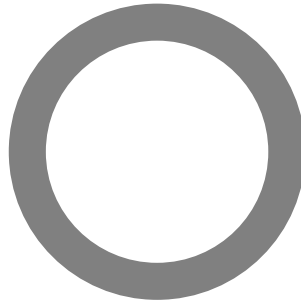


ASTM E 90: Laboratory Measurement of Airborne Sound Transmission of Building Partitions and Elements

Orfield Laboratories Inc



Design Research Testing
Acoustics / Vibration / Vision / Lighting / Architecture / Market Research

TEST

Client: **Serious Materials, Inc**
Report Date: **October 9, 2009**
Test Date: **August 26, 2009**
Test Number: **OL09-0821**

ACCREDITATION



For the scope of accreditation
under NVLAP code 200248-0

RESULT SUMMARY

STC = 52

CLIENT

ADDRESS

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Signatures are required on this document for an official laboratory test report.
Copies of this document without signatures are for reference only.

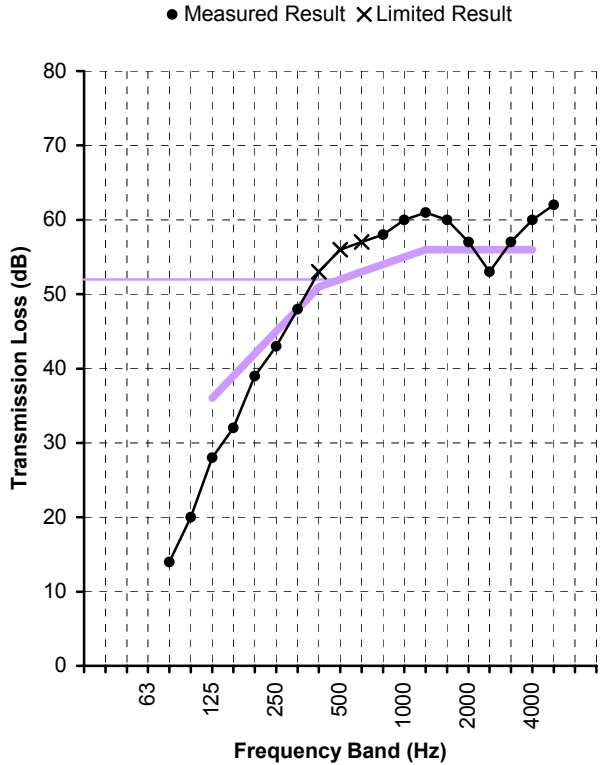




Test Date August 26, 2009
Specimen Interior Wall Assembly

Method ASTM Standard E90
Technician D. Berg

Single Number Rating
STC = 52



Freq. (Hz)	TL (dB)	Def. (dB)
80	14	
100	20	
125	28	8
160	32	7
200	39	3
250	43	2
315	48	-
400	53*	-
500	56*	-
630	57*	-
800	58	-
1000	60	-
1250	61	-
1600	60	-
2000	57	-
2500	53	3
3150	57	-
4000	60	-
5000	62	

Total Deficiencies 23

* Estimate of lower limit

Assembly Elements (listed in order from source room side to receiver room side)
 0.625" (5/8") type X gypsum board; 1.25" fine thread screw @ 12" O.C.
 3-5/8" 25 gauge steel studs @ 24" O.C.
 3-1/2" kraft-faced glass fiber insulation batts
 0.625" (5/8") QuietRock ES; 1.25" fine thread screw @ 12" O.C.





SPECIMEN DESCRIPTION

The specimen under test was one interior wall assembly. The elements in the assembly are described below the results table and chart. Additional information regarding the specimen may be found in the appendices.

Test results pertain to this specimen only.

INSTALLATION AND DISPOSITION

Independent contractors fabricated the filler wall and test specimen in the specimen opening. Qualified representatives of Orfield Laboratories observed the installation progress, and visually inspected the specimen prior to testing.

TEST METHODS

The methods followed these published standards:

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

ASTM E413: *Classification for Rating Sound Insulation*

** Orfield Laboratories, Inc. has been accredited by the U.S. Department of Commerce, National Institute of Standards and Technology (NIST) under their National Voluntary Laboratory Accreditation Program (NVLAP) for this test procedure. This report shall not be used to claim product endorsement by NVLAP or any agency of the U.S. Government.*

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.



APPENDIX A: MEASUREMENT SETUP

ENVIRONMENT

Environment

Temperature	70°F [21.1°C]
Relative Humidity	55%

Specimen Area

Specimen Area	64.5 ft ² [5.99 m ²]
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Chamber Volume - Airborne Transmission

Source Room Volume	3284 ft ³ [93.0 m ³]
Receiving Room Volume	8079 ft ³ [228.8 m ³]

INSTRUMENTATION

Description	Brand	Model	S/N
Microphone	Brüel & Kjær	Type 4134	1478843
Preamplifier	Brüel & Kjær	Type 2639	1202479
Microphone	Brüel & Kjær	Type 4134	558007
Preamplifier	Brüel & Kjær	Type 2639	1312237
Analyzer	Norsonic	Type 121	31185



APPENDIX B: CALCULATION RESULTS

Freq. Band (Hz)	Specimen T.L. (dB)	95% Conf. (dB)	Flanking Limit (dB)	STC Defic. (dB)
25				
31.5	21.3		40	
40	11.3		47	
50	13.9		43	
63	10.9		43	
80	13.6	±1.63	42	
100	20.0	±1.15	45	
125	28.1	±0.95	46	8
160	32.3	±1.27	52	7
200	38.6	±1.24	53	3
250	42.6	±0.65	56	2
315	47.7	±0.65	60	-
400	53.1 §	±0.62	61	-
500	56.1 §	±0.40	65	-
630	57.0 §	±0.50	66	-
800	58.3	±0.40	69	-
1000	59.8	±0.25	70	-
1250	60.6	±0.25	72	-
1600	60.0	±0.32	72	-
2000	57.1	±0.44	74	-
2500	53.5	±0.35	79	3
3150	56.6	±0.31	83	-
4000	59.7	±0.49		-
5000	62.4	±0.35		
6300	63.4			
8000	64.0			
10000	61.6 *			
Total deficiencies below STC contour (dB)				23
STC contour [ASTM E413]				52

* Actual transmission loss of specimen may be higher than measured at this frequency band. Signal-to-noise in the receiving room less than 5 dB, therefore the result is "an estimate of the lower limit".

§ Actual transmission loss of specimen may be higher than measured at this frequency band. Result within 10 dB of flanking limit found in separate study, therefore the result may be "potentially limited by the laboratory" due to flanking around the specimen.

Note: 95% Confidence from room qualification data. Flanking Limit from chamber flanking measurements. Data available upon request. Extended frequency results below 80Hz and above 5000Hz for reference only.





APPENDIX C: SPECIMEN ASSEMBLY DESCRIPTION

The following table shows the description of the interior wall assembly.

Overall Mass = 344.5 lb [156.3 kg]
 Overall Surface Density = 5.34 PSF [26.08 kg/m²]

Element	Mass lb [kg]	Surf. Dens. PSF [kg/m ²]
0.625" (5/8") type X gypsum board; 1.25" fine thread screw @ 12" O.C.	142.5 [64.6]	2.21 [10.79]
3-5/8" 25 gauge steel studs @ 24" O.C.	22.3 [10.1]	0.34 [1.68]
3-1/2" kraft-faced glass fiber insulation batts	15.8 [7.1]	0.24 [1.19]
0.625" (5/8") QuietRock ES; 1.25" fine thread screw @ 12" O.C.	164.0 [74.4]	2.54 [12.41]

The Quiet Solution QuietRock ES and QuietSeal Pro were supplied by the client. All other materials were purchased through retail channels. All materials were weighed prior to installation. Weights of fasteners are not represented in the above totals.

TEST SPECIMEN DESCRIPTION

The test specimen was one interior wall assembly.

An eight foot length of 3-5/8", 25 gauge steel track was laid on the floor and another attached to the top of the 8' x 8' test specimen opening. Five 3-5/8", 25 gauge steel studs were fastened vertically to the bottom and top tracks with 1-1/4" fine-thread screws. The studs were spaced at approximately 24" centers.

Kraft-faced glass-fiber insulation batts measuring 23" wide and 3-1/2" thick were friction-fit into each entire stud cavity.

On the source side of the partition, the sheeting consisted of a single layer of 5/8" type X gypsum board. On the receiver side of the partition the sheeting consisted of a single layer of 5/8" thick Quiet Solution QuietRock ES (QR-ES).

On the receiver room side, two 5/8" thick, 4' x 8' Quiet Solution QuietRock ES panels were fastened vertically to the steel studs with 1-1/4" drywall screws, spaced 12" apart. The seams between the two QR-ES panels were sealed with Quiet Solution QuietSeal Pro and then covered with Nashua 322, 5 mil foil tape.

On the source room side of the partition the type X gypsum board panels were installed vertically, but with the seams staggered from those on the receiver side. The installation pattern consisted of two 2' x 8' vertical panels at the two sides, and one 4' x 8' sheet in the center of the specimen opening. The panels were fastened to the steel studs with 1-1/4" drywall screws, spaced 12" apart.

The photograph in Figure 1 shows the typical staggered seam installation on the source room side. The seams between the three gypsum board panels were sealed with Quiet Solution QuietSeal Pro and then covered with Nashua 322, 5 mil foil tape.





The perimeter of the specimen was sealed, on both on the source and receiver room sides, with Quiet Solution QuietSeal Pro and then covered with Nashua 322, 5 mil foil tape.



Figure 1: Photograph of typical staggered seams on source room side of partition



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

Freq. Band (Hz)	R_i ($R_i = TL$) (dB)	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	13.9						
63	10.9						
80	13.6						
100	20.0	32	12.0	-29.0	-49.0	-20.0	-40.0
125	28.1	35	6.9	-26.0	-54.1	-20.0	-48.1
160	32.3	38	5.7	-23.0	-55.3	-18.0	-50.3
200	38.6	41	2.4	-21.0	-59.6	-18.0	-56.6
250	42.6	44	1.4	-19.0	-61.6	-15.0	-57.6
315	47.7	47	-	-17.0	-64.7	-14.0	-61.7
400	53.1	50	-	-15.0	-68.1	-13.0	-66.1
500	56.1	51	-	-13.0	-69.1	-12.0	-68.1
630	57.0	52	-	-12.0	-69.0	-11.0	-68.0
800	58.3	53	-	-11.0	-69.3	-9.0	-67.3
1000	59.8	54	-	-10.0	-69.8	-8.0	-67.8
1250	60.6	55	-	-9.0	-69.6	-9.0	-69.6
1600	60.0	55	-	-9.0	-69.0	-10.0	-70.0
2000	57.1	55	-	-9.0	-66.1	-11.0	-68.1
2500	53.5	55	1.5	-9.0	-62.5	-13.0	-66.5
3150	56.6	55	-	-9.0	-65.6	-15.0	-71.6
4000	59.7						
5000	62.4						
Sum =			29.9	$R_{A,1} =$	46.3	$R_{A,2} =$	38.8
$R_w =$			51	$C =$	-5	$C_{tr} =$	-12

$$R_w (C ; C_{tr}) = 51 (-5 ; -12)$$

$$R_w (C ; C_{tr} ; C_{50-3150} ; C_{tr, 50-3150}) = 51 (-5 ; -12 ; -9 ; -21)$$

$$R_w (C ; C_{tr} ; C_{100-5000} ; C_{tr, 100-5000}) = 51 (-5 ; -12 ; -4 ; -12)$$

$$R_w (C ; C_{tr} ; C_{50-5000} ; C_{tr, 50-5000}) = 51 (-5 ; -12 ; -9 ; -21)$$

Note: The 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 ASTM 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. 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.

