



Climate Seal™

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The Worlds Best Thermal - Acoustical - Preservation Window Inserts



Architectural Testing

ACOUSTICAL PERFORMANCE TEST REPORT

Rendered to:

Climate Seal™

**TYPE: Dual Window System Consisting of Three
Vinyl Clad Wood Casement Windows Muller Together
with the Magnetic Seal Interior Storm Window System**

Report No:	01-46458.01
Test Date:	07/31/03
Report Date:	09/26/03
Expiration Date:	07/31/07

130 Derry Court
York, PA 17402-9405
phone: 717.764.7700
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www.archtest.com



ACOUSTICAL PERFORMANCE TEST REPORT

Rendered to:

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123 Columbia Court North – Suite 201 – Chaska, MN 55318
952.448.5300 – Fax: 952.448.2613 – 800.387.4085

Report No: 01-46458.01
Test Date: 07/31/03
Report Date: 09/26/03
Expiration Date: 07/31/07

Test Sample Identification:

Option 1:

Prime Window Type: Three Vinyl Clad Wood Casement Windows Mullled Together
Prime Window Glazing: 5/8" IG (3/32" Annealed, 7/16" Air Space, 3/32" Annealed)

Option 2:

Prime Window Type: Three Vinyl Clad Wood Casement Windows Mullled Together
Prime Window Glazing: 5/8" IG (3/32" Annealed, 7/16" Air Space, 3/32" Annealed)
Storm Window Series/Model: Three-Lite in Jamb, four sided magnet
Storm Window Glazing: 1/8" Acrylic

Option 3:

Prime Window Type: Three Vinyl Clad Wood Casement Windows Mullled Together
Prime Window Glazing: 5/8" IG (3/32" Annealed, 7/16" Air Space, 3/32" Annealed)
Storm Window Series/Model: One-Lite in Jamb, four sided magnet
Storm Window Glazing: 1/8" Acrylic

Project Scope: Architectural Testing, Inc. (ATI) was contracted by Climate Seal™ to conduct sound transmission loss tests on a dual window consisting of three vinyl clad, wood casement windows mullled together as the prime window with a magnetic seal interior storm window system. 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.

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

ASTM E 90-02, *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.*

ASTM E 413-87 (Re-approved 1999), *Classification for Rating Sound Insulation.*

ASTM E 1332-90 (Re-approved 1998), *Standard Classification for Determination of Outdoor-Indoor Transmission Class.*

Test Equipment: The equipment, used to conduct this test, meets the requirements of ASTM E 90-02. The microphones were calibrated before conducting the sound transmission loss test. The test equipment and test chamber descriptions are listed in Appendix A.

Test Procedure:

Sound transmission loss tests were initially performed on a filler wall that was designed to test 4' 0" by 6' 0" and 6' 0" by 4' 0" test specimens. The filler wall achieved an STC rating of 63.

A wood frame was placed around the outside perimeter of the prime window. Duct seal was used to seal the window to the wood frame. The 6' 0" by 4' 0" plug was removed from the filler wall assembly and the test specimen was installed in the opening. 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 dense neoprene gasket and duct seal was used to seal the wood frame to the inside perimeter of the filler wall opening. A stethoscope was used to check for any abnormal air leaks before the test. The vents were opened and closed at least five times prior to testing.

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:

Prime Window Construction:

	Frame	All Vents
Size	62" x 48-1/2"	19-3/8" x 46-1/2"
Thickness	5-1/2"	2"
CORNERS	Coped / Butted	Coped / Butted
Fasteners	Screws	Screws
Seal Method	Sealant	Sealant
MATERIAL	Wood / Vinyl Clad	Wood / Vinyl Clad
Reinforcement	NA	NA
Thermal Break Material	NA	NA
Daylight Opening Size (For each of the 3 lites)	NA	16" x 43-1/4"

Option 1 Glazing:

Prime Window Glazing:

	Exterior Sheet	Gap	Interior Sheet
MEASURED THICKNESS	0.09"	0.44"	0.09"
MATERIAL	Annealed	Air*	Annealed
LAMINATE MATERIAL	NA	NA	NA
MUNTIN PATTERN	NA	NA	NA
SPACER TYPE	Aluminum		
MEASURED IG UNIT OVERALL THICKNESS	0.62"		

The prime window vents were interior glazed. Option 1 was a baseline test with no storm window attached.

Sample Descriptions: (Continued)

Option 2 Storm Window Construction:

	Frame
Size	20-1/8" x 47-3/4" (3)
Thickness	1"
CORNERS	Butted
Fasteners	NA
Seal Method	None
MATERIAL	Co-extruded, dual durometer PVC
Reinforcement	NA
Thermal Break Material	NA
Daylight Opening Size (For each of the 3 lites)	18-1/8" x 45-3/4"

Three individual storm windows were placed over the three casement window vents. A 1" x 1" sheet metal angle was faced with foam tape on one surface. For the in-jamb storm window mounting, the angle was screwed to the prime window frame around the interior perimeter. Foam tape provided an isolation break between the prime window frame and the angle. The storm panel was fastened to the angle with the use of 1" wide magnets located on all four members of the storm window. The glass to glass air space between the prime window and the storm window was five inches.

Option 2 Glazing:

Prime Window Glazing: Same glazing that was used in Option 1.

Storm Window Glazing:

MEASURED THICKNESS	0.13"
MATERIAL	Acrylic

The prime window vents were interior glazed. The storm window was channel glazed.

Sample Descriptions: (Continued)

Option 3 Storm Window Construction:

		Frame
Size	60-3/8" x 47-3/4"	
Thickness	1"	
CORNERS	Butted	
	Fasteners	NA
	Seal Method	None
MATERIAL	Co-extruded, dual durometer PVC	
	Reinforcement	NA
	Thermal Break Material	NA
Daylight Opening Size	58-3/8" x 45-3/4"	

The one large storm window covered all three casement windows. A 1" x 1" sheet metal angle was faced with foam tape on one surface. For the in-jamb storm window mounting, the angle was screwed to the prime window frame around the interior perimeter. Foam tape provided an isolation break between the prime window frame and the angle. The storm panel was fastened to the angle with the use of 1" wide magnets located on all four members of the storm window. The glass to glass air space between the prime window and the storm window was six inches.

Option 3 Glazing:

Prime Window Glazing: Same glazing that was used in Option 1.

Storm Window Glazing:

MEASURED THICKNESS	013"
MATERIAL	Acrylic

The prime window vents were interior glazed. The storm window was channel glazed.

Sample Descriptions: (Continued)

Components:

TYPE	QUANTITY	LOCATION
WEATHERSTRIP		
1/2" long rigid leaf gasket	1 Row	All prime window top rails
1/4" diameter flexible leaf gasket	1 Row	Perimeter of all prime window vents
HARDWARE		
Multi bar hinge system	3	Top and bottom rails of each vent
Roto operator	3	Bottom rail of each vent
Metal sweep lock	6	Two per main frame lock stile
Metal lock keeper	6	Two per vent keeper stile
DRAINAGE		
No drainage		

NA-Non Applicable

Comments: The prime window vents were located towards the exterior side of the window. Photographs of the test sample are located in Appendix C. The client did not supply drawings on the dual window system. The window was disassembled, and the components will be retained by ATI for four years.

Test Results: The STC (Sound Transmission Class) rating was calculated in accordance with ASTM E 413-87. The OITC (Outdoor-Indoor Transmission Class) was calculated in accordance with ASTM E 1332-90. A summary of the sound transmission loss test results are listed below.

ATI Job File No.	Sample Description	STC	OITC
01-46458.01A	Option 1: Prime window type: Three vinyl casement windows mullled together. Prime window glazing: 5/8" IG (3/32" Annealed, 7/16" Air Space, 3/32" Annealed)	27	23
01-46458.01B	Option 2: Prime window type: Three vinyl casement windows mullled together. Prime window glazing: 5/8" IG (3/32" Annealed, 7/16" Air Space, 3/32" Annealed). Storm window - Series/Model: Three-lite in jamb. Storm window glazing: 1/8" acrylic, four sided magnet	44	28
01-46458.01C	Option 3: Prime window type: Three vinyl casement windows mullled together. Prime window glazing: 5/8" IG (3/32" Annealed, 7/16" Air Space, 3/32" Annealed). Storm window - Series/Model: One-lite in jamb. Storm window glazing: 1/8" acrylic, four sided magnet	44	31

The complete test results are listed in Appendix B.

This report is prepared for the convenience of our customer and endeavors to provide accurate and timely project information. It contains a summary of observations made by a qualified representative of Architectural Testing, Inc. The results of this report apply only to the specimens that were tested. The statements made herein do not constitute approval, disapproval, certification or acceptance of performance or materials.

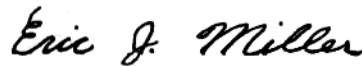
A copy of this report will be retained by ATI for a period of four years. This report is the exclusive property of the client so named herein. This report shall not be reproduced, except in full, without written approval by Architectural Testing, Inc.

For ARCHITECTURAL TESTING, INC:



Digitally Signed by: Todd D. Kister

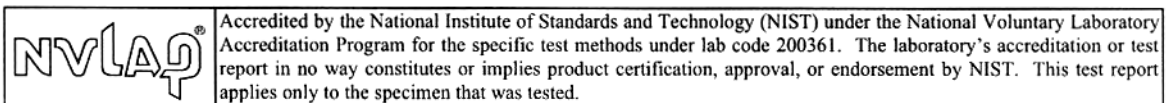
Todd D. Kister
Senior Technician - Acoustical Testing



Digitally Signed by: Eric J. Miller

Eric J. Miller
Director - Acoustical Testing

TDK:vlm
01-46458.01



DOCUMENT CONTROL ADDENDUM #01-46458.00

Current Issue Date: 09/26/03

Report No.: 01-46458.01

Requested by: Mattrew Petit, Climate Seal™

Purpose: Sound transmission loss test report on a dual window system consisting of three casement windows mulled together with three different magnetic interior storm window configurations.

Issued Date: 09/26/03

Comments:

Appendix A

Instrumentation:

Instrument	Manufacturer	Model	Description	ATI Number
Analyzer	Agilent Technologies	35670A	Dynamic signal analyzer	Y002929
Receive Room Microphone	ACO Pacific	7047	1/2", pressure type, condenser microphone	Y001775
Source Room Microphone	ACO Pacific	7047	1/2", pressure type, condenser microphone	Y002757
Receive Room Preamp	ACO Pacific	4012	1/2" preamplifier	Y002185
Source Room Preamp	ACO Pacific	4012	1/2" preamplifier	Y002756
Microphone Calibrator	Bruel & Kjaer	4228	Pistonphone calibrator	Y002186
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

Test Chamber:

	Volume	Description
Receiving Room	8291.3 ft ³ (234m ³)	Rotating vane and stationary diffusers. Temperature and humidity controlled. Isolation pads under the floor.
Source Room	7296.3 ft ³ (206.6m 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 Sound Transmission Loss Test Results



SOUND TRANSMISSION LOSS

ASTM E90


Architectural Testing

ATI No.	01-46458.01A	Date	07/31/03
Client	Climate Seal™		
Specimen	Clad Casement Window, baseline		
Specimen Area	20.63 Sq Ft		
Filler Area	119.37 Sq Ft		
Operator	Todd Kister		

	Bkgrd	Absorp	Source	Receive	Filler	Specimen
Temp F	79.2	79.7	80.0	80.1	69.8	79.8
RH %	61.3	60.5	56.2	59.9	67.2	59.5

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 Deficiencies	Trans Coef Diff
80	39.1	50.3	97.8	76.3	36.4	18	2.96	0	11.2
100	40.7	55.0	96.4	73.7	40.3	19	2.83	0	14.3
125	40.5	45.3	97.6	71.1	47.4	23	2.43	0	16.7
160	43.9	45.9	98.4	74.5	47.7	20	1.37	0	19.6
200	43.9	49.7	100.9	78.0	53.2	19	0.83	0	26.5
250	38.5	48.4	101.8	79.1	57.9	19	0.88	1	31.2
315	37.8	47.8	100.6	76.1	63.2	21	0.28	2	34.7
400	35.4	50.3	100.0	78.5	67.6	18	0.53	8	42.3
500	30.6	51.5	99.3	75.4	69.6	20	0.49	7	42.0
630	24.6	53.9	102.1	74.8	71.7	23	0.38	5	40.9
800	24.2	59.8	104.0	69.5	70.3	30	0.38	0	32.9
1000	24.5	65.0	103.6	68.4	77.4	30	0.52	0	39.6
1250	23.6	69.3	104.8	67.5	83.6	32	0.34	0	43.9
1600	18.7	73.4	110.5	71.4	86.5	34	0.40	0	45.4
2000	13.9	75.8	106.6	64.1	87.0	37	0.24	0	42.5
2500	13.3	89.4	105.3	58.9	85.7	40	0.23	0	38.1
3150	7.9	108.1	105.8	57.7	86.5	41	0.21	0	38.0
4000	7.8	126.9	105.0	56.6	85.6	41	0.19	0	37.5
5000	8.2	168.5	103.3	58.6	83.0	36	0.49	0	39.9

STC Rating 27 *(Sound Transmission Class)*
Deficiencies 23 *(Number of deficiencies versus contour curve)*
OITC Rating 23 *(Outdoor/Indoor Transmission Class)*

	Accredited by the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program for the specific test methods under lab code 200361. The laboratory's accreditation or test report in no way constitutes or implies product certification, approval, or endorsement by NIST. This test report applies only to the specimen that was tested.
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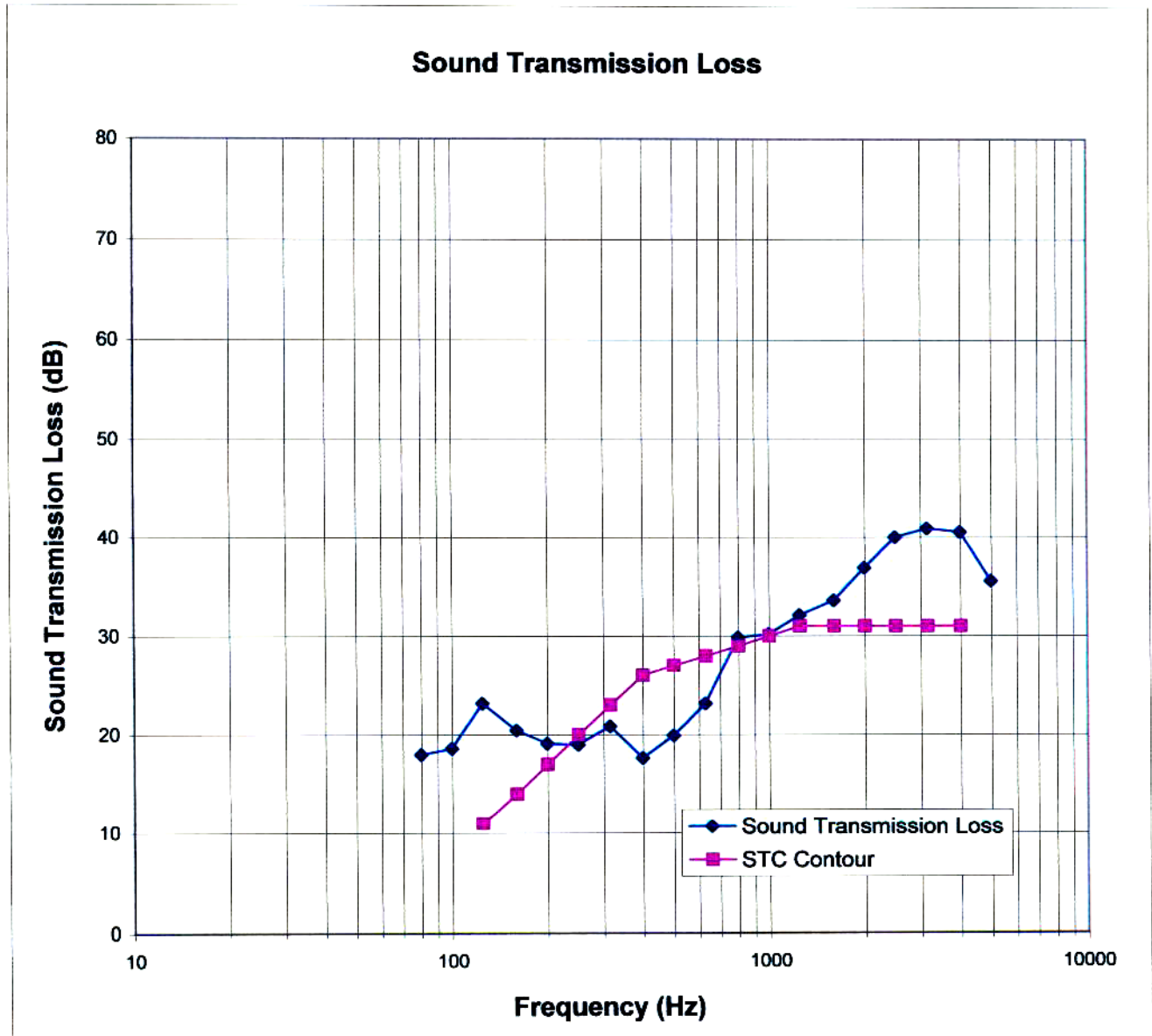


Architectural Testing

ATI No. 01-46458.01A
Client Climate Seal™
Specimen Clad Casement Window, baseline

Date 07/31/03

Specimen Area 20.63 Sq Ft
Filler Area 119.37 Sq Ft
Operator Todd Kister





SOUND TRANSMISSION LOSS ASTM E90

Architectural Testing

ATI No.	01-46458.01B	Date	07/31/03
Client	Climate Seal™		
Specimen	Clad Casement Window, in jamb storm window, 3 individual lites		
Specimen Area	20.63 Sq Ft		
Filler Area	119.37 Sq Ft		
Operator	Todd Kister		

	Bkgrd	Absorp	Source	Receive	Filler	Specimen
Temp F	80.7	80.6	80.8	80.5	69.8	80.7
RH %	60.8	60.9	55.7	61.0	67.2	59.6

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 Deficiencies	Trans Coef Diff
80	38.9	54.7	83.9	68.1	36.4	12	2.21	0	17.2
100	40.6	61.4	87.1	67.2	40.3	15	2.81	0	17.5
125	40.5	46.5	91.9	60.5	47.4	28	2.27	0	12.0
160	42.6	44.7	95.6	65.0	47.7	27	1.08	4	12.8
200	45.6	46.2	100.6	64.7	53.2	33	0.56	1	13.3
250	42.1	47.7	102.7	63.7	57.9	36	1.11	1	14.9
315	39.4	46.2	101.1	62.3	63.2	35	0.46	5	20.3
400	34.2	49.5	99.9	58.7	67.6	37	0.46	6	22.6
500	28.8	49.7	99.7	55.3	69.6	41	0.42	3	21.4
630	22.6	52.5	103.8	55.0	71.7	45	0.29	0	19.3
800	23.1	56.2	105.7	55.3	70.3	46	0.31	0	16.7
1000	21.3	59.3	105.8	53.7	77.4	48	0.32	0	22.2
1250	21.2	66.3	106.6	55.1	83.6	46	0.26	2	29.6
1600	15.3	70.1	111.3	59.2	86.5	47	0.23	1	32.2
2000	10.3	75.5	108.8	55.2	87.0	48	0.23	0	31.4
2500	6.6	88.3	107.4	49.6	85.7	52	0.34	0	26.5
3150	6.3	108.2	107.5	43.8	86.5	57	0.26	0	22.4
4000	6.7	126.6	106.8	40.1	85.6	59	0.48	0	19.2
5000	7.6	162.1	105.1	40.1	83.0	56	0.62	0	19.3

STC Rating 44 *(Sound Transmission Class)*
Deficiencies 23 *(Number of deficiencies versus contour curve)*
OITC Rating 28 *(Outdoor/Indoor Transmission Class)*

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Architectural Testing

ATI No. 01-46458.01B

Date 07/31/03

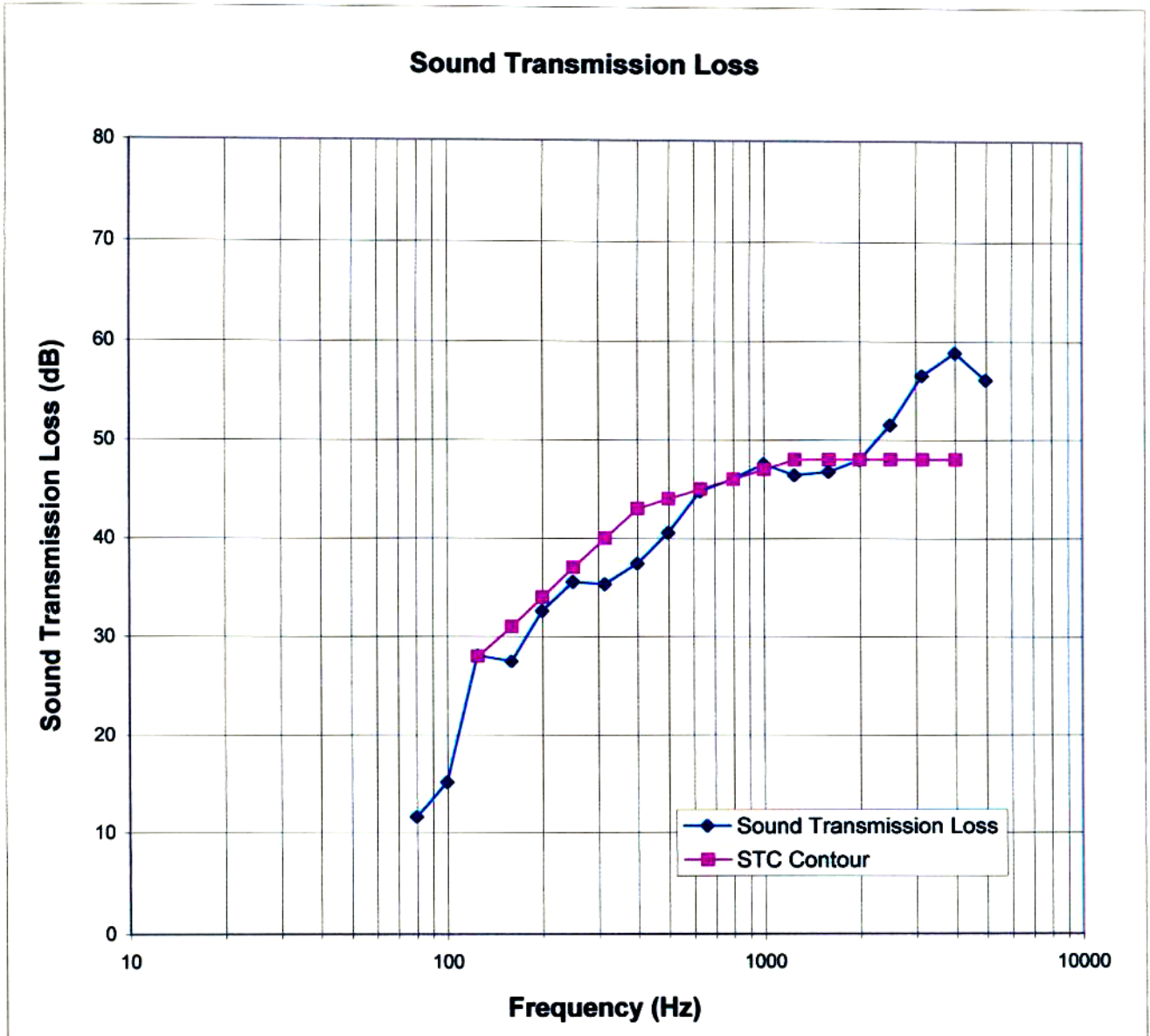
Client Climate Seal™

Specimen Clad Casement Window, in jamb storm window, 3 individual lites

Specimen Area 20.63 Sq Ft

Filler Area 119.37 Sq Ft

Operator Todd Kister





SOUND TRANSMISSION LOSS ASTM E90

Architectural Testing

ATI No.	01-46458.01C	Date	07/31/03
Client	Climate Seal™		
Specimen	Clad Casement Window, in jamb storm window, 1 lites		
Specimen Area	20.63 Sq Ft		
Filler Area	119.37 Sq Ft		
Operator	Todd Kister		

	Bkgrd	Absorp	Source	Receive	Filler	Specimen
Temp F	79.7	79.3	80.4	78.4	69.8	79.4
RH %	59.1	59.5	59.3	60.7	67.2	59.6

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 Deficiencies	Trans Coef Diff
80	41.6	55.8	84.0	65.2	36.4	15	1.85	0	14.3
100	44.0	50.6	87.4	62.8	40.3	21	3.29	0	12.0
125	42.3	46.1	91.9	65.1	47.4	23	3.52	5	16.5
160	44.7	42.1	95.6	65.6	47.7	27	1.25	4	13.1
200	45.3	48.3	100.4	68.9	53.2	28	0.75	6	17.9
250	39.3	46.4	102.7	64.6	57.9	35	1.12	2	15.7
315	38.2	43.7	101.2	61.0	63.2	37	0.67	3	18.7
400	35.4	49.7	100.1	58.9	67.6	37	0.94	6	22.6
500	31.7	47.2	99.6	53.4	69.6	43	0.39	1	19.3
630	22.2	51.6	103.7	52.6	71.7	47	0.31	0	16.9
800	22.0	54.6	105.7	51.7	70.3	50	0.29	0	12.9
1000	20.1	58.3	105.9	49.1	77.4	52	0.56	0	17.5
1250	20.0	65.5	106.6	49.4	83.6	52	0.46	0	23.9
1600	14.6	68.3	111.2	53.8	86.5	52	0.27	0	26.7
2000	9.9	74.8	108.8	49.7	87.0	54	0.24	0	25.9
2500	7.1	88.6	107.5	45.7	85.7	56	0.26	0	22.5
3150	6.5	107.5	107.7	41.0	86.5	60	0.41	0	19.4
4000	6.9	128.3	107.1	36.8	85.6	62	0.38	0	15.6
5000	7.9	172.0	105.3	39.5	83.0	57	0.69	0	18.8

STC Rating 44 *(Sound Transmission Class)*
Deficiencies 27 *(Number of deficiencies versus contour curve)*
OITC Rating 31 *(Outdoor/Indoor Transmission Class)*

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Architectural Testing

ATI No. 01-46458.01C

Date 07/31/03

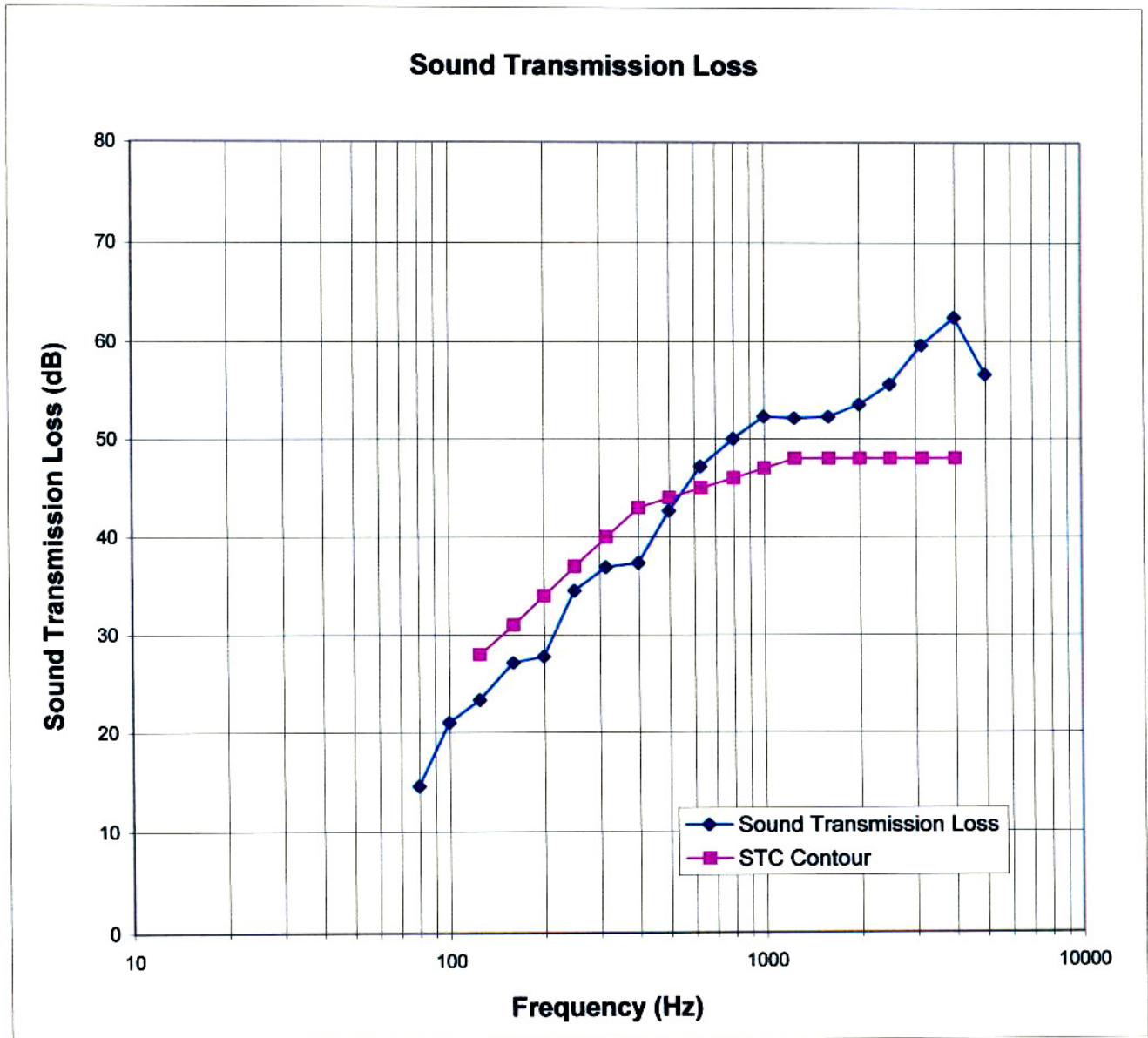
Client Climate Seal™

Specimen Clad Casement Window, in jamb storm window, 1 lites

Specimen Area 20.63 Sq Ft

Filler Area 119.37 Sq Ft

Operator Todd Kister



Appendix C

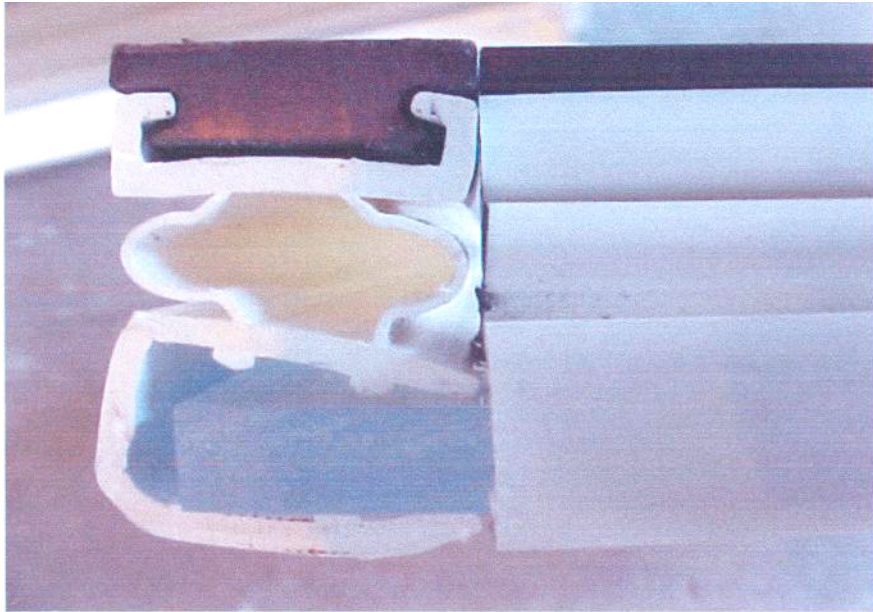
Photographs



Three Casement Windows Mullered Together Before Installation



Magnetic Seal Surface of Storm Panel



Co-extruded Dual Durometer Frame Extrusion