



Test Number: NOAL 20-0228

Test Method: ASTM E90-09 (2016): Laboratory Measurement of Airborne Sound Transmission of Building Partitions and Elements

Result Summary: STC 34

Test Date: February 13, 2020

Specimen: Wall Assembly

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

Report Date: February 26, 2020

Prepared For: Everblock Systems, LLC
790 Madison Avenue, Suite 506, New York, NY 10065

Technician: E. Dick

Prepared by: Elliott Dick
North Orbit Acoustic Laboratories
P.O. Box 6948
Minneapolis, MN 55406

ELECTRONICALLY
REPRODUCED
SIGNATURE

David M Berg
Laboratory Manager

ELECTRONICALLY
REPRODUCED
SIGNATURE

Heide Gross
Laboratory Quality Manager

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

Prepared For: Everblock Systems, LLC

790 Madison Avenue, Suite 506, New York, NY 10065

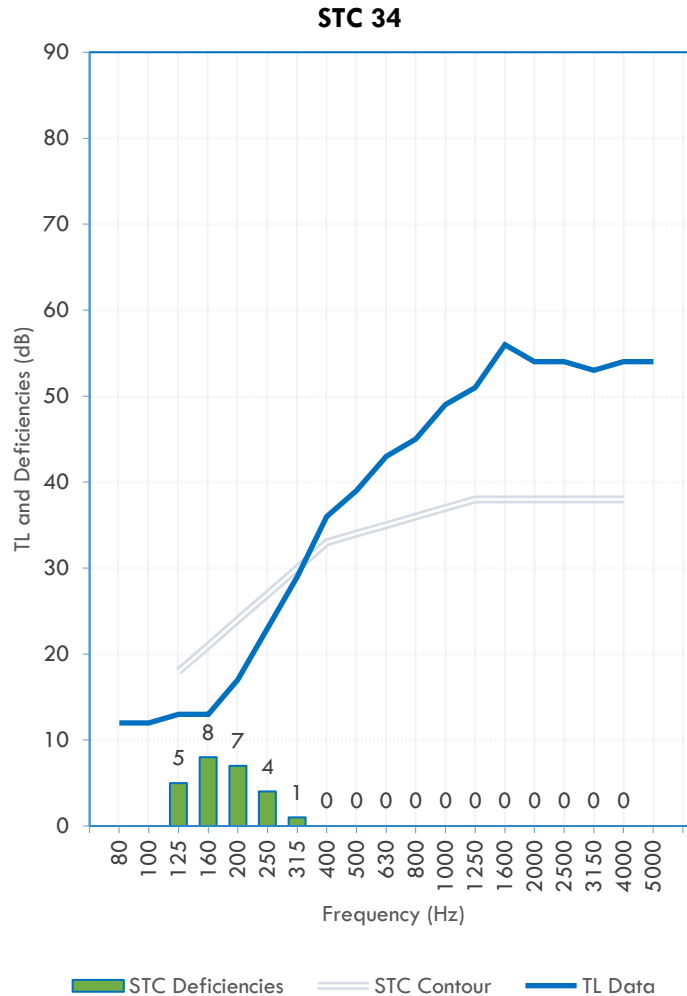
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Frequency (Hz)	TL (dB)	Deficiencies (dB)
80	12	
100	12	
125	13	5
160	13	8
200	17	7
250	23	4
315	29	1
400	36	0
500	39	0
630	43	0
800	45	0
1000	49	0
1250	51	0
1600	56	0
2000	54	0
2500	54	0
3150	53	0
4000	54	0
5000	54	0
Total Deficiencies		25



ASSEMBLY ELEMENTS:

(From Source Room Side to Receive Room Side)

Sheathing 48" x 96" x 3" EverPanel Modular Wall Panels with foam insulation insert panels
See Appendix C on pages 6 and 7 for a full description of Assembly Elements



SPECIMEN DESCRIPTION

The specimen is a 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 wall assembly was originally constructed on February 13, 2020 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 (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

All results reported herein were derived from tests performed in full accordance with test method ASTM E90-09 (2016). The laboratory and measurement systems fully meet all requirements of the test standard and the requirements of ASTM E90-09 (2016) 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 prohibited.

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APPENDIX A: MEASUREMENT SETUP

ENVIRONMENT

Temperature: 66.3 °F [19.1 °C]
 Relative Humidity: 54.6%

SPECIMEN AREA

Specimen Area: 96.0 ft² [8.9 m²]

CHAMBER VOLUME - AIRBORNE TRANSMISSION

Source Room 7,075.0 ft³ [200.3 m³]
 Receiver Room 7,852.8 ft³ [222.4 m³]

INSTRUMENTATION

Description	Brand	Model	Serial
Analyzer	Sinus	Apollo	7510
Software	Sinus	Samurai	ver. 2.8.3
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	2736620
Rotating Boom	Brüel & Kjær	3923	2705113
Calibrator	Brüel & Kjær	4231	2416109
Loudspeaker	Mackie	SR1521z	PP14915
Loudspeaker	Mackie	SR1521z	PP14940
Thermohygrometer	Digi-Sense	20250-21	192657769

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APPENDIX B: CALCULATION RESULTS

Freq. Band (Hz)	Spec TL (dB)	Data Flags (see below)	95% C.I. (dB)	Flanking Limit (dB)	STC Deficiencies (dB)
25					
32					
40					
50	7.9		±4.91	40	
63	10.5		±3.77	45	
80	12.3		±4.44	46	
100	12.2		±2.64	49	
125	13.0		±2.32	55	5
160	12.5		±1.61	58	8
200	17.4		±1.00	62	7
250	22.5		±0.92	65	4
315	29.1		±0.80	68	1
400	35.6		±0.66	71	0
500	39.3		±0.61	74	0
630	42.7		±0.63	76	0
800	45.4		±0.69	79	0
1000	48.6		±0.35	81	0
1250	50.9		±0.54	84	0
1600	55.5		±0.37	83	0
2000	54.5		±0.41	82	0
2500	54.2		±0.38	86	0
3150	52.9		±0.48	90	0
4000	54.5		±0.37	89	0
5000	54.4		±0.81	86	
6300					
8000					
10000					
Total deficiencies below STC contour (dB)					25
STC contour [ASTM E413]					34

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.

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APPENDIX C: SPECIMEN ASSEMBLY DESCRIPTION

Overall Mass 221.0 lb [100.2 kg]

Surface Weight 2.3 PSF [11.2 kg/m²]

Building Element	Mass lb [kg]	Surface Weight PSF [kg/m ²]
48" x 96" x 3" EverPanel Modular Wall Panels with foam insulation insert panels	221.0 [100.2]	2.30 [11.24]

All materials were weighed prior to installation. Weights of fasteners, tape and sealant are not represented in the above totals.



APPENDIX C: SPECIMEN ASSEMBLY DESCRIPTION (CONTINUED)

EverPanel Modular Wall Panels were supplied by the Client. All other materials were purchased through regional retail or wholesale channels.

EverPanel Modular Wall Panels with foam insulation insert panels arrived pre-assembled. Each panel consisted of a 4'-0" wide by 8'-0" tall by 3" thick assembly of fiberglass panels on each side, supported around the perimeter with rigid plastic framing elements. In addition, two foam insert panels were installed inside the central cavity of the panel assembly.

Three wall panels were installed vertically in the 12'-0" wide by 8'-0" tall specimen opening. Seams were sealed on the source and receiving room sides with 2" wide polypropylene tape. In addition, the perimeter of both sides of the specimen was sealed with 2" wide polypropylene tape, and then 7/8" dense putty tape.

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

Freq. Band (Hz)	R _i (R _i ≡ TL) (dB)	Adj. Ref. Curve (dB)	Unfav. Deviat. (dB)	L _{i1} Spectrum (dB)	L _{i1} - R _i Level (dB)	L _{i2} Spectrum (dB)	L _{i2} - R _i Level (dB)
50	7.9						
63	10.5						
80	12.3						
100	12.2	15	2.8	-29.0	-42.2	-20.0	-32.2
125	13.0	18	5.0	-26.0	-40.0	-20.0	-33.0
160	12.5	21	8.5	-23.0	-36.5	-18.0	-30.5
200	17.4	24	6.6	-21.0	-39.4	-18.0	-35.4
250	22.5	27	4.5	-19.0	-42.5	-15.0	-37.5
315	29.1	30	0.9	-17.0	-47.1	-14.0	-43.1
400	35.6	33	0.0	-15.0	-51.6	-13.0	-48.6
500	39.3	34	0.0	-13.0	-53.3	-12.0	-51.3
630	42.7	35	0.0	-12.0	-55.7	-11.0	-53.7
800	45.4	36	0.0	-11.0	-57.4	-9.0	-54.4
1000	48.6	37	0.0	-10.0	-59.6	-8.0	-56.6
1250	50.9	38	0.0	-9.0	-60.9	-9.0	-59.9
1600	55.5	38	0.0	-9.0	-65.5	-10.0	-65.5
2000	54.5	38	0.0	-9.0	-64.5	-11.0	-65.5
2500	54.2	38	0.0	-9.0	-64.2	-13.0	-67.2
3150	52.9	38	0.0	-9.0	-62.9	-15.0	-67.9
4000	54.5						
5000	54.4						
Sum =			28.3	R _{A,1} =	31.3	R _{A,2} =	25.9
R _w =			34	C =	-3	C _{tr} =	-8

$$R_w (C ; C_{tr}) = 34 (-3 ; -8)$$

$$R_w (C ; C_{tr} ; C_{50-3150} ; C_{tr,50-3150}) = 34 (-3 ; -8 ; -3 ; -10)$$

$$R_w (C ; C_{tr} ; C_{100-5000} ; C_{tr,100-5000}) = 34 (-3 ; -8 ; -2 ; -8)$$

$$R_w (C ; C_{tr} ; C_{50-5000} ; C_{tr,50-5000}) = 34 (-3 ; -8 ; -2 ; -10)$$

Calculations according to the standard ISO 717-1 are based on an assumed equivalency of the ASTM and the corresponding ISO test methods. NOAL's scope of accreditation includes ASTM E90 and the test herein is performed according to this standard as described, but NOAL does not hold accreditation for the corresponding ISO standards.

The spectrum adaptation terms C and C_{tr} 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. The calculation above represents the primary frequency range. The results below the table show the calculated primary ratings as well all available extended-frequency ratings, so that this specimen may be compared against corresponding ratings of other specimens.