T E S T R E P O R T

ASTM E 90: Laboratory Measurement of Airborne Sound Transmission of Building Partitions and Elements
ASTM E 492: Laboratory Measurement of Impact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine

Orfield Laboratories Inc

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

TEST
Client: **Saint-Gobain Performance Plastics**
Report Date: **September 16, 2009**
Test Date: **June 17, 2009**
Test Number: **OL09-0613**

RESULT SUMMARY

STC=52

IIC=44

CLIENT ADDRESS
Saint-Gobain Performance Plastics
One Sealants Park
Granville, NY 12832
Phone: (800) 724-0883
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ACCREDITATION
NVLAP
For the scope of accreditation under NVLAP code 200248-0

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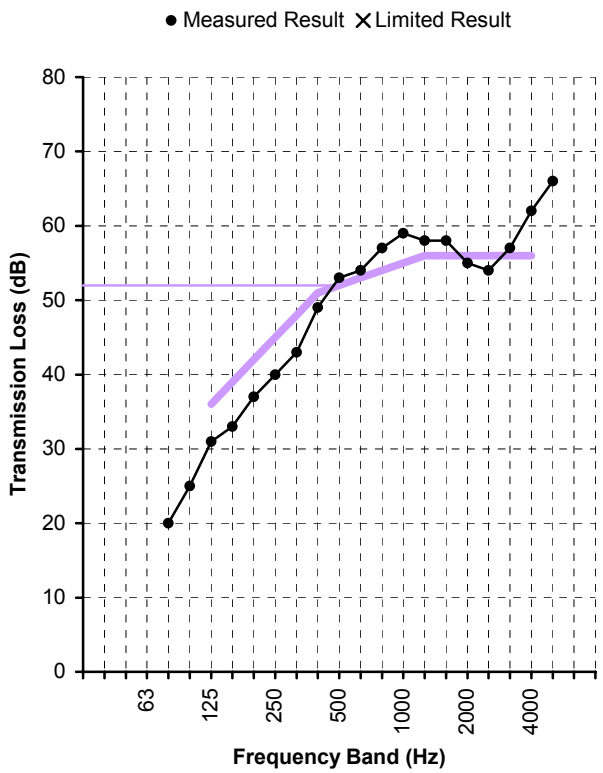
Signatures are required on this document for an official laboratory test report. Copies of this document without signatures are for reference only.

Orfield Laboratories Inc

Test Date June 17, 2009
Specimen Floor / Ceiling Assembly
Method ASTM Standard E90
Technician D. Berg

Single Number Rating
STC = 52



Freq. (Hz)	TL (dB)	Def. (dB)
80	20	
100	25	
125	31	5
160	33	6
200	37	5
250	40	5
315	43	5
400	49	2
500	53	-
630	54	-
800	57	-
1000	59	-
1250	58	-
1600	58	-
2000	55	1
2500	54	2
3150	57	-
4000	62	-
5000	66	
Total Deficiencies		31

* Estimate of lower limit

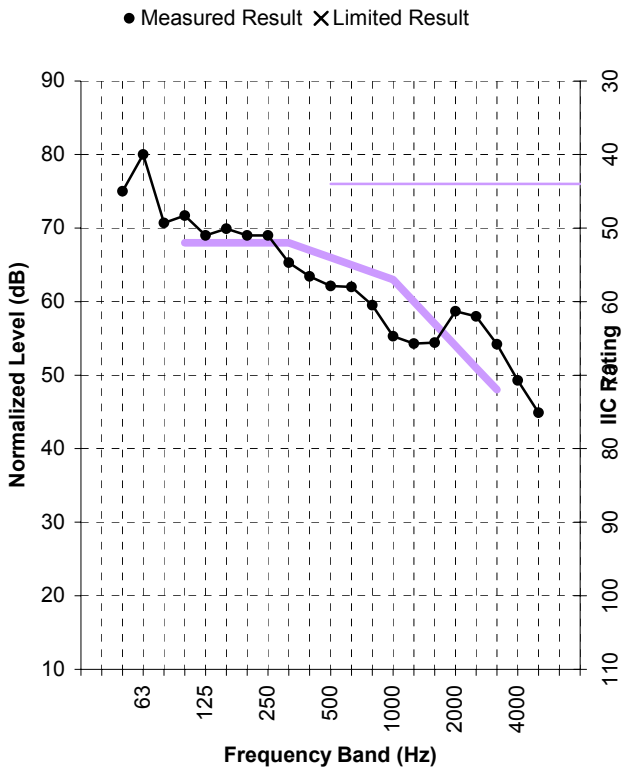
Assembly Elements listed in order from top (receiver) to bottom (source) room side

0.75" (3/4") plywood; 2" # 9 screw @ 12" O.C.
(1/8") Norton CST™ V494 foam tape @ 16" O.C.
2 x 10 wood joists @ 16" O.C.
(6.25") R19 kraft-faced CertainTeed glass fiber batt insulation
Resilient furring channels @ 24" O.C.; 1.25" drywall screw @ 24" O.C.
0.625" CertainTeed ProRoc
gypsum board type x; 1.625" drywall screw @ 12" O.C.

Orfield Laboratories Inc

Test Date June 17, 2009 **Method** ASTM Standard E492
Specimen Floor / Ceiling Assembly

Single Number Rating
IIC = 44



Freq. (Hz)	L_n (dB)	Dev. (dB)
50	75	
63	80	
80	71	
100	72	4
125	69	1
160	70	2
200	69	1
250	69	1
315	65	-
400	63	-
500	62	-
630	62	-
800	59	-
1000	55	-
1250	54	-
1600	54	-
2000	59	5
2500	58	7
3150	54	6
4000	49	
5000	45	
Total Deviations		27

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

0.75" (3/4") plywood; 2" # 9 screw @ 12" O.C.
(1/8") Norton CST™ V494 foam tape @ 16" O.C.
2 x 10 wood joists @ 16" O.C.
(6.25") R19 kraft-faced CertainTeed glass fiber batt insulation
Resilient furring channels @ 24" O.C.; 1.25" drywall screw @ 24" O.C.
0.625" CertainTeed ProRoc
gypsum board type x; 1.625" drywall screw @ 12" O.C.

SPECIMEN DESCRIPTION

The specimen under test was one floor-ceiling 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 floor-ceiling assembly 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*: *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements*

ASTM E413: *Classification for Rating Sound Insulation*

ASTM E492*: *Standard Test Method for Laboratory Measurement of Impact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine*

ASTM E1332: *Standard Classification for Determination of Impact Insulation Class (IIC)*

ASTM E2235: *Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods*

** 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

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APPENDIX A: MEASUREMENT SETUP

Environment	
Temperature	69°F [20.6°C]
Relative Humidity	55%

Specimen Area	
Specimen Area	187.5 ft² [17.42 m²]

Chamber Volume - Airborne Transmission	
Source Room Volume	2036 ft³ [57.7 m³]
Receiving Room Volume	8123 ft³ [230.0 m³]

Chamber Volume - Impact Transmission	
Source Room Volume	8123 ft³ [230.0 m³]
Receiving Room Volume	2036 ft³ [57.7 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	Norsonic	121	31185

APPENDIX B: AIRBORNE CALCULATION RESULTS

Freq. Band (Hz)	Specimen T.L. (dB)	95% Conf. (dB)	STC Defic. (dB)
25			
31.5	**27.7**		
40	**15.1**		
50	**16.7**		
63	**23.2**		
80	**19.7**	±1.63	
100	**24.9**	±1.15	
125	**30.7**	±0.95	5
160	**33.4**	±1.27	6
200	**36.6**	±1.24	5
250	**40.4**	±0.65	5
315	**43.2**	±0.65	5
400	**49.1**	±0.62	2
500	**52.9**	±0.40	-
630	**54.1**	±0.50	-
800	**56.5**	±0.40	-
1000	**59.0**	±0.25	-
1250	**57.7**	±0.25	-
1600	**58.2**	±0.32	-
2000	**54.6**	±0.44	1
2500	**54.2**	±0.35	2
3150	**57.4**	±0.31	-
4000	**62.4**	±0.49	-
5000	**65.8**	±0.35	
6300	**70.2**		
8000	**72.7** *		
10000	**68.5** *		
Total deficiencies below STC contour (dB)			31
STC contour [ASTM E413]			**52**

* 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 B CONTINUED: IMPACT CALCULATION RESULTS

Freq. Band (Hz)	Normalized Level (L_n) (dB)	95% Confidence (dB)	IIC Deviations (dB)
25			
31.5	**70.6**		
40	**69.1**		
50	**75.0**	±0.5	
63	**80.0**	±0.6	
80	**70.7**	±0.7	
100	**71.7**	±0.4	4
125	**69.0**	±0.2	1
160	**69.9**	±0.8	2
200	**69.0**	±1.1	1
250	**69.0**	±0.5	1
315	**65.3**	±0.5	-
400	**63.4**	±0.4	-
500	**62.1**	±0.3	-
630	**62.0**	±0.2	-
800	**59.5**	±0.1	-
1000	**55.3**	±0.2	-
1250	**54.3**	±0.2	-
1600	**54.4**	±0.1	-
2000	**58.7**	±0.1	5
2500	**58.0**	±0.1	7
3150	**54.2**	±0.2	6
4000	**49.3**	±0.2	
5000	**44.9**	±0.3	
6300	**40.8**		
8000	**39.3**		
10000	**37.0**		
Total deviations above IIC contour			27
IIC contour (ASTM E989)			**44**

Note: 95% Confidence from room qualification data. Data available upon request.
Extended frequency results below 50Hz and above 5000Hz for reference only.

APPENDIX C: SPECIMEN ASSEMBLY DESCRIPTION

The following table shows the elements in the floor-ceiling assembly, with the top-most element first and the bottom-most element last (from floor-top to ceiling-surface). The depth (thickness) of the floor ceiling assembly was approximately 11.125” [28.26 cm].

Overall Mass = 1091.2 lb [495.0 kg]
Overall Surface Density = 5.82 PSF [28.41 kg/m²]

Element	Mass lb [kg]	Surf. Dens. PSF [kg/m²]
0.75" (3/4") plywood; 2" # 9 screw @ 12" O.C.	431.8 [195.8]	2.30 [11.24]
(1/8") Norton CST™ V494 foam tape @ 16" O.C.	2.6 [1.2]	0.01 [0.07]
2 x 10 wood joists @ 16" O.C.	183.0 [83.0]	0.98 [4.77]
(6.25") R19 kraft-faced CertainTeed glass fiber batt insulation	52.5 [23.8]	0.28 [1.37]
Resilient furring channels @ 24" O.C.; 1.25" drywall screw @ 24" O.C.	20.0 [9.1]	0.11 [0.52]
0.625" CertainTeed ProRoc gypsum board type x; 1.625" drywall screw @ 12" O.C.	401.4 [182.1]	2.14 [10.45]

Independent contractors constructed and installed the test specimen assembly in the laboratory test opening. A qualified representative of Orfield Laboratories observed the installation in process and visually inspected the completed specimen and seal. All materials were weighed before installation. Fasteners were not weighed.

All construction materials were provided by the client, or acquired by the construction contractors through construction material suppliers. The framing and subfloor were constructed for previous tests in this series for this client, and portions of this specimen assembly were used in subsequent tests in the series.

In order to maximize the volume of the lower reverberation room (impact receiver room, airborne source room), the 2 x10 framing was constructed above the floor test opening and rested on its perimeter. The 2x10 joists were spaced at 16” O.C. The exposed vertical perimeter of the rim joists was covered by several additional layers of materials to prevent airborne flanking through the sides of the test sample. The additional layers consisted of a second 2x10 joist screwed in place and damped with Green Glue damping adhesive. Over that a 1” sandwich (2 x .5”) of Green Glue-damped cement board was attached with screws. All gaps and seams were filled with Green Glue Noiseproofing Sealant.

The Norlin CST™ V494, closed-cell foam tape was applied to the tops of the joists. The foam tape was fastened with its self-adhesive backing.

A top (floor) view photograph of the construction is shown in Figure 1. Subflooring was tongue-and-groove ¾” plywood. The plywood was supported by the Norlin CST™ V494 foam tape. The plywood was fastened to the joists, with 1-5/8” screws spaced 12”, and were inserted through the Norlin CST™ V494 foam tape. The seams of the subfloor were sealed with Green Glue Noiseproofing Sealant.

Kraft-faced CertainTeed glass fiber insulation batts were friction fit in each joist cavity. The finished ceiling was CertainTeed ProRoc gypsum board, type 'X', fastened to the resilient channel with 1-5/8" screws, spaced 12" on-center. Figure 2 shows a photograph of the resilient channel and partially installed ceiling. Care was taken to fasten the gypsum board panels only into the resilient channels and not into the joists. Seams of the gypsum board panels were sealed with Green Glue Noiseproofing Sealant.

Figure 1: Floor side of floor / ceiling; opened to reveal Norlin CST™ joist tape

Figure 2: Joists, insulation, resilient channel and partially installed ceiling