**G0665.04-113-11-R2**
**ACOUSTICAL PERFORMANCE TEST REPORT**
**ASTM E 90, ASTM E 492, ASTM E 2179**

**Rendered to**

**FOAM SOLUTIONS INC**

**Series/Model: 4 mm Luxury Vinyl Plank over Foam Solutions Rubber Foam Pad**

**Specimen Type: Concrete Slab - 152 mm**

**Overall Size: 3023 mm by 3632 mm**

| | |
|---|---|
| **STC** | **51** |
| **IIC** | **57** |
| **ΔIIC** | **27** |

**Test Specimen Identification:**
Floor Topping: 4 mm  Luxury Vinyl Plank
Floor Underlayment: 1.8 mm Foam Solutions Rubber Foam Pad
Floor Slab: 152 mm  Concrete Slab

Reference should be made to Intertek-ATI Report G0665.04-113-11 for complete test specimen description. This page alone is not a complete report.

# Acoustical Performance Test Report

FOAM SOLUTIONS INC
259 Steelcase Road West
Markham, Ontario L3R 2P6
CANADA

| | |
|---|---|
| **Report** | G0665.04-113-11 |
| **Test Date** | 07/11/16 |
| **Report Date** | 07/13/16 |
| **Revision Date** | 07/27/16 |

## Project Scope

Architectural Testing, Inc., a subsidiary of Intertek (Intertek-ATI), was contracted to conduct airborne sound transmission loss, impact sound transmission, and delta impact sound transmission tests. The complete test data is included as attachments to this report. The client provided the test specimen. The specimen was constructed on the date of testing.

## Test Methods

The acoustical tests were conducted in accordance with the following standards. The equipment listed in the attachments meets the requirements of the following standards.

ASTM E 90-09, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions

ASTM E 413-10, Classification for Rating Sound Insulation

ASTM E 492-09(2016)e1, Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine

ASTM E 2179-03(2016), Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors

ASTM E 989-06 (2012), Classification for Determination of Impact Insulation Class (IIC)

ASTM E 2235-04 (2012) Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods

## Test Procedure

All testing was conducted in the VT test chambers at Intertek-ATI located in York, Pennsylvania. The microphones were calibrated before conducting the tests.

The airborne transmission loss test was conducted in accordance with the ASTM E 90 test method using the single direction method. Two background noise sound pressure level and five sound absorption measurements were conducted at each of five microphone positions. Four sound pressure level measurements were made simultaneously in both rooms, at each of five microphone positions.

**Test Procedure** (Continued)
The impact sound transmission test was conducted in accordance with the ASTM E 492 test method. Two background noise sound pressure level, two sound pressure level measurements with the tapping machine operating at each position specified by ASTM E 492, and five sound absorption measurements were conducted at each of five microphone positions.

The delta impact insulation test was conducted in accordance with ASTM E 2179 test method. In addition to the impact sound transmission test, two sound pressure level measurements with the tapping machine operating at each position specified by ASTM E 492 with only the concrete slab installed.

The air temperature and relative humidity conditions were monitored and recorded during all measurements.

**Test Conditions**

| Source Room | | Receive Room | |
|---|---|---|---|
| Average Temperature | 22.1°C | Average Temperature | 22.4°C |
| Average Relative Humidity | 58% | Average Relative Humidity | 61% |

**Test Calculations**
The STC (Sound Transmission Class), IIC (Impact Insulation Class), and ΔIIC (Delta Impact Insulation Class) ratings were calculated in accordance with ASTM E 413, ASTM E 989, and ASTM E 2179, respectively.

**Test Specimen Materials and Installation Details**

| Material | Dimensions (mm) | Thickness (mm) | Manufacturer and Series | Quantity | Average Weight |
|---|---|---|---|---|---|
| Luxury Vinyl Plank | 914.4 by 152.4 | 4.0 | N/A | 10.98 m² | 7.52 kg/m² |
| | *Note: Installed with releasable self-adhesive* | | | | |
| Rubber Foam Pad | 914 by 3048 | 1.8 | Foam Solutions | 10.98 m² | 0.76 kg/m² |
| | *Note: Loose laid* | | | | |
| Concrete Slab | 3023 by 3632 | 152.0 | N/A | 10.98 m² | 366.18 kg/m² |
| | *Note: The concrete slab was installed in a test frame flush to the source room.* | | | | |

**Comments**
The total weight of the floor/ceiling assembly was 4111.6 kg. Intertek-ATI will store samples of the test specimen for four years. Photographs of the test specimen are included in the attachments. A drawing of the test specimen is included in the attachments.

Intertek-ATI will service this report for the entire test record retention period. Test records, such as detailed drawings, datasheets, representative samples of test specimens, or other pertinent project documentation, will be retained by Intertek-ATI for the entire test record retention period. The test record retention period ends four years after the test date.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. It is the exclusive property of the client so named herein and relates only to the specimen tested. This report is intended to help in the client's quality assurance program, but it does not represent a continuous or exhaustive evaluation of the specimen tested or of other products or materials that were not evaluated. The statements and data provided herein do not constitute approval, disapproval, certification, or acceptance of performance or materials.



FOR INTERTEK-ATI:


Cody R. Snyder
Technician II - Acoustical Testing


Jordan Strybos
Project Manager - Acoustical Testing

Attachments (9 Pages): This report is complete only when all attachments are included.

** Stated by Client/Manufacturer*
*N/A - Non Applicable*

## Revision Log

| Revision | Date | Page(s) | Description |
|---|---|---|---|
| R0 | 07/13/16 | N/A | Original Report Issue |
| R1 | 07/26/16 | Cover page, Page 1, Datasheets | Company name changed per client's request |
| R2 | 07/27/16 | Cover page, Pages 1-2, Datasheets | ASTM E2179 data added |

# Attachments

## Instrumentation

| Instrument | Manufacturer | Model | ATI Number | Date of Calibration |
|---|---|---|---|---|
| Data Acquisition Unit | National Instruments | PXI-1033 | 65124 | 06/16 * |
| Microphone Calibrator | Norsonic | 1251 | INT00127 | 01/16 |
| Receive Room Microphone | PCB Piezontronics | 378B20 | 63748 | 06/16 |
| Receive Room Microphone | PCB Piezotronics | 378B20 | 63744 | 06/16 |
| Receive Room Microphone | PCB Piezotronics | 378B20 | 63745 | 06/16 |
| Receive Room Microphone | PCB Piezotronics | 378C20 | 65617 | 06/16 |
| Receive Room Microphone | PCB Piezotronics | 378B20 | 63747 | 06/16 |
| Receive Room Environmental Indicator | Comet | T7510 | 63810 | 10/15 |
| | | | 63811 | 10/15 |
| Source Room Microphone | PCB Piezotronics | 378B20 | 63738 | 05/16 |
| Source Room Microphone | PCB Piezotronics | 378B20 | 63739 | 05/16 |
| Source Room Microphone | PCB Piezotronics | 378B20 | 63740 | 05/16 |
| Source Room Microphone | PCB Piezotronics | 378B20 | 63742 | 05/16 |
| Source Room Microphone | Scantek | 378B20 | 63741 | 05/16 |
| Source Room Environmental Indicator | Comet | T7510 | 63812 | 11/15 |
| Tapping Machine | Look Line s.r.l. | EM50 (TM50) | 65351 | 02/16 |

** The calibration frequency for this equipment is every two years per the manufacturer's recommendation.*

## Test Chambers

| | |
|---|---|
| VT Receive Room Volume | 158.86 m³ |
| VT Source Room Volume | 190 m³ |

# AIRBORNE SOUND TRANSMISSION LOSS

ASTM E 90

| | |
|---|---|
| **Test Date** | 07/11/16 |
| **Data File No.** | G0665.04 |
| **Client** | Foam Solutions Inc |
| **Description** | 4 mm Luxury Vinyl Plank, 1.8 mm Foam Solutions Rubber Foam Pad, 152 mm Concrete Slab |
| **Specimen Area** | 10.98 m² |
| **Technician** | Cody R. Snyder |

| **Freq** (Hz) | **Background SPL** (dB) | **Absorption** (m²) | **Source SPL** (dB) | **Receive SPL** (dB) | **Specimen TL** (dB) | **95% Confidence Limit** | **Number of Deficiencies** |
|---|---|---|---|---|---|---|---|
| 80 | 38.9 | 14.8 | 109 | 67 | 42 | 3.70 | - |
| 100 | 35.5 | 12.4 | 107 | 67 | 40 | 1.60 | - |
| 125 | 37.1 | 9.4 | 106 | 70 | 38 | 1.10 | 0 |
| 160 | 26.9 | 8.5 | 107 | 72 | 37 | 1.90 | 1 |
| 200 | 24.6 | 11.1 | 104 | 72 | 33 | 2.20 | 8 |
| 250 | 24.2 | 10.9 | 104 | 64 | 40 | 1.00 | 4 |
| 315 | 23.9 | 9.7 | 105 | 62 | 44 | 0.60 | 3 |
| 400 | 19.1 | 8.0 | 104 | 61 | 44 | 0.20 | 6 |
| 500 | 22.8 | 7.5 | 104 | 57 | 49 | 0.40 | 2 |
| 630 | 18.6 | 7.2 | 104 | 53 | 53 | 0.40 | 0 |
| 800 | 17.7 | 7.0 | 105 | 49 | 59 | 0.40 | 0 |
| 1000 | 15.3 | 6.9 | 104 | 44 | 63 | 0.40 | 0 |
| 1250 | 9.4 | 7.0 | 104 | 42 | 66 | 0.20 | 0 |
| 1600 | 6.1 | 7.0 | 104 | 40 | 67 | 0.20 | 0 |
| 2000 | 4.2 | 7.7 | 104 | 38 | 68 | 0.30 | 0 |
| 2500 | 4.1 | 8.7 | 102 | 36 | 68 | 0.30 | 0 |
| 3150 | 4.0 | 9.6 | 103 | 34 | 70 | 0.40 | 0 |
| 4000 | 4.6 | 11.0 | 104 | 33 | 72 | 0.50 | 0 |
| 5000 | 5.2 | 12.9 | 104 | 32 | 72 | 0.50 | - |
| 6300 | 5.8 | 16.7 | 97 | 27 | 69 | 0.70 | - |
| 8000 | 6.2 | 22.0 | 97 | 20 | 75 | 0.80 | - |
| 10000 | 6.4 | 26.7 | 92 | 11 | 79 | 0.70 | - |

**STC Rating** **51** *(Sound Transmission Class)*

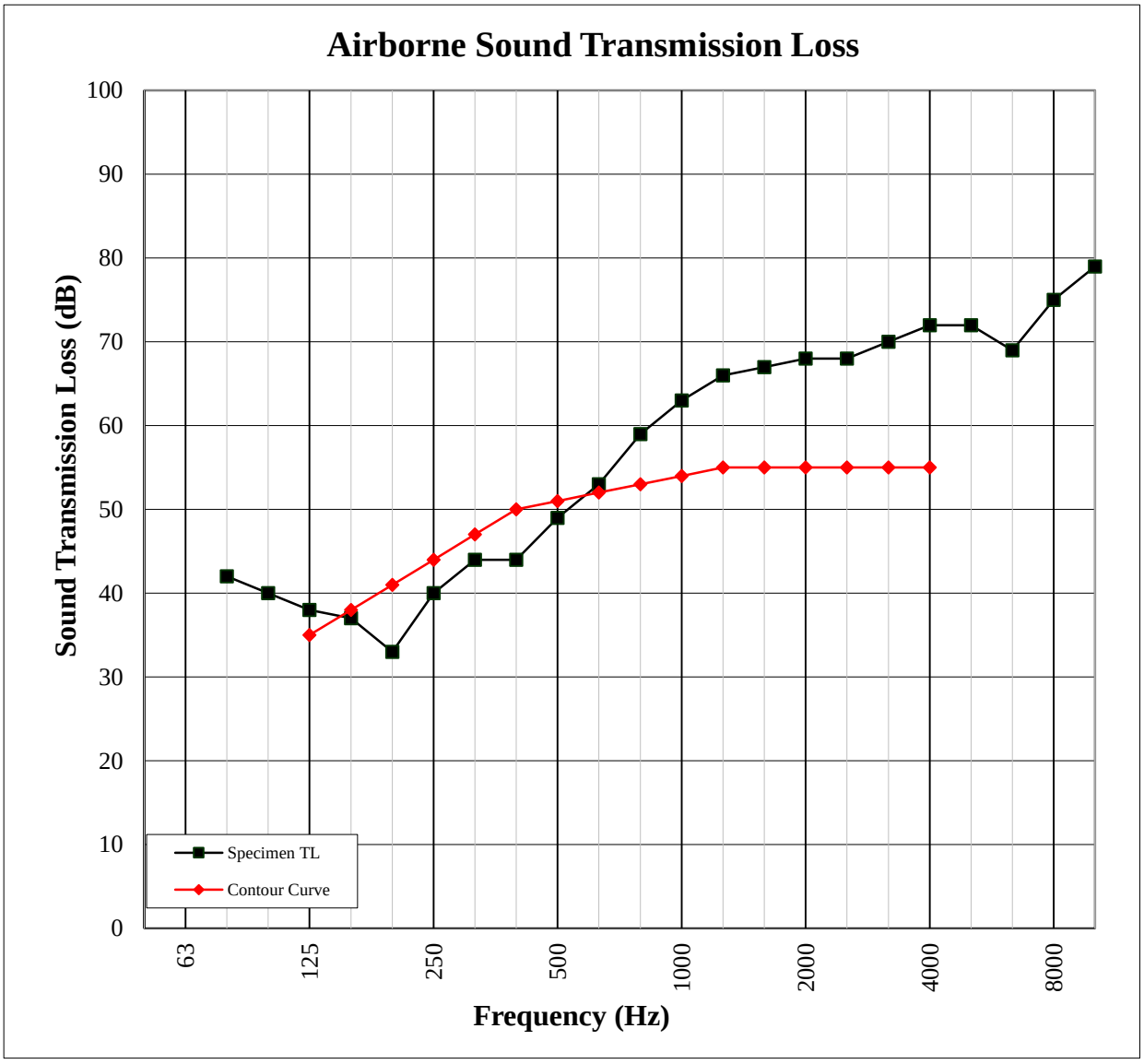
Deficiencies 24 *(Sum of Deficiencies)*

***Notes:*** *1) Receive Room levels less than 5 dB above the Background levels are highlighted in yellow.*
*2) Specimen TL levels listed in red indicate the lower limit of the transmission loss.*
*3) Specimen TL levels listed in green indicate that there has been a filler wall correction applied*

# AIRBORNE SOUND TRANSMISSION LOSS

ASTM E 90

| | |
|---|---|
| **Test Date** | 07/11/16 |
| **Data File No.** | G0665.04 |
| **Client** | Foam Solutions Inc |
| **Description** | 4 mm Luxury Vinyl Plank, 1.8 mm Foam Solutions Rubber Foam Pad, 152 mm Concrete Slab |
| **Specimen Area** | 10.98 m² |
| **Technician** | Cody R. Snyder |



Architectural Testing

ACCREDITED Testing Laboratory

# IMPACT SOUND TRANSMISSION

ASTM E 492

| | |
|---|---|
| **Test Date** | 07/11/16 |
| **Data File No.** | G0665.04 |
| **Client** | Foam Solutions Inc |
| **Description** | 4 mm Luxury Vinyl Plank, 1.8 mm Foam Solutions Rubber Foam Pad, 152 mm Concrete Slab |
| **Specimen Area** | 10.98 m² |
| **Technician** | Cody R. Snyder |

| **Freq** (Hz) | **Background SPL** (dB) | **Absorption** (m²) | **Normalized Impact SPL** (dB) | **95% Confidence Limit** | **Number of Deficiencies** |
|---|---|---|---|---|---|
| 80 | 37.6 | 15.9 | 53 | 2.8 | - |
| 100 | 32.8 | 12.6 | 54 | 3.1 | 0 |
| 125 | 38.1 | 9.6 | 54 | 1.8 | 0 |
| 160 | 25.8 | 8.9 | 56 | 1.2 | 1 |
| 200 | 21.6 | 10.9 | 63 | 2.5 | 8 |
| 250 | 22.0 | 10.3 | 60 | 0.8 | 5 |
| 315 | 21.5 | 9.2 | 56 | 1.2 | 1 |
| 400 | 17.1 | 7.9 | 52 | 0.4 | 0 |
| 500 | 22.4 | 7.4 | 46 | 0.9 | 0 |
| 630 | 19.2 | 7.3 | 42 | 0.5 | 0 |
| 800 | 18.7 | 7.0 | 40 | 0.9 | 0 |
| 1000 | 15.3 | 6.9 | 36 | 1.2 | 0 |
| 1250 | 9.7 | 7.0 | 29 | 0.6 | 0 |
| 1600 | 6.9 | 7.1 | 25 | 0.5 | 0 |
| 2000 | 5.7 | 7.7 | 19 | 0.6 | 0 |
| 2500 | 5.1 | 8.7 | 14 | 1.0 | 0 |
| 3150 | 4.7 | 9.6 | 7 | 0.6 | 0 |
| 4000 | 5.4 | 11.0 | 5 | 0.5 | - |
| 5000 | 5.9 | 12.9 | 5 | 0.5 | - |
| 6300 | 6.6 | 16.5 | 6 | 0.6 | - |
| 8000 | 7.0 | 22.1 | 8 | 0.7 | - |
| 10000 | 7.1 | 26.6 | 9 | 0.8 | - |

**IIC Rating** **57** *(Impact Insulation Class)*

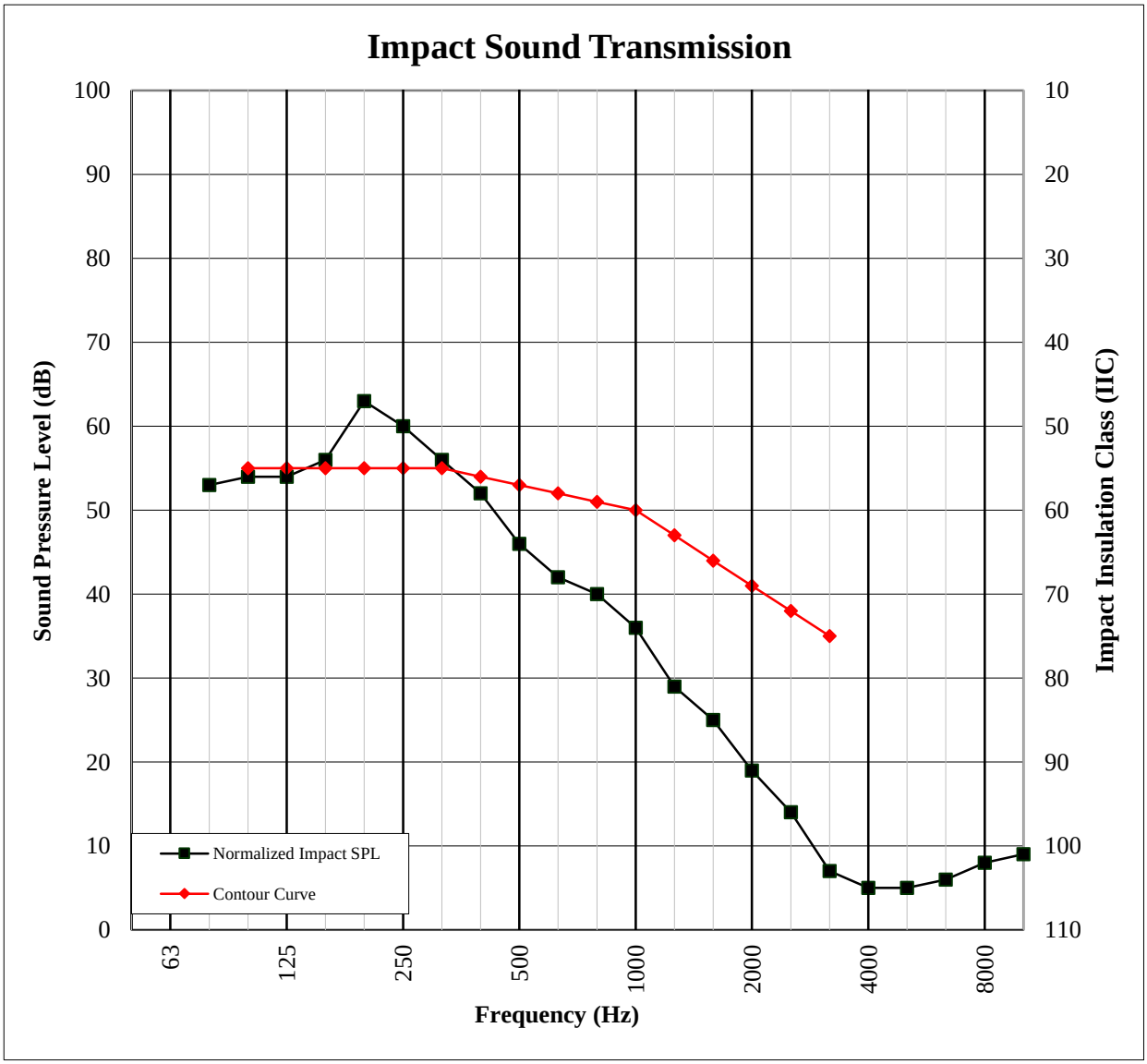
Deficiencies 15 *(Sum of Deficiencies)*

***Note:*** *Receive Room levels less than 5 dB above the Background levels are highlighted in yellow.*

# IMPACT SOUND TRANSMISSION

ASTM E 492

| | |
|---|---|
| **Test Date** | 07/11/16 |
| **Data File No.** | G0665.04 |
| **Client** | Foam Solutions Inc |
| **Description** | 4 mm Luxury Vinyl Plank, 1.8 mm Foam Solutions Rubber Foam Pad, 152 mm Concrete Slab |
| **Specimen Area** | 10.98 m² |
| **Technician** | Cody R. Snyder |



Architectural Testing

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# DELTA IMPACT INSULATION

ASTM E 2179

| | |
|---|---|
| **Test Date** | 07/11/16 |
| **Data File No.** | G0665.04 |
| **Client** | Foam Solutions Inc |
| **Description** | 4 mm Luxury Vinyl Plank, 1.8 mm Foam Solutions Rubber Foam Pad, 152 mm Concrete Slab |
| **Specimen Area** | 10.98 m² |
| **Technician** | Cody R. Snyder |

| **Freq** (Hz) | **Bkgrd SPL** (dB) | **Absorption** (Square Meters) | **Normalized Impact SPL** BARE (dB) | **95% Conf Limit** | **Normalized Impact SPL** SPEC (dB) | **95% Conf Limit** | **Resulting Array** $L_{ref,c}$ | **No. of Defici-encies** |
|---|---|---|---|---|---|---|---|---|
| 100 | 32.8 | 12.6 | 56.8 | 0.7 | 53.6 | 1.0 | 64 | 7 |
| 125 | 38.1 | 9.6 | 57.7 | 1.3 | 53.5 | 0.3 | 63 | 6 |
| 160 | 25.8 | 8.9 | 62.2 | 1.7 | 56.5 | 1.9 | 62 | 5 |
| 200 | 21.6 | 10.9 | 70.3 | 1.3 | 63.5 | 2.0 | 62 | 5 |
| 250 | 22.0 | 10.3 | 68.0 | 2.3 | 59.7 | 2.2 | 61 | 4 |
| 315 | 21.5 | 9.2 | 68.1 | 2.7 | 55.6 | 1.9 | 57 | 0 |
| 400 | 17.1 | 7.9 | 69.1 | 1.3 | 52.2 | 0.8 | 53 | 0 |
| 500 | 22.4 | 7.4 | 67.6 | 1.5 | 45.6 | 1.6 | 49 | 0 |
| 630 | 19.2 | 7.3 | 69.7 | 1.8 | 42.3 | 2.2 | 44 | 0 |
| 800 | 18.7 | 7.0 | 71.4 | 2.0 | 40.3 | 0.8 | 40 | 0 |
| 1000 | 15.3 | 6.9 | 71.5 | 2.6 | 35.8 | 0.3 | 36 | 0 |
| 1250 | 9.7 | 7.0 | 71.9 | 3.2 | 29.3 | 0.8 | 29 | 0 |
| 1600 | 6.9 | 7.1 | 72.6 | 3.3 | 24.9 | 1.0 | 24 | 0 |
| 2000 | 5.7 | 7.7 | 73.3 | 3.3 | 19.1 | 0.6 | 18 | 0 |
| 2500 | 5.1 | 8.7 | 73.0 | 3.0 | 13.7 | 1.0 | 13 | 0 |
| 3150 | 4.7 | 9.6 | 72.5 | 2.3 | 7.3 | 0.3 | 7 | 0 |

**ΔIIC Rating** **27** *(Delta Impact Insulation Class)*

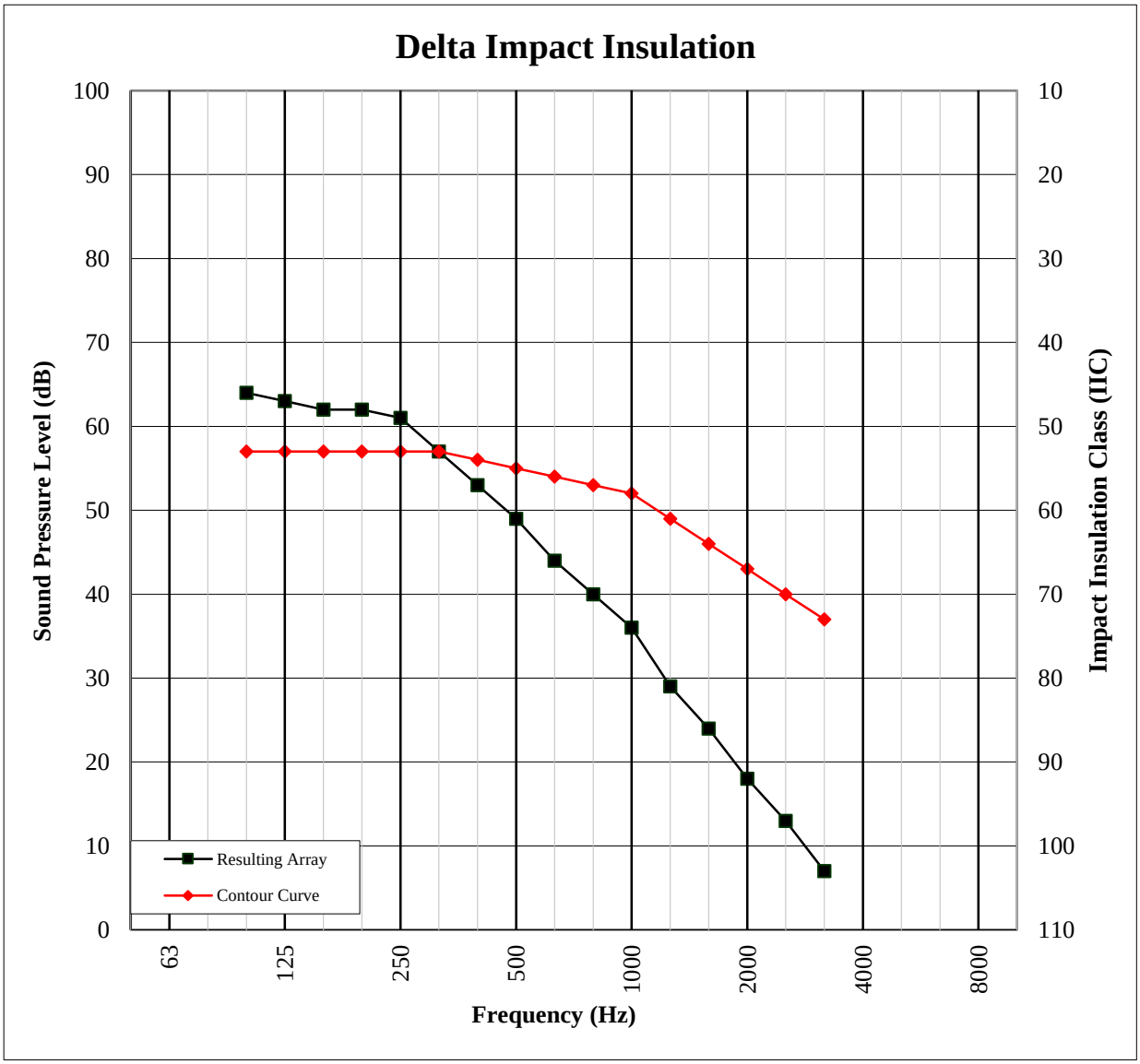
Deficiencies 27 *(Sum of Deficiencies)*

***Note:*** *Receive Room levels less than 5 dB above the Background levels are highlighted in yellow.*

# DELTA IMPACT INSULATION

ASTM E 2179

| | |
|---|---|
| **Test Date** | 07/11/16 |
| **Data File No.** | G0665.04 |
| **Client** | Foam Solutions Inc |
| **Description** | 4 mm Luxury Vinyl Plank, 1.8 mm Foam Solutions Rubber Foam Pad, 152 mm Concrete Slab |
| **Specimen Area** | 10.98 m² |
| **Technician** | Cody R. Snyder |

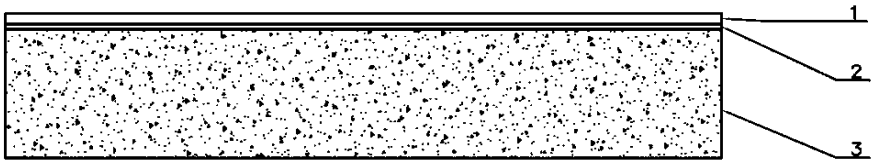


## Photographs


**Source Room View of Test Specimen Installation**

**Receive Room View of Test Specimen Installation**

## Drawing




1-Floor Topping
2-Underlayment
3-Concrete Slab