

WORTHINGTON ARMSTRONG VENTURE ACOUSTICAL PERFORMANCE TEST REPORT

SCOPE OF WORK

ASTM E90 AND ASTM E492 TESTING ON SHAW COMO LUXURY VINYL TILE - SONUSCLIP
WITH TWO-LAYER GYPSUM BOARD CEILING

SPECIMEN TYPE

Open Web Truss - 457 mm

REPORT NUMBER

J9666.03-113-11-R1

TEST DATE

08/02/19

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09/12/19

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10/18/19

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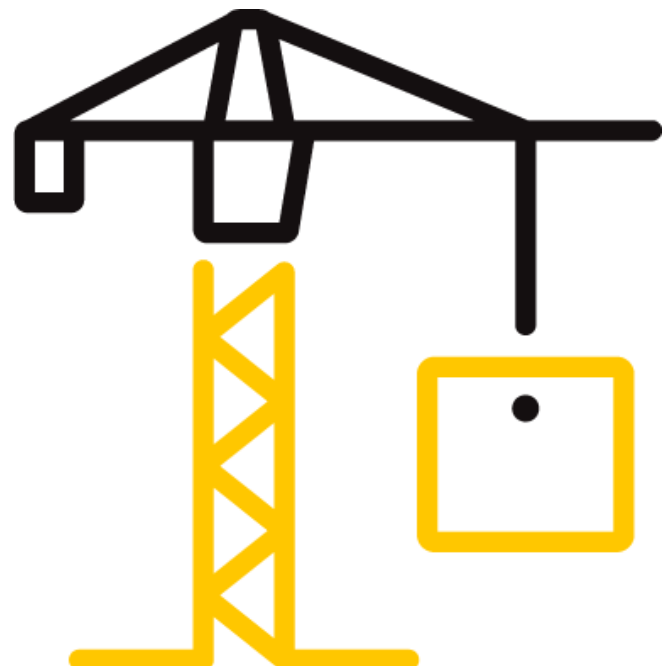
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TEST REPORT FOR WORTHINGTON ARMSTRONG VENTURE

Report No.: J9666.03-113-11-R1

Date: 10/18/19

REPORT ISSUED TO

WORTHINGTON ARMSTRONG VENTURE

101 Lindenwood Drive Suite 350

Malvern, Pennsylvania 19355

SECTION 1

SCOPE

Intertek Building & Construction (B&C) was contracted by Worthington Armstrong Venture to perform testing in accordance with ASTM E90 AND ASTM E492 on Shaw Como Luxury Vinyl Tile - SonusClip with Two-Layer Gypsum Board Ceiling. 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.	J9666.03
SERIES/MODEL:	Shaw Como Luxury Vinyl Tile - SonusClip with Two-Layer Gypsum Board Ceiling
STC	63
IIC	59

COMPLETED BY: Morgan S. J. Kennedy
Technician - Acoustical
TITLE: Testing
SIGNATURE:
DATE: 10/18/19

COMPLETED BY: Jordan Strybos
Engineer, Team Lead -
TITLE: Acoustical Testing
SIGNATURE:
DATE: 10/18/19

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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 E989-18, *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 (Open Web Truss - 457 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 1127 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-4462	Data Acquisition Card	INT00977	08/18 *
Data Acquisition Unit	National Instruments	PXI-4462	Data Acquisition Card	65124	05/18 *
Data Acquisition Unit	National Instruments	PXI-4462	Data Acquisition Card	63763-1	06/18 *
Microphone Calibrator	Norsonic	1251	Pistonphone Calibrator	65105	06/19
Receive Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	63741	04/19
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63739	04/19
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	67340	04/19
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63746	09/18
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	65617	06/19
Receive Room Environmental Indicator	Comet	T7510	Temperature and Humidity Transmitter	63810	10/18
				63811	10/18
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	65029	03/19
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	65586	02/19
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	INT01089	01/19
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	INT00652	01/19
Source Room Microphone	PCB Electronics	378C20	Microphone and Preamplifier	63742	03/19
Source Room Environmental Indicator	Comet	T7510	Temperature and Humidity Transmitter	63812	10/18
Tapping Machine	Norsonic	Nor277	Tapping Machine	INT00936	12/18

* 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
Seth J. Allen	Intertek B&C
Jordan Strybos	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 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)	THICKNESS (mm)	MANUFACTURER AND SERIES	QUANTITY	AVERAGE WEIGHT
Luxury Vinyl Plank	1220 by 150	5.5	Shaw Como	10.98 m ²	6.2 kg/m ²
	Note: Loose laid				
Gypsum Underlayment	3023 by 3632	25.4	Formulated Materials Treadstone™ FR25	10.98 m ²	45.85 kg/m ²
	Note: Poured directly onto the subfloor underlayment, cured a minimum of 14 days. The gypsum panel had a closed cell foam perimeter isolation. No noticeable shrinkage or cracking was visible on the specimen.				
Oriented Strand Board Sheathing	1219 by 2438	18.8	N/A	10.98 m ²	13.82 kg/m ²
	Note: Fastened to trusses with 76 mm by 3 mm framing nails on 203 mm centers along perimeter and 305 mm centers in the field.				
Fiberglass Insulation	520.7 by 3023	88.9	Johns Manville Unfaced R-13	10.98 m ²	1.32 kg/m ²
	Note: Installed over drywall grid cross tees				
Open Web Truss	88.9 by 2934	457.2	York PB Truss L/360	7 trusses	19.05 kg/truss
	Note: Installed on 610 mm centers using JUS414 hanger brackets.				
Resilient Sound Isolation Clip	38.1 by 44.5	111.1	Regupol® SonusClip 90DE™	20 clips	0.08 kg/clip
	Note: Attached to the bottom of the trusses in a 610 mm by 1219 mm grid pattern				
Drywall Main Beam	38.1 by 2870	43.0	Armstrong HD8906IIC	10.9 lin m	0.45 kg/m
	Note: The main beams were attached directly to the Regupol SonusClips creating a 153 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 406 mm centers. The measured steel thickness was 0.5 mm.				
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.				
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.				

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SECTION 10

TEST RESULTS - AIRBORNE SOUND TRANSMISSION LOSS



TEST DATE	8/2/2019				
DATA FILE NO.	J9666.03				
CLIENT	Worthington Armstrong Venture				
DESCRIPTION	5.5 mm Shaw Como Luxury Vinyl Plank, 25.4 mm Formulated Materials Treadstone™ FR25 Gypsum Underlayment, 18.8 mm Oriented Strand Board Sheathing, 88.9 mm Johns Manville Unfaced R-13 Fiberglass Insulation, 457.2 mm York PB Truss L/360 Open Web Truss, 111.1 mm Regupol® SonusClip 90DE™ Resilient Sound Isolation Clip, 43 mm Armstrong HD8906IIC Drywall Main Beam, 37.3 mm Armstrong XL8945P Cross Tee, 15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel, 15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel				
SPECIMEN AREA	10.98 m ²	Receive Temp.	22.3°C	Source Temp.	21.5°C
TECHNICIAN	SJA	Receive Humidity	71%	Source Humidity	71%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m ²	SOURCE SPL (dB)	RECEIVE SPL (dB)	SPECIMEN TL (dB)	95% CONFIDENCE LIMIT	NUMBER OF DEFICIENCIES
80	45.0	18.0	105	63	42	2.3	-
100	38.4	12.7	105	67	39	2.1	-
125	35.2	10.9	102	61	43	1.7	4
160	38.7	9.2	101	60	43	0.7	7
200	33.3	9.4	105	57	50	1.5	3
250	22.5	9.9	105	54	52	1.0	4
315	23.8	9.7	103	51	53	0.6	6
400	20.4	8.2	104	49	58	0.8	4
500	21.6	8.1	103	45	61	0.6	2
630	23.2	7.9	104	43	63	0.4	1
800	22.3	7.9	104	41	65	0.4	0
1000	19.9	7.9	103	39	65	0.4	1
1250	19.7	7.9	103	38	68	0.4	0
1600	13.4	8.1	103	36	69	0.5	0
2000	12.1	8.7	103	36	69	0.4	0
2500	9.7	10.0	101	34	69	0.4	0
3150	7.8	10.7	102	30	74	0.4	0
4000	7.0	12.0	103	28	76	0.6	0
5000	6.3	13.7	103	24	79	0.6	-
6300	6.5	16.9	96	14	82	0.8	-
8000	6.9	21.8	96	10	84	0.9	-
10000	7.0	21.8	90	6	82	0.8	-
STC Rating	63	<i>(Sound Transmission Class)</i>			Sum of Deficiencies	32	

- 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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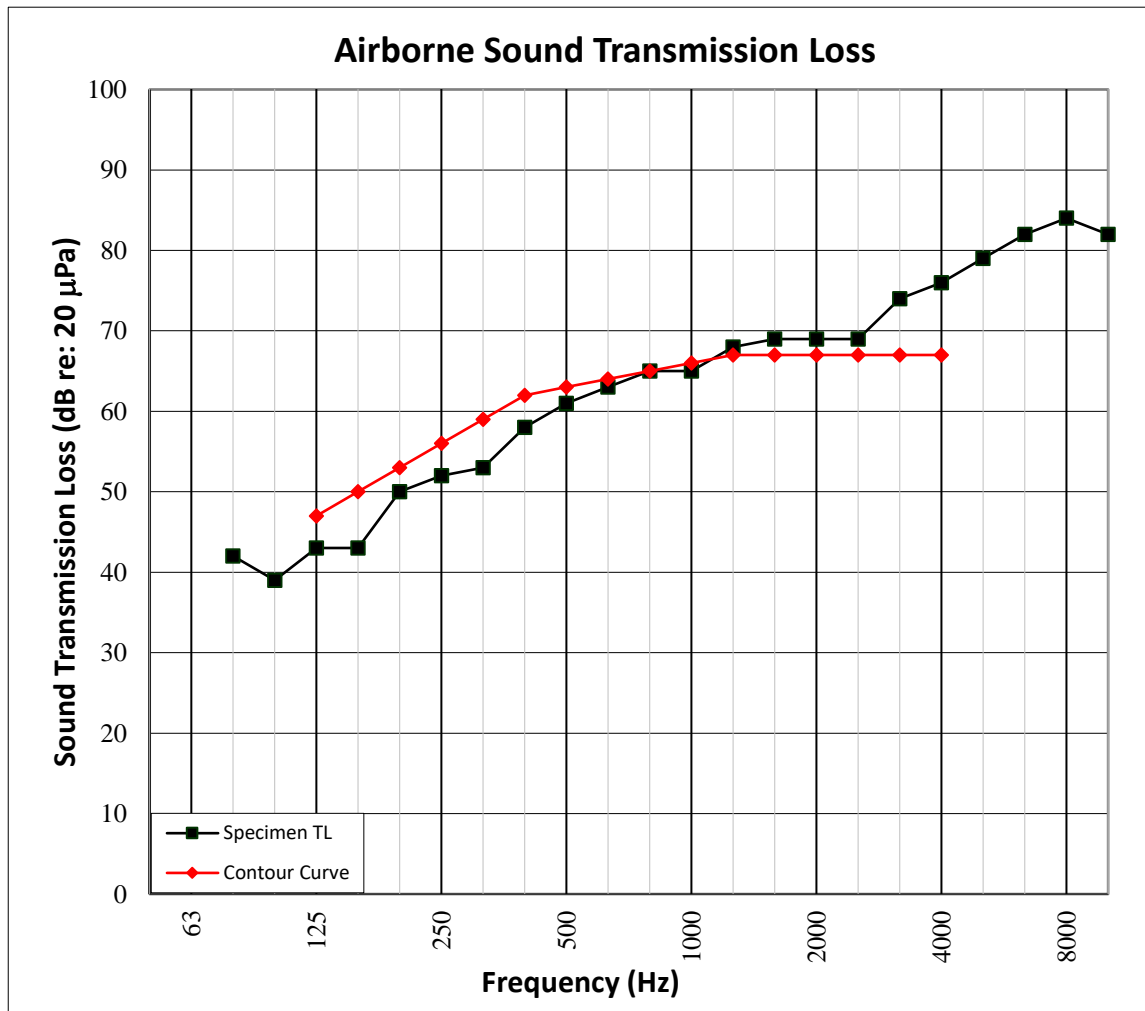
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SECTION 11

TEST RESULTS - AIRBORNE SOUND TRANSMISSION LOSS GRAPH



TEST DATE	8/2/2019				
DATA FILE NO.	J9666.03				
CLIENT	Worthington Armstrong Venture				
DESCRIPTION	5.5 mm Shaw Como Luxury Vinyl Plank, 25.4 mm Formulated Materials Treadstone™ FR25 Gypsum Underlayment, 18.8 mm Oriented Strand Board Sheathing, 88.9 mm Johns Manville Unfaced R-13 Fiberglass Insulation, 457.2 mm York PB Truss L/360 Open Web Truss, 111.1 mm Regupol® SonusClip 90DE™ Resilient Sound Isolation Clip, 43 mm Armstrong HD8906IIC Drywall Main Beam, 37.3 mm Armstrong XL8945P Cross Tee, 15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel, 15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel				
SPECIMEN AREA	10.98 m ²	Receive Temp.	22.3°C	Source Temp.	21.5°C
TECHNICIAN	SJA	Receive Humidity	71%	Source Humidity	71%



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SECTION 12

TEST RESULTS - IMPACT SOUND TRANSMISSION



TEST DATE	8/2/2019				
DATA FILE NO.	J9666.03				
CLIENT	Worthington Armstrong Venture				
DESCRIPTION	5.5 mm Shaw Como Luxury Vinyl Plank, 25.4 mm Formulated Materials Treadstone™ FR25 Gypsum Underlayment, 18.8 mm Oriented Strand Board Sheathing, 88.9 mm Johns Manville Unfaced R-13 Fiberglass Insulation, 457.2 mm York PB Truss L/360 Open Web Truss, 111.1 mm Regupol® SonusClip 90DE™ Resilient Sound Isolation Clip, 43 mm Armstrong HD8906IIC Drywall Main Beam, 37.3 mm Armstrong XL8945P Cross Tee, 15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel, 15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel				
SPECIMEN AREA	10.98 m ²	Maximum Temp.	22.3°C	Minimum Temp.	22.3°C
TECHNICIAN	SJA	Max. Humidity	71%	Min. Humidity	71%

FREQ (Hz)	BACKGROUND SPL (dB)	ABSORPTION m ²	NORMALIZED IMPACT SPL (dB)	95% CONFIDENCE LIMIT	NUMBER OF DEFICIENCIES
80	45.1	16.8	61	2.3	-
100	36.3	12.0	57	0.9	4
125	37.7	10.4	56	0.7	3
160	39.0	9.2	58	0.8	5
200	33.1	8.9	57	0.5	4
250	23.2	10.0	58	0.9	5
315	22.2	10.0	57	0.7	4
400	18.3	8.2	55	0.4	3
500	18.9	8.0	53	0.3	2
630	22.4	7.9	51	0.2	1
800	22.3	7.9	48	0.2	0
1000	19.2	7.9	45	0.3	0
1250	18.4	8.1	40	0.2	0
1600	13.2	8.1	39	0.2	0
2000	11.4	8.9	38	0.2	0
2500	8.3	9.9	33	0.2	0
3150	7.5	10.7	23	0.3	0
4000	7.0	12.0	14	0.4	-
5000	6.2	13.7	9	0.3	-
6300	6.4	16.9	8	0.3	-
8000	7.1	21.7	9	0.4	-
10000	7.2	21.7	9	0.5	-
IIC Rating	59	<i>(Impact Insulation Class)</i>		Sum of Deficiencies	31

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

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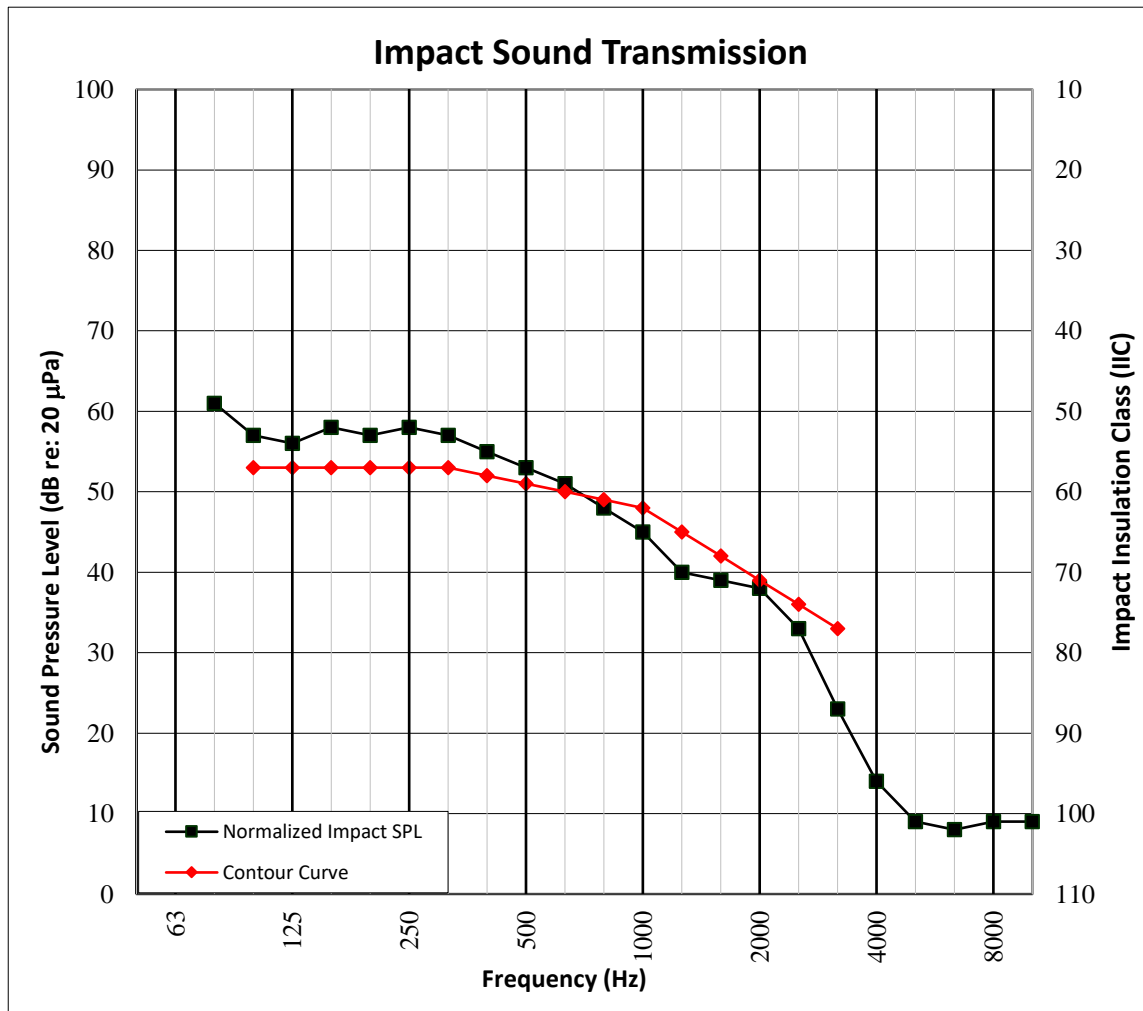
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SECTION 13

TEST RESULTS - IMPACT SOUND TRANSMISSION GRAPH



TEST DATE	8/2/2019				
DATA FILE NO.	J9666.03				
CLIENT	Worthington Armstrong Venture				
DESCRIPTION	5.5 mm Shaw Como Luxury Vinyl Plank, 25.4 mm Formulated Materials Treadstone™ FR25 Gypsum Underlayment, 18.8 mm Oriented Strand Board Sheathing, 88.9 mm Johns Manville Unfaced R-13 Fiberglass Insulation, 457.2 mm York PB Truss L/360 Open Web Truss, 111.1 mm Regupol® SonusClip 90DE™ Resilient Sound Isolation Clip, 43 mm Armstrong HD8906IIC Drywall Main Beam, 37.3 mm Armstrong XL8945P Cross Tee, 15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel, 15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel				
SPECIMEN AREA	10.98 m ²	Maximum Temp.	22.3°C	Minimum Temp.	22.3°C
TECHNICIAN	SJA	Max. Humidity	71%	Min. Humidity	71%



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SECTION 14

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 15

REVISION LOG

REVISION #	DATE	PAGES	DESCRIPTION
R0	09/12/19	N/A	Original Report Issue
R1	10/18/19	Page 6	Corrected Insulation Note