

Laboratory Acoustical Test Report

FC23-0883

Impact Insulation Class and Sound Transmission Class

ASTM E492, E90

December 1, 2023

Test Assembly:

Urban Surfaces 2101 Pearl

Urban Surfaces FloorSilencer Pro

USG Levelrock® Brand 2500

Oriented Strand Board Sheathing

R-13 Fiberglass Insulation

York PB Truss L/360

ClarkDietrich RC Deluxe™ Resilient Channel

National Gypsum Gold Bond® Fire-Shield C™

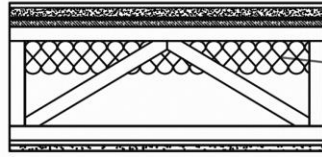
IIC-53

HIIC-58

LIIC- 39

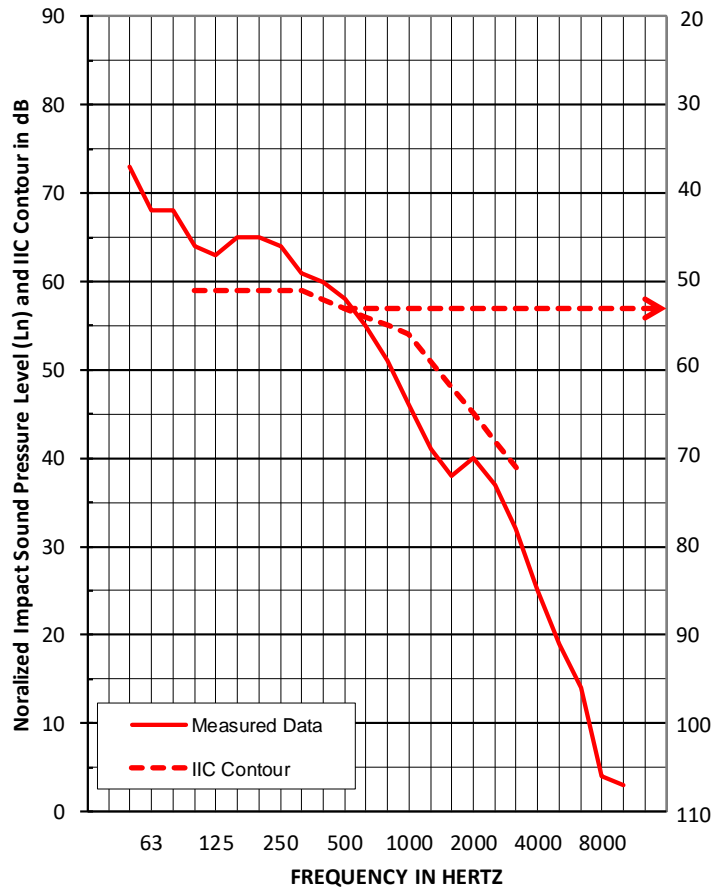
STC-58

Impact Insulation Class Test FC23-0883: IIC 53



Finish Flooring	2 mm Urban Surfaces 2101 Pearl (Adhered to Sound Mat)
Underlayment	1.3 mm Urban Surfaces FloorSilencer Pro (Adhered to Assembly)
Gypsum Concrete Subfloor Panel	19.1 mm USG Levelrock® Brand 2500
Insulation	18.8 mm Oriented Strand Board Sheathing
Truss	88.9 mm Johns Manville Unfaced R-13 Fiberglass Insulation
Resilient Channel	457.2 mm York PB Truss L/360
Gypsum Panel	12.7 mm ClarkDietrich RC Deluxe™ Resilient Channel
	15.9 mm National Gypsum Gold Bond® Fire-Shield C™

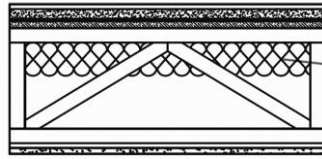
Test Date: October 14, 2023
Construction Date: October 14, 2023
Test Specimen Area: 11 sq.m.
Receiving Room Volume: 156 cu.m.
Receiving Room Temperature: 19.3-19.3 degrees C
Receiving Room Relative Humidity: 62-62 percent



95% Confidence		
Freq	Limit	Ln
50	1.4	73
63	1.7	68
80	2.4	68
100	1.7	64
125	0.6	63
160	0.6	65
200	0.9	65
250	0.5	64
315	0.5	61
400	0.4	60
500	0.4	58
630	0.4	55
800	0.3	51
1000	0.4	46
1250	0.3	41
1600	0.3	38
2000	0.3	40
2500	0.3	37
3150	0.3	32
4000	0.4	25
5000	0.6	19
6300	0.5	14
8000	0.3	4
10000	0.4	3

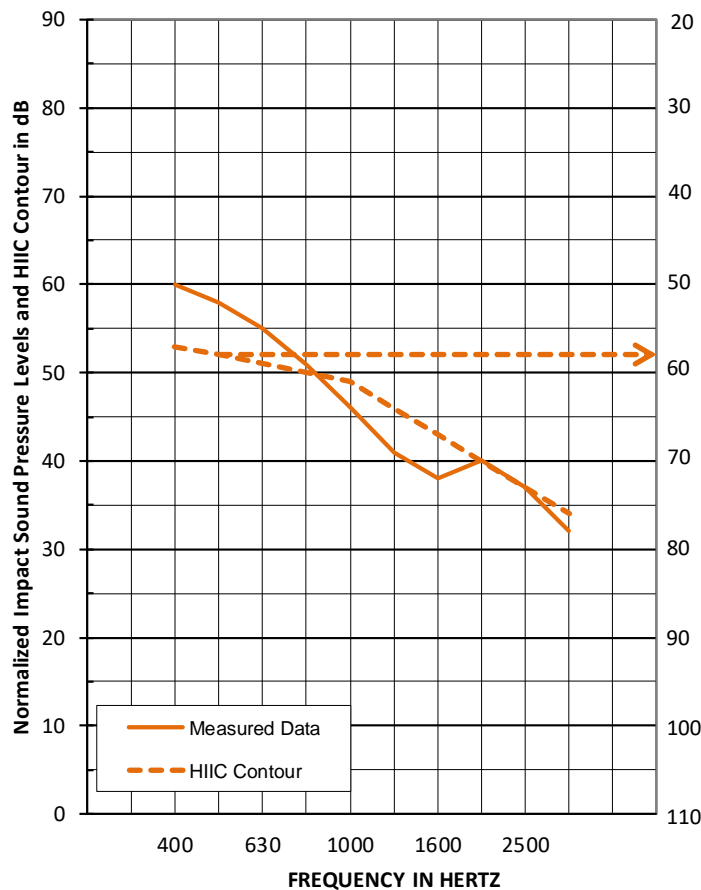
Background Affected

High-frequency Impact Insulation Class Test FC23-0883: HIIC 58



Finish Flooring	2 mm Urban Surfaces 2101 Pearl (Adhered to Sound Mat)
Underlayment	1.3 mm Urban Surfaces FloorSilencer Pro (Adhered to Assembly)
Gypsum Concrete	19.1 mm USG Levelrock® Brand 2500
Subfloor Panel	18.8 mm Oriented Strand Board Sheathing
Insulation	88.9 mm Johns Manville Unfaced R-13 Fiberglass Insulation
Truss	457.2 mm York PB Truss L/360
Resilient Channel	12.7 mm ClarkDietrich RC Deluxe™ Resilient Channel
Gypsum Panel	15.9 mm National Gypsum Gold Bond® Fire-Shield C™

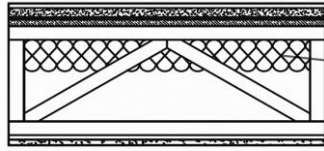
Test Date:	October 14, 2023
Construction Date:	October 14, 2023
Test Specimen Area:	11 sq.m.
Receiving Room Volume:	156 cu.m.
Receiving Room Temperature:	19.3-19.3 degrees C
Receiving Room Relative Humidity:	62-62 percent



95% Confidence		
Freq	Limit	Ln
400	0.4	60
500	0.4	58
630	0.4	55
800	0.3	51
1000	0.4	46
1250	0.3	41
1600	0.3	38
2000	0.3	40
2500	0.3	37
3150	0.3	32

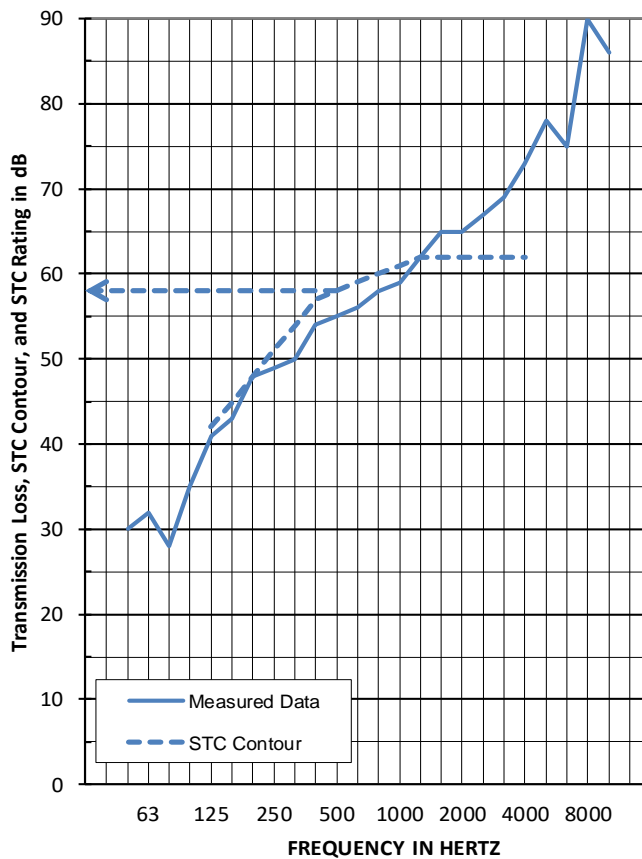
No Ln values were affected by background noise or flanking.

Sound Transmission Class Test FC23-0883: STC 58



Finish Flooring	2 mm Urban Surfaces 2101 Pearl (Adhered to Sound Mat)
Underlayment	1.3 mm Urban Surfaces FloorSilencer Pro (Adhered to Assembly)
Gypsum Concrete Subfloor Panel	19.1 mm USG Levelrock® Brand 2500
Insulation	18.8 mm Oriented Strand Board Sheathing
Truss	88.9 mm Johns Manville Unfaced R-13 Fiberglass Insulation
Resilient Channel	457.2 mm York PB Truss L/360
Gypsum Panel	12.7 mm ClarkDietrich RC Deluxe™ Resilient Channel
	15.9 mm National Gypsum Gold Bond® Fire-Shield C™

Test Date: October 14, 2023
 Construction Date: October 14, 2023
 Test Specimen Area: 11 sq.m.
 Source/Receiving Room Volume: 190/156 cu.m.
 Source/Receiving Room Temperature: 19.3/18.2 degrees C
 Source/Receiving Room Relative Humidity: 62/62 percent



Freq	TL
50	30
63	32
80	28
100	35
125	41
160	43
200	48
250	49
315	50
400	54
500	55
630	56
800	58
1000	59
1250	62
1600	65
2000	65
2500	67
3150	69
4000	73
5000	78
6300	75
8000	90
10000	86

Background Affected

Flanking Affected

Background and Flanking Affected

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-39.

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.

2.0 TEST ASSEMBLY

2.1 Assembly Description

The test assembly consists of:

- Urban Surfaces 2101 Pearl;
- Urban Surfaces FloorSilencer Pro;
- USG Levelrock® Brand 2500;
- Oriented Strand Board Sheathing;
- Johns Manville Unfaced R-13 Fiberglass Insulation;
- York PB Truss L/360;
- ClarkDietrich RC Deluxe™ Resilient Channel;
- National Gypsum Gold Bond® Fire-Shield C™.

Total mass of the floor-ceiling assembly was 861 kg, having an area density of 78.4 kg/m².

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
USG Levelrock® Brand 2500	19.1 mm	3023 mm x 3632 mm	10.98 m ²	36.62 kg/m ²
Oriented Strand Board Sheathing	18.8 mm	1219 mm x 2438 mm	10.98 m ²	11.65 kg/m ²
Unfaced R-13 Fiberglass Insulation	89 mm	520.7 mm x 3023 mm	10.98 m ²	1.32 kg/m ²
York PB Truss L/360	457.7 mm	88.9 mm x 2934 mm	7 Trusses	19.05 kg/m ²
Resilient Channel	12.7 mm	68.6 mm x 3454 mm	31.05 m	0.33 kg/m ²
Gypsum Panel	15.9 mm	1219 mm x 3023 mm	10.98 m ²	10.74 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 gypsum concrete. Sheeting adhered to floor slab with Sprayway Fast Tack 85 spray adhesive.
- Gypsum concrete: 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: Adhered to the floor trusses with Loctite PL 400 Subfloor adhesive. Fastened with 9D nails on 203 mm centers along perimeter and 305 mm centers along trusses.
- Fiberglass insulation: Installed in the cavity between trusses, stapled flush with the subfloor.
- Open web trusses: Installed on 610 mm centers using JUS414 hanger brackets.
- Resilient channel: Installed on 305 mm centers perpendicular to the trusses. The measured thickness of the metal was 0.7 mm.
- Gypsum panel: Fastened to the channels on 305 mm centers with 25.4 mm Type S bugle head screws. The seams of the gypsum panels were sealed with Pecora AC-20 FTR caulk and covered with pressure sensitive tape.

- Test frame: 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 assembly was constructed on October 14, 2023.

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 14, 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

APPENDIX

Test Equipment and Photos

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 m ³		
Test Chamber Source Room Volume			190 m ³		



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

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