

KARNDEAN DESIGNFLOORING ACOUSTICAL PERFORMANCE TEST REPORT

SCOPE OF WORK

ASTM E90 AND ASTM E492 TESTING ON
4.5 MM LOOSELAY LLP109

SPECIMEN TYPE

152 mm Concrete Slab with Suspended Ceiling

REPORT NUMBER

P1663.01-113-11-R0

TEST DATE

08/29/22

ISSUE DATE

10/05/22

RECORD RETENTION END

08/29/26

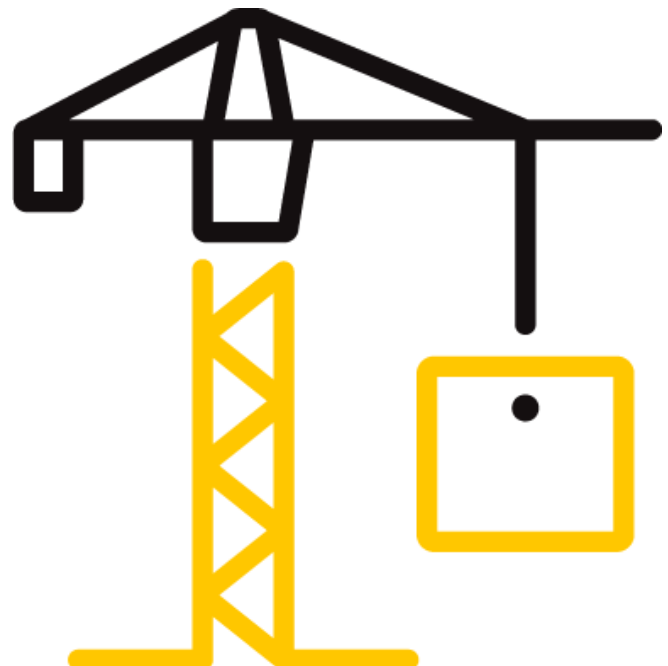
PAGES

15

DOCUMENT CONTROL

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TEST REPORT FOR KARNDEAN DESIGNFLOORING

Report No.: P1663.01-113-11-R0

Date: 10/05/22

REPORT ISSUED TO

KARNDEAN DESIGNFLOORING

1100 Pontiac Court, Bushy Run Corporate Park
Export, Pennsylvania 15632

SECTION 1

SCOPE

Architectural Testing, Inc. (an Intertek company) dba Intertek Building & Construction (B&C) was contracted by Karndean Designflooring to perform testing in accordance with ASTM E90 AND ASTM E492 on 4.5 mm LooseLay LLP109. 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.	P1663.01
SERIES/MODEL:	4.5 mm LooseLay LLP109
STC	62
IIC	57
HIIC	56

COMPLETED BY: Michael A. Unnone
Technician - Acoustical
TITLE: Testing
SIGNATURE:
DATE: 10/05/22

COMPLETED BY: Daniel B. Mohler
Project Lead - Acoustical
TITLE: Testing
SIGNATURE:
DATE: 10/05/22

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TEST REPORT FOR KARNDEAN DESIGNFLOORING

Report No.: P1663.01-113-11-R0

Date: 10/05/22

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 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 (152 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 4256 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.

TEST REPORT FOR KARNDÉAN DESIGNFLOORING

Report No.: P1663.01-113-11-R0

Date: 10/05/22

SECTION 5 EQUIPMENT

INSTRUMENT	MANUFACTURER	MODEL	DESCRIPTION	ASSET #	CAL DATE
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02586	04/22 *
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02587	04/22 *
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02608	04/22 *
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02609	04/22 *
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02610	04/22 *
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02612	04/22 *
Microphone Calibrator	Norsonic	34093	Acoustical Calibrator	65105	10/21
Receive Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	63741	06/22
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63740	04/22
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64340	10/21
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63744	09/21
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	65968	01/22
Receive Room Environmental Indicator	Comet	T7510	Temperature and Humidity Transmitter	63810	10/21
				63811	10/21
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	65103	02/22
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64902	12/21
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	63739	07/22
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	63742	04/22
Source Room Microphone	PCB Electronics	378C20	Microphone and Preamplifier	64906	04/22
Source Room Environmental Indicator	Comet	T7510	Temperature and Humidity Transmitter	63812	10/21
Tapping Machine	Norsonic	Nor277	Tapping Machine	INT00936	02/22

* 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
Nathan Kessler	Intertek B&C
Daniel B. Mohler	Intertek B&C

TEST REPORT FOR KARNDUAN DESIGNFLOORING

Report No.: P1663.01-113-11-R0

Date: 10/05/22

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.

TEST REPORT FOR KARNDUAN DESIGNFLOORING

Report No.: P1663.01-113-11-R0

Date: 10/05/22

SECTION 9

TEST SPECIMEN DESCRIPTION

MATERIAL	DIMENSIONS (mm)	THICKNESS (mm)	MANUFACTURER AND SERIES	QUANTITY	AVERAGE WEIGHT
Flooring	1050 by 250	4.5	LooseLay LLP109	10.98 m ²	7.76 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.				
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 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. Seams and perimeter sealed with Pecora AC-20® Acoustical Sealant and covered with pressure-sensitive tape.				

TEST REPORT FOR KARNDEAN DESIGNFLOORING

Report No.: P1663.01-113-11-R0

Date: 10/05/22

SECTION 10

TEST RESULTS - AIRBORNE SOUND TRANSMISSION LOSS



TEST DATE	8/29/2022				
DATA FILE NO.	P1663.01				
CLIENT	Karndean Designflooring				
DESCRIPTION	4.5 mm LooseLay LLP109 Flooring, 152.4 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				
SPECIMEN AREA	10.98 m ²	Receive Temp.	25°C	Source Temp.	23.3°C
TECHNICIAN	NSK	Receive Humidity	71%	Source Humidity	71%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m ²	SOURCE SPL (dB)	RECEIVE SPL (dB)	SPECIMEN TL (dB)	95% SAMPLING LIMIT	NUMBER OF DEFICIENCIES
50	36.3	25.9	107	70	35	2.9	-
63	32.3	18.0	106	65	40	5.5	-
80	32.3	13.1	103	67	36	2.8	-
100	27.2	8.8	100	66	36	1.6	-
125	31.0	9.4	103	61	44	2.0	2
160	24.1	8.8	101	59	44	1.1	5
200	21.0	11.7	97	52	47	1.7	5
250	21.3	10.7	100	49	52	1.1	3
315	20.5	9.5	104	51	55	0.8	3
400	20.2	9.0	104	49	57	1.0	4
500	18.6	8.3	100	42	60	0.7	2
630	19.6	7.8	98	39	62	0.7	1
800	17.5	8.0	99	39	62	0.7	2
1000	24.1	7.8	99	38	64	0.5	1
1250	18.9	7.8	100	36	66	0.7	0
1600	17.3	8.1	100	34	69	0.5	0
2000	14.3	8.9	100	33	70	0.5	0
2500	13.5	9.7	96	29	69	0.4	0
3150	11.8	10.2	93	23	71	0.6	0
4000	10.1	11.0	93	21	73	0.6	0
5000	9.5	12.2	92	16	76	0.6	-
6300	9.5	14.2	89	10	79	0.6	-
8000	9.7	17.1	92	10	81	0.8	-
10000	10.2	17.1	89	9	79	0.8	-
STC Rating	62	(Sound Transmission Class)			Sum of Deficiencies	28	

- 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

TEST REPORT FOR KARNDEAN DESIGNFLOORING

Report No.: P1663.01-113-11-R0

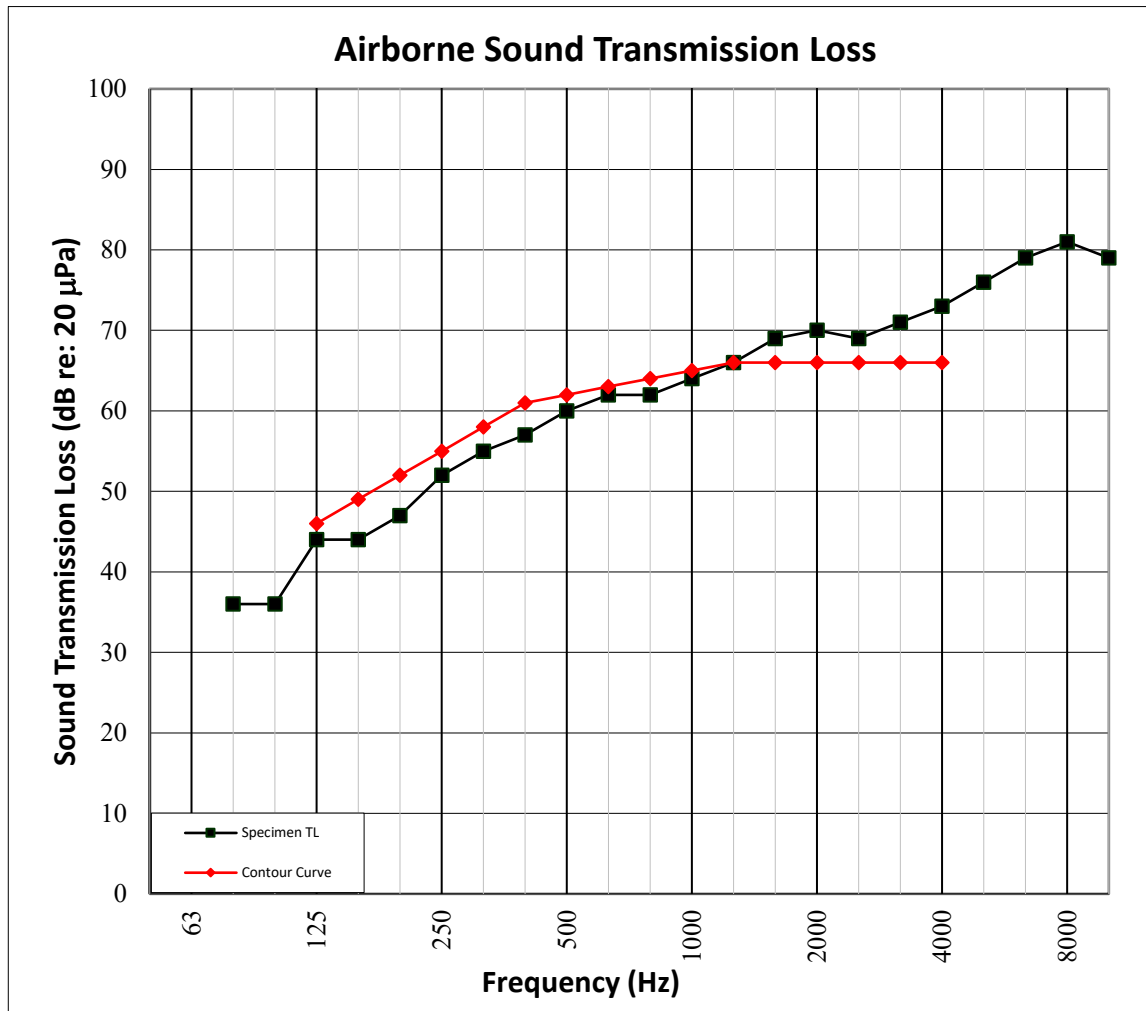
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SECTION 11

TEST RESULTS - AIRBORNE SOUND TRANSMISSION LOSS GRAPH



TEST DATE	8/29/2022			
DATA FILE NO.	P1663.01			
CLIENT	Karndean Designflooring			
DESCRIPTION	4.5 mm LooseLay LLP109 Flooring, 152.4 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			
SPECIMEN AREA	10.98 m ²	Receive Temp.	25°C	Source Temp. 23.3°C
TECHNICIAN	NSK	Receive Humidity	71%	Source Humidity 71%



TEST REPORT FOR KARNDEAN DESIGNFLOORING

Report No.: P1663.01-113-11-R0

Date: 10/05/22

SECTION 12

TEST RESULTS - IMPACT SOUND TRANSMISSION



TEST DATE	8/29/2022				
DATA FILE NO.	P1663.01				
CLIENT	Karndean Designflooring				
DESCRIPTION	4.5 mm LooseLay LLP109 Flooring, 152.4 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				
SPECIMEN AREA	10.98 m ²	Maximum Temp.	25.1°C	Minimum Temp.	24.9°C
TECHNICIAN	NSK	Max. Humidity	72%	Min. Humidity	71%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m ²	NORMALIZED IMPACT SPL (dB)	95% SAMPLING LIMIT	NUMBER OF DEFICIENCIES
80	41.4	12.9	45	1.2	-
100	36.0	8.6	51	1.6	0
125	32.9	9.1	49	1.3	0
160	29.7	8.7	54	0.8	0
200	26.4	10.9	53	0.8	0
250	22.2	10.6	55	0.8	0
315	25.6	10.8	54	0.5	0
400	23.0	9.2	54	0.4	0
500	24.8	8.2	52	0.4	0
630	23.5	7.8	51	0.4	0
800	19.1	7.9	51	0.5	0
1000	23.7	7.9	51	0.4	1
1250	20.5	7.8	51	0.3	4
1600	18.2	8.0	50	0.3	6
2000	17.8	8.9	46	0.3	5
2500	16.7	9.7	44	0.4	6
3150	13.9	10.2	37	0.5	2
4000	11.3	11.1	30	0.8	-
5000	11.0	12.2	19	1.6	-
6300	10.5	14.4	13	1.1	-
8000	9.9	17.2	12	0.8	-
10000	10.3	17.2	12	0.7	-
IIC Rating	57	(Impact Insulation Class)		Sum of Deficiencies	24

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

TEST REPORT FOR KARNDEAN DESIGNFLOORING

Report No.: P1663.01-113-11-R0

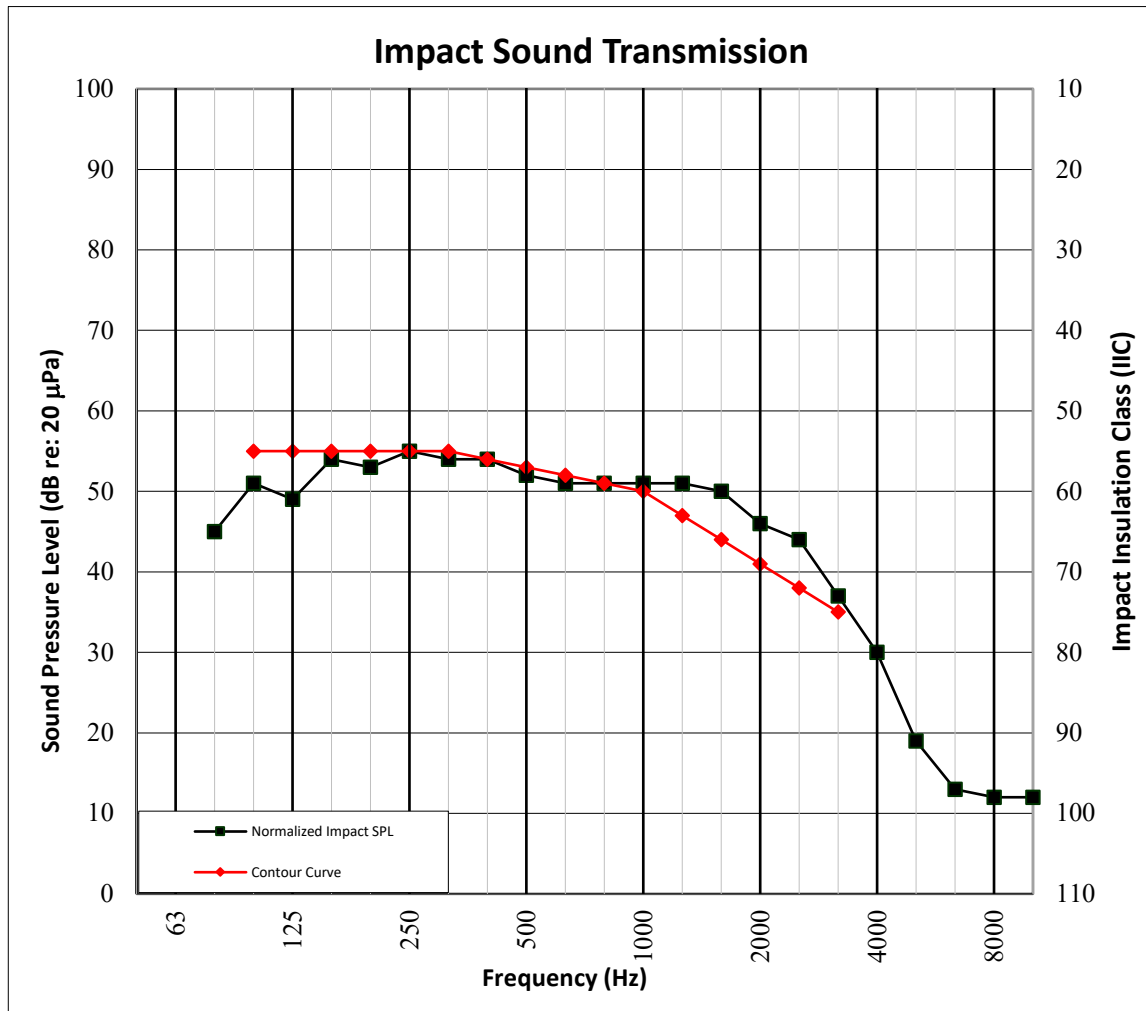
Date: 10/05/22

SECTION 13

TEST RESULTS - IMPACT SOUND TRANSMISSION GRAPH



TEST DATE	8/29/2022					ACCREDITED Testing Laboratory
DATA FILE NO.	P1663.01					
CLIENT	Karndean Designflooring					
DESCRIPTION	4.5 mm LooseLay LLP109 Flooring, 152.4 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					
SPECIMEN AREA	10.98 m²	Maximum Temp.	25.1°C	Minimum Temp.	24.9°C	
TECHNICIAN	NSK	Max. Humidity	72%	Min. Humidity	71%	



TEST REPORT FOR KARNDUAN DESIGNFLOORING

Report No.: P1663.01-113-11-R0

Date: 10/05/22

SECTION 14

TEST RESULTS - HIGH-FREQUENCY IMPACT SOUND TRANSMISSION



TEST DATE	8/29/2022				
DATA FILE NO.	P1663.01				
CLIENT	Karndean Designflooring				
DESCRIPTION	4.5 mm LooseLay LLP109 Flooring, 152.4 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				
SPECIMEN AREA	10.98 m ²	Maximum Temp.	25.1°C	Minimum Temp.	24.9°C
TECHNICIAN	NSK	Max. Humidity	72%	Min. Humidity	71%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m ²	NORMALIZED IMPACT SPL (dB)	95% SAMPLE CONFIDENCE LIMIT	NUMBER OF DEFICIENCIES
400	23.0	9.2	54	0.4	0.0
500	24.8	8.2	52	0.4	0.0
630	23.5	7.8	51	0.4	0.0
800	19.1	7.9	51	0.5	0.0
1000	23.7	7.9	51	0.4	0.0
1250	20.5	7.8	51	0.3	3.0
1600	18.2	8.0	50	0.3	4.6
2000	17.8	8.9	46	0.3	4.1
2500	16.7	9.7	44	0.4	5.4
3150	13.9	10.2	37	0.5	1.2
HIIC Rating	56	<i>(High-Frequency Impact Insulation Class)</i>		Sum of Deficiencies	18.4

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

TEST REPORT FOR KARNDEAN DESIGNFLOORING

Report No.: P1663.01-113-11-R0

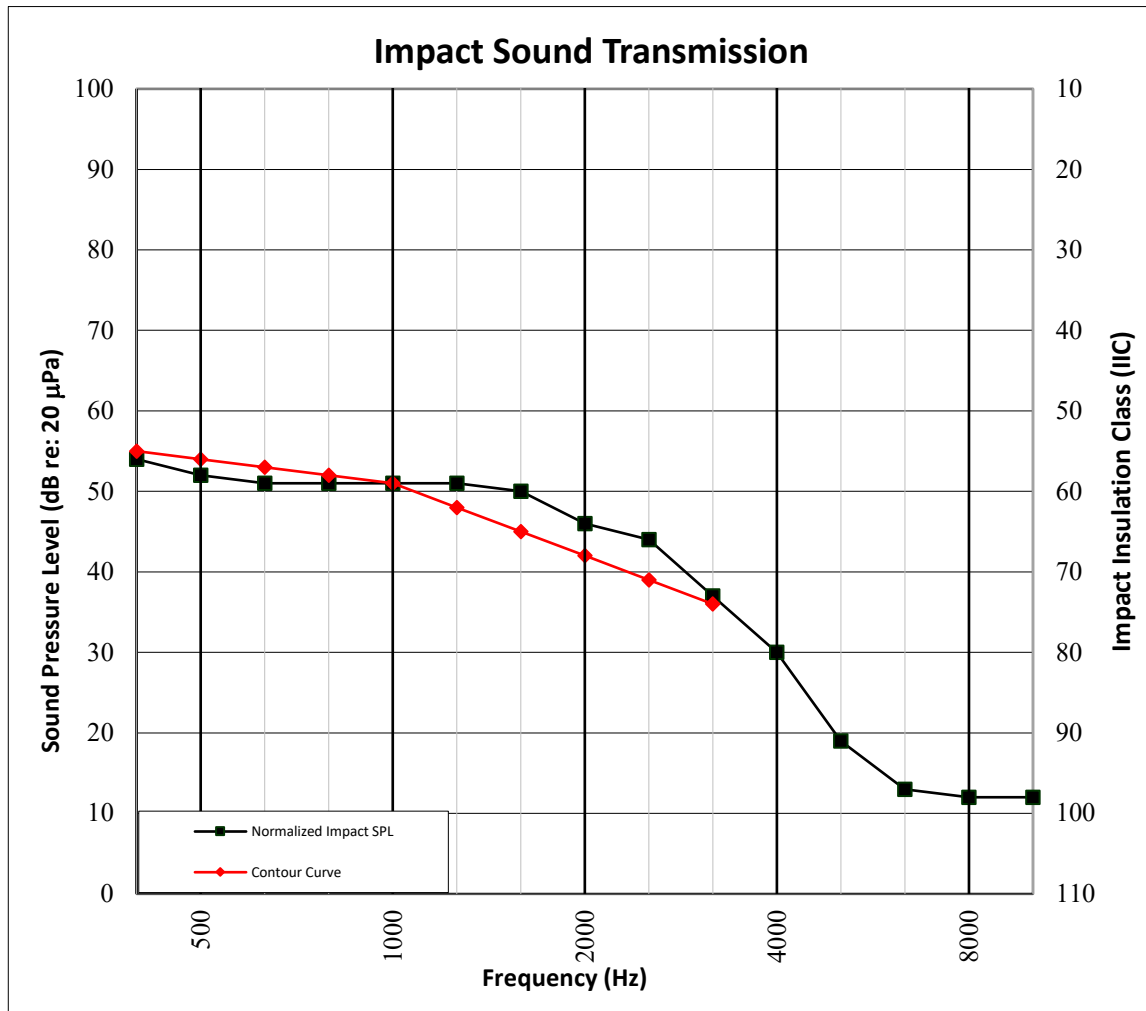
Date: 10/05/22

SECTION 15

TEST RESULTS - HIGH-FREQUENCY IMPACT SOUND TRANSMISSION GRAPH



TEST DATE	8/29/2022				
DATA FILE NO.	P1663.01				
CLIENT	Karndean Designflooring				
DESCRIPTION	4.5 mm LooseLay LLP109 Flooring, 152.4 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				
SPECIMEN AREA	10.98 m ²	Maximum Temp.	25.1°C	Minimum Temp.	24.9°C
TECHNICIAN	NSK	Max. Humidity	72%	Min. Humidity	71%



TEST REPORT FOR KARNDUAN DESIGNFLOORING

Report No.: P1663.01-113-11-R0

Date: 10/05/22

SECTION 16

PHOTOGRAPHS



Photo No. 1
Source Room View of Test Specimen Installation



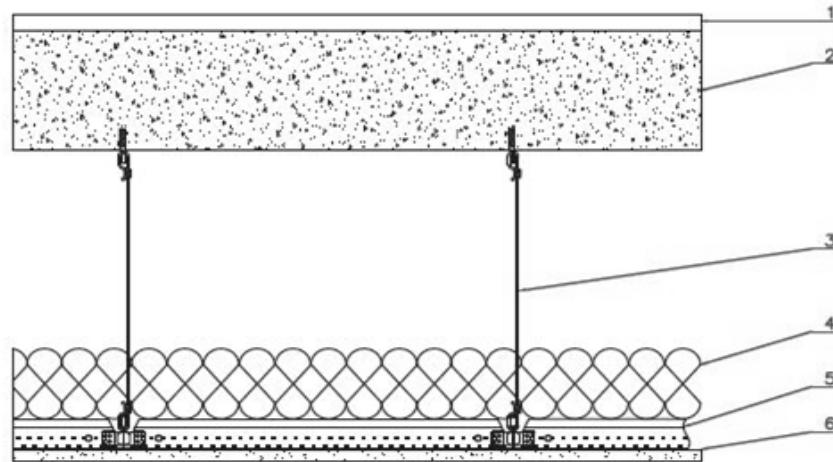
Photo No. 2
Receive Room View of Test Specimen Installation

TEST REPORT FOR KARNDUAN DESIGNFLOORING

Report No.: P1663.01-113-11-R0

Date: 10/05/22

SECTION 17
DRAWING



- 1-Floor Topping
- 2-Concrete Slab
- 3-Hanger Wire
- 4-Insulation
- 5-Ceiling Grid
- 6-Ceiling



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TEST REPORT FOR KARNDUAN DESIGNFLOORING

Report No.: P1663.01-113-11-R0

Date: 10/05/22

SECTION 18

REVISION LOG

REVISION #	DATE	PAGES	DESCRIPTION
R0	10/05/22	N/A	Original Report Issue