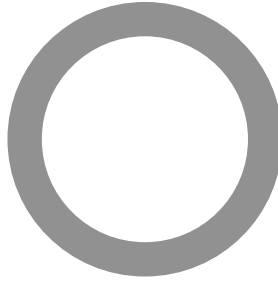


ASTM E 90: Laboratory Measurement of Airborne Sound Transmission of Building Partitions and Elements
ASTM E 492: Laboratory Measurement of Impact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine

Orfield Laboratories Inc



Design Research Testing

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

TEST

Client: **Sound Isolation Co.**
Report Date: **August 13, 2007**
Test Date: **May 16, 2007**
Test Number: **OL07-0508**

ACCREDITATION



For the scope of accreditation under NVLAP code 200248-0

RESULT SUMMARY

STC=55

IIC=53

CLIENT ADDRESS

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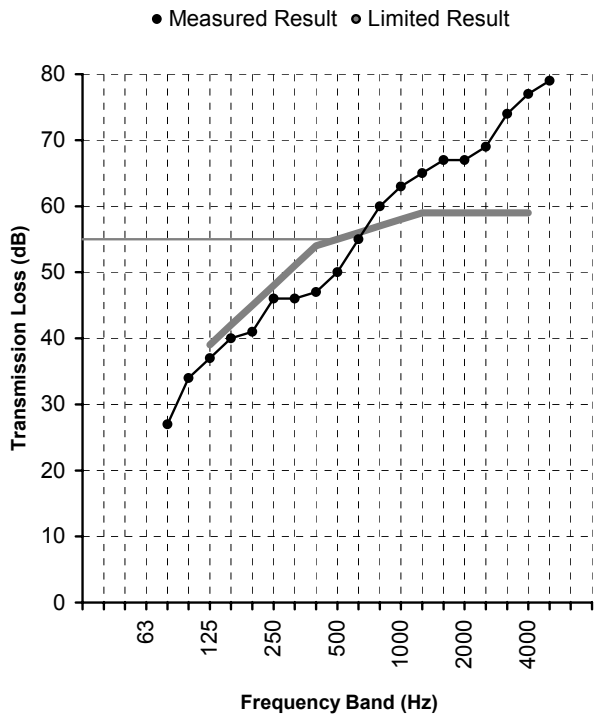
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Test Date May 16, 2007 **Method** ASTM Standard E90
Specimen Interior Floor Ceiling Assembly

Single Number Rating
STC = 55



Freq. (Hz)	TL (dB)	Def. (dB)
80	27	
100	34	
125	37	2
160	40	2
200	41	4
250	46	2
315	46	5
400	47	7
500	50	5
630	55	1
800	60	-
1000	63	-
1250	65	-
1600	67	-
2000	67	-
2500	69	-
3150	74	-
4000	77	-
5000	79	-
Total Deficiencies		28

* Estimate of lower limit

Assembly Elements (listed in order from floor surface to ceiling surface)

- 0.5" (1/2") engineered laminate flooring
- 0.413" (10.5mm) USRR Privacy Ultimate Underlay
- 0.75" (3/4") tongue and groove plywood ; 1.625" screw @ 12" O.C.
- 18" wood web truss @ 16" O.C.
- 5" (R19) glass fiber batts
- resilient channel @ 24" O.C.; 1.625" screw @ 16" O.C.
- 0.625" (5/8") type X gypsum board; 1.625" screw @ 12" O.C.



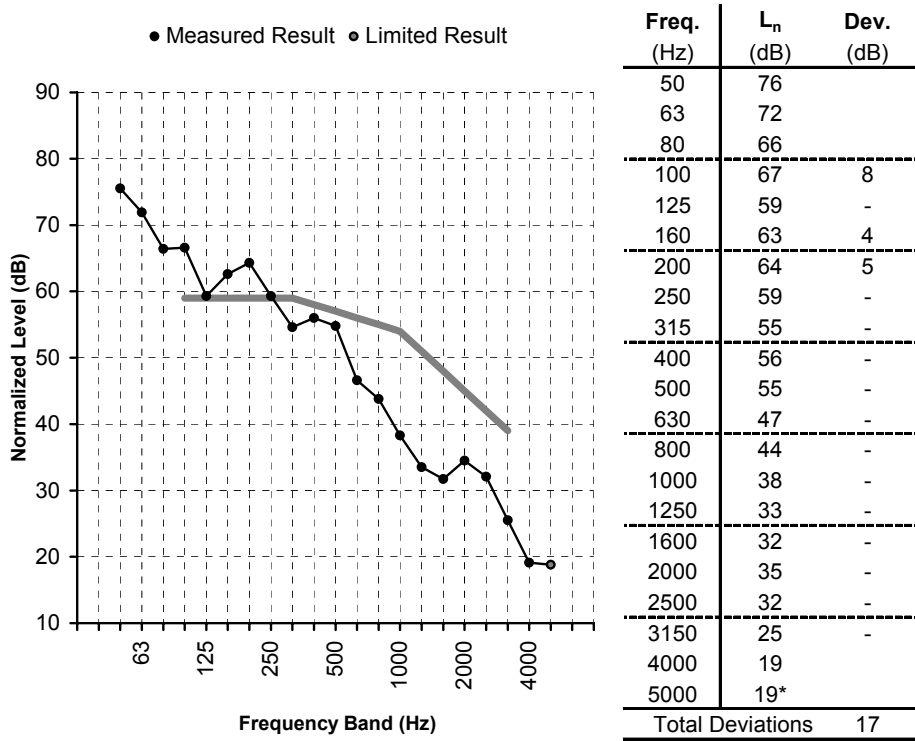


Test Date May 16, 2007

Method ASTM Standard E492

Specimen Interior Floor Ceiling Assembly

Single Number Rating
IIC = 53



* Limited by noise

Assembly Elements (listed in order from floor surface to ceiling surface)

- 0.5" (1/2") engineered laminate flooring
- 0.413" (10.5mm) USRR Privacy Ultimate Underlay
- 0.75" (3/4") tongue and groove plywood ; 1.625" screw @ 12" O.C.
- 18" wood web truss @ 16" O.C.
- 5" (R19) glass fiber batts
- resilient channel @ 24" O.C.; 1.625" screw @ 16" O.C.
- 0.625" (5/8") type X gypsum board; 1.625" 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

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	182.1 ft² [16.92 m²]
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Chamber Volume - Airborne Transmission

Source Room Volume	1488 ft³ [42.1 m³]
Receiving Room Volume	8281 ft³ [234.5 m³]

Chamber Volume - Impact Transmission

Source Room Volume	8281 ft³ [234.5 m³]
Receiving Room Volume	1488 ft³ [42.1 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





APPENDIX B: AIRBORNE CALCULATION RESULTS

Freq. Band (Hz)	Specimen T.L. (dB)	95% Conf. (dB)	STC Defic. (dB)	<i>R_w</i> Defic. (dB)
25				
31.5	21.1			
40	18.8			
50	22.9			
63	28.1			
80	26.8	±1.63		
100	34.3	±1.15		
125	36.6	±0.95	2	2.4
160	40.4	±1.27	2	1.6
200	41.4	±1.24	4	3.6
250	46.1	±0.65	2	1.9
315	46.3	±0.65	5	4.7
400	47.0	±0.62	7	7.0
500	49.5	±0.40	5	5.5
630	55.4	±0.50	1	0.6
800	60.0	±0.40	-	-
1000	62.7	±0.25	-	-
1250	65.2	±0.25	-	-
1600	66.6	±0.32	-	-
2000	66.9	±0.44	-	-
2500	69.1	±0.35	-	-
3150	73.8	±0.31	-	-
4000	77.5	±0.49	-	-
5000	79.4	±0.35	-	-
6300	78.0 *			
8000	74.5 *			
10000	71.9 *			
Total deficiencies below STC contour (dB)			28	
STC contour [ASTM E413]			55	
Average deficiencies below <i>R_w</i> contour (dB)				1.7
<i>R_w</i> contour [ISO 717/1]				55

* 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. Data is 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)	$L_{n,w}$ Deviations (dB)
25				
31.5	64.5			
40	66.3			
50	75.5	±0.5		
63	71.9	±0.6		
80	66.4	±0.7		
100	66.6	±0.4	8	9.6
125	59.3	±0.2	-	2.3
160	62.6	±0.8	4	5.6
200	64.3	±1.1	5	7.3
250	59.3	±0.5	-	2.3
315	54.6	±0.5	-	-
400	56.0	±0.4	-	-
500	54.8	±0.3	-	-
630	46.6	±0.2	-	-
800	43.8	±0.1	-	-
1000	38.3	±0.2	-	-
1250	33.5	±0.2	-	-
1600	31.7	±0.1	-	-
2000	34.5	±0.1	-	-
2500	32.1	±0.1	-	-
3150	25.5	±0.2	-	-
4000	19.1	±0.2	-	-
5000	18.8 *	±0.3	-	-
6300	17.7 *			
8000	18.4 *			
10000	20.0 *			
Total deviations above IIC contour			17	
IIC contour (ASTM E989)			53	
Average deviations above $L_{n,w}$ contour				1.7
$L_{n,w}$ contour (ISO 717/2)				55

* Actual impact isolation of specimen may be higher than measured at this frequency band. Signal-to-noise in the receiving room less than 5 dB, therefore the "background noise level was too high".

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).

Overall Mass = 1947.1 lb [883.2 kg]

Overall Surface Density = 10.69 PSF [52.20 kg/m²]

Element	Mass		Surf. Dens.	
	lb	[kg]	PSF	[kg/m ²]
0.5" (1/2") engineered laminate flooring	265.0	[120.2]	1.46	[7.11]
0.413" (10.5mm) USRR Privacy Ultimate Underlay	291.0	[132.0]	1.60	[7.80]
0.75" (3/4") tongue and groove plywood ; 1.625" screw @ 12" O.C.	410.0	[186.0]	2.25	[10.99]
18" wood web truss @ 16" O.C.	520.0	[235.9]	2.86	[13.94]
5" (R19) glass fiber batts resilient channel @ 24" O.C. ; 1.625" screw @ 16" O.C.	49.9	[22.6]	0.27	[1.34]
0.625" (5/8") type X gypsum board ; 1.625" screw @ 12" O.C.	16.5	[7.5]	0.09	[0.44]
	394.7	[179.0]	2.17	[10.58]

Independent contractors constructed and installed the specimen floor-ceiling 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 just before installation. Fasteners were not weighed.

All construction materials were provided by the client. All other materials were acquired by the 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.



Figure 1: open-web truss joists

Truss joists were installed 16" on center. Joist installation is shown in Figure 1. Resilient channel was fastened to the joists using 1-5/8" screws, spaced 24" on-center. Finished ceiling was 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 acoustic caulk.



Figure 2: resilient channel and gypsum board ceiling



Subflooring was tongue-and-groove 3/4" plywood, fastened to the joists with 1-5/8" screws spaced 12". The seams of the subfloor were sealed 1/8" rope caulk. Underlayment was 10.5 mm thick Privacy Ultimate Underlayment, manufactured by USRR, Inc. Underlayment was loose laid on top of the subfloor without fasteners. Seams of the underlayment were caulked and taped with metal foil tape, 3" wide and 2 mil thick. Engineered laminate flooring was laid atop the underlayment and snapped together with glue-less locking tongue-and-groove edges. Figure 3 shows the underlayment and foil tape, and Figure 4 shows the finished engineered laminate flooring.



Figure 3: underlayment with foil tape



Figure 4: finished floor