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

An ALION Technical Center

# Test Report

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WALLACE CLEMENT SABINE

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

**Floor Covering Impact Reduction**
**RAL-IFC18-004**

CONDUCTED: 2018-03-21



ON: Laminate wood flooring over dB 4 Pro underlayment

## TEST METHOD

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) for this test procedure (NVLAP Lab Code: 100227-0). 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 E989-06 (2012): "Standard Classification for Determination of Impact Insulation Class (IIC)." The measurements were recorded using a real time analyzer and a rotating microphone boom incorporating a spatial average. The rotation speed of the boom was set at 32 seconds per revolution and the linear integration time of the analyzer was set at 32 seconds. The impact sound pressure levels (ISPL) were measured for each of the twenty-one standard one-third octave bands from 50 Hz through 5000 Hz for both the standard concrete slab and the provided specimen. 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. A complete description of the measuring procedure and room qualifications is available upon request.

## DESCRIPTION OF THE SPECIMEN

The test specimen was designated by the manufacturer as Laminate wood flooring over dB 4 Pro underlayment. The building contractor and RAL staff compiled a detailed construction specification as follows:

**Underlayment**

| | |
|---|---|
| Trade Name: | dB 4 Pro |
| Material: | Felt over vinyl sheet |
| Installed: | Loose laid over concrete slab, felted side down |
| Overall Dimensions: | 2438.4 mm (96 in.) x 2743.2 mm (108 in.) |
| Measured Thickness: | 6.63 mm (0.261 in.) |
| Overall Weight: | 48.99 kg (108 lbs) |
| Mass per Unit Area: | 4.71 kg/m$^2$ (0.96 lb/ft$^2$) |
| Joints: | Sealed with tape |

## Floor Covering

| | |
|---|---|
| Material: | Wood-look laminate over fiberboard flooring tiles |
| Installed: | Loose laid over underlayment |
| Tile Dimensions: | 1290 mm (50.787 in.) x 194 mm (7.638 in.) |
| Tile Thickness: | 6.6 mm (0.26 in.) |
| Overall Weight: | 62.14 kg (137 lbs) |
| Mass per Unit Area: | 5.97 kg/m$^2$ (1.22 lb/ft$^2$) |
| Joints: | Locking edge design |

## Concrete Slab

| | |
|---|---|
| Material: | Wire-reinforced concrete |
| Dimensions: | 4 @ 609.6 mm (24 in.) x 4267.2 mm (168 in.) |
| Thickness: | 152.4 mm (6.0 in.) |
| Overall Weight: | 3,467.71 kg (7,645 lbs) |
| Mass per Unit Area: | 333.27 kg/m$^2$ (68.26 lb/ft$^2$) |
| Installation: | The slab was isolated from the sill by rubber pads |
| Joints: | Underside sealed with acoustical caulk and tape |
| | Top filled with general purpose sand, sealed with ready mix compound |

## Physical Measures

| | |
|---|---|
| Size: | 2.44 m (96.00 in.) wide by 4.27 m (168.00 in.) long |
| Thickness: | 172.21 mm (6.78 in.) |
| Weight: | 3578.90 kg (7890.00 lbs.) |
| Mass per Unit Area: | 343.97 kg/m$^2$ (70.45 lbs./ft$^2$) |
| Transmission Area: | 10.40 m$^2$ (112.00 ft$^2$) |

## 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: | 132.6 m$^3$ (4,681.0 ft$^3$) |
| Temperature: | 23±0ºC (73±0ºF) |
| Humidity: | 50±3% |

Receive Room

| | |
|---|---|
| Volume: | 81.7 m$^3$ (2,884.3 ft$^3$) |
| Temperature: | 23±0ºC (74±0ºF) |
| Humidity: | 52±1% |

Figure 1 – Specimen mounted in test opening


Figure 2 – Underlayment installed over concrete slab


Figure 3 – Underside of test specimen

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TEST RESULTS

| 1/3 Octave Center Frequency (Hz) | Normalized Impact SPL, $L_0$, 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 | 53 | 2.0 | 65.0 |
| 125 | 61 | 59 | 2.0 | 65.5 |
| 160 | 61 | 57 | 4.0 | 64.0 |
| 200 | 64 | 59 | 5.0 | 63.5 |
| 250 | 68 | 62 | 6.0 | 63.0 |
| 315 | 72 | 63 | 9.0 | 60.5 |
| 400 | 70 | 53 | 17.0 | 53.0 |
| 500 | 72 | 51 | 21.0 | 49.5 |
| 630 | 71 | 41 | 30.0 | 41.0 |
| 800 | 71 | 38 | 33.0 | 38.5 |
| 1000 | 70 | 32 | 38.0 | 34.0 |
| 1250 | 71 | 28 | 43.0 | 29.0 |
| 1600 | 74 | 25 | 49.0 | 23.0 |
| 2000 | 71 | 20 | 51.0 | 21.0 |
| 2500 | 70 | 14 | 56.0 | 16.0 |
| 3150 | 72 | 8 | 64.0 | 8.0 |

Increase in Impact Insulation Class $\Delta IIC = 25$

Impact Insulation Class, $IIC_c$ for $L_{ref,c}$ $IIC_c = 53$

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
*Experimentalist*

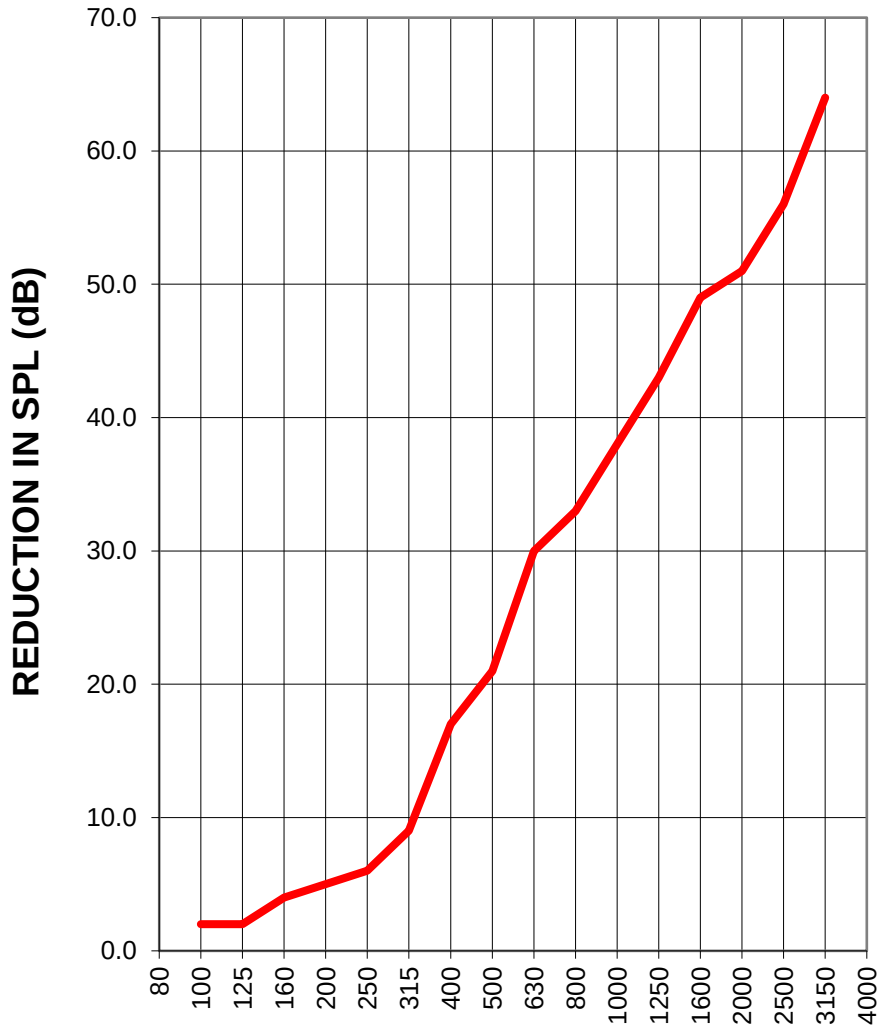
Report by _____
Malcolm Kelly
*Acoustician*

Approved by _____
Eric P. Wolfram
*Laboratory Manager*

Digitally signed by Eric P Wolfram
DN: cn=Eric P Wolfram, o=Alion Science & Technology, ou=Riverbank Acoustical Laboratories, email=ewolfram@alionscience.com, c=US
Date: 2018.04.05 16:48:54 -05'00'

## Floor Covering Impact Reduction

Laminate wood flooring over dB 4 Pro underlayment




**ΔIIC=25**

**IMPACT REDUCTION OF FLOOR COVERING ON A CONCRETE FLOOR**

**dB Sound Control** **RAL-IFC18-004**
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## APPENDIX A: Instruments of Traceability

Specimen: Laminate wood flooring over dB 4 Pro underlayment (See Full Report)

| Description | Model | Serial Number | Date of Certification | Calibration Due |
|---|---|---|---|---|
| Bruel & Kjaer Pulse Analyzer - System4 | Type 3560-C | 2639093 | 2017-08-02 | 2018-08-02 |
| Bruel & Kjaer Mic And Preamp D | Type 4943-B-001 | 2311440 | 2017-09-22 | 2018-09-22 |
| Bruel & Kjaer Tapping Machine-WoodCase | 3204 | 226940 | 2017-07-11 | 2018-07-11 |
| Bruel & Kjaer Pistonphone | Type 4228 | 2781248 | 2017-08-02 | 2018-08-02 |
| EXTECH_62 | SD700 | A.083662 | 2017-11-20 | 2018-11-20 |
| EXTECH_63 | SD700 | A.083663 | 2017-11-20 | 2018-11-20 |

END