Architectural Testing

AAMA 1801 SOUND TRANSMISSION LOSS TEST REPORT

Rendered to:

MI WINDOWS AND DOORS, INC.

SERIES/MODEL: 185/3185 SP

TYPE: Picture Window

Summary of Test Results				
ATI Data File No.	**Glazing Option (Nominal Dimensions)**	**Air Infiltration**	**STC**	**OITC**
71965.01A	5/8" IG (1/8" annealed exterior, 1/4" air space, 1/4" laminated interior) Glass temperature - 72°F	Pass	33	29
71965.01B	Single glazed, 5/16" laminated Glass temperature - 72°F	Pass	34	30

Reference should be made to ATI Report No. 71965.01-113-00 for complete test specimen description. The complete test results are listed in Appendix B.

130 Derry Court
York, PA 17406-8405
phone: 717-764-7700
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Architectural Testing

ACOUSTICAL PERFORMANCE TEST REPORT

Rendered to:

MI WINDOWS AND DOORS, INC.
P.O. Box 370
650 West Market Street
Gratz, Pennsylvania 17030

Report No:	71965.01-113-11
Test Dates:	04/20/07
	04/23/07
Report Date:	05/03/07
Expiration Date:	04/23/11

Test Sample Identification:

Series/Model: 185/3185 SP

Type: Picture Window

Performance Class: Residential

Overall Size: 48" by 48"

Glazing Option A (Nominal Dimensions): 5/8" IG (1/8" annealed exterior, 1/4" air space, 1/4" laminated interior)

Glazing Option B (Nominal Dimensions): Single glazed, 5/16" laminated

Project Scope: Architectural Testing, Inc. (ATI) was contracted by MI Windows and Doors, Inc. to conduct air leakage and sound transmission loss tests on two Series/Model 185/3185 SP, picture windows with different glazing options. A summary of the results is listed in the Test Results section and the complete test data is included as Appendix B of this report. The samples were provided by the client.

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Test Methods: The acoustical test was conducted in accordance with the following:

AAMA 1801-97, *Acoustical Rating of Windows, Doors, and Glazed Wall Sections.*

ASTM E 1425-91 (Re-approved 1999), *Standard Practice for Determining the Acoustical Performance of Exterior Windows and Doors.*

ASTM E 90-04, *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions*.

ASTM E 413-04, *Classification for Rating Sound Insulation*.

ASTM E 1332-90 (Re-approved 2003), *Standard Classification for Determination of Outdoor-Indoor Transmission Class.*

ASTM E 283-04, *Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.*

ASTM E 2235-04, *Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods*.

Test Equipment: The equipment used to conduct these tests meets the requirements of ASTM E 90. The microphones were calibrated before conducting sound transmission loss tests. The test equipment and test chamber descriptions are listed in Appendix A.

Sample Installation:

Sound transmission loss tests were initially performed on a filler wall that was designed to test 48" by 72" and 72" by 48" specimens. The filler wall achieved an STC rating of 64.

The 72" by 48" plug was removed from the filler wall assembly. A 24" by 48" reducing element was installed to reduce the test opening size to 48" by 48". The reducing element construction was the same as the surrounding filler wall.

Sample A had no nailing flange, and was placed on a foam isolation pad in the test opening, with the interior side of the window frame, when installed, was approximately 1/4" from being flush with the receiving room side of the filler wall.

Sample B was mounted with the nailing flange flush to the source side of the opening, and the frame was placed on foam isolation pads in the test opening.

Duct seal was used to seal the perimeter of window samples A and B to the test opening on both sides. A stethoscope was used to check for any abnormal air leaks around the test specimen prior to testing.

Test Procedure:

Air Leakage Test - A negative pressure of 1.57 psf was applied inside the chamber that was placed around the interior side of the window. The total air leakage and extraneous air leakage measurements were used to calculate the specimen air leakage. Barometric pressure corrections were applied to the air leakage calculations.

Sound Transmission Loss Test - One background noise sound pressure level and five sound absorption measurements were conducted at each of the five microphone positions. Two sound pressure level measurements were made simultaneously in both rooms, at each of the five microphone positions. The air temperature and relative humidity conditions were monitored and recorded during the background, absorption, source, and receive room measurements.

Sample Descriptions:

Frame Construction:

	Frame
Size	48" by 48"
Thickness	2"
Corners	Butted
Fasteners	Screws
Seal Method	Sealant
Material	Aluminum
Reinforcement	N/A
Thermal Break Material	N/A
Daylight Opening Size	45-1/4" by 45-1/4"

Note: The exterior of the sample B frame had a nailing flange that made the outside dimensions of the flange 49" by 49". Because of this flange, the specimen was mounted flush to the source side of the filler wall opening.

Sample Descriptions: (Continued)

Glazing Option A:

Measured Overall Insulation Glass Unit Thickness	0.637"
Spacer Type	Duraseal

	Exterior Sheet	**Gap**	**Interior Sheet**
Measured Thickness	0.123"	0.248"	0.088", 0.090", 0.088
Muntin Pattern	N/A	N/A	N/A
Material	Annealed	Air*	Laminated
Laminate Material	N/A	N/A	PVB

Glazing Method	Exterior
Glazing Material	Silicone
Glazing Bead Material	Aluminum

Glazing Option B:

Measured Overall Thickness	0.332"

	Sheet
Measured Thickness	0.121", 0.090", 0.121"
Muntin Pattern	N/A
Material	Laminated
Laminate Material	PVB

Glazing Method	Exterior
Glazing Material	Silicone
Glazing Bead Material	Aluminum

Sample Descriptions: (Continued)

Components:

	TYPE	QUANTITY	LOCATION
Weatherstrip			
	No weatherstrip		
Hardware			
	No hardware		
Drainage			
	No drainage		

** - Stated per Client/Manufacturer N/A-Non Applicable*

Comments: The weight of glazing option A was 78 lbs., and the weight of glazing option B was 62 lbs. The client did not supply drawings on the Series/Model 185/3185 SP, picture window. The picture window was disassembled, and the components will be retained by ATI for four years. Photographs of the test specimen are included in Appendix C.

Test Results: The STC (Sound Transmission Class) rating was calculated in accordance with ASTM E 413. The OITC (Outdoor-Indoor Transmission Class) was calculated in accordance with ASTM E 1332. A summary of the air leakage and sound transmission loss test results on the Series/Model 185/3185 SP, picture window is listed below.

ATI Data File No.	Glazing Option (Nominal Dimensions)	* Air Infiltration	STC	OITC
71965.01A	5/8" IG (1/8" annealed exterior, 1/4" air space, 1/4" laminated interior) Glass temperature - 72°F	Pass	33	29
71965.01B	Single glazed, 5/16" laminated Glass temperature - 72°F	Pass	34	30

* *The maximum allowable air leakage rate, according to AAMA/NWWDA 101/I.S.2-97, is 0.3 cfm/ft^2 when the test pressure is 1.57 psf for Residential performance class, picture windows.*

The complete test results are listed in Appendix B. Flanking limit tests and reference specimen tests are available upon request.

Detailed drawings, data sheets, representative samples of test specimens, a copy of this report, or other pertinent project documentation will be retained by Architectural Testing, Inc. for a period of four years from the original test date. At the end of this retention period, such materials shall be discarded without notice and the service life of this report will expire. Results obtained are tested values and were secured by using the designated test methods. 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(s) tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC:

Digitally Signed by: Benjamin W. Green

Benjamin W. Green
Technician - Acoustical Testing

Digitally Signed by: Todd D. Kister

Todd D. Kister
Laboratory Supervisor - Acoustical Testing

BWG:crc

Attachments (pages): This report is complete only when all attachments listed are included.
- Appendix-A: Equipment description (1)
- Appendix-B: Complete test results (6)
- Appendix-C: Photographs (1)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	05/03/07	N/A	Original Report Issue

Appendix A

Instrumentation:

Instrument	Manufacturer	Model	Description	ATI Number
Analyzer	Agilent Technologies	35670A	Dynamic signal analyzer	Y002929
Receive Room Microphone	G.R.A.S.	40AR	1/2", pressure type, condenser microphone	Y003246
Source Room Microphone	ACO Pacific	7047	1/2", pressure type, condenser microphone	Y002820
Receive Room Preamp	Norsonic	N-1201	1/2" preamplifier	Y003240
Source Room Preamp	ACO Pacific	4012	1/2" preamplifier	Y002185
Microphone Calibrator	Bruel & Kjaer	4228	Pistonphone calibrator	Y002816
Noise Source	Delta Electronics	SNG-1	Two, non-coherelated "Pink" noise signals	Y002181
Equalizer	Rane	RPE228	Programmable EQ	Y002180
Power Amplifiers	Renkus-Heinz	P2000	2 - Amplifiers	Y002179 Y001779
Receive Room Loudspeakers	Renkus-Heinz	Trap Jr/9"	2 - Loudspeakers	Y001784 Y001785
Source Room Loudspeakers	Renkus-Heinz	Trap Jr/9"	2 - Loudspeakers	Y002649 Y002650
Lab Pack	ATI	N/A	Air leakage apparatus	Y000370

Test Chamber:

	Volume	Description
Receiving Room	8291.3 ft^3 (234 m^3)	Rotating vane and stationary diffusers. Temperature and humidity controlled. Isolation pads under the floor.
Source Room	7296.3 ft^3 (206.6 m^3)	Stationary diffusers only. Temperature and humidity controlled.

	Maximum Size	Description
TL Test Opening	14 ft wide by 10 ft high	Vibration break between source and receive rooms.

Appendix B

Complete Test Results

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SOUND TRANSMISSION LOSS

ASTM E90

ATI No.	71965.01A	**Date**	04/20/07
Client	MI Windows and Doors, Inc.		
Specimen	Series/Model 185/3185 SP, picture window with 5/8" IG (1/8" annealed exterior, 1/4" air space, 1/4" laminated interior), glass temperature 72F		
Specimen Area	16.00 Sq Ft		
Filler Area	124.00 Sq Ft		
Operator	Benjamin W. Green		

	Bkgrd	Absorp	Source	Receive	Filler	Specimen
Temp F	71.7	72.3	71.5	71.9	71.8	71.9
RH %	64.7	64.1	63.5	64.5	62.9	64.2

Freq (Hz)	Bkgrd SPL (dB)	Absorp (Sabines /Sq Ft)	Source SPL (dB)	Receive SPL (dB)	Filler TL (dB)	Specimen TL (dB)	95% Conf Limit	No. of Defici-encies	Trans Coef Diff
80	41.5	46.4	86.1	52.6	36.1	30	2.75	0	-1.7
100	36.9	50.4	89.0	63.6	39.3	21	3.55	0	10.1
125	37.7	48.2	93.0	63.7	45.7	25	2.83	0	12.3
160	40.1	47.9	95.3	64.8	45.8	26	1.64	0	11.1
200	39.8	47.9	99.7	69.8	48.9	25	0.92	0	14.8
250	34.2	55.4	101.2	70.4	51.4	25	1.07	1	17.1
315	33.0	56.8	98.7	67.7	54.0	25	0.59	4	19.6
400	31.9	59.6	99.3	67.0	57.4	27	0.71	5	21.9
500	30.7	57.5	100.7	66.4	60.4	29	0.51	4	22.7
630	25.4	55.1	102.9	67.1	65.4	30	0.52	4	26.2
800	25.6	58.3	102.1	65.8	66.4	31	0.44	4	26.8
1000	23.4	62.0	102.0	63.5	72.1	33	0.36	3	30.5
1250	23.4	67.5	105.6	64.4	77.8	35	0.39	2	34.0
1600	18.3	69.8	111.4	68.3	82.9	37	0.36	0	37.2
2000	13.6	75.5	107.2	61.5	82.2	39	0.24	0	34.3
2500	5.7	88.3	105.6	58.3	77.7	40	0.27	0	28.8
3150	6.5	103.1	107.0	58.9	80.1	40	0.37	0	31.3
4000	6.1	129.6	105.9	58.1	82.2	39	0.23	0	34.5
5000	6.6	172.8	104.3	51.4	80.8	43	0.30	0	29.4

STC Rating = **33** *(Sound Transmission Class)*

Deficiencies = **27** *(Number of deficiencies versus contour curve)*

OITC Rating = **29** *(Outdoor/Indoor Transmission Class)*

Note: *The acoustical chambers are qualified for measurements down to 80 hertz. Data reported below 80 hertz is for reference only.*

NVLAP LAB CODE 200361

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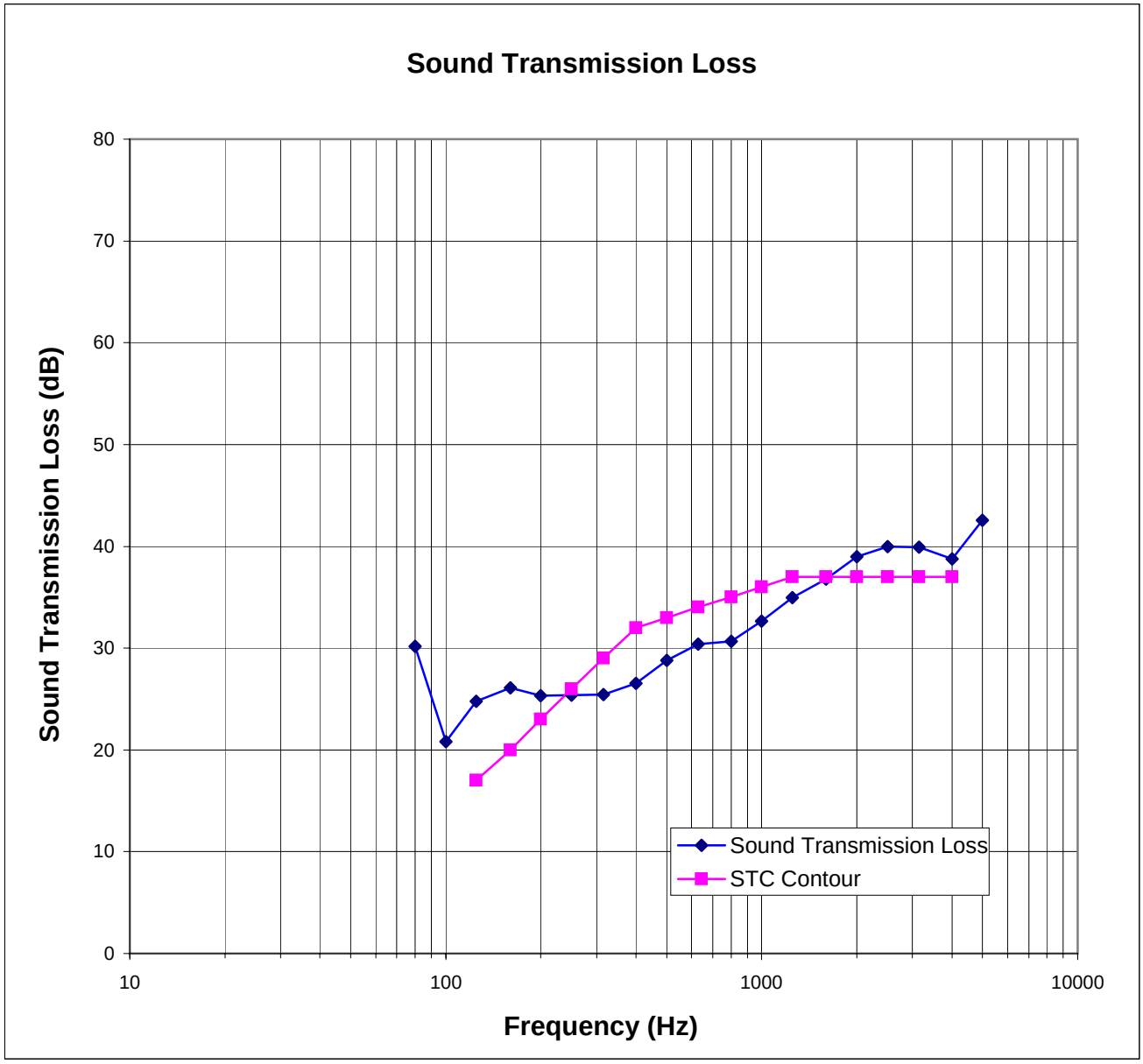
Architectural Testing

ATI No.	71965.01A	**Date**	04/20/07
Client	MI Windows and Doors, Inc.		
Specimen	Series/Model 185/3185 SP, picture window with 5/8" IG (1/8" annealed exterior, 1/4" air space, 1/4" laminated interior), glass temperature 72F		
Specimen Area	16.00 Sq Ft		
Filler Area	124.00 Sq Ft		
Operator	Benjamin W. Green		



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SOUND TRANSMISSION LOSS

ASTM E90

Architectural Testing

ATI No.	71965.01B	**Date**	04/23/07
Client	MI Windows and Doors, Inc.		
Specimen	Series/Model 185/3185 SP, picture window with single glazed, 5/16" laminated glass, glass temperature 72F		
Specimen Area	16.00 Sq Ft		
Filler Area	124.00 Sq Ft		
Operator	Benjamin W. Green		

	Bkgrd	Absorp	Source	Receive	Filler	Specimen
Temp F	74.8	74.8	74.3	74.8	71.8	74.7
RH %	64.3	64.3	64.0	64.3	62.9	64.2

Freq (Hz)	Bkgrd SPL (dB)	Absorp (Sabines /Sq Ft)	Source SPL (dB)	Receive SPL (dB)	Filler TL (dB)	Specimen TL (dB)	95% Conf Limit	No. of Defici-encies	Trans Coef Diff
80	47.8	48.4	86.3	55.5	36.1	27	4.10	0	1.3
100	40.7	61.1	90.4	59.1	39.3	27	4.43	0	5.0
125	40.3	52.9	93.1	61.3	45.7	27	3.54	0	10.2
160	44.7	45.3	95.2	67.2	45.8	24	2.87	0	13.4
200	44.3	50.8	99.9	70.3	48.9	25	1.98	0	15.4
250	37.8	53.9	100.7	71.3	51.4	24	2.25	3	18.4
315	36.8	59.3	98.6	66.3	54.0	27	2.08	3	18.5
400	35.8	61.1	99.1	64.7	57.4	28	1.75	5	20.0
500	33.9	58.4	100.6	63.8	60.4	31	1.22	3	20.3
630	28.0	58.4	102.5	64.7	65.4	32	0.89	3	24.4
800	28.5	59.9	102.3	62.9	66.4	34	0.77	2	23.8
1000	25.6	61.9	101.8	61.2	72.1	35	0.61	2	28.5
1250	25.6	66.1	105.4	63.0	77.8	36	0.29	2	32.8
1600	20.8	70.4	111.3	69.0	82.9	36	0.22	2	38.1
2000	14.9	75.8	106.8	65.1	82.2	35	0.23	3	38.4
2500	6.6	87.4	105.5	63.3	77.7	35	0.19	3	34.0
3150	7.5	104.4	106.7	61.6	80.1	37	0.18	1	34.3
4000	6.8	126.0	105.6	57.1	82.2	40	0.31	0	33.7
5000	7.0	164.4	104.3	51.3	80.8	43	0.44	0	29.1

STC Rating = **34** *(Sound Transmission Class)*
Deficiencies = **32** *(Number of deficiencies versus contour curve)*
OITC Rating = **30** *(Outdoor/Indoor Transmission Class)*

Note: *The acoustical chambers are qualified for measurements down to 80 hertz. Data reported below 80 hertz is for reference only.*

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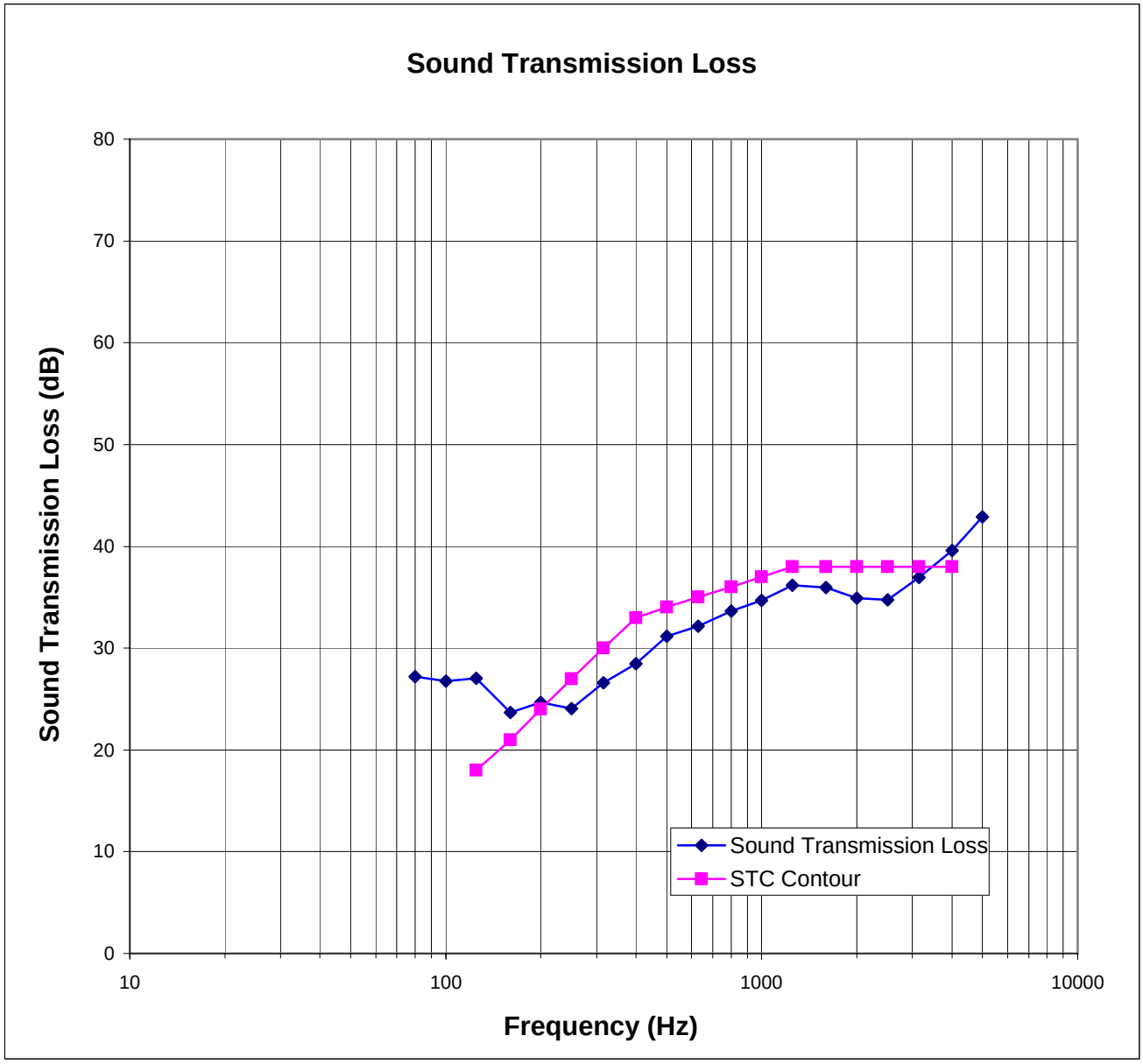
ATI No.	71965.01B	**Date**	04/23/07
Client	MI Windows and Doors, Inc.		
Specimen	Series/Model 185/3185 SP, picture window with single glazed, 5/16" laminated glass, glass temperature 72F		
Specimen Area	16.00 Sq Ft		
Filler Area	124.00 Sq Ft		
Operator	Benjamin W. Green		



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AAMA 1801 Data Sheets

ATI Job Number :	71965.01A
Client Name :	MI Windows and Doors, Inc.
Test Date :	4/20/2007
Tests Performed by:	Benjamin W. Green
Specimen Type :	Picture Window
Series/Model Number :	185/3185 SP
Sample Size :	48" x 48"

Air Leakage per ASTM test method ASTM E283

Total Air flow (ft^3/min) :	9.8		
Extraneous Leakage (ft3/min) :	9.75		
Temperature (^oF) at Specimen:	72		
Barometric Pressure at Specimen (in mbar):		1019.1	(Inches of Hg) : 30.09
Specimen Area in square feet :	16.00		
Density of air at reference standard conditions (lb/ft^3)	0.075		

Total air flow w/ air density correction (ft3/min)	Extraneous leakage with air density correction (ft3/min)	Air leakage through the specimen with air density correction (ft3/min)	Rate of air leakage per unit area (ft3/min)/sq.ft.
9.751	9.751	0.000	<0.01

AAMA 1801 Data Sheets

ATI Job Number :	71965.01B
Client Name :	MI Windows and Doors, Inc.
Test Date :	4/23/2007
Tests Performed by:	Benjamin W. Green
Specimen Type :	Picture Window
Series/Model Number :	185/3185 SP
Sample Size :	48" x 48"

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Air Leakage per ASTM test method ASTM E283

Total Air flow (ft^3/min) :	10.3		
Extraneous Leakage (ft3/min) :	10.25		
Temperature (^oF) at Specimen:	74		
Barometric Pressure at Specimen (in mbar):		1018.7	(Inches of Hg) : 30.08
Specimen Area in square feet :	16.00		
Density of air at reference standard conditions (lb/ft^3)	0.075		

Total air flow w/ air density correction (ft3/min)	Extraneous leakage with air density correction (ft3/min)	Air leakage through the specimen with air density correction (ft3/min)	Rate of air leakage per unit area (ft3/min)/sq.ft.
10.229	10.229	0.000	<0.01

Appendix C

Photographs

Sample Installed in Test Chamber, Receive Room View

Sample Installed in Test Chamber, Source Room View