

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

Rendered to:

REHAU INC.

SERIES/MODEL: 4500

TYPE: Tilt/Turn Casement Window

Summary of Test Results			
ATI Data File No.	Glazing	STC	OITC
56604.01	1-3/8" IG (1/4" laminated, 7/8" air space, 1/4" laminated) Glass temperature was 72°F	43	34

Reference should be made to ATI Report No. 56604.01-113-11 for complete test specimen description. The complete test results are listed in Appendix B.

ACOUSTICAL PERFORMANCE TEST REPORT

Rendered to:

REHAU INC.
1501 Edwards Ferry Road
Leesburg, Virginia 20176

Report No: 56604.01-113-11
Test Date: 03/24/05
Report Date: 04/04/05
Expiration Date: 03/24/09

Test Sample Identification:

Series/Model: 4500

Type: Tilt/Turn Casement Window

Performance Class: Residential

Overall Size: 44" by 60"

Glazing Option 1: 1-3/8" IG (1/4" Laminated, 7/8" Air Space, 1/4" Laminated)

Project Scope: Architectural Testing, Inc. (ATI) was contracted by REHAU Inc. to conduct sound transmission loss test on a Series/Model 4500, tilt/turn 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.

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

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 2235-04, *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:

Sound transmission loss tests were initially performed on a filler wall that was designed to test 48" by 72" and 72" by 48" test specimens. The filler wall achieved an STC rating of 68.

A filler wall reducing element (STC 64) was used to reduce the test opening size to 44-1/2" wide by 60-1/2" high. The reducing element consisted of a double 2x4 wood stud wall construction with two layers of 5/8" drywall on both sides. The stud cavities in the wall were insulated with two layers of R-13 fiberglass insulation. The window was placed on a foam 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 test consisted of the following measurements: 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.

Frame Construction:

	Frame	Vent
Size	44" by 60"	40-5/16" by 56-7/8"
Thickness	3-1/4"	2-1/4"
CORNERS	Mitered	Mitered
Welds	Welds	Welds
Seal Method	None	None
MATERIAL	Vinyl	Vinyl
Reinforcement	All members*	All members*
Thermal Break Material	N/A	34-3/4" by 50-3/4"

Sample Descriptions:

Lead Content: A lead check swab test was performed on all polymeric profiles. The test result was negative. Details of the lead check swab test are contained in Appendix B.

Vent Glazing:

Measured Overall Insulation Glass Unit Thickness	1.43"
Spacer Type	Aluminum

	Exterior Sheet	Gap	Interior Sheet
MEASURED THICKNESS	0.125" - 0.030" - 0.125"*	0.87"	0.125" - 0.030" - 0.125"*
MUNTIN PATTERN	N/A	N/A	N/A
MATERIAL	Laminated	Air*	Laminated
LAMINATE MATERIAL	PVB	N/A	PVB

The tilt/turn window was interior glazed onto flexible wedge gasket and held-in-place with vinyl glazing beads. The temperature of the glass was 72°F.

Components:

	TYPE	QUANTITY	LOCATION
WEATHERSTRIP			
	Dual leaf gasket	1 Row	Interior frame perimeter, vent
HARDWARE			
	Tilt/turn hinge system	1	Jamb and head
	Multi point locking system	1	Vent perimeter
	Metal lock keeper	9	Interior frame perimeter
DRAINAGE			
	1" by 1/4" Weep slot	2	Sill

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

Comments: The weight of the sample was 169 lbs. The design drawings (included in Appendix C) supplied by the client, accurately describe the Series/Model 4500, tilt/turn casement window. The dimensions on the drawings that are circled and/or checked were verified against the accessible components of the test specimen. The internal components and dimensions could not be verified, as the 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 operating force, air leakage, and sound transmission loss test results on the Series/Model 4500, tilt/turn casement window is listed below.

ATI Data File No.	Glazing	STC	OITC
56604.01	1-3/8" IG (1/4" laminated, 7/8" air space, 1/4" laminated) Glass temperature was 72°F	43	34

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 specimen that was 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 from the original test date. 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:


Kurt A. Golden
Technician - Acoustical Testing

Todd D. Kister
Laboratory Supervisor - Acoustical Testing

KAG:dnb

Attachments (pages):

- Appendix-A: Equipment description (1)
- Appendix-B: Complete test results (3)
- Appendix-C: Photographs (1)

 NVLAP LAB CODE 200361	Architectural Testing, Inc is accredited by the National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program for the specific test methods listed 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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Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	04/04/05	N/A	Original test report

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	Y002820
Receive Room Preamp	ACO Pacific	4012	1/2" preamplifier	Y002185
Source Room Preamp	ACO Pacific	4012	1/2" preamplifier	Y002752
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
Lab Pack	ATI		Air leakage apparatus	Y000370

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 Test Results



SOUND TRANSMISSION LOSS

ASTM E90

Architectural Testing


ATI No.	56604.01	Date	03/24/05
Client	REHAU, Inc.		
Specimen	Series/Model 4500 tilt/turn casement window with 1-3/8" IG (1/4" laminated, 7/8" air space, 1/4" laminated) Glass temp 72F		
Specimen Area	18.33 Sq Ft		
Filler Area	121.67 Sq Ft		
Operator	Kurt A. Golden		

	Bkgrd	Absorp	Source	Receive	Filler	Specimen
Temp F	71.8	72.2	71.5	72.2	71.4	71.9
RH %	63.6	63.4	64.8	63.3	64.6	63.8

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	37.6	46.8	92.1	67.3	36.2	22	3.38	0	7.3
100	40.6	53.4	99.4	71.8	40.5	24	2.15	0	9.2
125	38.3	48.6	104.2	72.9	46.8	27	1.64	0	11.5
160	41.6	53.0	107.3	74.9	49.0	28	0.74	2	13.0
200	39.7	52.3	112.4	77.4	51.5	31	0.95	2	12.9
250	34.9	53.0	112.9	73.7	56.1	35	1.22	1	13.3
315	33.2	56.4	111.1	69.5	60.4	37	0.81	2	15.4
400	32.2	56.4	110.1	66.8	64.8	38	0.64	4	18.2
500	31.2	59.3	109.5	64.8	69.4	40	0.40	3	21.5
630	26.7	58.8	113.1	66.7	76.5	41	0.29	3	27.0
800	30.9	60.8	114.4	66.2	81.1	43	0.39	2	29.8
1000	25.1	65.1	113.0	63.3	84.1	44	0.39	2	31.7
1250	23.6	72.0	113.0	62.1	86.5	45	0.27	2	33.4
1600	19.5	74.4	116.4	64.8	88.3	45	0.35	2	34.7
2000	14.9	79.8	108.9	55.9	89.1	47	0.30	0	34.3
2500	8.2	95.2	105.4	52.2	88.5	46	0.23	1	34.3
3150	7.3	113.8	105.5	53.2	90.2	44	0.22	3	37.7
4000	6.7	136.0	103.3	45.5	90.5	49	0.28	0	33.2
5000	6.5	179.2	99.5	34.7	88.5	55	0.47	0	25.3

STC Rating = 43 *(Sound Transmission Class)*
Deficiencies = 29 *(Number of deficiencies versus contour curve)*
OITC Rating = 34 *(Outdoor/Indoor Transmission Class)*

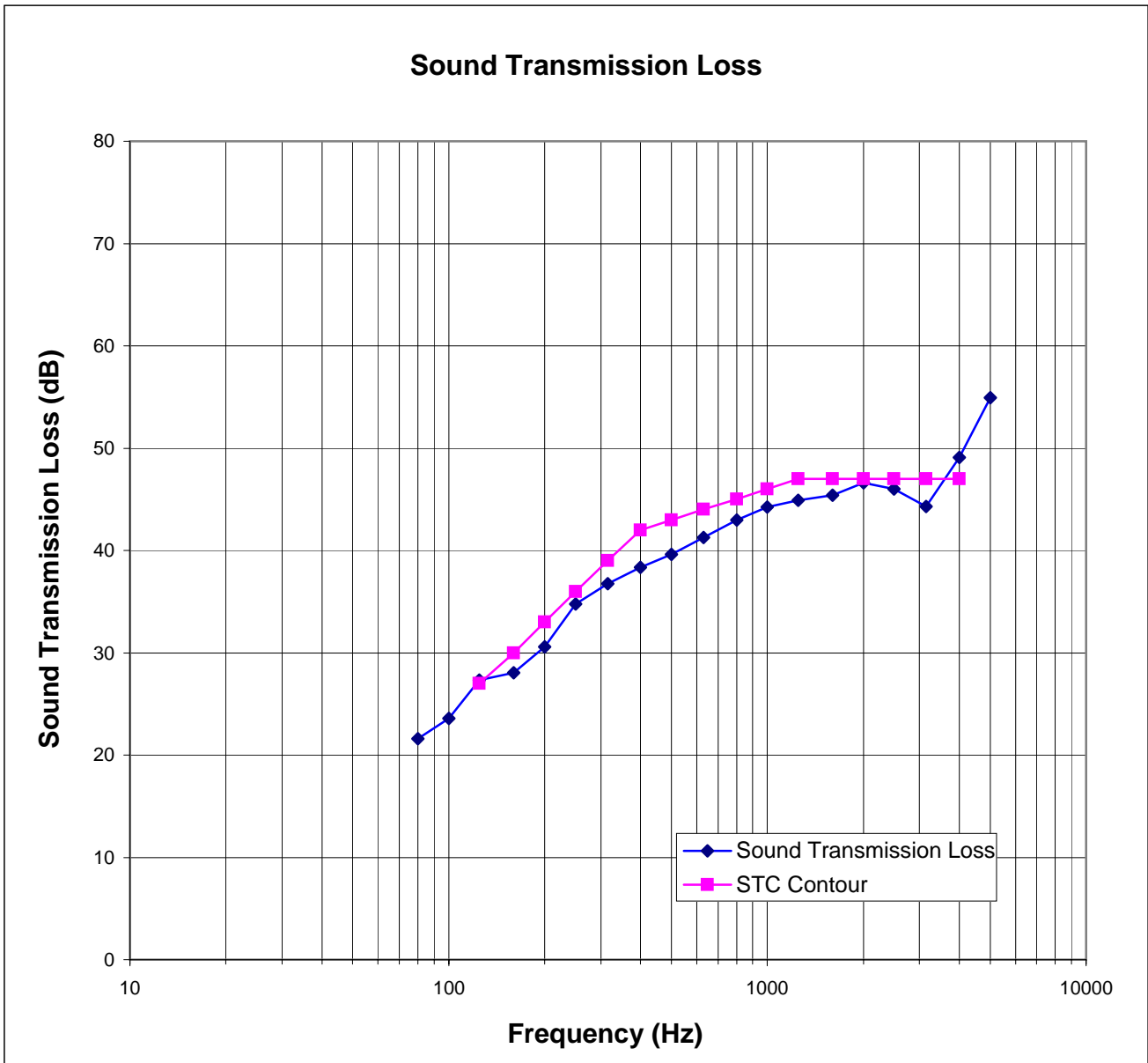
Note: *The acoustical chambers are qualified for measurements down to 80 hertz.
Data reported below 80 hertz is for reference only.*

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Architectural Testing

ATI No. 56604.01 Date 03/24/05
Client REHAU, Inc.
Specimen Series/Model 4500 tilt/turn casement window with 1-3/8" IG (1/4" laminated, 7/8" air space, 1/4" laminated) Glass temp 72F
Specimen Area 18.33 Sq Ft
Filler Area 121.67 Sq Ft
Operator Kurt A. Golden



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Appendix C
Photographs



Interior View of Sample



Exterior View of Sample