

P.O. Box 6948, Minneapolis MN 55406-0948

Prepared For: McCain Manufacturing
2633 Progress St. Vista, CA 92081



Test Number: NOAL 17-1101
Test Date: 11/1/17
Report Date: 1/24/18

Page 1 of 8

ASTM E90-09: Laboratory Measurement of Airborne Sound Transmission of Building Partitions and Elements

Result Summary: STC 40

Specimen: Modular Wall Assembly

Method: ASTM E90-09

Test Site: North Orbit Acoustic Laboratory Facility
512 5th Street NW
Dyersville, IA 52040

Technician: D. Berg

Prepared by: David M. Berg
North Orbit Acoustic Laboratories
P.O. Box 6948
Minneapolis, MN 55406

A handwritten signature in black ink is written over the text 'ELECTRONICALLY REPRODUCED SIGNATURE'.

David M. Berg
Laboratory Manager

A handwritten signature in black ink is written over the text 'ELECTRONICALLY REPRODUCED SIGNATURE'.

Heide Gross
Laboratory Quality Manager

Two signatures are required for an official laboratory test report.
Copies without signatures are considered to be for reference only.

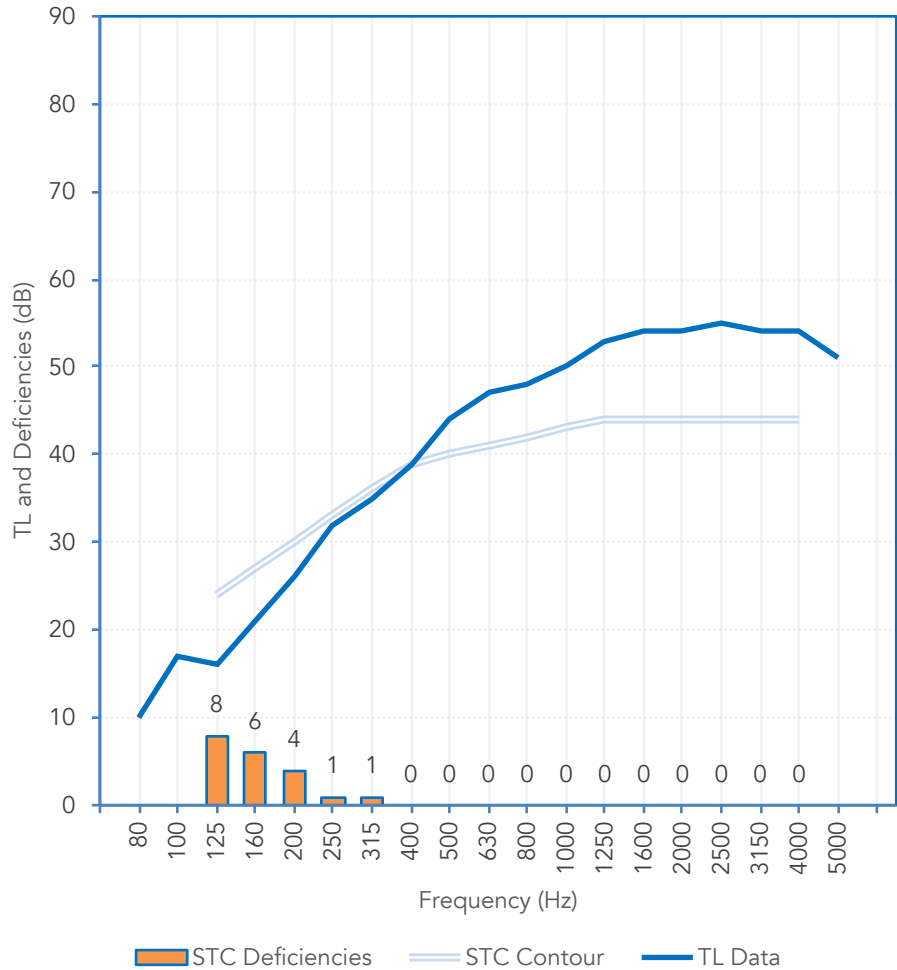


Test Number: NOAL 17-1101
Test Date: 11/1/17
Report Date: 1/24/18

STC 40

Frequency (Hz)	TL (dB)	Deficiencies (dB)
80	10	
100	17	
125	16	8
160	21	6
200	26	4
250	32	1
315	35	1
400	39	
500	44	
630	47	
800	48	
1000	50	
1250	53	
1600	54	
2000	54	
2500	55	
3150	54	
4000	54	
5000	51	

Total Deficiencies 20



ASSEMBLY ELEMENTS: (From Source Room Side to Receive Room Side)

Hardware McCain Walls modular wall assembly with interior finished panel
Insulation 3" mineral wool insulation in cavity



Test Number: NOAL 17-1101
Test Date: 11/1/17
Report Date: 1/24/18

Page 3 of 8

SPECIMEN DESCRIPTION

The specimen was a modular wall assembly and its elements are described below with results on page 2. Detailed information regarding the specimen is found in Appendix C on pages 6 and 7.

INSTALLATION AND DISPOSITION

The modular wall assembly was originally constructed on November 1, 2017 at the Dyersville acoustic laboratory location.

Qualified representatives from North Orbit Acoustic Laboratories observed the installation process and inspected all major building elements when completed and prior to testing.

FILLER WALL

A high transmission loss double stud filler wall was constructed in the entire 20' x 12' test opening. The filler wall consisted of two 1.5" x 7.5" x 12' wood bottom and top plates separated by approximately 3" of air space. 1.5" x 3.5" wood studs were placed at 24" OC in each frame. The resulting cavity was filled entirely with fiberglass batt insulation. Four layers of Type C gypsum wall board (GWB) were attached to the outside of the frames on both sides. The GWB on the north side of the filler is mounted on resilient clips and 7/8" hat channel at 16" OC. The GWB on the south side is directly attached to the frame. The filler wall assembly was tested and the results retained for use in composite wall corrections. The filler wall was then modified to provide a 12' x 8' decoupled opening to accommodate tests in this series.

TEST METHODS

Methods follow the published standards listed below. All values derived from single-direction transmission loss measurements.

ASTM E90-09 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

ASTM E413-16: Classification for Rating Sound Insulation

All results reported herein were derived from tests performed in full accordance with test method ASTM E90-09.

The laboratory and measurement systems fully meet all requirements of the test standard and the requirements of ASTM E90-09 Annex A2: *Qualification of room sound fields and microphone systems used for sampling.*

North Orbit Acoustic Laboratory (NOAL) is accredited through A2LA certificate number 4240.01 for this test procedure. This test report relates only to the item(s) tested. This report shall not be used to claim product certification, approval, or endorsement by North Orbit Acoustic Laboratories or A2LA.

CONFIDENTIALITY

The client has full control over this information and any release of information will be only to the client. The specific testing results are deemed to be confidential exclusively for the client's use. Reproduction of this report, except in full, is



Test Number: NOAL 17-1101
 Test Date: 11/1/17
 Report Date: 1/24/18

APPENDIX A: MEASUREMENT SETUP

ENVIRONMENT

Temperature: 70 °F 21 °C
 Relative Humidity: 50 %

SPECIMEN AREA

Specimen Area: 96.0 ft² 8.9 m²

CHAMBER VOLUME - AIRBORNE TRANSMISSION

Source Room 7071.0 ft³ 200.2 m³
 Receive Room 7852.8 ft³ 222.4 m³

INSTRUMENTATION

Description	Brand	Model	Serial Number
Analyzer	Sinus	Apollo	7510
Software	Sinus	Samurai	ver. 2.8.1
Microphone	Brüel & Kjær	4166	1620281
Microphone	Brüel & Kjær	4166	1620312
Preamplifier	Brüel & Kjær	2669	2025373
Preamplifier	Brüel & Kjær	2669	2083679
Rotating Boom	Brüel & Kjær	3923	2705113
Rotating Boom	Brüel & Kjær	3923	2736620
Calibrator	Brüel & Kjær	4231	2416109
Loudspeaker	Mackie	SA1501	PP14915
Loudspeaker	Mackie	SA1501	PP14940



Test Number: NOAL 17-1101
 Test Date: 11/1/17
 Report Date: 1/24/18

APPENDIX B: CALCULATION RESULTS

Freq. Band (Hz)	Spec TL (dB)	Data Flags (see below)	0.95 Conf. Δ TL (dB)	Flanking Limit (dB)	STC Defic. (dB)	Rw Defic. (dB)
25						
32						
40						
50	8.9		4.77	40		
63	9.4		2.15	45		
80	10.2		5.60	46		
100	17.2		3.29	49		4.8
125	16.2		2.36	55	8	8.8
160	20.8		1.27	58	6	7.2
200	26.3		1.29	62	4	4.7
250	32.3		1.27	65	1	1.7
315	35.4		0.97	68	1	1.6
400	39.3		0.61	71	-	0.7
500	43.8		0.79	74	-	-
630	47.2		0.43	76	-	-
800	47.9		0.40	79	-	-
1000	50.2		0.32	81	-	-
1250	52.5		0.50	84	-	-
1600	53.5		0.49	83	-	-
2000	53.8		0.47	82	-	-
2500	54.8		0.46	86	-	-
3150	53.9		0.56	90	-	-
4000	54.0		0.79	89	-	-
5000	50.9			86	-	-
6300						
8000						
10000						
Total deficiencies below STC contour (dB)					20	
STC contour [ASTM E413]					40	
Total deficiencies below Rw contour (dB)						29.5
Rw contour [ISO 717/1]						41.0

‡ Correction included in calculation due to a portion of the sound transmitted by way of the filler wall. Sound transmission through the filler wall is within correction limits established in ASTM E90. Note: 95% confidence intervals for TL measurements from room qualification data. ASTM E1289 reference sample and repeatability data available upon request. The standard deviation of reproducibility is stated in ASTM E90 as <2 dB for frequencies from 125 Hz to 4 kHz. Flanking Limit derived from chamber flanking study. Extended frequency results below 80Hz and above 5000Hz are for reference only.



Test Number: NOAL 17-1101
 Test Date: 11/1/17
 Report Date: 1/24/18

APPENDIX C: SPECIMEN ASSEMBLY DESCRIPTION

Overall Mass 362.00 lb [164.20 kg]

Surface Weight 3.77 PSF [18.41 kg/m²]

Building Element	Mass lb (kg)	Surface Weight PSF (kg/m ²)
McCain Walls modular wall assembly with interior finished panel	309.6 [140.4]	3.23 [15.75]
3" mineral wool insulation in cavity	52.4 [23.8]	0.55 [2.66]



Test Number: NOAL 17-1101
Test Date: 11/1/17
Report Date: 1/24/18

Page 7 of 8

APPENDIX C: SPECIMEN ASSEMBLY DESCRIPTION (CONTINUED)

The modular wall assembly was constructed on 11-01-17 and some components were retained for subsequent tests in the series.

MODULAR ASSEMBLY COMPONENTS

A modular wall assembly was constructed in the approximately 12' x 8' (w x h) specimen test area. The assembly consisted of a McCain Walls modular wall assembly. The interior cavity of the modular wall assembly was filled with 3" thick mineral wool insulation. In addition, the wall assembly had an interior finished panel installed on the receiving room side.

The assembly components were assembled by NOAL staff with the assistance of a representative from McCain Manufacturing. The perimeter of the specimen was sealed on the source and receiving room sides with non-hardening acoustical sealant and 2" wide, 2 mil aluminum foil tape. In addition, the perimeter of both sides of the specimen was sealed with 7/8" dense putty tape. No sealant or sealing treatments were applied to the modular system's seams or joints.



Test Number: NOAL 17-1101
 Test Date: 11/1/17
 Report Date: 1/24/18

APPENDIX D: SINGLE-NUMBER CALCULATION TO ISO 717-1

Freq. Band (Hz)	Ri (Ri ≡ TL) (dB)	Ref Curve (dB)	Unfav. Deviat. (dB)	Li1 Spectrum (dB)	Li1 - Ri Level (dB)	Li2 Spectrum (dB)	Li2 - Ri Level (dB)
50	8.9						
63	9.4						
80	10.2						
100	17.2	22.0	4.8	-29.0	-46.2	-20.0	-37.2
125	16.2	25.0	8.8	-26.0	-42.2	-20.0	-36.2
160	20.8	28.0	7.2	-23.0	-43.8	-18.0	-38.8
200	26.3	31.0	4.7	-21.0	-47.3	-18.0	-44.3
250	32.3	34.0	1.7	-19.0	-51.3	-15.0	-47.3
315	35.4	37.0	1.6	-17.0	-52.4	-14.0	-49.4
400	39.3	40.0	0.7	-15.0	-54.3	-13.0	-52.3
500	43.8	41.0	-	-13.0	-56.8	-12.0	-55.8
630	47.2	42.0	-	-12.0	-59.2	-11.0	-58.2
800	47.9	43.0	-	-11.0	-58.9	-9.0	-56.9
1000	50.2	44.0	-	-10.0	-60.2	-8.0	-58.2
1250	52.5	45.0	-	-9.0	-61.5	-9.0	-61.5
1600	53.5	45.0	-	-9.0	-62.5	-10.0	-63.5
2000	53.8	45.0	-	-9.0	-62.8	-11.0	-64.8
2500	54.8	45.0	-	-9.0	-63.8	-13.0	-67.8
3150	53.9	45.0	-	-9.0	-62.9	-15.0	-68.9
4000	54.0						
5000	50.9						

Sum = 29.5 RA,1 = 37.7 RA,2 = 31.9
 RW = 41.0 C = -3 Ctr = -9.0

Rw (C ; Ctr) = 41 (-3 ; -9)
 Rw (C ; Ctr ; C50-3150 ; Ctr,50-3150) = 41 (-3 ; -9 ; -5 ; -15)
 Rw (C ; Ctr ; C100-5000 ; Ctr,100-5000) = 41 (-3 ; -9 ; -2 ; -9)
 Rw (C ; Ctr ; C50-5000 ; Ctr,50-5000) = 41 (-3 ; -9 ; -4 ; -15)

Calculations in ISO 717-1 are performed based on assumed equivalency of the ASTM and the corresponding ISO test methods. The test herein is performed according to the ASTM standards. NOAL *does not* hold accreditation for ISO 140 or ISO 717 under their scope of accreditation.

The spectrum adaptation terms C and Ctr characterize performance against two specific sound sources, A-weighted pink noise and A-weighted traffic noise respectively. The standard ISO 717-1 includes a discussion of "Use of Spectrum Adaptation Terms" in Annex A (informative).

Each spectrum adaptation term may additionally be reported with extended frequency bands included. A calculation for the primary frequency range is shown above, but all available extended-frequency calculations were performed to compare against corresponding ratings of other specimens.