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DIVINE HARDWOOD FLOORING, INC.
ACOUSTICAL PERFORMANCE TEST REPORT

SCOPE OF WORK
ASTM E90, ASTM E492, AND ASTM E2179 TESTING ON
4.0 MM + 1.0 MM HDPE FOAM SPC CLICK

SPECIMEN TYPE
Concrete Slab - 152 mm

REPORT NUMBER
I0311.01-113-11-R0

TEST DATE
02/16/18

ISSUE DATE
03/06/18

RECORD RETENTION END
02/16/22

PAGES
15

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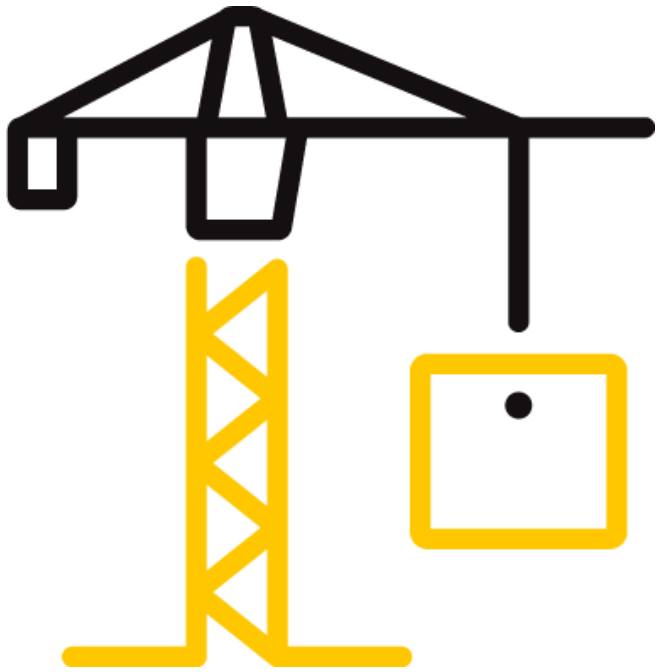

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TEST REPORT FOR DIVINE HARDWOOD FLOORING, INC.

Report No.: I0311.01-113-11-R0
Date: 03/06/18

REPORT ISSUED TO

DIVINE HARDWOOD FLOORING, INC.
235075 Ryan Road
Rocky View, AB, T1X 0K3 CANADA

SECTION 1

SCOPE

Intertek Building & Construction (B&C) was contracted by to perform testing in accordance with ASTM E90, ASTM E492, AND ASTM E2179 on 4.0 mm + 1.0 mm HDPE Foam SPC Click. Results obtained are tested values and were secured by using the designated test method(s). 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.	I0311.01
SERIES/MODEL:	4.0 mm + 1.0 mm HDPE Foam SPC Click
STC	52
IIC	52
ΔIIC	22

COMPLETED BY:	Jason P. Taylor	**COMPLETED BY:**	Jordan Strybos
TITLE:	Technician II - Acoustical Testing	**TITLE:**	Project Manager - Acoustical Testing
SIGNATURE:	Digitally Signed by: Jason Taylor	**SIGNATURE:**	Digitally Signed by: Jordan Strybos
DATE:	03/06/18	**DATE:**	03/06/18

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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 E2179-03(2016), *Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors*

ASTM E989-06 (2012), *Classification for Determination of Impact Insulation Class (IIC)*

ASTM E2235-04 (2012), *Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods*

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 4109.8 kg. B&C 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.

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.

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SECTION 5
EQUIPMENT

INSTRUMENT	MANUFACTURER	MODEL	DESCRIPTION	ASSET #	CAL DATE	
Data Acquisition Unit	National Instruments	PXI-1033	Data Acquisition Card	63763-1	06/16	*
Data Acquisition Unit	National Instruments	PXI-4462	Input Card	63763-4	07/16	*
Data Acquisition Unit	National Instruments	PXI-4462	Input Card	63763-5	06/16	*
Microphone Calibrator	Norsonic	1251	Pistonphone calibrator	INT00127	03/17	
Receive Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	65617	05/17	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63744	05/17	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63745	05/17	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63746	09/17	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63747	05/17	
Receive Room Environmental Indicator	Comet	T7510	Temperature and Humidity Transmitter	63810	10/17	
				63811	10/17	
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63738	04/17	
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63739	04/17	
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63740	04/17	
Source Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63742	04/17	
Source Room Microphone	PCB Electronics	378B20	Microphone and Preamplifier	63741	04/17	
Source Room Environmental Indicator	Comet	T7510	Temperature and Humidity Transmitter	INT00603	03/17	
Tapping Machine	Norsonic	Nor277	Tapping Machine	INT00936	12/17	

* 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
Jason P. Taylor	Intertek B&C
Jordan Strybos	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 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. Four 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), and ΔIIC (Delta Impact Insulation Class) ratings were calculated in accordance with ASTM E413, ASTM E989, and ASTM E2179, respectively.

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SECTION 9

TEST SPECIMEN DESCRIPTION

MATERIAL	DIMENSIONS (mm/inch)	THICKNESS (mm/inch)	MANUFACTURER AND SERIES	QUANTITY	AVERAGE WEIGHT
SPC Click	1219 by 177.8	5.0	4.0 mm + 1.0 mm HDPE Foam	10.98 m²	8.1 kg/m²
	Note: Loose laid				
Concrete Slab	3023 by 3632	152.4	5000 PSI	10.98 m²	366.18 kg/m²
	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.				

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SECTION 10

TEST RESULTS - AIRBORNE SOUND TRANSMISSION LOSS

ACCREDITED Testing Laboratory

TEST DATE	2/16/2018				
DATA FILE NO.	I0311.01				
CLIENT	Zhangjiagang Elegant Home-Tech Co., Ltd				
DESCRIPTION	5 mm 4.0 mm + 1.0 mm HDPE Foam SPC Click, 152.4 mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m²	**Receive Temp.**	16.7°C	**Source Temp.**	19.5°C
TECHNICIAN	JPT	**Receive Humidity**	52%	**Source Humidity**	52%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m²	SOURCE SPL (dB)	RECEIVE SPL (dB)	SPECIMEN TL (dB)	95% CONFIDENCE LIMIT	NUMBER OF DEFICIENCIES
80	34.6	18.4	110	68	39	4.4	-
100	31.0	15.7	106	66	38	2.5	-
125	30.5	10.2	104	67	38	1.8	0
160	28.1	11.4	107	69	38	1.6	1
200	23.6	11.5	105	69	35	1.8	7
250	29.3	11.6	104	60	43	1.1	2
315	22.1	10.0	106	59	48	0.6	0
400	22.2	9.2	105	59	47	0.7	4
500	25.1	8.5	103	55	49	0.4	3
630	21.7	7.8	104	59	47	0.8	6
800	21.9	7.8	104	57	48	0.6	6
1000	18.8	7.7	104	52	54	0.4	1
1250	13.9	7.8	104	45	60	0.6	0
1600	12.8	8.0	104	42	63	0.3	0
2000	9.7	8.8	103	39	65	0.4	0
2500	7.2	9.6	102	37	65	0.3	0
3150	5.5	10.3	103	34	69	0.4	0
4000	5.1	11.7	104	33	71	0.4	0
5000	5.3	13.5	103	30	73	0.4	-
6300	5.8	16.8	97	22	74	0.5	-
8000	6.3	21.9	97	18	76	0.6	-
10000	6.4	27.4	92	9	79	0.5	-
STC Rating	**52**	*(Sound Transmission Class)*			**Sum of Deficiencies**		**30**

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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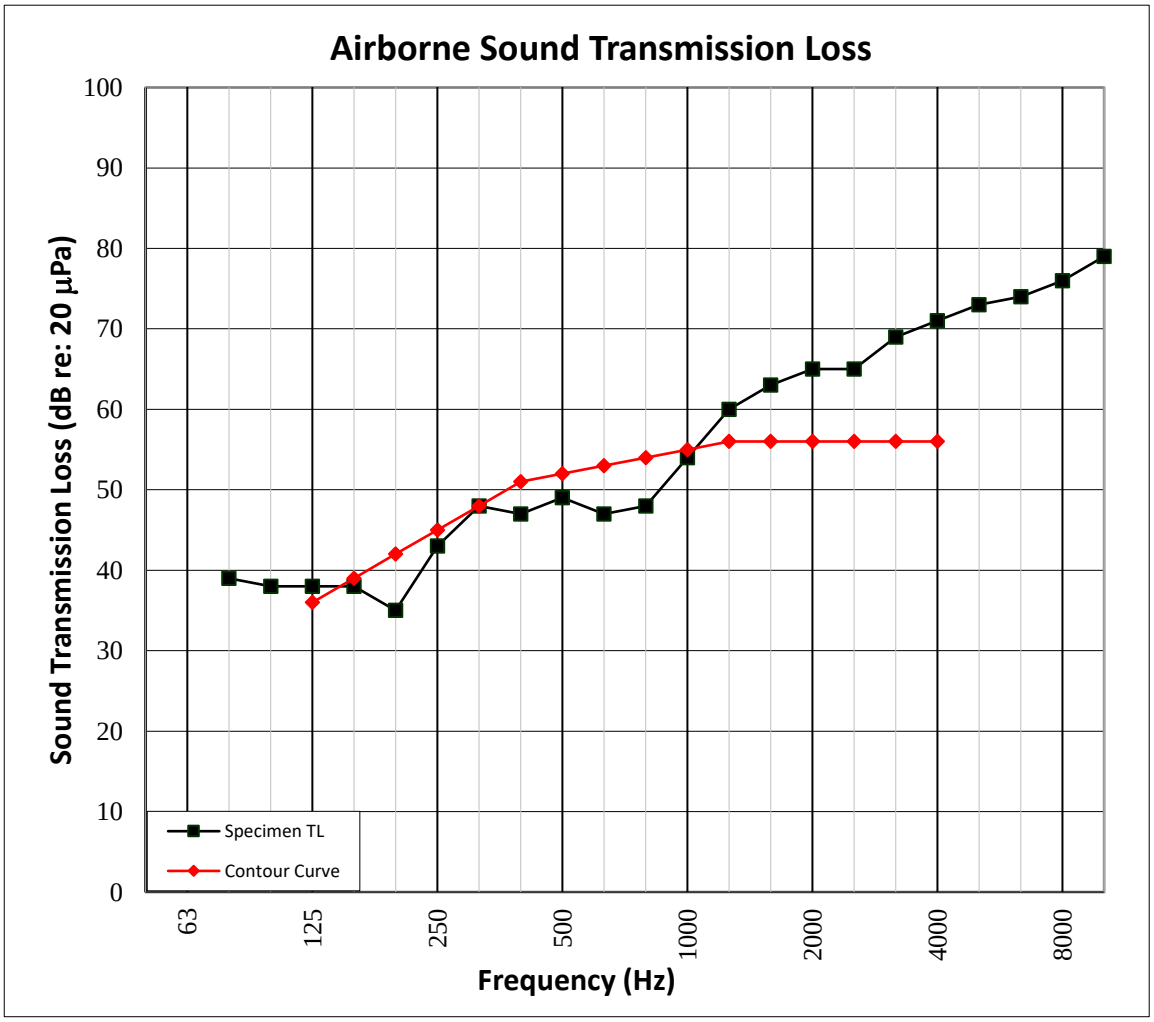
Date: 03/06/18

SECTION 11

TEST RESULTS - AIRBORNE SOUND TRANSMISSION LOSS GRAPH

ACCREDITED Testing Laboratory

TEST DATE	2/16/2018				
DATA FILE NO.	I0311.01				
CLIENT	Zhangjiagang Elegant Home-Tech Co., Ltd				
DESCRIPTION	5 mm 4.0 mm + 1.0 mm HDPE Foam SPC Click, 152.4 mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m²	**Receive Temp.**	16.7°C	**Source Temp.**	19.5°C
TECHNICIAN	JPT	**Receive Humidity**	52%	**Source Humidity**	52%



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Date: 03/06/18

SECTION 12

TEST RESULTS - IMPACT SOUND TRANSMISSION

ACCREDITED Testing Laboratory

TEST DATE	2/16/2018				
DATA FILE NO.	I0311.01				
CLIENT	Zhangjiagang Elegant Home-Tech Co., Ltd				
DESCRIPTION	5 mm 4.0 mm + 1.0 mm HDPE Foam SPC Click, 152.4 mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m²	**Maximum Temp.**	16.9°C	**Minimum Temp.**	16.3°C
TECHNICIAN	JPT	**Max. Humidity**	53%	**Min. Humidity**	50%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m²	NORMALIZED IMPACT SPL (dB)	95% CONFIDENCE LIMIT	NUMBER OF DEFICIENCIES
80	39.2	16.8	56	2.1	-
100	30.1	14.7	58	1.0	0
125	28.9	10.4	59	1.5	0
160	26.2	10.2	65	0.7	5
200	22.6	11.4	68	0.8	8
250	28.8	12.0	65	0.9	5
315	21.3	10.9	63	0.3	3
400	21.1	9.1	65	0.5	6
500	25.9	8.4	58	0.4	0
630	21.0	7.7	54	0.4	0
800	20.1	7.8	47	0.5	0
1000	17.8	7.8	47	0.4	0
1250	13.3	7.6	44	0.5	0
1600	14.9	7.9	41	0.4	0
2000	10.9	8.8	35	0.5	0
2500	11.6	9.6	29	0.4	0
3150	7.9	10.3	25	0.5	0
4000	5.4	11.8	19	0.7	-
5000	5.4	13.5	12	0.8	-
6300	5.8	16.8	8	0.5	-
8000	6.3	21.7	9	0.4	-
10000	6.3	27.1	9	0.4	-
IIC Rating	**52**	*(Impact Insulation Class)*		**Sum of Deficiencies**	**27**

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

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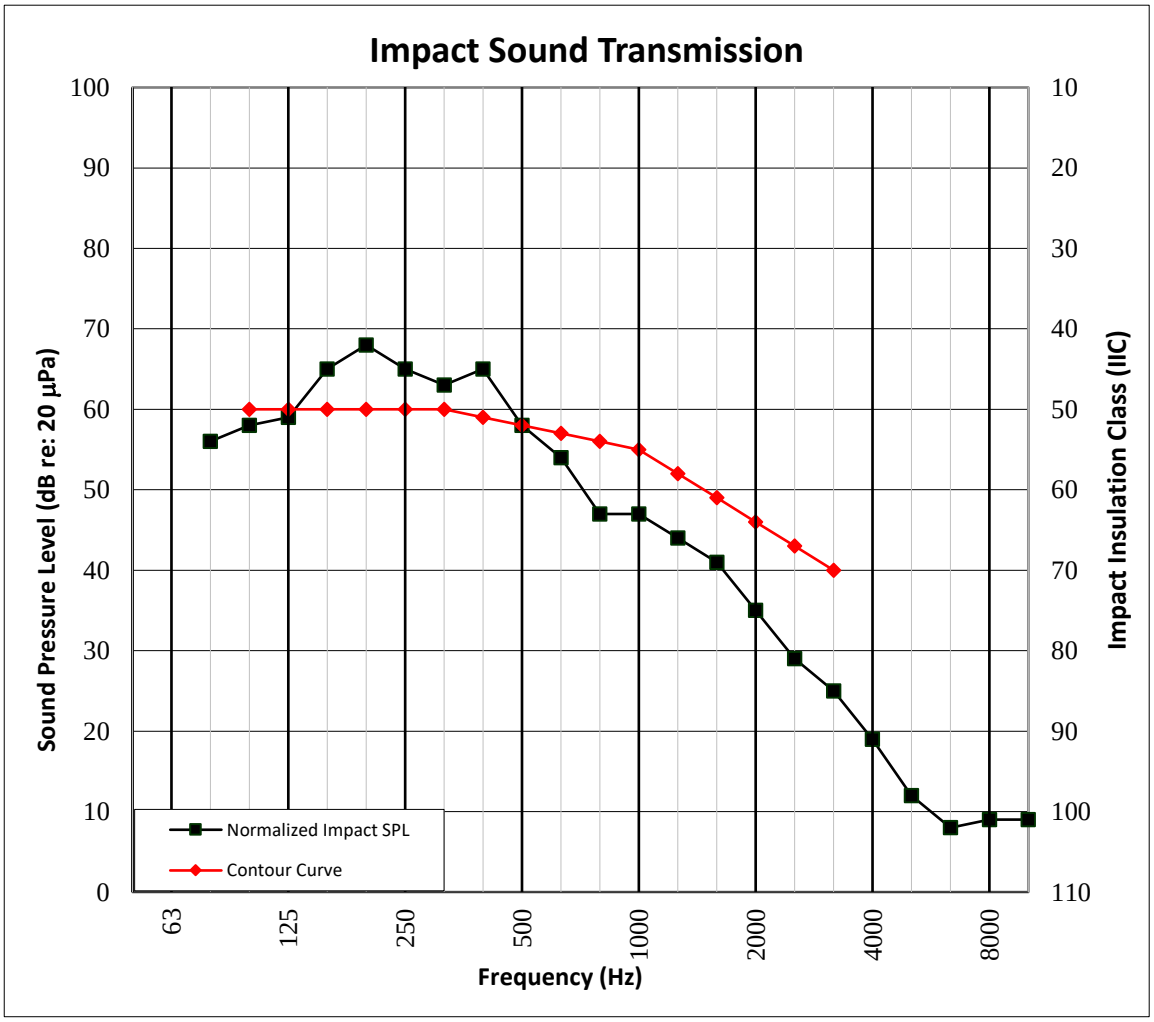
Date: 03/06/18

SECTION 13

TEST RESULTS - IMPACT SOUND TRANSMISSION GRAPH

ACCREDITED Testing Laboratory

TEST DATE	2/16/2018				
DATA FILE NO.	I0311.01				
CLIENT	Zhangjiagang Elegant Home-Tech Co., Ltd				
DESCRIPTION	5 mm 4.0 mm + 1.0 mm HDPE Foam SPC Click, 152.4 mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m²	**Maximum Temp.**	16.9°C	**Minimum Temp.**	16.3°C
TECHNICIAN	JPT	**Max. Humidity**	53%	**Min. Humidity**	50%



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TEST REPORT FOR DIVINE HARDWOOD FLOORING, INC.

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SECTION 14

TEST RESULTS - DELTA IMPACT INSULATION

ACCREDITED Testing Laboratory

TEST DATE	2/16/2018				
DATA FILE NO.	I0311.01				
CLIENT	Zhangjiagang Elegant Home-Tech Co., Ltd				
DESCRIPTION	5 mm 4.0 mm + 1.0 mm HDPE Foam SPC Click, 152.4 mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m²	**Maximum Temp.**	16.9°C	**Minimum Temp.**	16.3°C
TECHNICIAN	JPT	**Max. Humidity**	53%	**Min. Humidity**	50%

FREQ (Hz)	**BACKGROUND SPL** (dB)	**ABSORPTION** m²	**NORMALIZED IMPACT SPL** BARE (dB)	**95% CONF LIMIT**	**NORMALIZED IMPACT SPL** SPEC (dB)	**95% CONF LIMIT**	**RESULT ARRAY** $L_{ref,c}$	**NUMBER OF DEFI-CIENCIES**
100	30.1	14.7	59.9	1.4	58.2	1.2	65.0	3
125	28.9	10.4	60.2	2.1	58.5	1.9	66.0	4
160	26.2	10.2	65.9	0.7	64.6	0.9	67.0	5
200	22.6	11.4	70.6	0.9	68.1	1.0	66.0	4
250	28.8	12.0	68.0	1.1	65.5	1.1	66.0	4
315	21.3	10.9	67.4	0.2	62.8	0.3	65.0	3
400	21.1	9.1	71.8	0.6	64.7	0.6	63.0	2
500	25.9	8.4	69.0	0.5	58.1	0.5	60.0	0
630	21.0	7.7	70.9	0.4	53.6	0.5	54.0	0
800	20.1	7.8	72.2	0.7	47.5	0.7	47.0	0
1000	17.8	7.8	72.3	0.6	47.3	0.6	47.0	0
1250	13.3	7.6	72.3	0.6	43.8	0.6	43.0	0
1600	14.9	7.9	73.7	0.4	40.9	0.5	39.0	0
2000	10.9	8.8	74.0	0.7	34.9	0.6	33.0	0
2500	11.6	9.6	73.5	0.5	29.2	0.5	28.0	0
3150	7.9	10.3	73.3	0.7	25.2	0.7	24.0	0
ΔIIC Rating	**22**	*(Delta Impact Insulation Class)*			**Sum of Deficiencies**		**25**	

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

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TEST REPORT FOR DIVINE HARDWOOD FLOORING, INC.

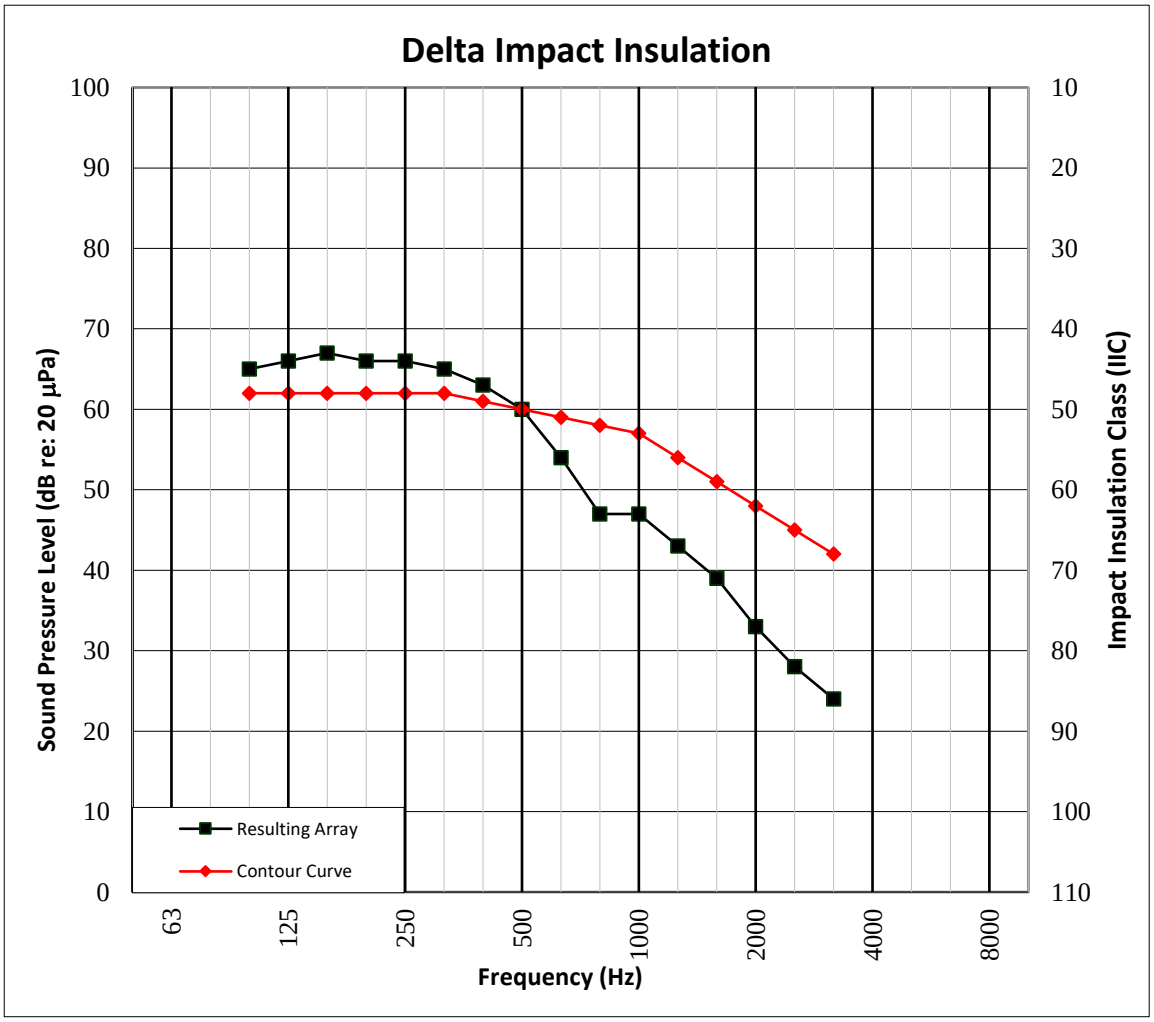
Report No.: I0311.01-113-11-R0
Date: 03/06/18

SECTION 15

TEST RESULTS - DELTA IMPACT INSULATION GRAPH

ACCREDITED Testing Laboratory

TEST DATE	2/16/2018				
DATA FILE NO.	I0311.01				
CLIENT	Zhangjiagang Elegant Home-Tech Co., Ltd				
DESCRIPTION	5 mm 4.0 mm + 1.0 mm HDPE Foam SPC Click, 152.4 mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m²	**Maximum Temp.**	16.9°C	**Minimum Temp.**	16.3°C
TECHNICIAN	JPT	**Max. Humidity**	53%	**Min. Humidity**	50%



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SECTION 16
PHOTOGRAPHS

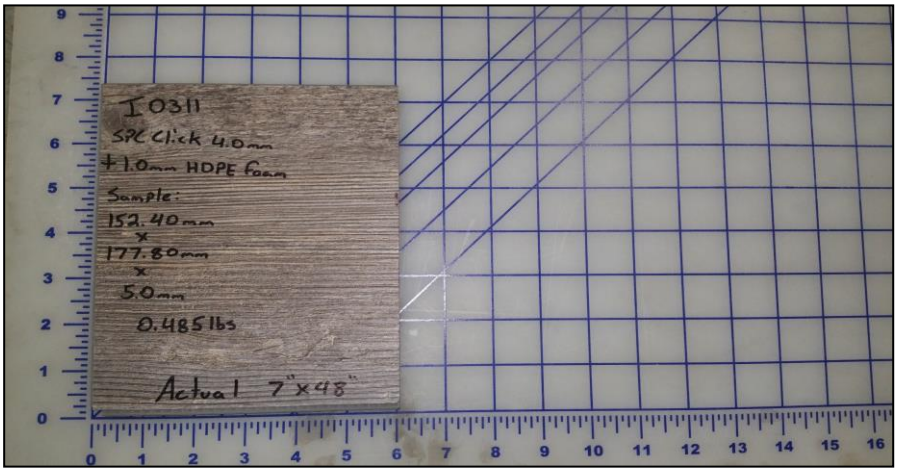

Photo No. 1
Close-Up of Test Specimen

Photo No. 2
Receive Room View of Test Specimen Installation

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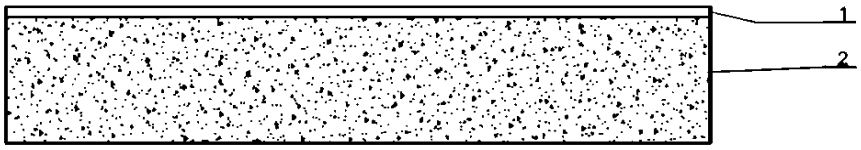
SECTION 17
DRAWING



1-Floor Topping
2-Concrete Slab

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SECTION 18

REVISION LOG

REVISION #	DATE	PAGES	DESCRIPTION
R0	03/06/18	N/A	Original Report Issue