



**G1169.01-113-11-R0**  
**ACOUSTICAL PERFORMANCE TEST REPORT**  
**ASTM E90**

**Rendered to:**

**HILTI CORPORATION**

**SERIES/MODEL: CF-I XTW WD**

**TYPE: Aerosol Foam Sealant**

Summary of Test Results				
Data File No.	Wall Description (Nominal Dimensions)	STC	Rw	OITC
G1169.01	Base wall	60*	60*	48*
G1169.01A	Base wall with 1/2" wide by 96" high vertical open gap	27*	28*	29*
G1169.01B	Base wall with 1/2" wide by 96" high gap filled with one bead of CF-I XTW WD aerosol foam sealant on both sides of wall, cured 24 hours	56*	56*	46*

**\*Note:** An STC, Rw, or OITC rating cannot be applied directly to sealant.

Reference should be made to Intertek-ATI Report No. G1169.01-113-11 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

HILTI CORPORATION  
Feldkircherstrasse 100  
P.O. Box 333  
FL-9494 Schaan  
LIECHTENSTEIN

Report No	G1169.01-113-11
Test Date	09/02/16
Report Date	09/23/16

### 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. The client provided the test specimen.

### 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, *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements*

ASTM E413-10, *Classification for Rating Sound Insulation*

ASTM E1332-10a, *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.

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 levels 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.

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

The specimen plug was removed from the filler wall assembly. The single 6" (25 gauge equivalent) steel stud wall construction was fabricated in the 96" wide by 96" high wood test frame. The end studs and the top and bottom plates of the wall system were acoustically isolated from the wood test frame with 3/8" thick, 3" wide dense neoprene foam. The top and bottom plates were fastened to the wood test frame with 1-1/4" long screws and isolation washers. The steel studs were attached to the top and bottom plates 24" on center with 1/4" self-tapping screws. The resilient channels were attached to the source room side of the steel studs 24" on center with 1/4" self-tapping screws. The stud cavities were filled with R-19 fiberglass insulation.

On the receive side, the first layer of 5/8" thick Type X gypsum board was attached to the studs with 1-1/4" drywall screws spaced 24" on center. The second layer of 5/8" Type X gypsum board was attached to the studs with 2" drywall screws spaced 12" on center.

On the source side, the first layer of 5/8" Type X gypsum board was attached to the resilient channel with 1-1/4" drywall screws spaced 24" on center. The second layer of Type X gypsum board was attached to the resilient channel with 2" drywall screws spaced 12" on center.

The joints between the wallboard panels were sealed with acoustical sealant. A 1/4" gap existed between the wallboard material and the test frame around the entire perimeter of the wall specimen on both sides. This gap was filled with acoustical sealant.

### 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.

### Comments

The total weight of the base wall was 700 lbs. The client did not supply a report drawing of the test specimen. The test specimen was disassembled. Photographs are located in Appendix C. 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.

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For INTERTEK-ATI:

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Sean G. Close  
Technician - Acoustical Testing

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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 (6)
- Appendix C: Photographs (1)



### Revision Log

<u>Rev. #</u>	<u>Date</u>	<u>Page(s)</u>	<u>Revision(s)</u>
R0	09/23/16	N/A	Original Report Issue

## Appendix A

### Instrumentation:

Instrument	Manufacturer	Model	Description	ATI Number	Date of Calibration
Data Acquisition Unit	National Instruments	PXI-1033	Data Acquisition card	65126	05/16 *
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64902	07/16
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64903	12/15
Source Room Microphone	PCB Electronics	378B20	Microphone and Preamplifier	65103	12/15
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64905	12/15
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64906	12/15
Receive Room Microphone	PBC Piezotronics	378B20	Microphone and Preamplifier	64907	12/15
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64908	12/15
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64909	12/15
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64910	12/15
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64911	12/15
Receive Room Environmental Indicator	Comet	T7510	Receive Room	64915	03/16
Source Room Environmental Indicator	Comet	T7510	Source Room	64914	03/16
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 <sup>3</sup> (8291.3 ft <sup>3</sup> )	Rotating vane and stationary diffusers Temperature and humidity controlled Isolation pads under the floor
Source Room	206.6 m <sup>3</sup> (7296.3 ft <sup>3</sup> )	Stationary diffusers only Temperature and humidity controlled

	Maximum Size	Description
TL Test Opening	4.27 m (14 ft) wide by 3.05 m (10 ft) high	Vibration break between source and receive rooms

N/A-Not Applicable



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## **Appendix B**

### **Complete Test Results**

## AIRBORNE SOUND TRANSMISSION LOSS

ASTM E 90

Test Date	09/02/16						
Data File No.	G1169.01						
Client	Hilti Corporation						
Description	Base Wall: Single 6" (25 gauge equivalent) steel stud wall 24" on center with two layers of 5/8" gypsum board on receive side, resilient channel 24" on center with two layers of 5/8" gypsum board on source side, cavities filled with 24" R-19 fiberglass insulation						
Specimen Area	5.95 m <sup>2</sup>	Receive Temp.	21.1 °C		Source Temp.	21.7 °C	
Technician	Sean G. Close	Receive Humidity	44%		Source Humidity	46%	

Freq (Hz)	Background SPL (dB)	Absorption (m <sup>2</sup> )	Source SPL (dB)	Receive SPL (dB)	Specimen TL (dB)	95% Confidence Limit	Number of Deficiencies
80	39.7	4.7	105	75	30.9	2.04	-
100	38.1	4.7	104	67	39.2	1.74	-
125	41.4	5.1	104	62	43.1	1.53	1
160	42.1	4.7	105	58	48.3	0.62	0
200	39.2	4.7	105	59	47.4	0.78	3
250	33.5	5.3	106	57	50.1	0.78	3
315	30.3	5.6	99	50	49.8	0.42	6
400	27.9	5.8	97	44	53.7	0.31	5
500	22.5	5.9	98	41	58.2	0.44	2
630	19.5	5.6	100	41	61.2	0.29	0
800	16.0	6.0	100	37	63.5	0.26	0
1000	11.9	6.2	97	31	66.4	0.23	0
1250	10.0	6.8	98	29	68.2	0.14	0
1600	7.9	7.2	103	35	67.0	0.21	0
2000	5.7	7.8	95	35	59.6	0.27	4
2500	5.9	8.9	93	31	60.8	0.31	3
3150	5.7	10.7	95	28	64.3	0.21	0
4000	6.3	13.5	94	23	67.4	0.18	0
5000	7.2	17.4	93	18	70.9	0.16	-

STC Rating	60	(Sound Transmission Class)
Deficiencies	27	(Sum of Deficiencies)
OITC Rating	48	(Outdoor-Indoor Transmission Class)
Rw Rating	60	(Sound Reduction Index)

**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

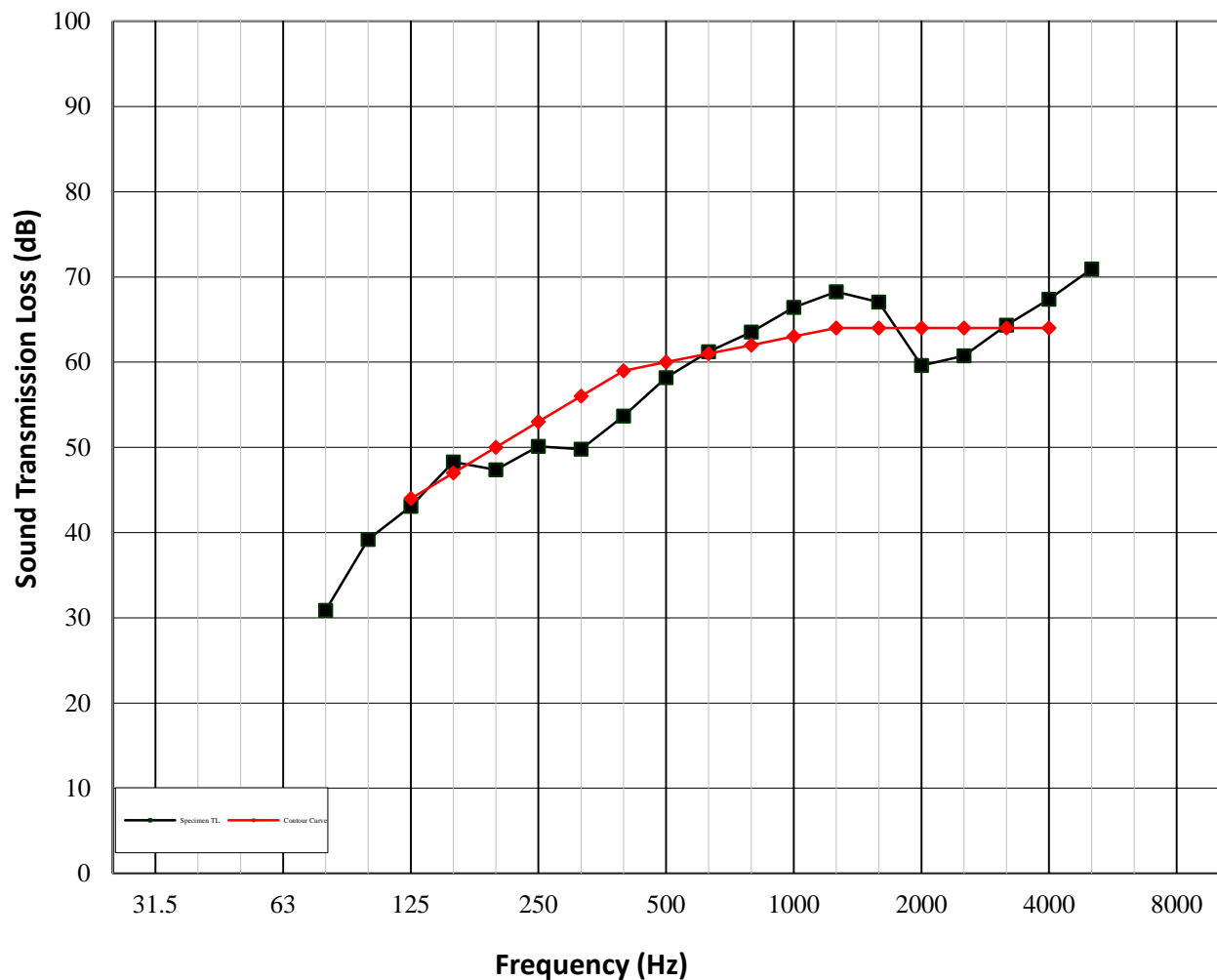


## AIRBORNE SOUND TRANSMISSION LOSS

ASTM E 90

Test Date	09/02/16					
Data File No.	G1169.01					
Client	Hilti Corporation					
Description	Base Wall: Single 6" (25 gauge equivalent) steel stud wall 24" on center with two layers of 5/8" gypsum board on receive side, resilient channel 24" on center with two layers of 5/8" gypsum board on source side, cavities filled with 24" R-19 fiberglass insulation					
Specimen Area	5.95 m <sup>2</sup>	Receive Temp.	21.1 °C		Source Temp.	21.7 °C
Technician	Sean G. Close	Receive Humidity	44%		Source Humidity	46%

### Airborne Sound Transmission Loss





## AIRBORNE SOUND TRANSMISSION LOSS

ASTM E 90

Test Date	09/02/16					
Data File No.	G1169.01A					
Client	Hilti Corporation					
Description	Base Wall: Single 6" (25 gauge equivalent) steel stud wall 24" on center with two layers of 5/8" gypsum board on receive side, resilient channel 24" on center with two layers of 5/8" gypsum board on source side, cavities filled with 24" R-19 fiberglass insulation, 1/2" wide by 96" high open vertical gap					
Specimen Area	5.95 m <sup>2</sup>	Receive Temp.	22.8 °C		Source Temp.	22.9 °C
Technician	Sean G. Close	Receive Humidity	44%		Source Humidity	47%

Freq (Hz)	Background SPL (dB)	Absorption (m <sup>2</sup> )	Source SPL (dB)	Receive SPL (dB)	Specimen TL (dB)	95% Confidence Limit	Number of Deficiencies
80	37.5	5.5	104	81	23.8	1.79	-
100	35.7	5.2	104	74	31.0	1.38	-
125	39.4	4.9	104	73	32.2	1.43	0
160	43.8	4.6	105	68	37.5	0.62	0
200	41.9	4.7	104	69	36.3	0.73	0
250	36.2	5.1	106	67	39.3	0.81	0
315	30.9	5.6	99	59	39.9	0.31	0
400	29.5	5.7	97	57	40.1	0.23	0
500	26.1	6.0	98	60	38.1	0.34	0
630	20.4	5.7	100	66	34.4	0.37	0
800	16.4	6.1	100	72	27.4	0.29	2
1000	11.7	6.3	97	70	27.0	0.25	3
1250	9.8	6.8	98	67	30.2	0.13	1
1600	7.3	7.3	103	76	26.1	0.17	5
2000	5.4	7.7	95	69	25.2	0.30	6
2500	5.4	8.7	93	65	26.9	0.25	4
3150	5.5	10.4	95	65	27.3	0.27	4
4000	6.3	12.9	94	64	27.2	0.10	4
5000	7.2	16.6	93	63	26.0	0.13	-

STC Rating	27	(Sound Transmission Class)
Deficiencies	29	(Sum of Deficiencies)
OITC Rating	29	(Outdoor-Indoor Transmission Class)
Rw Rating	28	(Sound Reduction Index)

**Notes:**

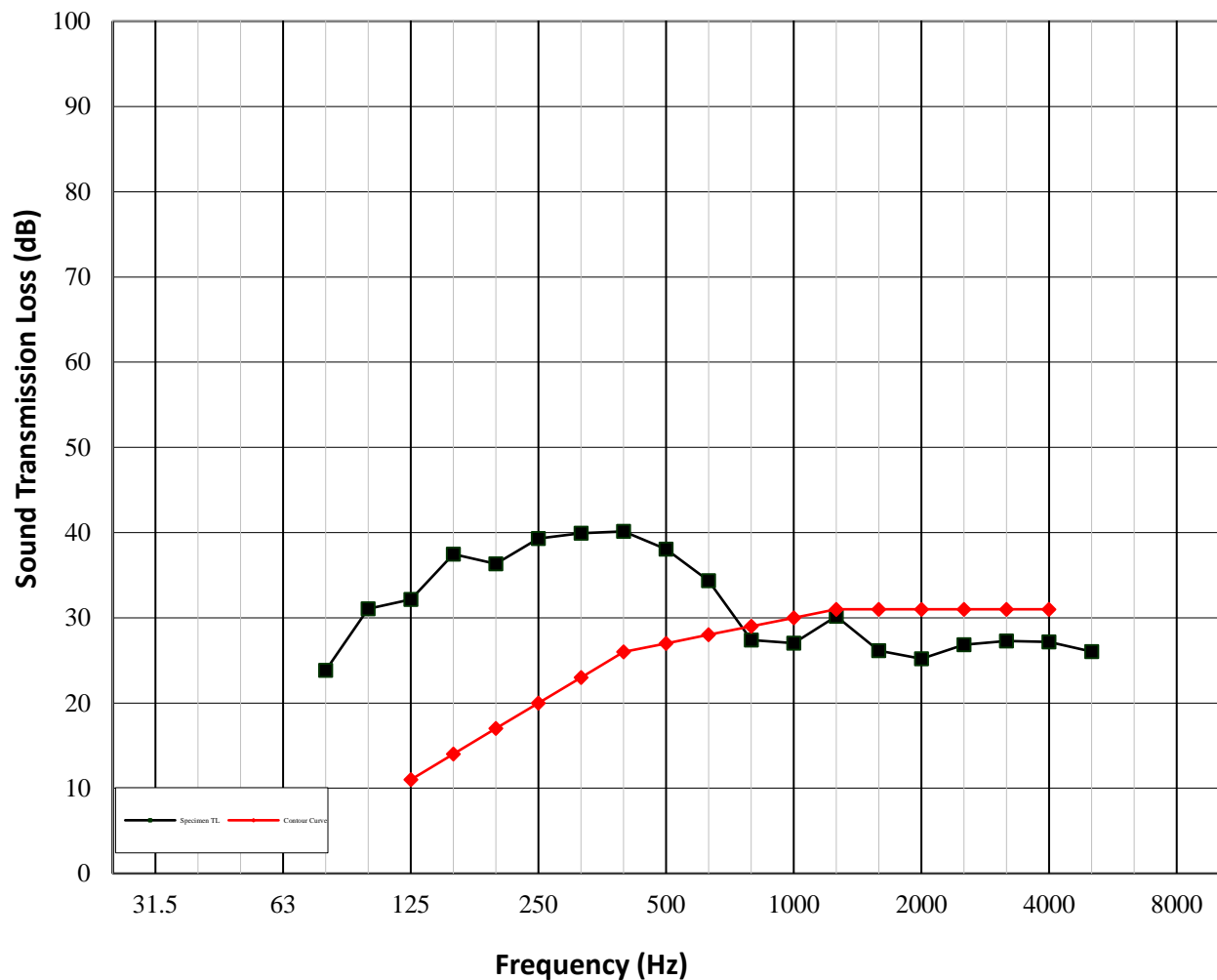
- 1) Receive Room levels less than 5 dB above the Background levels are red.
- 2) Specimen TL levels listed in red indicate the lower limit of the transmission loss.
- 3) Specimen TL levels listed in green indicate that there has been a filler wall correction applied

## AIRBORNE SOUND TRANSMISSION LOSS

ASTM E 90

Test Date	09/02/16					
Data File No.	G1169.01A					
Client	Hilti Corporation					
Description	Base Wall: Single 6" (25 gauge equivalent) steel stud wall 24" on center with two layers of 5/8" gypsum board on receive side, resilient channel 24" on center with two layers of 5/8" gypsum board on source side, cavities filled with 24" R-19 fiberglass insulation, 1/2" wide by 96" high open vertical gap					
Specimen Area	5.95 m <sup>2</sup>	Receive Temp.	22.8 °C	Source Temp.	22.9 °C	
Technician	Sean G. Close	Receive Humidity	44%	Source Humidity	47%	

### Airborne Sound Transmission Loss



## AIRBORNE SOUND TRANSMISSION LOSS

ASTM E 90

Test Date	09/06/16					
Data File No.	G1169.01B					
Client	Hilti Corporation					
Description	Base Wall: Single 6" (25 gauge equiv.) steel stud wall 24" o.c. with two layers of 5/8" gypsum board receive side, resilient channel 24" o.c. with two layers of 5/8" gypsum board source side, cavities filled with 24" R-19 fiberglass insulation, 1/2" wide by 96" high gap filled with one bead CF-I XTW WD aerosol foam sealant on both sides of wall, cured 24 hours					
Specimen Area	5.95 m <sup>2</sup>	Receive Temp.	21.7 °C		Source Temp.	21.6 °C
Technician	Sean G. Close	Receive Humidity	46%		Source Humidity	46%

Freq (Hz)	Background SPL (dB)	Absorption (m <sup>2</sup> )	Source SPL (dB)	Receive SPL (dB)	Specimen TL (dB)	95% Confidence Limit	Number of Deficiencies
80	36.0	3.8	105	75	32.5	2.13	-
100	35.7	4.6	104	70	35.0	1.42	-
125	38.7	5.1	104	67	38.2	1.67	2
160	45.8	4.8	105	64	41.8	0.70	1
200	44.8	4.6	105	61	45.2	0.76	1
250	38.1	5.3	106	61	45.8	0.82	3
315	32.8	5.4	99	53	46.8	0.44	5
400	31.1	5.7	97	47	50.5	0.23	5
500	24.8	5.8	98	44	54.6	0.40	1
630	19.5	5.8	100	44	57.0	0.38	0
800	16.1	6.0	100	41	59.5	0.24	0
1000	12.2	6.2	97	34	62.9	0.18	0
1250	10.8	6.8	98	32	65.4	0.17	0
1600	7.6	7.2	103	38	64.5	0.19	0
2000	5.6	7.7	95	37	56.6	0.32	3
2500	5.2	8.7	93	34	58.1	0.28	2
3150	5.5	10.5	95	30	62.4	0.18	0
4000	6.2	13.0	94	25	65.7	0.18	0
5000	7.1	16.9	93	20	68.9	0.14	-

STC Rating	56	(Sound Transmission Class)
Deficiencies	23	(Sum of Deficiencies)
OITC Rating	46	(Outdoor-Indoor Transmission Class)
Rw Rating	56	(Sound Reduction Index)

**Notes:**

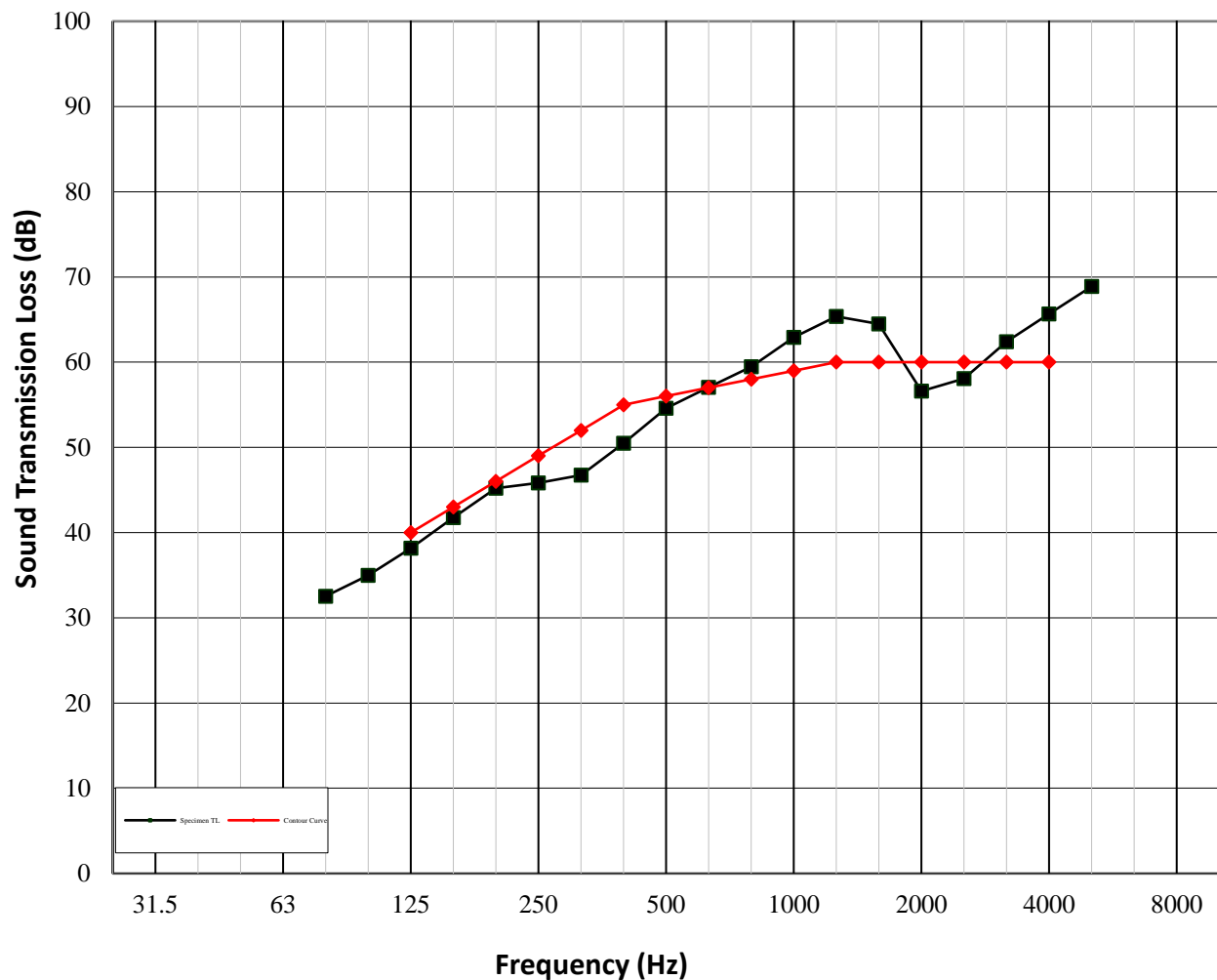
- 1) Receive Room levels less than 5 dB above the Background levels are red.
- 2) Specimen TL levels listed in red indicate the lower limit of the transmission loss.
- 3) Specimen TL levels listed in green indicate that there has been a filler wall correction applied

## AIRBORNE SOUND TRANSMISSION LOSS

ASTM E 90

Test Date	09/06/16					
Data File No.	G1169.01B					
Client	Hilti Corporation					
Description	Base Wall: Single 6" (25 gauge equiv.) steel stud wall 24" o.c. with two layers of 5/8" gypsum board receive side, resilient channel 24" o.c. with two layers of 5/8" gypsum board source side, cavities filled with 24" R-19 fiberglass insulation, 1/2" wide by 96" high gap filled with one bead CF-I XTW WD aerosol foam sealant on both sides of wall, cured 24 hours					
Specimen Area	5.95 m <sup>2</sup>	Receive Temp.	21.7 °C		Source Temp.	21.6 °C
Technician	Sean G. Close	Receive Humidity	46%		Source Humidity	46%

### Airborne Sound Transmission Loss



## Appendix C

### Photographs



**Receive Room View of Installed Specimen**



**Source Room View of Installed Specimen**