

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

**Rendered to:**

**AMERICAN MICRO INDUSTRIES, INC.**

**TYPE: 2x4 Wood Stud 16" On Center  
Wall Construction**

<b>Summary of Test Results</b>			
<b>ATI Data File No.</b>	<b>Description</b>	<b>STC</b>	<b>OITC</b>
78334.01A	One layer of 5/8" gypsum board on both sides	52	39
78334.01B	One layer of 5/8" gypsum board on receive side and two layers of 5/8" gypsum board on source side	55	42
78334.01C	Two layers of 5/8" gypsum board on both sides	58	46

Reference should be made to ATI Report No. 78334.01-113-11 for complete test specimen description. The complete test results are listed in Appendix B.

**ACOUSTICAL PERFORMANCE TEST REPORT**

Rendered to:

AMERICAN MICRO INDUSTRIES, INC.  
440 Ramsey Avenue, Suite C  
Chambersburg, Pennsylvania 17201

Report No: 78334.01-113-11  
Test Date: 11/12/07  
Report Date: 12/28/07  
Expiration Date: 11/12/11

**Test Sample Identification:**

**Type:** 2x4 Wood Stud 16" On Center Wall Construction

**Wallboard:**

**Option A:** Single layer of 5/8" gypsum board on both sides

**Option B:** Unbalanced layers of 5/8" gypsum board

**Option C:** Double layer of 5/8" gypsum board on both sides

**Insulation:** 6-1/4" Unfaced, R-19 Fiberglass Insulation

**Overall Size:** 96" by 96"

**Project Scope:** Architectural Testing, Inc. was contracted by American Micro Industries, Inc. to conduct sound transmission loss tests on a 2x4 wood stud 16" on center wall construction. 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 tests were 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 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.

**Test Procedure:** The sound transmission loss tests were conducted in accordance with the ASTM E 90 test method. 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:**

Sound transmission loss tests were initially performed on a filler wall that was designed to test 96" by 96" test specimens. The filler wall achieved an STC rating of 69.

The 96" by 96" plug was removed from the filler wall assembly. The wall construction was fabricated in a 12" deep wood buck with a vibration break that was placed on a foam isolation pad in the test opening. The perimeter of the wood stud wall construction frame was sealed with duct seal to the test opening. The perimeter and seam of every layer of gypsum board was first sealed with duct seal and then sealed with adhesive aluminum foil tape. All exposed screw heads were sealed with adhesive aluminum foil tape. The materials used in the construction are described in the Construction Materials section listed below.

**Sample Descriptions:** (Continued)

**Construction Materials:**

**Option A\*:**

Element	Material	Nominal Thickness	Orientation	Screw	Spacing	Attached to:
Receive Side	Drywall	0.625"	Vertical	1.25" Type W	16" OC	Stud
Stud	Wood	2x4	N/A	3" No.8 Drwl	16" OC	N/A
Fiberglass Insulation	R19	6.25"	Vertical	N/A	N/A	N/A
Isotrax™ Pad	N/A	0.25"	N/A	N/A	48" OC Staggered	Stud
Isotrax™	N/A	N/A	Horizontal	10x2 Hex	24" OC	Isotrax™ Pad / Stud
Source Side	Drywall	0.625"	Horizontal	1.25" Type S	12" OC	Isotrax™

**Option B\*:**

Element	Material	Nominal Thickness	Orientation	Screw	Spacing	Attached to:
Receive Side	Drywall	0.625"	Vertical	1.25" Type W	16" OC	Stud
Stud	Wood	2x4	N/A	3" No.8 Drwl	16" OC	N/A
Fiberglass Insulation	R19	6.25"	Vertical	N/A	N/A	N/A
Isotrax™ Pad	N/A	0.25"	N/A	N/A	48" OC Staggered	Stud
Isotrax™	N/A	N/A	Horizontal	10x2 Hex	24" OC	Isotrax™ Pad / Stud
Source Side 1 <sup>st</sup> Layer	Drywall	0.625"	Horizontal	1.25" Type S	24" OC	Isotrax™
2nd Layer	Drywall	0.625"	Vertical	2.00" Type S	12" OC	Isotrax™

\* Stated per Client/Manufacturer

**Sample Descriptions:** (Continued)

**Construction Materials:** (Continued)

**Option C\*:**

	<b>Element</b>	<b>Material</b>	<b>Nominal Thickness</b>	<b>Orientation</b>	<b>Screw</b>	<b>Spacing</b>	<b>Attached to:</b>
	Receive Side 1 <sup>st</sup> Layer	Drywall	0.625"	Vertical	1.25" Type W	16" OC	Stud
	2nd Layer	Drywall	0.625"	Horizontal	1.625" Type W	16" OC	Stud
	Stud	Wood	2x4	N/A	3" No.8 Drwl	24" OC	N/A
	Fiberglass Insulation	R19	6.25"	Vertical	N/A	N/A	N/A
	Isotrax™ Pad	N/A	0.25"	N/A	N/A	48" OC Staggered	Stud
	Isotrax™	N/A	N/A	Horizontal	10x2 Hex	24" OC	Isotrax™ Pad / Stud
	Source Side 1 <sup>st</sup> Layer	Drywall	0.625"	Horizontal	1.25" Type S	24" OC	Isotrax™
	2nd Layer	Drywall	0.625"	Vertical	2.00" Type S	12" OC	Isotrax™

\* Stated per Client/Manufacturer

**Comments:** The gypsum board panels were conditioned at a relative humidity of 55 to 60% for at least two days in a conditioning chamber and/or the reverberation chambers. Photographs of the test sample are located 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 wall construction is listed below.

ATI Data File No.	Description	STC	OITC
78334.01A	One layer of 5/8" gypsum board on both sides	52	39
78334.01B	One layer of 5/8" gypsum board on receive side, and two layers of 5/8" gypsum board on source side	55	42
78334.01C	Two layers of 5/8" gypsum board on both sides	58	46

The complete test results are listed in Appendix B. Data on 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:

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Kurt A. Golden  
Senior Technician - Acoustical Testing

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Todd D. Kister  
Laboratory Supervisor - Acoustical Testing


KAG: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)

	<p>Architectural Testing, Inc is accredited by the International Accreditation Service, Inc. (IAS) under the specific test methods listed under lab code TL-144, in accordance with the recognized International Standard ISO/IEC 17025:2005. The laboratory's accreditation or test report in no way constitutes or implies product certification, approval, or endorsement by IAS. This test report applies only to the specimen that was tested.</p>
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### Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
0	12/28/07	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	G.R.A.S.	40AR	1/2", pressure type, condenser microphone	Y003245
Receive Room Preamp	G.R.A.S.	26AK	1/2" preamplifier	Y003249
Source Room Preamp	G.R.A.S.	26AK	1/2" preamplifier	Y003248
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

### Test Chamber:

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


<b>ATI No.</b>	78334.01A	<b>Date</b>	11/12/07
<b>Client</b>	American Micro Industries, Inc.		
<b>Specimen</b>	Option A: 2x4 Wood Stud 16" On Center Wall Construction, with one layer of 5/8" gypsum board on both sides		
<b>Specimen Area</b>	64.00 Sq Ft		
<b>Filler Area</b>	76.00 Sq Ft		
<b>Operator</b>	Kurt A. Golden		

	Bkgrd	Absorp	Source	Receive	Filler	Specimen
Temp F	70.1	69.5	69.4	69.0	74.9	69.5
RH %	46.6	47.3	41.8	48.1	59.1	46.0

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
50	38.7	48.1	72.2	50.1	35.4	24	5.72	0	11.3
63	37.4	61.9	81.7	60.0	43.0	22	4.63	0	20.4
80	38.6	59.3	93.8	70.5	39.0	24	2.68	0	14.6
100	36.8	51.6	99.4	73.9	42.8	26	1.87	0	15.7
125	38.9	53.7	105.2	73.3	53.4	33	1.94	3	20.0
160	40.5	56.9	107.7	75.6	52.7	33	1.61	6	19.3
200	38.5	56.4	112.7	76.7	54.2	37	1.21	5	16.8
250	34.9	59.4	112.1	71.1	55.9	42	1.20	3	13.8
315	34.3	61.3	108.4	63.8	57.3	45	0.50	3	11.8
400	33.6	61.8	106.8	60.4	63.3	46	1.06	5	16.1
500	33.6	59.6	109.0	60.5	66.3	49	0.67	3	16.7
630	28.8	59.4	112.4	60.6	69.0	52	0.99	1	16.1
800	30.3	58.9	111.0	56.2	72.9	55	0.45	0	17.0
1000	28.8	63.3	109.2	52.1	76.7	57	0.34	0	18.9
1250	28.4	68.8	110.1	49.8	78.4	60	0.41	0	17.6
1600	25.3	70.5	114.9	54.2	77.2	60	0.41	0	16.2
2000	17.3	78.9	108.5	51.5	75.7	56	0.28	0	18.8
2500	8.2	90.6	106.1	48.4	77.7	56	0.41	0	20.9
3150	9.0	106.0	106.2	41.5	87.1	62	0.45	0	24.0
4000	8.3	129.8	103.8	34.1	90.7	67	0.36	0	23.3
5000	7.6	173.4	100.2	24.1	90.8	72	0.55	0	18.3

**STC Rating**                **52**        *(Sound Transmission Class)*  
**Deficiencies**            **29**        *(Number of deficiencies versus contour curve)*  
**OITC Rating**            **39**        *(Outdoor/Indoor Transmission Class)*

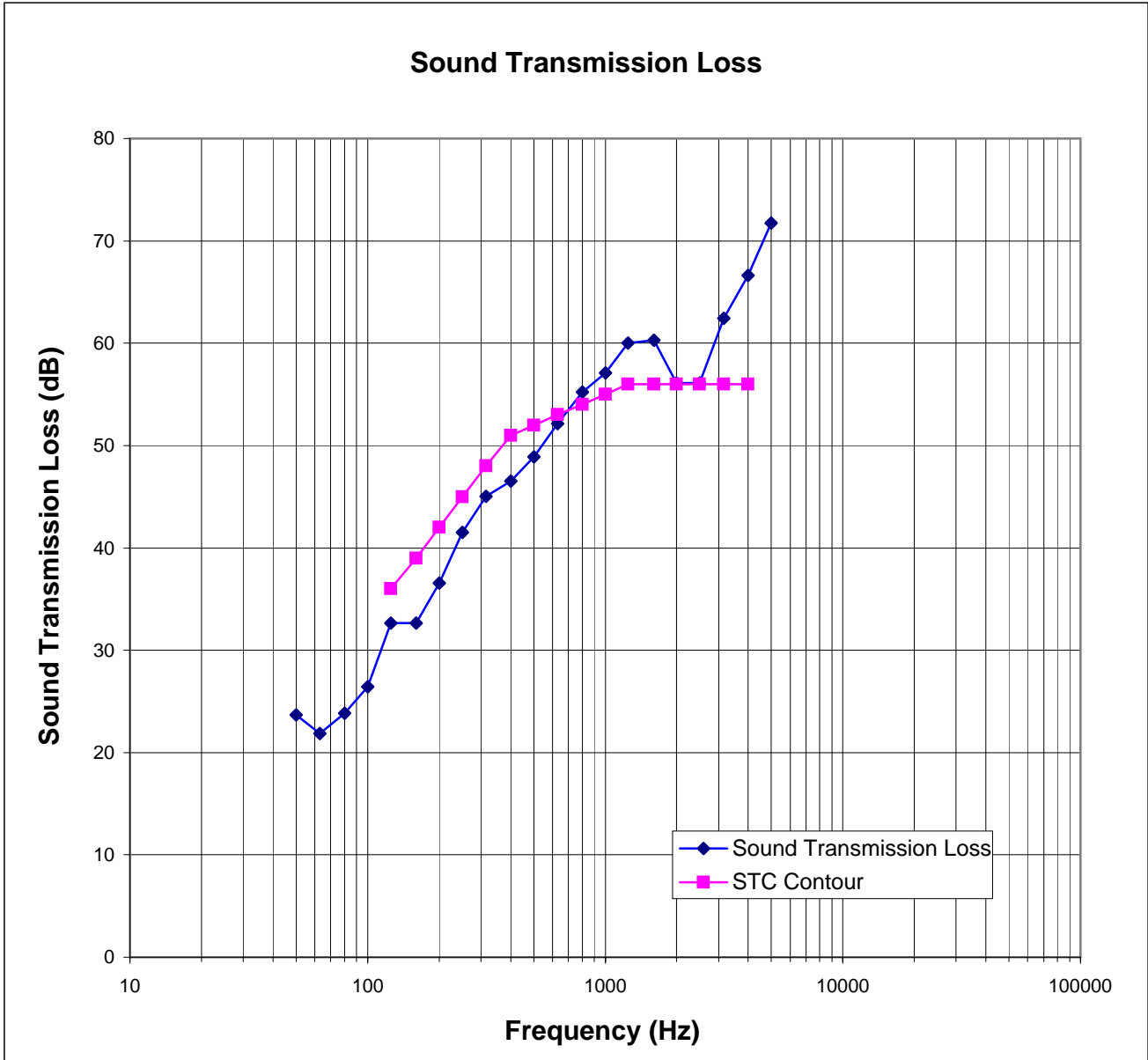
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### Architectural Testing

ATI No. 78334.01A Date 11/12/07  
Client American Micro Industries, Inc.  
Specimen Option A: 2x4 Wood Stud 16" On Center Wall Construction, with one layer of 5/8" gypsum board on both sides  
Specimen Area 64.00 Sq Ft  
Filler Area 76.00 Sq Ft  
Operator Kurt A. Golden



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## SOUND TRANSMISSION LOSS

ASTM E90

### Architectural Testing


<b>ATI No.</b>	78334.01B	<b>Date</b>	11/12/07
<b>Client</b>	American Micro Industries, Inc.		
<b>Specimen</b>	Option B: 2x4 Wood Stud 16" On Center Wall Construction, with one layer of 5/8" gypsum board on both sides		
<b>Specimen Area</b>	64.00 Sq Ft		
<b>Filler Area</b>	76.00 Sq Ft		
<b>Operator</b>	Kurt A. Golden		

	Bkgrd	Absorp	Source	Receive	Filler	Specimen
<b>Temp F</b>	68.8	68.8	69.6	69.1	74.9	69.1
<b>RH %</b>	48.7	48.5	44.2	48.6	59.1	47.5

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
50	40.1	51.5	73.0	48.4	35.4	26	6.16	0	9.1
63	39.8	69.8	81.8	56.6	43.0	25	3.71	0	17.5
80	35.1	62.0	93.4	65.5	39.0	28	3.18	0	10.2
100	37.1	63.1	99.7	70.9	42.8	29	1.96	0	13.2
125	34.4	56.4	105.9	70.9	53.4	36	2.50	3	17.0
160	38.6	54.5	107.7	71.0	52.7	38	1.69	4	14.5
200	39.0	54.0	112.5	73.3	54.2	40	1.23	5	13.4
250	35.4	57.9	112.6	68.5	55.9	45	1.42	3	10.6
315	34.6	61.6	108.8	62.2	57.3	47	0.68	4	9.8
400	34.2	63.7	107.2	58.8	63.3	49	0.81	5	14.1
500	34.8	60.1	109.5	58.0	66.3	52	0.59	3	13.8
630	30.1	58.6	112.5	58.5	69.0	55	0.62	1	13.9
800	31.6	58.6	111.5	54.4	72.9	58	0.40	0	14.7
1000	30.1	63.0	109.2	50.6	76.7	59	0.48	0	17.3
1250	30.0	69.5	110.1	48.4	78.4	61	0.41	0	16.3
1600	25.9	71.8	114.9	52.7	77.2	62	0.42	0	14.8
2000	18.0	78.7	108.6	49.3	75.7	58	0.45	1	16.6
2500	8.2	89.6	106.2	44.8	77.7	60	0.36	0	17.0
3150	9.1	106.1	106.6	38.8	87.1	66	0.36	0	20.8
4000	7.3	131.5	104.0	31.8	90.7	69	0.43	0	20.9
5000	7.3	175.6	100.3	21.2	90.8	75	0.59	0	15.4

**STC Rating =**            **55**        *(Sound Transmission Class)*  
**Deficiencies =**        **29**        *(Number of deficiencies versus contour curve)*  
**OITC Rating =**        **42**        *(Outdoor/Indoor Transmission Class)*

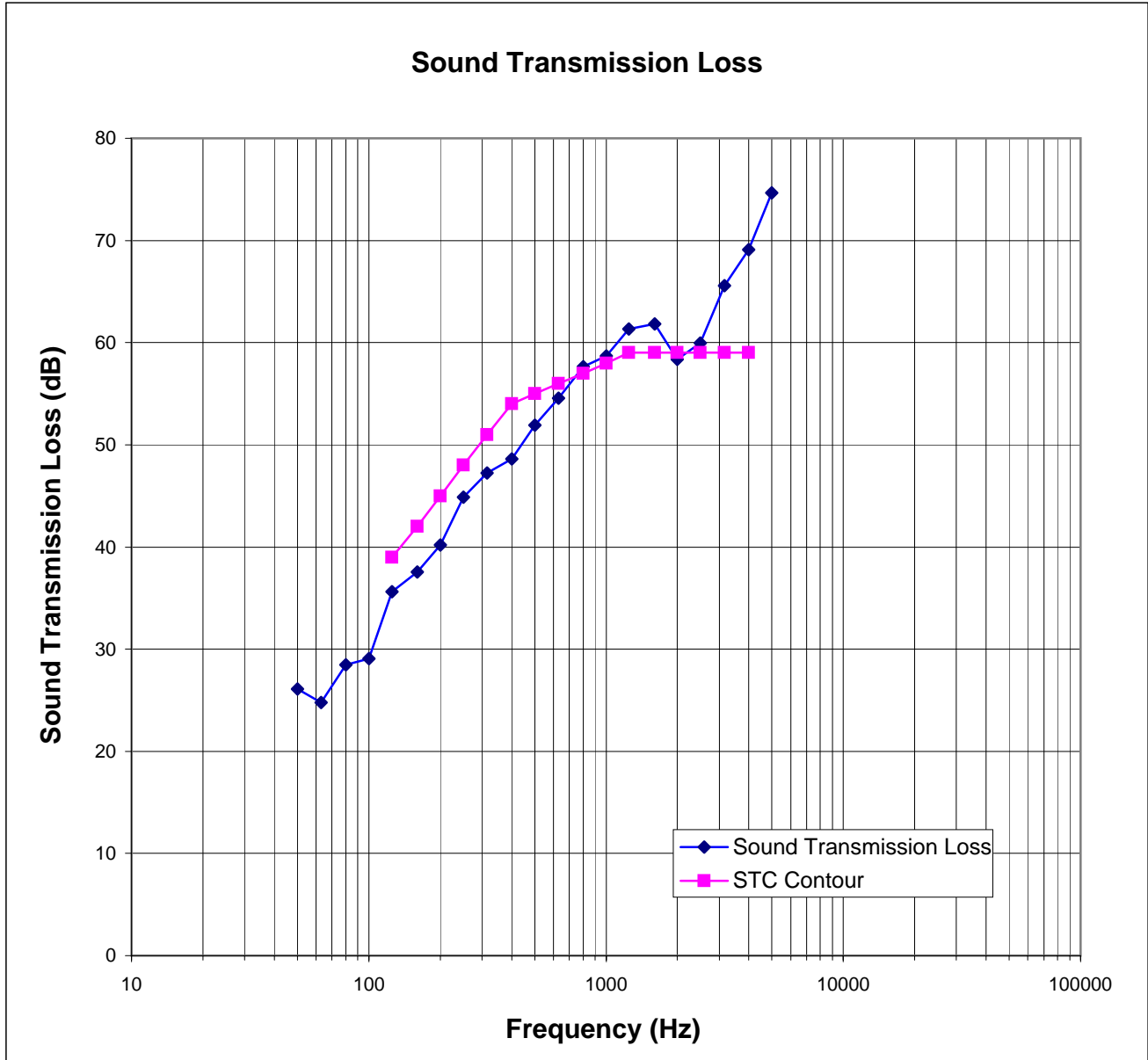
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### Architectural Testing

ATI No. 78334.01B Date 11/12/07  
Client American Micro Industries, Inc.  
Specimen Option B: 2x4 Wood Stud 16" On Center Wall Construction, with one layer of 5/8" gypsum board on both sides  
Specimen Area 64.00 Sq Ft  
Filler Area 76.00 Sq Ft  
Operator Kurt A. Golden



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## SOUND TRANSMISSION LOSS

ASTM E90

### Architectural Testing


<b>ATI No.</b>	78334.01C	<b>Date</b>	11/12/07
<b>Client</b>	American Micro Industries, Inc.		
<b>Specimen</b>	Option C: 2x4 Wood Stud 16" On Center Wall Construction, with two layers of 5/8" gypsum board on both sides		
<b>Specimen Area</b>	64.00 Sq Ft		
<b>Filler Area</b>	76.00 Sq Ft		
<b>Operator</b>	Kurt A. Golden		

	Bkgrd	Absorp	Source	Receive	Filler	Specimen
<b>Temp F</b>	69.2	69.0	69.5	69.0	74.9	69.2
<b>RH %</b>	46.1	46.3	42.2	46.3	59.1	45.2

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 Deficiencies	Trans Coef Diff
50	38.2	53.5	72.7	48.5	35.4	25	5.25	0	9.7
63	37.0	56.0	82.5	54.0	43.0	29	4.15	0	13.2
80	40.6	52.7	94.0	65.6	39.0	30	5.15	0	9.1
100	36.8	48.6	99.9	68.0	42.8	34	2.12	0	9.0
125	36.3	51.4	107.4	67.5	53.4	41	3.07	1	11.9
160	40.1	52.1	108.4	66.4	52.7	43	1.39	2	9.1
200	38.9	48.6	112.7	69.2	54.2	45	0.62	3	8.7
250	33.8	53.0	112.3	66.5	55.9	47	1.85	4	8.5
315	34.1	57.4	108.8	61.0	57.3	49	0.88	5	8.2
400	34.1	63.0	107.7	56.0	63.3	52	0.87	5	10.9
500	34.2	58.7	109.8	54.7	66.3	56	0.53	2	10.1
630	29.3	58.2	112.2	55.7	69.0	57	0.69	2	11.3
800	30.4	62.0	111.7	51.6	72.9	60	0.32	0	12.0
1000	29.2	62.9	109.3	47.6	76.7	62	0.41	0	14.2
1250	28.9	69.1	110.4	45.5	78.4	65	0.28	0	13.1
1600	25.1	73.2	115.2	49.8	77.2	65	0.40	0	11.7
2000	17.5	80.0	108.8	45.4	75.7	63	0.40	0	12.4
2500	7.6	91.2	106.5	40.0	77.7	65	0.24	0	12.0
3150	8.5	108.0	106.6	33.0	87.1	71	0.39	0	15.0
4000	7.0	135.8	103.9	25.4	90.7	75	0.46	0	14.8
5000	6.9	177.8	100.3	15.6	90.8	81	0.44	0	9.7

**STC Rating =**            **58**     *(Sound Transmission Class)*  
**Deficiencies =**        **24**     *(Number of deficiencies versus contour curve)*  
**OITC Rating =**        **46**     *(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.*

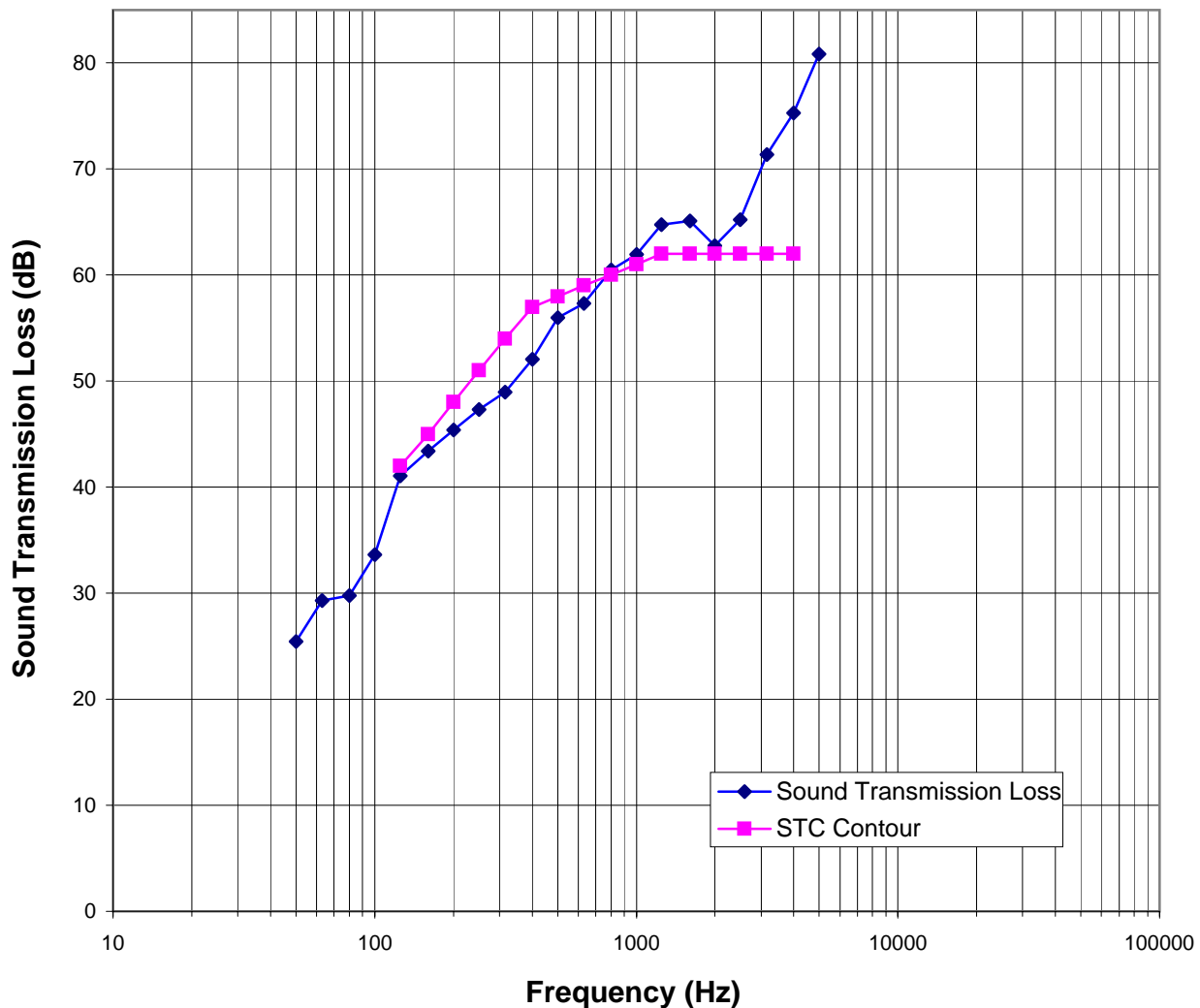
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### Architectural Testing

ATI No. 78334.01C Date 11/12/07  
Client American Micro Industries, Inc.  
Specimen Option C: 2x4 Wood Stud 16" On Center Wall Construction, with two layers of 5/8" gypsum board on both sides  
Specimen Area 64.00 Sq Ft  
Filler Area 76.00 Sq Ft  
Operator Kurt A. Golden

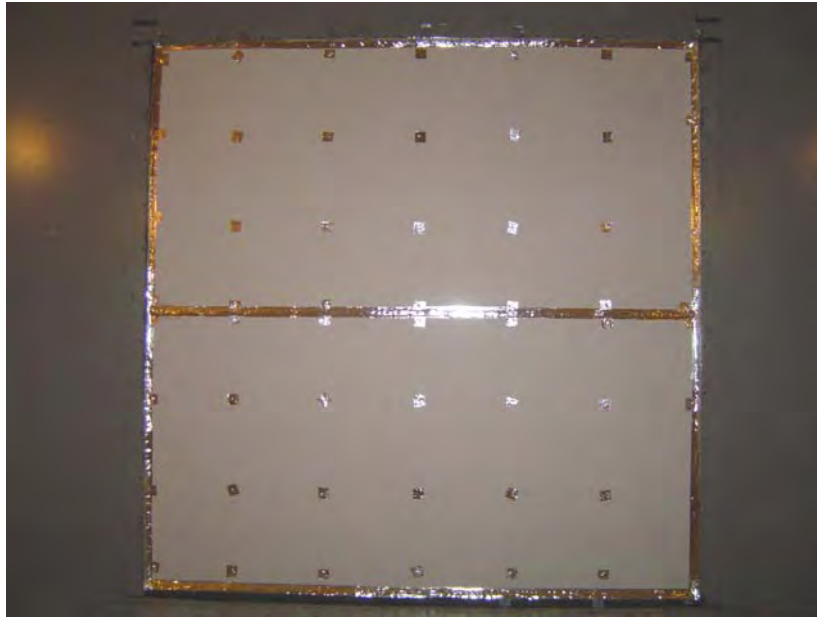
### Sound Transmission Loss



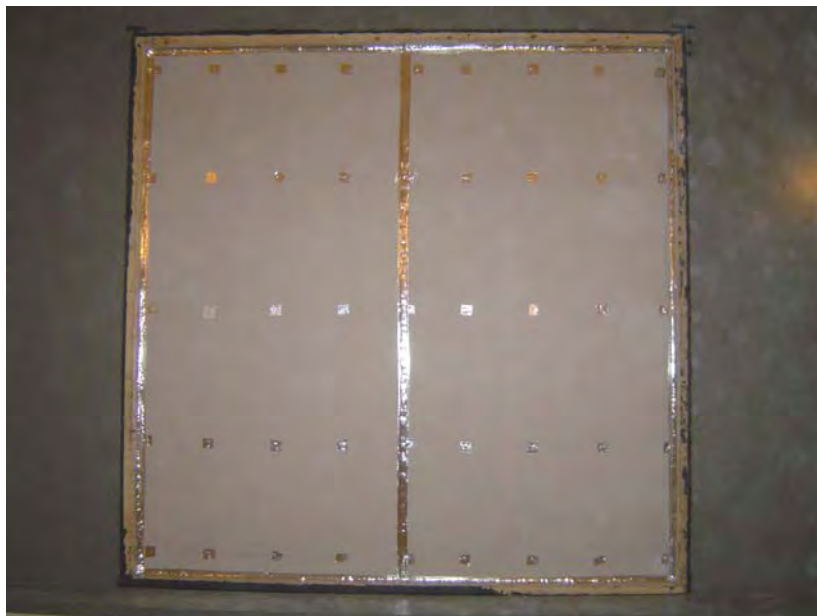
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**Appendix C**

**Photographs**



**Receive Room View of Installed Specimen**



**Source Room View of Installed Specimen**