

DMX MEMBRANES LIMITED

ACOUSTICAL PERFORMANCE TEST REPORT

SCOPE OF WORK

ASTM E90 AND ASTM E492 TESTING ON
DMX 1-STEP 2.0 UNDERLAYMENT WITH LUXURY VINYL PLANK

SPECIMEN TYPE

203 mm Concrete Slab with Suspended Ceiling

REPORT NUMBER

R4958.01-113-11-R0

TEST DATE

07/30/24

ISSUE DATE

08/16/24

RECORD RETENTION END

07/30/28

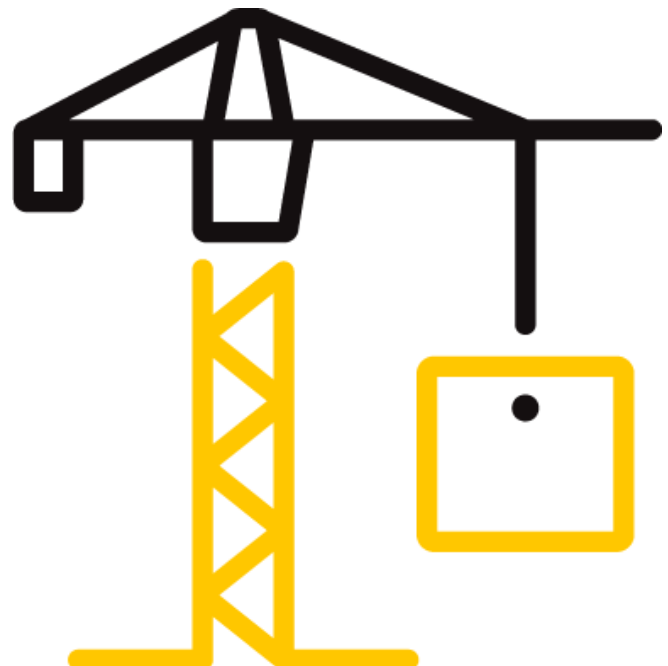
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DOCUMENT CONTROL

RTTDS-R-AMER-Test-2844 (03/23/22)

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TEST REPORT FOR DMX MEMBRANES LIMITED

Report No.: R4958.01-113-11-R0

Date: 08/16/24

REPORT ISSUED TO

DMX MEMBRANES LIMITED

165 Orenda Road

Brampton, Ontario L6W 1W3 CANADA

SECTION 1

SCOPE

Architectural Testing, Inc. (an Intertek company) dba Intertek Building & Construction (B&C) was contracted by DMX Membranes Limited to perform testing in accordance with ASTM E90 AND ASTM E492 on DMX 1-Step 2.0 Underlayment with 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.	R4958.01
SERIES/MODEL:	DMX 1-Step 2.0 Underlayment with Luxury Vinyl Plank
STC	63
IIC	73
HIIC	82

COMPLETED BY: Morgan S. J. Kennedy
Technician - Acoustical

TITLE: Testing

SIGNATURE:

DATE: 08/16/24

REVIEWED BY: Daniel B. Mohler
Project Manager - Acoustical

TITLE: Testing

SIGNATURE:

DATE: 08/16/24

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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 E413-22, *Classification for Rating Sound Insulation*

ASTM E492-22, *Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine*

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 E3207-21, *Standard Classification for Determination of Low-Frequency Impact Sound Ratings*

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 (203 mm Concrete Slab with Suspended Ceiling) 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 6130.5 kg. B&C will store samples of the test specimen for four years. Photographs of the test specimen are included in the report. The client did not supply drawings of the test specimen.

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	
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02672	10/23	*
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02673	10/23	*
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02674	10/23	*
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02675	10/23	*
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02676	10/23	*
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02677	10/23	*
2-Channel Analog Output	National Instruments	NI 9260	2-Channel Analog Output	INT02611	N/A	*
Microphone Calibrator	Norsonic	34093	Acoustical Calibrator	65105	09/23	
Receive Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64908	01/24	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64909	07/24	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	INT02912	03/24	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64902	09/23	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64910	02/24	
Receive Room Environmental Indicator	Comet	T7510	Temperature and Humidity Transmitter	63810	10/23	
				63811	10/23	
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64911	09/23	
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64907	01/24	
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	INT02256	01/24	
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	INT00235	06/24	
Source Room Microphone	PCB Electronics	378C20	Microphone and Preamplifier	INT00236	06/24	
Source Room Environmental Indicator	Comet	T7510	Temperature and Humidity Transmitter	63812	11/23	
Tapping Machine	Norsonic	Nor277	Tapping Machine	INT03333	02/24	

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

VT RECEIVE ROOM VOLUME	155.77 m ³
VT SOURCE ROOM VOLUME	190 m ³

SECTION 6 LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Michael A. Unnone	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 and 13.

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.

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 HIIC (High-Frequency Impact Insulation Class) ratings were calculated in accordance with ASTM E413, ASTM E989, and ASTM E3222, respectively.

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SECTION 9

TEST SPECIMEN DESCRIPTION

MATERIAL	DIMENSIONS (mm)	THICKNESS (mm)	MANUFACTURER AND SERIES	QUANTITY	AVERAGE WEIGHT
Luxrui Vinyl Plank	190.5 by 1209	7.0	Lifeproof	10.98 m ²	8.15 kg/m ²
	Note: Loose laid				
Underlayment	3023 by 1066.8	5.0	DMX 1-Step 2.0	10.98 m ²	0.98 kg/m ²
	Note: Loose laid				
Concrete Slab	3023 by 3632	203.2	5000 PSI	10.98 m ²	524.71 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.				
Drywall Main Beam	38.1 by 2870	43.0	Armstrong HD8906	10.9 lin m	0.45 kg/m
	Note: Twelve gauge hanger wires were attached to the bottom side of the concrete by Acoutivibe CDC Hangers at twelve locations and then to the main beams. The hanger wire was twisted around itself a minimum of three times within 76 mm creating a 305 mm plenum. The measured steel thickness was 0.5 mm.				
Cross Tee	38.3 by 1219	37.3	Armstrong XL8945P	27.2 lin m	0.45 kg/m
	Note: Inserted into the main beams on 610 mm centers. The measured steel thickness was 0.5 mm.				
Fiberglass Insulation	609.6 by 2438	88.9	Johns Manville Unfaced R-13	10.98 m ²	1.32 kg/m ²
	Note: Loose laid onto the ceiling grid system				
Gypsum Panel	3023 by 1219	15.9	National Gypsum Gold Bond® Fire-Shield® Type X	10.56 m ²	11.23 kg/m ²
	Note: Fastened with 25.4 mm fine thread drywall screws on 305 mm centers				

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SECTION 10
TEST RESULTS - AIRBORNE SOUND TRANSMISSION LOSS


TEST DATE	7/30/2024				
DATA FILE NO.	R4958.01				
CLIENT	DMX Membranes Limited				
DESCRIPTION	7 mm Lifeproof Luxrui Vinyl Plank, 5 mm DMX 1-Step 2.0 Underlayment, 203.2 mm 5000 PSI Concrete Slab, 43 mm Armstrong HD8906 Drywall Main Beam, 37.3 mm Armstrong XL8945P Cross Tee, 88.9 mm Johns Manville Unfaced R-13 Fiberglass Insulation, 15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel, 15.9 mm National				
SPECIMEN AREA	10.98 m ²	Receive Temp.	26.1°C	Source Temp.	24.2°C
TECHNICIAN	MAU	Receive Humidity	84%	Source Humidity	84%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m ²	SOURCE SPL (dB)	RECEIVE SPL (dB)	SPECIMEN TL (dB)	95% SAMPLING LIMIT	NUMBER OF DEFICIENCIES
50	34.2	29.0	93	54	36	2.9	-
63	31.8	23.5	93	52	39	5.1	-
80	33.9	14.6	89	57	31	3.5	-
100	27.4	8.4	85	53	35	2.0	-
125	24.6	9.8	88	48	41	1.6	6
160	26.3	8.2	88	48	43	1.5	7
200	23.1	9.4	88	39	51	1.3	2
250	22.5	9.4	92	41	53	0.7	3
315	18.3	8.5	95	42	55	1.3	4
400	15.3	8.4	95	40	57	0.9	5
500	17.1	7.7	93	35	61	0.9	2
630	15.7	7.7	95	34	64	0.8	0
800	15.2	7.5	96	31	68	0.6	0
1000	17.0	7.7	95	29	69	0.7	0
1250	14.7	7.8	95	29	69	0.5	0
1600	12.5	8.0	95	27	71	0.7	0
2000	10.4	8.6	95	27	70	0.5	0
2500	9.2	9.5	93	25	70	0.5	0
3150	7.9	8.7	92	21	74	0.7	0
4000	8.0	12.8	93	18	75	1.0	0
5000	8.7	16.3	93	14	78	0.9	-
6300	9.3	14.3	87	8	79	0.8	-
8000	9.9	23.3	86	7	76	1.0	-
10000	10.5	23.3	81	8	70	1.3	-
STC Rating	63	(Sound Transmission Class)			Sum of Deficiencies	29	

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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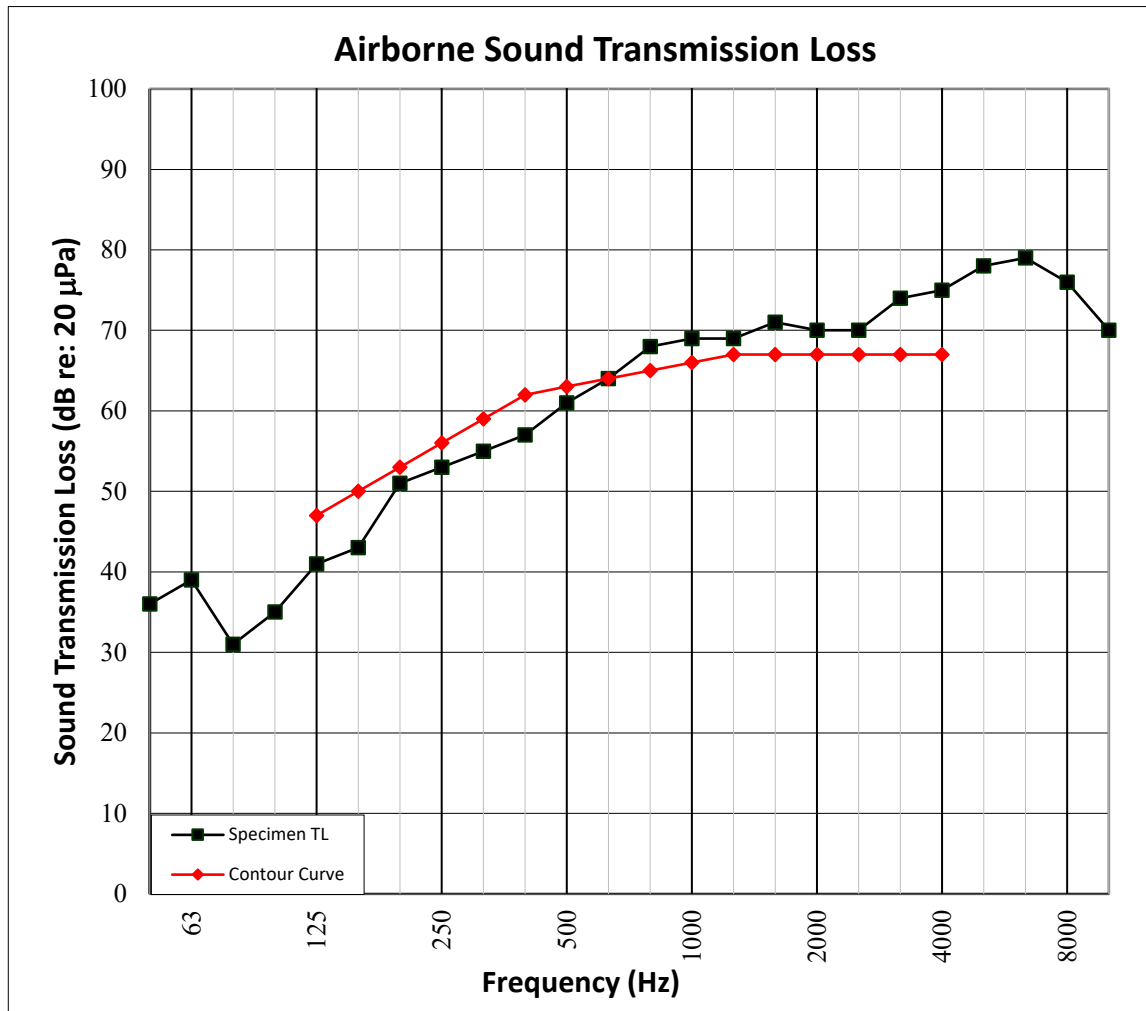
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SECTION 11

TEST RESULTS - AIRBORNE SOUND TRANSMISSION LOSS GRAPH



TEST DATE	7/30/2024				
DATA FILE NO.	R4958.01				
CLIENT	DMX Membranes Limited				
DESCRIPTION	7 mm Lifeproof Luxrui Vinyl Plank, 5 mm DMX 1-Step 2.0 Underlayment, 203.2 mm 5000 PSI Concrete Slab, 43 mm Armstrong HD8906 Drywall Main Beam, 37.3 mm Armstrong XL8945P Cross Tee, 88.9 mm Johns Manville Unfaced R-13 Fiberglass Insulation, 15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel, 15.9 mm National				
SPECIMEN AREA	10.98 m ²	Receive Temp.	26.1°C	Source Temp.	24.2°C
TECHNICIAN	MAU	Receive Humidity	84%	Source Humidity	84%



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SECTION 12

TEST RESULTS - IMPACT SOUND TRANSMISSION



TEST DATE	7/30/2024				
DATA FILE NO.	R4958.01				
CLIENT	DMX Membranes Limited				
DESCRIPTION	7 mm Lifeproof Luxrui Vinyl Plank, 5 mm DMX 1-Step 2.0 Underlayment, 203.2 mm 5000 PSI Concrete Slab, 43 mm Armstrong HD8906 Drywall Main Beam, 37.3 mm Armstrong XL8945P Cross Tee, 88.9 mm Johns Manville Unfaced R-13 Fiberglass Insulation, 15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel, 15.9 mm National				
SPECIMEN AREA	10.98 m ²	Maximum Temp.	26.1°C	Minimum Temp.	26.1°C
TECHNICIAN	MAU	Max. Humidity	84%	Min. Humidity	84%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m ²	NORMALIZED IMPACT SPL (dB)	95% SAMPLING LIMIT	NUMBER OF DEFICIENCIES
50	35.2	27.4	59	2.0	-
63	38.7	25.2	52	3.1	-
80	34.9	14.4	42	2.6	-
100	27.5	8.6	45	1.4	6
125	24.4	9.4	43	0.9	4
160	21.1	8.2	44	1.1	5
200	17.9	9.4	40	0.5	1
250	14.7	10.1	42	1.2	3
315	17.1	8.9	44	0.7	5
400	15.3	8.2	42	0.4	4
500	15.2	7.7	34	0.8	0
630	16.8	7.8	28	0.6	0
800	16.1	7.5	22	1.0	0
1000	17.1	7.8	18	0.7	0
1250	16.2	7.7	14	0.7	0
1600	14.0	8.0	10	0.7	0
2000	12.1	8.6	9	0.7	0
2500	10.1	9.5	6	0.5	0
3150	8.5	8.7	3	0.5	0
4000	8.3	12.8	4	0.5	-
5000	8.8	16.3	5	0.5	-
6300	9.3	14.3	5	0.5	-
8000	9.9	23.3	8	0.5	-
10000	10.5	23.3	8	0.5	-
IIC Rating	73	(Impact Insulation Class)		Sum of Deficiencies	28

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

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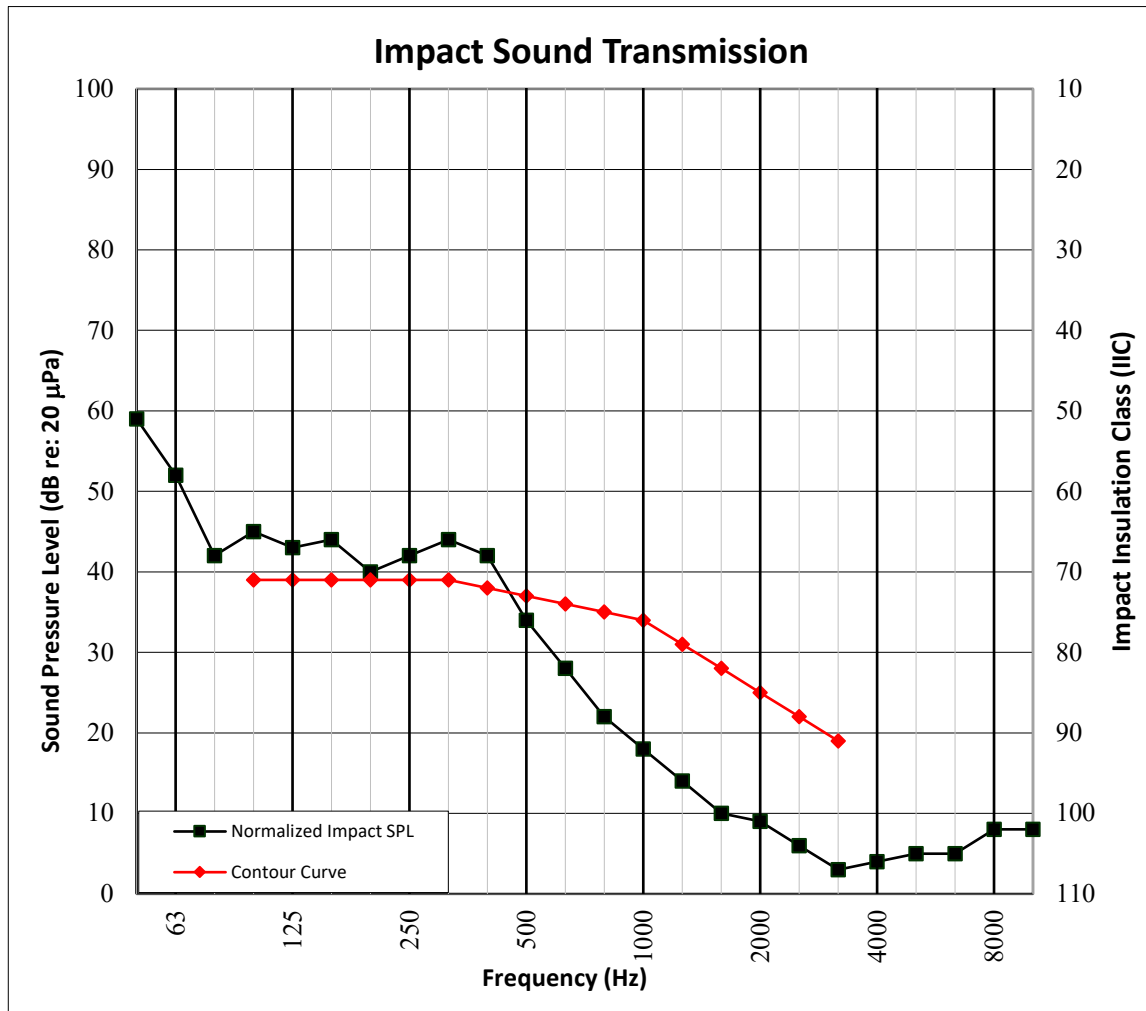
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SECTION 13

TEST RESULTS - IMPACT SOUND TRANSMISSION GRAPH



TEST DATE	7/30/2024				
DATA FILE NO.	R4958.01				
CLIENT	DMX Membranes Limited				
DESCRIPTION	7 mm Lifeproof Luxrui Vinyl Plank, 5 mm DMX 1-Step 2.0 Underlayment, 203.2 mm 5000 PSI Concrete Slab, 43 mm Armstrong HD8906 Drywall Main Beam, 37.3 mm Armstrong XL8945P Cross Tee, 88.9 mm Johns Manville Unfaced R-13 Fiberglass Insulation, 15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel, 15.9 mm National				
SPECIMEN AREA	10.98 m ²	Maximum Temp.	26.1°C	Minimum Temp.	26.1°C
TECHNICIAN	MAU	Max. Humidity	84%	Min. Humidity	84%



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SECTION 14

TEST RESULTS - HIGH-FREQUENCY IMPACT SOUND TRANSMISSION



TEST DATE	7/30/2024				
DATA FILE NO.	R4958.01				
CLIENT	DMX Membranes Limited				
DESCRIPTION	7 mm Lifeproof Luxrui Vinyl Plank, 5 mm DMX 1-Step 2.0 Underlayment, 203.2 mm 5000 PSI Concrete Slab, 43 mm Armstrong HD8906 Drywall Main Beam, 37.3 mm Armstrong XL8945P Cross Tee, 88.9 mm Johns Manville Unfaced R-13 Fiberglass Insulation, 15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel, 15.9 mm National				
SPECIMEN AREA	10.98 m ²	Maximum Temp.	26.1°C	Minimum Temp.	26.1°C
TECHNICIAN	MAU	Max. Humidity	84%	Min. Humidity	84%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m ²	NORMALIZED IMPACT SPL (dB)	95% SAMPLE CONFIDENCE LIMIT	NUMBER OF DEFICIENCIES
400	15.3	8.2	42	0.4	13.0
500	15.2	7.7	34	0.8	5.6
630	16.8	7.8	28	0.6	0.9
800	16.1	7.5	22	1.0	0.0
1000	17.1	7.8	18	0.7	0.0
1250	16.2	7.7	14	0.7	0.0
1600	14.0	8.0	10	0.7	0.0
2000	12.1	8.6	9	0.7	0.0
2500	10.1	9.5	6	0.5	0.0
3150	8.5	8.7	3	0.5	0.0
IIIC Rating	82	<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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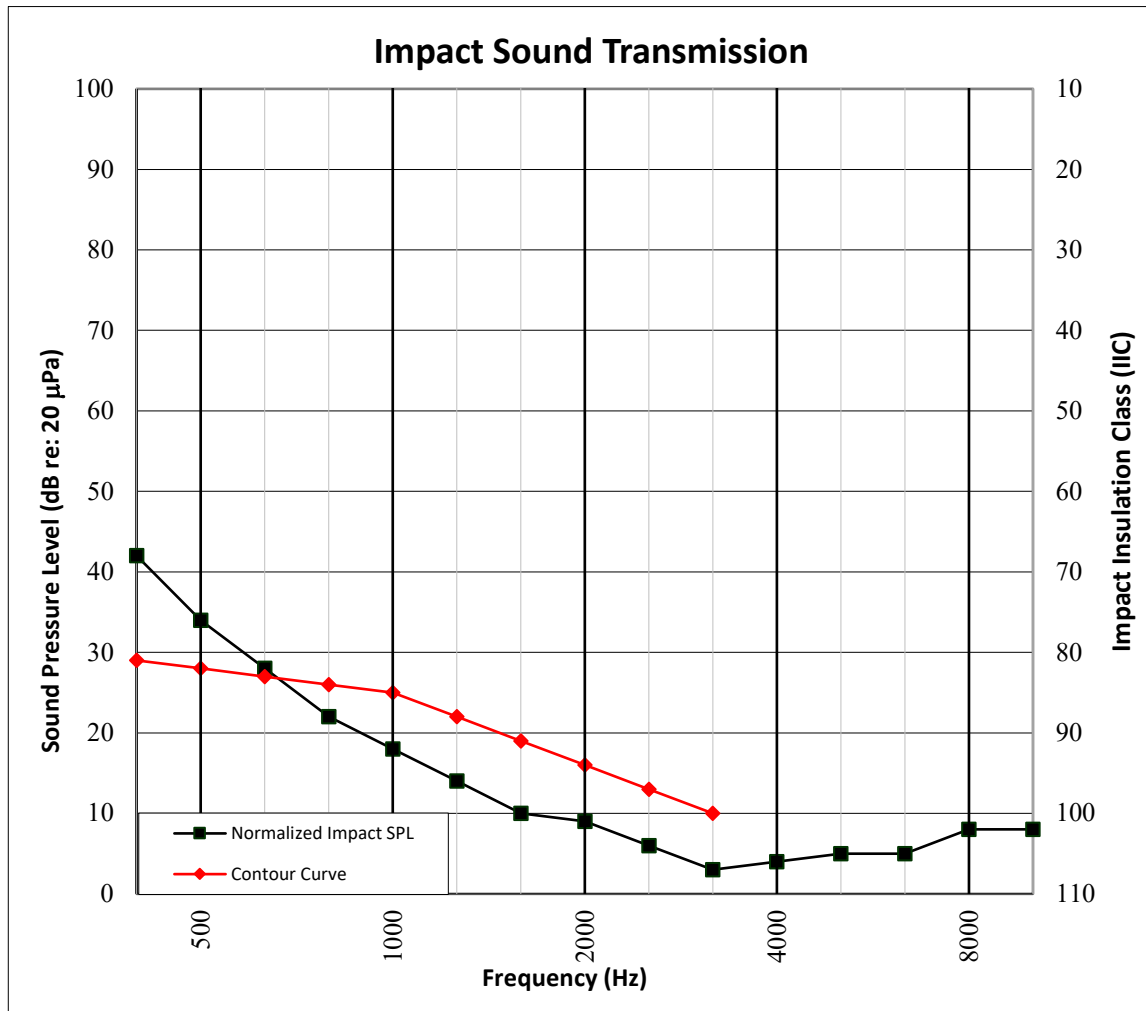
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SECTION 15

TEST RESULTS - HIGH-FREQUENCY IMPACT SOUND TRANSMISSION GRAPH



TEST DATE	7/30/2024				
DATA FILE NO.	R4958.01				
CLIENT	DMX Membranes Limited				
DESCRIPTION	7 mm Lifeproof Luxrui Vinyl Plank, 5 mm DMX 1-Step 2.0 Underlayment, 203.2 mm 5000 PSI Concrete Slab, 43 mm Armstrong HD8906 Drywall Main Beam, 37.3 mm Armstrong XL8945P Cross Tee, 88.9 mm Johns Manville Unfaced R-13 Fiberglass Insulation, 15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel, 15.9 mm National				
SPECIMEN AREA	10.98 m ²	Maximum Temp.	26.1°C	Minimum Temp.	26.1°C
TECHNICIAN	MAU	Max. Humidity	84%	Min. Humidity	84%



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SECTION 16

PHOTOGRAPHS



Photo No. 1

Source Room View of Test Specimen Installation



Photo No. 2

Receive Room View of Test Specimen Installation



Total Quality. Assured.

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SECTION 17

REVISION LOG

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