T E S T R E P O R T

ASTM E 90-09: 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: October 28, 2010
Test Number: OL10-1037

RESULT SUMMARY

STC=59

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

ACCREDITATION
NVLAP
For the scope of accreditation under NVLAP code 200248-0

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

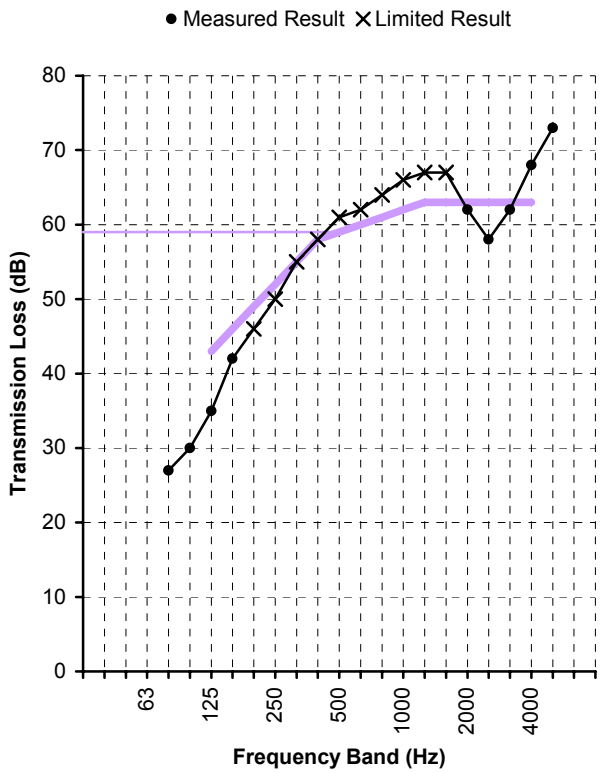
Signatures are required on this document for an official laboratory test report. Copies of this document without signatures are for reference only.

Orfield Laboratories Inc

Test Date October 28, 2010
Specimen Wall Assembly

Method ASTM Standard E90
Technician D. Berg

Single Number Rating
STC = 59



Freq. (Hz)	TL (dB)	Def. (dB)
80	27	
100	30	
125	35	8
160	42	4
200	46*	3
250	50*	2
315	55*	-
400	58*	-
500	61*	-
630	62*	-
800	64*	-
1000	66*	-
1250	67*	-
1600	67*	-
2000	62	1
2500	58	5
3150	62	1
4000	68	-
5000	73	
Total Deficiencies		24

* Estimate of lower limit

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

0.625" Type X gypsum board (h); 1.625" type W screws @ 12" O.C.
0.625" Type X gypsum board (v); 1.25" type W screws @ 12" O.C.
25 gauge hat channel @ 24" O.C.
GG Noiseproofing Clips RC (20)
3-5/8" 25 gauge steel studs @ 24" O.C.
3.5" kraft-faced insulation batts
0.625" Type X gypsum board (v); 1.25" type W screws @ 12" 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

The steel stud frame was originally constructed on October 27, 2010. The framing and insulation were retained for subsequent tests in the series. 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 E90-09*: *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements*

ASTM E413-10: *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 ft² [5.99 m²]

Chamber Volume - Airborne Transmission	
Source Room Volume	3284 ft³ [93.0 m³]
Receiving Room Volume	8079 ft³ [228.8 m³]

INSTRUMENTATION

Description	Brand	Model	S/N
Calibrator	Brüel & Kjær	Type 4230	584761
Microphone	Brüel & Kjær	Type 4134	558007
Preamplifier	Brüel & Kjær	Type 2639	1202479
Rotating Boom	Brüel & Kjær	Type 3923	2036583
Microphone	Brüel & Kjær	Type 4134	1478843
Preamplifier	Brüel & Kjær	Type 2639	1312147
Rotating Boom	Brüel & Kjær	Type 3923	890569
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	**23.6**		40	
40	**18.0**		47	
50	**14.1**		43	
63	**18.0**		43	
80	**26.6**	±1.63	42	
100	**29.7**	±1.15	45	
125	**34.7**	±0.95	46	8
160	**41.9**	±1.27	52	4
200	**46.1** §	±1.24	53	3
250	**49.7** §	±0.65	56	2
315	**54.9** §	±0.65	60	-
400	**57.8** §	±0.62	61	-
500	**61.1** §	±0.40	65	-
630	**62.1** §	±0.50	66	-
800	**64.4** §	±0.40	69	-
1000	**65.7** §	±0.25	70	-
1250	**66.6** §	±0.25	72	-
1600	**67.1** §	±0.32	72	-
2000	**62.5**	±0.44	74	1
2500	**57.8**	±0.35	79	5
3150	**62.1**	±0.31	83	1
4000	**67.9**	±0.49		-
5000	**73.3**	±0.35		
6300	**74.7** *			
8000	**74.1** *			
10000	**69.4** *			
Total deficiencies below STC contour (dB)				24
STC contour [ASTM E413]				**59**

* 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 = 473.2 lb [214.6 kg]
Overall Surface Density = 7.34 PSF [35.82 kg/m²]

Element	Mass lb [kg]	Surf. Dens. PSF [kg/m²]
0.625" Type X gypsum board (h); 1.625" type W screws @ 12" O.C.	143.3 [65.0]	2.22 [10.84]
0.625" Type X gypsum board (v); 1.25" type W screws @ 12" O.C.	143.8 [65.2]	2.23 [10.88]
25 gauge hat channel @ 24" O.C.	8.3 [3.7]	0.13 [0.62]
GG Noiseproofing Clips RC (20)	0.8 [0.4]	0.01 [0.06]
3-5/8" 25 gauge steel studs @ 24" O.C.	20.2 [9.1]	0.31 [1.53]
3.5" kraft-faced insulation batts	14.0 [6.4]	0.22 [1.06]
0.625" Type X gypsum board (v); 1.25" type W screws @ 12" O.C.	143.0 [64.9]	2.22 [10.82]

Green Glue Company Noiseproofing Clips 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 3-5/8", 25 gauge steel frame was constructed in the perimeter of the laboratory test specimen opening. The frame consisted of 3-5/8" x 1-1/4" track plates at the top and bottom, and five, 3-5/8" x 1-1/4" studs installed 24" on center. The track plates and studs were made of 25 gauge galvanized steel. The track plates and studs were fastened together with two type S pan head screws at each intersection. The perimeter of the frame was sealed to the specimen opening with Green Glue Noiseproofing Sealant.

INSULATION

3-1/2" thick kraft-faced fiberglass insulation bats were installed in the stud cavities. The insulation batts were 24" wide. The faced fiberglass batts were friction fit into each of the stud cavities with the paper facing the source room.

CLIPS AND HAT CHANNEL

Twenty (20) Green Glue Noiseproofing Clips were attached to the vertical studs on the source room side using type S pan head screws. Five 8'-0" lengths of 25 gauge, 7/8" hat-channel were then attached to the Green Glue® Noiseproofing Clips at 24" nominal spacing.

SHEETING

Two layers of 5/8” gypsum board were installed on the source room side. The base (inner) layer of type X gypsum board panels were fastened to the hat channel, so the seam between panels ran parallel to the studs, and perpendicular to the hat channel. The base layer was fastened with 1-1/4” type S screws spaced at 12” OC. The outer layer of type X gypsum board was fastened to the hat channel, driven through the first layer, with the seam between the panels running perpendicular to the studs and parallel to the hat channel. The outer (surface) layer of 5/8” type X panels were fastened to the hat channel with 1-5/8” type S drywall screws, spaced 12” apart. The seams between outer (face) layer source-room panels was sealed Green Glue Noiseproofing Sealant and 1-7/8” wide 2 mil foil tape. 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 room side with Green Glue Noiseproofing Sealant and 1-7/8” wide 2 mil foil tape.

On the receiver side, type X gypsum board panels were installed in a vertical orientation, so the seam between panels ran parallel to the studs. Panels were fastened to the studs with 1-1/4” drywall screws, spaced 12” apart. The seam between receiver-room panels was sealed with Green Glue Noiseproofing Sealant. 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 receiver room sides with Green Glue Noiseproofing Sealant, 1-7/8” wide 2 mil foil tape and 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	**14.1**						
63	**18.0**						
80	**26.6**						
100	**29.7**	39	9.3	-29.0	-58.7	-20.0	-49.7
125	**34.7**	42	7.3	-26.0	-60.7	-20.0	-54.7
160	**41.9**	45	3.1	-23.0	-64.9	-18.0	-59.9
200	**46.1**	48	1.9	-21.0	-67.1	-18.0	-64.1
250	**49.7**	51	1.3	-19.0	-68.7	-15.0	-64.7
315	**54.9**	54	-	-17.0	-71.9	-14.0	-68.9
400	**57.8**	57	-	-15.0	-72.8	-13.0	-70.8
500	**61.1**	58	-	-13.0	-74.1	-12.0	-73.1
630	**62.1**	59	-	-12.0	-74.1	-11.0	-73.1
800	**64.4**	60	-	-11.0	-75.4	-9.0	-73.4
1000	**65.7**	61	-	-10.0	-75.7	-8.0	-73.7
1250	**66.6**	62	-	-9.0	-75.6	-9.0	-75.6
1600	**67.1**	62	-	-9.0	-76.1	-10.0	-77.1
2000	**62.5**	62	-	-9.0	-71.5	-11.0	-73.5
2500	**57.8**	62	4.2	-9.0	-66.8	-13.0	-70.8
3150	**62.1**	62	-	-9.0	-71.1	-15.0	-77.1
4000	**67.9**						
5000	**73.3**						
		Sum =	27.1	$R_{A,1}$ =	54.5	$R_{A,2}$ =	47.8
		R_W =	**58**	**C =**	**-4**	**C_{tr} =**	**-10**

$Rw\ (C\ ;\ Ctr) = 58\ (-4\ ;\ -10)$

$Rw\ (C\ ;\ Ctr\ ;\ C\,50\text{-}3150\ ;\ Ctr,\,50\text{-}3150) = 58\ (-4\ ;\ -10\ ;\ -9\ ;\ -22)$

$Rw\ (C\ ;\ Ctr\ ;\ C\,100\text{-}5000\ ;\ Ctr,100\text{-}5000) = 58\ (-4\ ;\ -10\ ;\ -3\ ;\ -10)$

$Rw\ (C\ ;\ Ctr\ ;\ C\,50\text{-}5000\ ;\ Ctr,\,50\text{-}5000) = 58\ (-4\ ;\ -10\ ;\ -8\ ;\ -22)$

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