Architectural Testing

ACOUSTICAL TEST REPORT

Rendered to:

SMITH-MIDLAND CORPORATION

Series/Model: Slender Wall
Type: Wall Construction
Overall Size: 80.00" x 80.00"

Report No: 01-32271.01
Test Date: 07/23/98
Report Date: 01/11/99
Record Retention Date: 07/23/02

130 Derry Court
York, PA 17402-9405
phone: 717.764.7700
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ACOUSTICAL TEST REPORT

Rendered to:

SMITH-MIDLAND CORPORATION
Route 28
Midland, Virginia 22728

Report No:	01-32271.01
Test Date:	07/23/98
Report Date:	01/11/99
Expiration Date:	07/23/02

Test Sample Identification:

Series/Model: Slender Wall

Type: Wall Construction Mock-up

Overall Size: 80.00" x 80.00"

Project Scope: Architectural Testing, Inc. (ATI) was contracted by Smith-Midland Corporation to conduct a sound transmission loss test on a Slender Wall specimen. A summary of the results is listed in the Test Results section. The complete test data is included as Appendix B of this report.

Test Methods: The acoustical tests were conducted in accordance with the following:

ASTM E 90-97, *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.*

ASTM E 413-87 (Re-approved 1994), *Classification for Rating Sound Insulation.*

ASTM E 1332-90, *Standard Classification for Determination of Outdoor-Indoor Transmission Class.*

Test Equipment: The equipment, used to conduct these tests, meets the requirements of ASTM E 90-97. The microphones were calibrated before conducting the transmission loss test. The test equipment and test chamber descriptions are listed in Appendix A.

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Test Procedure: The sound transmission loss test was initially performed on a filler wall that was designed to test 3' 0" by 7' 0" and 6' 8" by 7' 0" specimens. The filler wall achieved an STC rating of 64.

A wood frame was placed around the outside perimeter of the Slender Wall mock-up. Latex caulk was used to seal the perimeter of the wall system to the wood frame. The 6' 8" by 7' 0" plug was removed from the filler wall assembly and the test specimen was installed in the opening. The exterior side (concrete side) of the mock-up, when installed, was approximately 1/4" from being flush with the receive 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. The wall system was tested with and without insulation and Gypsum board installed. A stethoscope was used to check for any abnormal air leaks before each test.

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.

Wall Construction Details:

Series/Model: Slender Wall
Type: Wall Construction Mock-up
Overall Size: 80" x 80"
Stud Type: 6" metal studs (16 gage)
Stud Spacing: Approximately 18" on center
Interior Panel Material: 5/8" Gypsum board
Exterior Panel Material: 2" thick, cast concrete
Cavity Insulation: Owens Corning, 6-1/4" thick, foil faced, R-19 fiberglass

Comments: The concrete was reinforced with 3/16" diameter, wire spaced 6" on center. The wall specimen was received with the metal studs already attached to the cast concrete. The studs were spaced approximately 3/8" away from the concrete with bolts that were welded to the studs and embedded into the concrete. The studs were welded into the header and base, metal runner tracks. Double metal studs were used on the sides of the wall specimen. The Gypsum board was attached to the interior side of the metal studs with drywall screws spaced 24" on center. The perimeter of the Gypsum board panel was sealed to the wood buck with latex caulk. The client did not provide sample drawings. The wall specimen was disassembled and sections will be stored at ATI for four years.

Test Results:

A summary of the sound transmission loss tests on the Slender Wall specimen with and without insulation and Gypsum board are listed below.

Slender Wall without insulation and Gypsum board	
Sound Transmission Class	STC = 40
Outdoor-Indoor Transmission Class	OITC = 36

Slender Wall with insulation and Gypsum board	
Sound Transmission Class	STC = 53
Outdoor-Indoor Transmission Class	OITC = 42

The complete test results are listed in Appendix B.

Test data on the ASTM E 1289 transmission loss reference specimen and the test chambers flanking limitation is available upon request.

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. 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:

Eric J. Miller
Director - Acoustical Testing

David G. Moyer
Vice President

EJM:ejm
01-32271.01

NVLAP®

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.

Appendix A

Instrumentation:

1. Analyzer:	Hewlett Packard Model 35670A, Dynamic Signal Analyzer.
2. Receive room microphone:	Hewlett Packard (ACO), model ACOJ 7047 1/2" pressure type, condenser microphone.
3. Source room microphone:	Hewlett Packard (ACO), model ACOJ 7047 1/2" pressure type, condenser microphone.
4. Microphone calibrator:	Bruel & Kjaer, Type 4228 Pistonphone Calibrator, 124 dB at 250 hertz.
5. Noise source:	Two, non-coherelated "Pink" noise signals generated by a Delta Electronics, Type SNG-1 Stereo Noise Generator.
6. Spectrum shaper:	Rane Type RPE228 Programmable EQ.
7. Power amplifiers:	Two Renkus-Heinz Model P2000 Amplifiers.
8. Receive room loudspeakers:	Two Renkus-Heinz "Trap Jr/9" loudspeakers.
9. Source room loudspeakers:	Two Renkus-Heinz "Trap Jr/9" loudspeakers.

Test Chamber Descriptions:

1. Receive Room:	Volume = 8,291.3 ft^3 (234 m^3). Rotating vane and stationary diffusers. Temperature & humidity controlled. Isolation pads under the floor.
2. Source Room:	Volume = 7296.3 ft^3 (206.6 m^3). Stationary diffusers only. Temperature & humidity controlled.
3. TL Test Opening:	Size = 14 ft wide by 10 ft high. Vibration break between source and receive rooms.

Appendix B

Complete Test Results

ARCHITECTURAL TESTING INC.

SOUND TRANSMISSION LOSS

ASTM E90

ATI No.	01-32271.01-1	**Date**	23-Jul-98
Client	Smith-Midland Corp.		
Specimen	80" x 80" Slender Wall, No Insulation or Gypsum Board		
Specimen Area	44.44 Sq Ft		
Filler Area	95.56 Sq Ft		

	Bkgrd	Absorp	Source	Receive	Filler	Spec
Temp F	91.2	91.3	89.0	91.1	85.9	90.6
RH %	64.5	63.5	67.2	64.3	51.5	64.9

Freq (Hz)	Bkgrd SPL (dB)	Absorp (Sabines /Sq Ft)	Source SPL (dB)	Receive SPL (dB)	Filler TL (dB)	Spec TL (dB)	95% Conf	Defs	Coef Diff
80	43.2	45.0	85.7	60.0	31.5	26.9	2.46	0	2.6
100	41.8	54.1	89.2	59.4	34.1	30.2	4.16	0	1.8
125	43.2	46.5	93.0	56.8	41.9	37.2	1.35	0	2.7
160	43.3	44.3	97.8	61.2	45.4	37.9	0.81	0	5.5
200	43.8	45.8	101.8	65.3	52.4	36.7	0.50	0	12.6
250	40.4	43.7	103.9	69.7	52.3	34.4	1.10	0	14.8
315	36.5	42.3	102.8	68.8	59.3	34.2	0.55	2	21.8
400	34.5	45.2	102.3	69.7	62.0	32.5	0.61	7	26.2
500	29.8	45.9	100.0	67.7	59.7	32.2	0.58	8	24.2
630	24.7	50.1	105.2	69.5	64.9	35.2	0.38	6	26.3
800	24.5	56.0	107.5	67.9	66.5	38.6	0.35	3	24.6
1000	23.5	58.9	107.3	67.2	68.1	38.9	0.42	4	25.9
1250	19.9	68.0	106.6	62.5	74.1	42.2	0.15	2	28.6
1600	19.8	72.7	109.7	62.0	78.6	45.5	0.38	0	29.7
2000	13.3	75.8	108.1	59.4	78.1	46.3	0.37	0	28.4
2500	8.4	85.1	103.2	52.2	76.3	48.2	0.28	0	24.8
3150	8.5	98.0	104.3	50.5	77.7	50.3	0.24	0	24.0
4000	8.1	113.5	104.9	49.0	81.6	51.8	0.34	0	26.5
5000	7.6	138.6	103.6	45.7	82.2	53.0	0.31	0	25.9

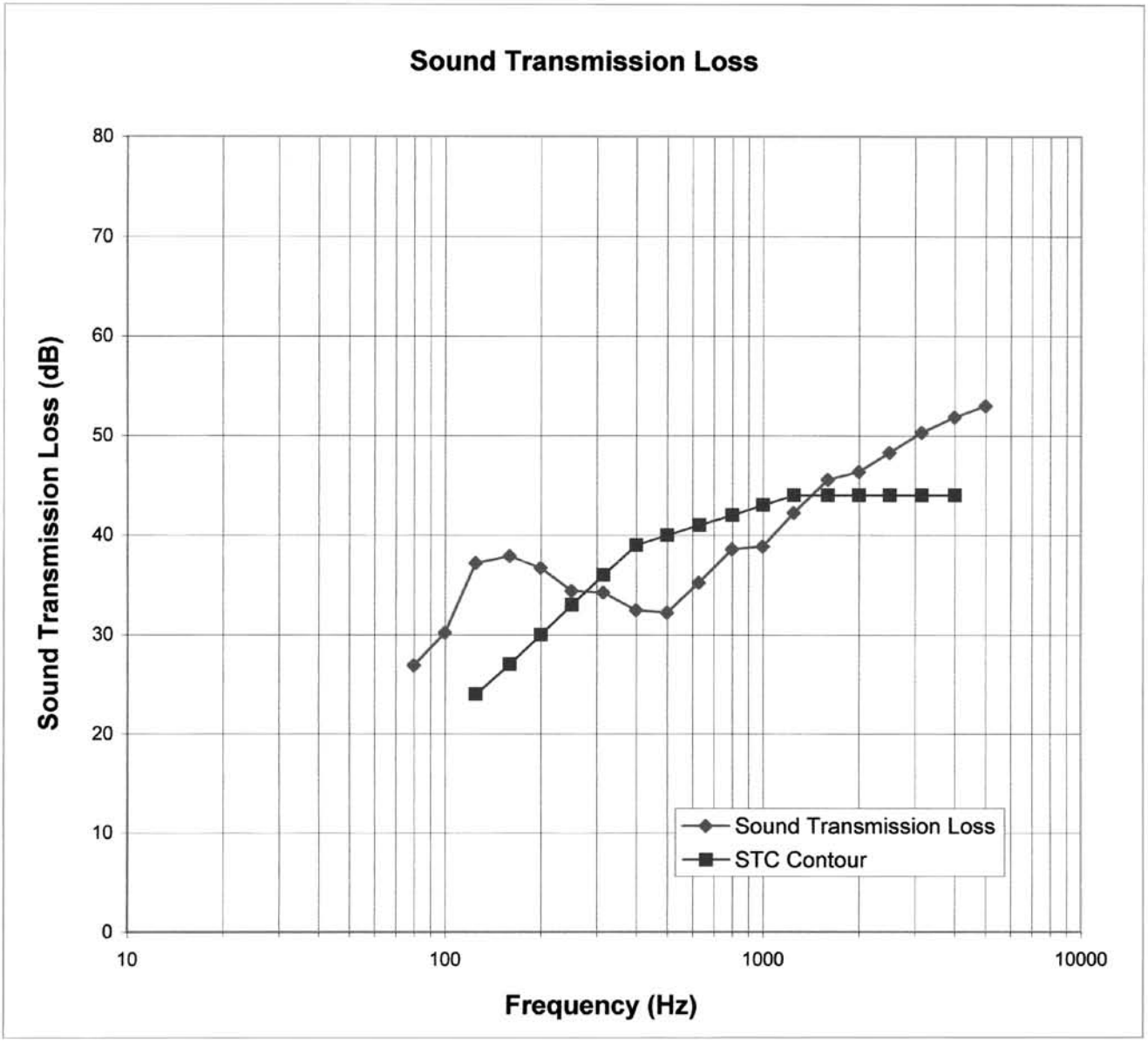
STC Rating	40
Deficiencies	32
OITC Rating	36

Appendix B

Complete Test Results

ARCHITECTURAL TESTING INC.

ATI No.	01-32271.01-1	**Date**	23-Jul-98
Client	Smith-Midland Corp.		
Specimen	80" x 80" Slender Wall, No Insulation or Gypsum Board		
Specimen Area	44.44 Sq Ft		
Filler Area	95.56 Sq Ft		



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ARCHITECTURAL TESTING INC.

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ASTM E90

ATI No.	01-32271.01-1	**Date**	23-Jul-98
Client	Smith-Midland Corp.		
Specimen	80" x 80" Slender Wall, No Insulation or Gypsum Board		
Specimen Area	44.44 Sq Ft		
Filler Area	95.56 Sq Ft		

	Bkgrd	Absorp	Source	Receive	Filler	Spec
Temp F	91.2	91.3	89.1	91.3	85.9	90.7
RH %	64.5	63.5	67.3	64.0	51.5	64.8

Freq (Hz)	Bkgrd SPL (dB)	Absorp (Sabines /Sq Ft)	Source SPL (dB)	Receive SPL (dB)	Filler TL (dB)	Spec TL (dB)	95% Conf	Defs	Coef Diff
80	43.2	45.0	86.0	60.5	31.5	26.7	2.15	0	2.8
100	41.8	54.1	88.2	59.4	34.1	29.2	4.27	0	2.8
125	43.2	46.5	93.5	57.0	41.9	37.6	1.54	0	2.2
160	43.3	44.3	97.6	61.1	45.4	37.8	0.92	0	5.6
200	43.8	45.8	101.6	65.3	52.4	36.5	1.04	0	12.8
250	40.4	43.7	103.8	69.7	52.3	34.3	0.89	0	14.8
315	36.5	42.3	102.9	68.8	59.3	34.3	0.42	2	21.7
400	34.5	45.2	102.7	70.0	62.0	32.6	0.59	6	26.1
500	29.8	45.9	100.9	68.7	59.7	32.1	0.47	8	24.3
630	24.7	50.1	105.3	69.7	64.9	35.1	0.57	6	26.4
800	24.5	56.0	107.7	67.8	66.5	38.8	0.29	3	24.4
1000	23.5	58.9	107.3	67.1	68.1	38.9	0.30	4	25.8
1250	19.9	68.0	106.6	62.5	74.1	42.3	0.18	2	28.5
1600	19.8	72.7	109.2	61.8	78.6	45.3	0.42	0	30.0
2000	13.3	75.8	107.8	59.2	78.1	46.2	0.52	0	28.5
2500	8.4	85.1	103.0	51.8	76.3	48.4	0.57	0	24.6
3150	8.5	98.0	103.9	50.0	77.7	50.5	0.43	0	23.9
4000	8.1	113.5	104.8	48.7	81.6	52.0	0.44	0	26.3
5000	7.6	138.6	103.8	45.6	82.2	53.2	0.49	0	25.7

STC Rating	40
Deficiencies	31
OITC Rating	36

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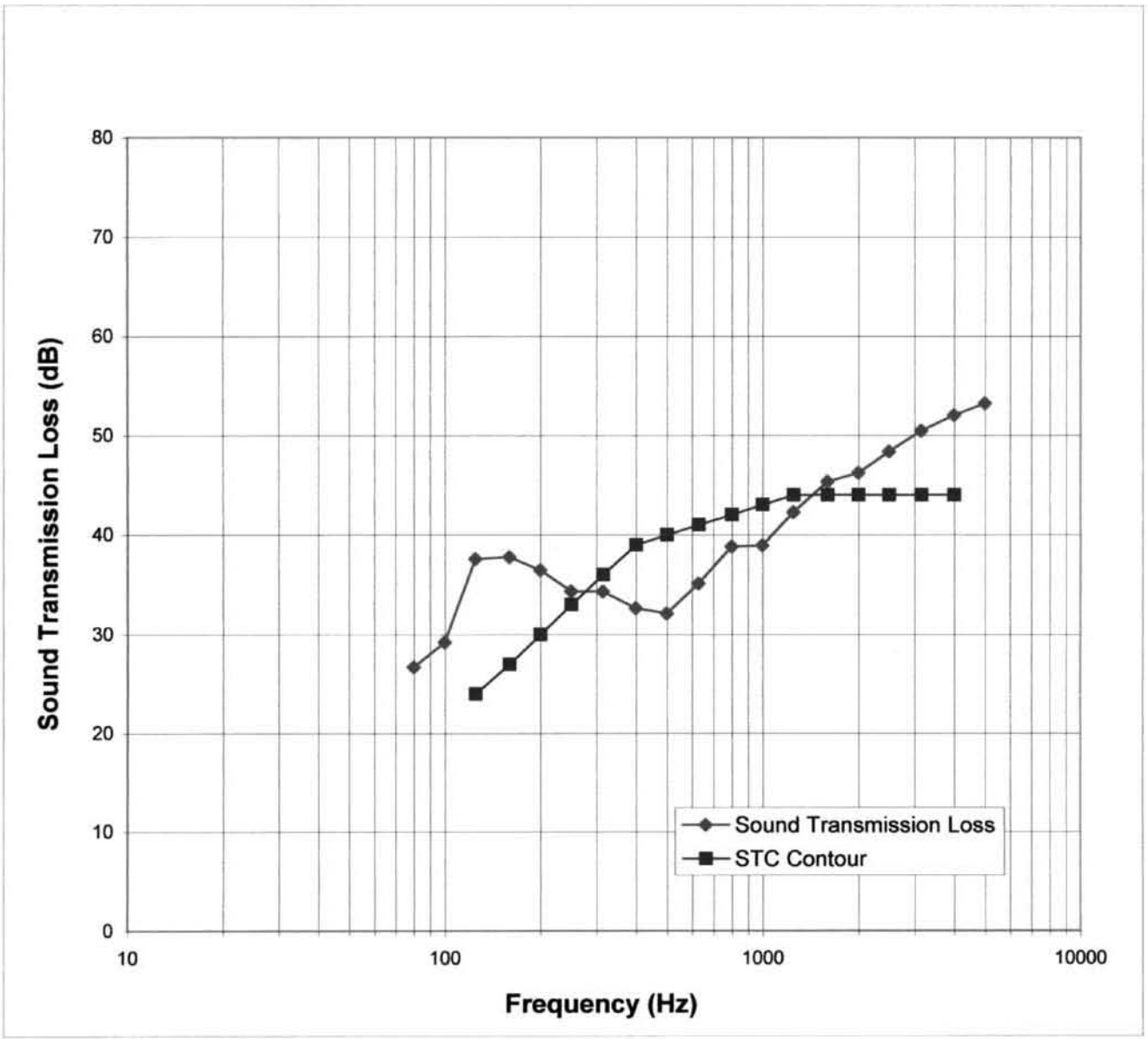
Complete Test Results

ARCHITECTURAL TESTING INC.

SOUND TRANSMISSION LOSS

ASTM E90

ATI No.	01-32271.01-1	**Date**	23-Jul-98
Client	Smith-Midland Corp.		
Specimen	80" x 80" Slender Wall, No Insulation or Gypsum Board		
Specimen Area			
Filler Area			



Appendix B

Complete Test Results

ARCHITECTURAL TESTING INC.

SOUND TRANSMISSION LOSS

ASTM E90

ATI No.	01-32271.01-2	**Date**	23-Jul-98
Client	Smith-Midland Corp.		
Specimen	80" x 80" Slender Wall, With Insulation & 5/8" Gypsum Board		
Specimen Area	44.44 Sq Ft		
Filler Area	95.56 Sq Ft		

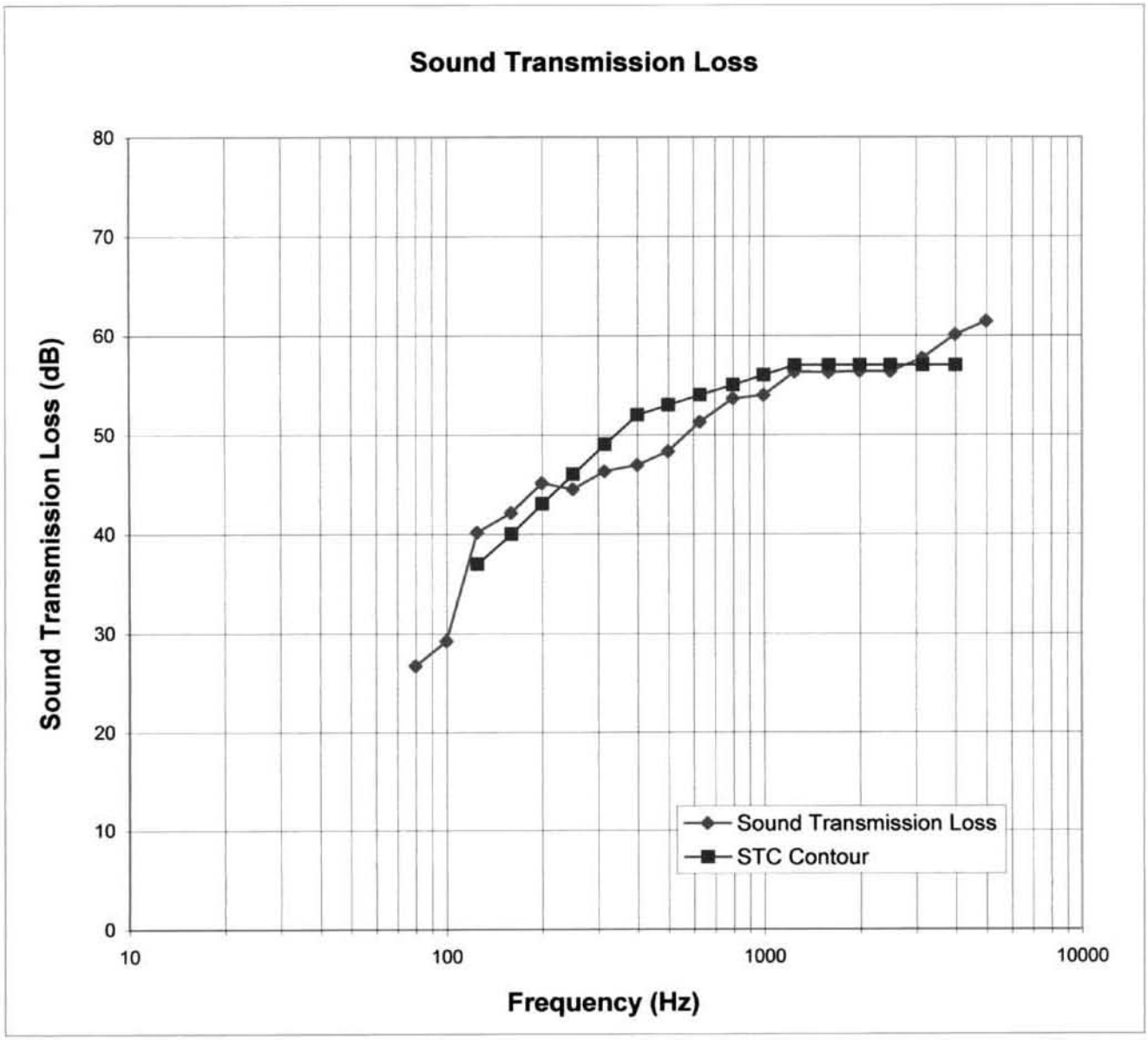
	Bkgrd	Absorp	Source	Receive	Filler	Spec
Temp F	91.1	90.9	88.8	90.6	85.9	90.4
RH %	65.3	64.7	67.6	65.5	51.5	65.8

Freq (Hz)	Bkgrd SPL (dB)	Absorp (Sabines /Sq Ft)	Source SPL (dB)	Receive SPL (dB)	Filler TL (dB)	Spec TL (dB)	95% Conf	Defs	Coef Diff
80	42.4	49.8	84.2	58.2	31.5	26.7	1.86	0	2.8
100	38.6	51.9	86.8	58.1	34.1	29.2	4.22	0	2.8
125	38.2	44.1	92.2	53.3	41.9	40.2	1.78	0	-0.3
160	42.2	43.7	96.7	55.9	45.4	42.1	0.67	0	1.2
200	44.0	43.2	101.6	57.9	52.4	45.1	0.79	0	5.2
250	40.7	43.9	104.5	61.3	52.3	44.5	0.43	2	5.8
315	35.9	42.5	103.4	57.8	59.3	46.3	0.42	3	10.1
400	34.8	44.6	102.2	55.6	62.0	46.9	0.48	5	12.0
500	31.0	46.7	100.7	52.8	59.7	48.3	0.95	5	8.7
630	24.1	49.5	104.6	53.2	64.9	51.3	0.71	3	10.7
800	24.5	54.2	106.7	52.6	66.5	53.7	0.36	1	10.0
1000	23.1	60.2	106.4	51.5	68.1	54.0	0.49	2	11.1
1250	20.3	65.9	105.5	47.6	74.1	56.3	0.38	1	14.6
1600	20.5	71.5	108.8	50.4	78.6	56.3	0.49	1	19.0
2000	13.7	75.6	107.1	48.5	78.1	56.4	0.26	1	18.4
2500	8.6	85.2	102.5	43.4	76.3	56.3	0.37	1	16.7
3150	8.6	98.1	103.3	42.2	77.7	57.7	0.39	0	16.6
4000	8.1	113.2	104.0	39.8	81.6	60.1	0.33	0	18.2
5000	7.6	140.0	102.8	36.3	82.2	61.4	0.42	0	17.5

STC Rating	53
Deficiencies	25
OITC Rating	42

Appendix B

Complete Test Results

ARCHITECTURAL TESTING INC.

ATI No.	01-32271.01-2	**Date**	23-Jul-98
Client	Smith-Midland Corp.		
Specimen	80" x 80" Slender Wall, With Insulation & 5/8" Gypsum Board		
Specimen Area	44.44 Sq Ft		
Filler Area	95.56 Sq Ft