Flow Through Mods to Surround Panel Opening (k = 0.82)	*2.7*	*BTU/hr*
Sensible Heat from Pressure Balance Air Flow	*2.9*	*BTU/hr*
Metering Box Heat Flow	*13.8*	*BTU/hr*
Flanking Loss Heat Flow	*27.3*	*BTU/hr*
Net Test Specimen Heat Flow	*887.8*	*BTU/hr*

Surface Temperature Data

Specimen Area-Weighted Room Side Surface Temperature, t_1	*47.4 °F*
Specimen Area-Weighted Weather Side Surface Temperature, t_2	*4.9 °F*
Area-Weighted Room Side Frame Surface Temperature	*39.9 °F*
Area-Weighted Weather Side Frame Surface Temperature	*5.1 °F*
Area-Weighted Room Side Edge-of-Glass Surface Temperature	*42.7 °F*
Area-Weighted Weather Side Edge-of-Glass Surface Temperature	*7.8 °F*
Area-Weighted Room Side Center-of-Glass Surface Temperature	*53.0 °F*
Area-Weighted Weather Side Center-of-Glass Surface Temperature	*3.8 °F*

Test Results & Calculated Test Data

Test Specimen Thermal Transmittance, U_s	*0.53*	*BTU/hr/ft²/°F*
Method A - Area Weighted Procedure		
Room Side Surface Conductance, h_I	*1.63*	*BTU/hr/ft²/°F*
Weather Side Surface Conductance, h_{II}	*7.97*	*BTU/hr/ft²/°F*
Test Specimen Thermal Conductance, C_s	*0.87*	*BTU/hr/ft²/°F*
Standardized Room Side Thermal Transmittance, h_{stI}	*1.39*	*BTU/hr/ft²/°F*
Standardized Weather Side Thermal Transmittance, h_{stII}	*5.10*	*BTU/hr/ft²/°F*
Test Specimen Standardized Thermal Transmittance, U_{st}	*0.49*	*BTU/hr/ft²/°F*
Method B - Equivalent CTS Method		
Emittance of Glass, e1	*0.84*	
Warm Side Baffle Emittance, eb1	*0.93*	
Equivalent Room Side Surface Temperature	*44.8*	*°F*
Equivalent Weather Side Surface Temperature	*7.7*	*°F*
Room Side Baffle Surface Temperature	*68.8*	*°F*
Measured Room Side Surface Conductance, h_I	*1.47*	*BTU/hr/ft²/°F*
Measured Weather Side Surface Conductance, h_{II}	*4.97*	*BTU/hr/ft²/°F*
Test Specimen Thermal Conductance, C_s	*1.00*	*BTU/hr/ft²/°F*
Convection Coefficient, K	*0.329*	
Radiative Test Specimen Heat Flow, Q_{r1}	*441.4*	*BTU/hr*
Conductive Test Specimen Heat Flow, Q_{c1}	*446.4*	*BTU/hr*
Radiative Heat Flux of Test Specimen, q_{r1}	*18.39*	*BTU/hr/ft²*
Convective Heat Flux of Test Specimen, q_{r2}	*18.60*	*BTU/hr/ft²*
Standardized Room Side Thermal Transmittance, h_{stI}	*1.40*	*BTU/hr/ft²/°F*
Standardized Weather Side Thermal Transmittance, h_{stII}	*5.10*	*BTU/hr/ft²/°F*
Test Specimen Standardized Thermal Transmittance, U_{st}	*0.52*	*BTU/hr/ft²/°F*

Based on the listed test results, the standardized thermal transmittance of the test specimen (U_{st}) was determined to be 0.52 BTU/hr/ft²/°F.

The results from the equivalent CTS procedure were chosen because the test specimen thermal transmittance (U_s) was less than 0.6.

Attachment 1 to this report lists the measured surface temperature data as well as the area information used to calculate the area-weighted surface temperatures. Attachment 2 to this report is an isometric drawing showing surface thermocouple measurement locations corresponding to the data on Attachment 1.

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 may be expected from field installations due to not accounting for solar radiation, air leakage effects, and the thermal bridge effects that may occur due to the specific design and construction of the fenestration system opening. Therefore, it should be recognized 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.

Per the client, the test specimen described in this report was a production line unit submitted for initial certification and plant qualification. Detailed drawings were available for laboratory records and compared to the test specimen at the time of this report. A copy of this report along with representative sections of the test specimen will be retained by NCTL for a period of four (4) years. The results obtained apply only to the specimen tested. This report may not be reproduced, except in full, without the written approval of National Certified Testing Laboratories. Testing described in this report was conducted in full compliance with NFRC requirements.

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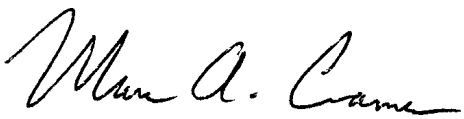
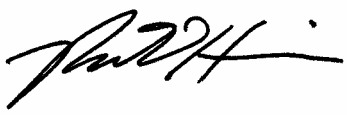


MARC A. CRAMER
Technician



PATRICK D. HEIN
Engineering Manager
Person-in-Responsible Charge

MAC/amb

ATTACHMENT 1

SURFACE TEMPERATURE MEASUREMENTS AND AREA INFORMATION

All Seasons Door & Window, Inc. NCTL-110-8058-5 1901-2101 03/16/02

Thermocouple Location #	*Individual Average Surface Temperatures (°F)*		*Assigned 3-D Areas Per Thermocouple Location (ft²)*	
	Room Side	*Weather Side*	*Room Side*	*Weather Side*
1	*33.9*	*2.8*	*0.84*	*1.00*
2	*32.9*	*7.0*	*0.39*	*0.63*
3	*43.4*	*3.6*	*0.92*	*1.06*
4	*24.1*	*3.8*	*0.17*	*0.15*
5	*39.6*	*11.5*	*0.50*	*0.38*
6	*42.4*	*8.2*	*1.06*	*0.72*
7	*45.6*	*6.1*	*0.78*	*0.75*
8	*33.2*	*9.8*	*0.30*	*0.19*
9	*64.7*	*7.9*	*0.30*	*0.19*
10	*43.1*	*6.5*	*0.78*	*0.75*
11	*33.9*	*1.0*	*0.36*	*0.97*
12	*35.5*	*9.0*	*0.33*	*0.28*
13	*35.1*	*8.6*	*0.33*	*0.28*
14	*34.1*	*2.0*	*0.36*	*0.97*
15	*40.1*	*7.3*	*1.20*	*1.20*
16	*51.3*	*4.9*	*6.90*	*6.90*
17	*45.6*	*8.8*	*1.20*	*1.20*
18	*33.6*	*2.2*	*1.20*	*1.20*
19	*54.7*	*2.8*	*6.91*	*6.91*
20	*51.5*	*12.9*	*1.20*	*1.20*
		TOTAL AREA	*26.04*	*26.91*

Average Room Side Area-Weighted Surface Temperature (°F)	*47.4*
Average Weather Side Area-Weighted Surface Temperature (°F)	*4.9*