

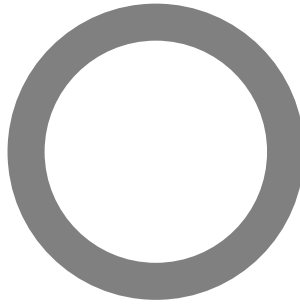


Important Notice

In August 1, 2013, PABCO® Gypsum, a division of PABCO® building products, LLC acquired the QuietRock® business and operations from Serious Energy, Inc. Serious Energy, Inc. corporate structure and legal name changed through the years from Quiet Solution, Inc. to Serious Materials, Inc to Serious Energy, Inc. The acquisition of the QuietRock® business by PABCO® Gypsum includes the products, technical data, test reports and other intellectual property. For the avoidance of confusion, references to "Quiet Solution", "Serious Materials", or "Serious Energy" used within test reports, in general, should be understood as references to PABCO® Gypsum as of August 1, 2013.

ASTM E 90-09: 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 Energy, Inc.
Report Date: July 27, 2012
Test Date: May 22, 2012
Test Number: OL 12-0515

ACCREDITATION



For the scope of accreditation
under NVLAP code 200248-0

RESULT SUMMARY

STC=50

CLIENT ADDRESS

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Signatures are required on this document for an official laboratory test report.
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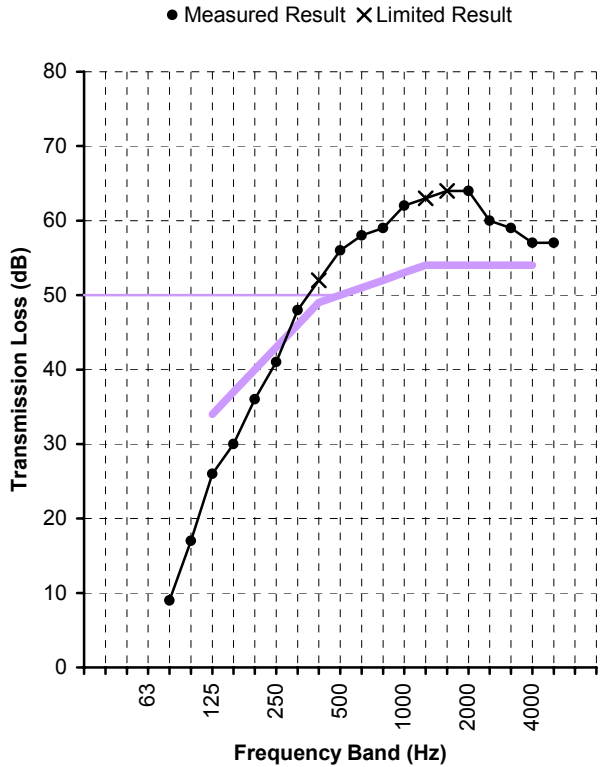




Test Date May 22, 2012
Specimen Wall Assembly

Method ASTM Standard E90
Technician D. Berg

Single Number Rating
STC = 50



Freq. (Hz)	TL (dB)	Def. (dB)
80	9	
100	17	
125	26	8
160	30	7
200	36	4
250	41	2
315	48	-
400	52*	-
500	56	-
630	58	-
800	59	-
1000	62	-
1250	63*	-
1600	64*	-
2000	64	-
2500	60	-
3150	59	-
4000	57	-
5000	57	-

Total Deficiencies 21

* Estimate of lower limit

Assembly Elements (listed in order from source room side to receiver room side)

- 0.5" (1/2") QuietRock 510 (v); 1.25" screw @ 12" O.C.
- 3-5/8" 25 ga. equivalent (.0155") steel studs @ 24" O.C.
- 3.5" kraft-faced fiberglass insulation batts
- 0.5" (1/2") gypsum board (vs); 1.25" screw @ 12" O.C.





SPECIMEN DESCRIPTION

The specimen under test was a wall assembly. The elements in the assembly are described briefly below the results table and chart on page 2. Detailed information regarding the specimen may be found in Appendix C.

Test results pertain to this specimen only.

INSTALLATION AND DISPOSITION

The steel stud frame was originally constructed on May 21, 2012. The steel stud frame and insulation were retained from previous tests, and were used for subsequent tests in this series. The entire assembly was constructed by independent contractors. Qualified representatives of Orfield Laboratories observed the installation in progress, and visually inspected the specimen prior to testing.

TEST METHODS

The methods followed these published 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*

The values presented in this report are from single-direction transmission loss measurements.

** 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

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	8281 ft ³ [234.5 m ³]

INSTRUMENTATION

Description	Brand	Model	S/N
Analyzer	Norsonic	Type 121	31185
Calibrator	Brüel & Kjær	Type 4230	1379712
Microphone	Brüel & Kjær	Type 4134	1675265
Microphone	Brüel & Kjær	Type 4134	296819
Preamplifier	Brüel & Kjær	Type 2639	1312147
Preamplifier	Brüel & Kjær	Type 2639	1202479
Rotating Boom	Brüel & Kjær	Type 3923	890569
Rotating Boom	Brüel & Kjær	Type 3923	2036583
Power Supply	Brüel & Kjær	Type WB1057	n/a
Loudspeakers	JBL	EON15	J149N-02xxxx
Subwoofer	JBL	JRX-118SP	P0370-018539



APPENDIX B: CALCULATION RESULTS

Freq. Band (Hz)	Specimen T.L. (dB)	95% Conf. (dB)	Flanking Limit (dB)	STC Defic. (dB)
25				
31.5	23.5		40	
40	13.6		47	
50	13.4		43	
63	10.5		43	
80	9.3	±3.04	41	
100	16.8	±3.11	46	
125	26.0	±1.39	51	8
160	29.6	±1.22	55	7
200	36.2	±1.53	57	4
250	40.8	±1.70	60	2
315	47.5	±0.98	60	-
400	51.8 §	±0.99	61	-
500	55.9	±0.82	66	-
630	57.6	±0.69	68	-
800	59.4	±0.60	72	-
1000	62.1	±0.50	75	-
1250	63.3 §	±0.56	72	-
1600	63.9 §	±0.44	73	-
2000	63.6	±0.35	77	-
2500	60.3	±0.63	81	-
3150	59.0	±0.58	84	-
4000	57.5	±0.47	78	-
5000	57.4			
6300	61.5			
8000	66.6			
10000	66.2 *			
Total deficiencies below STC contour (dB)				21
STC contour [ASTM E413]				50

* 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 intervals from room qualification data. Flanking Limit from chamber flanking study. Reference sample and repeatability data available upon request. Extended frequency results below 80Hz and above 5000Hz are for reference only.





APPENDIX C: SPECIMEN ASSEMBLY DESCRIPTION

The following table shows the elements in the wall assembly in order from the source room to receiving room. Independent contractors constructed and installed the wall assembly in the laboratory test opening. A qualified representative of Orfield Laboratories observed the installation in process and visually inspected the completed specimen and seals. All materials were weighed prior to installation. Fastener weights are not included in the reported weights.

Overall Mass = 273.4 lb [124.0 kg]

Overall Surface Density = 4.24 PSF [20.70 kg/m²]

Element	Mass lb [kg]	Surf. Dens. PSF [kg/m ²]
0.5" (1/2") QuietRock 510 (v); 1.25" screw @ 12" O.C.	139.0 [63.0]	2.16 [10.52]
3-5/8" 25 ga. equivalent (.0155") steel studs @ 24" O.C.	20.4 [9.3]	0.32 [1.54]
3.5" kraft-faced fiberglass insulation batts	14.0 [6.4]	0.22 [1.06]
0.5" (1/2") gypsum board (vs); 1.25" screw @ 12" O.C.	100.0 [45.4]	1.55 [7.57]

The QuietRock 510 noise reducing drywall and QuietSeal Pro acoustical sealant were supplied by the Client. All other materials were purchased through independent retail suppliers and were acquired by the independent construction contractors. The frame and insulation were constructed for previous tests in this series for this client, and portions of this specimen assembly were used in subsequent tests in the series.

FRAMING

A 3-5/8", 25 gauge equivalent (.0155" thick) steel frame was constructed in the perimeter of the laboratory test specimen opening. The frame consisted of 3-5/8" x 1-1/4" track plates at the top and bottom, and five, 3-5/8" x 1-1/4" studs installed 24" on center. The track plates and studs were made of 25 gauge equivalent (.0155") thick galvanized steel. The track plates and studs were fastened together with two type S pan head screws at each intersection. The perimeter of the frame was sealed to the specimen opening with QuietSeal Pro acoustical sealant.

INSULATION

Fiberglass insulation batts were installed in the stud cavities. The kraft-faced insulation batts were 24" wide, 3-1/2" thick (R13) and were friction fit into each of the six stud cavities. The kraft paper was oriented towards the source room side. Figure 1 is a photograph of the insulated frame before the installation of the sheeting layers.



Figure 1: Insulated steel stud frame viewed from source room side

SHEETING

The source room side sheeting was a single layer of 1/2" thick QuietRock 510 noise reducing drywall. The QuietRock 510 sheets were fastened parallel to the steel stud frame with 1-1/4" long, type S drywall screws spaced at 12" on center. The single layer was comprised of two complete 4' by 8' sheets. Figure 2 is a photograph of the source side sheeting.



Figure 2: Source room side QuietRock 510 installed and sealed in the specimen opening

The receiving room side sheeting layer consisted of a single layer of 1/2" thick gypsum board. The gypsum board sheets were fastened parallel to the steel stud frame with 1-1/4" long, type S drywall screws spaced at 12" on center. The single layer was comprised of three sections to provide seams that were staggered from those on the source side. Figure 3 is a photograph of the receiving room side sheeting.



Figure 3: Receiving room side sheeting installed and sealed in the specimen opening

Panels were shimmed at installation so equal gaps were at the top and bottom. Gaps were less than 1/4" in all cases. Shims were removed after sheeting was fastened and the vertical seams were sealed on the source and receiving room sides with QuietSeal Pro acoustical sealant and 1-7/8" wide, 5 mil aluminum foil tape. The perimeter of both sides of the sample were sealed with QuietSeal Pro acoustical sealant, 5 mil aluminum foil tape and 7/8" dense putty tape.



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

Freq. Band (Hz)	R_i ($R_i \equiv TL$) (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	13.4						
63	10.5						
80	9.3						
100	16.8	30	13.2	-29.0	-45.8	-20.0	-36.8
125	26.0	33	7.0	-26.0	-52.0	-20.0	-46.0
160	29.6	36	6.4	-23.0	-52.6	-18.0	-47.6
200	36.2	39	2.8	-21.0	-57.2	-18.0	-54.2
250	40.8	42	1.2	-19.0	-59.8	-15.0	-55.8
315	47.5	45	-	-17.0	-64.5	-14.0	-61.5
400	51.8	48	-	-15.0	-66.8	-13.0	-64.8
500	55.9	49	-	-13.0	-68.9	-12.0	-67.9
630	57.6	50	-	-12.0	-69.6	-11.0	-68.6
800	59.4	51	-	-11.0	-70.4	-9.0	-68.4
1000	62.1	52	-	-10.0	-72.1	-8.0	-70.1
1250	63.3	53	-	-9.0	-72.3	-9.0	-72.3
1600	63.9	53	-	-9.0	-72.9	-10.0	-73.9
2000	63.6	53	-	-9.0	-72.6	-11.0	-74.6
2500	60.3	53	-	-9.0	-69.3	-13.0	-73.3
3150	59.0	53	-	-9.0	-68.0	-15.0	-74.0
4000	57.5						
5000	57.4						
Sum =			30.6	$R_{A,1} =$	43.7	$R_{A,2} =$	35.9
$R_w =$			49	$C =$	-5	$C_{tr} =$	-13

$$R_w (C ; C_{tr}) = 49 (-5 ; -13)$$

$$R_w (C ; C_{tr} ; C_{50-3150} ; C_{tr, 50-3150}) = 49 (-5 ; -13 ; -10 ; -22)$$

$$R_w (C ; C_{tr} ; C_{100-5000} ; C_{tr, 100-5000}) = 49 (-5 ; -13 ; -4 ; -13)$$

$$R_w (C ; C_{tr} ; C_{50-5000} ; C_{tr, 50-5000}) = 49 (-5 ; -13 ; -9 ; -22)$$

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 the ASTM standards. Orfield Laboratories *does not* hold accreditation for ISO 140 or ISO 717 under their NVLAP scope of accreditation.

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

