Veneklasen Associates
Consultants in Acoustics | Noise | Vibration | AV | IT

Laboratory Acoustical Test Report

FC23-0887

Impact Insulation Class and Sound Transmission Class

ASTM E492, E90

December 1, 2023

Test Assembly:
Urban Surfaces 2101 Pearl
Urban Surfaces FloorSilencer Pro
152 mm Concrete Slab
Armstrong Suspended Ceiling Frame
R-13 Fiberglass Insulation
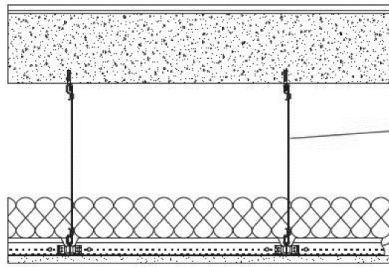National Gypsum Gold Bond® Fire-Shield® Type "X" Gypsum Panel
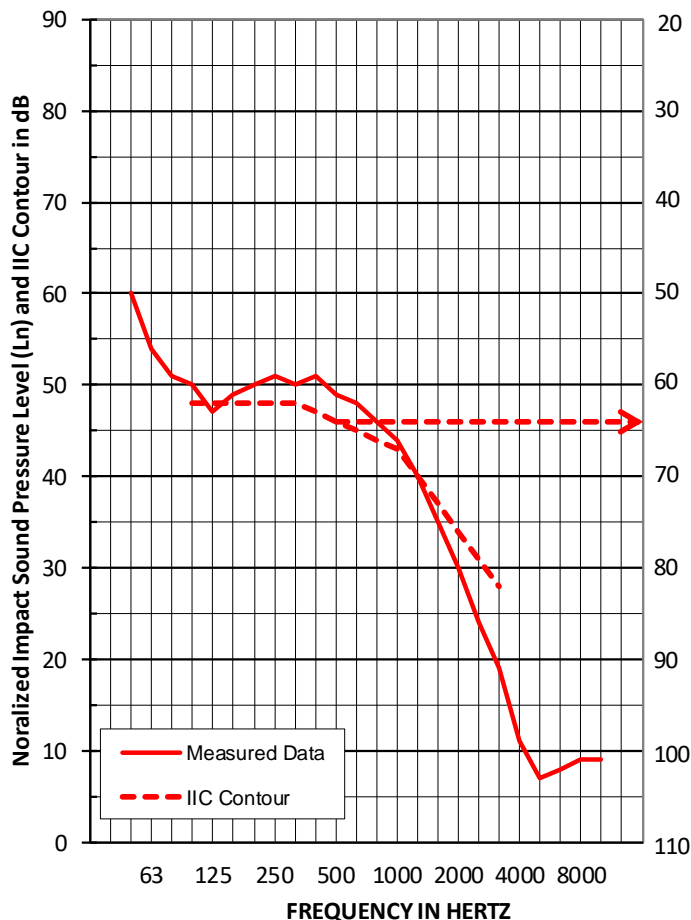
IIC-64
HIIC-65
LIIC- 68
STC-61

URBAN SURFACES
1121 Olympic Drive
Corona, California 92881

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Impact Insulation Class Test FC23-0887: IIC 64

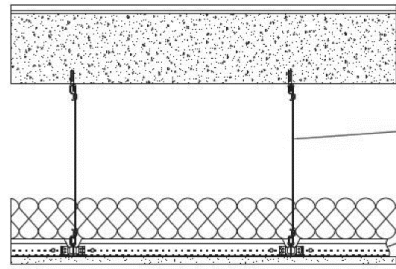|	
Finish Flooring	2 mm Urban Surfaces 2101 Pearl (Adhered to Sound Mat)
Sound Mat	1.3 mm Urban Surfaces FloorSilencer Pro (Adhered to Assembly)
Assembly Type	152 mm 5000 PSI Concrete Slab
Drywall Main Beam	43 mm Armstrong HD8906
Cross Tee	37.3 mm Armstrong XL8945P
Insulation	88.9 mm Johns Manville Unfaced R-13 Fiberglass
Gypsum Panel	15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X

Test Date:	October 15, 2023	
Construction Date:	October 15, 2023	
Test Specimen Area:	11	sq.m.
Receiving Room Volume:	156	cu.m.
Receiving RoomTemperature:	18.6-18.7	degrees C
Receiving Room Relative Humidity:	74-75	percent

	95% Confidence	
Freq	Limit	Ln
50	1.9	60
63	2.3	54
80	1.4	51
100	0.7	50
125	0.8	47
160	0.7	49
200	0.8	50
250	0.3	51
315	0.5	50
400	0.7	51
500	0.7	49
630	0.3	48
800	0.4	46
1000	0.6	44
1250	0.5	40
1600	0.5	35
2000	0.6	30
2500	0.6	24
3150	0.9	19
4000	0.5	11
5000	0.1	7
6300	0.1	8
8000	0.1	9
10000	0.1	9

Background Affected

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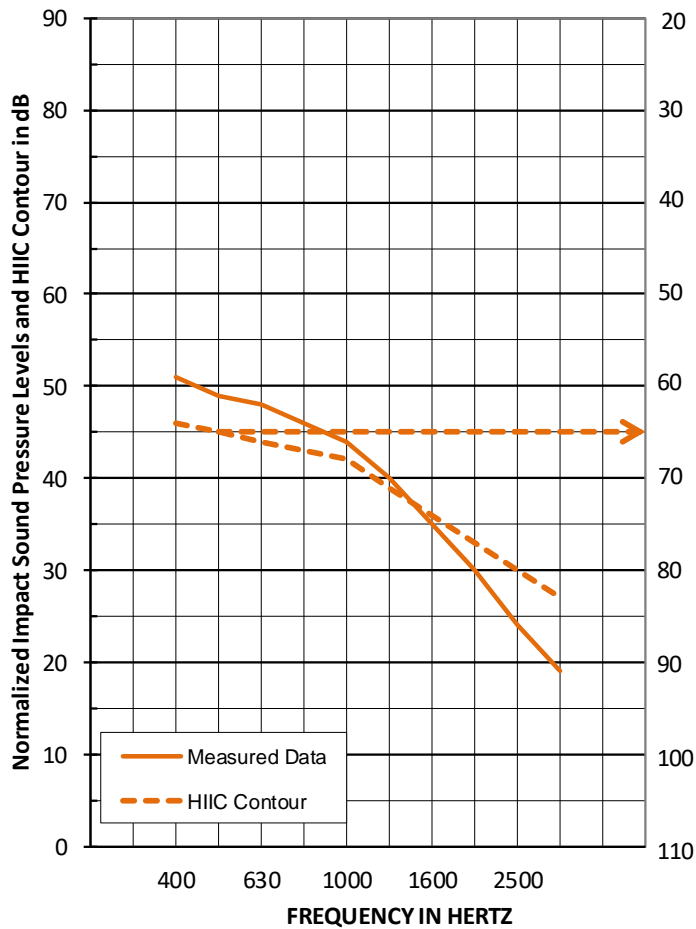Page 2 of 9

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High-frequency Impact Insulation Class Test FC23-0887: HIIC 65

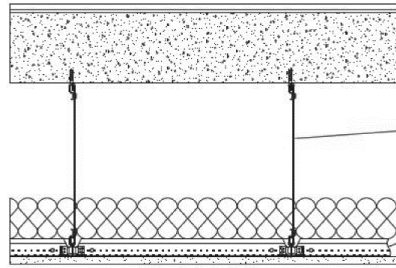|	
Finish Flooring	2 mm Urban Surfaces 2101 Pearl (Adhered to Sound Mat)
Sound Mat	1.3 mm Urban Surfaces FloorSilencer Pro (Adhered to Assembly)
Assembly Type	152 mm 5000 PSI Concrete Slab
Drywall Main Beam	43 mm Armstrong HD8906
Cross Tee	37.3 mm Armstrong XL8945P
Insulation	88.9 mm Johns Manville Unfaced R-13 Fiberglass
Gypsum Panel	15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X

Test Date:	October 15, 2023	
Construction Date:	October 15, 2023	
Test Specimen Area:	11	sq.m.
Receiving Room Volume:	156	cu.m.
Receiving RoomTemperature:	18.6-18.7	degrees C
Receiving Room Relative Humidity:	74-75	percent

	95% Confidence	
Freq	Limit	Ln
400	0.7	51
500	0.7	49
630	0.3	48
800	0.4	46
1000	0.6	44
1250	0.5	40
1600	0.5	35
2000	0.6	30
2500	0.6	24
3150	0.9	<u>19</u>

Background Affected

Measured Data

HIIC Contour

FREQUENCY IN HERTZ

Sound Transmission Class Test FC23-0887: STC 61

Finish Flooring	2 mm Urban Surfaces 2101 Pearl (Adhered to Sound Mat)
Sound Mat	1.3 mm Urban Surfaces FloorSilencer Pro (Adhered to Assembly)
Assembly Type	152 mm 5000 PSI Concrete Slab
Drywall Main Beam	43 mm Armstrong HD8906
Cross Tee	37.3 mm Armstrong XL8945P
Insulation	88.9 mm Johns Manville Unfaced R-13 Fiberglass
Gypsum Panel	15.9 mm National Gypsum Gold Bond® Fire-Shield® Type X

Test Date:	October 15, 2023	
Construction Date:	October 15, 2023	
Test Specimen Area:	11	sq.m.
Source/Receiving Room Volume:	190/156	cu.m.
Source/Receiving Room Temperature:	18.7/18.6	degrees C
Source/Receiving Room Relative Humidity:	74/74	percent

Freq	TL
50	**37**
63	**36**
80	33
100	**36**
125	**42**
160	**42**
200	**50**
250	**53**
315	**55**
400	**57**
500	58
630	58
800	59
1000	61
1250	66
1600	69
2000	69
2500	68
3150	71
4000	71
5000	71
6300	<u>78</u>
8000	<u>79</u>
10000	<u>74</u>

<u>Background Affected</u>

Flanking Affected

<u>Background and Flanking Affected</u>

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1.0 TEST PROCEDURES

1.1 Impact Insulation Tests

All tests were conducted in accordance with ASTM E492, "Standard Test Method for Laboratory Measurement of Impact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine." The IIC is a single-number rating derived from the Impact Sound Pressure Level in accordance with ASTM E989, "Standard Classification for Determination of Impact Insulation Class (IIC)." Results are presented above.

95% confidence intervals represent uncertainty for microphone averaging, not tapping positions.

1.2 High-frequency Impact Insulation Class Tests

The HIIC is the High-frequency Impact Insulation Class and is meant to assess the high-frequency impact noise on a floor-ceiling assembly. The higher the value, the better the floor, meaning less noise from high-frequency impacts in the space below.

All tests were conducted in accordance with the requirements of ASTM E492, "Standard Test Method for Laboratory Measurement of Impact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine," using ASTM E3222 "Standard Classification for Determination of High-frequency Impact Sound Ratings" to calculate the High-frequency Impact Insulation Class (HIIC). Results are presented above.

1.3 Low-frequency Impact Insulation Class Tests

The LIIC is the Low-frequency Impact Insulation Class and is meant to assess the low-frequency impact noise on a floor-ceiling assembly. The higher the value, the better the floor, meaning less noise from low-frequency impacts in the space below.

All tests were conducted in accordance with the requirements of ASTM E492, "Standard Test Method for Laboratory Measurement of Impact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine," using ASTM E3207 "Standard Classification for Determination of Low-frequency Impact Noise Ratings" to calculate the Low-frequency Impact Insulation Class (LIIC).

Measured result is LIIC-68.

1.4 Transmission Loss Tests

All tests were conducted in accordance with ASTM E90, "Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions," using the single-direction method. STC is a single-number rating derived from measured values of Sound Transmission Loss through a test specimen in accordance with ASTM E413, "Classification for Rating Sound Insulation." Results are presented above.

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2.0   TEST ASSEMBLY

2.1   Assembly Description

The test assembly consists of:

- Urban Surfaces 2101 Pearl;
- Urban Surfaces FloorSilencer Pro;
- Concrete Slab (5000 PSI) with 2-mil Polyethylene Protective Sheeting;
- Armstrong HD8906 Drywall Main Beam;
- Armstrong XL8945P Cross Tee;
- Johns Manville Unfaced R-13 Fiberglass Insulation;
- National Gypsum Gold Bond® Fire-Shield® Type X Gypsum Panel.

Total mass of the floor-ceiling assembly was 4230 kg, having an area density of 384.8 kg/m^2.

Product/Element	Thickness	Dimensions	Area	Area Density
Urban Surfaces 2101 Pearl	2 mm	1219 mm x 178 mm	10.98 m^2	3.69 kg/m^2
Urban Surfaces FloorSilencer Pro	1.3 mm	914 mm x 3023 mm	10.98 m^2	1.27 kg/m^2
Concrete Slab	152 mm	3023 mm x 3632 mm	10.98 m^2	366.18 kg/m^2
Armstrong HD8906	43 mm	38.1 mm x 2870 mm	10.9 m	0.45 kg/m^2
Armstrong XL8945P	37.3 mm	38.1 mm x 1219 mm	27.2 m	0.45 kg/m^2
Fiberglass Insulation	88.9 mm	609.6 mm x 2438 mm	10.98 m^2	1.32 kg/m^2
Gypsum Panel	15.9 mm	3023 mm x 1219 mm	11.23 m^2	11.23 kg/m^2

2.2   Installation

The materials were installed in the following manner:

- Finish flooring: Adhered to underlayment with manufacturer's adhesive using a 0.79 mm by 1.59 mm by 0.79 mm trowel. Adhesive allowed to cure per manufacturer's specifications.
- Flooring underlayment: The underlayment was adhered to 2-mil polyethylene plastic sheeting with the manufacturer's 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.
- Protective sheeting: 2-mil polyethylene plastic sheeting installed on top of concrete slab. Sheeting adhered to floor slab with Sprayway Fast Tack 85 spray adhesive.
- Concrete slab: 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. The test frame was isolated from the structure with a dense neoprene gasket. This slab was an existing assembly, reused. No noticeable shrinkage or cracking was visible.
- Drywall Main Beam: 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: Inserted into the main beams on 610 mm centers. The measured steel thickness was 0.5 mm.
- Gypsum Panel: 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.

The assembly was constructed on October 15, 2023.

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3.0   TESTING PROTOCOL

This report summarizes laboratory acoustical testing contracted by Veneklasen to be completed for URBAN SURFACES on Urban Surfaces 2101 Pearl over Urban Surfaces FloorSilencer Pro. The scope of the acoustical testing is for Impact Insulation Class (IIC), Low-frequency Impact Insulation Class (LIIC), High-frequency Impact Insulation Class (HIIC), and Sound Transmission Class (STC), in accordance with ASTM standards E492, E90.

The tests were conducted on October 15, 2023. Details of the tests are contained in this report. Testing was completed in strict accordance with the following standards:

- ASTM E90, "Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions"
- ASTM E413, "Classification for Rating Sound Insulation"
- ASTM E492, "Standard Test Method for Laboratory Measurement of Impact Sound Transmission through Floor-Ceiling Assemblies Using the Tapping Machine"
- ASTM E989, "Standard Classification for Determination of Impact Insulation Class (IIC)"
- ASTM E2235, "Standard Test Method for Determination of Decay Rates for Use in Sound Insulation Test Methods"
- ASTM E3207, "Standard Classification for Determination of Low-frequency Impact Noise Ratings."
- ASTM E3222, "Standard Classification for Determination of High-frequency Impact Sound Ratings."

3.1   Equipment

Equipment list and information associated with this test, including calibration information, is included in the Appendix.

3.2   Accreditation and Reporting

Report must be distributed in its entirety except with written authorization from Veneklasen Associates. Test was conducted at IAS-accredited test facility; the full report is available upon request. Detailed test procedures, data for flanking limit tests, repeatability measurements, and reference specimen tests are available on request.

Veneklasen Associates provides no warranties, expressed or implied, regarding the structural integrity or fitness of these assemblies for a specific installation. Any advertising which utilizes this test report or test data must not imply product certification or endorsement by Veneklasen Associates, NVLAP, NIST or the U.S. Government.

Sincerely,
Veneklasen Associates, Inc.

John LoVerde, *FASA*
Principal

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APPENDIX

Test Equipment and Photos

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Instrument	Manufacturer	Model	Description	Serial Number	Calibration 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	10/22
Receive room microphone	PCB Piezotronics	378C20	Microphone and preamplifier	63739	03/23
Receive room microphone	PCB Piezotronics	378B20	Microphone and preamplifier	INT02910	02/23
Receive room microphone	PCB Piezotronics	378B20	Microphone and preamplifier	INT02911	02/23
Receive room microphone	PCB Piezotronics	378B20	Microphone and preamplifier	63742	03/23
Receive room microphone	PCB Piezotronics	378B20	Microphone and preamplifier	63741	05/23
Receive room environmental indicator	Comet	T7510	Temperature and humidity transmitter	63810	10/22
				63811	10/22
Source room microphone	PCB Piezotronics	378C20	Microphone and preamplifier	63740	03/23
Source room microphone	PCB Piezotronics	378C20	Microphone and preamplifier	64905	03/23
Source room microphone	PCB Piezotronics	378C20	Microphone and preamplifier	65103	02/23
Source room microphone	PCB Piezotronics	378C20	Microphone and preamplifier	64910	02/23
Source room microphone	PCB Electronics	378C20	Microphone and preamplifier	INT01089	02/23
Source room environmental indicator	Comet	T7510	Temperature and humidity transmitter	63812	10/22
Tapping machine	Norsonic	Nor277	Tapping machine	INT03333	02/23
Test Chamber Receive Room Volume			156 m³		
Test Chamber Source Room Volume			190 m³		

Photo 1: View of Source Chamber, finish flooring installation observed

Photo 2: View of Receive Chamber, bottom of gypsum panel observed

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