

Test Report

SPONSOR: **dB Sound Control**
Mt. Airy, NC

Impact Sound Transmission
RAL™-IFC19-003

CONDUCTED: 2019-02-15

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ON: Porcelain tile and mortar floor with dB Ceramic underlayment

TEST METHODOLOGY

Riverbank Acoustical Laboratories has been accredited by the U.S. Department of Commerce, National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP) as an ISO 17025:2005 Laboratory (NVLAP Lab Code: 100227-0) and for this test procedure. The test reported in this document conformed explicitly with ASTM E2179-03 (2009): "Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors" The single number rating was calculated according to ASTM E989-18: "Standard Classification for Determination of Single-Number Metrics for Impact Noise." A complete description of the measurement procedure and room specifications are available upon request. The results presented in this report apply to the sample material as received from the test sponsor.

STANDARD CONCRETE FLOOR

The laboratory's standard concrete floor is a fully cured 152.40 mm (6.0 in.) thick concrete floor installed directly in the laboratory's 4.27 m (14.0 ft.) by 2.44 m (8 ft.) test opening. No additional ceiling materials were installed over the bottom face of the concrete.

Concrete Slab

Material: Wire-reinforced concrete
Dimensions: 4 @ 609.6 mm (24 in.) x 4267.2 mm (168 in.)
Thickness: 152.4 mm (6 in.)
Overall Weight: 3474.74 kg (7660.5 lbs)
Mass per Unit Area: 333.94 kg/m² (68.40 lbs/ft²)
Joints: Underside sealed with acoustical caulk and tape
Top filled with general purpose sand, sealed with ready mix compound

Note: A 0.08 mm (0.003 in.) thick polyethylene sheet was adhered with spray adhesive to the top face of the concrete slab in order to protect the slab surface.

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SPECIMEN MEASUREMENTS & TEST CONDITIONS

The test specimen was designated by the sponsor as Porcelain tile and mortar floor with dB Ceramic underlayment. The building contractor and RAL staff compiled a detailed construction specification for the test specimen as follows, in order of installation:

Adhesive

Trade Name: Roberts 2057
Material: Vinyl composition tile adhesive
Application Tool: 1.59 mm (0.0625 in.) x 1.59 mm (0.0625 in.) x 0.79 mm (0.03125 in.) trowel
Wet Weight: 3.18 kg (7 lbs)
Installation: Spread in a thin layer over polyethylene sheet

Underlayment

Trade Name: dB Ceramic
Dimensions: 2438.4 mm (96 in.) x 4267.2 mm (168 in.) as installed
Overall Thickness: 3 mm (0.118 in.)
Overall Weight: 5.33 kg (11.75 lbs)
Mass per Unit Area: 0.51 kg/m² (0.10 lbs/ft²)
Installation: Laid over adhesive, rolled with 40.82 kg (90 lbs) flooring roller

Mortar

Trade Name: Mapei Ultraflex™ 2
Material: Polymer-modified thin-set mortar
Application Tool: 6.35 mm (0.25 in.) x 9.52 mm (0.375 in.) x 6.35 mm (0.25 in.) trowel
Thickness: Approximately 6.35 mm (0.25 in.) as installed
Mix Ratio: 2.57 L water per 11.34 kg (25 lbs) dry mix
Wet Weight: 56.36 kg (124.25 lbs)
Installation: Troweled over underlayment
Trowel lines parallel to length of concrete slab

Tile

Trade Name: Daltile LV02 12121HDIP6
Material: Porcelain
Dimensions: 304.8 mm (12 in.) x 304.8 mm (12 in.)
Thickness: 7.94 mm (0.3125 in.)
Overall Weight: 164.65 kg (363 lbs)
Installation: Laid over mortar, spaced 6.35 mm (0.25 in.) apart
Installation Date: 2019-02-12

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Grout

Trade Name: Mapei Flexcolor™ CQ
Wet Weight: 5.1 kg (11.25 lbs)
Installation: Pressed into space between tiles
Installation Date: 2019-02-13

Overall Specimen Properties

Size: 2.44 m (96.0 in) wide by 4.27 m (168.0 in) long
Thickness: 0.17 m (6.6 in)
Weight: 234.62 kg (517.25 lbs)
Transmission Area: 10.405 m² (112 ft²)
Mass per Unit Area: 22.55 kg/m² (4.62 lbs/ft²)

Test Aperture

Size: 4.27 m (14.0 ft.) by 2.44 m (8 ft.)
Filler Wall: None
Sealed: Entire periphery (both sides) with dense mastic

Test Environment

Source Room

Volume: 131.32 m³
Temperature: 22.2 °C ± 0.0 °C
Relative Humidity: 49.5 % ± 1.0 %

Receive Room

Volume: 82.64 m³
Temperature: 22.8 °C ± 0.0 °C
Relative Humidity: 49.5 % ± 1.0 %

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Figure 1 – Completed specimen mounted in test aperture, as viewed from source room.



Figure 2 – Completed specimen mounted in test aperture, as viewed from receive room.

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Figure 3 – Adhesive installed on polyethylene sheet over concrete slab



Figure 4 – Underlayment installed, floor roller used in installation

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Figure 5 – Detail of underlayment material



Figure 6 – Mortar and tile partially installed over underlayment

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TEST RESULTS

1/3 Octave Center Frequency (Hz)	Normalized Impact SPL, L_o , Bare Standard Concrete Floor (dB)	Normalized Impact SPL, L_c , Floor Covering Installed (dB)	Reduction in Impact SPL, L_d , ($L_o - L_c$), (dB)	Impact SPL of Floor Covering on a Reference Concrete Slab, $L_{ref, c}$, (dB)
100	55	55	0	67.0
125	59	56	3	64.5
160	61	60	1	67.0
200	63	60	3	65.5
250	67	66	1	68.0
315	70	69	1	68.5
400	71	71	0	70.0
500	69	69	0	70.5
630	69	64	5	66.0
800	70	60	10	61.5
1000	69	53	16	56.0
1250	69	50	19	53.0
1600	74	49	25	47.0
2000	71	43	28	44.0
2500	71	40	31	41.0
3150	72	37	35	37.0

Increase in Impact Insulation Class $\Delta IIC = 19$

Impact Insulation Class, IIC_c for $L_{ref, c}$

$IIC_c = 47$



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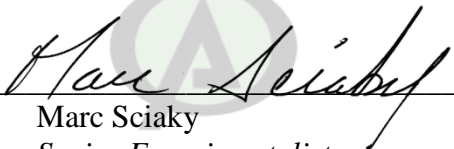
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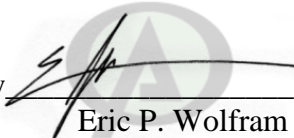
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TEST RESULTS (Continued)

The measured impact sound pressure levels (ISPL) are tabulated in each of the twenty-one standard one third octave bands from 100 Hz through 3150 Hz for both the standard concrete slab and the three sample materials. The reduction in ISPL calculated for the floor covering has been applied to a reference concrete floor with an IIC = 28 as described in the standard. The increase in impact insulation class, ΔIIC as well as the IIC_c for the floor covering on a reference concrete slab has also been calculated. An * indicates that the value has been adjusted for background noise levels and reflects a lower limit. A graphic presentation of the data appears on the following page.

Tested by 
Marc Sciaky
Senior Experimentalist

Report by 
Malcolm Kelly
Test Engineer, Acoustician

Approved by 
Eric P. Wolfram
Laboratory Manager

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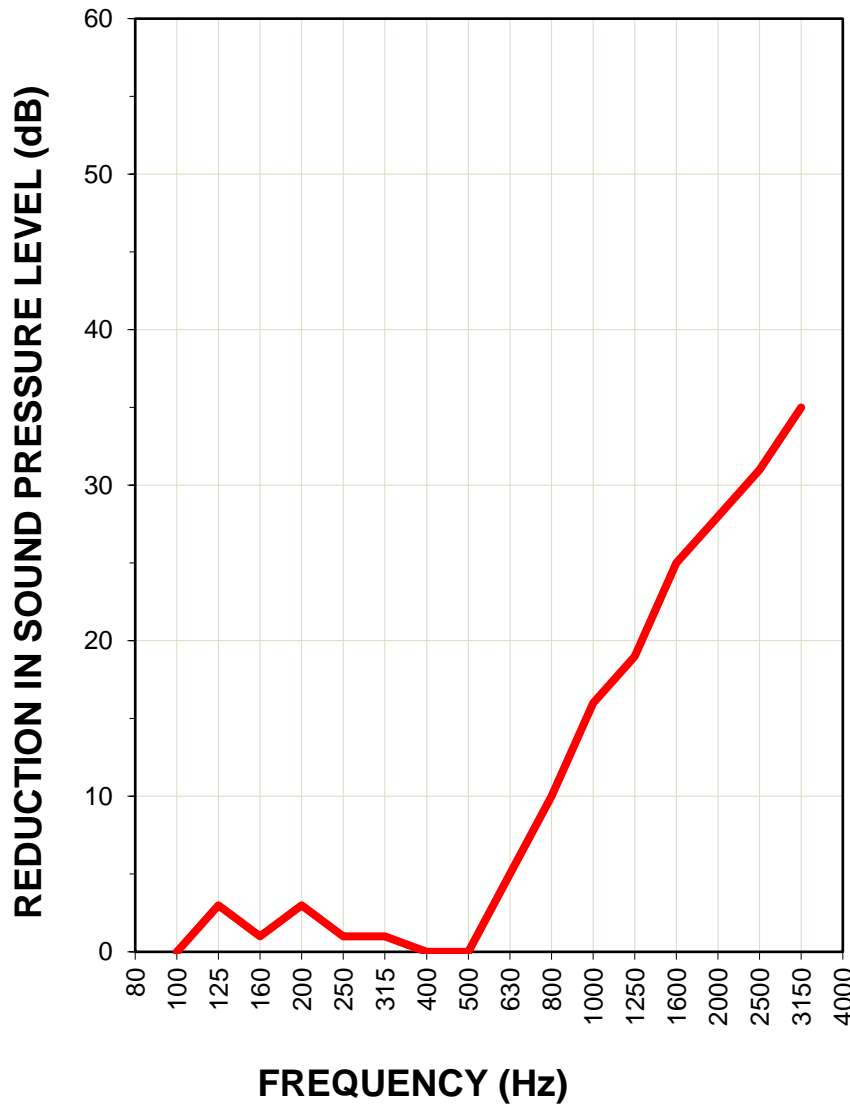
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Floor Covering Impact Reduction

Porcelain tile and mortar floor with dB Ceramic underlayment



ΔIIC=19

IMPACT REDUCTION OF FLOOR COVERING
ON A CONCRETE FLOOR



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1512 S BATAVIA AVENUE
GENEVA, IL 60134
630-232-0104

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RIVERBANK.ALIONSCIENCE.COM

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APPENDIX A: Instruments of Traceability

Specimen: Porcelain tile and mortar floor with dB Ceramic underlayment (See Full Report)

<u>Description</u>	<u>Model</u>	<u>Serial Number</u>	<u>Date of Certification</u>	<u>Calibration Due</u>
System 2	Type 3160-A-042	3160-106974	2018-08-09	2019-08-09
Bruel & Kjaer Mic And Preamp D	Type 4943-B-001	2311440	2018-09-28	2019-09-28
Wood Case Tapping Machine	Type 3204	226940	2018-08-23	2019-08-23
Bruel & Kjaer Pistonphone	Type 4228	2781248	2018-08-06	2019-08-06
EXTECH Hygro 330	SD700	A083330	2018-09-07	2019-09-07
EXTECH Hygro 322	SD700	A083322	2018-09-07	2019-09-07

APPENDIX B: Revisions to Original Test Report

Specimen: Porcelain tile and mortar floor with dB Ceramic underlayment (See Full Report)

<u>Date</u>	<u>Revision</u>
2019-02-20	Original report issued

END



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