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HF DESIGN LLC
ACOUSTICAL PERFORMANCE TEST REPORT

SCOPE OF WORK
ASTM E90 AND ASTM E492 TESTING ON
Nuvelle GRANDEUR

SPECIMEN TYPE
Concrete Slab - 203 mm

REPORT NUMBER
Q9505.01-113-11-R0

TEST DATE(S)
04/12/24

ISSUE DATE
05/22/24

RECORD RETENTION END
04/12/28

PAGES
15

DOCUMENT CONTROL
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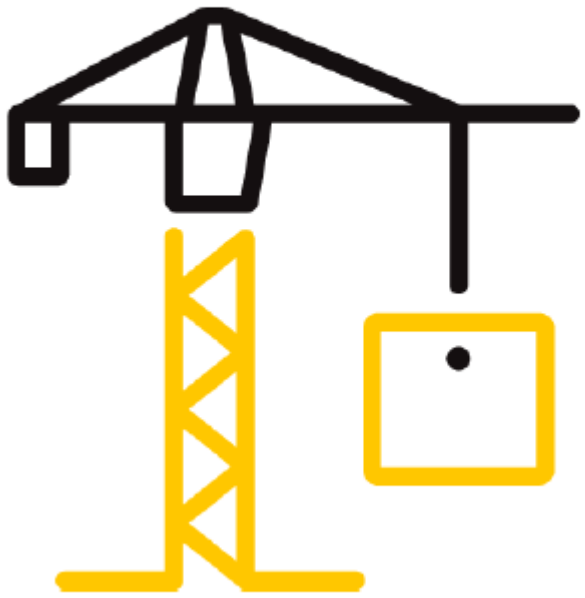

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TEST REPORT FOR HF DESIGN LLC
Report No.: Q9505.01-113-11-R0
Date: 05/22/24

REPORT ISSUED TO
HF DESIGN LLC
242 W 30th Street, 6th Floor
New York, New York 10001

SECTION 1
SCOPE

Architectural Testing, Inc. (an Intertek company) dba Intertek Building & Construction (B&C) was contracted by HF Design LLC to perform testing in accordance with ASTM E90 AND ASTM E492 on HF Design VersaCore Grand 10. 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.	Q9505.01
SERIES/MODEL:	Nuvelle GRANDEUR
STC	55
IIC	55
HIIC	55

COMPLETED BY:	Michael A. Unnone	**REVIEWED BY:**	Daniel B. Mohler
TITLE:	Technician Team Leader - Acoustical Testing	**TITLE:**	Project Manager - Acoustical Testing
SIGNATURE:	Michael Unnone	**SIGNATURE:**	Dan Mohler
DATE:	05/22/24	**DATE:**	05/22/24

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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 (Concrete Slab - 203 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 5892.1 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	03/23	*
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02587	03/23	*
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02608	03/23	*
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02609	03/23	*
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02610	03/23	*
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02612	03/23	*
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	07/23	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63740	12/23	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64902	09/23	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63741	05/23	
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	06/23	
Source Room Environmental Indicator	Comet	T7510	Temperature and Humidity Transmitter	INT00603	05/23	
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	158.34 m³
VT SOURCE ROOM VOLUME	190 m³

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
WPC	2100 by 250	10.0	Nuvelle GRANDEUR	10.98 m^2	11.91 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.				

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TEST REPORT FOR HF DESIGN LLC

Report No.: Q9505.01-113-11-R0
Date: 05/22/24

SECTION 10

TEST RESULTS - AIRBORNE SOUND TRANSMISSION LOSS

IAS ACCREDITED Testing Laboratory

TEST DATE	4/12/2024				
DATA FILE NO.	Q9505.01				
CLIENT	HF Design LLC				
DESCRIPTION	10mm Nuvelle GRANDEUR WPC, 203.2mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m²	Receive Temp.	15.9°C	Source Temp.	18.4°C
TECHNICIAN	MAU	Receive Humidity	88%	Source Humidity	88%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m²	SOURCE SPL (dB)	RECEIVE SPL (dB)	SPECIMEN TL (dB)	95% SAMPLING LIMIT	NUMBER OF DEFICIENCIES
50	40.8	22.9	94	57	36	4.0	-
63	31.3	18.5	93	56	36	5.6	-
80	30.9	13.8	89	56	33	4.4	-
100	25.4	11.4	86	53	34	1.7	-
125	24.7	8.8	89	53	38	2.4	1
160	21.9	8.1	89	53	38	1.4	4
200	19.7	8.9	91	46	46	1.9	0
250	15.1	9.4	94	48	47	1.3	1
315	21.2	8.9	97	49	49	1.0	2
400	19.6	7.2	96	46	52	0.6	2
500	15.6	6.9	94	49	48	0.6	7
630	18.7	7.1	96	49	49	0.7	7
800	17.9	7.0	97	45	53	0.6	4
1000	19.4	7.1	96	39	59	0.5	0
1250	18.9	7.3	96	36	63	0.5	0
1600	17.1	7.3	96	33	65	0.7	0
2000	16.6	7.7	96	31	67	0.4	0
2500	14.6	8.4	94	28	68	0.5	0
3150	14.3	9.0	92	24	69	1.2	0
4000	9.9	13.2	94	22	71	0.5	0
5000	9.0	16.8	94	19	74	0.9	-
6300	9.0	14.8	87	11	76	1.2	-
8000	9.5	24.1	87	9	75	1.0	-
10000	10.2	24.1	81	9	70	1.2	-
STC Rating	55	*(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

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TEST REPORT FOR HF DESIGN LLC

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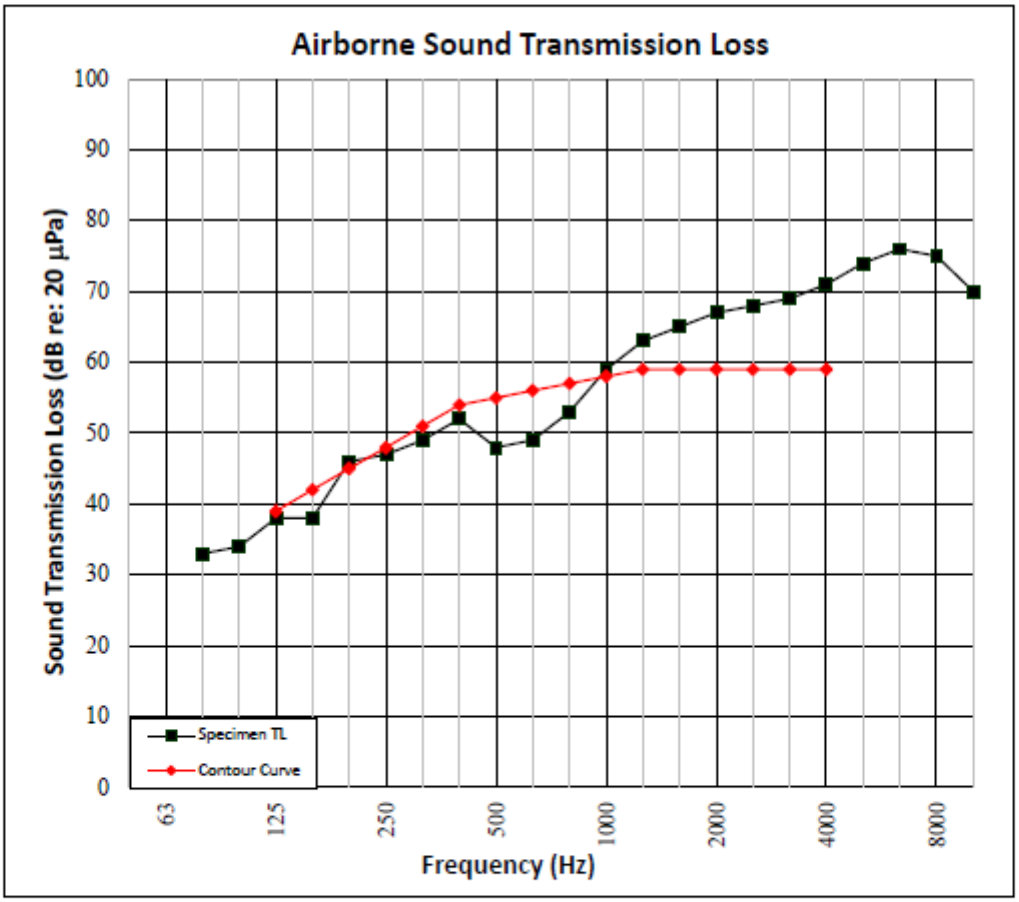
SECTION 11

TEST RESULTS - AIRBORNE SOUND TRANSMISSION LOSS GRAPH

TEST DATE	4/12/2024				
DATA FILE NO.	Q9505.01				
CLIENT	HF Design LLC				
DESCRIPTION	10mm Nuvelle GRANDEUR WPC, 203.2mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m²	Receive Temp.	15.9°C	Source Temp.	18.4°C
TECHNICIAN	MAU	Receive Humidity	88%	Source Humidity	88%



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SECTION 12

TEST RESULTS - IMPACT SOUND TRANSMISSION

IAS ACCREDITED Testing Laboratory

TEST DATE	4/12/2024				
DATA FILE NO.	Q9505.01				
CLIENT	HF Design LLC				
DESCRIPTION	10mm Nuvelle GRANDEUR WPC, 203.2mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m²	Maximum Temp.	15.9°C	Minimum Temp.	15.9°C
TECHNICIAN	MAU	Max. Humidity	88%	Min. Humidity	87%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m²	NORMALIZED IMPACT SPL (dB)	95% SAMPLING LIMIT	NUMBER OF DEFICIENCIES
80	38.1	14.3	51	2.1	-
100	29.3	11.2	51	1.2	0
125	28.2	9.6	56	1.5	0
160	27.8	8.1	56	0.7	0
200	22.5	8.6	59	0.9	2
250	17.3	9.2	61	0.8	4
315	19.6	8.7	59	0.8	2
400	16.9	7.3	58	0.3	2
500	15.3	7.0	61	0.5	6
630	17.7	6.9	58	0.4	4
800	17.4	7.1	57	0.4	4
1000	19.6	7.1	54	0.5	2
1250	19.0	7.4	49	0.6	0
1600	15.0	7.4	45	0.4	0
2000	12.6	7.7	39	0.6	0
2500	10.2	8.5	35	0.6	0
3150	9.0	9.0	28	0.9	0
4000	8.2	13.2	24	1.1	-
5000	8.3	16.8	21	1.4	-
6300	8.8	14.8	16	1.5	-
8000	9.5	24.1	14	1.1	-
10000	10.2	24.1	15	1.0	-
IIC Rating	55	*(Impact Insulation Class)*		Sum of Deficiencies	26

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

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Report No.: Q9505.01-113-11-R0
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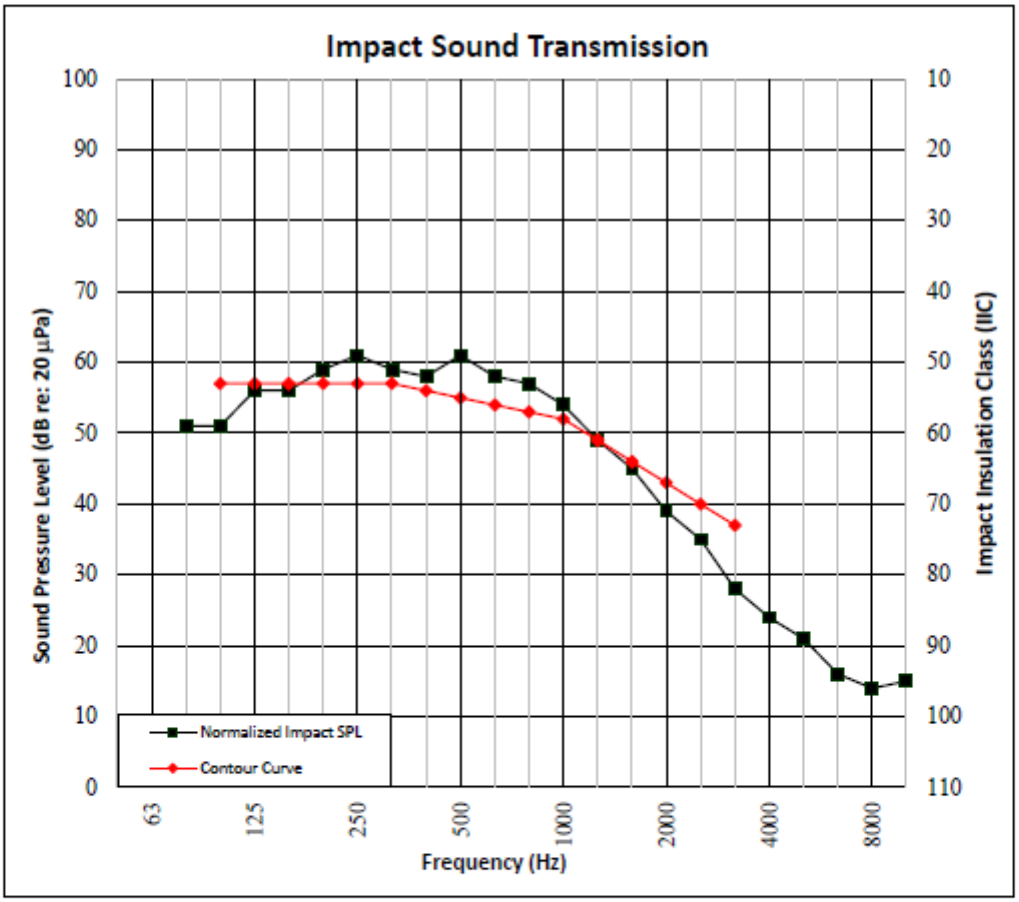
SECTION 13

TEST RESULTS - IMPACT SOUND TRANSMISSION GRAPH

IAS ACCREDITED Testing Laboratory

TEST DATE	4/12/2024				
DATA FILE NO.	Q9505.01				
CLIENT	HF Design LLC				
DESCRIPTION	10mm Nuvelle GRANDEUR WPC, 203.2mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m²	Maximum Temp.	15.9°C	Minimum Temp.	15.9°C
TECHNICIAN	MAU	Max. Humidity	88%	Min. Humidity	87%



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TEST REPORT FOR HF DESIGN LLC

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SECTION 14

TEST RESULTS - HIGH-FREQUENCY IMPACT SOUND TRANSMISSION

TEST DATE	4/12/2024				
DATA FILE NO.	Q9505.01				
CLIENT	HF Design LLC				
DESCRIPTION	10mm Nuvelle GRANDEUR WPC, 203.2mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m²	Maximum Temp.	15.9°C	Minimum Temp.	15.9°C
TECHNICIAN	MAU	Max. Humidity	88%	Min. Humidity	87%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m²	NORMALIZED IMPACT SPL (dB)	95% SAMPLE CONFIDENCE LIMIT	NUMBER OF DEFICIENCIES
400	16.9	7.3	58	0.3	1.6
500	15.3	7.0	61	0.5	5.7
630	17.7	6.9	58	0.4	4.2
800	17.4	7.1	57	0.4	4.2
1000	19.6	7.1	54	0.5	2.4
1250	19.0	7.4	49	0.6	0.3
1600	15.0	7.4	45	0.4	0.0
2000	12.6	7.7	39	0.6	0.0
2500	10.2	8.5	35	0.6	0.0
3150	9.0	9.0	28	0.9	0.0
HIIC Rating	55	*(High-Frequency Impact Insulation Class)*		Sum of Deficiencies	18.3

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

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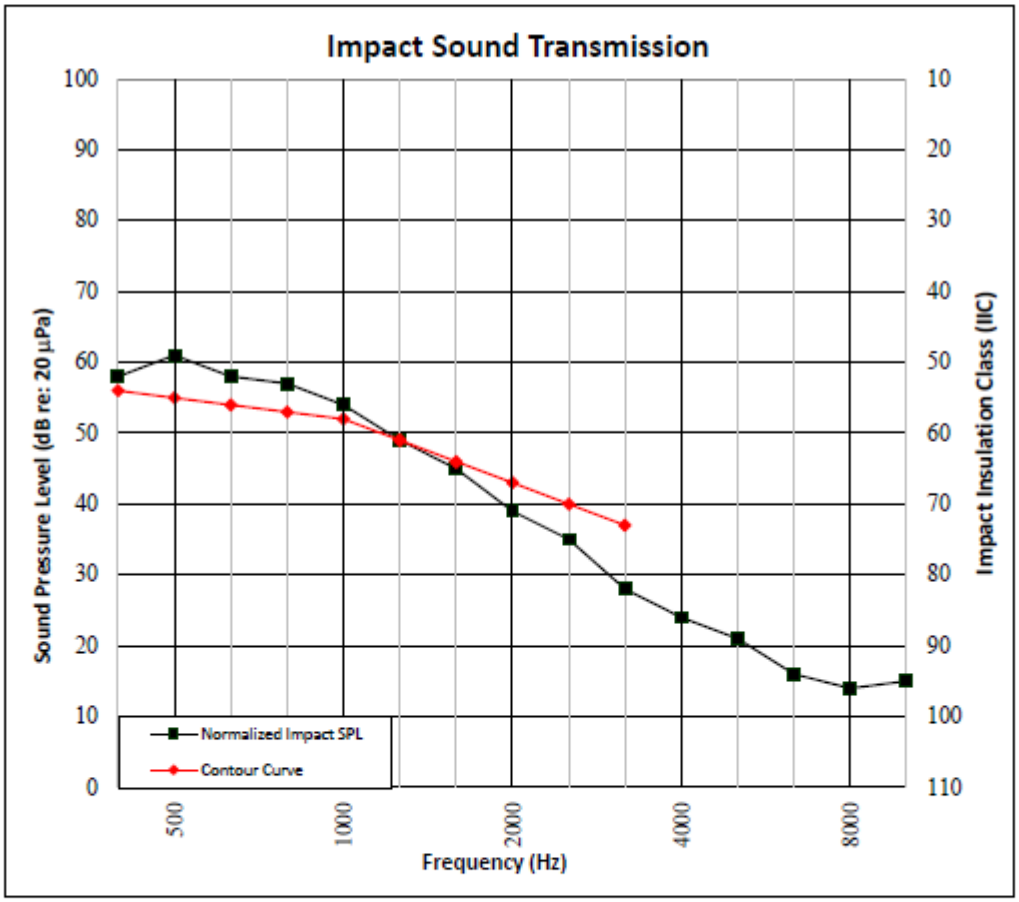
TEST REPORT FOR HF DESIGN LLC

Report No.: Q9505.01-113-11-R0
Date: 05/22/24

SECTION 15

TEST RESULTS - HIGH-FREQUENCY IMPACT SOUND TRANSMISSION GRAPH

TEST DATE	4/12/2024				
DATA FILE NO.	Q9505.01				
CLIENT	HF Design LLC				
DESCRIPTION	10mm Nuvelle GRANDEUR WPC, 203.2mm 5000 PSI Concrete Slab				
SPECIMEN AREA	10.98 m²	Maximum Temp.	15.9°C	Minimum Temp.	15.9°C
TECHNICIAN	MAU	Max. Humidity	88%	Min. Humidity	87%



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TEST REPORT FOR HF DESIGN LLC
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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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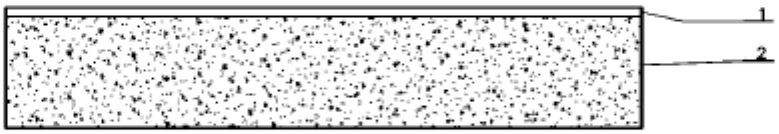
SECTION 17
DRAWING



1-Floor Topping
2-Concrete Slab

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SECTION 18

REVISION LOG

REVISION #	DATE	PAGES	DESCRIPTION
R0	05/22/24	N/A	Original Report Issue