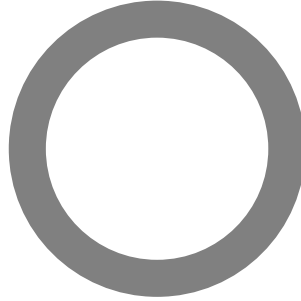


******* NOTICE *******

In June 2011, Serious Materials, Inc. changed its name to Serious Energy, Inc. In addition, the Company conducted business under other names in the past, including Quiet Solution. For the avoidance of confusion, references to "Quiet Solution" or "Serious Materials" in the reports in general should, going forward, be understood as references to Serious Energy, Inc.

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: **November 22, 2010**
Test Date: **August 30, 2010**
Test Number: **OL10-0839**

ACCREDITATION



For the scope of accreditation
under NVLAP code 200248-0

RESULT SUMMARY

STC=50

CLIENT

ADDRESS

Serious Materials, Inc.
1250 Elko Drive
Sunnyvale, CA 94089
email: info@SeriousMaterials.com

PREPARED BY

David M. Berg
Orfield Laboratories, Inc.
2709 East 25th Street
Minneapolis MN 55406
Voice (612) 721-2455
FAX (612) 721-2457

Prepared by:

ELECTRONICALLY
REPRODUCED
SIGNATURE

David M. Berg
Laboratory Manager

Reviewed By:

ELECTRONICALLY
REPRODUCED
SIGNATURE

Michael R. Role

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



Project Sound Transmission 2
 Client Serious Materials, Inc of 9
 Test OL10-0839

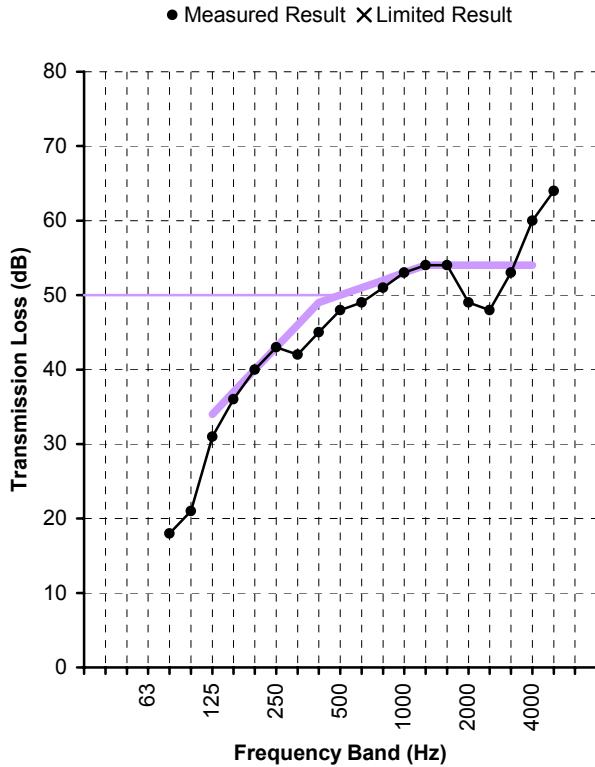


Orfield Laboratories Inc

Test Date August 30, 2010
Specimen wall assembly

Method ASTM Standard E90
Technician D. Berg

Single Number Rating
STC = 50



Freq. (Hz)	TL (dB)	Def. (dB)
80	18	
100	21	
125	31	3
160	36	1
200	40	-
250	43	-
315	42	4
400	45	4
500	48	2
630	49	2
800	51	1
1000	53	-
1250	54	-
1600	54	-
2000	49	5
2500	48	6
3150	53	1
4000	60	-
5000	64	

Total Deficiencies 29

* 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 (vert); 2" type W screws @ 12" O.C.
- QuietGlue® Pro @ 56oz per 4'x8' sheet (112oz total)
- 0.625" (5/8") type X gypsum board (vert)
- 2x4 wood studs @ 24" OC
- 3.5" R13 kraft-faced insulation batts
- 0.625" (5/8") type X gypsum board (vert); 1.25" type W screws @ 12" O.C.





SPECIMEN DESCRIPTION

The specimen under test was an 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 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*

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	73°F [22.8°C]
Relative Humidity	50%

Specimen Area

Specimen Area	64.5 ft ² [5.99 m ²]
---------------	---

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
Calibrator	Brüel & Kjær	Type 4230	1379712
Microphone	Brüel & Kjær	Type 4134	1478843
Preamplifier	Brüel & Kjær	Type 2639	1202479
Microphone	Brüel & Kjær	Type 4134	558007
Preamplifier	Brüel & Kjær	Type 2639	1312147
Power Supply	Brüel & Kjær	Type WB1057	n/a
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	26.9		40	
40	24.5		47	
50	23.7		43	
63	19.0		43	
80	18.3	±1.63	42	
100	20.9	±1.15	45	
125	31.4	±0.95	46	3
160	36.0	±1.27	52	1
200	40.3	±1.24	53	-
250	42.9	±0.65	56	-
315	41.9	±0.65	60	4
400	45.1	±0.62	61	4
500	48.5	±0.40	65	2
630	48.9	±0.50	66	2
800	51.2	±0.40	69	1
1000	52.8	±0.25	70	-
1250	54.2	±0.25	72	-
1600	54.3	±0.32	72	-
2000	49.0	±0.44	74	5
2500	47.7	±0.35	79	6
3150	52.7	±0.31	83	1
4000	59.5	±0.49		-
5000	64.0	±0.35		
6300	69.0			
8000	71.4 *			
10000	67.5 *			
Total deficiencies below STC contour (dB)				29
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".

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 wall assembly.

Overall Mass = 520.4 lb [236.0 kg]

Overall Surface Density = 8.07 PSF [39.39 kg/m²]

Element	Mass lb [kg]	Surf. Dens. PSF [kg/m ²]
0.625" (5/8") type X gypsum board (vert); 2" type W screws @ 12" O.C. QuietGlue® Pro @ 56oz per 4'x8' sheet (112oz total)	292.8 [132.8]	4.54 [22.16]
0.625" (5/8") type X gypsum board (vert) 2x4 wood studs @ 24" OC	70.0 [31.8]	1.09 [5.30]
3.5" R13 kraft-faced insulation batts	14.6 [6.6]	0.23 [1.11]
0.625" (5/8") type X gypsum board (vert); 1.25" type W screws @ 12" O.C.	143.0 [64.9]	2.22 [10.82]

QuietGlue® Pro damping adhesive was supplied by the client. All other materials were purchased through retail channels. The gypsum board and QuietGlue® Pro damping adhesive sandwich panels were constructed by independent contractors at the test laboratory and aged at room temperature for fourteen days prior to testing. All materials were weighed prior to installation. Weights of fasteners are not represented in the above totals.

FRAMING

A 2x4 wood frame was constructed in the perimeter of the laboratory test specimen opening. The frame consisted of a wood 2x4 sill plate, wood 2x4 sides, and a double top plate consisting of two wood 2x4s. Wood 2x4 studs were spaced 24" on center and fastened to the sill and top plates using four (4), 2-1/2" drywall screws per stud; two at each the sill and top plate. The perimeter of the frame was sealed to the specimen opening with acoustic sealant.

INSULATION

23" wide, 3-1/2" thick (R13), kraft-faced, glass fiber insulation batts were friction fit into each of the 4 stud cavities.

PANEL SANDWICH PREPARATION

Serious Materials QuietGlue® Pro Glue damping adhesive was pre-laminated into sandwiches between two 5/8" type X gypsum board panels. QuietGlue® Pro was applied in a random pattern from two entire 28 oz. adhesive cartridges over one whole gypsum board panel. A second sheet of 5/8" type X gypsum board was applied to the adhesive-covered panel. The sandwich was thoroughly compressed by methodically walking over the entire face of the panel sandwich. The sandwich panels were constructed by independent contractors at the test laboratory and aged at room temperature for fourteen days prior to testing.



SHEETING

The source room side sheeting layer consisted of pre-assembled sandwiches of two 5/8" thick 4' by 8' sheets of type X gypsum board laminated with QuietGlue® Pro damping adhesive. Fifty-six (56) oz. (two tubes) of QuietGlue® Pro were used for each 4' by 8' gypsum sandwich.

Two full 4' by 8' sandwiches were used to fill the source side test opening. The QuietGlue® Pro and gypsum board sandwiches were fastened to the studs with 2" long, drywall screws spaced at 12" on center. The screws penetrated both layers of gypsum board and directly into the wood studs.

The receiving room side sheeting layer consisted of a single layer of 5/8" thick type X gypsum board fastened vertically to the wood stud frame with 1.25" long, type W drywall screws spaced at 12" on center. The single layer was comprised of two complete 4' by 8' sheets.

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 perimeter and seams were sealed on the source and receiving room sides with acoustic sealant and 5 mil aluminum foil tape.

Figure 1 is a representative photograph of sandwich panel damping adhesive application prior to adding the second layer of the sandwich. Figure 2 is a photograph of installed, insulated and caulked frame. Figure 3 is representative photo of a finished installation from this test series.



Figure 1: Representative damping adhesive application prior to adding 2nd layer of sheeting to sandwich.



Figure 2: Framing and insulation prior installation of sheeting (viewed from source room side).



Figure 3: Representative installation viewed from source room side.



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	23.7						
63	19.0						
80	18.3						
100	20.9	30	9.1	-29.0	-49.9	-20.0	-40.9
125	31.4	33	1.6	-26.0	-57.4	-20.0	-51.4
160	36.0	36	-	-23.0	-59.0	-18.0	-54.0
200	40.3	39	-	-21.0	-61.3	-18.0	-58.3
250	42.9	42	-	-19.0	-61.9	-15.0	-57.9
315	41.9	45	3.1	-17.0	-58.9	-14.0	-55.9
400	45.1	48	2.9	-15.0	-60.1	-13.0	-58.1
500	48.5	49	0.5	-13.0	-61.5	-12.0	-60.5
630	48.9	50	1.1	-12.0	-60.9	-11.0	-59.9
800	51.2	51	-	-11.0	-62.2	-9.0	-60.2
1000	52.8	52	-	-10.0	-62.8	-8.0	-60.8
1250	54.2	53	-	-9.0	-63.2	-9.0	-63.2
1600	54.3	53	-	-9.0	-63.3	-10.0	-64.3
2000	49.0	53	4.0	-9.0	-58.0	-11.0	-60.0
2500	47.7	53	5.3	-9.0	-56.7	-13.0	-60.7
3150	52.7	53	0.3	-9.0	-61.7	-15.0	-67.7
4000	59.5						
5000	64.0						
Sum =			27.9	$R_{A,1} =$	46.0	$R_{A,2} =$	39.7
$R_w =$			49	$C =$	-3	$C_{tr} =$	-9

$$R_w (C ; C_{tr}) = 49 (-3 ; -9)$$

$$R_w (C ; C_{tr} ; C_{50-3150} ; C_{tr, 50-3150}) = 49 (-3 ; -9 ; -5 ; -14)$$

$$R_w (C ; C_{tr} ; C_{100-5000} ; C_{tr, 100-5000}) = 49 (-3 ; -9 ; -2 ; -9)$$

$$R_w (C ; C_{tr} ; C_{50-5000} ; C_{tr, 50-5000}) = 49 (-3 ; -9 ; -4 ; -14)$$

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.

