

# KARNDEAN DESIGNFLOORING ACOUSTICAL PERFORMANCE TEST REPORT

## SCOPE OF WORK

ASTM E90 AND ASTM E492 TESTING ON  
4.5 MM KNIGHT TILE RIGID CORE SCB KP104

## SPECIMEN TYPE

152 mm Concrete Slab with Suspended Ceiling

## REPORT NUMBER

P1663.02-113-11-R0

## TEST DATE

08/29/22

## ISSUE DATE

10/05/22

## RECORD RETENTION END

08/29/26

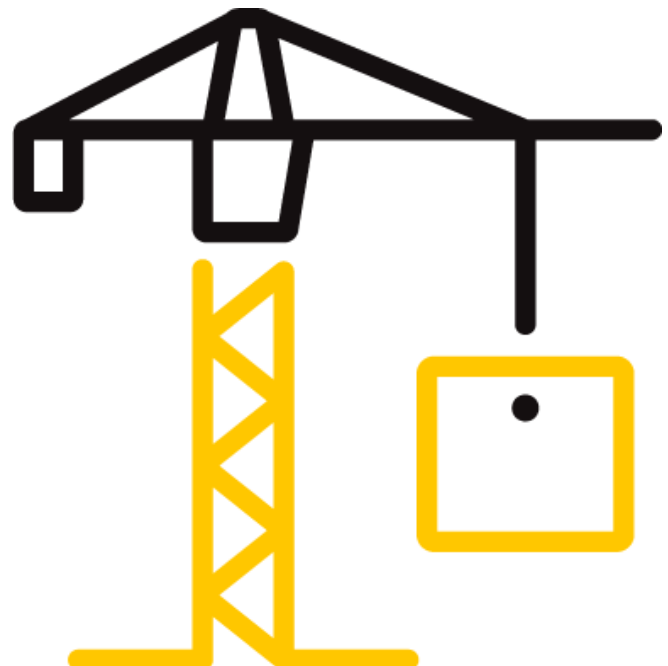
## PAGES

15

## DOCUMENT CONTROL

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

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## TEST REPORT FOR KARNDEAN DESIGNFLOORING

Report No.: P1663.02-113-11-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 Knight Tile Rigid Core SCB KP104 . 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

<b>DATA FILE NO.</b>	P1663.02
<b>SERIES/MODEL:</b>	4.5 mm Knight Tile Rigid Core SCB KP104
<b>STC</b>	60
<b>IIC</b>	65
<b>HIIC</b>	71

**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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### 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 4262 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	
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 <sup>3</sup>
VT SOURCE ROOM VOLUME	190 m <sup>3</sup>

### 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
Rigid Core SCB KP104	1220 by 180	4.5	Knight Tile	10.98 m <sup>2</sup>	8.3 kg/m <sup>2</sup>
	Note: Loose laid. The flooring had an attached pad.				
Concrete Slab	3023 by 3632	152.4	5000 PSI	10.98 m <sup>2</sup>	366.18 kg/m <sup>2</sup>
	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 <sup>2</sup>	1.32 kg/m <sup>2</sup>
	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 <sup>2</sup>	11.23 kg/m <sup>2</sup>
	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.				

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**SECTION 10**
**TEST RESULTS - AIRBORNE SOUND TRANSMISSION LOSS**


<b>TEST DATE</b>	8/29/2022				
<b>DATA FILE NO.</b>	P1663.02				
<b>CLIENT</b>	Karndean Designflooring				
<b>DESCRIPTION</b>	4.5 mm Knight Tile Rigid Core SCB KP104 , 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				
<b>SPECIMEN AREA</b>	10.98 m <sup>2</sup>	<b>Receive Temp.</b>	24.8°C	<b>Source Temp.</b>	23.4°C
<b>TECHNICIAN</b>	MAU	<b>Receive Humidity</b>	71%	<b>Source Humidity</b>	71%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m <sup>2</sup>	SOURCE SPL (dB)	RECEIVE SPL (dB)	SPECIMEN TL (dB)	95% SAMPLING LIMIT	NUMBER OF DEFICIENCIES
50	35.4	28.5	108	71	35	3.5	-
63	35.7	19.9	106	65	40	5.5	-
80	35.8	13.3	102	67	36	2.7	-
100	26.2	8.4	100	67	36	1.6	-
125	25.8	9.2	103	61	44	2.1	0
160	21.5	8.8	101	60	44	1.2	3
200	17.3	11.6	97	52	47	1.7	3
250	14.0	10.5	100	49	52	1.1	1
315	16.0	10.2	104	51	54	0.8	2
400	14.1	9.2	104	51	55	0.7	4
500	14.3	8.0	100	46	56	0.9	4
630	16.6	7.8	98	43	56	0.8	5
800	15.9	8.0	99	40	60	0.4	2
1000	18.1	7.9	100	37	65	0.5	0
1250	16.9	7.8	100	35	68	0.5	0
1600	15.0	8.0	101	34	69	0.5	0
2000	11.5	8.7	100	33	70	0.6	0
2500	10.1	9.8	96	29	69	0.5	0
3150	8.8	10.2	93	23	71	0.5	0
4000	8.4	11.0	93	21	73	0.4	0
5000	8.5	12.1	92	16	76	0.5	-
6300	9.1	14.3	89	10	79	0.5	-
8000	9.5	17.1	92	10	81	0.8	-
10000	10.2	17.1	89	9	80	0.9	-
<b>STC Rating</b>	<b>60</b>	(Sound Transmission Class)			<b>Sum of Deficiencies</b>	<b>24</b>	

- 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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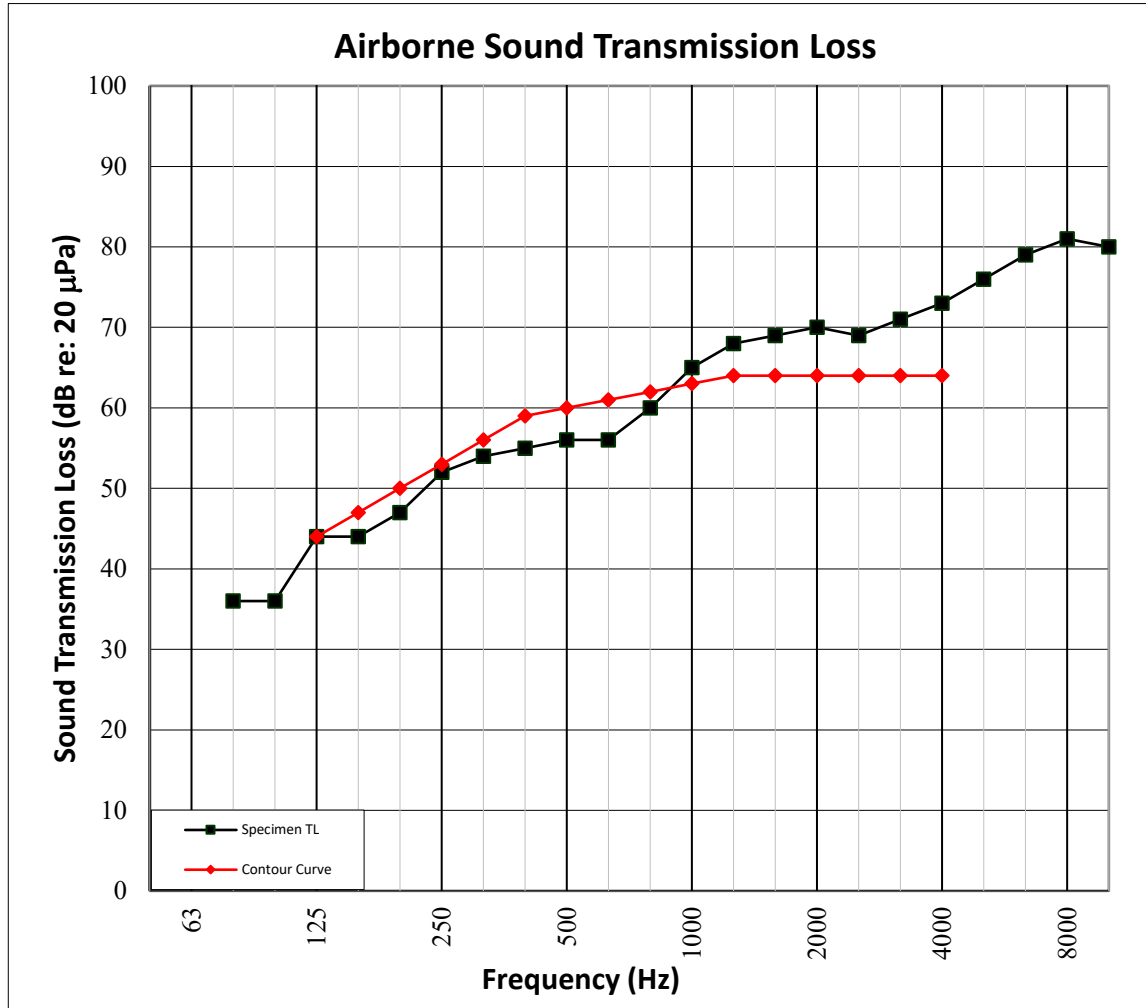
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**SECTION 11**

**TEST RESULTS - AIRBORNE SOUND TRANSMISSION LOSS GRAPH**



<b>TEST DATE</b>	8/29/2022				
<b>DATA FILE NO.</b>	P1663.02				
<b>CLIENT</b>	Karndean Designflooring				
<b>DESCRIPTION</b>	4.5 mm Knight Tile Rigid Core SCB KP104 , 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				
<b>SPECIMEN AREA</b>	10.98 m <sup>2</sup>	<b>Receive Temp.</b>	24.8°C	<b>Source Temp.</b>	23.4°C
<b>TECHNICIAN</b>	MAU	<b>Receive Humidity</b>	71%	<b>Source Humidity</b>	71%





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**SECTION 12**
**TEST RESULTS - IMPACT SOUND TRANSMISSION**


<b>TEST DATE</b>	8/29/2022				
<b>DATA FILE NO.</b>	P1663.02				
<b>CLIENT</b>	Karndean Designflooring				
<b>DESCRIPTION</b>	4.5 mm Knight Tile Rigid Core SCB KP104 , 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				
<b>SPECIMEN AREA</b>	10.98 m <sup>2</sup>	<b>Maximum Temp.</b>	24.8°C	<b>Minimum Temp.</b>	24.8°C
<b>TECHNICIAN</b>	MAU	<b>Max. Humidity</b>	71%	<b>Min. Humidity</b>	71%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m <sup>2</sup>	NORMALIZED IMPACT SPL (dB)	95% SAMPLING LIMIT	NUMBER OF DEFICIENCIES
80	32.1	13.6	48	1.4	-
100	26.0	10.2	51	1.8	4
125	24.2	9.4	49	1.4	2
160	22.2	9.1	52	0.9	5
200	19.3	10.9	52	1.0	5
250	17.8	10.2	52	0.8	5
315	16.8	10.1	49	0.5	2
400	14.3	9.3	48	0.4	2
500	13.5	8.3	45	0.6	0
630	15.5	7.7	41	0.5	0
800	14.0	7.8	37	0.4	0
1000	16.8	7.9	32	0.3	0
1250	18.5	7.8	30	0.3	0
1600	13.3	8.0	28	0.3	0
2000	10.4	8.9	21	0.3	0
2500	9.7	9.7	16	0.4	0
3150	8.5	10.2	11	0.4	0
4000	8.3	11.0	9	0.3	-
5000	8.4	12.1	8	0.4	-
6300	9.5	14.3	9	0.5	-
8000	9.7	17.4	10	0.5	-
10000	10.3	17.4	11	0.6	-
<b>IIC Rating</b>	<b>65</b>	<i>(Impact Insulation Class)</i>		<b>Sum of Deficiencies</b>	<b>25</b>

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

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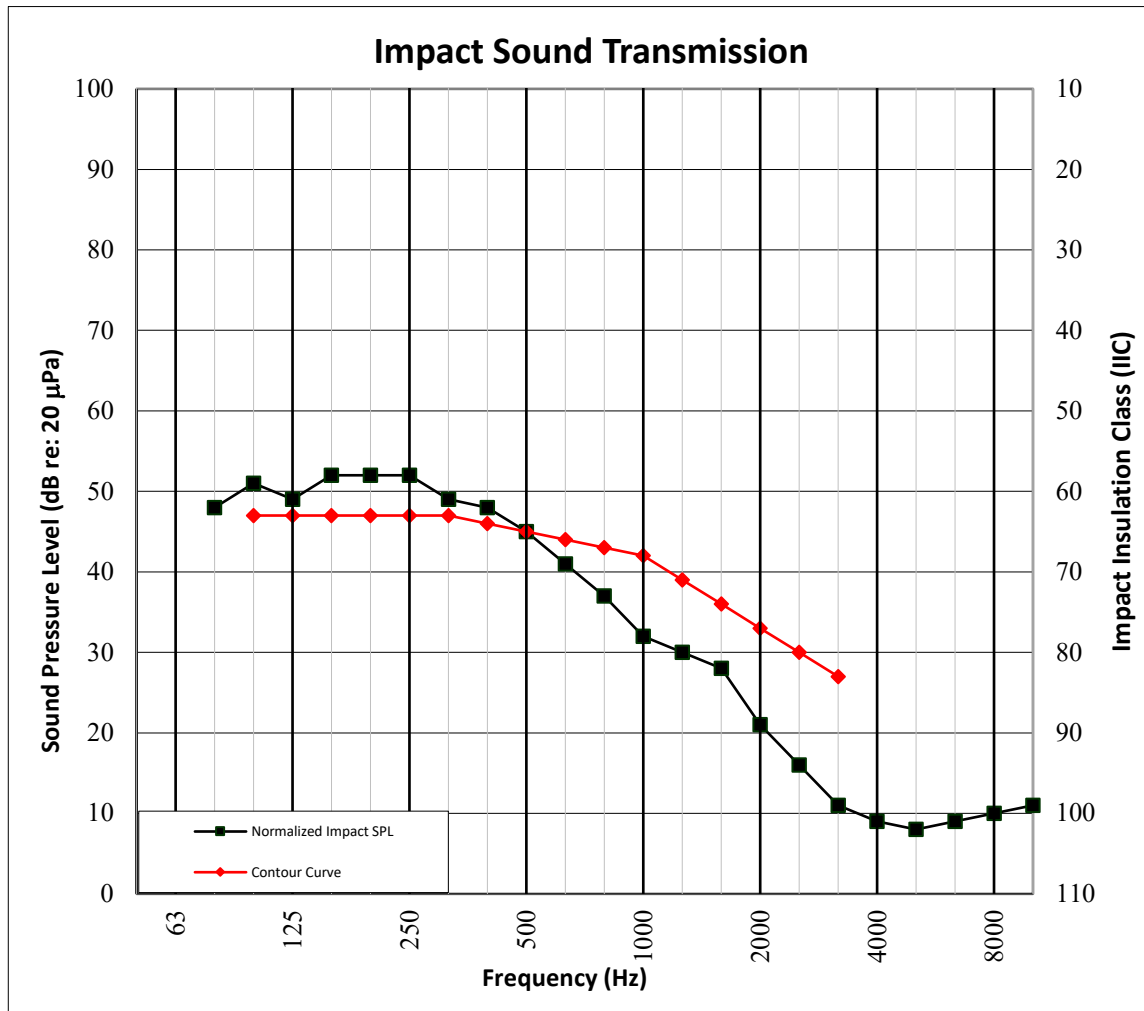
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**SECTION 13**

**TEST RESULTS - IMPACT SOUND TRANSMISSION GRAPH**



<b>TEST DATE</b>	8/29/2022				
<b>DATA FILE NO.</b>	P1663.02				
<b>CLIENT</b>	Karndean Designflooring				
<b>DESCRIPTION</b>	4.5 mm Knight Tile Rigid Core SCB KP104 , 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				
<b>SPECIMEN AREA</b>	10.98 m <sup>2</sup>	<b>Maximum Temp.</b>	24.8°C	<b>Minimum Temp.</b>	24.8°C
<b>TECHNICIAN</b>	MAU	<b>Max. Humidity</b>	71%	<b>Min. Humidity</b>	71%



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## SECTION 14

### TEST RESULTS - HIGH-FREQUENCY IMPACT SOUND TRANSMISSION



TEST DATE	8/29/2022				
DATA FILE NO.	P1663.02				
CLIENT	Karndean Designflooring				
DESCRIPTION	4.5 mm Knight Tile Rigid Core SCB KP104 , 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 <sup>2</sup>	Maximum Temp.	24.8°C	Minimum Temp.	24.8°C
TECHNICIAN	MAU	Max. Humidity	71%	Min. Humidity	71%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m <sup>2</sup>	NORMALIZED IMPACT SPL (dB)	95% SAMPLE CONFIDENCE LIMIT	NUMBER OF DEFICIENCIES
400	14.3	9.3	48	0.4	8.0
500	13.5	8.3	45	0.6	5.5
630	15.5	7.7	41	0.5	2.6
800	14.0	7.8	37	0.4	0.1
1000	16.8	7.9	32	0.3	0.0
1250	18.5	7.8	30	0.3	0.0
1600	13.3	8.0	28	0.3	0.0
2000	10.4	8.9	21	0.3	0.0
2500	9.7	9.7	16	0.4	0.0
3150	8.5	10.2	11	0.4	0.0
HIIC Rating	71	(High-Frequency Impact Insulation Class)		Sum of Deficiencies	16.3

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

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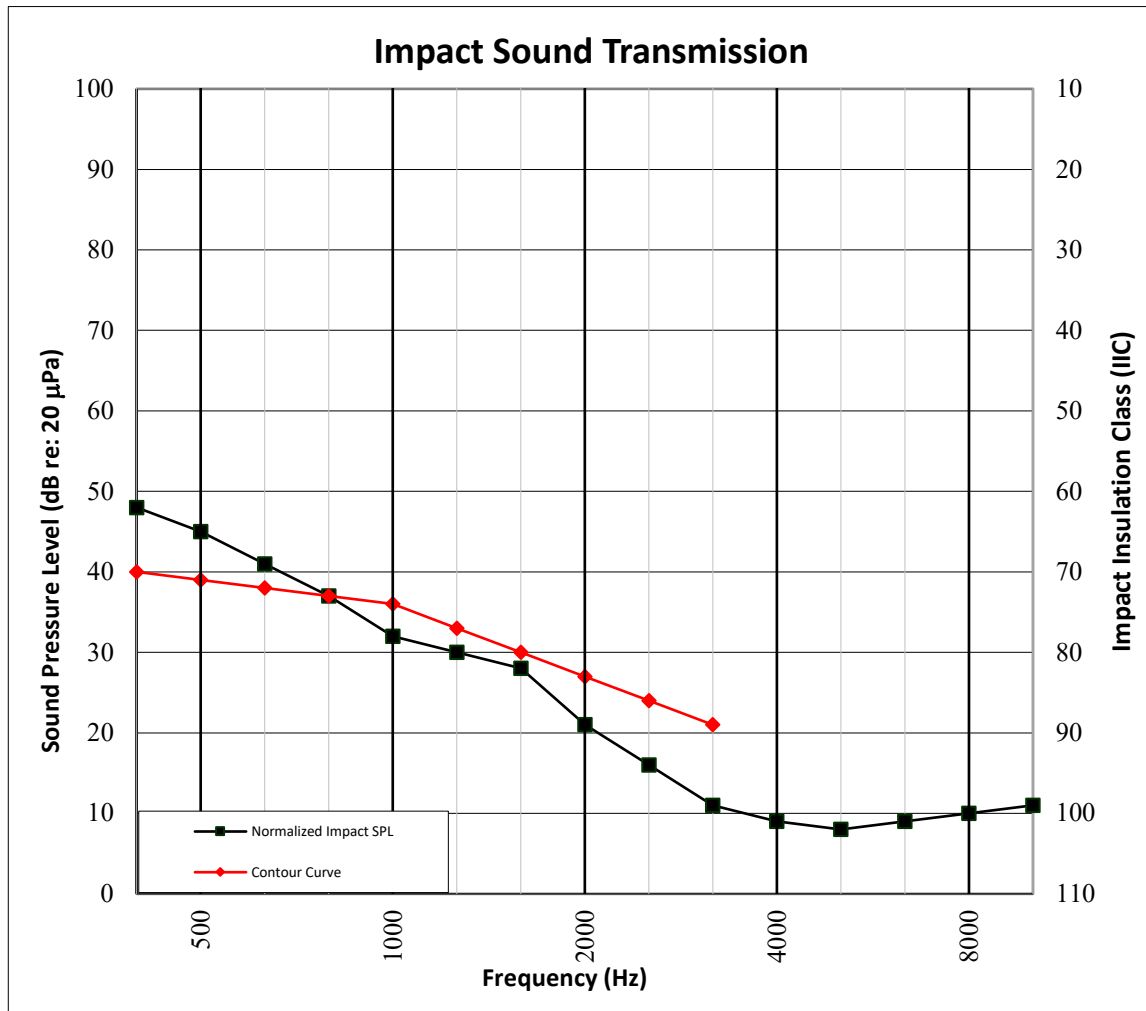
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### SECTION 15

#### TEST RESULTS - HIGH-FREQUENCY IMPACT SOUND TRANSMISSION GRAPH



TEST DATE	8/29/2022				
DATA FILE NO.	P1663.02				
CLIENT	Karndean Designflooring				
DESCRIPTION	4.5 mm Knight Tile Rigid Core SCB KP104 , 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 <sup>2</sup>	Maximum Temp.	24.8°C	Minimum Temp.	24.8°C
TECHNICIAN	MAU	Max. Humidity	71%	Min. Humidity	71%



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**SECTION 16**

**PHOTOGRAPHS**



**Photo No. 1**  
**Source Room View of Test Specimen Installation**

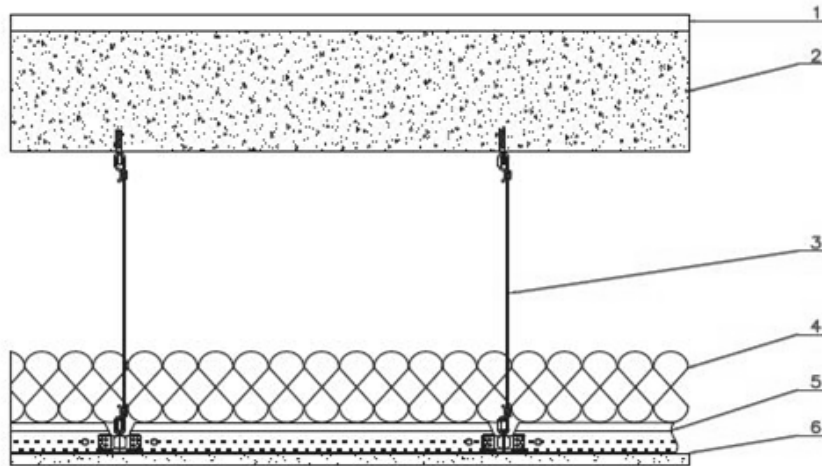


**Photo No. 2**  
**Receive Room View of Test Specimen Installation**

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**SECTION 17****DRAWING**

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



Total Quality. Assured.

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### SECTION 18

#### REVISION LOG

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