



G9722.07-113-11-R1
ACOUSTICAL PERFORMANCE TEST REPORT
ASTM E90

Rendered to:

METAL BUILDING MANUFACTURERS ASSOCIATION
AND
NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION

TEST SPECIMEN: W-8, Wall Assembly

DATA FILE NO: G9722.01F

STC: 54

OITC: 37

Test Specimen Identification (Source to Receive Room)

Steel Wall Panel: 26 Gauge R-Panel
Isolator: R-0.75 Foam Tape
Girt: 8" 16 Gauge Steel 60" O.C.
Insulation: R-30 FG Insulation
Vapor Retarder
Steel Hat Channel: 20 MSG Galvanized Steel 24" O.C.
Gypsum Board: Two Layers, Type X, 5/8" Gypsum Board

Reference should be made to Intertek-ATI Report No. G9722.07-113-11 for complete test specimen description. This page alone is not a complete report. Flanking limit tests and reference specimen tests are available upon request.



Acoustical Performance Test Report

METAL BUILDING MANUFACTURERS ASSOCIATION
1300 Sumner Avenue
Cleveland, Ohio 44115

AND

NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION
11 Canal Center, Suite 103
Alexandria, Virginia 22310

Report No	G9722.07-113-11
Revision 1	08/28/17
Test Date	05/02/17
Report Date	07/07/17
Specimen Construction Date	05/01/17

Project Scope

Architectural Testing, Inc., an Intertek company ("Intertek-ATI"), was contracted to conduct a sound transmission loss test. The complete test data is included as Appendix B of this report.

Test Methods

Testing for this project was conducted in accordance with the following standards. The equipment listed in the attachments meets the requirements of the following standards.

ASTM E90-09(2016), *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements*

ASTM E413-16, *Classification for Rating Sound Insulation*

ASTM E1332-16, *Standard Classification for Rating Outdoor-Indoor Sound Attenuation*

ASTM E2235-04 (2012), *Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods*

Test Procedure

All measurements were conducted in the HT test chambers at Intertek-ATI located in York, Pennsylvania. The sensitivity of the microphones was checked before measurements were conducted.

Test Procedure (Continued)

The transmission loss values were obtained for a single direction of measurement. Two 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 the receive and source rooms at each of five microphone positions.

The air temperature and relative humidity conditions were monitored and recorded during all measurements.

Specimen Installation

A sound transmission loss test was initially performed on a filler wall. The 96" wide by 96" high specimen plug was removed from the filler wall assembly. All materials were provided by the client. The specimen was constructed by Intertek-ATI personnel in the test opening (see the test materials list and Appendices C and D for photographs and illustrations). Duct seal was used to seal the perimeter of the specimen to the test opening on both sides. The interior side of the specimen, when installed, was approximately 1/4" from being flush with the receive room side of the filler wall. A stethoscope was used to check for any abnormal air leaks around the test specimen prior to testing.

Test Calculations

Transmission loss (TL) at each 1/3 octave frequency is the average source room sound pressure level minus the average receive room sound pressure level, plus 10 times the log of the specimen area divided by the sound absorption of the receive room with the sample in place.

STC Rating

To obtain the Sound Transmission Class (STC), read the TL of the contour curve at 500 Hz. The sum of the deficiencies below the contour curve must not exceed 32. The maximum deficiency at any one frequency must not exceed 8.

OITC Rating

The Outdoor-Indoor Transmission Class (OITC) is calculated by subtracting the logarithmic summation of the TL values from the logarithmic summation of the A-weighted transportation noise spectrum stated in ASTM E1332.

Test Specimen Materials (Source Room to Receive Room)

Material	Actual Dimensions (inches)	Actual Thickness (inches)	Description	Quantity	Average Weight
Steel Wall Panel	38-3/4 by 96	0.50	R-Panel, 26 Gauge	2.5 sheets	0.795 lbs/ft ²
	<i>Note: Screws spaced 30" on centers along overlap, 12" on center along steel girt.</i>				
Insulation Support Banding	1 by 96	0.037	N/A	4	0.125 lbs/linear ft
	<i>Note: Held insulation in place from source side, 48" apart from the center of the wall and 3-1/2" from each end, fastened to wood stops at top and bottom.</i>				
R-0.75 Foam Isolator	3 by 96	0.266	N/A	2	0.040 lbs/linear ft
	<i>Note: Adhered to the edge of steel girt, wood perimeter blocks, and vertical straps on the source side.</i>				
Steel Girt	8 by 96	8	16 Gauge	2	4 lbs/linear ft
	<i>Note: Attached to L-Bracket for support at both ends. Spaced 60" on center. The measured thickness of the metal was 0.111".</i>				
Insulation	60 by 96 18 by 96 18 by 96	9 (approx.)	R-30 Fiberglass Insulation	3 blankets	0.45 lbs/ft ²
	<i>Note: Insulation was installed between girts and test frame box.</i>				
Vapor Retarder	96 by 96	0.005	Polypropylene with tri-directional fiberglass	1	0.015 lbs/ft ²
	<i>Note: N/A</i>				
Steel Banding	1 by 96	0.024	N/A	4	0.085 lbs/linear ft
	<i>Note: Spaced 30" on center from the center of the wall. Screwed to girts and wood stops at top and bottom.</i>				
Steel Hat Channel	3 by 96	0.75	20 MSG Galvanized	5	0.420 lbs/linear ft
	<i>Note: Spaced 24" on center vertically from the center of the wall. Screwed to girts.</i>				
Gypsum Board First Layer	48 by 96	0.625	Type X	2	2.28 lbs/ft ²
	<i>Note: Screw spacing 24" on center vertically and horizontally. Center joint caulked and taped. Screw heads taped.</i>				
Gypsum Board Second Layer	48 by 96	0.625	Type X	2	2.28 lbs/ft ²
	<i>Note: Screw spacing 12" on center vertically and 24" horizontally. Center joint caulked and taped. Screw heads taped.</i>				

Comments

The total weight of the wall system was 461 lbs. A drawing of the test specimen is included in Appendix D. Intertek-ATI will store samples of test specimens for four years.

Intertek-ATI will service this report for the entire test record retention period. Test records, such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained by Intertek-ATI for the entire test record retention period. The test record retention period ends four years after the test date.

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 tested. This report is intended to help in the client's quality assurance program, but it does not represent a continuous or exhaustive evaluation of the specimen tested or of other products or materials that were not evaluated. The statements and data provided herein do not constitute approval, disapproval, certification, or acceptance of performance or materials.

This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For INTERTEK-ATI:


Digitally Signed by: Sean Close

Sean G. Close
Technician - Acoustical Testing


Digitally Signed by: Kurt A. Golden

Kurt A. Golden
Project Lead – Acoustical Testing

SGC:jmc

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix A: Equipment description (1)
- Appendix B: Complete test results (2)
- Appendix C: Photographs (2)
- Appendix D: Drawing (1)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
R0	07/07/17	N/A	Original Report Issue
R1	08/28/17	Entire report	Changes to ensure consistency between roof assembly and wall test reports per clients' request.

Appendix A

Instrumentation:

Instrument	Manufacturer	Model	Description	ATI Number	Date of Calibration
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	1643A62	04/16 *
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	65126	05/16 *
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	065125	05/16 *
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64902	07/16
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64903	02/17
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	65103	02/17
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64905	02/17
Source Room Microphone	PCB piezotronics	378C20	Microphone and Preamplifier	64906	02/17
Receive Room Microphone	PBC Piezotronics	378B20	Microphone and Preamplifier	64907	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64908	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64909	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64910	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64911	01/17
Receive Room Environmental Indicator	Comet	T7510	Receive Room	64915	03/17
Source Room Environmental Indicator	Comet	T7510	Source Room	64914	03/17
Microphone Calibrator	Norsonic	1251	Pistonphone Calibrator	65105	05/16

*- 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	Rotating vane and stationary diffusers Temperature and humidity controlled Isolation pads under the floor
Source Room	207 m ³	Stationary diffusers only Temperature and humidity controlled

	Maximum Size	Description
TL Test Opening	4.27 m wide by 3.05 m high	Vibration break between source and receive rooms

N/A-Not Applicable



G9722.07-113-11-R1

Appendix B

Complete Test Results

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E90

Test Date	05/02/17						
Data File No.	G9722.01F						
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association						
Description	W-8, wall assembly (26 gauge steel R-Panel, R-0.75 foam tape, 8" steel girt, R-30 fiberglass insulation, vapor retarder, steel hat channel, two layers Type X 5/8" gypsum board on receive side)						
Specimen Area	5.95 m ²	Receive Temp.	23.0 °C		Source Temp.	22.3 °C	
Technician	Sean G. Close	Receive Humidity	51%		Source Humidity	49%	

Freq (Hz)	Background SPL (dB)	Absorption (m ²)	Source SPL (dB)	Receive SPL (dB)	Specimen TL (dB)	95% Confidence Limit	Number of Deficiencies
80	39.6	4.3	103	83	21	1.92	-
100	34.2	5.0	105	80	26	1.40	-
125	36.5	5.1	105	76	30	2.14	8
160	39.1	4.3	104	70	35	0.60	6
200	37.6	4.4	106	68	40	0.68	4
250	31.6	5.1	105	61	45	0.51	2
315	24.8	5.5	100	53	48	0.50	2
400	21.6	5.8	99	48	51	0.50	2
500	17.6	6.1	99	45	54	0.33	0
630	16.9	5.8	102	46	56	0.27	0
800	14.6	6.3	101	42	59	0.31	0
1000	10.0	6.4	98	35	63	0.30	0
1250	8.1	7.0	98	35	63	0.26	0
1600	6.4	7.4	102	38	64	0.30	0
2000	4.7	7.8	96	33	62	0.26	0
2500	4.6	8.8	95	30	63	0.29	0
3150	4.7	10.1	97	28	68	0.28	0
4000	5.3	12.4	96	25	68	0.25	0
5000	6.2	15.8	95	19	72	0.37	-

STC Rating **54** *(Sound Transmission Class)*
Deficiencies **24** *(Sum of Deficiencies)*
OITC Rating **37** *(Outdoor-Indoor Transmission Class)*

Notes:
 1) Receive Room levels less than 5 dB above the Background levels are red.
 2) Specimen TL levels listed in red indicate the lower limit of the transmission loss.
 3) Specimen TL levels listed in green indicate that there has been a filler wall correction applied

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E90

Test Date	05/02/17					
Data File No.	G9722.01F					
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association					
Description	W-8, wall assembly (26 gauge steel R-Panel, R-0.75 foam tape, 8" steel girt, R-30 fiberglass insulation, vapor retarder, steel hat channel, two layers Type X 5/8" gypsum board on receive side)					
Specimen Area	5.95 m ²	Receive Temp.	23.0 °C	Source Temp.	22.3 °C	
Technician	Sean G. Close	Receive Humidity	51%	Source Humidity	49%	



Appendix C

Photographs



Receive Room View of Installed Specimen



Source Room View of Installed Specimen



Girt with Support Bracket

Test F, Drawing W-8, Test Date 05/2/17

Data File No. G9722.01F

STC: 54

OITC: 37

1" VERTICAL
STEEL
BANDING @ 30"
O.C.

26 GA. METAL WALL
PANEL

8" GIRT @ 60" O.C.

VAPOR RETARDER

R-0.75 FOAM TAPE

STEEL HAT
CHANNEL
@ 24" O.C.

R-30 FG INSULATION
W/ HANGERS @ 48"
O.C.

2 LAYERS 5/8"
GYPSUM
BOARD TYPE X

INTERIOR

EXTERIOR

W-8

R-Panel, 8" Girt, R30+R0.75 Tape,
2 Layer Gyp. Bd.

UL W404
EQUIVALENT



**G9722.06-113-11-R1
ACOUSTICAL PERFORMANCE TEST REPORT
ASTM E90**

Rendered to:

**METAL BUILDING MANUFACTURERS ASSOCIATION
AND
NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION**

TEST SPECIMEN: W-9, Wall Assembly

DATA FILE NO: G9722.01E

STC: 54

OITC: 36

Test Specimen Identification (Source to Receive Room)

Steel Wall Panel: 26 Gauge R-Panel
Isolator: R-0.75 Foam Tape
Girt: 8" 16 Gauge Steel 60" O.C.
Insulation: R-30 FG Insulation
Vapor Retarder
Steel Hat Channel: 20 MSG Galvanized Steel 24" O.C.
Resilient Channel: 24" O.C.
Gypsum Board: One Layer, Type X, 5/8" Gypsum Board

Reference should be made to Intertek-ATI Report No. G9722.06-113-11 for complete test specimen description. This page alone is not a complete report. Flanking limit tests and reference specimen tests are available upon request.



Acoustical Performance Test Report

METAL BUILDING MANUFACTURERS ASSOCIATION
1300 Sumner Avenue
Cleveland, Ohio 44115

AND

NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION
11 Canal Center, Suite 103
Alexandria, Virginia 22310

Report No	G9722.06-113-11
Revision 1	08/28/17
Test Date	05/02/17
Report Date	07/07/17
Specimen Construction Date	05/01/17

Project Scope

Architectural Testing, Inc., an Intertek company ("Intertek-ATI"), was contracted to conduct a sound transmission loss test. The complete test data is included as Appendix B of this report.

Test Methods

Testing for this project was conducted in accordance with the following standards. The equipment listed in the attachments meets the requirements of the following standards.

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ASTM E1332-16, *Standard Classification for Rating Outdoor-Indoor Sound Attenuation*

ASTM E2235-04 (2012), *Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods*

Test Procedure

All measurements were conducted in the HT test chambers at Intertek-ATI located in York, Pennsylvania. The sensitivity of the microphones was checked before measurements were conducted.

Test Procedure (Continued)

The transmission loss values were obtained for a single direction of measurement. Two 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 the receive and source rooms at each of five microphone positions.

The air temperature and relative humidity conditions were monitored and recorded during all measurements.

Specimen Installation

A sound transmission loss test was initially performed on a filler wall. The 96" wide by 96" high specimen plug was removed from the filler wall assembly. All materials were provided by the client. The specimen was constructed by Intertek-ATI personnel in the test opening (see the test materials list and Appendices C and D for photographs and illustrations). Duct seal was used to seal the perimeter of the specimen to the test opening on both sides. The interior side of the specimen, when installed, was approximately 1/4" from being flush with the receive room side of the filler wall. A stethoscope was used to check for any abnormal air leaks around the test specimen prior to testing.

Test Calculations

Transmission loss (TL) at each 1/3 octave frequency is the average source room sound pressure level minus the average receive room sound pressure level, plus 10 times the log of the specimen area divided by the sound absorption of the receive room with the sample in place.

STC Rating

To obtain the Sound Transmission Class (STC), read the TL of the contour curve at 500 Hz. The sum of the deficiencies below the contour curve must not exceed 32. The maximum deficiency at any one frequency must not exceed 8.

OITC Rating

The Outdoor-Indoor Transmission Class (OITC) is calculated by subtracting the logarithmic summation of the TL values from the logarithmic summation of the A-weighted transportation noise spectrum stated in ASTM E1332.

Test Specimen Materials (Source Room to Receive Room)

Material	Actual Dimensions (inches)	Actual Thickness (inches)	Description	Quantity	Average Weight
Steel Wall Panel	38-3/4 by 96	0.50	R-Panel, 26 Gauge	2.5 sheets	0.795 lbs/ft ²
	<i>Note: Screws spaced 30" on centers along overlap, 12" on center along steel girt.</i>				
Insulation Support Banding	1 by 96	0.037	N/A	4	0.125 lbs/linear ft
	<i>Note: Held insulation in place from source side, 48" apart from the center of the wall and 3-1/2" from each end, fastened to wood stops at top and bottom.</i>				
R-0.75 Foam Isolator	3 by 96	0.266	N/A	2	0.040 lbs/linear ft
	<i>Note: Adhered to the edge of steel girt, wood perimeter blocks, and vertical straps on the source side.</i>				
Steel Girt	8 by 96	8	16 Gauge	2	4 lbs/linear ft
	<i>Note: Attached to L-Bracket for support at both ends. Spaced 60" on center. The measured thickness of the metal was 0.111".</i>				
Insulation	60 by 96 18 by 96 18 by 96	9 (approx.)	R-30 Fiberglass Insulation	3 blankets	0.45 lbs/ft ²
	<i>Note: Insulation was installed between girts and test frame box.</i>				
Vapor Retarder	96 by 96	0.005	Polypropylene with tri-directional fiberglass	1	0.015 lbs/ft ²
	<i>Note: N/A</i>				
Steel Banding	1 by 96	0.024	N/A	4	0.085 lbs/linear ft
	<i>Note: Spaced 30" on center from the center of the wall. Screwed to girts and wood stops at top and bottom.</i>				
Steel Hat Channel	3 by 96	0.75	20 MSG Galvanized	5	0.420 lbs/linear ft
	<i>Note: Spaced 24" on center vertically from the center of the wall. Screwed to girts.</i>				
Resilient Channel	2-5/8 by 96	.025	N/A	5	0.210 lbs/linear ft
	<i>Note: Spaced 24" on center horizontally. Screwed to hat channel.</i>				
Gypsum Board	48 by 96	0.625	Type X	2	2.28 lbs/ft ²
	<i>Note: Screw spacing 12" on center horizontally, and 24" on center vertically. Center joint caulked and taped. Screw heads taped.</i>				

Comments

The total weight of the wall system was 332 lbs. A drawing of the test specimen is included in Appendix D. Intertek-ATI will store samples of test specimens for four years.

Intertek-ATI will service this report for the entire test record retention period. Test records, such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained by Intertek-ATI for the entire test record retention period. The test record retention period ends four years after the test date.

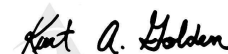
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For INTERTEK-ATI:


Digitally Signed by: Sean Close

Sean G. Close
Technician - Acoustical Testing


Digitally Signed by: Kurt A. Golden

Kurt A. Golden
Project Lead – Acoustical Testing

SGC:jmc

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix A: Equipment description (1)
- Appendix B: Complete test results (2)
- Appendix C: Photographs (2)
- Appendix D: Drawing (1)



Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
R0	07/07/17	N/A	Original Report Issue
R1	08/28/17	Entire report	Changes to ensure consistency between roof assembly and wall test reports per clients' request.

Appendix A

Instrumentation:

Instrument	Manufacturer	Model	Description	ATI Number	Date of Calibration
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	1643A62	04/16 *
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	65126	05/16 *
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	065125	05/16 *
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64902	07/16
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64903	02/17
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	65103	02/17
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64905	02/17
Source Room Microphone	PCB piezotronics	378C20	Microphone and Preamplifier	64906	02/17
Receive Room Microphone	PBC Piezotronics	378B20	Microphone and Preamplifier	64907	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64908	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64909	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64910	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64911	01/17
Receive Room Environmental Indicator	Comet	T7510	Receive Room	64915	03/17
Source Room Environmental Indicator	Comet	T7510	Source Room	64914	03/17
Microphone Calibrator	Norsonic	1251	Pistonphone Calibrator	65105	05/16

*- 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	Rotating vane and stationary diffusers Temperature and humidity controlled Isolation pads under the floor
Source Room	207 m ³	Stationary diffusers only Temperature and humidity controlled

	Maximum Size	Description
TL Test Opening	4.27 m wide by 3.05 m high	Vibration break between source and receive rooms

N/A-Not Applicable

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E90

Test Date	05/02/17						
Data File No.	G9722.01E						
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association						
Description	W-9, wall assembly (26 gauge steel R-Panel, R-0.75 foam tape, 8" steel girt, R-30 fiberglass insulation, vapor retarder, steel hat channel, resilient channel, one layer Type X 5/8" gypsum board on receive side)						
Specimen Area	5.95 m ²	Receive Temp.	23.4 °C		Source Temp.	22.7 °C	
Technician	Sean G. Close	Receive Humidity	50%		Source Humidity	49%	

Freq (Hz)	Background SPL (dB)	Absorption (m ²)	Source SPL (dB)	Receive SPL (dB)	Specimen TL (dB)	95% Confidence Limit	Number of Deficiencies
80	39.9	4.3	102	86	18	1.59	-
100	36.8	5.2	104	78	27	1.34	-
125	36.9	5.5	104	74	30	1.87	8
160	38.6	4.6	104	71	34	0.70	7
200	37.2	4.7	106	68	39	0.65	5
250	31.3	5.3	105	62	43	0.54	4
315	24.6	5.6	100	53	47	0.50	3
400	21.9	5.8	98	47	52	0.46	1
500	18.8	6.0	98	43	56	0.39	0
630	17.9	5.8	101	44	58	0.26	0
800	15.4	6.1	101	41	60	0.25	0
1000	11.8	6.3	98	34	63	0.29	0
1250	9.5	6.8	98	33	65	0.24	0
1600	6.8	7.3	102	35	67	0.25	0
2000	4.8	7.7	96	31	64	0.16	0
2500	4.7	8.7	94	28	65	0.28	0
3150	4.8	10.1	97	25	70	0.23	0
4000	5.4	12.4	95	22	70	0.28	0
5000	6.2	15.7	95	17	74	0.34	-

STC Rating **54** *(Sound Transmission Class)*
Deficiencies **28** *(Sum of Deficiencies)*
OITC Rating **36** *(Outdoor-Indoor Transmission Class)*

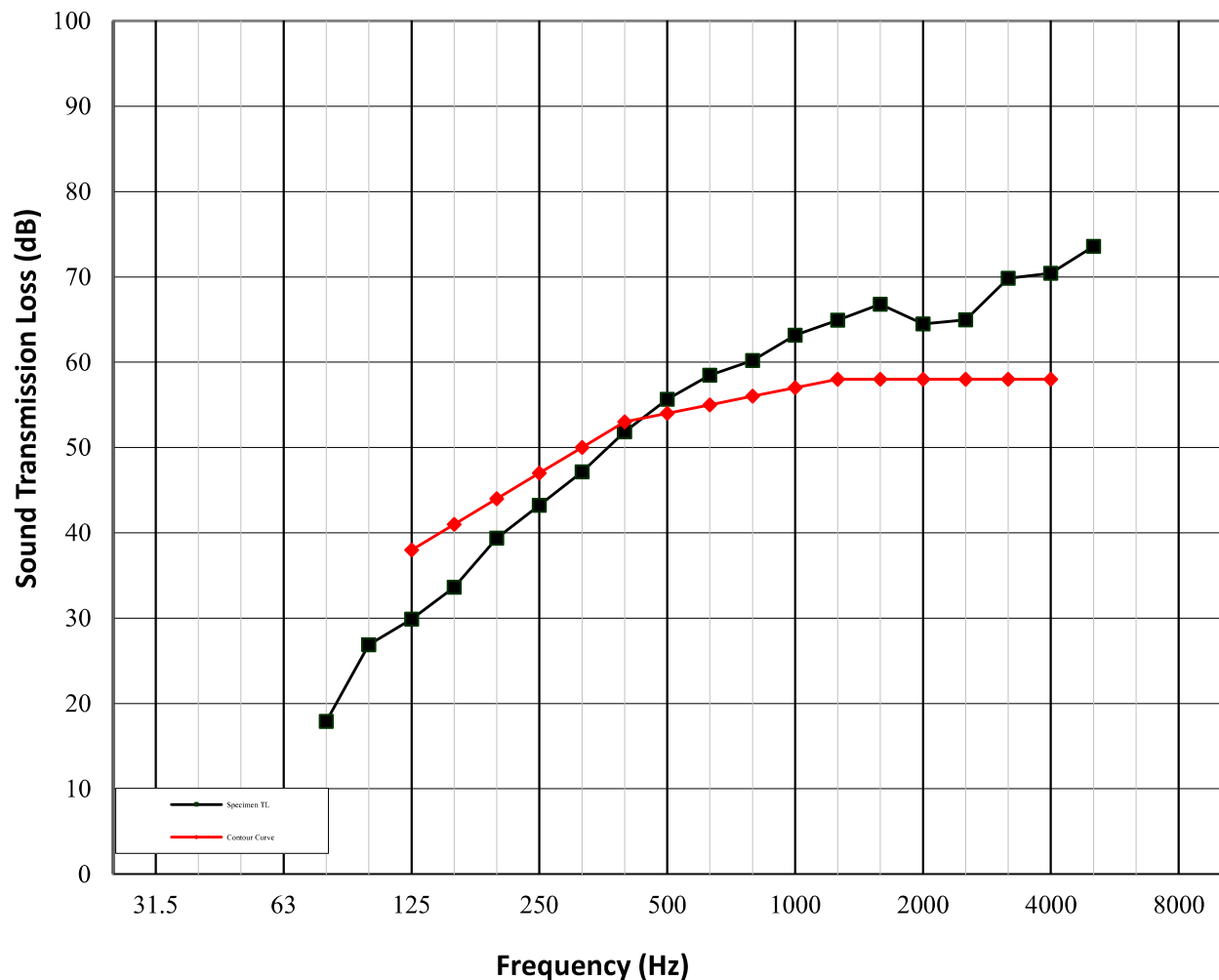
Notes: 1) Receive Room levels less than 5 dB above the Background levels are red.
 2) Specimen TL levels listed in red indicate the lower limit of the transmission loss.
 3) Specimen TL levels listed in green indicate that there has been a filler wall correction applied

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E90

Test Date	05/02/17					
Data File No.	G9722.01E					
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association					
Description	W-9, wall assembly (26 gauge steel R-Panel, R-0.75 foam tape, 8" steel girt, R-30 fiberglass insulation, vapor retarder, steel hat channel, resilient channel, one layer Type X 5/8" gypsum board on receive side)					
Specimen Area	5.95 m ²	Receive Temp.	23.4 °C		Source Temp.	22.7 °C
Technician	Sean G. Close	Receive Humidity	50%		Source Humidity	49%

Airborne Sound Transmission Loss



Appendix C

Photographs



Receive Room View of Installed Specimen



Source Room View of Installed Specimen



Girt with Support Bracket



Hat Channel and Resilient Channel

Test E, Drawing W-9, Test Date 05/2/17**Data File No. G9722.01E****STC: 54****OITC: 36**

1" VERTICAL
STEEL
BANDING @ 30"
O.C.

VAPOR RETARDER

STEEL HAT
CHANNEL
@ 24" O.C.

5/8" GYPSUM
BOARD TYPE X

RESILIENT
CHANNELS @ 24"
O.C.

INTERIOR

26 GA. METAL WALL
PANEL

8" GIRT @ 60" O.C.

R-0.75 FOAM TAPE

R-30 FG INSULATION
W/ HANGERS @ 48"
O.C.

EXTERIOR

W-9

R-Panel, 8" Girt, R30+R0.75 Tape,
1 Layer Gyp. Bd., Resilient Channels



**G9722.08-113-11-R1
ACOUSTICAL PERFORMANCE TEST REPORT
ASTM E90**

Rendered to:

**METAL BUILDING MANUFACTURERS ASSOCIATION
AND
NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION**

TEST SPECIMEN: W-10, Wall Assembly

DATA FILE NO: G9722.01G

STC: 53

OITC: 39

Test Specimen Identification (Source to Receive Room)

Steel Wall Panel: 26 Gauge R-Panel - Reversed
Isolator: R-0.75 Foam Tape
Girt: 8" 16 Gauge Steel 60" O.C.
Insulation: R-30 FG Insulation
Vapor Retarder
Steel Hat Channel: 20 MSG Galvanized Steel 24" O.C.
Gypsum Board: Two Layers, Type X; 5/8" Gypsum Board

Reference should be made to Intertek-ATI Report No. G9722.08-113-11 for complete test specimen description. This page alone is not a complete report. Flanking limit tests and reference specimen tests are available upon request.



Acoustical Performance Test Report

METAL BUILDING MANUFACTURERS ASSOCIATION
1300 Sumner Avenue
Cleveland, Ohio 44115

AND

NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION
11 Canal Center, Suite 103
Alexandria, Virginia 22310

Report No	G9722.08-113-11
Revision 1	08/28/17
Test Date	05/02/17
Report Date	07/07/17
Specimen Construction Date	05/01/17

Project Scope

Architectural Testing, Inc., an Intertek company ("Intertek-ATI"), was contracted to conduct a sound transmission loss test. The complete test data is included as Appendix B of this report.

Test Methods

Testing for this project was conducted in accordance with the following standards. The equipment listed in the attachments meets the requirements of the following standards.

ASTM E90-09(2016), *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements*

ASTM E413-16, *Classification for Rating Sound Insulation*

ASTM E1332-16, *Standard Classification for Rating Outdoor-Indoor Sound Attenuation*

ASTM E2235-04 (2012), *Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods*

Test Procedure

All measurements were conducted in the HT test chambers at Intertek-ATI located in York, Pennsylvania. The sensitivity of the microphones was checked before measurements were conducted.

Test Procedure (Continued)

The transmission loss values were obtained for a single direction of measurement. Two 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 the receive and source rooms at each of five microphone positions.

The air temperature and relative humidity conditions were monitored and recorded during all measurements.

Specimen Installation

A sound transmission loss test was initially performed on a filler wall. The 96" wide by 96" high specimen plug was removed from the filler wall assembly. All materials were provided by the client. The specimen was constructed by Intertek-ATI personnel in the test opening (see the test materials list and Appendices C and D for photographs and illustrations). Duct seal was used to seal the perimeter of the specimen to the test opening on both sides. The interior side of the specimen, when installed, was approximately 1/4" from being flush with the receive room side of the filler wall. A stethoscope was used to check for any abnormal air leaks around the test specimen prior to testing.

Test Calculations

Transmission loss (TL) at each 1/3 octave frequency is the average source room sound pressure level minus the average receive room sound pressure level, plus 10 times the log of the specimen area divided by the sound absorption of the receive room with the sample in place.

STC Rating

To obtain the Sound Transmission Class (STC), read the TL of the contour curve at 500 Hz. The sum of the deficiencies below the contour curve must not exceed 32. The maximum deficiency at any one frequency must not exceed 8.

OITC Rating

The Outdoor-Indoor Transmission Class (OITC) is calculated by subtracting the logarithmic summation of the TL values from the logarithmic summation of the A-weighted transportation noise spectrum stated in ASTM E1332.

Test Specimen Materials (Source Room to Receive Room) Reverse

Material	Actual Dimensions (inches)	Actual Thickness (inches)	Description	Quantity	Average Weight
Steel Wall Panel Reversed	38-3/4 by 96	0.50	R-Panel, 26 Gauge	2.5 sheets	0.795 lbs/ft ²
	<i>Note: Screws spaced 30" on centers along overlap, 12" on center along steel girt. Panels mounted in converse direction.</i>				
Insulation Support Banding	1 by 96	0.037	N/A	4	0.125 lbs/linear ft
	<i>Note: Held insulation in place from source side, 48" apart from the center of the wall and 3-1/2" from each end, fastened to wood stops at top and bottom.</i>				
R-0.75 Foam Isolator	3 by 96	0.266	N/A	2	0.040 lbs/linear ft
	<i>Note: Adhered to the edge of steel girt, wood perimeter blocks, and vertical straps on the source side.</i>				
Steel Girt	8 by 96	8	16 Gauge	2	4 lbs/linear ft
	<i>Note: Attached to L-Bracket for support at both ends. Spaced 60" on center. The measured thickness of the metal was 0.111".</i>				
Insulation	60 by 96 18 by 96 18 by 96	9 (approx.)	R-30 Fiberglass Insulation	3 blankets	0.45 lbs/ft ²
	<i>Note: Insulation was installed between girts and test frame box.</i>				
Vapor Retarder	96 by 96	0.005	Polypropylene with tri-directional fiberglass	1	0.015 lbs/ft ²
	<i>Note: N/A</i>				
Steel Banding	1 by 96	0.024	N/A	4	0.085 lbs/linear ft
	<i>Note: Spaced 30" on center from the center of the wall. Screwed to girts and wood stops at top and bottom.</i>				
Steel Hat Channel	3 by 96	0.75	20 MSG Galvanized	5	0.420 lbs/linear ft
	<i>Note: Spaced 24" on center vertically from the center of the wall. Screwed to girts.</i>				
Gypsum Board First Layer	48 by 96	0.625	Type X	2	2.28 lbs/ft ²
	<i>Note: Screw spacing 24" on center vertically and horizontally. Center joint caulked and taped. Screw heads taped.</i>				
Gypsum Board Second Layer	48 by 96	0.625	Type X	2	2.28 lbs/ft ²
	<i>Note: Screw spacing 12" on center vertically and 24" horizontally. Center joint caulked and taped. Screw heads taped.</i>				

Comments

The total weight of the wall system was 461 lbs. A drawing of the test specimen is included in Appendix D. Intertek-ATI will store samples of test specimens for four years.

Intertek-ATI will service this report for the entire test record retention period. Test records, such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained by Intertek-ATI for the entire test record retention period. The test record retention period ends four years after the test date.

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 tested. This report is intended to help in the client's quality assurance program, but it does not represent a continuous or exhaustive evaluation of the specimen tested or of other products or materials that were not evaluated. The statements and data provided herein do not constitute approval, disapproval, certification, or acceptance of performance or materials.

This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For INTERTEK-ATI:


Digitally Signed by: Sean Close

Sean G. Close
Technician - Acoustical Testing


Digitally Signed by: Kurt A. Golden

Kurt A. Golden
Project Lead – Acoustical Testing

SGC:jmc

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix A: Equipment description (1)
- Appendix B: Complete test results (2)
- Appendix C: Photographs (2)
- Appendix D: Drawing (1)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
R0	07/07/17	N/A	Original Report Issue
R1	08/28/17	Entire report	Changes to ensure consistency between roof assembly and wall test reports per clients' request

Appendix A

Instrumentation:

Instrument	Manufacturer	Model	Description	ATI Number	Date of Calibration
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	1643A62	04/16 *
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	65126	05/16 *
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	065125	05/16 *
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64902	07/16
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64903	02/17
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	65103	02/17
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64905	02/17
Source Room Microphone	PCB piezotronics	378C20	Microphone and Preamplifier	64906	02/17
Receive Room Microphone	PBC Piezotronics	378B20	Microphone and Preamplifier	64907	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64908	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64909	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64910	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64911	01/17
Receive Room Environmental Indicator	Comet	T7510	Receive Room	64915	03/17
Source Room Environmental Indicator	Comet	T7510	Source Room	64914	03/17
Microphone Calibrator	Norsonic	1251	Pistonphone Calibrator	65105	05/16

*- 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	Rotating vane and stationary diffusers Temperature and humidity controlled Isolation pads under the floor
Source Room	207 m ³	Stationary diffusers only Temperature and humidity controlled

	Maximum Size	Description
TL Test Opening	4.27 m wide by 3.05 m high	Vibration break between source and receive rooms

N/A-Not Applicable



G9722.08-113-11-R1

Appendix B

Complete Test Results

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E90

Test Date	05/02/17						
Data File No.	G9722.01G						
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association						
Description	W-10, wall assembly (26 gauge steel R-Panel mounted in converse direction, R-0.75 foam tape, 8" steel girt, R-30 fiberglass insulation, vapor retarder, steel hat channel, two layers Type X 5/8" gypsum board on receive side)						
Specimen Area	5.95 m ²	Receive Temp.	23.4 °C		Source Temp.	22.9 °C	
Technician	Sean G. Close	Receive Humidity	52%		Source Humidity	49%	

Freq (Hz)	Background SPL (dB)	Absorption (m ²)	Source SPL (dB)	Receive SPL (dB)	Specimen TL (dB)	95% Confidence Limit	Number of Deficiencies
80	38.8	4.8	103	82	22	1.64	-
100	34.2	4.9	105	76	29	1.47	-
125	37.1	5.2	105	76	30	2.70	7
160	39.1	4.3	104	70	36	0.71	4
200	37.7	4.4	106	69	39	0.68	4
250	31.9	5.2	105	61	44	0.59	2
315	25.3	5.6	100	52	48	0.69	1
400	21.6	5.9	98	49	49	0.67	3
500	17.4	6.1	98	47	51	0.45	2
630	16.6	5.8	101	48	53	0.41	1
800	14.3	6.2	101	45	55	0.53	0
1000	9.8	6.4	98	37	61	0.50	0
1250	7.6	6.8	98	36	61	0.37	0
1600	5.9	7.4	102	40	61	0.44	0
2000	4.5	7.7	96	37	57	0.36	0
2500	4.5	8.6	94	35	58	0.39	0
3150	4.7	10.1	97	31	63	0.42	0
4000	5.3	12.3	95	29	63	0.38	0
5000	6.3	15.6	95	21	70	0.48	-

STC Rating **53** *(Sound Transmission Class)*
Deficiencies **24** *(Sum of Deficiencies)*
OITC Rating **39** *(Outdoor-Indoor Transmission Class)*

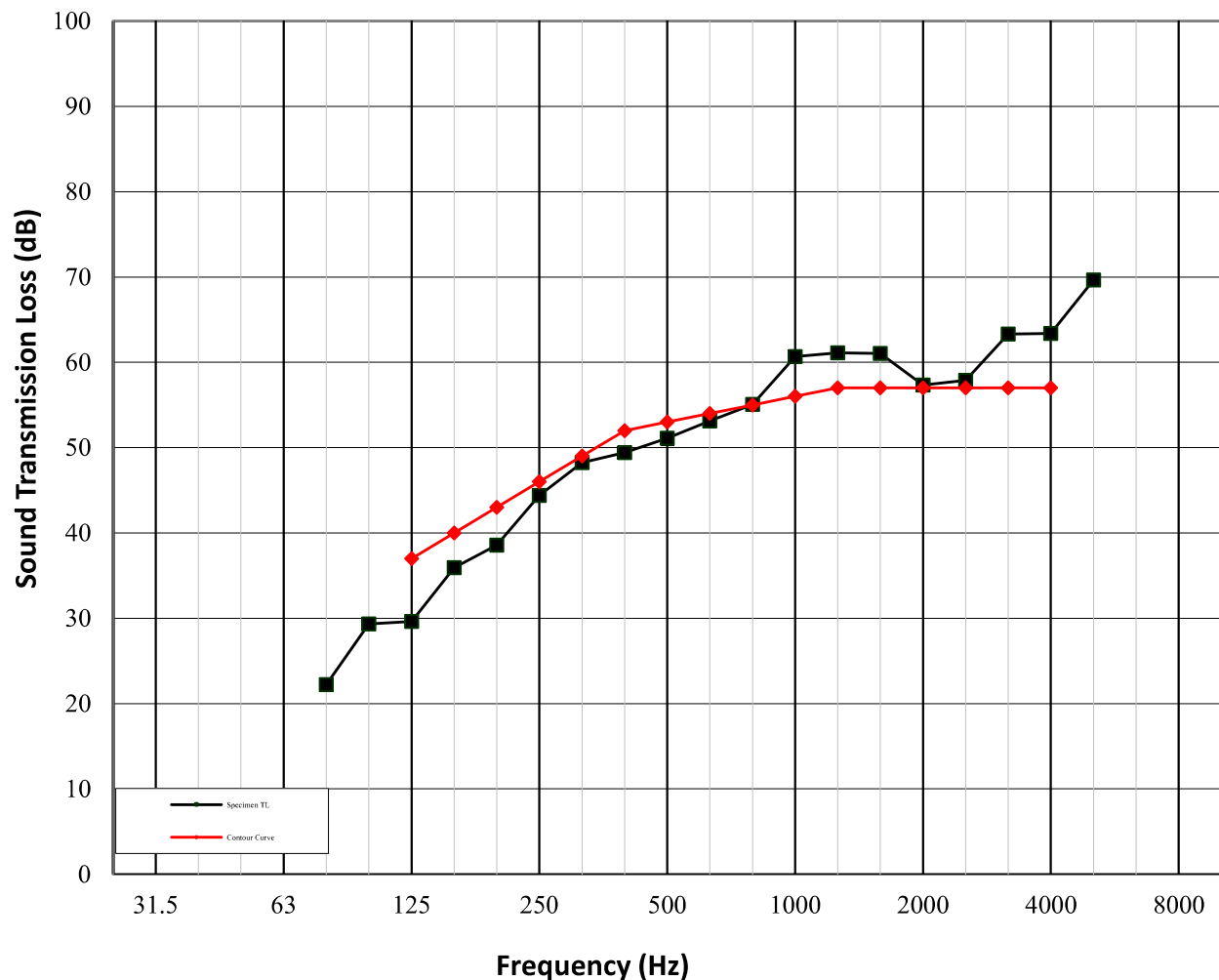
Notes:
 1) Receive Room levels less than 5 dB above the Background levels are red.
 2) Specimen TL levels listed in red indicate the lower limit of the transmission loss.
 3) Specimen TL levels listed in green indicate that there has been a filler wall correction applied

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E90

Test Date	05/02/17					
Data File No.	G9722.01G					
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association					
Description	W-10, wall assembly (26 gauge steel R-Panel mounted in converse direction, R-0.75 foam tape, 8" steel girt, R-30 fiberglass insulation, vapor retarder, steel hat channel, two layers Type X 5/8" gypsum board on receive side)					
Specimen Area	5.95 m ²	Receive Temp.	23.4 °C		Source Temp.	22.9 °C
Technician	Sean G. Close	Receive Humidity	52%		Source Humidity	49%

Airborne Sound Transmission Loss



Appendix C

Photographs



Receive Room View of Installed Specimen



Source Room View of Installed Specimen



Girt with Support Bracket

**Test G**, Drawing W-10, Test Date 05/2/17**Data File No.** G9722.01G**STC:** 53**OITC:** 39

1" VERTICAL
STEEL
BANDING @ 30"
O.C.

VAPOR RETARDER

VAPOR RETARDER

STEEL HAT
CHANNEL
@ 24" O.C.

2 LAYERS 5/8"
GYPSUM
BOARD TYPE X

REVERSE PANEL 26
GA. METAL WALL
PANEL

8" GIRT @ 60" O.C.

R-0.75 FOAM TAPE

R-30 FG INSULATION
W/ HANGARS @ 48"
O.C.

INTERIOR

EXTERIOR

W-10

Reverse R-Panel, 8" Girt, R30+R0.75 Tape,
2 Layer Gyp. Bd.

UL W404
EQUIVALENT



**G9722.11-113-11-R1
ACOUSTICAL PERFORMANCE TEST REPORT
ASTM E90**

Rendered to:

**METAL BUILDING MANUFACTURERS ASSOCIATION
AND
NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION**

TEST SPECIMEN: W-11, Wall Assembly

DATA FILE NO: G9722.01J

STC: 35

OITC: 24

Test Specimen Identification (Source to Receive Room)

Steel Wall Panel: 26 Gauge R-Panel
Insulation: R-10 FG Insulation over the Girt
Girt: 8" 16 Gauge Steel 60" O.C.
Insulation: R-25 FG Insulation over the Girts
Vapor Retarder

Reference should be made to Intertek-ATI Report No. G9722.11-113-11 for complete test specimen description. This page alone is not a complete report. Flanking limit tests and reference specimen tests are available upon request.



Acoustical Performance Test Report

METAL BUILDING MANUFACTURERS ASSOCIATION
1300 Sumner Avenue
Cleveland, Ohio 44115

AND

NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION
11 Canal Center, Suite 103
Alexandria, Virginia 22310

Report No	G9722.11-113-11
Revision 1	08/31/17
Test Date	05/03/17
Report Date	07/07/17
Specimen Construction Date	05/01/17

Project Scope

Architectural Testing, Inc., an Intertek company ("Intertek-ATI"), was contracted to conduct a sound transmission loss test. The complete test data is included as Appendix B of this report.

Test Methods

Testing for this project was conducted in accordance with the following standards. The equipment listed in the attachments meets the requirements of the following standards.

ASTM E90-09(2016), *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements*

ASTM E413-16, *Classification for Rating Sound Insulation*

ASTM E1332-16, *Standard Classification for Rating Outdoor-Indoor Sound Attenuation*

ASTM E2235-04 (2012), *Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods*

Test Procedure

All measurements were conducted in the HT test chambers at Intertek-ATI located in York, Pennsylvania. The sensitivity of the microphones was checked before measurements were conducted.

Test Procedure (Continued)

The transmission loss values were obtained for a single direction of measurement. Two 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 the receive and source rooms at each of five microphone positions.

The air temperature and relative humidity conditions were monitored and recorded during all measurements.

Specimen Installation

A sound transmission loss test was initially performed on a filler wall. The 96" wide by 96" high specimen plug was removed from the filler wall assembly. All materials were provided by the client. The specimen was constructed by Intertek-ATI personnel in the test opening (see the test materials list and Appendices C and D for photographs and illustrations). Duct seal was used to seal the perimeter of the specimen to the test opening on both sides. The interior side of the specimen, when installed, was approximately 1/4" from being flush with the receive room side of the filler wall. A stethoscope was used to check for any abnormal air leaks around the test specimen prior to testing.

Test Calculations

Transmission loss (TL) at each 1/3 octave frequency is the average source room sound pressure level minus the average receive room sound pressure level, plus 10 times the log of the specimen area divided by the sound absorption of the receive room with the sample in place.

STC Rating

To obtain the Sound Transmission Class (STC), read the TL of the contour curve at 500 Hz. The sum of the deficiencies below the contour curve must not exceed 32. The maximum deficiency at any one frequency must not exceed 8.

OITC Rating

The Outdoor-Indoor Transmission Class (OITC) is calculated by subtracting the logarithmic summation of the TL values from the logarithmic summation of the A-weighted transportation noise spectrum stated in ASTM E1332.

Test Specimen Materials (Source Room to Receive Room)

Material	Actual Dimensions (inches)	Actual Thickness (inches)	Description	Quantity	Average Weight
Steel Wall Panel	38-3/4 by 96	0.50	R-Panel, 26 Gauge	2.5 sheets	0.795 lbs/ft ²
	<i>Note: Screws spaced 30" on centers along overlap, 12" on center along steel girt.</i>				
Insulation Support Banding	1 by 96	0.037	N/A	4	0.125 lbs/linear ft
	<i>Note: Held insulation in place from source side, 48" apart from the center of the wall and 3-1/2" from each end, fastened to wood stops at top and bottom.</i>				
Insulation	48 by 96	3 (approx.)	R-10	2 blankets	0.15 lbs/ft ²
	<i>Note: Insulation was compressed over the girts.</i>				
Steel Girt	8 by 96	8	16 Gauge	2	4 lbs/linear ft
	<i>Note: Attached to L-Bracket for support at both ends. Spaced 60" on center. The measured thickness of the metal was 0.111".</i>				
Insulation	60 by 96 18 by 96 18 by 96	8 (approx.)	R-25 Fiberglass Insulation	3 blankets	0.40 lbs/ft ²
	<i>Note: Insulation was installed between girts and test frame box.</i>				
Vapor Retarder	96 by 96	0.005	Polypropylene with tri-directional fiberglass	1	0.015 lbs/ft ²
	<i>Note: N/A</i>				
Steel Banding	1 by 96	0.024	N/A	4	0.085 lbs/linear ft
	<i>Note: Spaced 30" on center from the center of the wall. Screwed to girts and wood stops at top and bottom.</i>				

Comments

The total weight of the wall system was 158 lbs. A drawing of the test specimen is included in Appendix D. Intertek-ATI will store samples of test specimens for four years.

Intertek-ATI will service this report for the entire test record retention period. Test records, such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained by Intertek-ATI for the entire test record retention period. The test record retention period ends four years after the test date.

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 tested. This report is intended to help in the client's quality assurance program, but it does not represent a continuous or exhaustive evaluation of the specimen tested or of other products or materials that were not evaluated. The statements and data provided herein do not constitute approval, disapproval, certification, or acceptance of performance or materials.

This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For INTERTEK-ATI:


Digitally Signed by: Sean Close

Sean G. Close
Technician - Acoustical Testing


Digitally Signed by: Kurt A. Golden

Kurt A. Golden
Project Lead – Acoustical Testing

SGC:jmc

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix A: Equipment description (1)
- Appendix B: Complete test results (2)
- Appendix C: Photographs (2)
- Appendix D: Drawing (1)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
R0	07/07/17	N/A	Original Report Issue
R1	08/31/17	Entire report	Changes to ensure consistency between roof assembly and wall test reports per clients' request.

Appendix A

Instrumentation:

Instrument	Manufacturer	Model	Description	ATI Number	Date of Calibration
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	1643A62	04/16 *
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	65126	05/16 *
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	065125	05/16 *
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64902	07/16
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64903	02/17
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	65103	02/17
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64905	02/17
Source Room Microphone	PCB piezotronics	378C20	Microphone and Preamplifier	64906	02/17
Receive Room Microphone	PBC Piezotronics	378B20	Microphone and Preamplifier	64907	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64908	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64909	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64910	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64911	01/17
Receive Room Environmental Indicator	Comet	T7510	Receive Room	64915	03/17
Source Room Environmental Indicator	Comet	T7510	Source Room	64914	03/17
Microphone Calibrator	Norsonic	1251	Pistonphone Calibrator	65105	05/16

*- 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	Rotating vane and stationary diffusers Temperature and humidity controlled Isolation pads under the floor
Source Room	207 m ³	Stationary diffusers only Temperature and humidity controlled

	Maximum Size	Description
TL Test Opening	4.27 m wide by 3.05 m high	Vibration break between source and receive rooms

N/A-Not Applicable



G9722.11-113-11-R1

Appendix B

Complete Test Results

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E90

Test Date	05/03/17						
Data File No.	G9722.01J						
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association						
Description	W-11, wall assembly (26 gauge steel R-Panel, R-10 fiberglass insulation, 8" steel girt, R-25 fiberglass insulation, vapor retarder)						
Specimen Area	5.95 m ²	Receive Temp.	21.7 °C		Source Temp.	21.2 °C	
Technician	Sean G. Close	Receive Humidity	51%		Source Humidity	48%	

Freq (Hz)	Background SPL (dB)	Absorption (m ²)	Source SPL (dB)	Receive SPL (dB)	Specimen TL (dB)	95% Confidence Limit	Number of Deficiencies
80	35.4	10.3	103	90	11	1.74	-
100	33.2	10.3	105	88	15	1.11	-
125	28.4	11.7	104	87	14	1.66	5
160	33.2	11.1	104	85	16	0.59	6
200	32.4	10.9	106	83	21	0.60	4
250	26.9	11.7	105	79	24	0.52	4
315	21.3	11.8	100	70	27	0.51	4
400	17.8	11.9	98	65	31	0.45	3
500	14.7	11.7	99	61	34	0.21	1
630	13.6	11.4	102	61	38	0.32	0
800	12.4	11.5	101	57	41	0.47	0
1000	6.8	11.1	98	51	45	0.37	0
1250	6.6	11.1	98	46	49	0.31	0
1600	5.4	10.8	102	47	53	0.26	0
2000	5.0	11.0	96	39	55	0.34	0
2500	5.4	11.4	95	35	57	0.26	0
3150	6.1	12.6	97	34	60	0.19	0
4000	6.8	14.4	96	35	57	0.32	0
5000	7.8	17.8	95	30	60	0.36	-

STC Rating **35** *(Sound Transmission Class)*
Deficiencies **27** *(Sum of Deficiencies)*
OITC Rating **24** *(Outdoor-Indoor Transmission Class)*

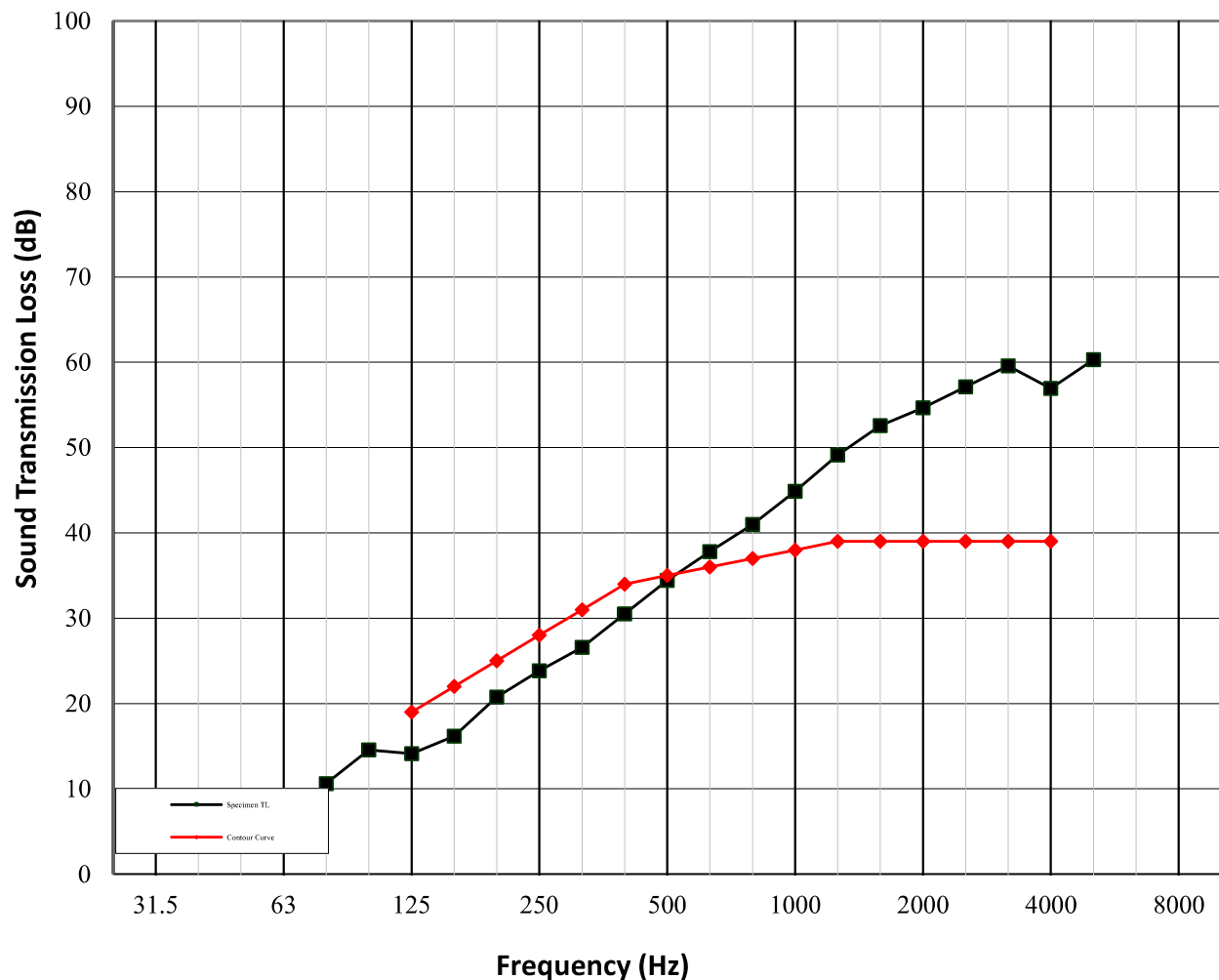
Notes: 1) Receive Room levels less than 5 dB above the Background levels are red.
 2) Specimen TL levels listed in red indicate the lower limit of the transmission loss.
 3) Specimen TL levels listed in green indicate that there has been a filler wall correction applied

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E90

Test Date	05/03/17					
Data File No.	G9722.01J					
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association					
Description	W-11, wall assembly (26 gauge steel R-Panel, R-10 fiberglass insulation, 8" steel girt, R-25 fiberglass insulation, vapor retarder)					
Specimen Area	5.95 m ²	Receive Temp.	21.7 °C	Source Temp.	21.2 °C	
Technician	Sean G. Close	Receive Humidity	51%	Source Humidity	48%	

Airborne Sound Transmission Loss



Appendix C

Photographs



Receive Room View of Installed Specimen



Source Room View of Installed Specimen



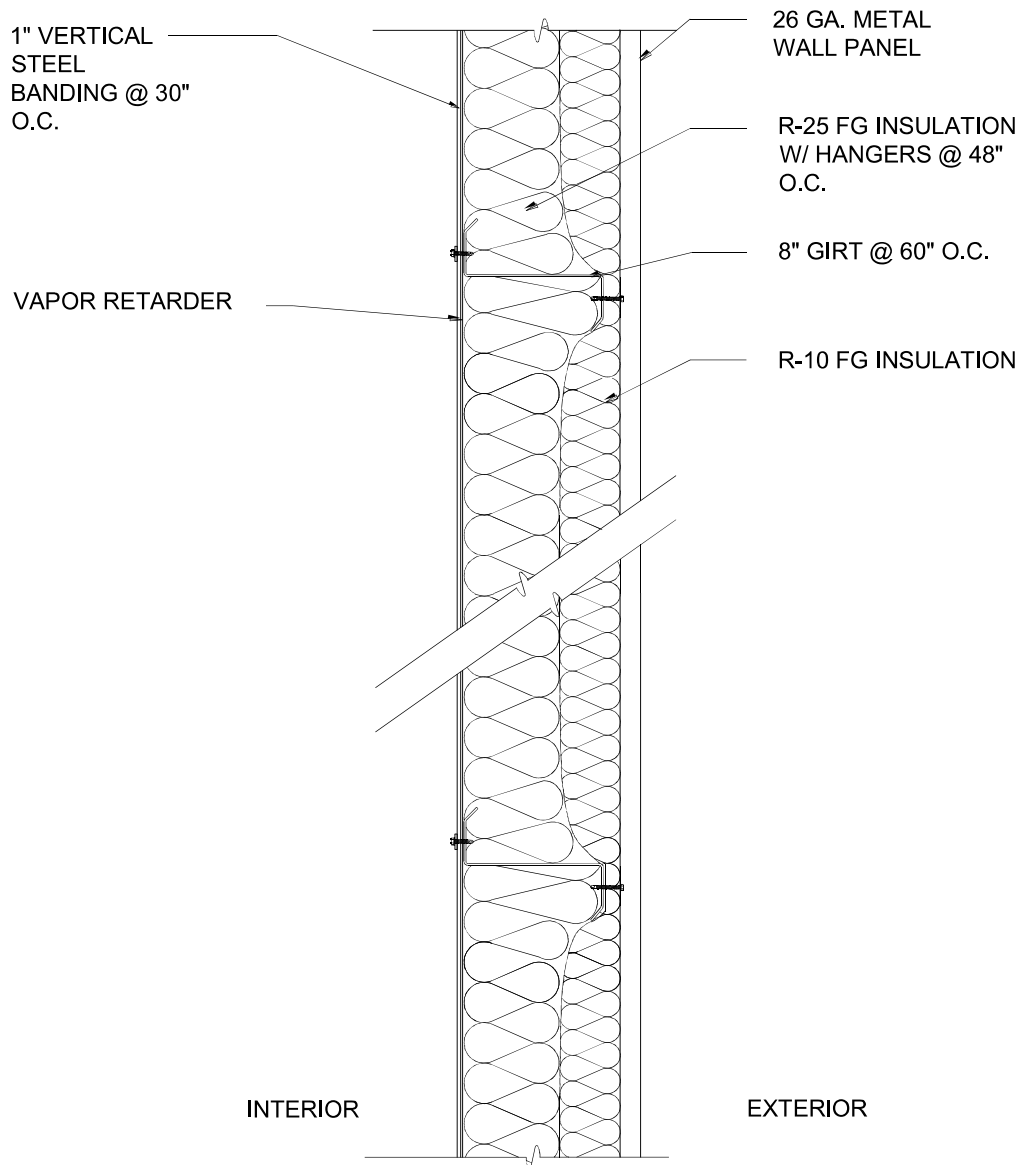
Girt with Support Bracket

Test J, Drawing W-11, Test Date 05/3/17

Data File No. G9722.01J

STC: 35

OITC: 24



W-11

R-Panel, 8" Girt, R25+R10



**G9722.12-113-11-R1
ACOUSTICAL PERFORMANCE TEST REPORT
ASTM E90**

Rendered to:

**METAL BUILDING MANUFACTURERS ASSOCIATION
AND
NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION**

TEST SPECIMEN: W-12, Wall Assembly

DATA FILE NO: G9722.01K

STC: 51

OITC: 34

Test Specimen Identification (Source to Receive Room)

Steel Wall Panel: 26 Gauge R-Panel
Insulation: R-10 FG Insulation over the Girts
Girt: 8" 16 Gauge Steel 60" O.C.
Insulation: R-25 FG Insulation
Vapor Retarder
Steel Hat Channel: 20 MSG Galvanized Steel 24" O.C.
Gypsum Board: One Layer, Type X; 5/8" Gypsum Board

Reference should be made to Intertek-ATI Report No. G9722.12-113-11 for complete test specimen description. This page alone is not a complete report. Flanking limit tests and reference specimen tests are available upon request.



Acoustical Performance Test Report

METAL BUILDING MANUFACTURERS ASSOCIATION
1300 Sumner Avenue
Cleveland, Ohio 44115

AND

NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION
11 Canal Center, Suite 103
Alexandria, Virginia 22310

Report No	G9722.12-113-11
Revision 1	08/31/17
Test Date	05/03/17
Report Date	07/07/17
Specimen Construction Date	05/01/17

Project Scope

Architectural Testing, Inc., an Intertek company ("Intertek-ATI"), was contracted to conduct a sound transmission loss test. The complete test data is included as Appendix B of this report.

Test Methods

Testing for this project was conducted in accordance with the following standards. The equipment listed in the attachments meets the requirements of the following standards.

ASTM E90-09(2016), *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements*

ASTM E413-16, *Classification for Rating Sound Insulation*

ASTM E1332-16, *Standard Classification for Rating Outdoor-Indoor Sound Attenuation*

ASTM E2235-04 (2012), *Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods*

Test Procedure

All measurements were conducted in the HT test chambers at Intertek-ATI located in York, Pennsylvania. The sensitivity of the microphones was checked before measurements were conducted.

Test Procedure (Continued)

The transmission loss values were obtained for a single direction of measurement. Two 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 the receive and source rooms at each of five microphone positions.

The air temperature and relative humidity conditions were monitored and recorded during all measurements.

Specimen Installation

A sound transmission loss test was initially performed on a filler wall. The 96" wide by 96" high specimen plug was removed from the filler wall assembly. All materials were provided by the client. The specimen was constructed by Intertek-ATI personnel in the test opening (see the test materials list and Appendices C and D for photographs and illustrations). Duct seal was used to seal the perimeter of the specimen to the test opening on both sides. The interior side of the specimen, when installed, was approximately 1/4" from being flush with the receive room side of the filler wall. A stethoscope was used to check for any abnormal air leaks around the test specimen prior to testing.

Test Calculations

Transmission loss (TL) at each 1/3 octave frequency is the average source room sound pressure level minus the average receive room sound pressure level, plus 10 times the log of the specimen area divided by the sound absorption of the receive room with the sample in place.

STC Rating

To obtain the Sound Transmission Class (STC), read the TL of the contour curve at 500 Hz. The sum of the deficiencies below the contour curve must not exceed 32. The maximum deficiency at any one frequency must not exceed 8.

OITC Rating

The Outdoor-Indoor Transmission Class (OITC) is calculated by subtracting the logarithmic summation of the TL values from the logarithmic summation of the A-weighted transportation noise spectrum stated in ASTM E1332.

Test Specimen Materials (Source Room to Receive Room)

Material	Actual Dimensions (inches)	Actual Thickness (inches)	Description	Quantity	Average Weight
Steel Wall Panel	38-3/4 by 96	0.50	R-Panel, 26 Gauge	2.5 sheets	0.795 lbs/ft ²
	<i>Note: Screws spaced 30" on centers along overlap, 12" on center along steel girt.</i>				
Insulation Support Banding	1 by 96	0.037	N/A	4	0.125 lbs/linear ft
	<i>Note: Held insulation in place from source side, 48" apart from the center of the wall and 3-1/2" from each end, fastened to wood stops at top and bottom.</i>				
Insulation	48 by 96	3 (approx.)	R-10	2 blankets	0.15 lbs/ft ²
	<i>Note: Insulation was compressed over the girts.</i>				
Steel Girt	8 by 96	8	16 Gauge	2	4 lbs/linear ft
	<i>Note: Attached to L-Bracket for support at both ends. Spaced 60" on center. The measured thickness of the metal was 0.111".</i>				
Insulation	60 by 96 18 by 96 18 by 96	8 (approx.)	R-25 Fiberglass Insulation	3 blankets	0.40 lbs/ft ²
	<i>Note: Insulation was installed between girts and test frame box.</i>				
Vapor Retarder	96 by 96	0.005	Polypropylene with tri-directional fiberglass	1	0.015 lbs/ft ²
	<i>Note: N/A</i>				
Steel Banding	1 by 96	0.024	N/A	4	0.085 lbs/linear ft
	<i>Note: Spaced 30" on center from the center of the wall. Screwed to girts and wood stops at top and bottom.</i>				
Steel Hat Channel	3 by 96	0.75	20 MSG Galvanized	5	0.420 lbs/linear ft
	<i>Note: Spaced 24" on center vertically from the center of the wall. Screwed to girts.</i>				
Gypsum Board	48 by 96	0.625	Type X	2	2.28 lbs/ft ²
	<i>Note: Screw spacing 12" on center vertically and 24" on center horizontally. Center joint caulked and taped. Screw heads taped.</i>				

Comments

The total weight of the wall system was 320 lbs. A drawing of the test specimen is included in Appendix D. Intertek-ATI will store samples of test specimens for four years.

Intertek-ATI will service this report for the entire test record retention period. Test records, such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained by Intertek-ATI for the entire test record retention period. The test record retention period ends four years after the test date.

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 tested. This report is intended to help in the client's quality assurance program, but it does not represent a continuous or exhaustive evaluation of the specimen tested or of other products or materials that were not evaluated. The statements and data provided herein do not constitute approval, disapproval, certification, or acceptance of performance or materials.

This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For INTERTEK-ATI:


Digitally Signed by: Sean Close

Sean G. Close
Technician - Acoustical Testing


Digitally Signed by: Kurt A. Golden

Kurt A. Golden
Project Lead – Acoustical Testing

SGC:jmc

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix A: Equipment description (1)
- Appendix B: Complete test results (2)
- Appendix C: Photographs (2)
- Appendix D: Drawing (1)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
R0	07/07/17	N/A	Original Report Issue
R1	08/31/17	Entire report	Changes to ensure consistency between roof assembly and wall test reports per clients' request.

Appendix A

Instrumentation:

Instrument	Manufacturer	Model	Description	ATI Number	Date of Calibration
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	1643A62	04/16 *
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	65126	05/16 *
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	065125	05/16 *
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64902	07/16
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64903	02/17
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	65103	02/17
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64905	02/17
Source Room Microphone	PCB piezotronics	378C20	Microphone and Preamplifier	64906	02/17
Receive Room Microphone	PBC Piezotronics	378B20	Microphone and Preamplifier	64907	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64908	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64909	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64910	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64911	01/17
Receive Room Environmental Indicator	Comet	T7510	Receive Room	64915	03/17
Source Room Environmental Indicator	Comet	T7510	Source Room	64914	03/17
Microphone Calibrator	Norsonic	1251	Pistonphone Calibrator	65105	05/16

*- 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	Rotating vane and stationary diffusers Temperature and humidity controlled Isolation pads under the floor
Source Room	207 m ³	Stationary diffusers only Temperature and humidity controlled

	Maximum Size	Description
TL Test Opening	4.27 m wide by 3.05 m high	Vibration break between source and receive rooms

N/A-Not Applicable



G9722.12-113-11-R1

Appendix B

Complete Test Results

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E90

Test Date	05/03/17					
Data File No.	G9722.01K					
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association					
Description	W-12, wall assembly (26 gauge steel R-Panel, R-10 fiberglass insulation, 8" steel girt, R-25 fiberglass insulation, vapor retarder, steel hat channel, one layer Type X 5/8" gypsum board on receive side)					
Specimen Area	5.95 m ²	Receive Temp.	21.8 °C		Source Temp.	22.2 °C
Technician	Sean G. Close	Receive Humidity	53%		Source Humidity	49%

Freq (Hz)	Background SPL (dB)	Absorption (m ²)	Source SPL (dB)	Receive SPL (dB)	Specimen TL (dB)	95% Confidence Limit	Number of Deficiencies
80	38.9	5.6	103	86	17	1.66	-
100	35.5	6.1	105	82	22	1.12	-
125	36.7	5.4	105	78	27	2.27	8
160	39.6	4.8	104	73	32	0.69	6
200	37.7	4.7	107	70	37	0.72	4
250	31.5	5.1	105	64	42	0.53	2
315	25.7	5.6	100	56	45	0.65	2
400	21.9	5.8	98	50	48	0.46	2
500	18.6	6.0	99	45	54	0.30	0
630	17.7	5.8	102	47	55	0.27	0
800	15.9	6.1	101	43	58	0.56	0
1000	10.9	6.2	98	37	62	0.34	0
1250	9.2	6.8	98	37	61	0.33	0
1600	6.9	7.3	103	41	61	0.31	0
2000	5.6	7.8	96	37	58	0.44	0
2500	5.9	8.6	95	34	59	0.32	0
3150	6.2	10.1	97	32	63	0.27	0
4000	7.0	12.4	96	30	63	0.35	0
5000	7.8	15.7	95	25	66	0.43	-

STC Rating **51** *(Sound Transmission Class)*
Deficiencies **24** *(Sum of Deficiencies)*
OITC Rating **34** *(Outdoor-Indoor Transmission Class)*

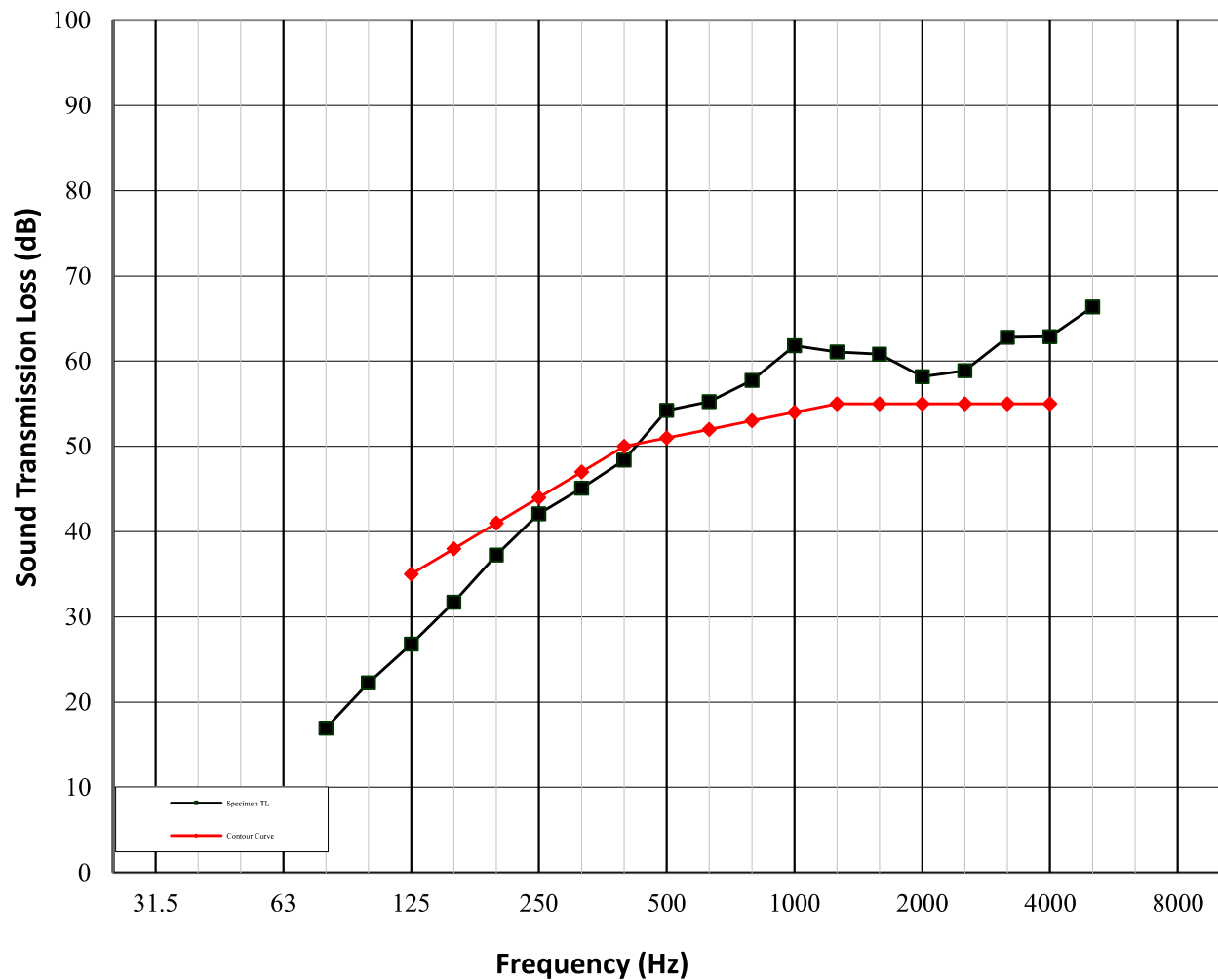
Notes:
 1) Receive Room levels less than 5 dB above the Background levels are red.
 2) Specimen TL levels listed in red indicate the lower limit of the transmission loss.
 3) Specimen TL levels listed in green indicate that there has been a filler wall correction applied

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E90

Test Date	05/03/17					
Data File No.	G9722.01K					
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association					
Description	W-12, wall assembly (26 gauge steel R-Panel, R-10 fiberglass insulation, 8" steel girt, R-25 fiberglass insulation, vapor retarder, steel hat channel, one layer Type X 5/8" gypsum board on receive side)					
Specimen Area	5.95 m ²	Receive Temp.	21.8 °C		Source Temp.	22.2 °C
Technician	Sean G. Close	Receive Humidity	53%		Source Humidity	49%

Airborne Sound Transmission Loss



Appendix C

Photographs



Receive Room View of Installed Specimen



Source Room View of Installed Specimen



Girt with Support Bracket

Test K, Drawing W-12, Test Date 05/3/17

Data File No. G9722.01K

STC: 51

OITC: 34

1" VERTICAL
STEEL
BANDING @ 30"
O.C.

VAPOR RETARDER

STEEL HAT
CHANNEL
@ 24" O.C.

5/8" GYPSUM
BOARD TYPE X

INTERIOR

26 GA. METAL
WALL PANEL

R-25 FG INSULATION
W/ HANGERS @ 48"
O.C.

8" GIRT @ 60" O.C.

R-10 FG INSULATION

EXTERIOR

W-12

R-Panel, 8" Girt, R25+R10,
1 Layer Gyp. Bd.



G9722.13-113-11-R1
ACOUSTICAL PERFORMANCE TEST REPORT
ASTM E90

Rendered to:

METAL BUILDING MANUFACTURERS ASSOCIATION
AND
NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION

TEST SPECIMEN: W-13, Wall Assembly

DATA FILE NO: G9722.01L

STC: 53

OITC: 38

Test Specimen Identification (Source to Receive Room)

Steel Wall Panel: 26 Gauge R-Panel
Insulation: R-10 FG Insulation over the Girt
Girt: 8" 16 Gauge Steel 60" O.C.
Insulation: R-25 FG Insulation
Vapor Retarder
Steel Hat Channel: 20 MSG Galvanized Steel 24" O.C.
Gypsum Board: Two Layers, Type X, 5/8" Gypsum Board

Reference should be made to Intertek-ATI Report No. G9722.13-113-11 for complete test specimen description. This page alone is not a complete report. Flanking limit tests and reference specimen tests are available upon request.



Acoustical Performance Test Report

METAL BUILDING MANUFACTURERS ASSOCIATION
1300 Sumner Avenue
Cleveland, Ohio 44115

AND

NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION
11 Canal Center, Suite 103
Alexandria, Virginia 22310

Report No	G9722.13-113-11
Revision 1	08/31/17
Test Date	05/03/17
Report Date	07/07/17
Specimen Construction Date	05/01/17

Project Scope

Architectural Testing, Inc., an Intertek company ("Intertek-ATI"), was contracted to conduct a sound transmission loss test. The complete test data is included as Appendix B of this report.

Test Methods

Testing for this project was conducted in accordance with the following standards. The equipment listed in the attachments meets the requirements of the following standards.

ASTM E90-09(2016), *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements*

ASTM E413-16, *Classification for Rating Sound Insulation*

ASTM E1332-16, *Standard Classification for Rating Outdoor-Indoor Sound Attenuation*

ASTM E2235-04 (2012), *Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods*

Test Procedure

All measurements were conducted in the HT test chambers at Intertek-ATI located in York, Pennsylvania. The sensitivity of the microphones was checked before measurements were conducted.

Test Procedure (Continued)

The transmission loss values were obtained for a single direction of measurement. Two 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 the receive and source rooms at each of five microphone positions.

The air temperature and relative humidity conditions were monitored and recorded during all measurements.

Specimen Installation

A sound transmission loss test was initially performed on a filler wall. The 96" wide by 96" high specimen plug was removed from the filler wall assembly. All materials were provided by the client. The specimen was constructed by Intertek-ATI personnel in the test opening (see the test materials list and Appendices C and D for photographs and illustrations). Duct seal was used to seal the perimeter of the specimen to the test opening on both sides. The interior side of the specimen, when installed, was approximately 1/4" from being flush with the receive room side of the filler wall. A stethoscope was used to check for any abnormal air leaks around the test specimen prior to testing.

Test Calculations

Transmission loss (TL) at each 1/3 octave frequency is the average source room sound pressure level minus the average receive room sound pressure level, plus 10 times the log of the specimen area divided by the sound absorption of the receive room with the sample in place.

STC Rating

To obtain the Sound Transmission Class (STC), read the TL of the contour curve at 500 Hz. The sum of the deficiencies below the contour curve must not exceed 32. The maximum deficiency at any one frequency must not exceed 8.

OITC Rating

The Outdoor-Indoor Transmission Class (OITC) is calculated by subtracting the logarithmic summation of the TL values from the logarithmic summation of the A-weighted transportation noise spectrum stated in ASTM E1332.

Test Specimen Materials (Source Room to Receive Room)

Material	Actual Dimensions (inches)	Actual Thickness (inches)	Description	Quantity	Average Weight
Steel Wall Panel	38-3/4 by 96	0.50	R-Panel, 26 Gauge	2.5 sheets	0.795 lbs/ft ²
	<i>Note: Screws spaced 30" on centers along overlap, 12" on center along steel girt.</i>				
Insulation Support Banding	1 by 96	0.037	N/A	4	0.125 lbs/linear ft
	<i>Note: Held insulation in place from source side, 48" apart from the center of the wall and 3-1/2" from each end, fastened to wood stops at top and bottom.</i>				
Insulation	48 by 96	3 (approx.)	R-10 Fiberglass Insulation	2 blankets	0.15 lbs/ft ²
	<i>Note: Insulation was installed over the girts.</i>				
Steel Girt	8 by 96	8	16 Gauge	2	4 lbs/linear ft
	<i>Note: Attached to L-Bracket for support at both ends. Spaced 60" on center. The measured thickness of the metal was 0.111".</i>				
Insulation	60 by 96 18 by 96 18 by 96	8 (approx.)	R-25 Fiberglass Insulation	3 blankets	0.40 lbs/ft ²
	<i>Note: N/A</i>				
Vapor Retarder	96 by 96	0.005	Polypropylene with tri-directional fiberglass	1	0.015 lbs/ft ²
	<i>Note: N/A</i>				
Steel Banding	1 by 96	0.024	N/A	4	0.085 lbs/linear ft
	<i>Note: Spaced 30" on center from the center of the wall. Screwed to girts and wood stops at top and bottom.</i>				
Steel Hat Channel	3 by 96	0.75	20 MSG Galvanized	5	0.420 lbs/linear ft
	<i>Note: Spaced 24" on center vertically from the center of the wall. Screwed to girts.</i>				
Gypsum Board First Layer	48 by 96	0.625	Type X	2	2.28 lbs/ft ²
	<i>Note: Screw spacing 24" on center vertically and horizontally. Center joint caulked and taped. Screw heads taped.</i>				
Gypsum Board Second Layer	48 by 96	0.625	Type X	2	2.28 lbs/ft ²
	<i>Note: Screw spacing 12" on center vertically and 24" on center horizontally. Center joint caulked and taped. Screw heads taped.</i>				

Comments

The total weight of the wall system was 466 lbs. A drawing of the test specimen is included in Appendix D. Intertek-ATI will store samples of test specimens for four years.

Intertek-ATI will service this report for the entire test record retention period. Test records, such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained by Intertek-ATI for the entire test record retention period. The test record retention period ends four years after the test date.

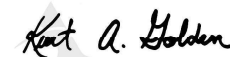
This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen tested. This report is intended to help in the client's quality assurance program, but it does not represent a continuous or exhaustive evaluation of the specimen tested or of other products or materials that were not evaluated. The statements and data provided herein do not constitute approval, disapproval, certification, or acceptance of performance or materials.

This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For INTERTEK-ATI:


Digitally Signed by: Sean Close

Sean G. Close
Technician - Acoustical Testing


Digitally Signed by: Kurt A. Golden

Kurt A. Golden
Project Lead – Acoustical Testing

SGC:jmc

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix A: Equipment description (1)
- Appendix B: Complete test results (2)
- Appendix C: Photographs (2)
- Appendix D: Drawing (1)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
R0	07/07/17	N/A	Original Report Issue
R1	08/31/17	Entire report	Changes to ensure consistency between roof assembly and wall test reports per clients' request

Appendix A

Instrumentation:

Instrument	Manufacturer	Model	Description	ATI Number	Date of Calibration
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	1643A62	04/16 *
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	65126	05/16 *
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	065125	05/16 *
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64902	07/16
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64903	02/17
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	65103	02/17
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64905	02/17
Source Room Microphone	PCB piezotronics	378C20	Microphone and Preamplifier	64906	02/17
Receive Room Microphone	PBC Piezotronics	378B20	Microphone and Preamplifier	64907	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64908	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64909	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64910	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64911	01/17
Receive Room Environmental Indicator	Comet	T7510	Receive Room	64915	03/17
Source Room Environmental Indicator	Comet	T7510	Source Room	64914	03/17
Microphone Calibrator	Norsonic	1251	Pistonphone Calibrator	65105	05/16

*- 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	Rotating vane and stationary diffusers Temperature and humidity controlled Isolation pads under the floor
Source Room	207 m ³	Stationary diffusers only Temperature and humidity controlled

	Maximum Size	Description
TL Test Opening	4.27 m wide by 3.05 m high	Vibration break between source and receive rooms

N/A-Not Applicable



G9722.13-113-11-R1

Appendix B

Complete Test Results

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E90

Test Date	05/03/17						
Data File No.	G9722.01L						
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association						
Description	W-13, wall assembly (26 gauge steel R-Panel, R-10 fiberglass insulation, 8" steel girt, R-25 fiberglass insulation, vapor retarder, steel hat channel, two layers Type X 5/8" gypsum board on receive side)						
Specimen Area	5.95 m ²	Receive Temp.	21.6 °C		Source Temp.	22.4 °C	
Technician	Sean G. Close	Receive Humidity	51%		Source Humidity	50%	

Freq (Hz)	Background SPL (dB)	Absorption (m ²)	Source SPL (dB)	Receive SPL (dB)	Specimen TL (dB)	95% Confidence Limit	Number of Deficiencies
80	38.9	4.2	103	82	22	1.81	-
100	34.2	5.1	105	78	27	1.24	-
125	36.2	5.0	105	77	29	2.51	8
160	39.8	4.4	104	69	36	0.65	4
200	38.5	4.7	107	68	40	0.62	3
250	32.2	5.1	106	61	46	0.58	0
315	26.1	5.5	100	53	48	0.58	1
400	22.2	5.9	99	47	51	0.36	1
500	18.7	6.0	99	43	57	0.39	0
630	17.6	5.8	102	45	57	0.28	0
800	16.4	6.2	101	42	60	0.51	0
1000	11.9	6.4	99	35	64	0.36	0
1250	10.6	6.9	99	35	63	0.31	0
1600	9.8	7.3	103	38	64	0.31	0
2000	8.5	7.8	96	34	62	0.45	0
2500	7.2	8.7	95	30	64	0.26	0
3150	7.3	10.2	97	28	67	0.21	0
4000	8.3	12.5	96	26	67	0.32	0
5000	9.0	16.0	95	21	71	0.35	-

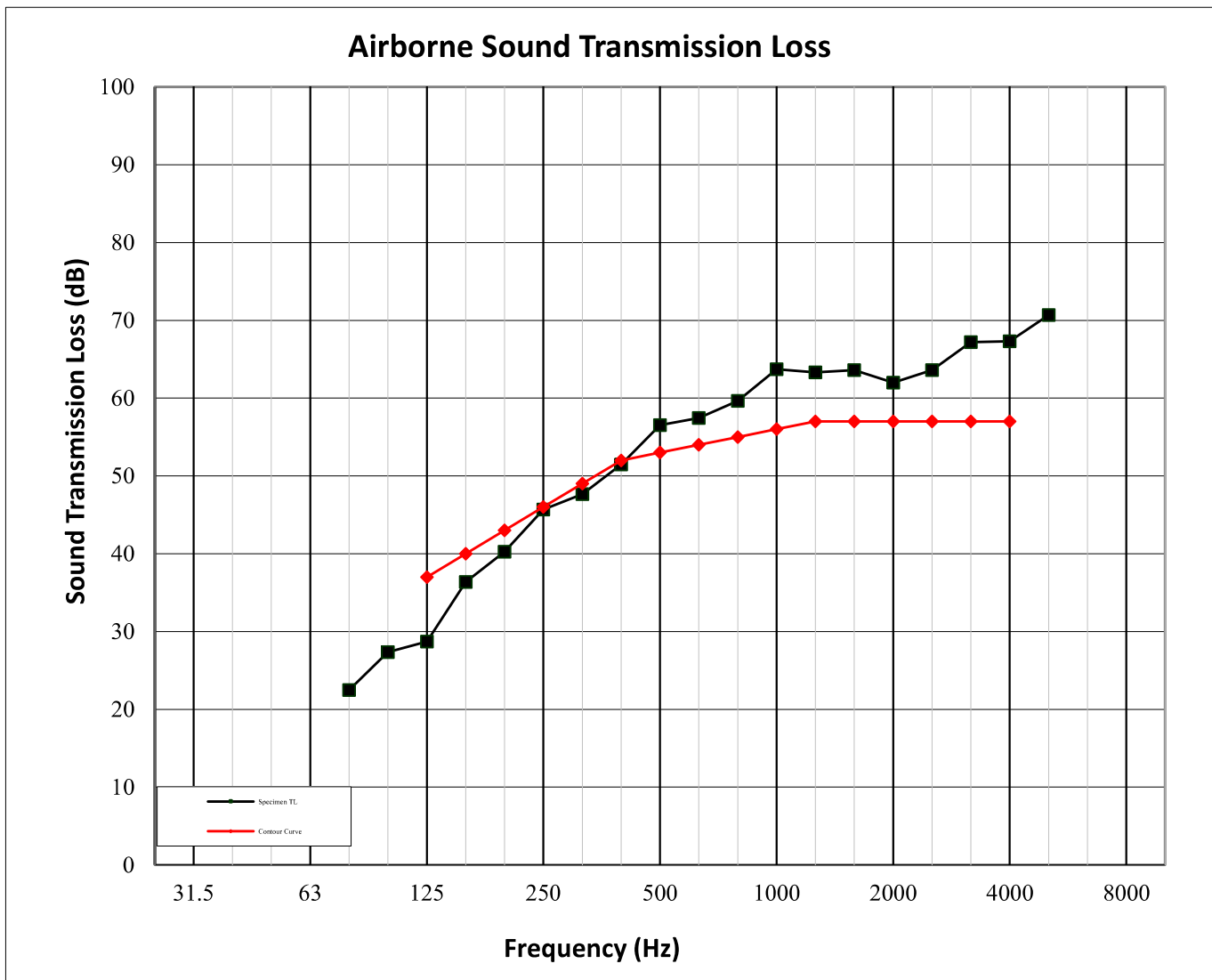
STC Rating **53** *(Sound Transmission Class)*
Deficiencies **17** *(Sum of Deficiencies)*
OITC Rating **38** *(Outdoor-Indoor Transmission Class)*

Notes:
 1) Receive Room levels less than 5 dB above the Background levels are red.
 2) Specimen TL levels listed in red indicate the lower limit of the transmission loss.
 3) Specimen TL levels listed in green indicate that there has been a filler wall correction applied

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E90

Test Date	05/03/17						
Data File No.	G9722.01L						
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association						
Description	W-13, wall assembly (26 gauge steel R-Panel, R-10 fiberglass insulation, 8" steel girt, R-25 fiberglass insulation, vapor retarder, steel hat channel, two layers Type X 5/8" gypsum board on receive side)						
Specimen Area	5.95 m ²	Receive Temp.	21.6 °C		Source Temp.	22.4 °C	
Technician	Sean G. Close	Receive Humidity	51%		Source Humidity	50%	



Appendix C

Photographs



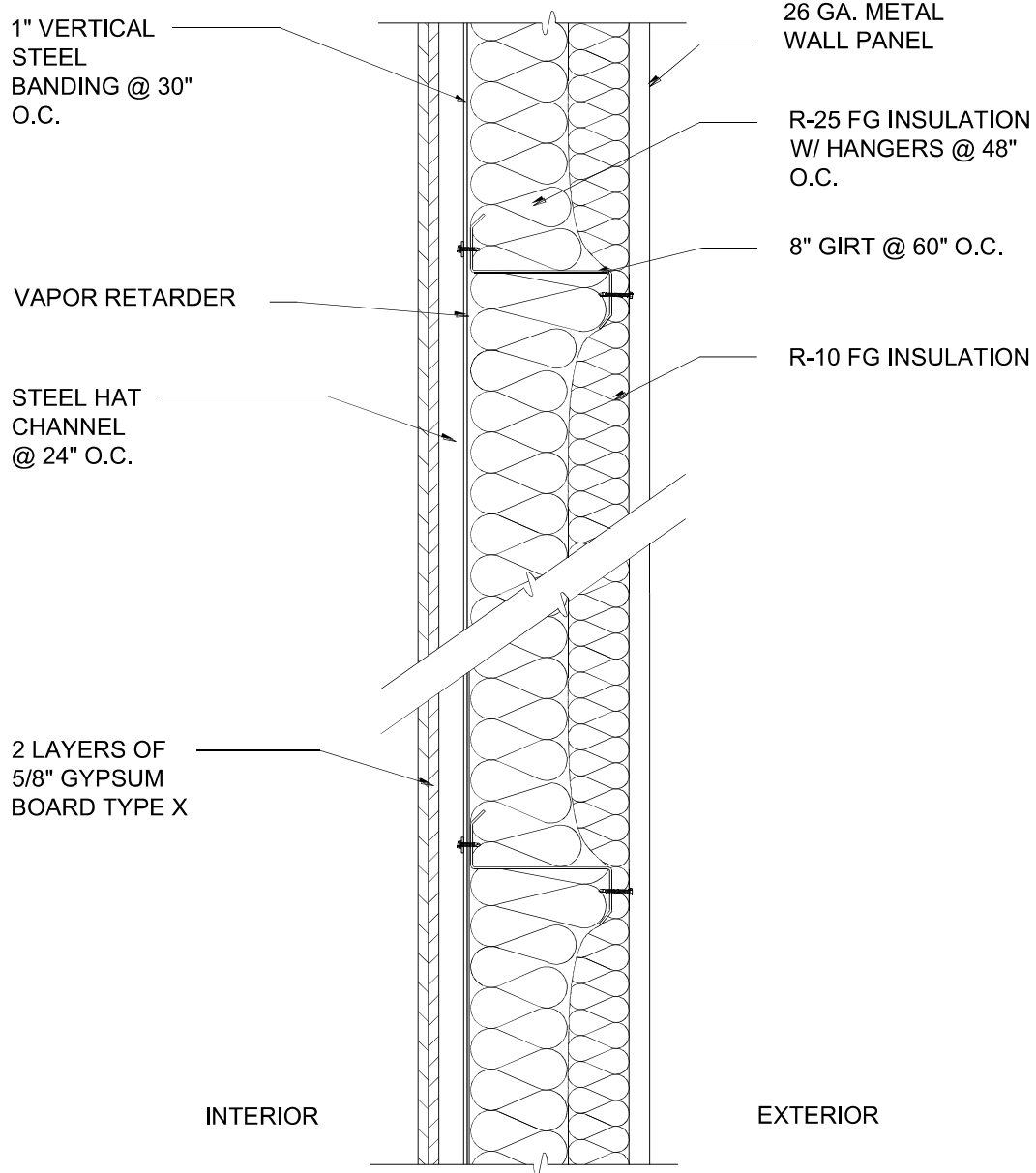
Receive Room View of Installed Specimen



Source Room View of Installed Specimen



Girt with Support Bracket

**Test L, Drawing W-13, Test Date 05/3/17****Data File No. G9722.01L****STC: 53****OITC: 38**

W-13

R-Panel, 8" Girt, R25+R10,
2 Layer Gyp. Bd.

UL W404
EQUIVALENT



**G9722.14-113-11-R1
ACOUSTICAL PERFORMANCE TEST REPORT
ASTM E90**

Rendered to:

**METAL BUILDING MANUFACTURERS ASSOCIATION
AND
NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION**

TEST SPECIMEN: W-17, Wall Assembly

DATA FILE NO: G9722.01M

STC: 57

OITC: 42

Test Specimen Identification (Source to Receive Room)

Steel Wall Panel: 26 Gauge R-Panel
Insulation: R-10 FG Insulation over the Girts
Girt: 8" 16 Gauge Steel 60" O.C.
Insulation: R-25 FG Insulation
Vapor Retarder
Steel Hat Channel: 20 MSG Galvanized Steel 24" O.C.
Gypsum Board: Four Layers, Type X, 5/8" Gypsum Board

Reference should be made to Intertek-ATI Report No. G9722.14-113-11 for complete test specimen description. This page alone is not a complete report. Flanking limit tests and reference specimen tests are available upon request.



Acoustical Performance Test Report

METAL BUILDING MANUFACTURERS ASSOCIATION
1300 Sumner Avenue
Cleveland, Ohio 44115

AND

NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION
11 Canal Center, Suite 103
Alexandria, Virginia 22310

Report No	G9722.14-113-11
Revision 1	08/31/17
Test Date	05/03/17
Report Date	07/07/17
Specimen Construction Date	05/01/17

Project Scope

Architectural Testing, Inc., an Intertek company ("Intertek-ATI"), was contracted to conduct a sound transmission loss test. The complete test data is included as Appendix B of this report.

Test Methods

Testing for this project was conducted in accordance with the following standards. The equipment listed in the attachments meets the requirements of the following standards.

ASTM E90-09(2016), *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements*

ASTM E413-16, *Classification for Rating Sound Insulation*

ASTM E1332-16, *Standard Classification for Rating Outdoor-Indoor Sound Attenuation*

ASTM E2235-04 (2012), *Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods*

Test Procedure

All measurements were conducted in the HT test chambers at Intertek-ATI located in York, Pennsylvania. The sensitivity of the microphones was checked before measurements were conducted.

Test Procedure (Continued)

The transmission loss values were obtained for a single direction of measurement. Two 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 the receive and source rooms at each of five microphone positions.

The air temperature and relative humidity conditions were monitored and recorded during all measurements.

Specimen Installation

A sound transmission loss test was initially performed on a filler wall. The 96" wide by 96" high specimen plug was removed from the filler wall assembly. All materials were provided by the client. The specimen was constructed by Intertek-ATI personnel in the test opening (see the test materials list and Appendices C and D for photographs and illustrations). Duct seal was used to seal the perimeter of the specimen to the test opening on both sides. The interior side of the specimen, when installed, was approximately 1/4" from being flush with the receive room side of the filler wall. A stethoscope was used to check for any abnormal air leaks around the test specimen prior to testing.

Test Calculations

Transmission loss (TL) at each 1/3 octave frequency is the average source room sound pressure level minus the average receive room sound pressure level, plus 10 times the log of the specimen area divided by the sound absorption of the receive room with the sample in place.

STC Rating

To obtain the Sound Transmission Class (STC), read the TL of the contour curve at 500 Hz. The sum of the deficiencies below the contour curve must not exceed 32. The maximum deficiency at any one frequency must not exceed 8.

OITC Rating

The Outdoor-Indoor Transmission Class (OITC) is calculated by subtracting the logarithmic summation of the TL values from the logarithmic summation of the A-weighted transportation noise spectrum stated in ASTM E1332.

Test Specimen Materials (Source Room to Receive Room)

Material	Actual Dimensions (inches)	Actual Thickness (inches)	Description	Quantity	Average Weight
Steel Wall Panel	38-3/4 by 96	0.50	R-Panel, 26 Gauge	2.5 sheets	0.795 lbs/ft ²
	<i>Note: Screws spaced 30" on centers along overlap, 12" on center along steel girt.</i>				
Insulation Support Banding	1 by 96	0.037	N/A	4	0.125 lbs/linear ft
	<i>Note: Held insulation in place from source side, 48" apart from the center of the wall and 3-1/2" from each end, fastened to wood stops at top and bottom.</i>				
Insulation	48 by 96	3 (approx.)	R-10 Fiberglass Insulation	2 blankets	0.15 lbs/ft ²
	<i>Note: Insulation was installed over the girts.</i>				
Steel Girt	8 by 96	8	16 Gauge	2	4 lbs/linear ft
	<i>Note: Attached to L-Bracket for support at both ends. Spaced 60" on center. The measured thickness of the metal was 0.111".</i>				
Insulation	60 by 96 18 by 96 18 by 96	8 (approx.)	R-25 Fiberglass Insulation	3 blankets	0.40 lbs/ft ²
	<i>Note: Insulation was installed between girts and test frame box.</i>				
Vapor Retarder	96 by 96	0.005	Polypropylene with tri-directional fiberglass	1	0.015 lbs/ft ²
	<i>Note: N/A</i>				
Steel Banding	1 by 96	0.024	N/A	4	0.085 lbs/linear ft
	<i>Note: Spaced 30" on center from the center of the wall. Screwed to girts and wood stops at top and bottom.</i>				
Steel Hat Channel	3 by 96	0.75	20 MSG Galvanized	5	0.420 lbs/linear ft
	<i>Note: Spaced 24" on center vertically from the center of the wall. Screwed to girts.</i>				
Gypsum Board First Layer	48 by 96	0.625	Type X	2	2.28 lbs/ft ²
	<i>Note: Screw spacing 24" on center vertically and horizontally. Center joint caulked and taped. Screw heads taped.</i>				
Gypsum Board Second Layer	48 by 96	0.625	Type X	2	2.28 lbs/ft ²
	<i>Note: Screw spacing 24" on center vertically and horizontally. Center joint caulked and taped. Screw heads taped.</i>				
Gypsum Board Third Layer	48 by 96	0.625	Type X	2	2.28 lbs/ft ²
	<i>Note: Screw spacing 12" on center vertically and 24" horizontally. Center joint caulked and taped. Screw heads taped.</i>				
Gypsum Board Fourth Layer	48 by 96	0.625	Type X	2	2.28 lbs/ft ²
	<i>Note: Screw spacing 12" on center vertically and 24" horizontally. Center joint caulked and taped. Screw heads taped.</i>				

Comments

The total weight of the wall system was 758 lbs. A drawing of the test specimen is included in Appendix D. Intertek-ATI will store samples of test specimens for four years.

Intertek-ATI will service this report for the entire test record retention period. Test records, such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained by Intertek-ATI for the entire test record retention period. The test record retention period ends four years after the test date.

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 tested. This report is intended to help in the client's quality assurance program, but it does not represent a continuous or exhaustive evaluation of the specimen tested or of other products or materials that were not evaluated. The statements and data provided herein do not constitute approval, disapproval, certification, or acceptance of performance or materials.

This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For INTERTEK-ATI:


Digitally Signed by: Sean Close

Sean G. Close
Technician - Acoustical Testing


Digitally Signed by: Kurt A. Golden

Kurt A. Golden
Project Lead – Acoustical Testing

SGC:jmc

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix A: Equipment description (1)
- Appendix B: Complete test results (2)
- Appendix C: Photographs (2)
- Appendix D: Drawing (1)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
R0	07/07/17	N/A	Original Report Issue
R1	08/31/17	Page 3	Test specimen description, added 24" to gypsum board layers 3 and 4
R1	08/31/17	Entire report	Changes to ensure consistency between roof assembly and wall test reports per clients' request

Appendix A

Instrumentation:

Instrument	Manufacturer	Model	Description	ATI Number	Date of Calibration
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	1643A62	04/16 *
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	65126	05/16 *
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	065125	05/16 *
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64902	07/16
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64903	02/17
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	65103	02/17
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64905	02/17
Source Room Microphone	PCB piezotronics	378C20	Microphone and Preamplifier	64906	02/17
Receive Room Microphone	PBC Piezotronics	378B20	Microphone and Preamplifier	64907	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64908	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64909	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64910	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64911	01/17
Receive Room Environmental Indicator	Comet	T7510	Receive Room	64915	03/17
Source Room Environmental Indicator	Comet	T7510	Source Room	64914	03/17
Microphone Calibrator	Norsonic	1251	Pistonphone Calibrator	65105	05/16

*- 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	Rotating vane and stationary diffusers Temperature and humidity controlled Isolation pads under the floor
Source Room	207 m ³	Stationary diffusers only Temperature and humidity controlled

	Maximum Size	Description
TL Test Opening	4.27 m wide by 3.05 m high	Vibration break between source and receive rooms

N/A-Not Applicable



G9722.14-113-11-R1

Appendix B

Complete Test Results

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E90

Test Date	05/03/17						
Data File No.	G9722.01M						
Client	Metal Building Manufacturers Association and North America Insulation Manufacturers Association						
Description	W-17, wall assembly (26 gauge steel R-Panel, R-10 fiberglass insulation, 8" steel girt, R-25 fiberglass insulation, vapor retarder, steel hat channel, four layers Type X 5/8" gypsum board on receive side)						
Specimen Area	5.95 m ²	Receive Temp.	22.1 °C		Source Temp.	22.4 °C	
Technician	Sean G. Close	Receive Humidity	49%		Source Humidity	49%	

Freq (Hz)	Background SPL (dB)	Absorption (m ²)	Source SPL (dB)	Receive SPL (dB)	Specimen TL (dB)	95% Confidence Limit	Number of Deficiencies
80	41.5	3.8	103	79	26	2.47	-
100	38.1	5.4	105	73	32	1.38	-
125	36.4	5.2	105	72	33	2.41	8
160	39.8	4.5	104	68	37	0.91	7
200	38.1	4.5	107	64	44	0.94	3
250	32.0	5.2	105	58	49	0.79	1
315	25.8	5.5	100	51	50	0.85	3
400	21.9	5.8	98	44	55	0.82	1
500	18.7	6.2	99	42	58	0.62	0
630	18.7	5.9	101	43	59	0.57	0
800	19.3	6.2	101	40	61	0.77	0
1000	17.9	6.3	98	33	65	0.69	0
1250	17.6	6.8	98	33	65	0.65	0
1600	14.6	7.3	102	36	66	0.64	0
2000	11.2	7.8	96	31	64	0.71	0
2500	9.2	8.6	95	26	68	0.59	0
3150	8.1	10.3	97	24	71	0.56	0
4000	7.6	12.6	96	22	71	0.65	0
5000	8.1	16.1	95	15	76	0.68	-

STC Rating **57** *(Sound Transmission Class)*
Deficiencies **23** *(Sum of Deficiencies)*
OITC Rating **42** *(Outdoor-Indoor Transmission Class)*

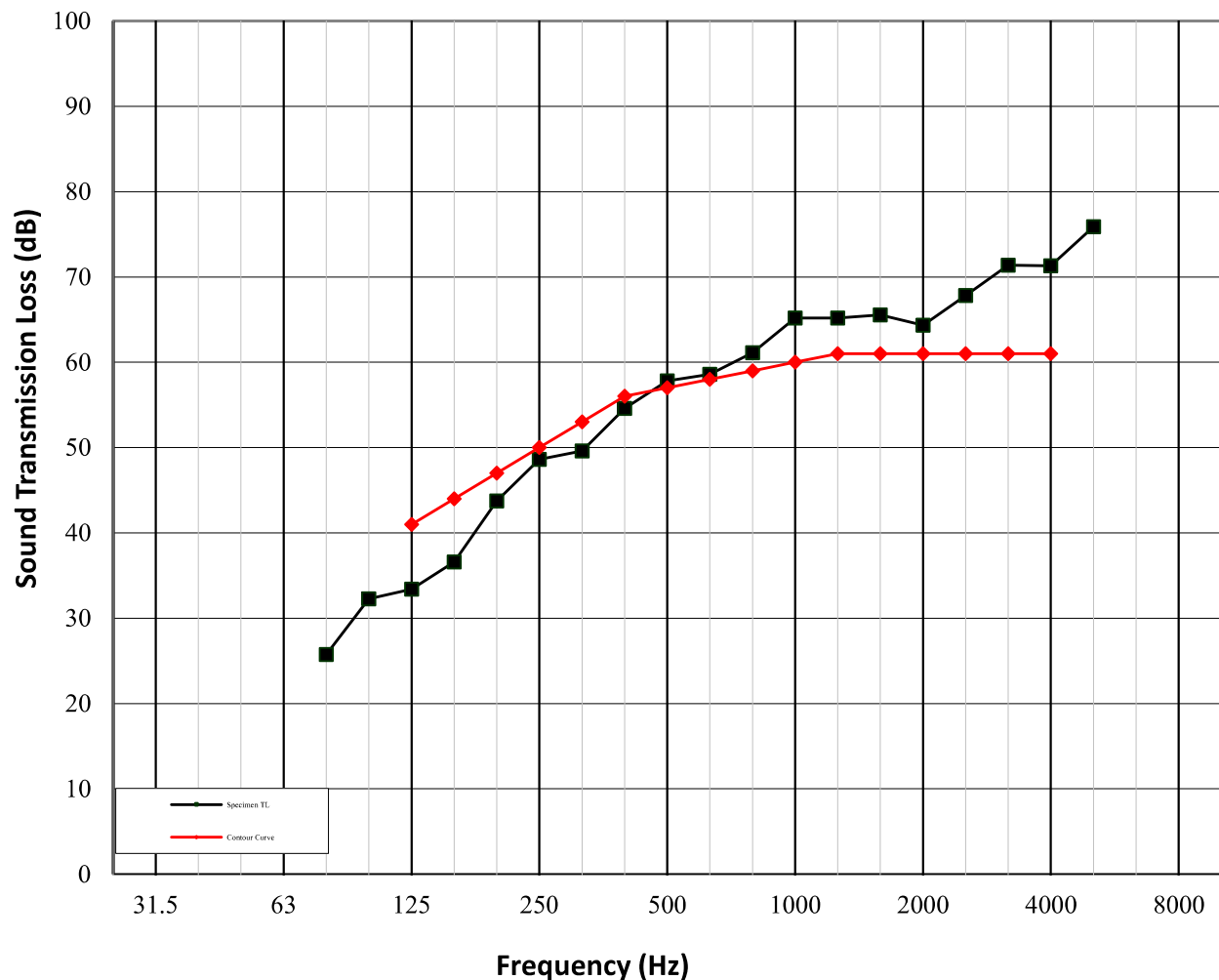
Notes:
 1) Receive Room levels less than 5 dB above the Background levels are red.
 2) Specimen TL levels listed in red indicate the lower limit of the transmission loss.
 3) Specimen TL levels listed in green indicate that there has been a filler wall correction applied

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E90

Test Date	05/03/17					
Data File No.	G9722.01M					
Client	Metal Building Manufacturers Association and North America Insulation Manufacturers Association					
Description	W-17, wall assembly (26 gauge steel R-Panel, R-10 fiberglass insulation, 8" steel girt, R-25 fiberglass insulation, vapor retarder, steel hat channel, four layers Type X 5/8" gypsum board on receive side)					
Specimen Area	5.95 m ²	Receive Temp.	22.1 °C		Source Temp.	22.4 °C
Technician	Sean G. Close	Receive Humidity	49%		Source Humidity	49%

Airborne Sound Transmission Loss



Appendix C

Photographs



Receive Room View of Installed Specimen



Source Room View of Installed Specimen



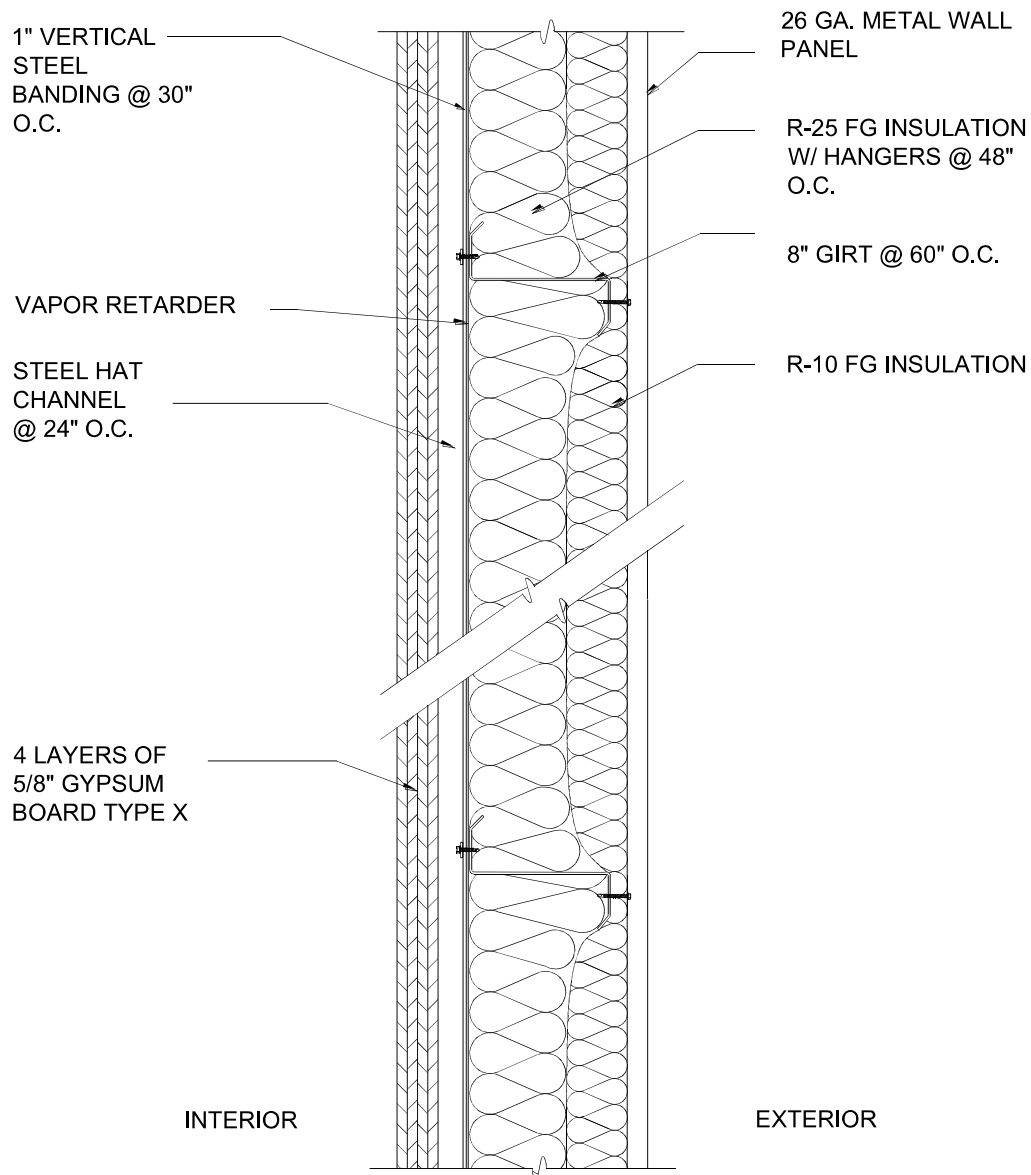
Girt with Support Bracket

Test M, Drawing W-17, Test Date 05/3/17

Data File No. G9722.01M

STC: 57

OITC: 42

**W-17**R-Panel, 8" Girt, R25+R10,
4 Layer Gyp. Bd.UL W413
EQUIVALENT



**G9722.15-113-11-R2
ACOUSTICAL PERFORMANCE TEST REPORT
ASTM E90**

Rendered to:

**METAL BUILDING MANUFACTURERS ASSOCIATION
AND
NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION**

TEST SPECIMEN: W-18, Wall Assembly

DATA FILE NO: G9722.01N

STC: 55

OITC: 41

Test Specimen Identification (Source to Receive Room)

Steel Wall Panel: 26 Gauge R-Panel
Insulation: R-10 FG Insulation over the Girts
Girt: 8" 16 Gauge Steel 60" O.C.
Insulation: 6" Mineral Fiber Wool
Vapor Retarder
Steel Hat Channel: 20 MSG Galvanized Steel 24" O.C.
Gypsum Board: Three Layers, Type X, 5/8" Gypsum Board

Reference should be made to Intertek-ATI Report No. G9722.15-113-11 for complete test specimen description. This page alone is not a complete report. Flanking limit tests and reference specimen tests are available upon request.



Acoustical Performance Test Report

METAL BUILDING MANUFACTURERS ASSOCIATION
1300 Sumner Avenue
Cleveland, Ohio 44115

AND

NORTH AMERICAN INSULATION MANUFACTURERS ASSOCIATION
11 Canal Center, Suite 103
Alexandria, Virginia 22310

Report No	G9722.15-113-11
Revision 2	08/31/17
Test Date	05/04/17
Report Date	07/07/17
Specimen Construction Date	05/01/17

Project Scope

Architectural Testing, Inc., an Intertek company ("Intertek-ATI"), was contracted to conduct a sound transmission loss test. The complete test data is included as Appendix B of this report.

Test Methods

Testing for this project was conducted in accordance with the following standards. The equipment listed in the attachments meets the requirements of the following standards.

ASTM E90-09(2016), *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements*

ASTM E413-16, *Classification for Rating Sound Insulation*

ASTM E1332-16, *Standard Classification for Rating Outdoor-Indoor Sound Attenuation*

ASTM E2235-04 (2012), *Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods*

Test Procedure

All measurements were conducted in the HT test chambers at Intertek-ATI located in York, Pennsylvania. The sensitivity of the microphones was checked before measurements were conducted.

Test Procedure (Continued)

The transmission loss values were obtained for a single direction of measurement. Two 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 the receive and source rooms at each of five microphone positions.

The air temperature and relative humidity conditions were monitored and recorded during all measurements.

Specimen Installation

A sound transmission loss test was initially performed on a filler wall. The 96" wide by 96" high specimen plug was removed from the filler wall assembly. All materials were provided by the client. The specimen was constructed by Intertek-ATI personnel in the test opening (see the test materials list and Appendices C and D for photographs and illustrations). Duct seal was used to seal the perimeter of the specimen to the test opening on both sides. The interior side of the specimen, when installed, was approximately 1/4" from being flush with the receive room side of the filler wall. A stethoscope was used to check for any abnormal air leaks around the test specimen prior to testing.

Test Calculations

Transmission loss (TL) at each 1/3 octave frequency is the average source room sound pressure level minus the average receive room sound pressure level, plus 10 times the log of the specimen area divided by the sound absorption of the receive room with the sample in place.

STC Rating

To obtain the Sound Transmission Class (STC), read the TL of the contour curve at 500 Hz. The sum of the deficiencies below the contour curve must not exceed 32. The maximum deficiency at any one frequency must not exceed 8.

OITC Rating

The Outdoor-Indoor Transmission Class (OITC) is calculated by subtracting the logarithmic summation of the TL values from the logarithmic summation of the A-weighted transportation noise spectrum stated in ASTM E1332.

Test Specimen Materials (Source Room to Receive Room)

Material	Actual Dimensions (inches)	Actual Thickness (inches)	Description	Quantity	Average Weight
Steel Wall Panel	38-3/4 by 96	0.50	R-Panel, 26 Gauge	2.5 sheets	0.795 lbs/ft ²
	<i>Note: Screws spaced 30" on centers along overlap, 12" on center along steel girt.</i>				
Insulation Support Banding	1 by 96	0.037	N/A	4	0.125 lbs/linear ft
	<i>Note: Held insulation in place from source side, 48" apart from the center of the wall and 3-1/2" from each end, fastened to wood stops at top and bottom.</i>				
Insulation	48 by 96	3 (approx.)	R-10 Fiberglass Insulation	2 blankets	0.15 lbs/ft ²
	<i>Note: Insulation was installed over the girts.</i>				
Steel Girt	8 by 96	8	16 Gauge	2	4 lbs/linear ft
	<i>Note: Attached to L-Bracket for support at both ends. Spaced 60" on center. The measured thickness of the metal was 0.111".</i>				
Insulation First Layer	24 by 48	3 (approx.)	Mineral Fiber Wool	8 batts	0.560 lbs/ft ²
	<i>Note: Insulation was installed between the girts and test frame box. R-4.2 per inch +/-.</i>				
Insulation Second Layer	24 by 48	3 (approx.)	Mineral Fiber Wool	8 batts	0.560 lbs/ft ²
	<i>Note: Insulation was installed between the girts and test frame box. First and second layers equaled 6" thick mineral fiber wool. R-4.2 per inch +/-.</i>				
Vapor Retarder	96 by 96	0.005	Polypropylene with tri-directional fiberglass	1	0.015 lbs/ft ²
	<i>Note: N/A</i>				
Steel Banding	1 by 96	0.024	N/A	4	0.085 lbs/linear ft
	<i>Note: Spaced 30" on center from the center of the wall. Screwed to girts and wood stops at top and bottom.</i>				
Steel Hat Channel	3 by 96	0.75	20 MSG Galvanized	5	0.420 lbs/linear ft
	<i>Note: Spaced 24" on center vertically from the center of the wall. Screwed to girts.</i>				
Gypsum Board First Layer	48 by 96	0.625	Type X	2	2.28 lbs/ft ²
	<i>Note: Screw spacing 24" on center vertically and horizontally. Center joint caulked and taped. Screw heads taped.</i>				
Gypsum Board Second Layer	48 by 96	0.625	Type X	2	2.28 lbs/ft ²
	<i>Note: Screw spacing 24" on center vertically and horizontally. Center joint caulked and taped. Screw heads taped.</i>				
Gypsum Board Third Layer	48 by 96	0.625	Type X	2	2.28 lbs/ft ²
	<i>Note: Screw spacing 12" on center vertically and 24" horizontally. Center joint caulked and taped. Screw heads taped.</i>				

Comments

The total weight of the wall system was 658 lbs. A drawing of the test specimen is included in Appendix D. Intertek-ATI will store samples of test specimens for four years.

Intertek-ATI will service this report for the entire test record retention period. Test records, such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained by Intertek-ATI for the entire test record retention period. The test record retention period ends four years after the test date.

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 tested. This report is intended to help in the client's quality assurance program, but it does not represent a continuous or exhaustive evaluation of the specimen tested or of other products or materials that were not evaluated. The statements and data provided herein do not constitute approval, disapproval, certification, or acceptance of performance or materials.

This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

For INTERTEK-ATI:


Digitally Signed by: Sean Close

Sean G. Close
Technician - Acoustical Testing


Digitally Signed by: Kurt A. Golden

Kurt A. Golden
Project Lead – Acoustical Testing

SGC:jmc

Attachments (pages): This report is complete only when all attachments listed are included.

- Appendix A: Equipment description (1)
- Appendix B: Complete test results (2)
- Appendix C: Photographs (2)
- Appendix D: Drawing (1)

Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
R0	07/07/17	N/A	Original Report Issue
R1	07/19/17	Appendix D	Replaced drawing
R2	08/28/17	Entire report	Changes to ensure consistency between roof assembly and wall test reports per clients' request

Appendix A

Instrumentation:

Instrument	Manufacturer	Model	Description	ATI Number	Date of Calibration
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	1643A62	04/16 *
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	65126	05/16 *
Data Acquisition Card	National Instruments	PXI-4462	Data Acquisition Card	065125	05/16 *
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64902	07/16
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64903	02/17
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	65103	02/17
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64905	02/17
Source Room Microphone	PCB piezotronics	378C20	Microphone and Preamplifier	64906	02/17
Receive Room Microphone	PBC Piezotronics	378B20	Microphone and Preamplifier	64907	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64908	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64909	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64910	01/17
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64911	01/17
Receive Room Environmental Indicator	Comet	T7510	Receive Room	64915	03/17
Source Room Environmental Indicator	Comet	T7510	Source Room	64914	03/17
Microphone Calibrator	Norsonic	1251	Pistonphone Calibrator	65105	05/16

*- 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	Rotating vane and stationary diffusers Temperature and humidity controlled Isolation pads under the floor
Source Room	207 m ³	Stationary diffusers only Temperature and humidity controlled

	Maximum Size	Description
TL Test Opening	4.27 m wide by 3.05 m high	Vibration break between source and receive rooms

N/A-Not Applicable



G9722.15-113-11-R2

Appendix B

Complete Test Results

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E90

Test Date	05/04/17						
Data File No.	G9722.01N						
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association						
Description	W-18, wall assembly (26 gauge steel R- Panel, R-10 fiberglass insulation, 8" steel girt, two layers 3" mineral fiber wool, vapor retarder, steel hat channel, three layers Type X 5/8" gypsum board on receive side)						
Specimen Area	5.95 m ²	Receive Temp.	20.8 °C		Source Temp.	20.9 °C	
Technician	Sean G. Close	Receive Humidity	50%		Source Humidity	52%	

Freq (Hz)	Background SPL (dB)	Absorption (m ²)	Source SPL (dB)	Receive SPL (dB)	Specimen TL (dB)	95% Confidence Limit	Number of Deficiencies
80	40.1	4.2	102	78	26	2.24	-
100	34.3	4.7	105	74	31	1.41	-
125	35.3	4.8	104	74	31	2.25	8
160	39.2	4.3	104	70	35	0.61	7
200	36.2	4.6	106	64	44	0.58	1
250	30.1	5.2	105	58	48	0.48	0
315	24.6	5.6	100	51	50	0.55	1
400	23.4	5.8	98	44	54	0.37	0
500	20.4	6.1	99	42	57	0.37	0
630	17.7	5.9	101	44	58	0.23	0
800	15.8	6.2	101	41	60	0.46	0
1000	10.8	6.3	98	34	64	0.33	0
1250	10.4	6.8	98	34	64	0.22	0
1600	7.5	7.3	102	37	65	0.25	0
2000	6.9	7.7	96	33	63	0.39	0
2500	6.0	8.7	95	29	65	0.29	0
3150	6.2	10.4	97	27	68	0.19	0
4000	7.0	12.8	96	24	69	0.26	0
5000	7.9	16.4	95	18	73	0.28	-

STC Rating **55** (Sound Transmission Class)
 Deficiencies **17** (Sum of Deficiencies)
 OITC Rating **41** (Outdoor-Indoor Transmission Class)

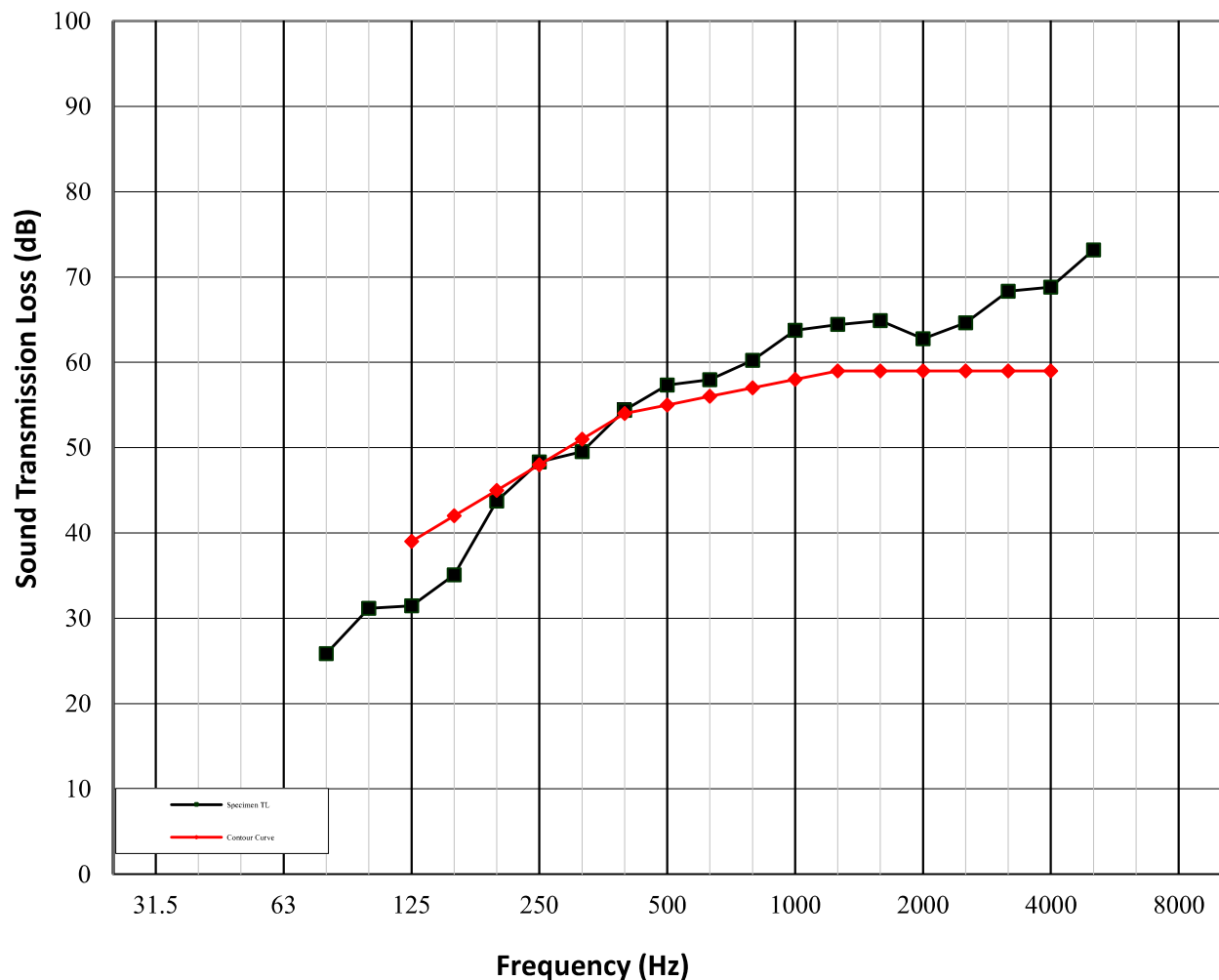
Notes:
 1) Receive Room levels less than 5 dB above the Background levels are red.
 2) Specimen TL levels listed in red indicate the lower limit of the transmission loss.
 3) Specimen TL levels listed in green indicate that there has been a filler wall correction applied

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E90

Test Date	05/04/17					
Data File No.	G9722.01N					
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association					
Description	W-18, wall assembly (26 gauge steel R- Panel, R-10 fiberglass insulation, 8" steel girt, two layers 3" mineral fiber wool, vapor retarder, steel hat channel, three layers Type X 5/8" gypsum board on receive side)					
Specimen Area	5.95 m ²	Receive Temp.	20.8 °C	Source Temp.	20.9 °C	
Technician	Sean G. Close	Receive Humidity	50%	Source Humidity	52%	

Airborne Sound Transmission Loss



Appendix C

Photographs



Receive Room View of Installed Specimen



Source Room View of Installed Specimen



Girt with Support Bracket

Test N, Drawing W-18, Test Date 05/3/17

Data File No. G9722.01N

STC: 55

OITC: 41

1" VERTICAL
STEEL
BANDING @ 30"
O.C.

26 GA. METAL
WALL PANEL

8" GIRT @ 60" O.C.

VAPOR RETARDER

R-10 FG INSULATION

STEEL HAT
CHANNEL
@ 24" O.C.

6" MINERAL WOOL
INSULATION

3 LAYERS OF
5/8" GYPSUM
BOARD TYPE X

INTERIOR

EXTERIOR

W-18

R-Panel, 8" Girt, 6 inch Mineral Fiber
Wool+R10, 3 Layer Gyp. Bd.

UL W413
EQUIVALENT