

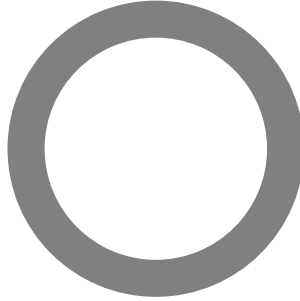


Important Notice

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 Materials, Inc
Report Date: March 31, 2011
Test Date: March 4, 2011
Test Number: OL 11-0319

ACCREDITATION



For the scope of accreditation under NVLAP code 200248-0

RESULT SUMMARY

STC=51

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.

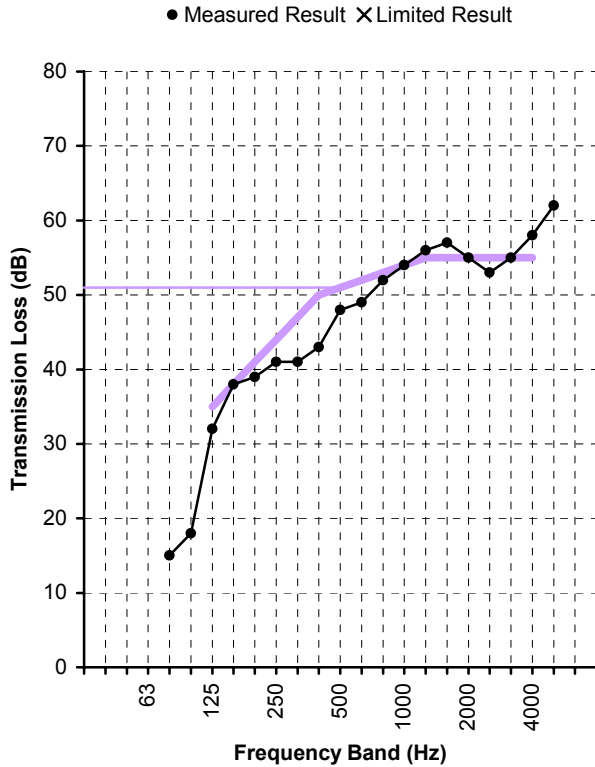




Test Date March 4, 2011
Specimen Wall Assembly

Method ASTM Standard E90
Technician D. Berg

Single Number Rating
STC = 51



Freq. (Hz)	TL (dB)	Def. (dB)
80	15	
100	18	
125	32	3
160	38	-
200	39	2
250	41	3
315	41	6
400	43	7
500	48	3
630	49	3
800	52	1
1000	54	-
1250	56	-
1600	57	-
2000	55	-
2500	53	2
3150	55	-
4000	58	-
5000	62	

Total Deficiencies 30

* Estimate of lower limit

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

- 0.625" (5/8") gypsum board; 1.625" type W screw @ 12" O.C.
- 2x4 wood studs @ 24" O.C.
- 3.5" kraft-faced insulation batts (R13)
- 0.625" (5/8") QuietRock ES; 1.625" type W screw @ 12" O.C.





SPECIMEN DESCRIPTION

The specimen under test was one 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

The 2x4 wood stud frame was originally constructed on March 1, 2011 and was used for previous tests in this series. The framing and insulation were retained for subsequent tests in the 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	68°F [20.0°C]
Relative Humidity	50%

Specimen Area

Specimen Area	64.5 ft² [5.99 m²]
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Chamber Volume - Airborne Transmission

Source Room Volume	3284 ft³ [93.0 m³]
Receiving Room Volume	8281 ft³ [234.5 m³]

INSTRUMENTATION

Description	Brand	Model	S/N
Calibrator	Brüel & Kjær	Type 4230	1379712
Microphone	Brüel & Kjær	Type 4134	1478843
Preamplifier	Brüel & Kjær	Type 2639	1202479
Microphone	Brüel & Kjær	Type 4134	296819
Preamplifier	Brüel & Kjær	Type 2639	1312147
Power Supply	Brüel & Kjær	Type WB1057	n/a
Analyzer	Norsonic	Type 121	31185



APPENDIX B: CALCULATION RESULTS

Band (Hz)	T.L. (dB)	Conf. (dB)	Limit (dB)	Defic. (dB)
25				
31.5	29.8		40	
40	18.0		47	
50	18.2		43	
63	17.4		43	
80	15.3	±2.89	42	
100	17.7	±2.96	45	
125	32.3	±1.32	50	3
160	37.7	±1.16	52	-
200	39.0	±1.46	55	2
250	40.6	±1.62	59	3
315	41.1	±0.93	59	6
400	42.7	±0.94	61	7
500	47.9	±0.78	65	3
630	48.7	±0.66	67	3
800	51.8	±0.57	71	1
1000	53.6	±0.48	74	-
1250	55.8	±0.54	73	-
1600	56.6	±0.42	74	-
2000	54.9	±0.33	77	-
2500	53.3	±0.60	83	2
3150	54.9	±0.55	85	-
4000	58.0	±0.45	80	-
5000	62.0			
6300	66.9			
8000	69.4 *			
10000	65.0 *			
Total deficiencies below STC contour (dB)				30
STC contour [ASTM E413]				51

* 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".

Note: 95% Confidence 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.

Overall Mass = 378.8 lb [171.8 kg]

Overall Surface Density = 5.87 PSF [28.67 kg/m²]

Element	Mass lb [kg]	Surf. Dens. PSF [kg/m ²]
0.625" (5/8") gypsum board; 1.625" type W screw @ 12" O.C.	133.1 [60.4]	2.06 [10.08]
2x4 wood studs @ 24" O.C.	56.0 [25.4]	0.87 [4.24]
3.5" kraft-faced insulation batts (R13)	14.0 [6.4]	0.22 [1.06]
0.625" (5/8") QuietRock ES; 1.625" type W screw @ 12" O.C.	175.7 [79.7]	2.72 [13.30]

The QuietRock ES was provided by the client. Other construction materials were acquired by the construction contractors through construction material suppliers. 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.

A 2x4 wood frame was constructed in the perimeter of the laboratory test specimen opening. The frame consisted of a wood 2x4 sill and top plates, and wood 2x4 sides. Wood 2x4 studs were installed vertically and spaced 24" on center and fastened to the sill plate and top plate using four (4), 2-1/2" drywall screws per stud; two at each the sill and top plate. The frame was sealed at the perimeter on both sides with acoustic sealant.

INSULATION

Kraft-faced fiberglass insulation batts were installed in the stud cavities. The insulation batts were 23" wide, 3-1/2" thick (R13) and were friction fit into each of the four stud cavities. The kraft-faced sides of the insulation batts were oriented towards the source room. Figure 1 is a photograph of the insulated frame before the installation of the sheeting layers.



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

SHEETING

The source room sheeting was a single layer of 5/8" thick Type X gypsum board. The gypsum board sheets were fastened vertically to the source room side of the wood stud frame with 1-5/8" long, type W drywall screws spaced at 12" on center. The source layer was comprised of two 4' by 8' sheets, however one of the sheets was cut lengthwise and installed on either side of a complete 4'x8' sheet in order to stagger the seams relative to the receiver room side sheeting.

The receiving room sheeting was a single layer of 5/8" thick QuietRock ES acoustically enhanced gypsum board. The QuietRock ES was fastened vertically to the source room side of the wood stud frame with 1-5/8" long, type W drywall screws spaced at 12" on center. The receiving room sheeting layer was comprised of two complete 4' by 8' sheets.



Figure 2: Receiving room side sheeting installed and sealed

Sheeting panels on both sides of the partition 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 perimeter was sealed on the source and receiving room sides with acoustic sealant, 1-7/8" wide, 5 mil aluminum foil tape and 1 7/8" wide dense putty tape. On both sides of the partition the vertical seams were sealed with acoustic sealant and 1-7/8" wide, 5 mil aluminum foil 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	18.2						
63	17.4						
80	15.3						
100	17.7	30	12.3	-29.0	-46.7	-20.0	-37.7
125	32.3	33	0.7	-26.0	-58.3	-20.0	-52.3
160	37.7	36	-	-23.0	-60.7	-18.0	-55.7
200	39.0	39	-	-21.0	-60.0	-18.0	-57.0
250	40.6	42	1.4	-19.0	-59.6	-15.0	-55.6
315	41.1	45	3.9	-17.0	-58.1	-14.0	-55.1
400	42.7	48	5.3	-15.0	-57.7	-13.0	-55.7
500	47.9	49	1.1	-13.0	-60.9	-12.0	-59.9
630	48.7	50	1.3	-12.0	-60.7	-11.0	-59.7
800	51.8	51	-	-11.0	-62.8	-9.0	-60.8
1000	53.6	52	-	-10.0	-63.6	-8.0	-61.6
1250	55.8	53	-	-9.0	-64.8	-9.0	-64.8
1600	56.6	53	-	-9.0	-65.6	-10.0	-66.6
2000	54.9	53	-	-9.0	-63.9	-11.0	-65.9
2500	53.3	53	-	-9.0	-62.3	-13.0	-66.3
3150	54.9	53	-	-9.0	-63.9	-15.0	-69.9
4000	58.0						
5000	62.0						
Sum =			26.0	$R_{A,1} =$	44.7	$R_{A,2} =$	37.1
$R_w =$			49	$C =$	-4	$C_{tr} =$	-12

$$R_w (C ; C_{tr}) = 49 (-4 ; -12)$$

$$R_w (C ; C_{tr} ; C_{50-3150} ; C_{tr, 50-3150}) = 49 (-4 ; -12 ; -6 ; -17)$$

$$R_w (C ; C_{tr} ; C_{100-5000} ; C_{tr, 100-5000}) = 49 (-4 ; -12 ; -3 ; -12)$$

$$R_w (C ; C_{tr} ; C_{50-5000} ; C_{tr, 50-5000}) = 49 (-4 ; -12 ; -5 ; -17)$$

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

