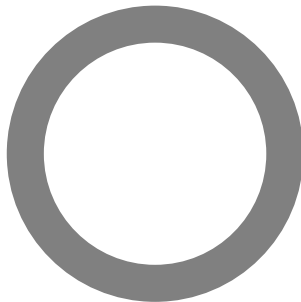


**ASTM E 90-04: Laboratory Measurement of Airborne Sound Transmission of Building Partitions and Elements**

**Orfield** Laboratories Inc



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

**TEST**

Client: **Saint-Gobain Performance Plastics**  
 Report Date: February 14, 2014  
 Test Date: February 2, 2007  
 Test Number: OL07-0211

**ACCREDITATION**



For the scope of accreditation under NVLAP code 200248-0

**RESULT SUMMARY**

**STC=52**

**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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**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.

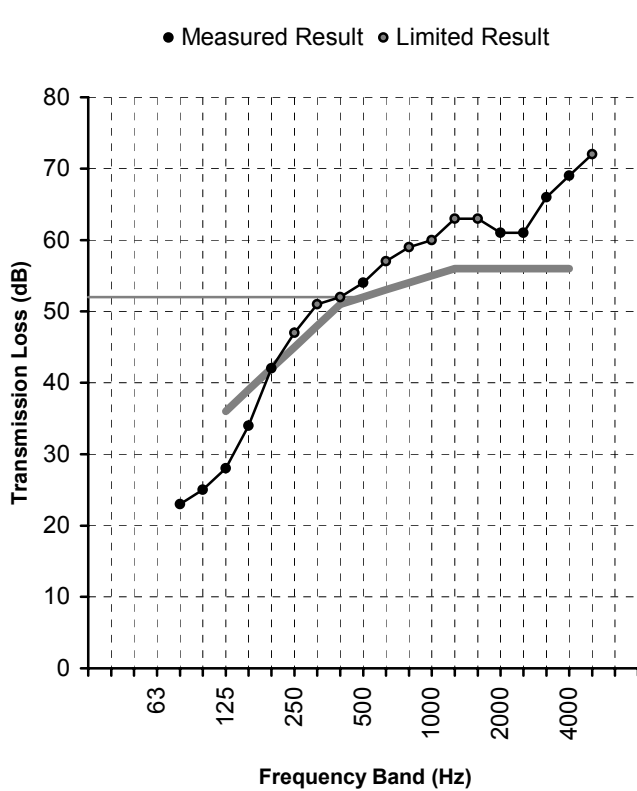




**Test Date** February 2, 2007  
**Specimen** Interior Wall Assembly

**Method** ASTM Standard E90

Single Number Rating  
**STC = 52**



Freq. (Hz)	TL (dB)	Def. (dB)
80	23	
100	25	
125	28	8
160	34	5
200	42	-
250	47*	-
315	51*	-
400	52*	-
500	54	-
630	57*	-
800	59*	-
1000	60*	-
1250	63*	-
1600	63*	-
2000	61	-
2500	61	-
3150	66	-
4000	69	-
5000	72*	-
<b>Total Deficiencies</b>		<b>13</b>

\* 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 @ 2 Tubes (58 oz) / sheet - total 116 oz
- 0.625" Type X gypsum board
- Resilient Channel @ 24" O.C.; 1.63" screw @ 16" O.C.
- 2x6" wood studs @ 16" O.C.
- 3.5" (R11) glass fiber insulation
- 0.625" (5/8") type X gypsum board; 1.63" screw @ 16" O.C.





## SPECIMEN DESCRIPTION

The specimen under test was a 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

Some parts of the assembly were used in previous tests in the series and were retained for subsequent tests in the series. Independent contractors installed the specimen wall assembly. A qualified representative of Orfield Laboratories observed the installation and visually inspected the specimen.

## 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	69°F [20.6°C]
Relative Humidity	48%

**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
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
Rotating Boom	Brüel & Kjær	Type 3923	2036583
Rotating Boom	Brüel & Kjær	Type 3923	890569



**APPENDIX B: CALCULATION RESULTS**

Freq. Band (Hz)	Specimen T.L. (dB)	95% Conf. (dB)	Flanking Limit (dB)	STC Defic. (dB)
25				
31.5	<b>25.4</b>		40	
40	<b>18.7</b>		47	
50	<b>19.2</b>		43	
63	<b>18.4</b>		43	
80	<b>22.7</b>	±1.63	42	
100	<b>24.9</b>	±1.15	45	
125	<b>27.7</b>	±0.95	46	8
160	<b>34.0</b>	±1.27	52	5
200	<b>42.1</b>	±1.24	53	-
250	<b>46.6 §</b>	±0.65	56	-
315	<b>51.1 §</b>	±0.65	60	-
400	<b>52.2 §</b>	±0.62	61	-
500	<b>54.5</b>	±0.40	65	-
630	<b>56.7 §</b>	±0.50	66	-
800	<b>59.0 §</b>	±0.40	69	-
1000	<b>60.5 §</b>	±0.25	70	-
1250	<b>62.8 §</b>	±0.25	72	-
1600	<b>62.6 §</b>	±0.32	72	-
2000	<b>60.6</b>	±0.44	74	-
2500	<b>61.4</b>	±0.35	79	-
3150	<b>65.5</b>	±0.31	83	-
4000	<b>69.3</b>	±0.49		-
5000	<b>71.8 *</b>	±0.35		-
6300	<b>71.4 *</b>			
8000	<b>71.6 *</b>			
10000	<b>66.9 *</b>			
Total deficiencies below STC contour (dB)				13
STC contour [ASTM E413]				<b>52</b>

\* 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 = 603.0 lb [273.5 kg]  
 Overall Surface Density = 9.35 PSF [45.65 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 @ 2 Tubes (58 oz) / sheet - total 116 oz	319.0 [144.7]	4.95 [24.15]
0.625" Type X gypsum board		
Resilient Channel @ 24" O.C.; 1.63" screw @ 16" O.C.	8.0 [3.6]	0.12 [0.61]
2x6" wood studs @ 16" O.C.	117.5 [53.3]	1.82 [8.89]
3.5" (R11) glass fiber insulation	10.5 [4.8]	0.16 [0.79]
0.625" (5/8") type X gypsum board; 1.63" screw @ 16" O.C.	148.0 [67.1]	2.29 [11.20]

All pre-constructed sandwich sheeting panels 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 wood 2x6 sill plate was laid on the floor and a wood 2x6 top plate was bolted to the top frame in the specimen opening. Wood 2x6 studs were fastened to the sill and top plates, spaced 16" apart, on-centers. The outermost wood 2x6 studs were also bolted to each side of the specimen opening frame. Actual lumber dimensions were 1.5" x 5.5".

**INSULATION**

Fiberglass insulation batts were installed in the stud cavities. The insulation batts were 15" wide, 3.5" thick, and were friction fit into each of the 6 stud cavities. The insulation was labeled with an R-value of R-11.

**RESILIENT CHANNELS**

Resilient channels were oriented horizontally, perpendicular to the studs, and spaced 24" on-centers. Channel was fastened to the studs with 1-5/8" drywall screws.

**SHEETING**

For the source side sheeting, the gypsum board panels and the Green Glue adhesive were pre-laminated into sandwiches. Each sandwich was assembled by the client off-site. According to the client, Green Glue was applied from two 29 oz. adhesive cartridges in a random pattern over a whole gypsum board panel. A second sheet of gypsum board was applied to the first side. The sandwich was thoroughly compressed by methodically walking over the entire face.





The assemblies were spaced out and stacked to dry with forced air ventilation. The adhesive aged from the assembly date, January 14, 2007 to the test date, February 2, 2007 according to the client. This is greater than the 14 day period stated in ASTM Standard E90 for water-based adhesives. Sandwiches on the source-room side were installed in a vertical orientation, so the seam between sandwiches ran along the center stud.

Sandwiches on the source-room side were installed in a vertical orientation, so the seam between sandwiches ran perpendicular to the resilient channel and parallel to the studs. Sandwiches were fastened to the resilient channel with 2" drywall screws, spaced 12" apart and taking care to avoid short-circuits. The seam between source-room panels was sealed with 1/8" strips of rope-caulk. Panels were shimmed at installation so equal gaps were at the top and bottom. Gaps were less than 1/2" in all cases. Shims were removed after sheeting was fastened and the perimeter was sealed on the source and receiver room sides with 7/8" Mortite-brand rope-caulk.

Type X gypsum board panels were fastened to the studs on the receiver-room side with 1-5/8" drywall screws, spaced 16" apart, driven through to the studs. The seam between receiver-room panels was sealed with acoustical sealant.

**Figure 1:** Typical glue application pattern (photo supplied by Client)





**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	19.2						
63	18.4						
80	22.7						
100	24.9	35	10.1	-29.0	-53.9	-20.0	-44.9
125	27.7	38	10.3	-26.0	-53.7	-20.0	-47.7
160	34.0	41	7.0	-23.0	-57.0	-18.0	-52.0
200	42.1	44	1.9	-21.0	-63.1	-18.0	-60.1
250	46.6	47	0.4	-19.0	-65.6	-15.0	-61.6
315	51.1	50	-	-17.0	-68.1	-14.0	-65.1
400	52.2	53	0.8	-15.0	-67.2	-13.0	-65.2
500	54.5	54	-	-13.0	-67.5	-12.0	-66.5
630	56.7	55	-	-12.0	-68.7	-11.0	-67.7
800	59.0	56	-	-11.0	-70.0	-9.0	-68.0
1000	60.5	57	-	-10.0	-70.5	-8.0	-68.5
1250	62.8	58	-	-9.0	-71.8	-9.0	-71.8
1600	62.6	58	-	-9.0	-71.6	-10.0	-72.6
2000	60.6	58	-	-9.0	-69.6	-11.0	-71.6
2500	61.4	58	-	-9.0	-70.4	-13.0	-74.4
3150	65.5	58	-	-9.0	-74.5	-15.0	-80.5
4000	69.3						
5000	71.8						
Sum =			30.5	$R_{A,1} =$	49.1	$R_{A,2} =$	42.3
$R_w =$			54	$C =$	-5	$C_{tr} =$	-12

$$R_w (C ; C_{tr}) = 54 (-5 ; -12)$$

$$R_w (C ; C_{tr} ; C_{50-3150} ; C_{tr, 50-3150}) = 54 (-5 ; -12 ; -7 ; -17)$$

$$R_w (C ; C_{tr} ; C_{100-5000} ; C_{tr, 100-5000}) = 54 (-5 ; -12 ; -4 ; -12)$$

$$R_w (C ; C_{tr} ; C_{50-5000} ; C_{tr, 50-5000}) = 54 (-5 ; -12 ; -6 ; -17)$$

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

