

FORPAC, LLC

ACOUSTICAL PERFORMANCE TEST REPORT

SCOPE OF WORK

ASTM E90, ASTM E492, AND ASTM E2179 TESTING ON
ENDUROMAX® MALIBU LUXURY VINYL PLANK

SPECIMEN TYPE

Concrete Slab - 152 mm

REPORT NUMBER

M5096.01-113-11-R0

TEST DATE

07/16/21

ISSUE DATE

08/18/21

RECORD RETENTION END

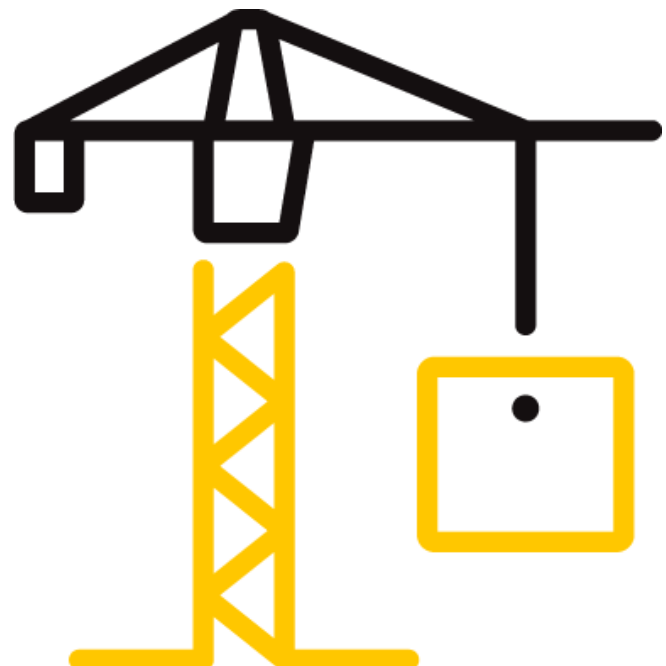
07/16/25

PAGES

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DOCUMENT CONTROL

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TEST REPORT FOR FORPAC, LLC

Report No.: M5096.01-113-11-R0

Date: 08/18/21

REPORT ISSUED TO

FORPAC, LLC

1603 Grove Avenue

Haines City, Florida 33844

SECTION 1

SCOPE

Architectural Testing, Inc. (an Intertek company) dba Intertek Building & Construction (B&C) was contracted by FORPAC, LLC to perform testing in accordance with ASTM E90, ASTM E492, AND ASTM E2179 on ENDUROMAX® Malibu Luxury Vinyl Plank. Results obtained are tested values and were secured by using the designated test methods. Testing was conducted in the VT test chambers at Intertek B&C located in York, Pennsylvania.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

SECTION 2

SUMMARY OF TEST RESULTS

DATA FILE NO.	M5096.01
SERIES/MODEL:	ENDUROMAX® Malibu Luxury Vinyl Plank
STC	50
IIC	58
ΔIIC	26
HIIC	61
ΔHIIC	32

COMPLETED BY: Michael A. Unnone
Technician - Acoustical

TITLE: Testing

SIGNATURE:

DATE: 08/18/21

COMPLETED BY: Daniel B. Mohler
Project Lead - Acoustical

TITLE: Testing

SIGNATURE:

DATE: 08/18/21

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SECTION 3**TEST METHODS**

The specimen was evaluated in accordance with the following:

ASTM E90-09 (2016), *Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions*

ASTM E413-16, *Classification for Rating Sound Insulation*

ASTM E492-09(2016)e1, *Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine*

ASTM E2179-21, *Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors*

ASTM E989-21, *Classification for Determination of Impact Insulation Class (IIC)*

ASTM E2235-04 (2020), *Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods*

ASTM E3222-20, *Standard Classification for Determination of High-Frequency Impact Sound Ratings*

SECTION 4**MATERIAL SOURCE/INSTALLATION**

The full test specimen was assembled on the day of testing by B&C. All materials provided by the client were installed on an existing B&C assembly (Concrete Slab - 152 mm) utilizing B&C-supplied materials. The assembly was installed in a steel test frame which was installed into the opening between the source and receive rooms in the test chamber. The test frame was isolated from the structure with dense neoprene gasket.

The total weight of the floor/ceiling assembly was 4128.8 kg. B&C will store samples of the test specimen for four years. Photographs of the test specimen are included in the report. A drawing of the test specimen is included in the report.

B&C 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 B&C for the entire test record retention period.

Unless differently required, Intertek reports apply the "Simple Acceptance" rule, also called "Shared Risk approach," of ILAC-G8:09/2019, Guidelines on Decision Rules and Statements of Conformity.

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**SECTION 5
EQUIPMENT**

INSTRUMENT	MANUFACTURER	MODEL	DESCRIPTION	ASSET #	CAL DATE
Data Acquisition Unit	National Instruments	PXI-4462	Data Acquisition Card	63763-1	10/20 *
Data Acquisition Unit	National Instruments	PXI-4462	Data Acquisition Card	63763-4	10/20 *
Data Acquisition Unit	National Instruments	PXI-4462	Data Acquisition Card	65124	02/21 *
Microphone Calibrator	Norsonic	1251	Acoustical Calibrator	65105	09/20
Receive Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64340	11/20
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	65617	09/20
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	65968	01/21
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	INT01089	02/21
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	INT00652	02/21
Receive Room Environmental Indicator	Comet	T7510	Temperature and Humidity Transmitter	63810	10/20
				63811	10/20
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	65969	04/21
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	63742	03/21
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	63747	09/20
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	63745	09/20
Source Room Microphone	PCB Electronics	378C20	Microphone and Preamplifier	63744	09/20
Source Room Environmental Indicator	Comet	T7510	Temperature and Humidity Transmitter	63812	10/20
Tapping Machine	Norsonic	Nor277	Tapping Machine	INT00936	01/21

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

VT RECEIVE ROOM VOLUME	158.86 m ³
VT SOURCE ROOM VOLUME	190 m ³

**SECTION 6
LIST OF OFFICIAL OBSERVERS**

NAME	COMPANY
Morgan S. J. Kennedy	Intertek B&C
Daniel B. Mohler	Intertek B&C

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SECTION 7**TEST PROCEDURE**

The microphones were calibrated before conducting the tests. The air temperature and relative humidity conditions were monitored and recorded during all measurements. The average temperature and humidity of both the source and receive rooms are listed in Sections 10 and 11. The maximum and minimum temperatures and humidities of the receive room from the duration of the test are listed in Sections 12 through 15.

The airborne transmission loss test was conducted in accordance with the ASTM E90 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. Two sound pressure level measurements were made simultaneously in both rooms, at each of five microphone positions.

The impact sound transmission test was conducted in accordance with the ASTM E492 test method. Two background noise sound pressure level, two sound pressure level measurements with the tapping machine operating at each position specified by ASTM E492, and five sound absorption measurements were conducted at each of five microphone positions.

The delta impact insulation test was conducted in accordance with ASTM E2179 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 E492 with only the concrete slab installed were conducted at each of five microphone positions.

Detailed test procedures, data for flanking limit tests, repeatability measurements, and reference specimen tests are available upon request.

SECTION 8**TEST CALCULATIONS**

The STC (Sound Transmission Class), IIC (Impact Insulation Class), HIIC (High-Frequency Impact Insulation Class), and Δ IIC (Delta Impact Insulation Class) ratings were calculated in accordance with ASTM E413, ASTM E989, ASTM E3222, and ASTM E2179, respectively.

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SECTION 9

TEST SPECIMEN DESCRIPTION

MATERIAL	DIMENSIONS (mm)	THICKNESS (mm)	MANUFACTURER AND SERIES	QUANTITY	AVERAGE WEIGHT
Luxury Vinyl Plank	1219.2 by 117.8	6.5	ENDUROMAX® Malibu	10.98 m ²	9.86 kg/m ²
	Note: Loose laid				
Concrete Slab	3023 by 3632	152.4	5000 PSI	10.98 m ²	366.18 kg/m ²
	Note: Installed in a test frame flush to the source room. Mats of #5 reinforcing bars were placed 25.4 mm from both the top and bottom of the slab, with bars spaced on 305 mm centers in both directions. No noticeable shrinkage or cracking was visible on the specimen.				

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SECTION 10

TEST RESULTS - AIRBORNE SOUND TRANSMISSION LOSS



TEST DATE	7/16/2021				
DATA FILE NO.	M5096.01				
CLIENT	FORPAC, LLC				
DESCRIPTION	6.5 mm ENDUROMAX® Malibu Luxury Vinyl Plank, 152.4 mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m ²	Receive Temp.	21.9°C	Source Temp.	20.9°C
TECHNICIAN	MSJK	Receive Humidity	70%	Source Humidity	70%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m ²	SOURCE SPL (dB)	RECEIVE SPL (dB)	SPECIMEN TL (dB)	95% CONFIDENCE LIMIT	NUMBER OF DEFICIENCIES
50	41	31.5	101	65	33	2.7	-
63	35	25.3	98	61	35	3.7	-
80	38.3	14.3	97	63	33	2.1	-
100	31.6	11.0	95	62	35	2.7	-
125	32.2	9.5	97	58	41	1.7	0
160	26.3	9.1	96	59	39	1.3	0
200	26.0	10.9	96	57	39	1.4	1
250	22.7	11.2	100	57	43	0.7	0
315	18.8	10.4	104	58	47	0.6	0
400	20.1	10.7	102	61	41	0.9	8
500	19.5	9.6	102	61	42	0.7	8
630	17.4	9.7	104	60	45	0.7	6
800	19.9	10.0	103	53	50	0.6	2
1000	18.4	10.3	103	47	56	0.5	0
1250	19.6	10.2	103	44	60	0.5	0
1600	15.7	10.1	103	41	63	0.3	0
2000	15.9	10.8	103	38	66	0.4	0
2500	13.8	11.8	102	35	68	0.4	0
3150	12.7	12.5	103	34	69	0.4	0
4000	10.9	13.4	104	33	70	0.5	0
5000	9.3	15.4	104	32	70	0.5	-
6300	11.3	18.2	98	23	72	0.5	-
8000	9.5	23.5	98	20	74	0.8	-
10000	8.4	23.5	93	10	80	0.7	-
STC Rating	50	<i>(Sound Transmission Class)</i>			Sum of Deficiencies	25	

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

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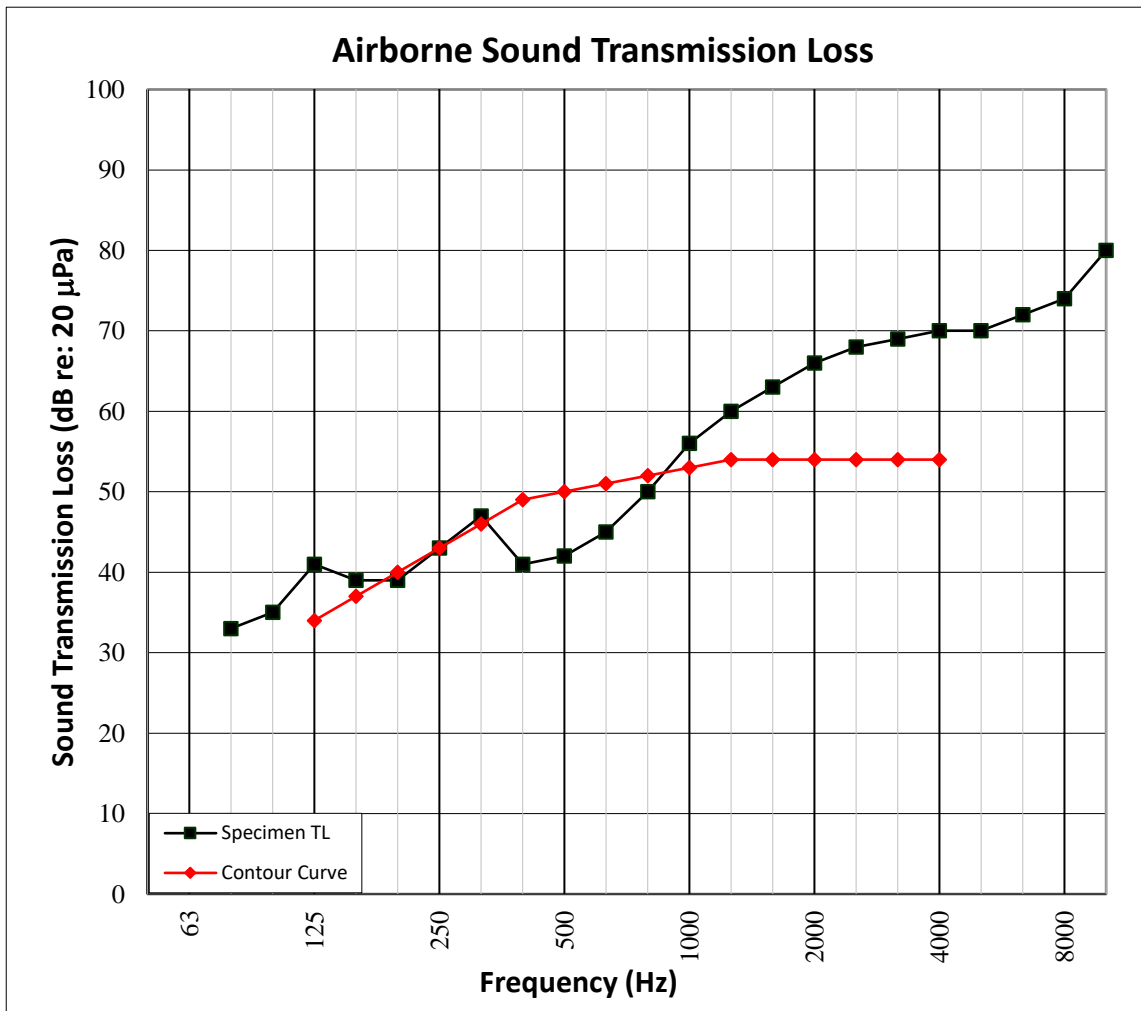
Date: 08/18/21

SECTION 11

TEST RESULTS - AIRBORNE SOUND TRANSMISSION LOSS GRAPH



TEST DATE	7/16/2021				
DATA FILE NO.	M5096.01				
CLIENT	FORPAC, LLC				
DESCRIPTION	6.5 mm ENDUROMAX® Malibu Luxury Vinyl Plank, 152.4 mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m ²	Receive Temp.	21.9°C	Source Temp.	20.9°C
TECHNICIAN	MSJK	Receive Humidity	70%	Source Humidity	70%



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SECTION 12

TEST RESULTS - IMPACT SOUND TRANSMISSION



TEST DATE	7/16/2021				
DATA FILE NO.	M5096.01				
CLIENT	FORPAC, LLC				
DESCRIPTION	6.5 mm ENDUROMAX® Malibu Luxury Vinyl Plank, 152.4 mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m ²	Maximum Temp.	22°C	Minimum Temp.	21.7°C
TECHNICIAN	MSJK	Max. Humidity	71%	Min. Humidity	70%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m ²	NORMALIZED IMPACT SPL (dB)	95% CONFIDENCE LIMIT	NUMBER OF DEFICIENCIES
80	38.9	15.5	54	2.3	-
100	34.1	11.3	55	1.4	1
125	31.5	9.4	55	1.1	1
160	25.2	9.5	57	0.6	3
200	20.4	10.7	59	0.7	5
250	15.6	11.2	57	0.7	3
315	16.1	10.9	56	0.3	2
400	12.8	10.3	56	0.6	3
500	13.2	9.6	56	0.5	4
630	13.8	9.8	53	0.3	2
800	16.0	10.0	48	0.6	0
1000	15.1	10.2	43	0.4	0
1250	12.1	10.1	37	0.3	0
1600	9.1	10.1	32	0.4	0
2000	8.3	10.7	26	0.6	0
2500	7.2	11.8	21	0.6	0
3150	5.8	12.4	16	0.8	0
4000	5.8	13.4	11	1.0	-
5000	6.5	15.3	9	0.5	-
6300	11.4	18.1	10	0.4	-
8000	9.0	23.5	10	0.3	-
10000	8.3	23.5	10	0.2	-
IIC Rating	58	<i>(Impact Insulation Class)</i>		Sum of Deficiencies	24

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

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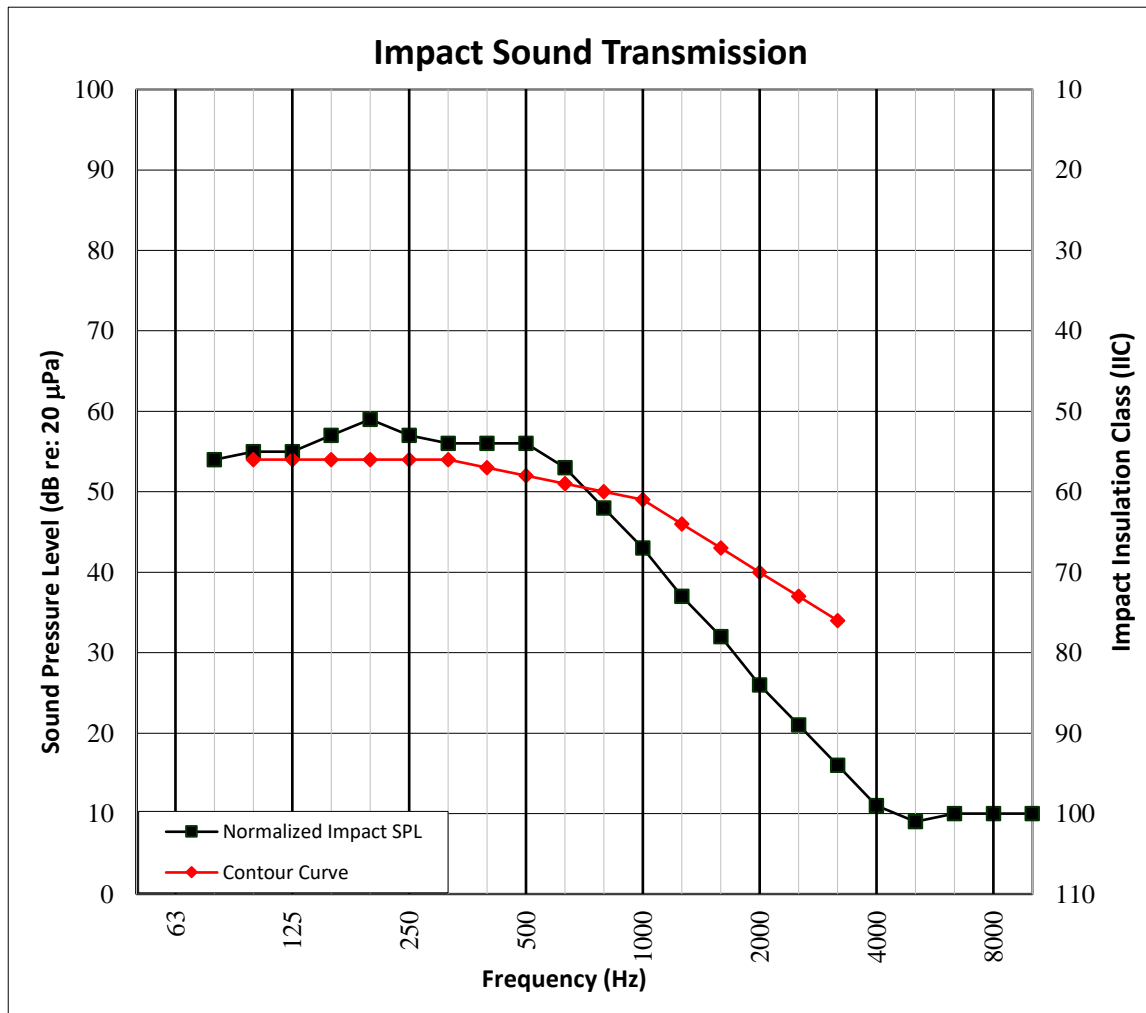
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SECTION 13

TEST RESULTS - IMPACT SOUND TRANSMISSION GRAPH



TEST DATE	7/16/2021				
DATA FILE NO.	M5096.01				
CLIENT	FORPAC, LLC				
DESCRIPTION	6.5 mm ENDUROMAX® Malibu Luxury Vinyl Plank, 152.4 mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m ²	Maximum Temp.	22°C	Minimum Temp.	21.7°C
TECHNICIAN	MSJK	Max. Humidity	71%	Min. Humidity	70%



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SECTION 14

TEST RESULTS - HIGH-FREQUENCY IMPACT SOUND TRANSMISSION



TEST DATE	7/16/2021				
DATA FILE NO.	M5096.01				
CLIENT	FORPAC, LLC				
DESCRIPTION	6.5 mm ENDUROMAX® Malibu Luxury Vinyl Plank, 152.4 mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m ²	Maximum Temp.	22°C	Minimum Temp.	21.7°C
TECHNICIAN	MSJK	Max. Humidity	71%	Min. Humidity	70%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m ²	NORMALIZED IMPACT SPL (dB)	95% CONFIDENCE LIMIT	NUMBER OF DEFICIENCIES
400	12.8	10.3	56	0.6	5.9
500	13.2	9.6	56	0.5	6.8
630	13.8	9.8	53	0.3	5.5
800	16.0	10.0	48	0.6	1.3
1000	15.1	10.2	43	0.4	0.0
1250	12.1	10.1	37	0.3	0.0
1600	9.1	10.1	32	0.4	0.0
2000	8.3	10.7	26	0.6	0.0
2500	7.2	11.8	21	0.6	0.0
3150	5.8	12.4	16	0.8	0.0
HIIC Rating	61	<i>(High-Frequency Impact Insulation Class)</i>		Sum of Deficiencies	19.5

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

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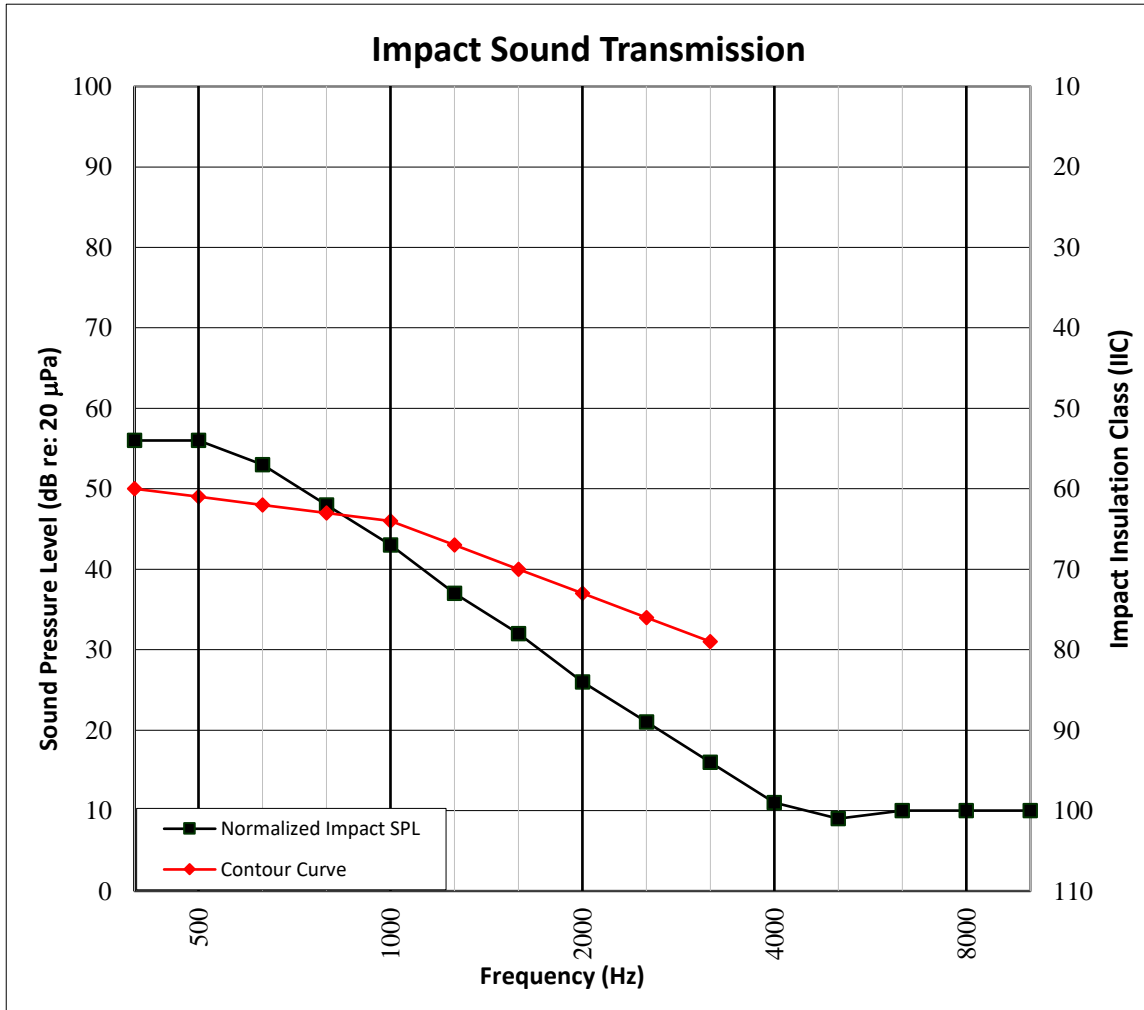
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SECTION 15

TEST RESULTS -HIGH-FREQUENCY IMPACT SOUND TRANSMISSION GRAPH



TEST DATE	7/16/2021				
DATA FILE NO.	M5096.01				
CLIENT	FORPAC, LLC				
DESCRIPTION	6.5 mm ENDUROMAX® Malibu Luxury Vinyl Plank, 152.4 mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m ²	Maximum Temp.	22°C	Minimum Temp.	21.7°C
TECHNICIAN	MSJK	Max. Humidity	71%	Min. Humidity	70%



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SECTION 16

TEST RESULTS - DELTA IMPACT INSULATION



TEST DATE	7/16/2021				
DATA FILE NO.	M5096.01				
CLIENT	FORPAC, LLC				
DESCRIPTION	6.5 mm ENDUROMAX® Malibu Luxury Vinyl Plank, 152.4 mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m ²	Maximum Temp.	22°C	Minimum Temp.	21.7°C
TECHNICIAN	MSJK	Max. Humidity	71%	Min. Humidity	70%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m ²	NORMALIZED IMPACT SPL BARE (dB)	95% CONF LIMIT	NORMALIZED IMPACT SPL SPEC (dB)	95% CONF LIMIT	RESULT ARRAY L _{ref,c}	NUMBER OF DEFICIENCIES
100	34.1	11.3	57.7	1.5	54.6	1.7	64.0	6
125	31.5	9.4	58.4	1.3	54.6	1.4	64.0	6
160	25.2	9.5	61.7	0.5	56.6	0.8	63.0	5
200	20.4	10.7	65.7	0.8	58.9	0.8	62.0	4
250	15.6	11.2	66.3	0.7	57.4	0.8	60.0	2
315	16.1	10.9	67.1	0.7	55.7	0.4	58.0	0
400	12.8	10.3	68.7	0.7	55.9	0.8	57.0	0
500	13.2	9.6	68.2	0.5	55.8	0.6	58.0	2
630	13.8	9.8	70.2	0.4	53.5	0.4	54.0	0
800	16.0	10.0	71.0	0.8	48.3	0.7	49.0	0
1000	15.1	10.2	72.1	0.6	42.9	0.5	43.0	0
1250	12.1	10.1	72.1	0.3	37.1	0.4	37.0	0
1600	9.1	10.1	72.9	0.8	31.9	0.5	31.0	0
2000	8.3	10.7	72.9	0.7	26.3	0.7	25.0	0
2500	7.2	11.8	72.0	0.7	20.9	0.8	21.0	0
3150	5.8	12.4	70.9	1.0	15.8	1.0	17.0	0
ΔIIC Rating	26	<i>(Delta Impact Insulation Class)</i>				Sum of Deficiencies	25	
ΔHIIC Rating	32	<i>(Delta High-Frequency Impact Insulation Class)</i>				Sum of Deficiencies	20	

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

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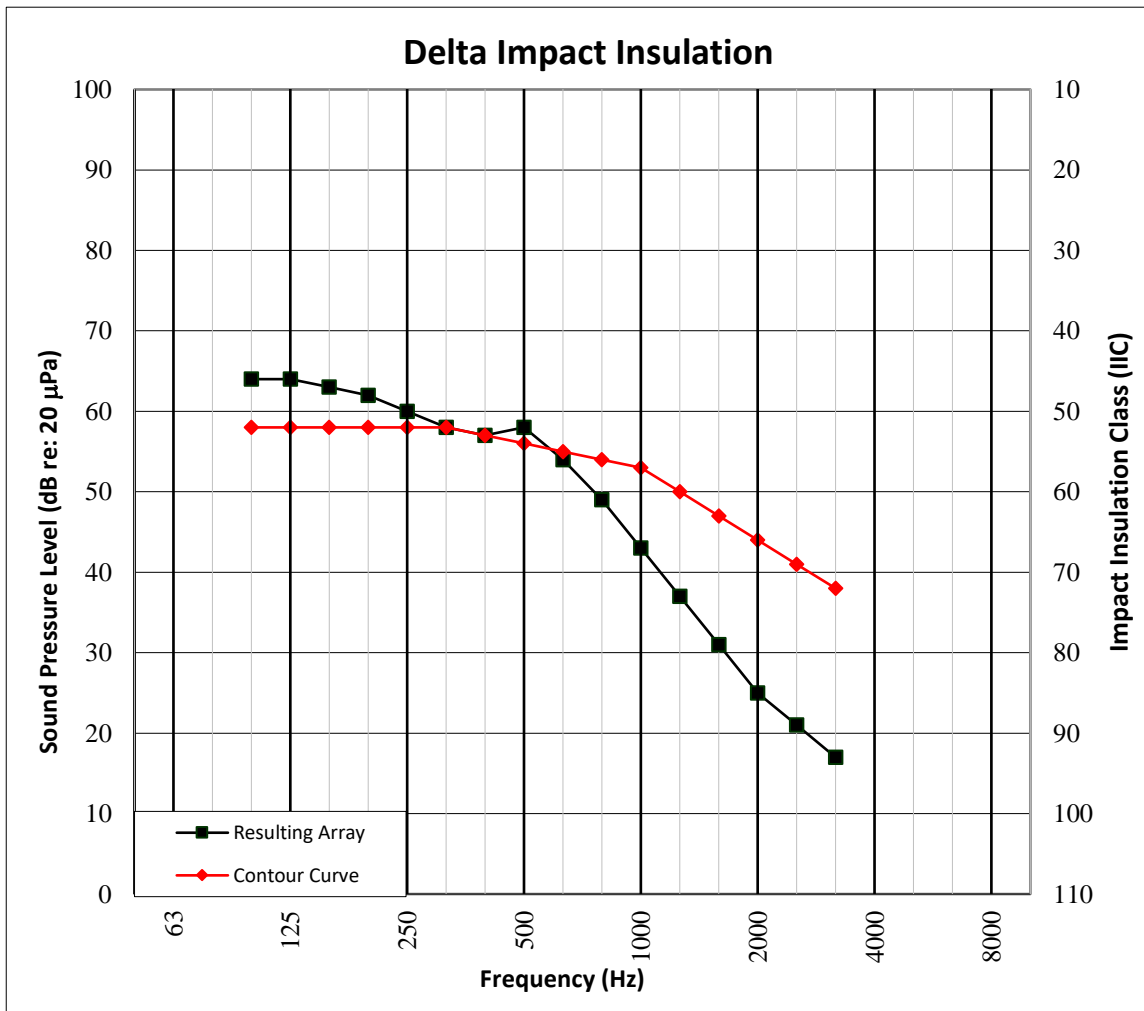
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SECTION 17

TEST RESULTS - DELTA IMPACT INSULATION GRAPH



TEST DATE	7/16/2021				
DATA FILE NO.	M5096.01				
CLIENT	FORPAC, LLC				
DESCRIPTION	6.5 mm ENDUROMAX® Malibu Luxury Vinyl Plank, 152.4 mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m ²	Maximum Temp.	22°C	Minimum Temp.	21.7°C
TECHNICIAN	MSJK	Max. Humidity	71%	Min. Humidity	70%



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SECTION 18

PHOTOGRAPHS



Photo No. 1

Source Room View of Test Specimen Installation



Photo No. 2

Receive Room View of Test Specimen Installation

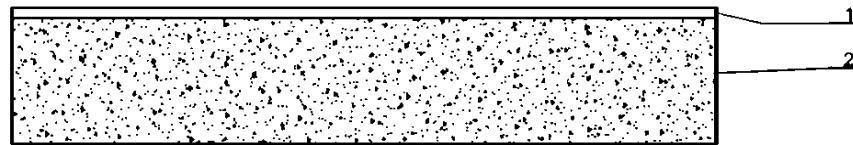
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SECTION 19

DRAWING



1-Floor Topping

2-Concrete Slab



Total Quality. Assured.

130 Derry Court
York, PA 17406

Telephone: 717-764-7700
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SECTION 20

REVISION LOG

REVISION #	DATE	PAGES	DESCRIPTION
R0	08/18/21	N/A	Original Report Issue