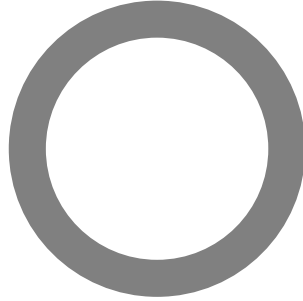


******* NOTICE *******

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: **April 15, 2010**
Test Date: **November 6, 2008**
Test Number: **OL08-1102**

ACCREDITATION



For the scope of accreditation under NVLAP code 200248-0

RESULT SUMMARY

STC=54

CLIENT

ADDRESS

Serious Materials, Inc.
250 Elko Drive
Sunnyvale, CA 94089

PREPARED BY

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

info@SeriousMaterials.com
(800) 797-8159

Prepared by:

Reviewed By:


ELECTRONICALLY REPRODUCED SIGNATURE


ELECTRONICALLY REPRODUCED SIGNATURE

David M. Berg
Laboratory Manager

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

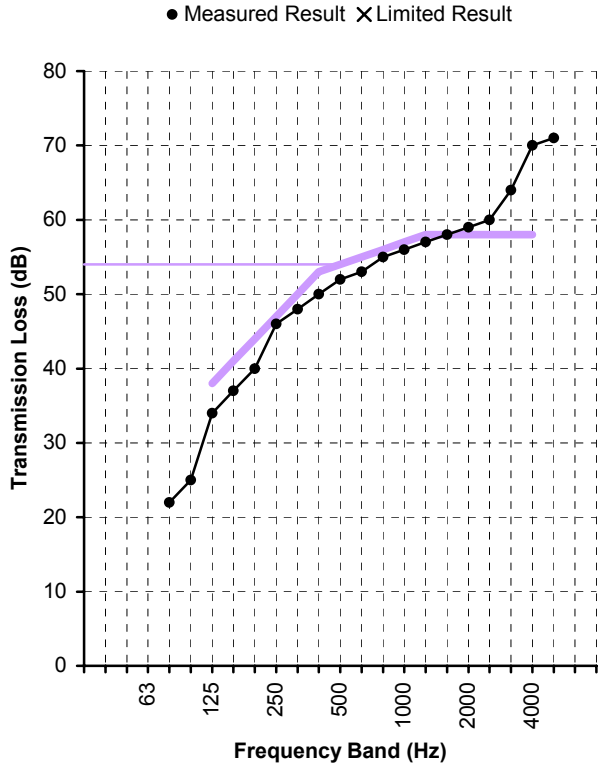




Test Date November 6, 2008
Specimen Interior Wall Assembly

Method ASTM Standard E90
Technician D. Berg

Single Number Rating
STC = 54



Freq. (Hz)	TL (dB)	Def. (dB)
80	22	
100	25	
125	34	4
160	37	4
200	40	4
250	46	1
315	48	2
400	50	3
500	52	2
630	53	2
800	55	1
1000	56	1
1250	57	1
1600	58	-
2000	59	-
2500	60	-
3150	64	-
4000	70	-
5000	71	-

Total Deficiencies 25

* Estimate of lower limit

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

- 0.625" (5/8") gypsum board; 2" screw @ 12" O.C.
- QuietGlue® Pro @ 56oz per 4'x8' sheet (112oz. total)
- 0.625" (5/8") gypsum board
- 2x4 wood studs @ 24" O.C.
- (3.5") glass fiber batt insulation
- 0.5" (1/2") gypsum board
- QuietGlue® Pro @ 56oz per 4'x8' sheet (112oz. total)
- 0.5" (1/2") gypsum board; 2" 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 test specimen gypsum sandwiches and installed the specimen in the test 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*

Transmission loss (TL) values and resulting sound transmission class (STC) ratings reported herein are the result of single-direction measurements that used one source room and one receiver room.

** 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	68°F [20.0°C]
Relative Humidity	50%

Specimen Area

Specimen Area	64.5 ft² [5.99 m²]
---------------	--------------------

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
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	Brüel & Kjær	Type 2133	1389369



APPENDIX B: CALCULATION RESULTS

Freq. Band (Hz)	Specimen T.L. (dB)	95% Conf. (dB)	Flanking Limit (dB)	STC Defic. (dB)
25				
31.5	27.7		40	
40	28.6		47	
50	28.3		43	
63	20.0		43	
80	22.0	±1.63	42	
100	25.2	±1.15	45	
125	33.8	±0.95	46	4
160	37.0	±1.27	52	4
200	40.3	±1.24	53	4
250	45.6	±0.65	56	1
315	47.8	±0.65	60	2
400	50.1	±0.62	61	3
500	51.8	±0.40	65	2
630	52.9	±0.50	66	2
800	54.8	±0.40	69	1
1000	55.8	±0.25	70	1
1250	57.4	±0.25	72	1
1600	58.0	±0.32	72	-
2000	58.9	±0.44	74	-
2500	60.0	±0.35	79	-
3150	63.9	±0.31	83	-
4000	69.6	±0.49		-
5000	70.7	±0.35		-
6300	70.7 *			
8000	70.6 *			
10000	65.6 *			
Total deficiencies below STC contour (dB)				25
STC contour [ASTM E413]				54

* 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 = 585.7 lb [265.7 kg]

Overall Surface Density = 9.08 PSF [44.34 kg/m²]

Element	Mass lb [kg]	Surf. Dens. PSF [kg/m ²]
0.625" (5/8") gypsum board; 2" screw @ 12" O.C. QuietGlue® Pro @ 56oz per 4'x8' sheet (112oz. total)	295.0 [133.8]	4.57 [22.33]
0.625" (5/8") gypsum board 2x4 wood studs @ 24" O.C.	58.5 [26.5]	0.91 [4.43]
(3.5") glass fiber batt insulation 0.5" (1/2") gypsum board	14.2 [6.4]	0.22 [1.07]
QuietGlue® Pro @ 56oz per 4'x8' sheet (112oz. total) 0.5" (1/2") gypsum board; 2" screw @ 12" O.C.	218.0 [98.9]	3.38 [16.50]

The QuietGlue® Pro damping adhesive was supplied by the Client. All other materials were purchased through retail channels. The gypsum board and 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 wood 2x4 top plate. 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), glass fiber insulation batts were friction fit into each of the 4 stud cavities.

SHEETING

Serious Materials QuietGlue® Pro damping adhesive was pre-laminated into sandwiches between two 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 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.

The source room side sheeting layer consisted of pre-assembled sandwiches of two 5/8" thick 4' by 8' sheets of gypsum board laminated with Serious Materials 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 sandwiches were fastened horizontally 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 receiver room side sheeting layer consisted of pre-assembled sandwiches of two 1/2" thick 4' by 8' sheets of gypsum board laminated with Serious Materials QuietGlue[®] Pro damping adhesive. Fifty-eight (58) 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 test opening. The QuietGlue[®] Pro sandwiches were fastened vertically 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.

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 receiver room sides with acoustic sealant.

Figure 1 and Figure 2 are photographs of panels under construction and prior to installation in the specimen opening.



Figure 1: Random application of 56 oz. of QuietGlue Pro to a gypsum panel.



Figure 2: Pre-constructed sandwich panels stacked and spaced for drying.



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	28.3						
63	20.0						
80	22.0						
100	25.2	34	8.8	-29.0	-54.2	-20.0	-45.2
125	33.8	37	3.2	-26.0	-59.8	-20.0	-53.8
160	37.0	40	3.0	-23.0	-60.0	-18.0	-55.0
200	40.3	43	2.7	-21.0	-61.3	-18.0	-58.3
250	45.6	46	0.4	-19.0	-64.6	-15.0	-60.6
315	47.8	49	1.2	-17.0	-64.8	-14.0	-61.8
400	50.1	52	1.9	-15.0	-65.1	-13.0	-63.1
500	51.8	53	1.2	-13.0	-64.8	-12.0	-63.8
630	52.9	54	1.1	-12.0	-64.9	-11.0	-63.9
800	54.8	55	0.2	-11.0	-65.8	-9.0	-63.8
1000	55.8	56	0.2	-10.0	-65.8	-8.0	-63.8
1250	57.4	57	-	-9.0	-66.4	-9.0	-66.4
1600	58.0	57	-	-9.0	-67.0	-10.0	-68.0
2000	58.9	57	-	-9.0	-67.9	-11.0	-69.9
2500	60.0	57	-	-9.0	-69.0	-13.0	-73.0
3150	63.9	57	-	-9.0	-72.9	-15.0	-78.9
4000	69.6						
5000	70.7						
Sum =			23.9	$R_{A,1} =$	50.2	$R_{A,2} =$	43.6
$R_w =$			53	$C =$	-3	$C_{tr} =$	-9

$$R_w (C ; C_{tr}) = 53 (-3 ; -9)$$

$$R_w (C ; C_{tr} ; C_{50-3150} ; C_{tr,50-3150}) = 53 (-3 ; -9 ; -5 ; -15)$$

$$R_w (C ; C_{tr} ; C_{100-5000} ; C_{tr,100-5000}) = 53 (-3 ; -9 ; -2 ; -9)$$

$$R_w (C ; C_{tr} ; C_{50-5000} ; C_{tr,50-5000}) = 53 (-3 ; -9 ; -4 ; -15)$$

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.

