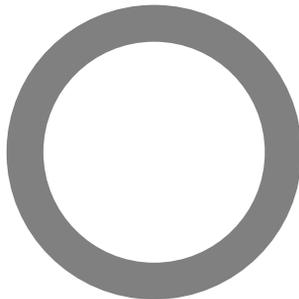


**ASTM E 90-04: Laboratory Measurement of Airborne Sound Transmission of Building Partitions and Elements**

**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: **May 30, 2008**  
 Test Number: **OL08-0520**

**ACCREDITATION**



For the scope of accreditation under NVLAP code 200248-0

**RESULT SUMMARY**

**STC=58**

**CLIENT**

**ADDRESS**

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

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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.

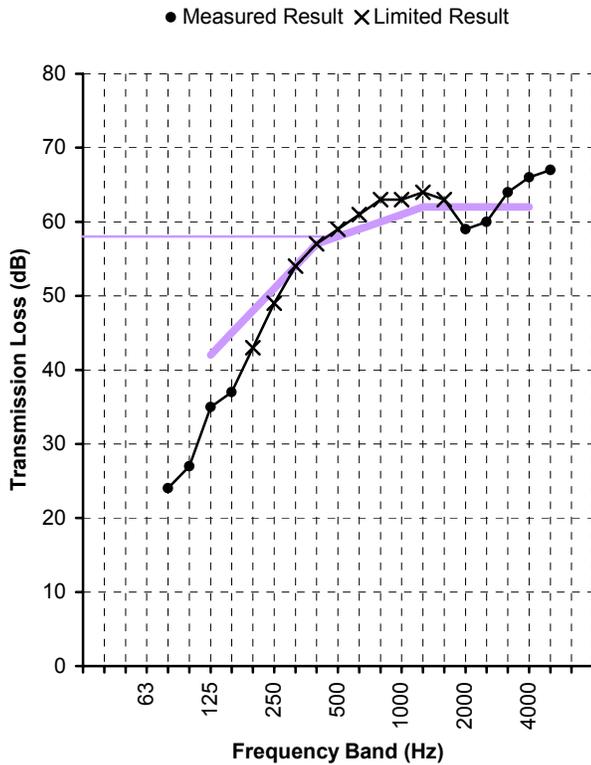




**Test Date** May 30, 2008  
**Specimen** Interior Wall Assembly

**Method** ASTM Standard E90

Single Number Rating  
**STC = 58**



Freq. (Hz)	TL (dB)	Def. (dB)
80	24	
100	27	
125	35	7
160	37	8
200	43*	5
250	49*	2
315	54*	-
400	57*	-
500	59*	-
630	61*	-
800	63*	-
1000	63*	-
1250	64*	-
1600	63*	-
2000	59	3
2500	60	2
3150	64	-
4000	66	-
5000	67	
Total Deficiencies		27

\* 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; 1.625" 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	50%

### Specimen Area

Specimen Area	64.5 ft <sup>2</sup> [5.99 m <sup>2</sup> ]
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### Chamber Volume - Airborne Transmission

Source Room Volume	3284 ft <sup>3</sup> [93.0 m <sup>3</sup> ]
Receiving Room Volume	8245 ft <sup>3</sup> [233.5 m <sup>3</sup> ]

## 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	23.8		40	
40	21.3		47	
50	21.5		43	
63	16.6		43	
80	23.6	±1.63	42	
100	26.9	±1.15	45	
125	35.3	±0.95	46	7
160	36.8	±1.27	52	8
200	43.0 §	±1.24	53	5
250	49.2 §	±0.65	56	2
315	53.9 §	±0.65	60	-
400	57.1 §	±0.62	61	-
500	59.4 §	±0.40	65	-
630	60.6 §	±0.50	66	-
800	63.4 §	±0.40	69	-
1000	63.3 §	±0.25	70	-
1250	63.6 §	±0.25	72	-
1600	62.9 §	±0.32	72	-
2000	59.4	±0.44	74	3
2500	59.7	±0.35	79	2
3150	63.9	±0.31	83	-
4000	66.1	±0.49		-
5000	66.6	±0.35		-
6300	67.4			
8000	65.9			
10000	62.0			
Total deficiencies below STC contour (dB)				27
STC contour [ASTM E413]				<b>58</b>

§ 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 = 548.0 lb [248.6 kg]

Overall Surface Density = 8.50 PSF [41.48 kg/m<sup>2</sup>]

Element	Mass lb [kg]	Surf. Dens. PSF [kg/m <sup>2</sup> ]
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; 1.625" screw @ 16" O.C.	147.0 [66.7]	2.28 [11.13]

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

For the source room side, the 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 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 layer consisted of a single layer of 5/8" thick type X gypsum board. The type X gypsum board was fastened parallel to the wood stud frame with 1-5/8" long, type W drywall screws spaced at 16" on center. The single receive side layer was comprised of two complete 4' x 8' 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	21.4						
63	16.5						
80	23.5						
100	26.8	37	10.2	-29.0	-55.8	-20.0	-46.8
125	35.3	40	4.7	-26.0	-61.3	-20.0	-55.3
160	36.8	43	6.2	-23.0	-59.8	-18.0	-54.8
200	43.0	46	3.0	-21.0	-64.0	-18.0	-61.0
250	49.1	49	-	-19.0	-68.1	-15.0	-64.1
315	53.8	52	-	-17.0	-70.8	-14.0	-67.8
400	57.0	55	-	-15.0	-72.0	-13.0	-70.0
500	59.3	56	-	-13.0	-72.3	-12.0	-71.3
630	60.6	57	-	-12.0	-72.6	-11.0	-71.6
800	63.4	58	-	-11.0	-74.4	-9.0	-72.4
1000	63.3	59	-	-10.0	-73.3	-8.0	-71.3
1250	63.6	60	-	-9.0	-72.6	-9.0	-72.6
1600	62.9	60	-	-9.0	-71.9	-10.0	-72.9
2000	59.3	60	0.7	-9.0	-68.3	-11.0	-70.3
2500	59.7	60	0.3	-9.0	-68.7	-13.0	-72.7
3150	63.8	60	-	-9.0	-72.8	-15.0	-78.8
4000	66.1						
5000	66.5						
Sum =			25.1	$R_{A,1} =$	52.4	$R_{A,2} =$	45.4
$R_w =$			56	$C =$	-4	$C_{tr} =$	-11

$$R_w (C ; C_{tr}) = 56 (-4 ; -11)$$

$$R_w (C ; C_{tr} ; C_{50-3150} ; C_{tr, 50-3150}) = 56 (-4 ; -11 ; -8 ; -19)$$

$$R_w (C ; C_{tr} ; C_{100-5000} ; C_{tr, 100-5000}) = 56 (-4 ; -11 ; -3 ; -11)$$

$$R_w (C ; C_{tr} ; C_{50-5000} ; C_{tr, 50-5000}) = 56 (-4 ; -11 ; -7 ; -19)$$

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

