

**ASTM E 90 SOUND TRANSMISSION LOSS
TEST REPORT**

Rendered to:

MI WINDOWS AND DOORS, INC.

SERIES/MODEL: EC-147

TYPE: Casement Window

Summary of Test Results			
Data File No.	Glazing Option (Nominal Dimensions)	STC	OITC
B2195.01A	1-1/8" IG (1/8" annealed, 13/32" air space, 3/32" annealed, 3/8" air space, 1/8" annealed)	30	24
B2195.01B	1-1/8" IG (1/8" annealed exterior, 21/64" air space, 3/32" annealed, 21/64" air space, 1/4" laminated interior), Glass temperature 75°F	36	29
B2195.01C	3/4" IG (1/8" annealed exterior, 3/8" air space, 1/4" laminated interior), Glass temperature 75°F	35	29
B2195.01D	1-1/8" IG (1/4" laminated, 5/8" air space, 1/4" laminated), Glass temperature 75°F	39	32

Reference should be made to Architectural Testing, Inc. Report No. B2195.01-113-11 for complete test specimen description. The complete test results are listed in Appendix B.

ACOUSTICAL PERFORMANCE TEST REPORT

Rendered to:

MI WINDOWS AND DOORS, INC.
7555 East State Route 69
Prescott Valley, Arizona 86314

Report No: B2195.01-113-11
Test Date: 08/02/11
Report Date: 09/26/11
Record Retention End Date: 08/02/15

Test Sample Identification:

Series/Model: EC-147

Type: Casement Window

Test Option A Overall Size: 23-5/8" by 59"

Test Option B, C, D Overall Size: 23-7/8" by 59"

Glazing (Nominal Dimensions):

- Option A:** 1-1/8" IG (1/8" Annealed, 13/32" Air Space, 3/32" Annealed, 3/8" Air Space, 1/8" Annealed)
- Option B:** 1-1/8" IG (1/8" Annealed Exterior, 21/64" Air Space, 3/32" Annealed, 21/64" Air Space, 1/4" Laminated Interior), Glass Temperature 75°F
- Option C:** 3/4" IG (1/8" Annealed Exterior, 3/8" Air Space, 1/4" Laminated Interior), Glass Temperature 75°F
- Option D:** 1-1/8" IG (1/4" Laminated, 5/8" Air space, 1/4" Laminated), Glass Temperature 75°F

Project Scope: Architectural Testing, Inc. was contracted by MI Windows and Doors, Inc. to conduct a sound transmission loss tests on a Series/Model EC-147, casement window. 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.

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

ASTM E 90-09, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.

ASTM E 413-10, Classification for Rating Sound Insulation.

ASTM E 1332-10a, Standard Classification for Rating Outdoor-Indoor Sound Attenuation.

ASTM E 2235-04^{e1}, Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods.

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

Sample Installation: A filler wall reducing element was used to reduce the test opening size. The reducing element consisted of two separate 2x6 wood frames filled with concrete to reduce the test opening size to 24-3/8" wide by 59-1/2" high. A dense neoprene gasket was placed between the two wood and concrete frames. The window was placed on an isolation pad in the new test opening. Duct seal was used to seal the perimeter of the window to the test opening on both sides. 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. A stethoscope was used to check for any abnormal air leaks around the test specimen prior to testing. The vent was opened and closed at least five times prior to testing.

Test Procedure: The window was closed and locked for this test. The sound transmission loss tests were conducted in accordance with the ASTM E 90 test method using a single direction of measurement. One background noise sound pressure level and five sound absorption measurements were conducted at each of five microphone positions. Two sound pressure level measurements were made simultaneously in both rooms, at each of 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	Frame
Test Option	A	B, C, D
Size	23-5/8" by 59"	23-7/8" by 59"
Thickness	3-1/4"	3-1/4"
Corners	Mitered	Mitered
Fasteners	Welds	Welds
Seal Method	None	None
Material	Vinyl	Vinyl
Reinforcement	Aluminum / Head and sill*	Aluminum / Head and sill*
Thermal Break Material	N/A	N/A

Vent Construction:

	Vent	Vent
Test Option	A	B, C, D
Size	21-3/4" by 57-1/16"	22" by 57-1/16"
Thickness	2-1/4"	2-1/4"
Corners	Mitered	Mitered
Fasteners	Welds	Welds
Seal Method	None	None
Material	Vinyl	Vinyl
Reinforcement	Aluminum / Bottom and top rail*	Aluminum / Bottom and top rail*
Thermal Break Material	None	None
Daylight Opening Size	16-7/8" by 52-1/4"	17-1/8" by 52-1/4"

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

Sample Descriptions: (Continued)

Glazing Option A:

Nominal Overall Insulation Glass Unit Thickness		1-1/8"			
Spacer Type		Intercept			
	Exterior Sheet	Gap	Center Sheet	Gap	Interior Sheet
Nominal Thickness	1/8"	13/32"	3/32"	3/8"	1/8"
Muntin Pattern	N/A	N/A	N/A	N/A	N/A
Material	Annealed	Air*	Annealed	Air*	Annealed
Laminate Material	N/A	N/A	N/A	N/A	N/A
Glazing Method	Exterior				
Glazing Material	Dow Corning® InstalGlaze				
Glazing Bead Material	Vinyl				

Vent Glazing Option B:

Nominal Overall Insulation Glass Unit Thickness		1-1/8"			
Spacer Type		Duralite™			
	Exterior Sheet	Gap	Center Sheet	Gap	Interior Sheet
Nominal Thickness	1/8"	21/64"	3/32"	21/64"	1/4"
Muntin Pattern	N/A	N/A	N/A	N/A	N/A
Material	Annealed	Air*	Annealed	Air*	Laminated
Laminate Material	N/A	N/A	N/A	N/A	SQ41*
Glazing Method	Exterior				
Glazing Material	Dow Corning® InstalGlaze				
Glazing Bead Material	Vinyl				

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

Sample Descriptions: (Continued)

Vent Glazing Option C:

Measured Overall Insulation Glass Unit Thickness	0.723"		
Spacer Type	Duralite™		
	Exterior Sheet	Gap	Interior Sheet
Measured Thickness	0.119"	0.363"	0.241"
Muntin Pattern	N/A	N/A	N/A
Material	Annealed	Air*	Laminated
Laminate Material	N/A	N/A	SQ41*
Glazing Method	Exterior		
Glazing Material	Dow Corning® InstalGlaze		
Glazing Bead Material	Vinyl		

Vent Glazing Option D:

Measured Overall Insulation Glass Unit Thickness	1.124"		
Spacer Type	Duralite™		
	Exterior Sheet	Gap	Interior Sheet
Measured Thickness	0.245"	0.642"	0.237"
Muntin Pattern	N/A	N/A	N/A
Material	Laminated	Air*	Laminated
Laminate Material	SQ41*	N/A	SQ41*
Glazing Method	Exterior		
Glazing Material	Dow Corning® InstalGlaze		
Glazing Bead Material	Vinyl		

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

Sample Descriptions: (Continued)

Sample Weights:

Overall Sample Area:	m ²	ft ²
Option A	0.9	9.68
Options B, C, D	0.91	9.78

Sample Identification:	Total Weight		Weight Per Unit Area	
	kg	lbs	kg / m ²	lbs / ft ²
A	24.5	54	26.92	5.52
B	28.0	62	30.77	6.31
C	24.5	54	26.92	5.52
D	28.0	62	30.77	6.31

Components:

	TYPE	QUANTITY	LOCATION
Weatherstrip			
	1/4" Diameter foam-filled bulb gasket	2 Rows	Frame perimeter
	Polypile with center fin	1 Row	Vent perimeter
Hardware			
	Roto-crank operator	1	Sill
	Multi-point lock system	1	Lock jamb
	Multi-point hinge system	1	Head and sill
	Snubber	4	Hinge stile
	Keeper	3	Lock stile
Drainage			
	Sloped sill		

Comments: The client did not supply drawings on the Series/Model EC-147, casement window. The test specimen was returned per the client's request. 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 sound transmission loss test results on the Series/Model EC-147, casement window is listed below.

Summary of Test Results			
Data File No.	Glazing Option (Nominal Dimensions)	STC	OITC
B2195.01A	1-1/8" IG (1/8" annealed, 13/32" air space, 3/32" annealed, 3/8" air space, 1/8" annealed)	30	24
B2195.01B	1-1/8" IG (1/8" annealed exterior, 21/64" air space, 3/32" annealed, 21/64" air space, 1/4" Laminated Interior), Glass temperature 75°F	36	29
B2195.01C	3/4" IG (1/8" annealed exterior, 3/8" air space, 1/4" laminated interior), Glass temperature 75°F	35	29
B2195.01D	1-1/8" IG (1/4" laminated, 5/8" air space, 1/4" laminated), Glass temperature 75°F	39	32

Note: Transmission loss coefficient differences less than 6 indicate the lower limit of the transmission loss for this specimen. On each data sheet listed in Appendix B, the cells are highlighted red for the transmission loss values limited in this way. Due to the calculations and sample size, transmission loss coefficient differences between 6 and 15 indicate there has been a filler wall correction applied. On each data sheet listed in Appendix B, cells highlighted in green indicate transmission loss values affected in this way.

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 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 specimens tested. This report may not be reproduced, except in full, without the written approval of Architectural Testing.

For ARCHITECTURAL TESTING, INC:


Kurt A. Golden
Senior Technician - Acoustical Testing

Todd D. Kister
Laboratory Supervisor - Acoustical Testing

KAG:jmcs

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

- Appendix-A: Equipment description (1)
- Appendix-B: Complete test results (8)
- Appendix-C: Photographs (1)

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Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	09/26/11	N/A	Original Report Issue



Architectural Testing

Appendix A

Instrumentation:

Instrument	Manufacturer	Model	Description	ATI Number	Date of Calibration
Analyzer	Hewlett Packard	HP35670A	Real time analyzer	Y002929	06/14/11 *
Data Acquisition Unit	Agilent	34970A	Data Acquisition Unit	62211	07/13/11
Receive Room Microphone	GRAS	40 AR	1/2" Microphone	Y003246	08/17/10
Source Room Microphone	GRAS	40 AR	1/2" Microphone	Y003245	08/17/10
Receive Room Preamplifier	GRAS	26 AK	1/2" Preamplifier	Y003249	08/17/10
Source Room Preamplifier	GRAS	26 AK	1/2" Preamplifier	Y003248	08/17/10
Microphone Calibrator	Bruel & Kjaer	Type 4228	Pistonphone Calibrator	Y002816	02/17/11
Noise Source	Delta Electronics	SNG-1	Noise Generator	Y002181	N/A
Equalizer	Rane	RPE 228	Programmable Equalizer	Y002180	N/A
Power Amplifiers	Crown	Xti 2000	Two, Amplifiers	005769 005770	N/A
Receive Room Loudspeakers	Renkus-Heinz Inc.	Trap Jr./9	Two, Loudspeakers	Y001784 Y001785	N/A
Source Room Loudspeakers	Renkus-Heinz Inc.	Trap Jr./9	Two, Loudspeakers	Y002649 Y002650	N/A
Receive Room Environmental Indicator	Vaisala	HMW60Y	Temperature and Humidity Sensor	005066	08/20/10
Source Room Environmental Indicator	Vaisala	HMW60Y	Temperature and Humidity Sensor	Y002652	09/15/10
Weather Station	Davis Instruments	VantagePRO 6150C	Weather Station	Y003257	05/16/11

*- Note: The calibration frequency for this equipment is every two years per the manufacturer's recommendation.

Test Chamber:

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

	Maximum Size	Description
TL Test Opening	4.27 m (14 ft) wide by 3.05 m (10 ft) high	Vibration break between source and receive rooms

N/A-Non Applicable

Appendix B
Complete Test Results



SOUND TRANSMISSION LOSS

ASTM E 90

Architectural Testing

ATI No.	B2195.01A	Date	08/02/11
Client	MI Windows and Doors, Inc.		
Specimen	Series/Model: EC-147, casement window with 1-1/8" IG (1/8" annealed, 13/32" air space, 3/32" annealed, 3/8" air space, 1/8" annealed)		
Specimen Area	0.90 Square Meters		
Filler Area	12.09 Square Meters		
Operator	Kurt Golden		


	Bkgrd	Absorp	Source	Receive	Filler	Specimen
Temp C	24.6	25.2	22.8	24.6	23.0	24.3
RH %	41.1	40.6	47.8	44.1	43.7	43.4

Freq (Hz)	Bkgrd SPL (dB)	Absorp (Square Meters)	Source SPL (dB)	Receive SPL (dB)	Filler TL (dB)	Specimen TL (dB)	95% Conf Limit	No. of Deficiencies	Trans Coef Diff
80	46.9	5.6	88.1	59.6	35.8	22	2.05	0	4.0
100	42.2	5.5	90.7	58.4	41.2	26	3.37	0	5.6
125	42.5	5.1	95.1	61.8	47.8	26	2.55	0	10.7
160	47.4	4.8	95.5	72.4	47.0	16	1.25	1	19.9
200	45.7	5.0	100.9	80.1	52.1	13	0.81	7	27.4
250	39.8	5.4	100.8	74.6	54.8	18	0.97	5	25.1
315	36.6	5.5	100.9	70.3	55.7	23	0.75	3	21.6
400	34.5	5.8	101.6	70.8	61.2	23	0.71	6	27.1
500	32.0	5.7	102.2	65.9	67.5	28	0.43	2	28.0
630	27.5	5.6	103.2	65.8	72.6	29	0.67	2	31.9
800	27.4	5.6	103.8	61.0	73.3	35	1.06	0	27.1
1000	26.0	5.8	104.1	61.4	75.9	35	0.69	0	30.0
1250	22.2	6.5	103.2	57.1	77.5	37	0.52	0	28.8
1600	16.8	6.8	105.1	59.3	84.6	37	0.29	0	36.3
2000	14.1	7.1	105.1	57.9	83.3	38	0.35	0	33.8
2500	12.3	8.3	105.2	56.4	83.0	39	0.22	0	32.6
3150	11.1	10.0	106.1	56.3	83.0	39	0.34	0	32.3
4000	10.0	12.2	106.3	62.3	81.5	33	0.41	1	37.5
5000	8.5	16.0	105.0	58.3	81.6	34	0.55	0	36.1

STC Rating = 30 *(Sound Transmission Class)*
Deficiencies = 27 *(Number of deficiencies versus contour curve)*
OITC Rating = 24 *(Outdoor/Indoor Transmission Class)*

Notes:

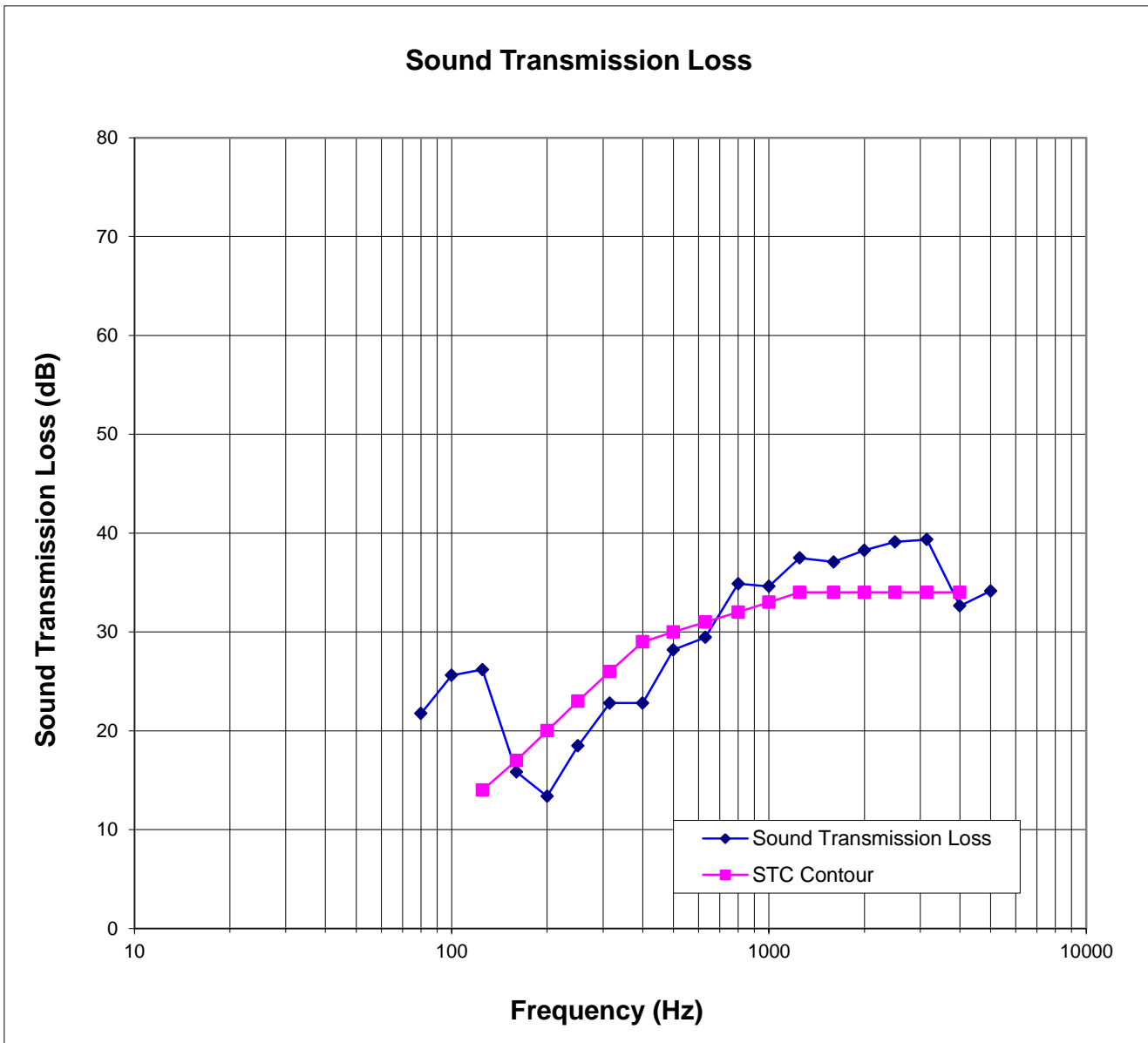
- 1) The acoustical chambers are qualified for measurements down to 80 hertz. Data reported below 80 hertz is for reference only.
- 2) Transmission loss coefficient differences less than 6 indicate the lower limit of the transmission loss for this specimen. These cells are highlighted red.
- 3) Transmission loss coefficient differences between 6 and 15 indicate there has been a filler wall correction applied. These cells are highlighted green.
- 4) Receive Room levels less than 5dB above the Background levels are highlighted in yellow.

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Architectural Testing

ATI No. B2195.01A **Date** 08/02/11
Client MI Windows and Doors, Inc.
Specimen Series/Model: EC-147, casement window with 1-1/8" IG (1/8" annealed, 13/32" air space, 3/32" annealed, 3/8" air space, 1/8" annealed)
Specimen Area 0.90 Square Meters
Filler Area 12.09 Square Meters
Operator Kurt Golden



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SOUND TRANSMISSION LOSS

ASTM E 90

Architectural Testing

ATI No.	B2195.01B	Date	08/02/11
Client	MI Windows and Doors, Inc.		
Specimen	Series/Model: EC-147, casement window with 1-1/8" IG (1/8" annealed exterior, 21/64" air space, 3/32" annealed, 21/64" air space, 1/4" laminated interior), Glass temperature 75°F		
Specimen Area	0.91 Square Meters		
Filler Area	12.08 Square Meters		
Operator	Kurt Golden		


	Bkgrd	Absorp	Source	Receive	Filler	Specimen
Temp C	24.6	25.2	23.8	25.7	23.0	24.8
RH %	37.2	37.1	46.7	36.3	43.7	39.3

Freq (Hz)	Bkgrd SPL (dB)	Absorp (Square Meters)	Source SPL (dB)	Receive SPL (dB)	Filler TL (dB)	Specimen TL (dB)	95% Conf Limit	No. of Deficiencies	Trans Coef Diff
80	45.3	4.8	89.4	60.6	35.8	23	1.77	0	3.1
100	44.0	4.8	91.6	58.4	41.2	27	3.80	0	4.0
125	43.9	4.9	95.9	59.0	47.8	31	1.95	0	7.0
160	45.0	4.2	96.1	68.8	47.0	21	0.89	2	15.1
200	43.8	4.7	101.3	74.9	52.1	19	0.73	7	21.6
250	40.7	5.4	101.0	68.9	54.8	24	1.09	5	19.2
315	38.1	5.6	101.2	64.2	55.7	29	0.93	3	15.4
400	35.4	5.9	101.8	62.7	61.2	31	0.69	4	19.0
500	30.0	6.0	102.2	60.1	67.5	34	0.36	2	22.3
630	25.0	5.7	103.1	57.4	72.6	38	0.43	0	23.6
800	26.5	5.7	103.5	55.3	73.3	40	0.36	0	21.8
1000	25.0	6.0	104.0	55.6	75.9	40	0.34	0	24.4
1250	24.2	6.6	102.9	54.4	77.5	40	0.29	0	26.3
1600	19.5	6.9	105.1	57.6	84.6	39	0.20	1	34.7
2000	15.9	7.5	104.9	55.3	83.3	40	0.29	0	31.7
2500	13.0	8.7	104.9	55.3	83.0	40	0.24	0	31.9
3150	11.6	10.5	106.0	52.8	83.0	43	0.30	0	29.1
4000	9.9	12.9	106.1	52.2	81.5	42	0.25	0	27.9
5000	9.3	16.7	104.7	48.3	81.6	44	0.30	0	26.6

STC Rating = 36 (Sound Transmission Class)
Deficiencies = 24 (Number of deficiencies versus contour curve)
OITC Rating = 29 (Outdoor/Indoor Transmission Class)

Notes:

- 1) The acoustical chambers are qualified for measurements down to 80 hertz. Data reported below 80 hertz is for reference only.
- 2) Transmission loss coefficient differences less than 6 indicate the lower limit of the transmission loss for this specimen. These cells are highlighted red.
- 3) Transmission loss coefficient differences between 6 and 15 indicate there has been a filler wall correction applied. These cells are highlighted green.
- 4) Receive Room levels less than 5dB above the Background levels are highlighted in yellow.

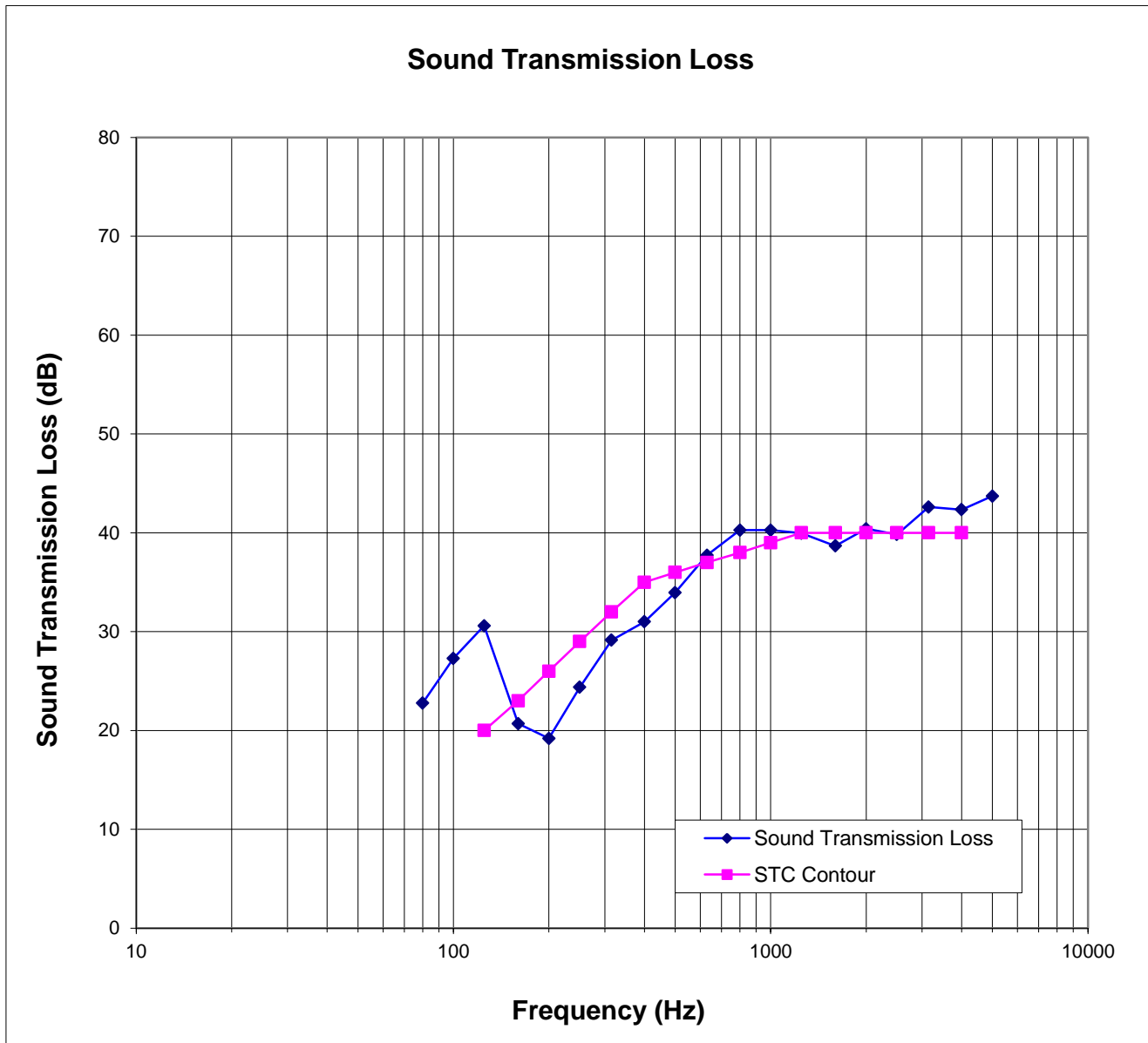
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Architectural Testing

ATI No. B2195.01B **Date** 08/02/11
Client MI Windows and Doors, Inc.
Specimen Series/Model: EC-147, casement window with 1-1/8" IG (1/8" annealed exterior, 21/64" air space, 3/32" annealed, 21/64" air space, 1/4" laminated interior), Glass temperature 75°F

Specimen Area 0.91 Square Meters
Filler Area 12.08 Square Meters
Operator Kurt Golden



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SOUND TRANSMISSION LOSS

ASTM E 90

Architectural Testing

ATI No.	B2195.01C	Date	08/02/11
Client	MI Windows and Doors, Inc.		
Specimen	Series/Model: EC-147, casement window with 3/4" IG (1/8" annealed exterior, 3/8" air space, 1/4" laminated interior), Glass temperature 75°F		
Specimen Area	0.91 Square Meters		
Filler Area	12.08 Square Meters		
Operator	Kurt Golden		


	Bkgrd	Absorp	Source	Receive	Filler	Specimen
Temp C	24.1	25.3	22.6	23.7	23.0	23.9
RH %	43.6	36.7	46.4	44.7	43.7	42.8

Freq (Hz)	Bkgrd SPL (dB)	Absorp (Square Meters)	Source SPL (dB)	Receive SPL (dB)	Filler TL (dB)	Specimen TL (dB)	95% Conf Limit	No. of Deficiencies	Trans Coef Diff
80	45.4	4.9	89.5	61.2	35.8	22	1.98	0	3.7
100	43.6	5.7	92.0	59.1	41.2	26	3.51	0	5.0
125	42.3	5.1	96.8	59.6	47.8	31	2.19	0	7.0
160	45.9	4.5	96.7	64.5	47.0	26	1.53	0	10.5
200	43.5	5.1	102.1	74.3	52.1	20	0.91	5	20.4
250	39.2	5.3	102.0	74.6	54.8	20	0.94	8	23.9
315	38.4	5.5	102.2	66.5	55.7	28	0.82	3	16.6
400	35.7	5.6	102.7	66.2	61.2	28	0.75	6	21.5
500	30.9	5.9	102.9	62.2	67.5	33	0.31	2	23.7
630	26.7	5.5	103.6	59.3	72.6	36	0.52	0	24.9
800	27.5	5.7	103.9	57.1	73.3	39	0.54	0	23.2
1000	25.9	6.1	104.0	56.2	75.9	39	0.39	0	25.2
1250	26.1	6.6	102.9	55.7	77.5	39	0.38	0	27.7
1600	21.9	6.8	104.8	58.6	84.6	37	0.33	2	36.0
2000	22.0	7.2	104.5	55.8	83.3	40	0.28	0	32.4
2500	19.2	8.6	104.6	54.2	83.0	41	0.33	0	31.2
3150	13.2	10.4	105.5	55.0	83.0	40	0.35	0	31.8
4000	9.8	12.8	105.5	55.4	81.5	39	0.24	0	31.6
5000	8.5	16.9	104.1	50.5	81.6	41	0.40	0	29.5

STC Rating = 35 (Sound Transmission Class)
Deficiencies = 26 (Number of deficiencies versus contour curve)
OITC Rating = 29 (Outdoor/Indoor Transmission Class)

Notes:

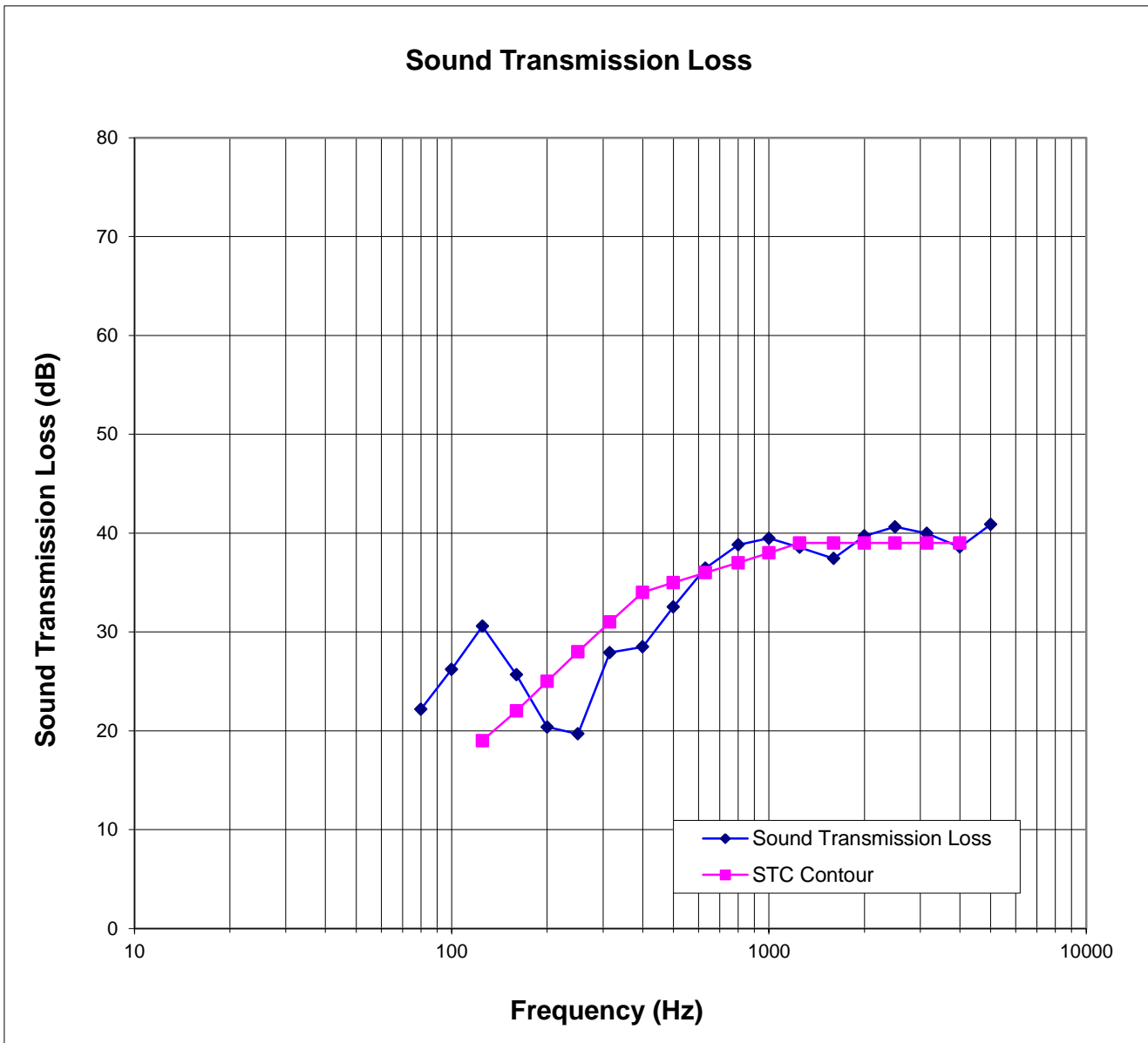
- 1) The acoustical chambers are qualified for measurements down to 80 hertz. Data reported below 80 hertz is for reference only.
- 2) Transmission loss coefficient differences less than 6 indicate the lower limit of the transmission loss for this specimen. These cells are highlighted red.
- 3) Transmission loss coefficient differences between 6 and 15 indicate there has been a filler wall correction applied. These cells are highlighted green.
- 4) Receive Room levels less than 5dB above the Background levels are highlighted in yellow.

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Architectural Testing

ATI No. B2195.01C **Date** 08/02/11
Client MI Windows and Doors, Inc.
Specimen Series/Model: EC-147, casement window with 3/4" IG (1/8" annealed exterior, 3/8" air space, 1/4" laminated interior), Glass temperature 75°F
Specimen Area 0.91 Square Meters
Filler Area 12.08 Square Meters
Operator Kurt Golden



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SOUND TRANSMISSION LOSS

ASTM E 90

Architectural Testing

ATI No.	B2195.01D	Date	08/02/11
Client	MI Windows and Doors, Inc.		
Specimen	Series/Model: EC-147, casement window with 1-1/8" IG (1/4" laminated, 5/8" air space, 1/4" laminated), Glass temperature 75°F		
Specimen Area	0.91 Square Meters		
Filler Area	12.08 Square Meters		
Operator	Kurt Golden		

	Bkgrd	Absorp	Source	Receive	Filler	Specimen
Temp C	26.4	24.7	22.5	23.4	23.0	24.2
RH %	33.6	36.9	48.8	43.9	43.7	40.8

Freq (Hz)	Bkgrd SPL (dB)	Absorp (Square Meters)	Source SPL (dB)	Receive SPL (dB)	Filler TL (dB)	Specimen TL (dB)	95% Conf Limit	No. of Deficiencies	Trans Coef Diff
80	43.5	4.7	88.6	59.5	35.8	23	2.35	0	2.6
100	42.3	5.4	90.7	57.0	41.2	27	3.19	0	4.0
125	42.2	4.8	95.0	59.8	47.8	29	2.31	0	8.6
160	45.2	4.9	95.5	66.8	47.0	21	1.75	5	14.5
200	45.0	5.7	100.8	67.7	52.1	25	1.02	4	15.7
250	39.8	5.8	100.6	59.0	54.8	34	0.71	0	10.0
315	35.7	5.6	100.9	59.5	55.7	34	1.19	1	11.0
400	33.6	5.7	101.5	60.5	61.2	33	0.53	5	17.0
500	31.3	6.1	102.2	56.9	67.5	37	0.27	2	19.2
630	24.8	5.8	103.2	53.8	72.6	41	0.55	0	20.0
800	24.7	5.9	103.6	53.6	73.3	42	0.52	0	20.2
1000	24.1	6.1	104.0	54.4	75.9	41	0.44	1	23.2
1250	21.3	6.8	103.0	53.3	77.5	41	0.69	2	25.4
1600	16.3	7.1	105.2	56.3	84.6	40	0.50	3	33.5
2000	13.9	7.5	105.0	53.6	83.3	42	0.70	1	29.9
2500	12.4	8.5	105.0	53.9	83.0	41	0.37	2	30.4
3150	11.3	10.3	106.0	50.6	83.0	45	0.48	0	26.9
4000	10.4	13.1	106.1	46.7	81.5	48	0.74	0	22.3
5000	9.5	17.0	104.7	43.4	81.6	49	0.37	0	21.8

STC Rating = 39 (Sound Transmission Class)
Deficiencies = 26 (Number of deficiencies versus contour curve)
OITC Rating = 32 (Outdoor/Indoor Transmission Class)

Notes:

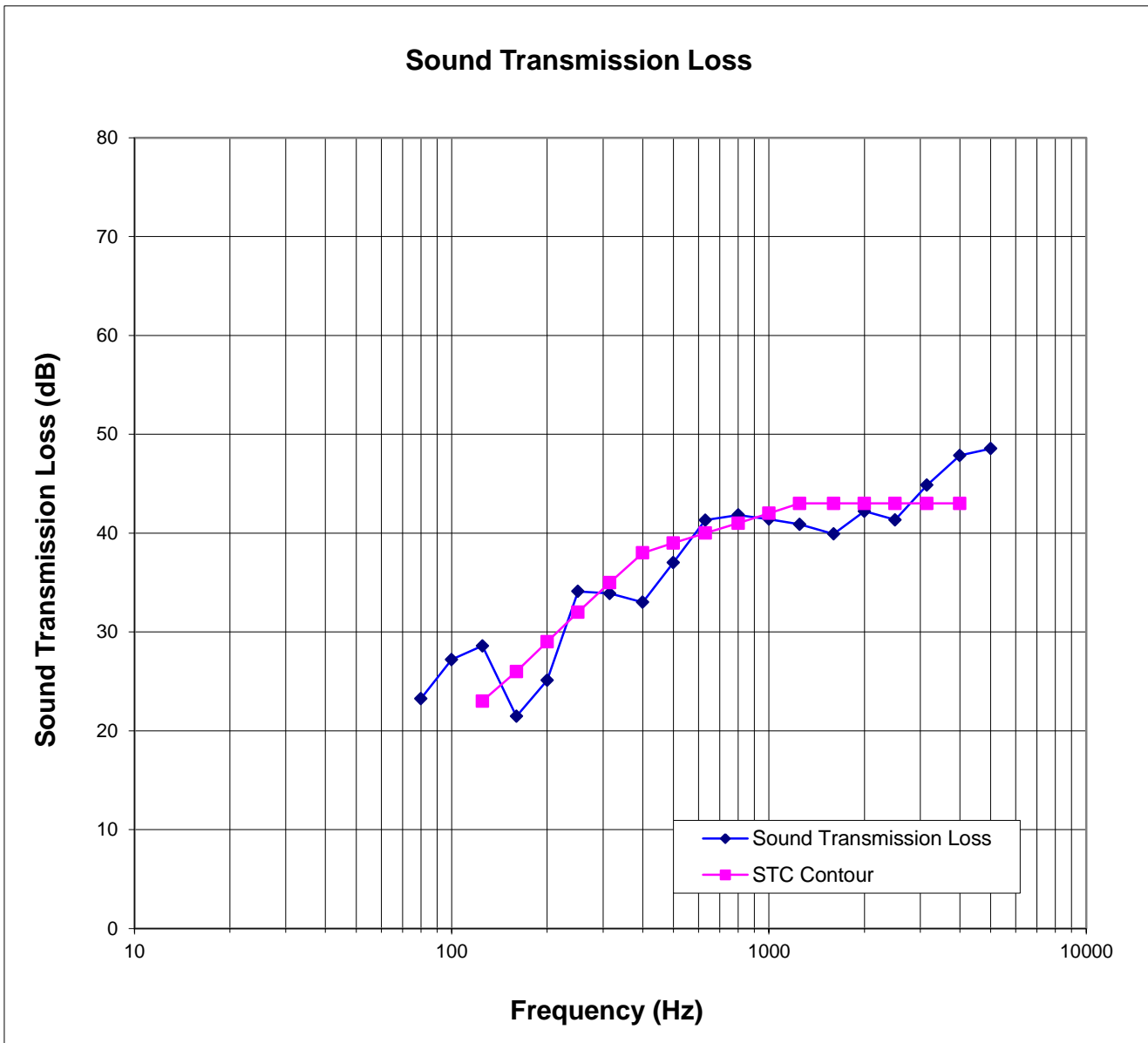
- 1) The acoustical chambers are qualified for measurements down to 80 hertz. Data reported below 80 hertz is for reference only.
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- 4) Receive Room levels less than 5dB above the Background levels are highlighted in yellow.

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Architectural Testing

ATI No. B2195.01D Date 08/02/11
Client MI Windows and Doors, Inc.
Specimen Series/Model: EC-147, casement window with 1-1/8" IG (1/4" laminated, 5/8" air space, 1/4" laminated), Glass temperature 75°F
Specimen Area 0.91 Square Meters
Filler Area 12.08 Square Meters
Operator Kurt Golden



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Appendix C

Photographs



Receive Room View of Installed Test Specimen



Source Room View of Installed Test Specimen