



**G9721.01-113-11-R1
ACOUSTICAL PERFORMANCE TEST REPORT
ASTM E90**

Rendered to:

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

TEST SPECIMEN: R-1, Roof Assembly

DATA FILE NO: G9721.01

STC: 37

OITC: 26

Test Specimen Identification (Source Room to Receive Room)

Steel Roof Panel: 24 Gauge Standing Seam Roof Panel
Spacer Block: R-2.5 Thermal Spacer Block
Steel Purlin: 8" 16 Gauge Steel Purlin
Insulation (Top Layer): R-11 FG Insulation
Insulation (Bottom Layer): R-19 FG Insulation
Vapor Retarder

Reference should be made to Intertek-ATI Report No. G9721.01-113-11 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	G9721.01-113-11
Revision 1	08/28/17
Test Date	05/31/17
Report Date	07/07/17
Specimen Construction Date	05/31/17

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 VT 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

The full test specimen was assembled on the day of testing by Intertek-ATI. All materials provided by the client were installed on an existing Intertek-ATI assembly utilizing Intertek-ATI-supplied materials (see the test materials list and Appendices C and D for photographs and illustrations). The assembly was installed in a steel test frame which was installed into the opening between the source and receive rooms in the test chamber. The test frame was isolated from the structure with a dense neoprene gasket. Duct seal was used to seal the perimeter of the specimen to the test opening on both sides. The top of the steel roof deck ribs, when installed, were approximately 1/4" from being flush with the upper room side of the test opening. 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
Roof Panel	112 by 24	2.5 Rib Ht.	Standing Seam, 24 Gauge	105.81 ft ²	1.15 lbs/ft ²
	<i>Note: Attached to purlin utilizing 1.375" panel clips. The measured thickness of the metal was 0.02".</i>				
Thermal Spacer Block	24 by 3	0.65	R-2.5	12 units	0.04 lbs/unit
	<i>Note: Insulation installed perpendicular over purlins.</i>				
Purlin	112 by 1	8	Steel, 16 Gauge	2 Units	4 lbs/linear ft
	<i>Note: Attached to the perimeter frame utilizing steel angle brackets. Spaced 60" on center. The measured thickness of the metal was 0.111".</i>				
Insulation	12 by 6	3 Approx.	R-11 Fiberglass Insulation	105.81 ft ²	0.04 lbs/ft ²
	<i>Note: Loose laid on top of bottom layer of insulation.</i>				
Insulation	136 by 60	6 Approx.	R-19 Fiberglass Insulation	105.81 ft ²	0.03 lbs/ft ²
	<i>Note: Insulation installed parallel to purlins and supported by banding.</i>				
Vapor Barrier	136 by 60	0.01	Polypropylene with Tri-directional fiberglass	105.81 ft ²	0.01 lbs/ft ²
	<i>Note: N/A</i>				
Steel Banding	112 by 1	0.02	N/A	5 Units	0.97 lbs/unit
	<i>Note: Spaced 30" on center perpendicular to the purlins from the center of the roof assembly. Screwed to the purlins and perimeter.</i>				

Comments

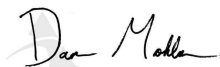
The total weight of the floor/ceiling assembly was 254 lbs. A drawing of the test specimen is included in Appendix D. Intertek-ATI will store samples of test specimens for four years.

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: Daniel Mohler

Daniel B. Mohler
Project Lead - Acoustical Testing


Digitally Signed by: Jordan Strybos

Jordan Strybos
Project Manager – Acoustical Testing

DBM: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 (1)
- 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	ATI Number	Date of Calibration	
Data Acquisition Unit	National Instruments	PXI-4462	63763-4	07/16	*
Data Acquisition Unit	National Instruments	PXI-4462	63763-1	06/16	*
Data Acquisition Unit	National Instruments	PXI-4462	63763-5	06/16	*
Microphone Calibrator	Norsonic	1251	INT00127	03/17	
Receive Room Microphone	PCB Piezotronics	378C20	65617	05/17	
Receive Room Microphone	PCB Piezotronics	378B20	63744	05/17	
Receive Room Microphone	PCB Piezotronics	378B20	63745	05/17	
Receive Room Microphone	PCB Piezotronics	378B20	63746	09/16	
Receive Room Microphone	PCB Piezotronics	378B20	63747	05/17	
Receive Room Environmental Indicator	Comet	T7510	63810	10/16	
			63811	10/16	
Source Room Microphone	PCB Piezotronics	378B20	63738	04/17	
Source Room Microphone	PCB Piezotronics	378B20	63739	04/17	
Source Room Microphone	PCB Piezotronics	378B20	63740	04/17	
Source Room Microphone	PCB Piezotronics	378B20	63742	04/17	
Source Room Microphone	PCB Electronics	378B20	63741	04/17	
Source Room Environmental Indicator	Comet	T7510	63812	11/16	

* The calibration frequency for this equipment is every two years per the manufacturer's recommendation.

Test Chambers:

VT Receive Room Volume	157 m ³
VT Source Room Volume	190 m ³



G9721.01-113-11-R1

Appendix B

Complete Test Results



G9721.01-113-11-R1

**AIRBORNE SOUND TRANSMISSION LOSS**

ASTM E 90

Test Date	05/31/17					
Data File No.	G9721.01					
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association					
Description	63.5 mm (2.5") 24 Gauge Standing Seam Roof Panel, 16.6 mm (0.65") R-2.5 Thermal Spacer Block, 88.9 mm (3.5") R-11 Fiberglass, 165.1 mm (6.5") R-19 Fiberglass Insulation, 0.13 mm (0.01") Polypropylene with tri-directional fiberglass, 203.2 mm (8") 16 Gauge Steel Purlin, 0.61 mm (0.02") Steel Banding					
Specimen Area	10.98 m ²	Receive Temp.	18.6 °C	Source Temp.	19.9 °C	
Technician	Daniel B. Mohler	Receive Humidity	73%	Source Humidity	74%	

Freq (Hz)	Background SPL (dB)	Absorption (m ²)	Source SPL (dB)	Receive SPL (dB)	Specimen TL (dB)	95% Confidence Limit	Number of Deficiencies
80	40.5	19.5	108	92	14	4.60	-
100	29.6	21.1	106	87	15	2.30	-
125	31.2	22.2	103	84	16	2.10	5
160	24.2	18.7	105	83	20	1.50	4
200	21.2	20.7	103	77	23	1.50	4
250	24.3	19.2	103	74	27	0.80	3
315	19.8	19.1	106	76	28	1.10	5
400	18.1	19.6	104	71	30	0.60	6
500	20.9	18.5	103	67	33	0.50	4
630	18.2	17.2	103	62	38	0.60	0
800	17.6	17.7	103	59	41	0.50	0
1000	13.5	16.1	103	57	44	0.50	0
1250	12.5	16.2	101	51	48	0.30	0
1600	10.5	15.0	101	49	51	0.40	0
2000	9.4	15.3	101	48	52	0.40	0
2500	7.7	15.0	97	44	52	0.30	0
3150	7.7	15.0	98	43	54	0.50	0
4000	6.8	15.6	98	41	56	0.40	0
5000	6.4	16.5	96	36	58	0.50	-
6300	6.6	18.7	93	32	59	0.40	-
8000	6.9	22.7	94	30	61	0.60	-
10000	7.2	27.1	92	25	63	0.70	-

STC Rating **37** (Sound Transmission Class)

Deficiencies 31 (Sum of Deficiencies)

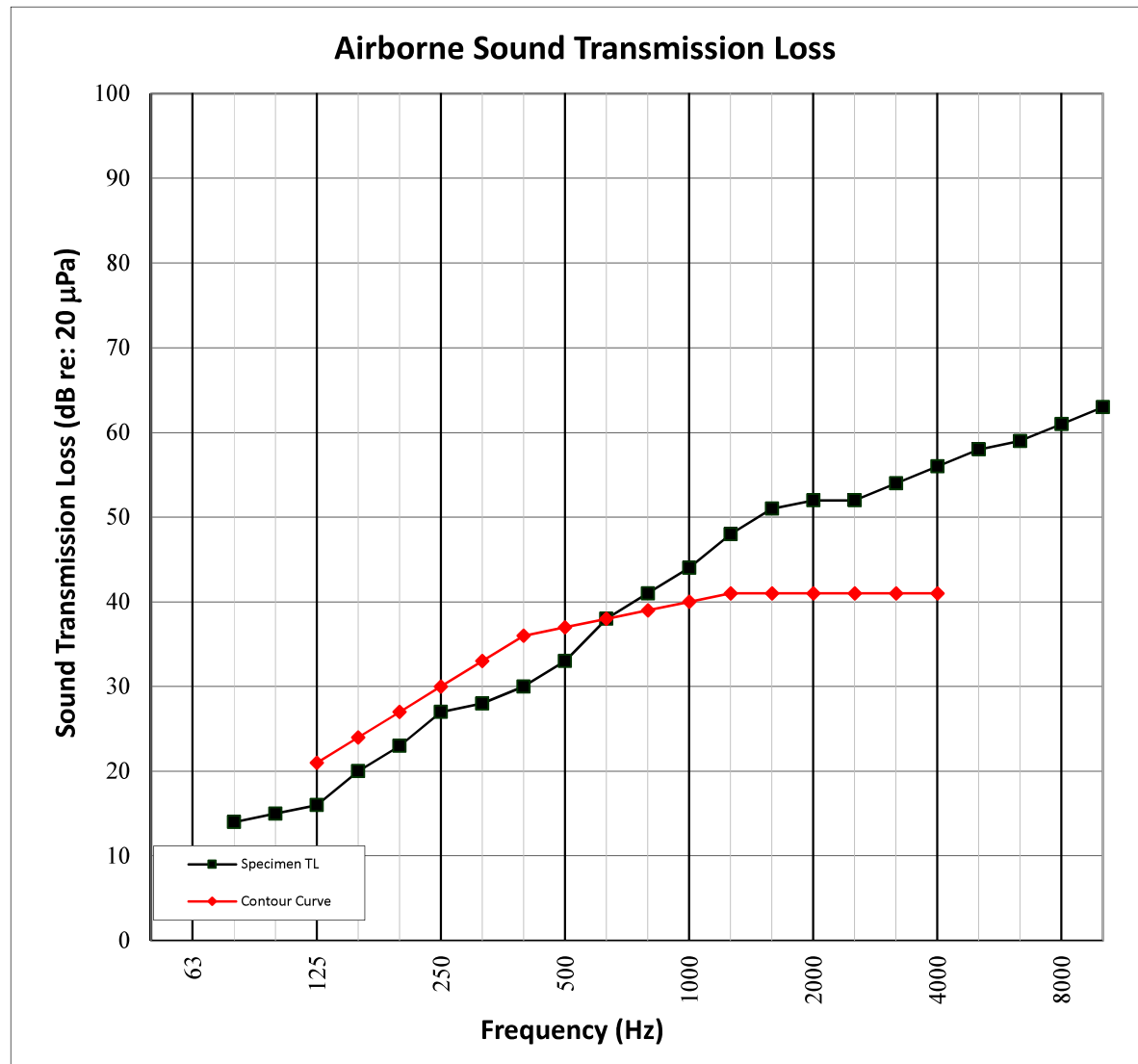
OITC Rating **26** (Outdoor-Indoor Transmission Class)**Notes:**

- 1) Receive Room levels less than 5 dB above the Background levels are highlighted in yellow.
- 2) Specimen TL levels listed in red are potentially limited by the laboratory flanking limit.
- 3) Specimen TL levels listed in blue indicate the lower limit of the transmission loss.
- 4) Specimen TL levels listed in green indicate that there has been a filler wall correction applied

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E 90

Test Date	05/31/17					
Data File No.	G9721.01					
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association					
Description	63.5 mm (2.5") 24 Gauge Standing Seam Roof Panel, 16.6 mm (0.65") R-2.5 Thermal Spacer Block, 88.9 mm (3.5") R-11 Fiberglass, 165.1 mm (6.5") R-19 Fiberglass Insulation, 0.13 mm (0.01") Polypropylene with tri-directional fiberglass, 203.2 mm (8") 16 Gauge Steel Purlin, 0.61 mm (0.02") Steel Banding					
Specimen Area	10.98 m ²	Receive Temp.	18.6 °C	Source Temp.	19.9 °C	
Technician	Daniel B. Mohler	Receive Humidity	73%	Source Humidity	74%	



Appendix C

Photographs



Construction of Test Specimen

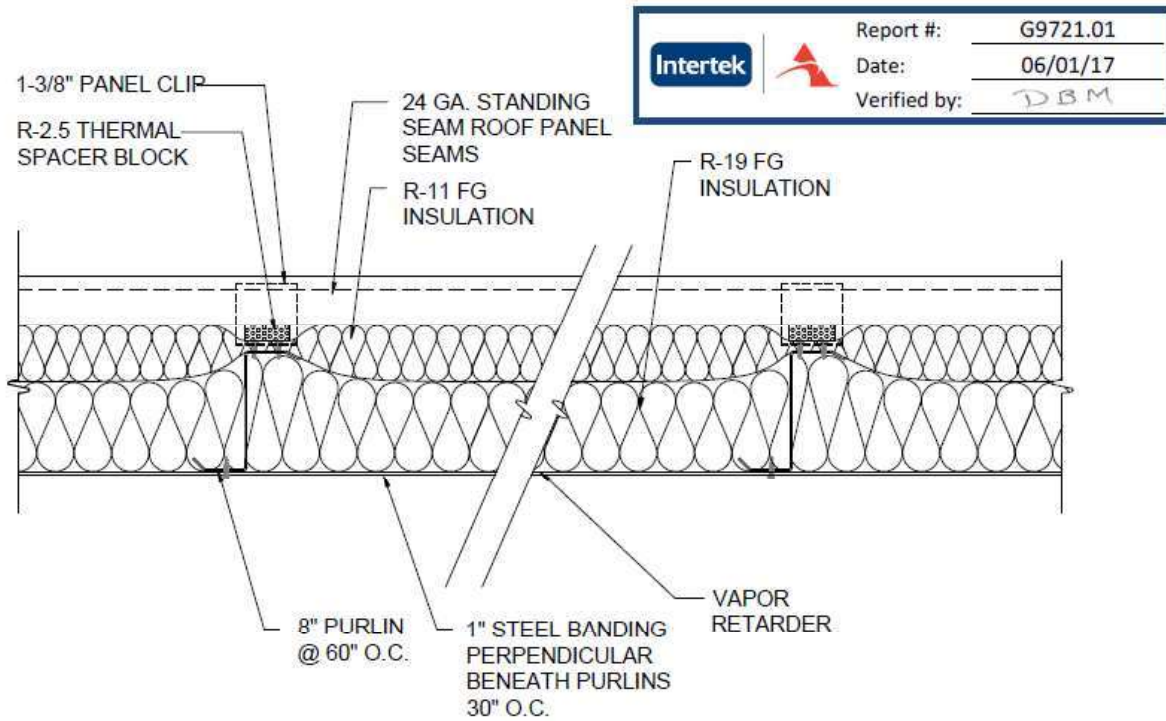


Receive Room View of Test Specimen Installation

Appendix D

Drawing

Test A, Drawing R-1, Test Date 05/31/17	
Data File No. G9721.01	
STC: 37	OITC: 26





**G9721.02-113-11-R1
ACOUSTICAL PERFORMANCE TEST REPORT
ASTM E90**

Rendered to:

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

TEST SPECIMEN: R-2, Roof Assembly

DATA FILE NO: G9721.02

STC: 45

OITC: 30

Test Specimen Identification (Source Room to Receive Room)

Steel Roof Panel: 24 Gauge Standing Seam Roof Panel
Spacer Block: R-2.5 Thermal Spacer Block
Steel Purlin: 8" 16 Gauge Steel Purlin
Insulation (Top Layer): R-11 FG Insulation
Insulation (Bottom Layer): R-19 FG Insulation
Vapor Retarder
Main Beams: Main Beams
Cross Tees: 4' Cross Tees
Cross Tees: 2' Cross Tees
Ceiling Tiles: Textured Square Edge Ceiling Tiles

Reference should be made to Intertek-ATI Report No. G9721.02-113-11 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	G9721.02-113-11
Revision 1	08/24/17
Test Date	05/31/17
Report Date	07/07/17
Specimen Construction Date	05/31/17

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 VT 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

The full test specimen was assembled on the day of testing by Intertek-ATI. All materials provided by the client were installed on an existing Intertek-ATI assembly utilizing Intertek-ATI-supplied materials (see the test materials list and Appendices C and D for photographs and illustrations). The assembly was installed in a steel test frame which was installed into the opening between the source and receive rooms in the test chamber. The test frame was isolated from the structure with a dense neoprene gasket. Duct seal was used to seal the perimeter of the specimen to the test opening on both sides. The top of the steel roof deck ribs, when installed, were approximately 1/4" from being flush with the upper room side of the test opening. 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
Roof Panel	112 by 24	2.5 Rib Ht.	Standing Seam, 24 Gauge	105.81 ft ²	1.15 lbs/ft ²
	<i>Note: Attached to purlin utilizing 1.375" panel clips. The measured thickness of the metal was 0.02".</i>				
Thermal Spacer Block	24 by 3	0.65	R-2.5	12 units	0.04 lbs/unit
	<i>Note: Insulation installed perpendicular over purlins.</i>				
Purlin	112 by 1	8	Steel, 16 Gauge	2 Units	4 lbs/linear ft
	<i>Note: Attached to the perimeter frame utilizing steel angle brackets. Spaced 60" on center. The measured thickness of the metal was 0.08".</i>				
Insulation	12 by 6	3 Approx.	R-11 Fiberglass Insulation	105.81 ft ²	0.04 lbs/ft ²
	<i>Note: Loose laid on top of bottom layer of insulation.</i>				
Insulation	136 by 60	6 Approx.	R-19 Fiberglass Insulation	105.81 ft ²	0.03 lbs/ft ²
	<i>Note: Insulation installed parallel to purlins and supported by banding.</i>				
Vapor Barrier	136 by 60	0.01	Polypropylene with Tri-directional fiberglass	105.81 ft ²	0.01 lbs/ft ²
	<i>Note: N/A</i>				
Steel Banding	112 by 1	0.02	N/A	5 Units	0.97 lbs/unit
	<i>Note: Spaced 30" on center perpendicular to the purlins from the center of the roof assembly. Screwed to the purlins and perimeter.</i>				
Main Beams	110 by 0.90	1.689	N/A	36.7 Lin. ft	0.22 lbs/ft
	<i>Note: #12 SWG hanger wires were attached around the purlin and through the main beams at eight locations. The beams were spaced on 48" centers.</i>				
Cross Tees	48 by 0.90	1.689	4' Cross Tees	16 Lin. ft	0.16 lbs/ft
	<i>Note: Inserted into the main beams on 24" centers.</i>				
Cross Tees	24 by 0.90	1.689	2' Cross Tees	62 Lin ft	0.14 lbs/ft
	<i>Note: Placed into the 4' cross tees on 24" centers.</i>				
Ceiling Tiles	24 by 24	0.563	Textured Square Edge	105.81 ft ²	0.60 lbs/ ft ²
	<i>Note: Placed into the drop ceiling grid; 7/8" by 7/8" hemmed angle molding was placed along the perimeter.</i>				

Comments

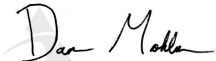
The total weight of the floor/ceiling assembly was 337 lbs. A drawing of the test specimen is included in Appendix D. Intertek-ATI will store samples of test specimens for four years.

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: Daniel Mohler

Daniel B. Mohler
Project Lead - Acoustical Testing


Digitally Signed by: Jordan Strybos

Jordan Strybos
Project Manager – Acoustical Testing

DBM: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)
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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	08/24/17	Entire report	Changes to ensure consistency between roof assembly and wall test reports per clients' request.

Appendix A

Instrumentation

Instrument	Manufacturer	Model	ATI Number	Date of Calibration
Data Acquisition Unit	National Instruments	PXI-4462	63763-4	07/16 *
Data Acquisition Unit	National Instruments	PXI-4462	63763-1	06/16 *
Data Acquisition Unit	National Instruments	PXI-4462	63763-5	06/16 *
Microphone Calibrator	Norsonic	1251	INT00127	03/17
Receive Room Microphone	PCB Electronics	378C20	INT00204	01/17
Receive Room Microphone	PCB Piezotronics	378C20	65586	02/17
Receive Room Microphone	PCB Piezotronics	378B20	64340	08/16
Receive Room Microphone	PCB Piezotronics	378B20	63746	09/16
Receive Room Microphone	PCB Piezotronics	378C20	65969	03/17
Receive Room Environmental Indicator	Comet	T7510	63810	10/16
			63811	10/16
Source Room Microphone	PCB Piezotronics	378B20	63738	04/17
Source Room Microphone	PCB Piezotronics	378B20	63739	04/17
Source Room Microphone	PCB Piezotronics	378B20	63740	04/17
Source Room Microphone	PCB Piezotronics	378B20	63742	04/17
Source Room Microphone	PCB Electronics	378B20	63741	04/17
Source Room Environmental Indicator	Comet	T7510	63812	11/16

* The calibration frequency for this equipment is every two years per the manufacturer's recommendation.

Test Chambers

VT Receive Room Volume	157 m ³
VT Source Room Volume	190 m ³



G9721.02-113-11-R1

Appendix B

Complete Test Results



G9721.02-113-11-R1

**AIRBORNE SOUND TRANSMISSION LOSS**

ASTM E 90

Test Date	05/31/17					
Data File No.	G9721.02					
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association					
Description	24 Gauge Standing Seam Roof Panel, R-2.5 Thermal Spacer Block, 8" 16 Gauge Steel Purlin, R-11 Fiberglass, R-19 Fiberglass Insulation, Polypropylene with tri-directional fiberglass, Steel Banding, Main Beams, 4' Cross Tees, 2' Cross Tees, Textured Square Edge Ceiling Tiles					
Specimen Area	10.98 m ²	Receive Temp.	18.6 °C	Source Temp.	19.0 °C	
Technician	Daniel B. Mohler	Receive Humidity	73%	Source Humidity	59%	

Freq (Hz)	Background SPL (dB)	Absorption (m ²)	Source SPL (dB)	Receive SPL (dB)	Specimen TL (dB)	95% Confidence Limit	Number of Deficiencies
80	40.6	19.4	108	89	16	4.20	-
100	32.4	15.8	105	85	19	2.50	-
125	33.2	15.0	104	81	21	1.70	8
160	28.8	12.6	105	78	26	1.50	6
200	25.2	14.4	103	71	31	1.60	4
250	27.0	13.1	103	68	34	0.90	4
315	23.8	13.5	106	69	36	0.60	5
400	21.3	12.5	104	64	40	0.50	4
500	22.1	12.8	103	58	44	0.50	1
630	20.7	14.1	103	52	49	0.50	0
800	19.4	14.5	103	48	54	0.50	0
1000	15.8	14.6	103	44	57	0.60	0
1250	14.3	15.6	101	40	60	0.30	0
1600	11.9	15.2	101	38	62	0.30	0
2000	9.1	15.8	101	36	63	0.30	0
2500	7.2	16.8	97	33	62	0.30	0
3150	9.0	17.7	98	33	63	0.40	0
4000	6.1	18.6	98	30	66	0.40	0
5000	6.0	20.4	95	26	67	0.40	-
6300	6.6	23.5	93	20	69	0.40	-
8000	6.9	28.7	93	17	72	0.90	-
10000	7.1	33.7	91	12	74	0.90	-

STC Rating **45** *(Sound Transmission Class)*
Deficiencies **32** *(Sum of Deficiencies)*
OITC Rating **30** *(Outdoor-Indoor Transmission Class)*

Notes:

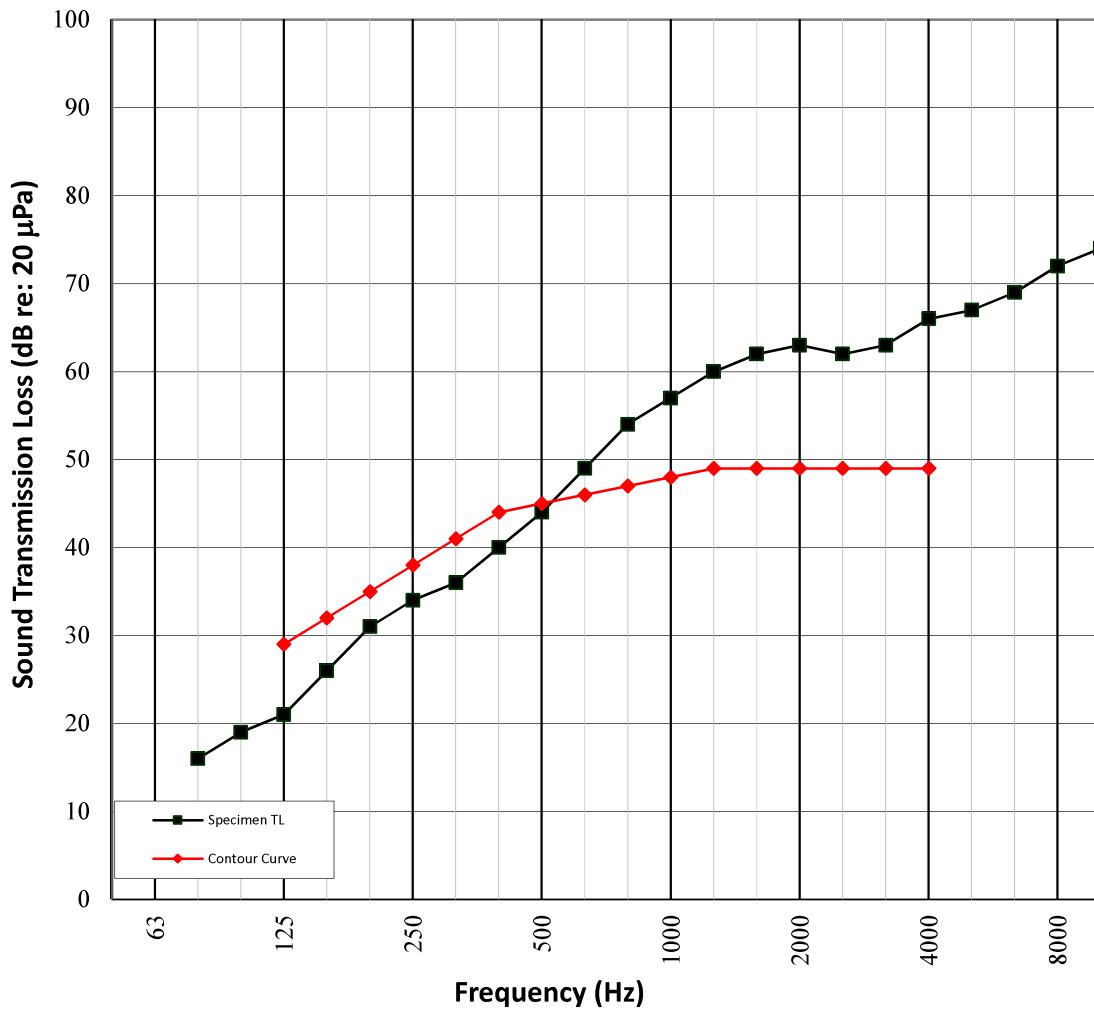
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- 2) Specimen TL levels listed in *red* are potentially limited by the laboratory flanking limit.
- 3) Specimen TL levels listed in *blue* indicate the lower limit of the transmission loss.
- 4) Specimen TL levels listed in *green* indicate that there has been a filler wall correction applied

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E 90

Test Date	05/31/17				
Data File No.	G9721.02				
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association				
Description	24 Gauge Standing Seam Roof Panel, R-2.5 Thermal Spacer Block, 8" 16 Gauge Steel Purlin, R-11 Fiberglass, R-19 Fiberglass Insulation, Polypropylene with tri-directional fiberglass, Steel Banding, Main Beams, 4' Cross Tees, 2' Cross Tees, Textured Square Edge Ceiling Tiles				
Specimen Area	10.98 m ²	Receive Temp.	18.6 °C	Source Temp.	19.0 °C
Technician	Daniel B. Mohler	Receive Humidity	73%	Source Humidity	59%

Airborne Sound Transmission Loss



Appendix C

Photographs



Construction of Test Specimen

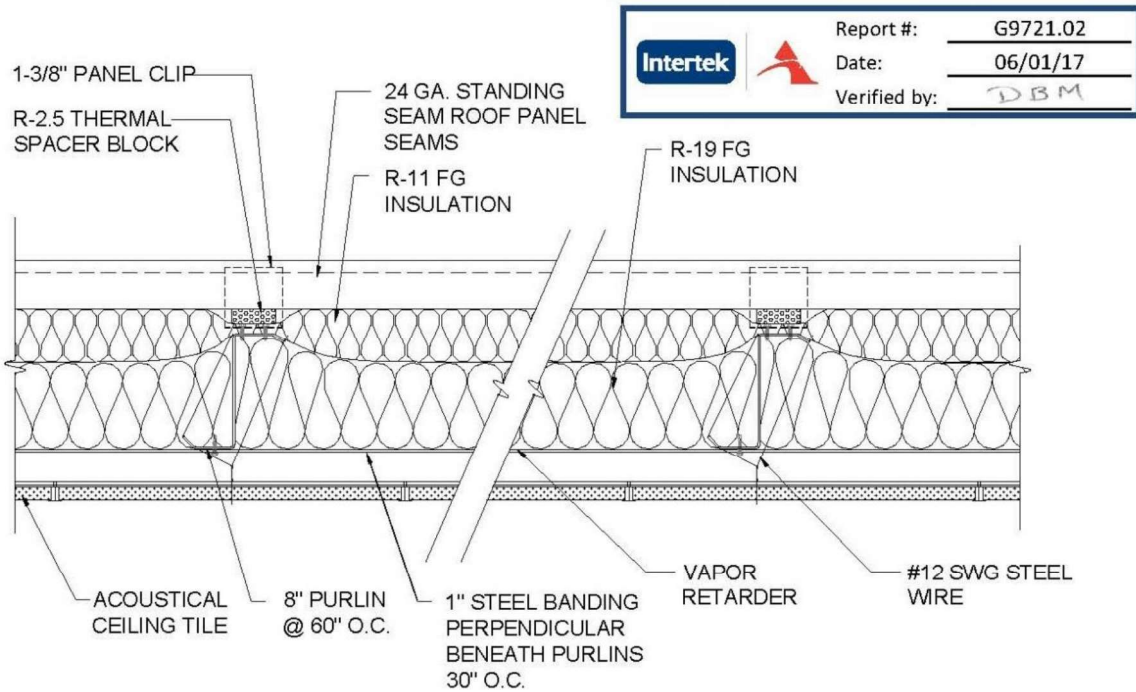


Receive Room View of Test Specimen Installation

Appendix D

Drawing

Test B, Drawing R-2, Test Date 05/31/17	
Data File No. G9721.02	
STC: 45	OITC: 30





**G9721.03-113-11-R1
ACOUSTICAL PERFORMANCE TEST REPORT
ASTM E90**

Rendered to:

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

TEST SPECIMEN: R-3, Roof Assembly

DATA FILE NO: G9721.03

STC: 56

OITC: 43

Test Specimen Identification (Source Room to Receive Room)

Steel Roof Panel: 24 Gauge Standing Seam Roof Panel
Spacer Block: R-2.5 Thermal Spacer Block
Steel Purlin: 8" 16 Gauge Steel Purlin
Insulation (Top Layer): R-11 FG Insulation
Insulation (Bottom Layer): R-19 FG Insulation
Vapor Retarder
Main Beams: C-Channel Cold Rolled Steel Channel
Cross Beams: Steel Furring Channel
Ceiling: One Layer, Type X, 8/5" Gypsum Board

Reference should be made to Intertek-ATI Report No. G9721.03-113-11 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	G9721.03-113-11
Revision 1	08/28/17
Test Date	05/31/17
Report Date	07/07/17
Specimen Construction Date	05/31/17

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 VT 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

The full test specimen was assembled on the day of testing by Intertek-ATI. All materials provided by the client were installed on an existing Intertek-ATI assembly utilizing Intertek-ATI-supplied materials (see the test materials list and Appendices C and D for photographs and illustrations). The assembly was installed in a steel test frame which was installed into the opening between the source and receive rooms in the test chamber. The test frame was isolated from the structure with a dense neoprene gasket. Duct seal was used to seal the perimeter of the specimen to the test opening on both sides. The top of the steel roof deck ribs, when installed, were approximately 1/4" from being flush with the upper room side of the test opening. 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
Roof Panel	112 by 24	2.5 Rib Ht.	Standing Seam, 24 Gauge	105.81 ft ²	1.15 lbs/ft ²
	<i>Note: Attached to purlin utilizing 1.375" panel clips. The measured thickness of the metal was 0.02".</i>				
Thermal Spacer Block	24 by 3	0.65	R-2.5	12 units	0.04 lbs/unit
	<i>Note: Insulation installed perpendicular over purlins.</i>				
Purlin	112 by 1	8	Steel, 16 Gauge	2 Units	4 lbs/linear ft
	<i>Note: Attached to the perimeter frame utilizing steel angle brackets. Spaced 60" on center. The measured thickness of the metal was 0.08".</i>				
Insulation	12 by 6	3 Approx.	R-11 Fiberglass Insulation	105.81 ft ²	0.04 lbs/ft ²
	<i>Note: Loose laid on top of bottom layer of insulation.</i>				
Insulation	136 by 60	6 Approx.	R-19 Fiberglass Insulation	105.81 ft ²	0.03 lbs/ft ²
	<i>Note: Insulation installed parallel to purlins and supported by banding.</i>				
Vapor Barrier	136 by 60	0.01	Polypropylene with Tri-directional fiberglass	105.81 ft ²	0.01 lbs/ft ²
	<i>Note: N/A</i>				
Steel Banding	112 by 1	0.02	N/A	5 Units	0.97 lbs/unit
	<i>Note: Spaced 30" on center perpendicular to the purlins from the center of the roof assembly. Screwed to the purlins and perimeter.</i>				
Main Beams	0.6 by 143	1.5	C-Channel Cold Rolled Steel Channel	36.75 Lin. ft	0.44 lbs/ft
	<i>Note: #12 SWG hanger wires were attached around the purlin and around the cold rolled channel at eight locations. The cold rolled channels were spaced on 48" centers.</i>				
Cross Beams	119 by 2.5	0.9	Steel Furring Channel	55.8 Lin. ft	0.26 lbs/ft
	<i>Note: Attached to the cold rolled channel on 24" centers with 18 gauge hanger wire.</i>				
Ceiling	119 by 48	0.625	Type X Gypsum Board	113.37 ft ²	2.3 lbs/ ft ²
	<i>Note: Fastened to the furring channel with 1-1/8" fine thread drywall screws on 12" centers.</i>				

Comments

The total weight of the floor/ceiling assembly was 558 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: Daniel Mohler

Daniel B. Mohler
Project Lead - Acoustical Testing


Digitally Signed by: Jordan Strybos

Jordan Strybos
Project Manager – Acoustical Testing

DBM: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 (1)
- 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	Corrected report number. Changes to ensure consistency between roof assembly and wall test reports per clients' request.

Appendix A

Instrumentation

Instrument	Manufacturer	Model	ATI Number	Date of Calibration
Data Acquisition Unit	National Instruments	PXI-4462	63763-4	07/16 *
Data Acquisition Unit	National Instruments	PXI-4462	63763-1	06/16 *
Data Acquisition Unit	National Instruments	PXI-4462	63763-5	06/16 *
Microphone Calibrator	Norsonic	1251	INT00127	03/17
Receive Room Microphone	PCB Electronics	378C20	INT00204	01/17
Receive Room Microphone	PCB Piezotronics	378C20	65586	02/17
Receive Room Microphone	PCB Piezotronics	378B20	64340	08/16
Receive Room Microphone	PCB Piezotronics	378B20	63746	09/16
Receive Room Microphone	PCB Piezotronics	378C20	65969	03/17
Receive Room Environmental Indicator	Comet	T7510	63810	10/16
			63811	10/16
Source Room Microphone	PCB Piezotronics	378B20	63738	04/17
Source Room Microphone	PCB Piezotronics	378B20	63739	04/17
Source Room Microphone	PCB Piezotronics	378B20	63740	04/17
Source Room Microphone	PCB Piezotronics	378B20	63742	04/17
Source Room Microphone	PCB Electronics	378B20	63741	04/17
Source Room Environmental Indicator	Comet	T7510	63812	11/16

* The calibration frequency for this equipment is every two years per the manufacturer's recommendation.

Test Chambers

VT Receive Room Volume	157 m ³
VT Source Room Volume	190 m ³



G9721.03-113-11-R1

Appendix B

Complete Test Results



G9721.03-113-11-R1

**AIRBORNE SOUND TRANSMISSION LOSS**

ASTM E 90

Test Date	05/31/17					
Data File No.	G9721.03					
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association					
Description	24 Gauge Standing Seam Roof Panel, R-2.5 Thermal Spacer Block, 16 Gauge Steel Purlin, R-11 Fiberglass, R-19 Fiberglass Insulation, Polypropylene with tri-directional fiberglass, Steel Banding, C-Channel Cold Rolled Channel, Furring Channel, 5/8" Type X Gypsum Panel					
Specimen Area	10.98 m ²	Receive Temp.	18.6 °C	Source Temp.	19.7 °C	
Technician	Daniel B. Mohler	Receive Humidity	73%	Source Humidity	58%	

Freq (Hz)	Background SPL (dB)	Absorption (m ²)	Source SPL (dB)	Receive SPL (dB)	Specimen TL (dB)	95% Confidence Limit	Number of Deficiencies
80	40.5	18.2	108	76	30	4.20	-
100	32.4	11.6	106	75	31	2.50	-
125	33.6	10.1	104	71	33	1.90	7
160	28.2	9.9	105	68	37	1.30	6
200	25.8	10.4	103	61	43	1.00	3
250	29.5	9.9	103	57	47	0.90	2
315	24.6	9.4	105	58	49	0.60	3
400	22.5	8.5	104	53	53	0.50	2
500	22.1	8.5	102	48	56	0.40	0
630	21.9	8.7	103	45	59	0.50	0
800	22.6	8.4	103	44	60	0.50	0
1000	18.0	8.8	103	45	59	0.40	0
1250	17.1	8.8	101	43	59	0.40	1
1600	14.7	8.7	101	41	61	0.40	0
2000	11.4	9.6	101	39	63	0.40	0
2500	10.4	10.5	97	34	63	0.40	0
3150	7.8	11.2	98	32	66	0.40	0
4000	6.7	12.5	98	29	69	0.40	0
5000	6.6	14.5	95	24	70	0.40	-
6300	6.8	17.4	93	19	72	0.50	-
8000	7.1	22.7	93	16	75	0.80	-
10000	7.2	27.5	91	10	77	0.70	-

STC Rating **56** *(Sound Transmission Class)*
Deficiencies **24** *(Sum of Deficiencies)*
OITC Rating **43** *(Outdoor-Indoor Transmission Class)*

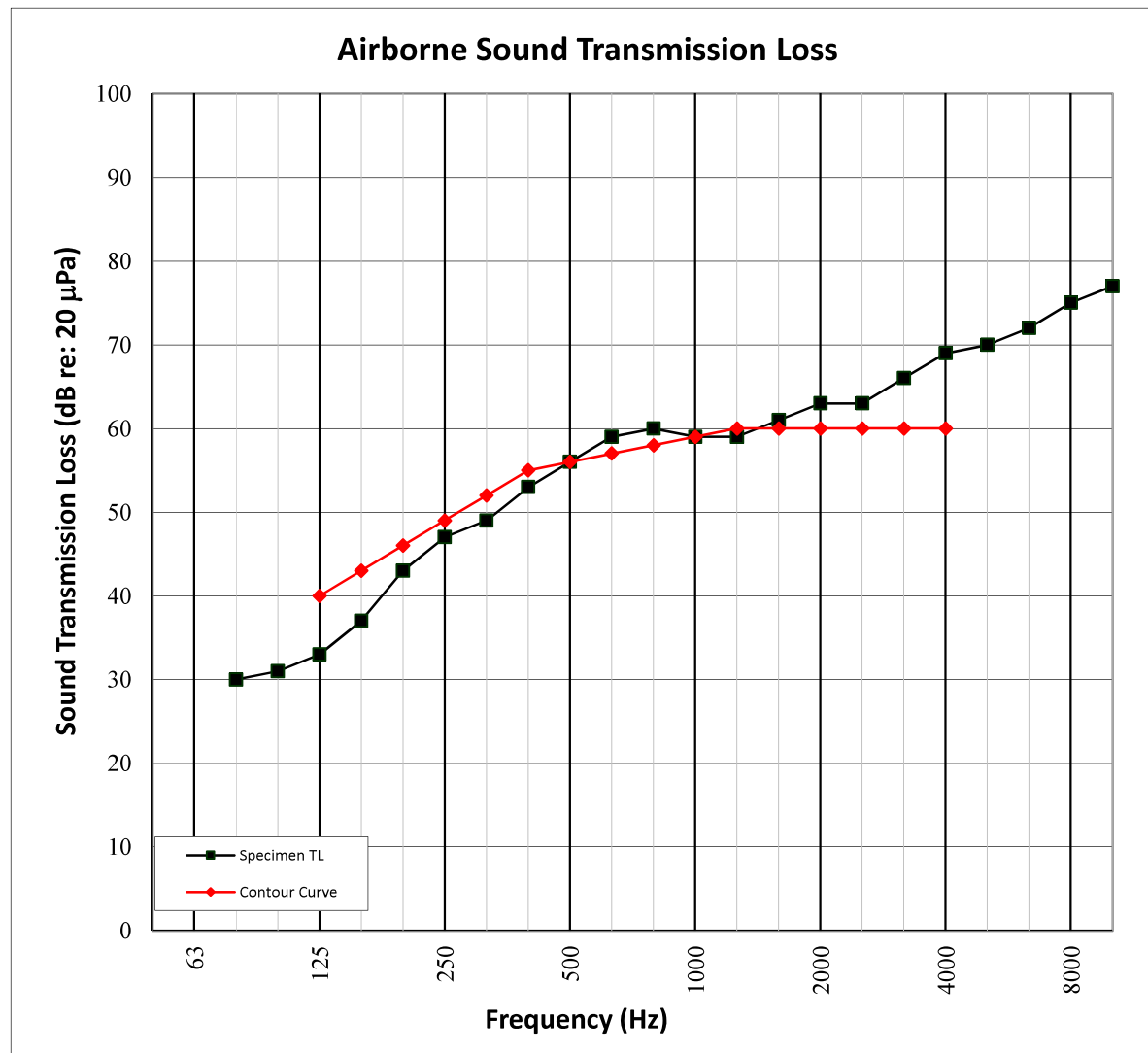
Notes:

- 1) Receive Room levels less than 5 dB above the Background levels are highlighted in yellow.
- 2) Specimen TL levels listed in **red** are potentially limited by the laboratory flanking limit.
- 3) Specimen TL levels listed in **blue** indicate the lower limit of the transmission loss.
- 4) Specimen TL levels listed in **green** indicate that there has been a filler wall correction applied

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E 90

Test Date	05/31/17				
Data File No.	G9721.03				
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association				
Description	24 Gauge Standing Seam Roof Panel, R-2.5 Thermal Spacer Block, 16 Gauge Steel Purlin, R-11 Fiberglass, R-19 Fiberglass Insulation, Polypropylene with tri-directional fiberglass, Steel Banding, C-Channel Cold Rolled Channel, Furring Channel, 5/8" Type X Gypsum Panel				
Specimen Area	10.98 m ²	Receive Temp.	18.6 °C	Source Temp.	19.7 °C
Technician	Daniel B. Mohler	Receive Humidity	73%	Source Humidity	58%



Appendix C

Photographs



Construction of Test Specimen

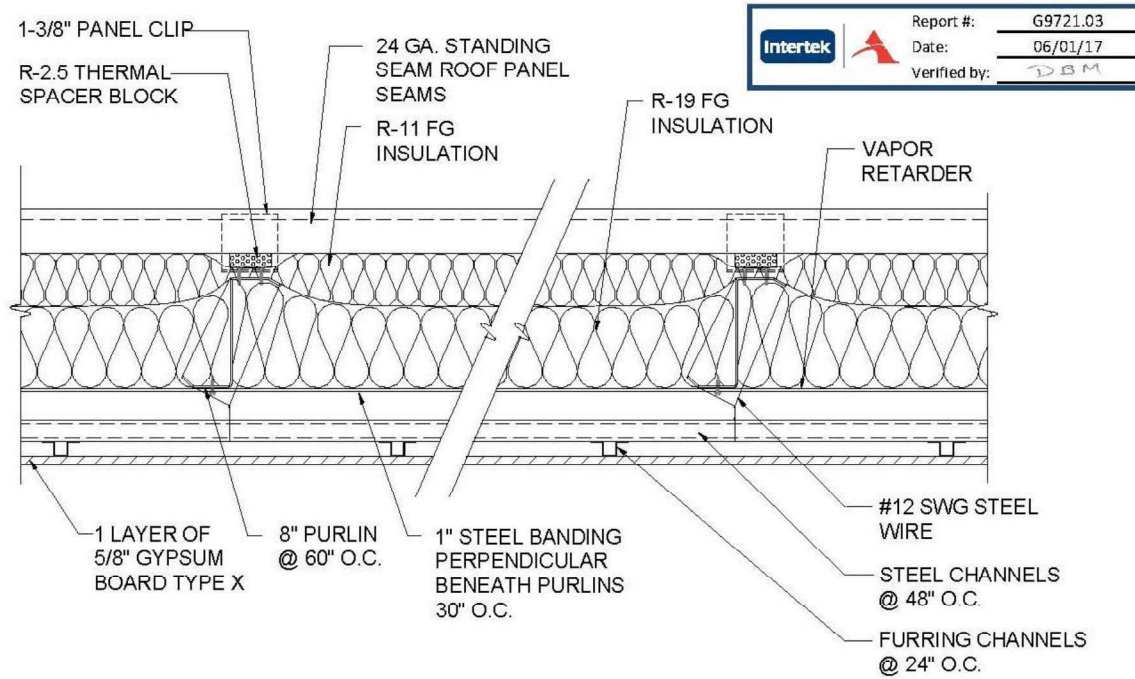


Receive Room View of Test Specimen Installation

Appendix D

Drawing

Test C, Drawing R-3, Test Date 05/31/17	
Data File No. G9721.03	
STC: 56	OITC: 43





**G9721.04-113-11-R1
ACOUSTICAL PERFORMANCE TEST REPORT
ASTM E90**

Rendered to:

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

TEST SPECIMEN: R-4, Roof Assembly

DATA FILE NO: G9721.04

STC: 58

OITC: 46

Test Specimen Identification (Source Room to Receive Room)

Steel Roof Panel: 24 Gauge Standing Seam Roof Panel
Spacer Block: R-2.5 Thermal Spacer Block
Steel Purlin: 8" 16 Gauge Steel Purlin
Insulation (Top Layer): R-11 FG Insulation
Insulation (Bottom Layer): R-19 FG Insulation
Vapor Retarder
Main Beams: C-Channel Cold Rolled Steel Channel
Cross Beams: Steel Furring Channel
Ceiling: Two Layers, Type X, 8/5" Gypsum Board

Reference should be made to Intertek-ATI Report No. G9721.04-113-11 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	G9721.04-113-11
Revision 1	08/28/17
Test Date	06/01/17
Report Date	07/07/17
Specimen Construction Date	06/01/17

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 VT 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

The full test specimen was assembled on the day of testing by Intertek-ATI. All materials provided by the client were installed on an existing Intertek-ATI assembly utilizing Intertek-ATI-supplied materials (see the test materials list and Appendices C and D for photograph and illustrations). The assembly was installed in a steel test frame which was installed into the opening between the source and receive rooms in the test chamber. The test frame was isolated from the structure with a dense neoprene gasket. Duct seal was used to seal the perimeter of the specimen to the test opening on both sides. The top of the steel roof deck ribs, when installed, were approximately 1/4" from being flush with the upper room side of the test opening. 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
Roof Panel	112 by 24	2.5 Rib Ht.	Standing Seam, 24 Gauge	105.81 ft ²	1.15 lbs/ft ²
	<i>Note: Attached to purlin utilizing 1.375" panel clips. The measured thickness of the metal was 0.02".</i>				
Thermal Spacer Block	24 by 3	0.65	R-2.5	12 units	0.04 lbs/unit
	<i>Note: Insulation installed perpendicular over purlins.</i>				
Purlin	112 by 1	8	Steel, 16 Gauge	2 Units	4 lbs/linear ft
	<i>Note: Attached to the perimeter frame utilizing steel angle brackets. Spaced 60" on center. The measured thickness of the metal was 0.08".</i>				
Insulation	12 by 6	3 Approx.	R-11 Fiberglass Insulation	105.81 ft ²	0.04 lbs/ft ²
	<i>Note: Loose laid on top of bottom layer of insulation.</i>				
Insulation	136 by 60	6 Approx.	R-19 Fiberglass Insulation	105.81 ft ²	0.03 lbs/ft ²
	<i>Note: Insulation installed parallel to purlins and supported by banding.</i>				
Vapor Barrier	136 by 60	0.01	Polypropylene with Tri-directional fiberglass	105.81 ft ²	0.01 lbs/ft ²
	<i>Note: N/A</i>				
Steel Banding	112 by 1	0.02	N/A	5 Units	0.97 lbs/unit
	<i>Note: Spaced 30" on center perpendicular to the purlins from the center of the roof assembly. Screwed to the purlins and perimeter.</i>				
Main Beams	0.6 by 143	1.5	C-Channel Cold Rolled Steel Channel	36.75 Lin. ft	0.44 lbs/ft
	<i>Note: #12 SWG hanger wires were attached around the Purlin and around the cold rolled channel at eight locations. The cold rolled channels were spaced on 48" centers.</i>				
Cross Beams	119 by 2.5	0.9	Steel Furring Channel	55.8 Lin. ft	0.26 lbs/ft
	<i>Note: Attached to the cold rolled channel on 24" centers with 18-gauge hanger wire.</i>				
Ceiling First Layer	119 by 48	0.625	Type X Gypsum Board	113.37 ft ²	2.3 lbs/ ft ²
	<i>Note: Fastened to the furring channel with 1-1/8" fine thread drywall screws o 12" centers.</i>				
Ceiling Second Layer	119 by 48	0.625	Type X Gypsum Board	113.37 ft ²	2.3 lbs/ ft ²
	<i>Note: Fastened to the furring channel with 1-7/8" fine thread drywall screws o 12" centers.</i>				

Comments

The total weight of the floor/ceiling assembly was 808 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: Daniel Mohler

Daniel B. Mohler
Project Lead - Acoustical Testing


Digitally Signed by: Jordan Strybos

Jordan Strybos
Project Manager – Acoustical Testing

DBM: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: Photograph (1)
- 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	ATI Number	Date of Calibration
Data Acquisition Unit	National Instruments	PXI-4462	63763-4	07/16 *
Data Acquisition Unit	National Instruments	PXI-4462	63763-1	06/16 *
Data Acquisition Unit	National Instruments	PXI-4462	63763-5	06/16 *
Microphone Calibrator	Norsonic	1251	INT00127	03/17
Receive Room Microphone	PCB Electronics	378C20	INT00204	01/17
Receive Room Microphone	PCB Piezotronics	378C20	65586	02/17
Receive Room Microphone	PCB Piezotronics	378B20	64340	08/16
Receive Room Microphone	PCB Piezotronics	378B20	63746	09/16
Receive Room Microphone	PCB Piezotronics	378C20	65969	03/17
Receive Room Environmental Indicator	Comet	T7510	63810	10/16
			63811	10/16
Source Room Microphone	PCB Piezotronics	378B20	63738	04/17
Source Room Microphone	PCB Piezotronics	378B20	63739	04/17
Source Room Microphone	PCB Piezotronics	378B20	63740	04/17
Source Room Microphone	PCB Piezotronics	378B20	63742	04/17
Source Room Microphone	PCB Electronics	378B20	63741	04/17
Source Room Environmental Indicator	Comet	T7510	63812	11/16

* The calibration frequency for this equipment is every two years per the manufacturer's recommendation.

Test Chambers

VT Receive Room Volume	157 m ³
VT Source Room Volume	190 m ³



G9721.04-113-11-R1

Appendix B

Complete Test Results

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E 90

Test Date	06/01/17					
Data File No.	G9721.04					
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association					
Description	24 Gauge Standing Seam Roof Panel, R-2.5 Thermal Spacer Block, 8" 16 Gauge Steel Purlin, R-11 Fiberglass, R-19 Fiberglass Insulation, Polypropylene with tri-directional fiberglass, Steel Banding, C-Channel Cold Rolled Channel, Furring Channel, 5/8" Type X Gypsum Panel, 5/8" Type X Gypsum Panel					
Specimen Area	10.98 m ²	Receive Temp.	18.6 °C	Source Temp.	19.9 °C	
Technician	Daniel B. Mohler	Receive Humidity	73%	Source Humidity	63%	

Freq (Hz)	Background SPL (dB)	Absorption (m ²)	Source SPL (dB)	Receive SPL (dB)	Specimen TL (dB)	95% Confidence Limit	Number of Deficiencies
80	45.2	17.0	108	71	35	3.80	-
100	35.7	12.0	106	72	34	2.10	-
125	35.2	10.3	104	67	37	2.10	5
160	29.8	9.5	104	65	40	1.20	5
200	25.9	10.4	103	58	45	1.10	3
250	30.9	9.9	103	55	49	1.10	2
315	23.3	9.8	106	55	51	0.70	3
400	22.1	8.5	104	51	55	0.40	2
500	22.3	8.4	103	46	57	0.50	1
630	21.2	8.4	103	44	60	0.50	0
800	20.0	8.3	103	43	61	0.30	0
1000	17.2	8.3	103	42	62	0.50	0
1250	21.2	8.5	101	39	63	0.40	0
1600	14.1	8.5	102	40	63	0.70	0
2000	10.0	9.2	101	41	61	1.10	1
2500	9.1	10.4	97	39	59	1.70	3
3150	8.9	11.0	98	36	62	1.00	0
4000	7.0	12.6	98	34	64	1.50	0
5000	6.2	13.9	95	28	66	1.90	-
6300	6.5	16.8	93	25	66	2.80	-
8000	6.9	22.0	94	20	71	2.10	-
10000	7.1	26.5	91	13	75	1.00	-

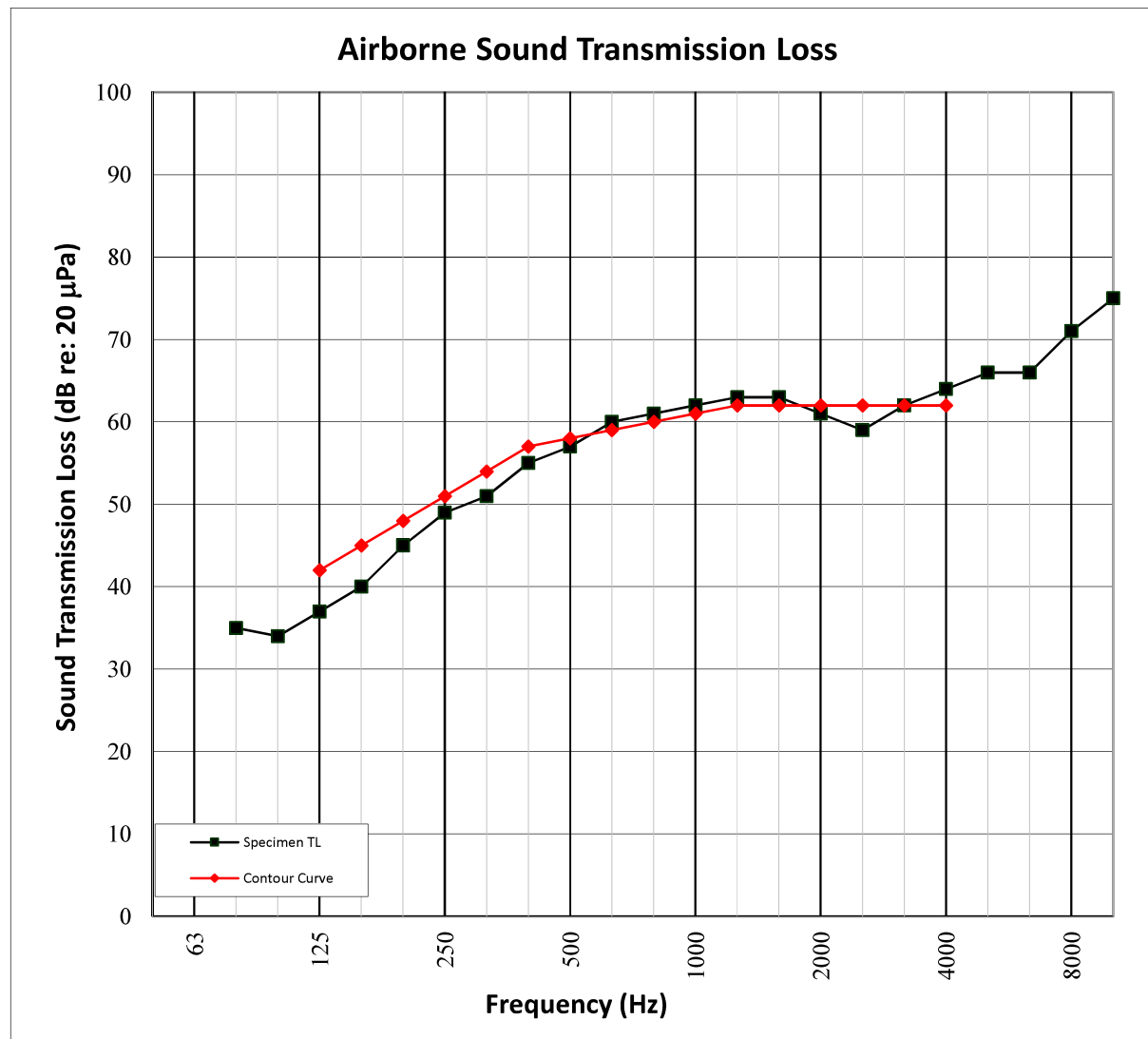
STC Rating **58** *(Sound Transmission Class)*
Deficiencies **25** *(Sum of Deficiencies)*
OITC Rating **46** *(Outdoor-Indoor Transmission Class)*

- Notes:**
- 1) Receive Room levels less than 5 dB above the Background levels are highlighted in yellow.
 - 2) Specimen TL levels listed in *red* are potentially limited by the laboratory flanking limit.
 - 3) Specimen TL levels listed in *blue* indicate the lower limit of the transmission loss.
 - 4) Specimen TL levels listed in *green* indicate that there has been a filler wall correction applied

AIRBORNE SOUND TRANSMISSION LOSS

ASTM E 90

Test Date	06/01/17				
Data File No.	G9721.04				
Client	Metal Building Manufacturers Association and North American Insulation Manufacturers Association				
Description	24 Gauge Standing Seam Roof Panel, R-2.5 Thermal Spacer Block, 8" 16 Gauge Steel Purlin, R-11 Fiberglass, R-19 Fiberglass Insulation, Polypropylene with tri-directional fiberglass, Steel Banding, C Channel Cold Rolled Channel, Furring Channel, 5/8" Type X Gypsum Panel, 5/8" Type X Gypsum Panel				
Specimen Area	10.98 m ²	Receive Temp.	18.6 °C	Source Temp.	19.9 °C
Technician	Daniel B. Mohler	Receive Humidity	73%	Source Humidity	63%



Appendix C

Photograph



Construction of Test Specimen

Appendix D

Drawing

Test D, Drawing R-4, Test Date 05/31/17	
Data File No. G9721.04	
STC: 58	OITC: 46

