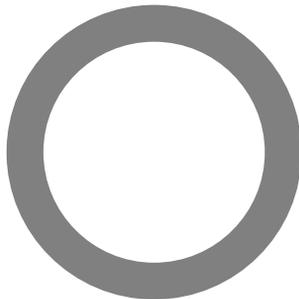


ASTM E 90-04: Laboratory Measurement of Airborne Sound Transmission of Building Partitions and Elements

Orfield Laboratories Inc



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

TEST

Client: **Saint-Gobain Performance Plastics**
 Report Date: **November 2, 2011**
 Test Date: **June 3, 2008**
 Test Number: **OL08-0601**

ACCREDITATION



For the scope of accreditation under NVLAP code 200248-0

RESULT SUMMARY

STC=62

CLIENT

ADDRESS

Saint-Gobain Performance Plastics
 Green Glue Division
 One Sealants Park
 Granville, NY 12832
 Phone (800) 724-0883
 www.greengluecompany.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:

David M. Berg
Laboratory Manager

Reviewed By:

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.

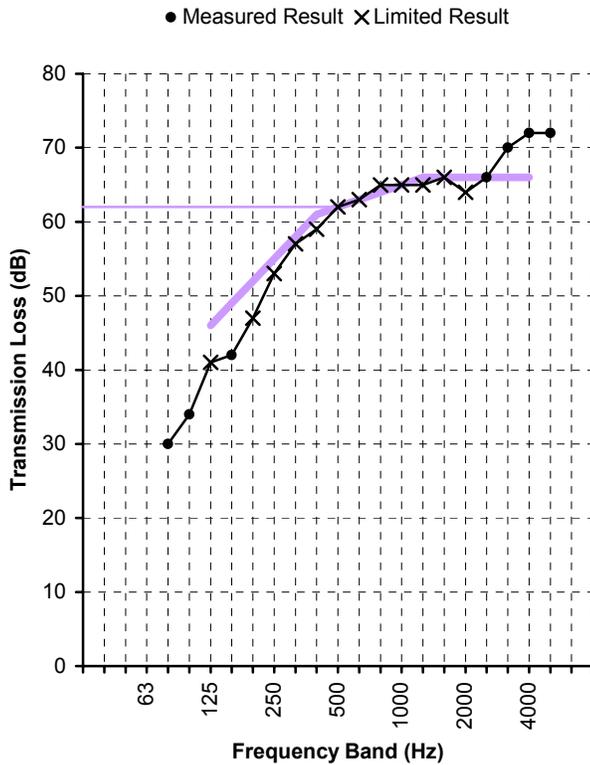




Test Date June 3, 2008
Specimen Interior Wall Assembly

Method ASTM Standard E90

Single Number Rating
STC = 62



Freq. (Hz)	TL (dB)	Def. (dB)
80	30	
100	34	
125	41*	5
160	42	7
200	47*	5
250	53*	2
315	57*	1
400	59*	2
500	62*	-
630	63*	-
800	65*	-
1000	65*	-
1250	65*	1
1600	66*	-
2000	64*	2
2500	66	-
3150	70	-
4000	72	-
5000	72	-

Total Deficiencies 25

* 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; 2" screw @ 12" O.C.
- Green Glue @ 20 oz per 4'x8' sheet
- 0.625" (5/8") type X gypsum board
- Resilient channels @ 24" O.C.; 1.625" screw @ 16" O.C.
- 2x4 wood studs @ 16" O.C.
- 3.5" R13 batt insulation
- 0.625" (5/8") type X gypsum board
- Green Glue @ 20 oz per 4'x8' sheet
- 0.625" (5/8") type X gypsum board; 2" screw @ 16" O.C.





SPECIMEN DESCRIPTION

The specimen under test was an interior 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 2x4 frame was originally constructed on May 29, 2008. The framing and insulation was installed for previous tests in the series and retained for subsequent tests. Independent contractors fabricated the test specimen and sealed it 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 E90-04* *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements*

ASTM E413-04: *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 certification, approval or endorsement by NVLAP, NIST, 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	8245 ft ³ [233.5 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
Rotating Boom	Brüel & Kjær	Type 3923	2036583
Microphone	Brüel & Kjær	Type 4134	558007
Preamplifier	Brüel & Kjær	Type 2639	1312237
Rotating Boom	Brüel & Kjær	Type 3923	890569
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	24.5		40	
40	19.0		47	
50	17.6		43	
63	22.7		43	
80	29.9	±1.63	42	
100	34.1	±1.15	45	
125	40.7 §	±0.95	46	5
160	41.8	±1.27	52	7
200	46.6 §	±1.24	53	5
250	52.6 §	±0.65	56	2
315	56.7 §	±0.65	60	1
400	59.0 §	±0.62	61	2
500	62.3 §	±0.40	65	-
630	63.5 §	±0.50	66	-
800	64.9 §	±0.40	69	-
1000	64.8 §	±0.25	70	-
1250	65.0 §	±0.25	72	1
1600	66.0 §	±0.32	72	-
2000	64.3 §	±0.44	74	2
2500	66.4	±0.35	79	-
3150	69.5	±0.31	83	-
4000	72.3	±0.49		-
5000	72.4	±0.35		-
6300	72.2 *			
8000	72.0 *			
10000	67.5 *			
Total deficiencies below STC contour (dB)				25
STC contour [ASTM E413]				62

* 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 wall assembly.

Overall Mass = 701.0 lb [318.0 kg]

Overall Surface Density = 10.87 PSF [53.06 kg/m²]

Element	Mass lb [kg]	Surf. Dens. PSF [kg/m ²]
0.625" (5/8") type X gypsum board; 2" screw @ 12" O.C. Green Glue @ 20 oz per 4'x8' sheet	299.0 [135.6]	4.64 [22.63]
0.625" (5/8") type X gypsum board Resilient channels @ 24" O.C.; 1.625" screw @ 16" O.C.	10.0 [4.5]	0.16 [0.76]
2x4 wood studs @ 16" O.C.	76.0 [34.5]	1.18 [5.75]
3.5" R13 batt insulation	16.0 [7.3]	0.25 [1.21]
0.625" (5/8") type X gypsum board Green Glue @ 20 oz per 4'x8' sheet		
0.625" (5/8") type X gypsum board; 2" screw @ 16" O.C.	300.0 [136.1]	4.65 [22.71]

Green Glue Company noiseproofing compound and Green Glue Company noiseproofing sealant 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.

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 top plate consisting of a wood 2x4. Wood 2x4 studs were spaced 16" 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 Green Glue Company noiseproofing sealant.

HARDWARE

Five approximately eight foot lengths of 25 gauge steel resilient channel were attached horizontally to the source side of the wood stud frame at approximately 24" on center. The resilient channel had an overall height of 2-1/2" and was 1/2" deep. The channel had 5/16" wide, 3" long slots spaced 4 inches on center. The slots flared to 3/8" on each end.

The lengths of resilient channel were screwed to the wood 2x4s with 1-1/4" type W drywall screws with the stud-attachment side of the channel oriented down, towards the bottom of the wall (resilient side up), except the top channel, which was inverted to prevent short-circuiting at the top plate.

INSULATION

Fiberglass insulation batts were installed in the stud cavities. The insulation batts were 15-1/4" wide, 3-1/2" thick and were friction fit into each of the six stud cavities.



SHEETING

Green Glue Company noiseproofing compound was pre-laminated into sandwiches between two 5/8" thick gypsum board panels. Each sandwich was pre-assembled by the client off-site. According to the client, 20 oz. of Green Glue Company noiseproofing compound was applied in a random pattern over each 4' x 8' gypsum board panel. A second sheet of 5/8" gypsum board was applied to complete the sandwich. The sandwich was thoroughly compressed by methodically walking over the entire face. Prepared sandwiches were stacked with spacers, and thoroughly dried for over 30 days.

The source room side sheeting consisted of the pre-made sandwiches (described above) fastened perpendicular to the resilient channels with 2" long, type S drywall screws spaced at 12" apart, driven through both layers of gypsum board sandwich at once. The source side sheeting was comprised of two complete 4' by 8' sandwich sheets.

The receiving room side sheeting consisted of the pre-made sandwiches (described above) fastened parallel to the stud frame with 2" long, type W drywall screws spaced at 16" apart, driven through both layers of gypsum board sandwich at once. The receiver side sheeting was comprised of two complete 4' by 8' sandwich sheets.

All 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 Green Glue Company noiseproofing sealant. In addition, the perimeter of both sides of the specimen was sealed with 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	17.6						
63	22.7						
80	29.8						
100	34.0	42	8.0	-29.0	-63.0	-20.0	-54.0
125	40.7	45	4.3	-26.0	-66.7	-20.0	-60.7
160	41.8	48	6.2	-23.0	-64.8	-18.0	-59.8
200	46.6	51	4.4	-21.0	-67.6	-18.0	-64.6
250	52.5	54	1.5	-19.0	-71.5	-15.0	-67.5
315	56.6	57	0.4	-17.0	-73.6	-14.0	-70.6
400	59.0	60	1.0	-15.0	-74.0	-13.0	-72.0
500	62.3	61	-	-13.0	-75.3	-12.0	-74.3
630	63.4	62	-	-12.0	-75.4	-11.0	-74.4
800	64.8	63	-	-11.0	-75.8	-9.0	-73.8
1000	64.8	64	-	-10.0	-74.8	-8.0	-72.8
1250	64.9	65	0.1	-9.0	-73.9	-9.0	-73.9
1600	66.0	65	-	-9.0	-75.0	-10.0	-76.0
2000	64.2	65	0.8	-9.0	-73.2	-11.0	-75.2
2500	66.4	65	-	-9.0	-75.4	-13.0	-79.4
3150	69.5	65	-	-9.0	-78.5	-15.0	-84.5
4000	72.3						
5000	72.4						
Sum =			26.7	$R_{A,1} =$	57.8	$R_{A,2} =$	51.7
$R_w =$			61	$C =$	-3	$C_{tr} =$	-9

$$R_w (C ; C_{tr}) = 61 (-3 ; -9)$$

$$R_w (C ; C_{tr} ; C_{50-3150} ; C_{tr, 50-3150}) = 61 (-3 ; -9 ; -8 ; -21)$$

$$R_w (C ; C_{tr} ; C_{100-5000} ; C_{tr, 100-5000}) = 61 (-3 ; -9 ; -2 ; -9)$$

$$R_w (C ; C_{tr} ; C_{50-5000} ; C_{tr, 50-5000}) = 61 (-3 ; -9 ; -7 ; -21)$$

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 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

