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VULCRAFT/VERCO GROUP
ACOUSTICAL PERFORMANCE TEST REPORT

SCOPE OF WORK
ASTM E90 AND ASTM E492 TESTING ON
CERAMIC TILE OVER 5 MM ECOSILENCE UNDERLAYMENT

SPECIMEN TYPE
Vulcraft 20 Gage Dove Tail 2.00 Steel Deck with Wire-Hung Gypsum Board Ceiling

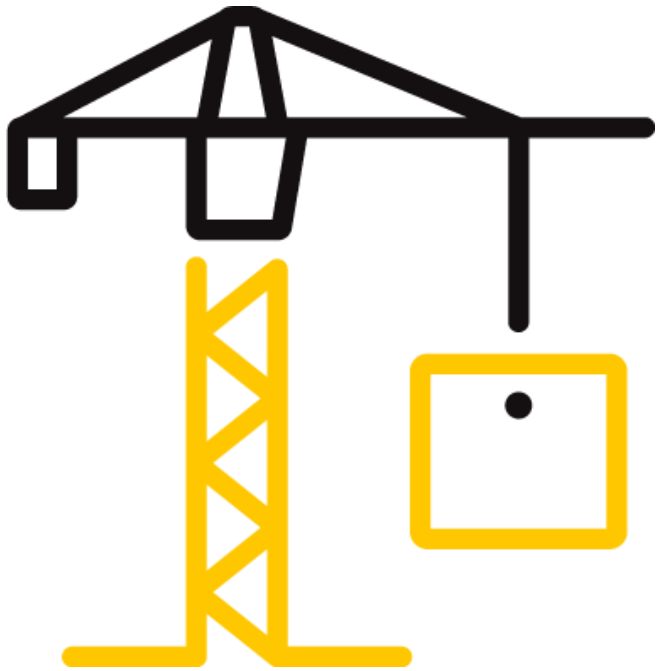
REPORT NUMBER
I5133.01-113-11-R0

TEST DATE
05/27/18

ISSUE DATE
06/07/18

RECORD RETENTION END
05/27/22

PAGES
12



DOCUMENT CONTROL
ATI 00629 (09/19/17)
RTTDS-R-AMER-Test-2844

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York, PA 17406

Telephone: 717-764-7700
Facsimile: 717-764-4129
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Report No.: I5133.01-113-11-R0
Date: 06/07/18

REPORT ISSUED TO

VULCRAFT/VERCO GROUP
7205 Gault Avenue North
Fort Payne, Alabama 35967

SECTION 1

SCOPE

Intertek Building & Construction (B&C) was contracted by to perform testing in accordance with ASTM E90 AND ASTM E492 on Ceramic Tile over 5 mm ECOsilence Underlayment. Results obtained are tested values and were secured by using the designated test method(s). 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.	I5133.01
SERIES/MODEL:	Ceramic Tile over 5 mm ECOsilence Underlayment
STC	62
IIC	60

COMPLETED BY:	Zachary P. Golden	**COMPLETED BY:**	Jordan Strybos
TITLE:	Technician Team Leader - Acoustical Testing	**TITLE:**	Project Manager - Acoustical Testing
SIGNATURE:	Digitally Signed by: Zachary Golden	**SIGNATURE:**	Digitally Signed by: Jordan Strybos
DATE:	06/07/18	**DATE:**	06/07/18

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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 E989-06 (2012), *Classification for Determination of Impact Insulation Class (IIC)*

ASTM E2235-04 (2012), *Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods*

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 (Vulcraft 20 Gage Dove Tail 2.00 Steel Deck with Wire-Hung Gypsum Board 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 3225 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.

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SECTION 5
EQUIPMENT

INSTRUMENT	MANUFACTURER	MODEL	DESCRIPTION	ASSET #	CAL DATE	
Data Acquisition Unit	National Instruments	PXI-1033	Data Acquisition Card	63763-1	06/16	*
Data Acquisition Unit	National Instruments	PXI-4462	Data Acquisition Card	63763-4	07/16	*
Data Acquisition Unit	National Instruments	PXI-4462	Data Acquisition Card	63763-5	06/16	*
Microphone Calibrator	Norsonic	1251	Pistonphone calibrator	65105	06/17	
Receive Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	INT01089	12/17	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	65586	02/18	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	65969	04/18	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63747	09/17	
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	65968	01/18	
Receive Room Environmental Indicator	Comet	T7510	Temperature and Humidity Transmitter	63810	10/17	
				63811	10/17	
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	INT01009	02/18	
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	63739	04/18	
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	63740	04/18	
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	63742	03/18	
Source Room Microphone	PCB Electronics	378C20	Microphone and Preamplifier	63741	04/18	
Source Room Environmental Indicator	Comet	T7510	Temperature and Humidity Transmitter	INT00603	03/18	
Tapping Machine	Norsonic	Nor277	Tapping Machine	INT00936	12/17	

* 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
Zachary P. Golden	Intertek B&C
Michael K. Daniel	Intertek B&C

130 Derry Court
York, PA 17406

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Facsimile: 717-764-4129
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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 received 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) and IIC (Impact Insulation Class) ratings were calculated in accordance with ASTM E413 and ASTM E989, respectively.

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SECTION 9
TEST SPECIMEN DESCRIPTION

MATERIAL	DIMENSIONS (mm/inch)	THICKNESS (mm/inch)	MANUFACTURER AND SERIES	QUANTITY	AVERAGE WEIGHT
Ceramic Tile	304.8 by 304.8	8.5	Daltile	10.98 m²	15.72 kg/m²
	Note: Laticrete Permacolor grout was placed into the 6.35 mm joints between the porcelain tile and wiped clean. The ceramic tile was placed with light pressure onto a bed of Laticrete Platinum 254 mortar on the underlayment. The mortar was set using a 6.35 mm by 6.35 mm trowel. Both the grout and mortar were allowed to cure to manufacturer's specifications.				
Rubber Underlayment	3023 by 1219	5.0	ECOsilence	10.98 m²	4.2 kg/m²
	Note: A sheet of 2 mil polyethylene plastic was adhered to the floor slab with 3M Super 77 spray adhesive. The underlayment was adhered to the sheeting with ECORE™ EGrip™ III adhesive, which was spread using a 0.79 mm by 1.59 mm by 0.79 mm trowel. Adhesive was allowed to cure per manufacturer's specifications.				
Standard 4000 PSI Concrete	3023 by 3632	139.7	N/A	10.98 m²	248.08 kg/m²
	Note: Poured directly on the floor deck and allowed to cure for a minimum of 28 days.				
Dove Tail Steel Deck	3023 by 609.6	139.7	20 Gage Vulcraft	10.98 m²	12.01 kg/m²
	Note: Installed per manufacturer's specifications in a test frame with the top of the concrete flush with the source room. All seams and gaps underneath the deck were plugged with backer rod and sealed with Pecora AC-20 Acoustical Sealant.				
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 eyehooks in 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	2962 by 584	88.9	Johns Manville Kraft Faced R-13	10.98 m²	1.32 kg/m²
	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 m²	11.23 kg/m²
	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

ACCREDITED Testing Laboratory

TEST DATE	5/27/2018				
DATA FILE NO.	I5133.01				
CLIENT	Vulcraft/Verco Group				
DESCRIPTION	8.5 mm Daltile Ceramic Tile, 5 mm ECOsilence Rubber Underlayment, 139.7 mm Standard 4000 PSI Concrete, 139.7 mm 20 Gage Vulcraft Dove Tail Steel Deck, 43 mm Armstrong HD8906 Drywall Main Beam, 37.3 mm Armstrong XL8945P Cross Tee, 88.9 mm Johns Manville Kraft Faced R-13 Fiberglass Insulation, 15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel				
SPECIMEN AREA	10.98 m²	**Receive Temp.**	22.1°C	**Source Temp.**	21.1°C
TECHNICIAN	MKD	**Receive Humidity**	71%	**Source Humidity**	71%

FREQ (Hz)	**BACKGROUND SPL** (dB)	**ABSORPTION** m²	**SOURCE SPL** (dB)	**RECEIVE SPL** (dB)	**SPECIMEN TL** (dB)	**95% CONFIDENCE LIMIT**	**NUMBER OF DEFICIENCIES**
80	23.9	15.7	109	69	38	4.8	-
100	22.0	13.3	107	67	39	1.8	-
125	28.5	9.9	106	64	42	1.2	4
160	17.6	9.8	107	65	43	1.5	6
200	15.5	10.4	104	57	48	0.7	4
250	27.3	10.5	104	54	50	1.4	5
315	20.0	10.0	107	54	53	0.9	5
400	18.1	8.3	104	49	56	0.8	5
500	19.7	7.4	104	44	62	0.6	0
630	13.3	7.1	105	43	64	0.4	0
800	12.8	7.4	104	40	66	0.4	0
1000	11.4	7.3	105	39	67	0.4	0
1250	7.5	7.2	104	39	68	0.5	0
1600	6.2	7.4	104	38	68	0.3	0
2000	6.1	8.1	104	38	68	0.4	0
2500	6.3	9.0	102	36	66	0.3	0
3150	6.9	9.8	103	33	70	0.4	0
4000	7.7	10.9	104	32	72	0.4	0
5000	8.5	12.4	104	28	75	0.5	-
6300	9.4	15.2	97	19	77	0.8	-
8000	10.2	19.4	97	15	79	0.8	-
10000	11.1	23.7	92	11	78	0.8	-
STC Rating	**62**	*(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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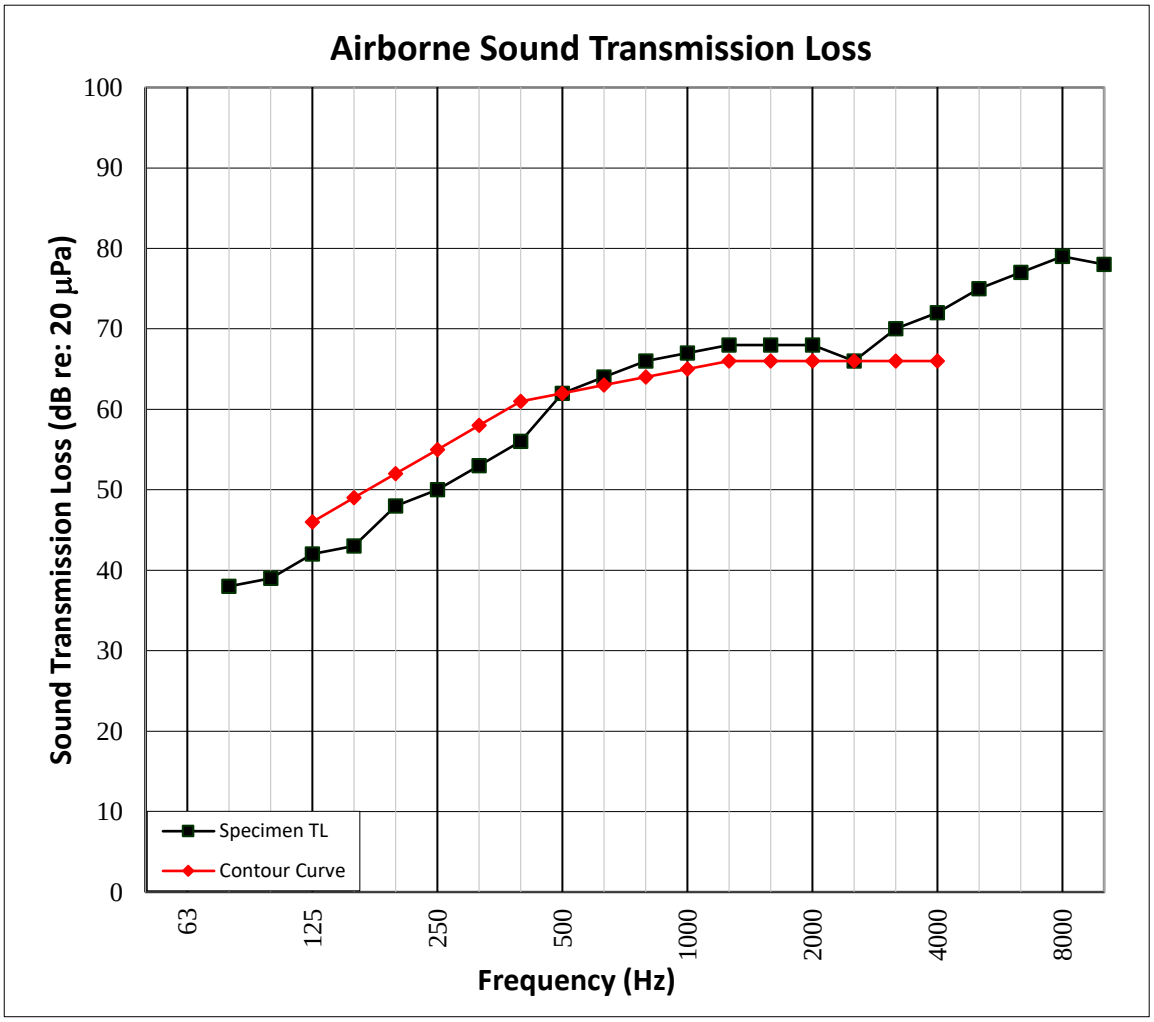
SECTION 11

TEST RESULTS - AIRBORNE SOUND TRANSMISSION LOSS GRAPH

ACCREDITED Testing Laboratory

TEST DATE	5/27/2018				
DATA FILE NO.	I5133.01				
CLIENT	Vulcraft/Verco Group				
DESCRIPTION	8.5 mm Daltile Ceramic Tile, 5 mm ECOsilence Rubber Underlayment, 139.7 mm Standard 4000 PSI Concrete, 139.7 mm 20 Gage Vulcraft Dove Tail Steel Deck, 43 mm Armstrong HD8906 Drywall Main Beam, 37.3 mm Armstrong XL8945P Cross Tee, 88.9 mm Johns Manville Kraft Faced R-13 Fiberglass Insulation, 15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel				
SPECIMEN AREA	10.98 m²	**Receive Temp.**	22.1°C	**Source Temp.**	21.1°C
TECHNICIAN	MKD	**Receive Humidity**	71%	**Source Humidity**	71%



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SECTION 12

TEST RESULTS - IMPACT SOUND TRANSMISSION

ACCREDITED Testing Laboratory

TEST DATE	5/27/2018				
DATA FILE NO.	I5133.01				
CLIENT	Vulcraft/Verco Group				
DESCRIPTION	8.5 mm Daltile Ceramic Tile, 5 mm ECOsilence Rubber Underlayment, 139.7 mm Standard 4000 PSI Concrete, 139.7 mm 20 Gage Vulcraft Dove Tail Steel Deck, 43 mm Armstrong HD8906 Drywall Main Beam, 37.3 mm Armstrong XL8945P Cross Tee, 88.9 mm Johns Manville Kraft Faced R-13 Fiberglass Insulation, 15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel				
SPECIMEN AREA	10.98 m²	**Maximum Temp.**	22.2°C	**Minimum Temp.**	22.1°C
TECHNICIAN	MKD	**Max. Humidity**	72%	**Min. Humidity**	71%

FREQ (Hz)	**BACKGROUND SPL** (dB)	**ABSORPTION** m²	**NORMALIZED IMPACT SPL** (dB)	**95% CONFIDENCE LIMIT**	**NUMBER OF DEFICIENCIES**
80	24.7	14.1	49	1.6	-
100	20.4	13.6	53	1.4	1
125	25.1	10.5	52	0.9	0
160	15.5	10.3	50	0.7	0
200	14.9	11.4	53	0.9	1
250	27.1	10.4	54	0.6	2
315	19.9	9.4	55	0.9	3
400	18.1	8.1	54	0.6	3
500	19.6	7.6	51	0.5	1
630	12.7	7.0	51	0.4	2
800	12.5	7.3	51	0.4	3
1000	11.7	7.3	48	0.2	1
1250	8.4	7.2	45	0.2	1
1600	6.9	7.5	42	0.2	1
2000	6.9	8.1	40	0.2	2
2500	6.8	9.1	42	0.2	7
3150	7.2	9.7	36	0.3	4
4000	8.0	11.1	30	0.3	-
5000	8.9	12.5	23	0.4	-
6300	9.8	15.2	14	0.4	-
8000	10.5	19.2	13	0.6	-
10000	11.2	23.5	14	0.6	-
IIC Rating	**60**	*(Impact Insulation Class)*		**Sum of Deficiencies**	**32**

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

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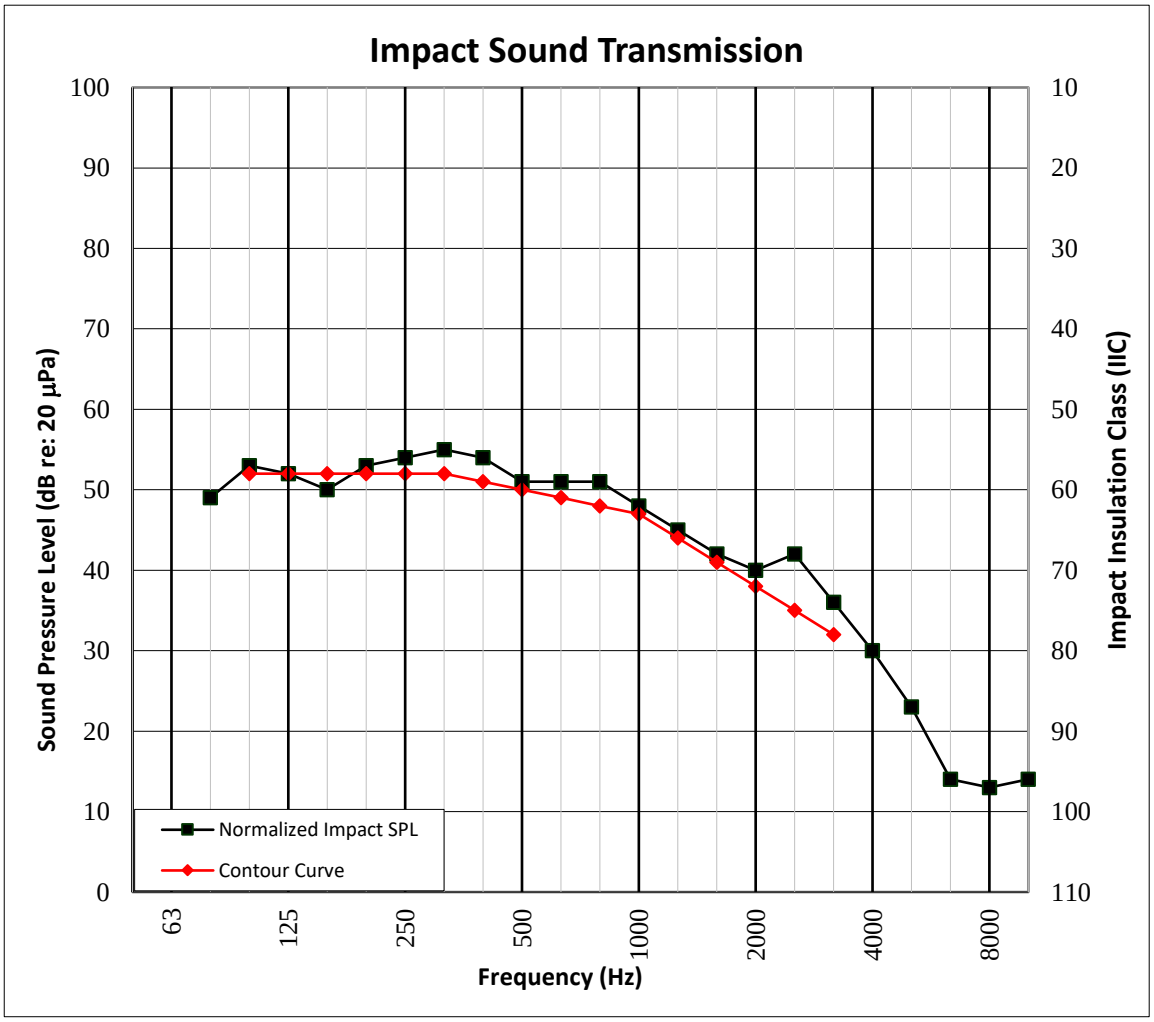
SECTION 13

TEST RESULTS - IMPACT SOUND TRANSMISSION GRAPH

ACCREDITED Testing Laboratory

TEST DATE	5/27/2018				
DATA FILE NO.	I5133.01				
CLIENT	Vulcraft/Verco Group				
DESCRIPTION	8.5 mm Daltile Ceramic Tile, 5 mm ECOsilence Rubber Underlayment, 139.7 mm Standard 4000 PSI Concrete, 139.7 mm 20 Gage Vulcraft Dove Tail Steel Deck, 43 mm Armstrong HD8906 Drywall Main Beam, 37.3 mm Armstrong XL8945P Cross Tee, 88.9 mm Johns Manville Kraft Faced R-13 Fiberglass Insulation, 15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel				
SPECIMEN AREA	10.98 m²	**Maximum Temp.**	22.2°C	**Minimum Temp.**	22.1°C
TECHNICIAN	MKD	**Max. Humidity**	72%	**Min. Humidity**	71%



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SECTION 14
PHOTOGRAPHS

Photo No. 1
Close-Up of Test Specimen

Photo No. 2
Receive Room View of Test Specimen Installation

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SECTION 15

REVISION LOG

REVISION #	DATE	PAGES	DESCRIPTION
R0	06/07/18	N/A	Original Report Issue