



H1810.10-113-11-R0
ACOUSTICAL PERFORMANCE TEST REPORT
ASTM E 90, ASTM E 492, ASTM E 2179

Rendered to

AMORIM CORK COMPOSITES

Series/Model: AcoustiCORK® ECOx2 Sound Reduction Underlayment for LVT Plank Flooring

Specimen Type: Concrete Slab - 152 mm (6")

Overall Size: 3023 mm by 3632 mm (119" by 143")

STC	53
IIC	50
ΔIIC	21

Test Specimen Identification:

Floor Topping: 3 mm (0.12") Flexco Premium Wood Vinyl Plank

Floor Underlayment: 1.9 mm (0.07") AcoustiCORK® ECOx2 Sound Reduction Underlayment for LVT Plank Flooring

Floor Slab: 152.4 mm (6") 5000 PSI Concrete Slab

Reference should be made to Intertek-ATI Report H1810.10-113-11 for complete test specimen description. This page alone is not a complete report.



Acoustical Performance Test Report

AMORIM CORK COMPOSITES
26112 110th Street
Trevor, Wisconsin 53179

Report H1810.10-113-11
Test Date 05/18/17
Report Date 10/13/17

Project Scope

Architectural Testing, Inc., an Intertek company (Intertek-ATI), was contracted to conduct airborne sound transmission loss, impact sound transmission, and delta impact sound transmission tests. This report is a reissue in the name of Amorim Cork Composites through written authorization from the original report holder. The complete test data is included as attachments to this report. The full test specimen was assembled on the day of testing by Intertek-ATI. All materials provided by the client were installed on an existing Intertek-ATI assembly (Concrete Slab - 152 mm (6")) utilizing Intertek-ATI-supplied materials.

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 (2016), Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions

ASTM E 413-16, 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 were conducted at each of five microphone positions.

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

Test Conditions

Source Room		Receive Room	
Minimum Temperature	21.6°C (70.9°F)	Minimum Temperature	21.8°C (71.3°F)
Maximum Temperature	21.8°C (71.2°F)	Maximum Temperature	22.5°C (72.5°F)
Minimum Relative Humidity	47%	Minimum Relative Humidity	47%
Maximum Relative Humidity	49%	Maximum Relative Humidity	48%

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/inch)	Thickness (mm/inch)	Manufacturer and Series	Quantity	Average Weight
Premium Wood Vinyl Plank	914.4 by 101.6 36 by 4	3 / 0.12	Flexco	10.98 m ² 118.19 ft ²	4.51 kg/m ² 0.92 lb/ft ²
	<i>Note: Adhered to the underlayment with Excelsior MS 700 Modified Silane Wet Set Resilient Flooring Adhesive using a 0.79 mm by 1.59 mm by 0.79 mm (1/32" by 1/16" by 1/32") trowel. Adhesive was allowed to cure per manufacturer's specifications.</i>				
Sound Reduction Underlayment for LVT Plank Flooring	3023 by 1041 119 by 41	1.9 / 0.07	AcoustiCORK® ECOx2	10.98 m ² 118.19 ft ²	0.69 kg/m ² 0.14 lb/ft ²
	<i>Note: A sheet of 2 mil polyethylene plastic sheeting was adhered to the floor slab with 3M Super 77 spray adhesive. The underlayment was adhered to the sheeting with Excelsior MS 700 Modified Silane Wet Set Resilient Flooring Adhesive using a 0.79 mm by 1.59 mm by 0.79 mm (1/32" by 1/16" by 1/32") trowel. Adhesive was allowed to cure per manufacturer's specifications.</i>				

Test Specimen Materials and Installation Details (Continued)

Material	Dimensions (mm/inch)	Thickness (mm/inch)	Manufacturer and Series	Quantity	Average Weight
Concrete Slab	3023 by 3632 119 by 143	152.4 / 6	5000 PSI	10.98 m ² 118.19 ft ²	366.18 kg/m ² 75 lb/ft ²
	<i>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.</i>				

Comments

The total weight of the floor/ceiling assembly was 4077.8 kg / 8989.5 lbs. 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.

This report is reissued in the name of Amorim Cork Composites through written authorization from the original report holder. The original Report No. is H1810.02-113-11.

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.

This report may not be reproduced, except in full, without the written approval of Intertek-ATI.

FOR INTERTEK-ATI:

Daniel B. Mohler
Project Lead - Acoustical Testing

Jordan Strybos
Project Manager - Acoustical Testing

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

- Instrumentation (1)
- Airborne Sound Transmission Loss Data (2)
- Impact Sound Transmission Data (2)
- Delta Impact Insulation Data (2)
- Photographs (1)
- Drawings (1)

** Stated by Client/Manufacturer*

N/A - Non Applicable



Revision Log

<u>Revision</u>	<u>Date</u>	<u>Page(s)</u>	<u>Description</u>
R0	10/13/17	N/A	Original Report Issue - Reissue of Report No. H1810.02-113-11 in the name of Amorim Cork Composites.

Attachments

Instrumentation

Instrument	Manufacturer	Model	ATI Number	Date of Calibration
Data Acquisition Unit	National Instruments	PXI-4462	65124	06/16 *
Microphone Calibrator	Norsonic	1251	INT00127	03/17
Receive Room Microphone	PCB Piezotronics	378C20	65617	05/17
Receive Room Microphone	PCB Piezotronics	378B20	63744	05/17
Receive Room Microphone	PCB Piezotronics	378B20	63745	05/17
Receive Room Microphone	PCB Piezotronics	378B20	63746	09/16
Receive Room Microphone	PCB Piezotronics	378B20	63747	05/17
Receive Room Environmental Indicator	Comet	T7510	63810	10/16
			63811	10/16
Source Room Microphone	PCB Piezotronics	378B20	63738	04/17
Source Room Microphone	PCB Piezotronics	378B20	63739	04/17
Source Room Microphone	PCB Piezotronics	378B20	63740	04/17
Source Room Microphone	PCB Piezotronics	378B20	63742	04/17
Source Room Microphone	PCB Electronics	378B20	63741	04/17
Source Room Environmental Indicator	Comet	T7510	63812	11/16
Tapping Machine	Look Line s.r.l.	EM50 (TM50)	65351	02/17

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

Test Chambers

VT Receive Room Volume	158.86 m ³ (5610.1 ft ³)
VT Source Room Volume	190 m ³ (6709.79 ft ³)



H1810.10-113-11-R0

**AIRBORNE SOUND TRANSMISSION LOSS**

ASTM E 90

Test Date	05/18/17
Data File No.	H1810.02
Client	Amorim Cork Composites
Description	3 mm (0.12") Flexco Premium Wood Vinyl Plank, 1.9 mm (0.07") AcoustiCORK® ECOx2 Sound Reduction Underlayment for LVT Plank Flooring, 152.4 mm (6") 5000 PSI Concrete Slab
Specimen Area	10.98 m ²
Technician	Daniel B. Mohler

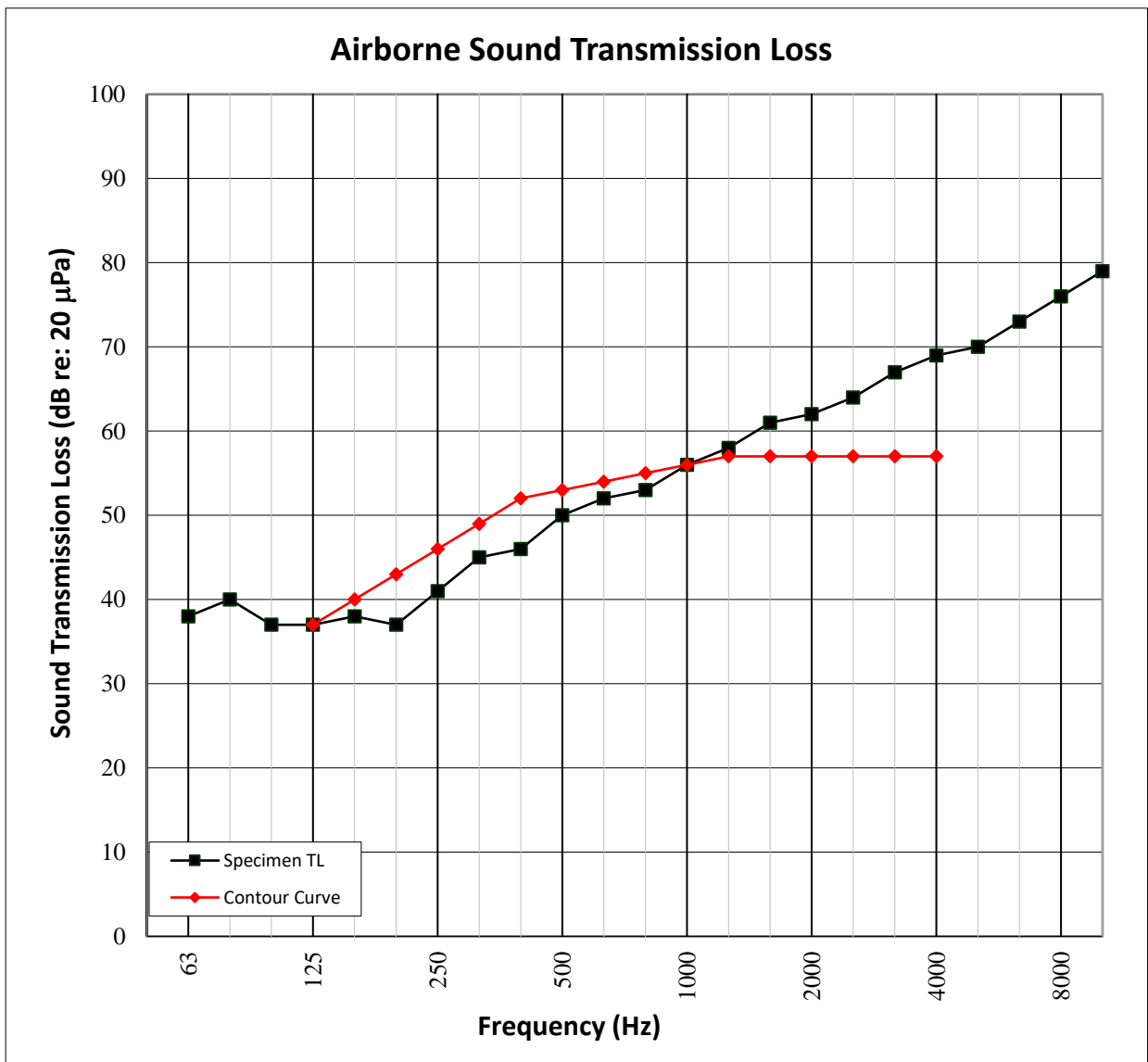
Freq (Hz)	Background SPL (dB)	Absorption (m ²)	Source SPL (dB)	Receive SPL (dB)	Specimen TL (dB)	95% Confidence Limit	Number of Deficiencies
50	38.7	32.7	103	63	35	5.00	-
63	37.7	25.4	101	62	35	3.70	-
80	40.7	15.6	109	67	40	4.60	-
100	33.8	12.4	107	69	37	2.00	-
125	35.5	9.8	105	68	37	1.60	0
160	36.5	10.0	107	69	38	1.50	2
200	27.4	11.1	104	67	37	1.20	6
250	28.9	11.2	104	63	41	0.80	5
315	26.1	10.2	107	62	45	0.80	4
400	24.1	8.5	104	59	46	0.60	6
500	24.4	8.2	103	54	50	0.70	3
630	24.2	8.1	102	51	52	0.50	2
800	22.9	8.0	102	50	53	0.80	2
1000	18.5	8.1	102	47	56	0.30	0
1250	17.4	7.9	100	43	58	0.60	0
1600	15.0	8.0	100	41	61	0.60	0
2000	12.0	8.7	100	39	62	0.40	0
2500	8.8	9.9	96	33	64	0.50	0
3150	8.1	10.8	98	31	67	0.50	0
4000	7.5	12.4	97	28	69	0.50	0
5000	6.3	14.0	95	23	70	0.60	-
6300	6.5	17.5	92	17	73	0.70	-
8000	6.8	23.8	93	13	76	0.80	-
10000	7.0	29.0	91	8	79	0.70	-

STC Rating **53** *(Sound Transmission Class)*Deficiencies 30 *(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 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

AIRBORNE SOUND TRANSMISSION LOSS
ASTM E 90

Test Date	05/18/17
Data File No.	H1810.02
Client	Amorim Cork Composites
Description	3 mm (0.12") Flexco Premium Wood Vinyl Plank, 1.9 mm (0.07") AcoustiCORK® ECOx2 Sound Reduction Underlayment for LVT Plank Flooring, 152.4 mm (6") 5000 PSI Concrete Slab
Specimen Area	10.98 m ²
Technician	Daniel B. Mohler





H1810.10-113-11-R0



IMPACT SOUND TRANSMISSION
ASTM E 492

Test Date	05/18/17
Data File No.	H1810.02
Client	Amorim Cork Composites
Description	3 mm (0.12") Flexco Premium Wood Vinyl Plank, 1.9 mm (0.07") AcoustiCORK® ECOx2 Sound Reduction Underlayment for LVT Plank Flooring, 152.4 mm (6") 5000 PSI Concrete Slab
Specimen Area	10.98 m ²
Technician	Daniel B. Mohler

Freq (Hz)	Background SPL (dB)	Absorption (m ²)	Normalized Impact SPL (dB)	95% Confidence Limit	Number of Deficiencies
50	39.0	28.5	58	2.8	-
63	38.3	34.7	55	2.7	-
80	42.5	17.1	55	2.2	-
100	37.3	11.7	58	1.6	0
125	36.3	9.8	58	1.4	0
160	32.3	10.9	64	0.7	2
200	27.4	10.6	65	0.8	3
250	28.6	11.4	67	0.7	5
315	26.3	9.8	68	0.6	6
400	23.7	8.5	67	0.8	6
500	24.1	8.1	63	0.4	3
630	24.2	8.2	63	0.4	4
800	23.6	8.0	60	0.7	2
1000	18.3	8.0	53	0.3	0
1250	17.6	7.9	45	0.5	0
1600	15.8	8.0	40	0.4	0
2000	12.5	8.7	33	0.4	0
2500	9.5	9.9	29	0.6	0
3150	8.5	10.7	26	0.6	0
4000	7.8	12.4	23	0.7	-
5000	6.5	14.0	20	1.2	-
6300	6.6	17.4	15	1.1	-
8000	6.9	23.6	11	0.7	-
10000	7.1	28.6	11	0.3	-

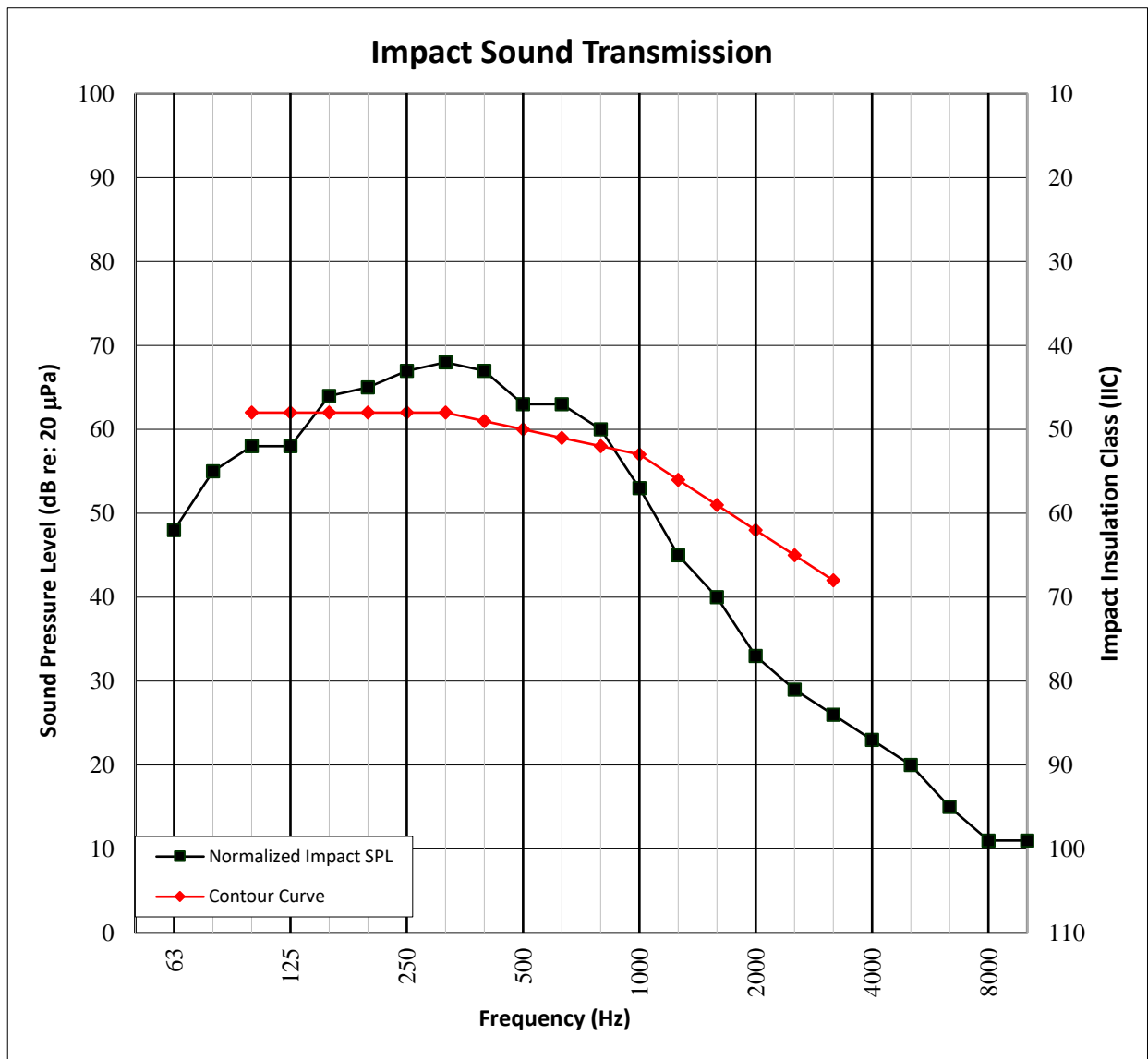
IIC Rating **50** *(Impact Insulation Class)*

Deficiencies **31** *(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	05/18/17
Data File No.	H1810.02
Client	Amorim Cork Composites
Description	3 mm (0.12") Flexco Premium Wood Vinyl Plank, 1.9 mm (0.07") AcoustiCORK® ECOx2 Sound Reduction Underlayment for LVT Plank Flooring, 152.4 mm (6") 5000 PSI Concrete Slab
Specimen Area	10.98 m ²
Technician	Daniel B. Mohler





H1810.10-113-11-R0



DELTA IMPACT INSULATION
ASTM E 2179

Test Date	05/18/17
Data File No.	H1810.02
Client	Amorim Cork Composites
Description	3 mm (0.12") Flexco Premium Wood Vinyl Plank, 1.9 mm (0.07") AcoustiCORK® ECOx2 Sound Reduction Underlayment for LVT Plank Flooring, 152.4 mm (6") 5000 PSI Concrete Slab
Specimen Area	10.98 m ²
Technician	Daniel B. Mohler

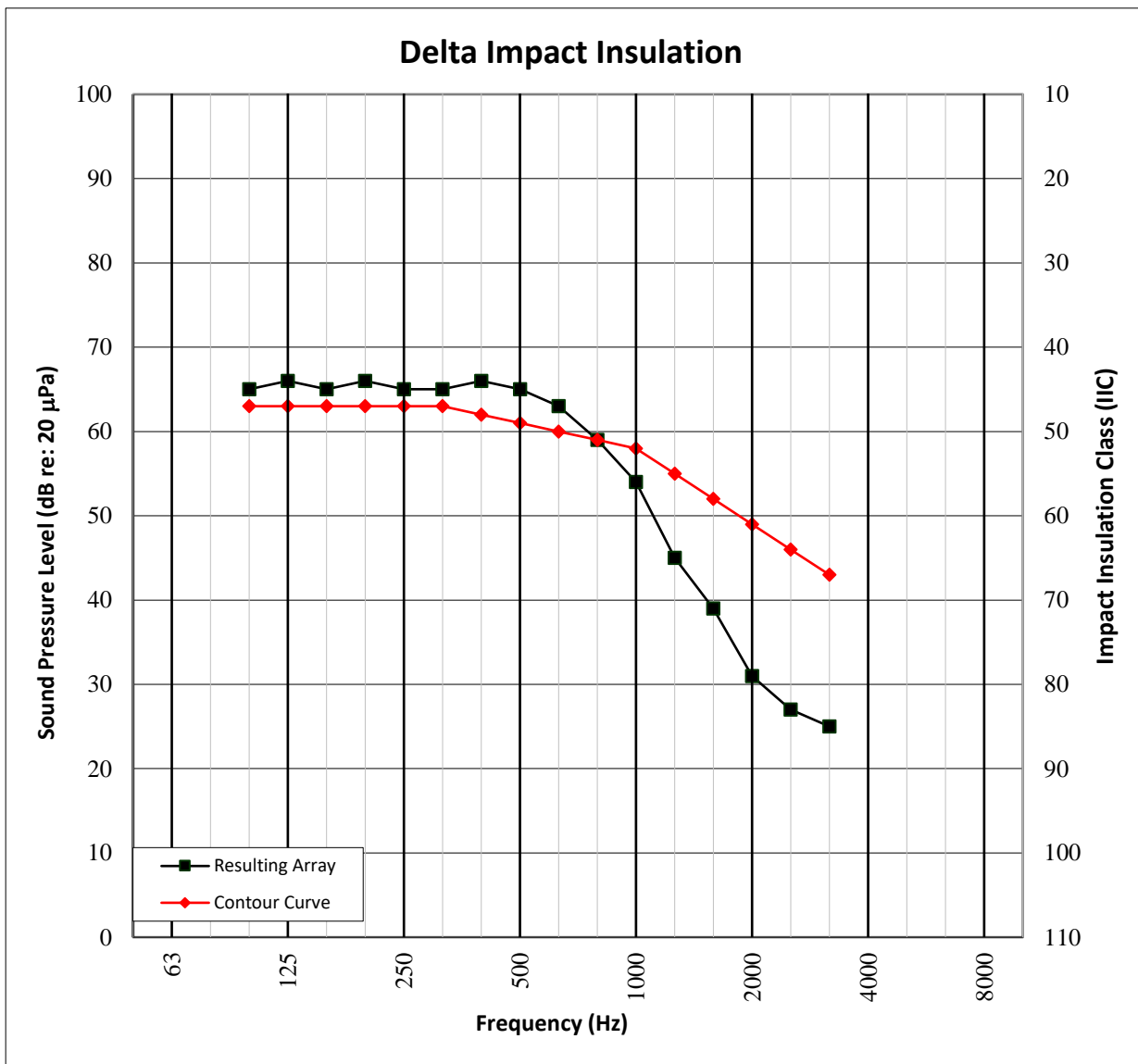
Freq (Hz)	Bkgrd SPL (dB)	Absorption (Square Meters)	Normalized Impact SPL BARE (dB)	95% Conf Limit	Normalized Impact SPL SPEC (dB)	95% Conf Limit	Resulting Array L _{ref,c}	No. of Defici- encies
100	37.3	11.7	59.6	1.6	57.7	1.9	65	2
125	36.3	9.8	60.2	1.4	58.3	1.7	66	3
160	32.3	10.9	66.8	1.0	63.7	0.9	65	2
200	27.4	10.6	68.0	1.1	65.0	1.0	66	3
250	28.6	11.4	70.6	0.9	66.8	0.9	65	2
315	26.3	9.8	71.8	0.9	67.5	0.7	65	2
400	23.7	8.5	70.5	0.8	66.6	0.9	66	4
500	24.1	8.1	69.0	0.5	63.5	0.5	65	4
630	24.2	8.2	70.7	0.5	62.9	0.5	63	3
800	23.6	8.0	71.8	1.0	59.5	0.9	59	0
1000	18.3	8.0	71.6	0.4	53.3	0.4	54	0
1250	17.6	7.9	72.4	0.6	45.5	0.6	45	0
1600	15.8	8.0	72.6	0.5	39.6	0.5	39	0
2000	12.5	8.7	73.4	0.6	32.7	0.5	31	0
2500	9.5	9.9	73.4	0.7	28.5	0.8	27	0
3150	8.5	10.7	72.9	0.8	25.5	0.7	25	0

ΔIIC Rating **21** *(Delta Impact Insulation Class)*
Deficiencies **25** *(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	05/18/17
Data File No.	H1810.02
Client	Amorim Cork Composites
Description	3 mm (0.12") Flexco Premium Wood Vinyl Plank, 1.9 mm (0.07") AcoustiCORK® ECOx2 Sound Reduction Underlayment for LVT Plank Flooring, 152.4 mm (6") 5000 PSI Concrete Slab
Specimen Area	10.98 m ²
Technician	Daniel B. Mohler



Photographs

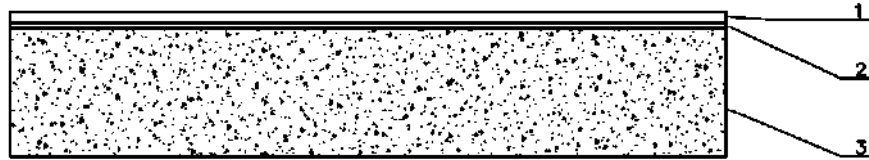


Source Room View of Test Specimen Installation



Receive Room View of Test Specimen Installation

Drawing



- 1-Floor Topping
- 2-Underlayment
- 3-Concrete Slab