AIR-INS inc.
1320, boul. Lionel-Boulet, Varennes (Quebec) J3X 1P7 – Tél. : (450) 652-0838 • Fax : (450) 652-7588 • info@air-ins.com

THERMAL PERFORMANCE VALIDATION TEST CONDUCTED ON YOUR 300 / 301 FIXED WINDOW IN ACCORDANCE WITH NFRC 102-2004

Prepared for:

GREAT LAND WINDOW
2401 COLLEGE ROAD
FAIRBANKS, AK, USA
99709
CHIP VAUGHAN
907-479-6437

AIR-INS INC.

Reissued report: NV-00894-B
Date : February 9, 2011

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1.INTRODUCTION

This report is reissued for initial certification to ***Great Land Window*** with the authorization of ***Inline Fiberglass Ltd***. Consequently, no test sample was submitted. Initially ***Air-Ins Inc.*** Laboratories has been retained by ***Inline Fiberglass Ltd.*** to test a fixed window in accordance with NFRC 102-2004 Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems, 2004 edition. The sample components and manufacturing are documented in section 3.0.

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

2.SPECIFICATION

NFRC 102-2004 Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems, 2004 edition

3.DESCRIPTION OF THE TESTED SPECIMEN

Type: Production Line
Operator Type: FIXD
Submitted for: Initial certification
Size: 1200 mm W. x 1500 mm H. (47.24" x 59.06")
Model: 300 / 301 Fixed
Frame Material: FG
Glazing:

Type:	Quadruple Sealed Unit
Total thickness:	35,21 mm (1.40")
*Type of glass:	Glass 1: 4,03 mm (0.16") Low-e S-2 e=0.04
	Glass 2: Film (*HMTC88) Low-e S-3 e=0.13, S-4 e=0.11
	Glass 3: Film (*HMTC88) Low-e S-5 e=0.13, S-6 e=0.11
	Glass 4: 4,03 mm (0.16") Low-e S-7 e=0.04
Gap thickness:	Gap 1: 9,05 mm (0.36")
	Gap 2: 9,05 mm (0.36")
	Gap 3: 9,05 mm (0.36")
*Type of spacer:	Steel spacer (CS-D)
*Design gas fill:	Krypton
*Filling technique:	Single Probe
*Gas concentration:	10% Air, 90% Krypton

**Data obtained by the manufacturer*

Date of test: **September 25, 2007**
Thermal Transmittance (Us) : **1,03 W/(m²C) (0.18 BTU/(hr ft² °F))**
Standardized Thermal Transmittance (Ust) : **1,03 W/(m²C) (0.18 BTU/(hr ft² °F))**
Thermal validation test

4.SPECIMEN PREPARATION PRIOR TO TEST

The test specimen was preconditioned 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 non-reflective tape.

5.TEST PARAMETERS

Tests to determine the Standardized Thermal Transmittance (Ust) of the specimen were performed in the guarded hot box located at Varennes, Quebec. The most recent calibration of the hot box apparatus was in August 01, 2007. 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 was maintained across the specimen during the test by pressurizing the guard 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.

6.RESULTS

Measured Test Data

Glass Thickness and Glazing Deflection

	(Metric units)		(Imperial Units)	
1. Glazing Deflection Before Test :	0.40	mm	(0.02)	inch
2. Glazing Deflection During Test :	1.59	mm	(0.06)	inch

Heat Flows

	(Metric units)		(Imperial Units)	
1. Total Measured Input into Metering Box (Qtotal) :	113.84	W	(388.78)	BTU/hr
2. Surround Panel Heat Flow (Q_{sp}) :	46.85	W	(159.99)	BTU/hr
3. Metering Box Wall Heat Flow (Q_{mb}) :	0.10	W	(0.35)	BTU/hr
4. Flanking Loss Heat Flow (Q_{fl}) :	-5.55	W	(-18.94)	BTU/hr
5. Net Specimen Heat Loss (Q_s) :	72.44	W	(247.39)	BTU/hr

Areas

	(Metric units)		(Imperial Units)	
1. Test Specimen Projected Area (A_s) :	1.80	m²	(19.38)	ft²
2. Test Specimen Interior Total (3-D) Surface Area (A_{int}) :	1.85	m²	(19.93)	ft²
3. Test Specimen Exterior Total (3-D) Surface Area (A_{ext}) :	1.85	m²	(19.93)	ft²
4. Metering Box Opening Area (Amb) :	5.75	m²	(61.84)	ft²
5. Metering Box Baffle Area (A_{b1}) :	5.40	m²	(58.11)	ft²
6. Surround Panel Interior Exposed Area (Asp):	3.95	m²	(42.47)	ft²

Test Conditions

	(Metric units)		(Imperial Units)	
1. Average Metering Room Air Temperature :	21.06	°C	(69.90)	°F
2. Average Cold Side Air Temperature :	-17.91	°C	(-0.24)	°F
3. Average Guard/Environmental Air Temperature :	21.64	°C	(70.95)	°F
4. Metering Room Maximum Relative Humidity :	12.44	%	(12.44)	%
5. Measured Cold Side Wind Velocity:	14.64	km/h	(9.10)	mph
6. Measured Metering Side Wind Velocity:	2.00	km/h	(1.24)	mph
7. Measured Maximum Static Pressure Difference Across Specimen :	4.08	Pa	(0.09)	psf

Surface Temperature Data

	(Metric units)		(Imperial Units)	
1. Area-Weighted Surround Panel Warm Side Surface Temperature:	19.97	°C	(67.95)	°F
2. Area-Weighted Surround Panel Cold Side Surface Temperature :	-17.20	°C	(1.04)	°F

Results

	(Metric units)		(Imperial Units)	
1. Thermal Transmittance of Test Specimen (U_s) :	1.03	W/(m²C)	(0.18)	BTU/(hrft²°F)
2. Standardized Thermal Transmittance of Test Specimen (U_{st}) :	1.03	W/(m²C)	(0.18)	BTU/(hrft²°F)

Calculated Test Data, Method B (Equivalent CTS Method) :

	(Metric units)		(Imperial Units)	
1. Emittance of Glass (e_1) :	0.84		0.84	
2. Warm Side Baffle Emittance (e_{b1}) :	0.91		0.91	
3. Equivalent Warm Side Surface Temperature:	15.22	°C	(59.39)	°F
4. Equivalent Weather Side Surface Temperature:	-16.53	°C	(2.25)	°F
5. Warm Side Baffle Surface Temperature:	20.86	°C	(69.55)	°F
6. Measured Warm Side Surface Conductance (h_I) :	6.89	W/(m²C)	(1.21)	BTU/(hrft²°F)
7. Measured Weather Side Surface Conductance (h_{II}) :	29.06	W/(m²C)	(5.12)	BTU/(hrft²°F)
8. Test Specimen Thermal Conductance (C_s) :	1.27	W/(m²C)	(0.22)	BTU/(hrft²°F)
9. Convection Coefficient (K) :	1.61	W/($m^2C^{1,25}$)	(0.28)	BTU/($hrft^2°F^{1,25}$)
10. Radiative Test Specimen Heat Flow (Q_{r1}) :	45.42	W	(155.13)	BTU/hr
11. Conductive Test Specimen Heat Flow (Q_{c1}):	27.01	W	(92.26)	BTU/hr
12. Radiative Heat Flux of Test Specimen (q_{r1}) :	25.24	W/m²	(8.01)	BTU/(hr ft²)
13. Convective Heat Flux of Test Specimen (q_{c1}):	15.01	W/m²	(4.76)	BTU/(hr ft²)
14. Standardized Warm Side Surface Conductance (h_{stI}):	6.76	W/(m²C)	(1.19)	BTU/(hrft²°F)
15. Standardized Cold Side Surface Conductance (h_{stII}) :	30.00	W/(m²C)	(5.28)	BTU/(hrft²°F)
16. Standardized Thermal Transmittance (U_{st}) :	1.03	W/(m²C)	(0.18)	BTU/(hrft²°F)

Test Duration

1. The environmental systems were started at :	21:45 on 2007-09-24
2. The test parameters were considered stable for two consecutive two hour test periods from:	7:30 to 11:30 on 2007-09-25
3. The thermal performance test results were derived from:	13:30 to 15:30 on 2007-09-25

Thermal validation 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 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.

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 Air-Ins Inc. for a period of four (4) years. The results obtained apply only to the specimen tested. Testing described in this report was conducted in full compliance with NFRC requirements.

Appendix A of this report includes drawings and information of the product.

Dave Deshaies McMahon, Eng.

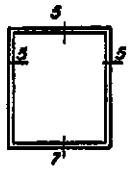
Gilbert Riopel, B.Sc.
Program Director
Person-in-Responsible Charge

APPENDIX A: DRAWINGS AND PRODUCT INFORMATIONS

INLINE
FIBERGLASS

SERIES 300/301 FIXED WINDOW

OPTIONAL STYROFOAM



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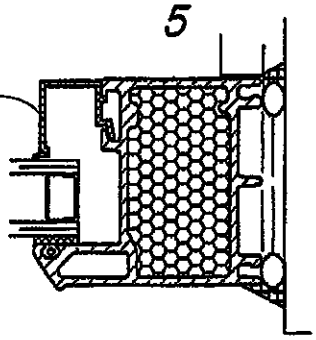

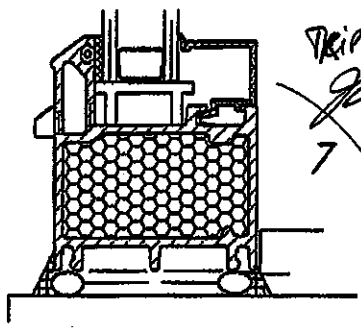

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Enermetric Engineering

22mm(DOUBLE GLASS)
GLASS STOP(PVC)

3.08mm F.C. 4.06mm F.C. 3.04mm F.C.
GLAZING WEDGE(NEOPRENE)

35mm(TRIPLE GLASS)
GLAZING STOP(ALUMINUM)