Architectural Testing

ASTM E 90 SOUND TRANSMISSION LOSS TEST REPORT

Rendered to:

ETO DOORS CORPORATION

TYPE: Side-Hinged Single Door System

Summary of Test Results			
Data File No.	**Leaf Description (Nominal Dimensions)**	**STC**	**OITC**
B2385.01A	Wood Door with Pemko seals S773 head and jambs, 234AV bottom rail, 2005AT threshold	28	26
B2385.01B	Steel Door with Pemko seals S773 head and jambs, 234AV bottom rail, 2005AT threshold	27	28

Reference should be made to Architectural Testing, Inc. Report No. B2385.01-113-11 for complete test specimen description. The complete test results are listed in Appendix B.

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York, PA 17406-8405
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Architectural Testing

ACOUSTICAL PERFORMANCE TEST REPORT

Rendered to:

ETO DOORS CORPORATION
801 East 7th Street
Los Angeles, California 90021

Report No: B2385.01-113-11
Test Date: 08/10/11
Report Date: 08/24/11
Expiration Date: 08/10/15

Test Sample Identification:

Option A: Wood Door

Option B: Steel Door

Type: Side-Hinged Single Door System

Overall Leaf Size: 35-3/4" by 79-3/8"

Project Scope: Architectural Testing, Inc. was contracted by ETO Doors Corporation to conduct sound transmission loss tests on a Wood Door and Steel Door, side-hinged single door 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. The samples were provided by the client.

Test Methods: The acoustical tests were 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, *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.

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Sample Installation: Sound transmission loss tests were initially performed on a filler wall that was designed to test door specimens. The filler wall achieved an STC rating of 68.

The specimen plug was removed from the filler wall assembly, and the door system was placed on an isolation pad in the test opening. Duct seal was used to seal the perimeter of the test specimen to the test opening on both sides. The interior side of the door frame, when installed, was approximately 1" 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 door panel was opened and closed at least five times prior to testing.

Test Procedure: The door was closed and latched 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:

Door Construction:

		Main Frame
Size		37-1/2" by 81-1/2"
Thickness		4-9/16"
Corners		Butted
	Fasteners	Screws
	Seal Method	None
Material		Wood
	Reinforcement	N/A
	Thermal Break Material	N/A
Daylight Opening Size		N/A

N/A-Non Applicable

Comments: The weight of the frame was 28 lbs.

Sample Descriptions: (Continued)

Comments: The Wood Door leaf was a two panel constructed from solid wood. The Steel Door leaf was constructed from 18 gauge flush steel with an expanded polystyrene core. Both door leafs were 1-3/4" thick.

Components:

TYPE	QUANTITY	LOCATION
Weatherstrip		
Pemko S773	2 Rows	Head and jambs
Pemko 234AV	1	Bottom rail
Pemko 2005AT threshold	1	Sill
Hardware		
Hinge	3	Jambs
Lock set	1	Lock stile
Strike plate	1	Lock jamb
Drainage		
Sloped Sill		

Sample Weights:

Overall Sample Area:	m^2	ft^2
	1.97	21.22

Test Option:	**Total Weight**		**Weight Per Unit Area**	
	kg	lbs	kg / m^2	lbs / ft^2
A	39	86	19.79	4.05
B	43	94	21.63	4.43

Comments: The client did not supply drawings on the side-hinged single door system. The door was disassembled, and the components will be retained by Architectural Testing 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 sound transmission loss test results on the side-hinged single door system is listed below.

Summary of Test Results			
Data File No.	**Leaf Description (Nominal Dimensions)**	**STC**	**OITC**
B2385.01A	Wood Door with Pemko seals S773 head and jambs, 234AV bottom rail, 2005AT threshold	28	26
B2385.01B	Steel Door with Pemko seals S773 head and jambs, 234AV bottom rail, 2005AT threshold	27	28

***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
Digitally Signed by: Kurt A. Golden

Kurt A. Golden
Senior Technician - Acoustical Testing

Todd D. Kister
Digitally Signed by: Todd D. Kister

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 (4)
- Appendix-C: Photographs (2)

Revision Log

Rev. #	Date	Page(s)	Revision(s)
0	08/24/11	N/A	Original Report Issue

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 Environemental 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.	B2385.01A	**Date**	08/10/11
Client	ETO Doors Corporation		
Specimen	Wood Door, side-hinged single door system, with Pemko seals S773 head and jambs, 234AV bottom rail, 2005AT threshold		
Specimen Area	1.97 Square Meters		
Filler Area	11.02 Square Meters		
Operator	Kurt Golden		

	Bkgrd	Absorp	Source	Receive	Filler	Specimen
Temp C	25.7	25.5	22.0	23.1	23.7	24.1
RH %	36.0	37.4	49.7	44.4	44.5	41.9

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 Defici-encies	Trans Coef Diff
80	50.0	5.4	87.5	63.2	30.5	21	1.41	0	3.0
100	43.9	6.6	90.3	64.4	36.6	21	2.99	0	8.5
125	46.1	5.6	95.0	66.3	44.2	24	1.99	0	12.5
160	46.4	4.6	95.9	67.8	48.1	24	1.52	0	16.2
200	45.5	5.2	100.7	72.7	56.7	24	0.85	0	25.4
250	40.2	5.2	100.8	72.0	59.1	25	0.78	0	27.0
315	37.0	5.5	101.4	71.2	61.4	26	0.55	0	28.2
400	34.6	5.8	101.7	70.1	62.6	27	0.84	0	28.2
500	31.3	5.7	102.0	69.8	64.9	28	0.72	0	29.8
630	26.8	5.7	103.1	70.7	68.1	28	0.43	1	32.8
800	25.6	5.9	103.5	71.1	68.7	28	0.41	2	33.7
1000	25.5	6.3	103.6	71.2	71.6	27	0.29	4	36.8
1250	26.0	7.1	102.9	69.5	71.3	28	0.40	4	36.0
1600	18.1	7.2	104.7	72.5	73.6	27	0.40	5	39.5
2000	12.8	7.9	104.4	72.9	74.6	25	0.45	7	41.6
2500	10.6	9.1	104.3	71.2	78.3	26	0.28	6	44.3
3150	9.4	10.9	105.5	67.1	80.0	31	0.36	1	41.6
4000	8.8	13.0	105.4	62.7	82.3	35	0.28	0	40.3
5000	8.2	17.3	104.2	56.9	84.3	38	0.53	0	38.9

STC Rating =	**28**	*(Sound Transmission Class)*
Deficiencies =	**30**	*(Number of deficiencies versus contour curve)*
OITC Rating =	**26**	*(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.

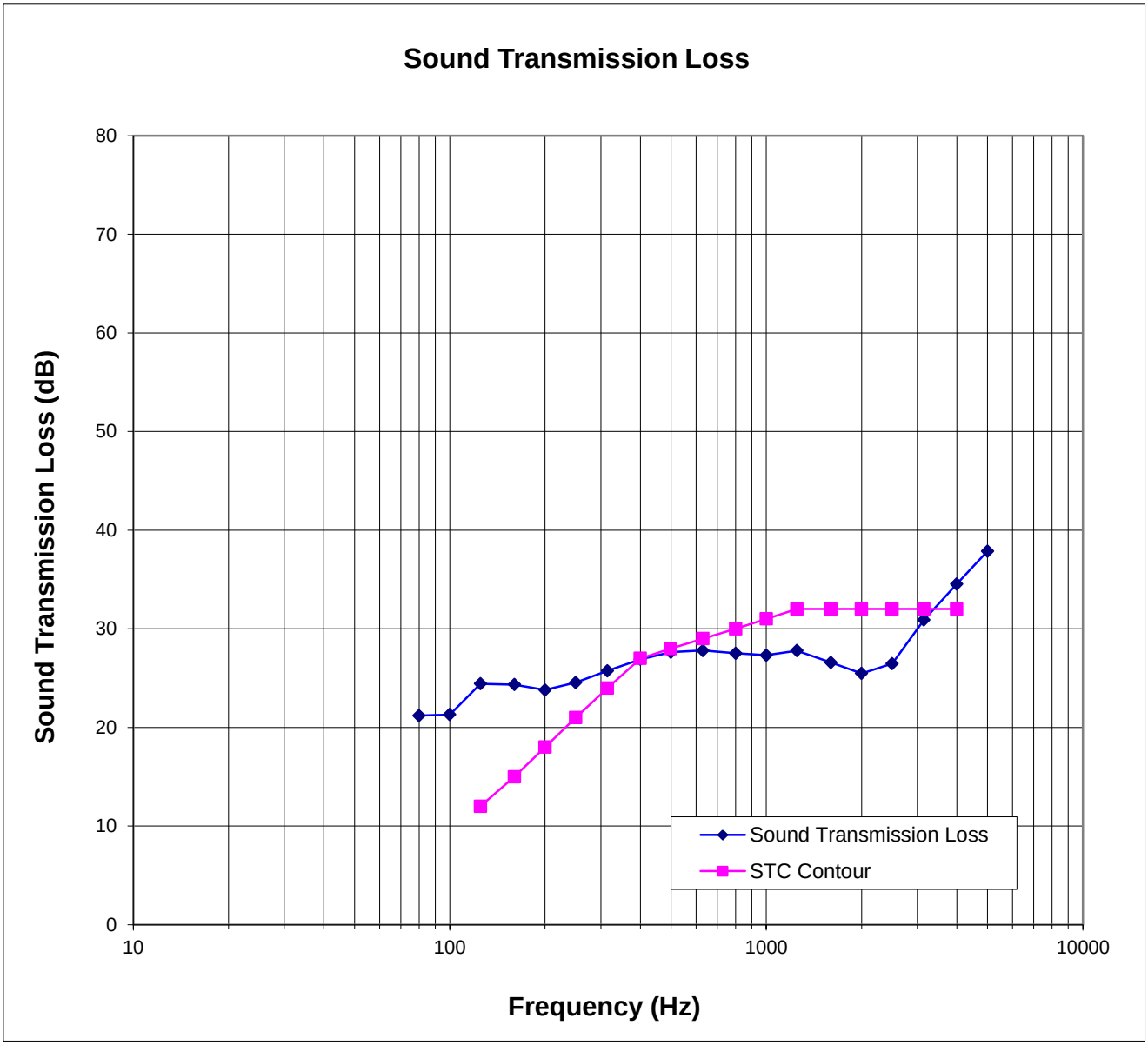
4) Receive Room levels less than 5dB above the Background levels are highlighted in yellow.

IAS ACCREDITED

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.

Architectural Testing

ATI No.	B2385.01A	**Date**	08/10/11
Client	ETO Doors Corporation		
Specimen	Wood Door, side-hinged single door system, with Pemko seals S773 head and jambs, 234AV bottom rail, 2005AT threshold		
Specimen Area	1.97 Square Meters		
Filler Area	11.02 Square Meters		
Operator	Kurt Golden		



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SOUND TRANSMISSION LOSS

ASTM E 90

Architectural Testing

ATI No.	B2385.01B	**Date**	08/10/11
Client	ETO Doors Corporation		
Specimen	Steel Door, side-hinged single door system (wood frame), with Pemko seals S773 head and jambs, 234AV bottom rail, 2005AT threshold		
Specimen Area	1.97 Square Meters		
Filler Area	11.02 Square Meters		
Operator	Kurt Golden		

	Bkgrd	Absorp	Source	Receive	Filler	Specimen
Temp C	26.1	25.4	22.5	23.7	23.7	24.4
RH %	35.1	36.9	46.2	42.8	44.5	40.3

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 Defici-encies	Trans Coef Diff
80	48.6	5.5	87.3	62.6	30.5	22	2.00	0	2.7
100	42.7	5.4	90.1	63.4	36.6	23	2.88	0	6.9
125	41.1	5.3	94.5	63.7	44.2	27	2.02	0	10.2
160	44.9	5.1	95.3	66.5	48.1	25	1.38	0	15.9
200	44.7	5.1	100.1	70.8	56.7	25	0.96	0	24.0
250	39.7	5.3	100.4	70.2	59.1	26	0.78	0	25.7
315	35.3	5.3	100.9	69.7	61.4	27	0.44	0	27.1
400	33.5	5.5	101.4	68.5	62.6	28	0.83	0	26.7
500	30.2	5.7	102.0	66.8	64.9	31	0.61	0	26.8
630	22.1	5.7	103.0	67.2	68.1	31	0.20	0	29.3
800	20.6	6.0	103.6	68.8	68.7	30	0.31	0	31.4
1000	18.6	6.1	103.8	71.6	71.6	27	0.43	3	36.8
1250	15.9	6.9	103.0	74.6	71.3	23	0.45	8	40.8
1600	13.0	6.9	105.0	65.4	73.6	34	0.24	0	32.0
2000	11.6	7.5	104.7	60.8	74.6	38	0.33	0	29.0
2500	9.6	8.7	104.6	60.0	78.3	38	0.23	0	32.6
3150	8.7	10.4	105.8	59.0	80.0	40	0.38	0	32.9
4000	8.2	12.8	105.8	57.7	82.3	40	0.39	0	34.9
5000	7.8	16.8	104.4	53.8	84.3	41	0.70	0	35.4

STC Rating =	**27**	*(Sound Transmission Class)*
Deficiencies =	**11**	*(Number of deficiencies versus contour curve)*
OITC Rating =	**28**	*(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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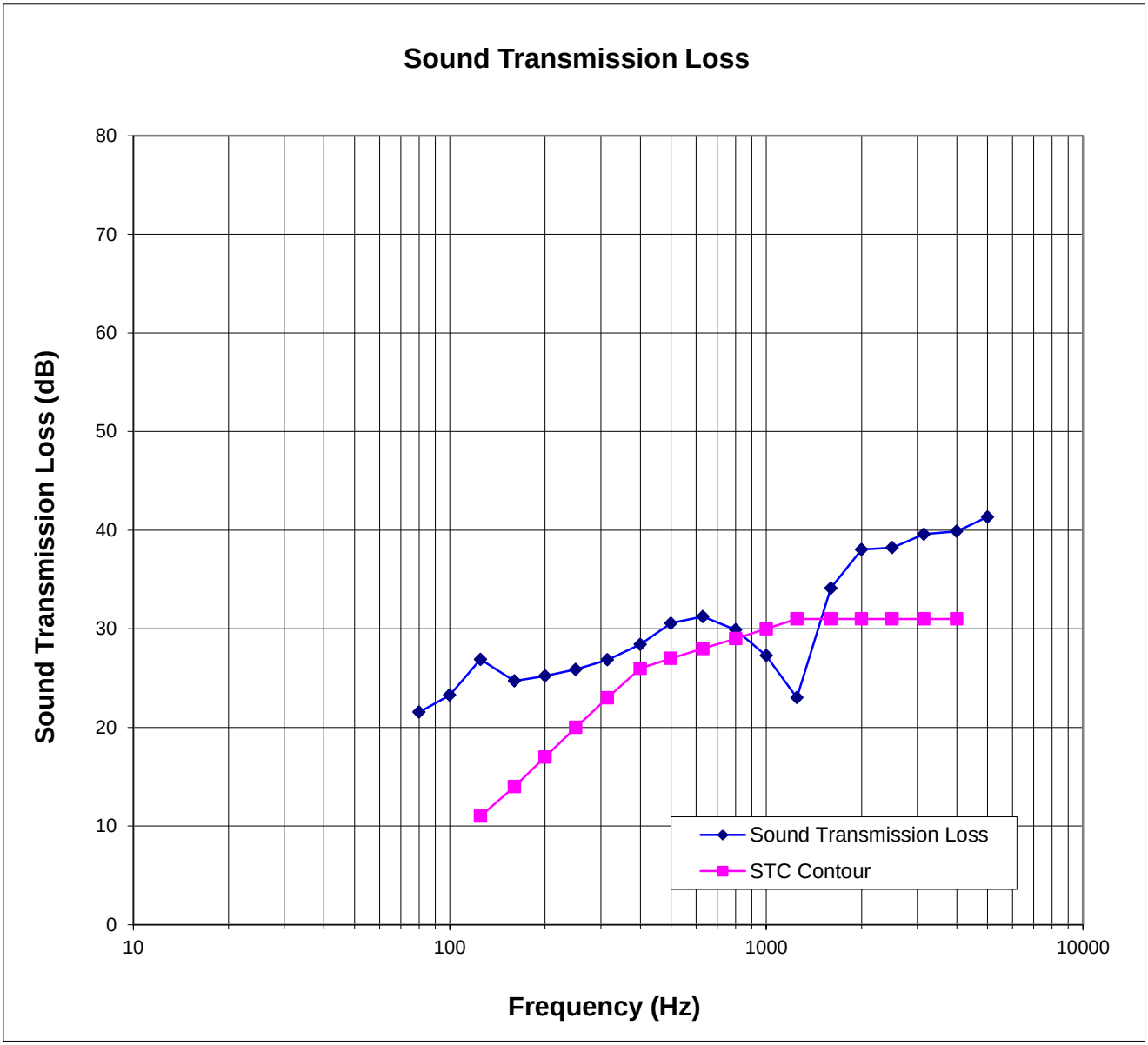

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Appendix C

Photographs

Receive Room View of Installed Test Option A

Source Room View of Installed Test Option A

Receive Room View of Installed Test Option B

Source Room View of Installed Test Option B