Laboratory Acoustical Test Report

FC22-0558

Impact Insulation Class and Sound Transmission Class

ASTM E492, E90

November 8, 2022

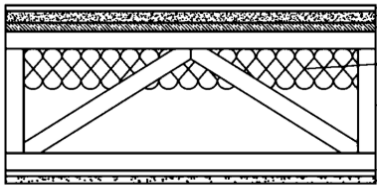
Test Assembly:

Urban Surfaces SoundTec SPC Flooring
USG Levelrock 2500
Oriented Strand Board Sheathing
Johns Manville Unfaced R-13
York PB Truss L/360
ClarkDietrich RC Deluxe™
USG SHEETROCK® Brand FIRECODE® C Core

IIC-52
HIIC-63
LIIC-43
STC-60

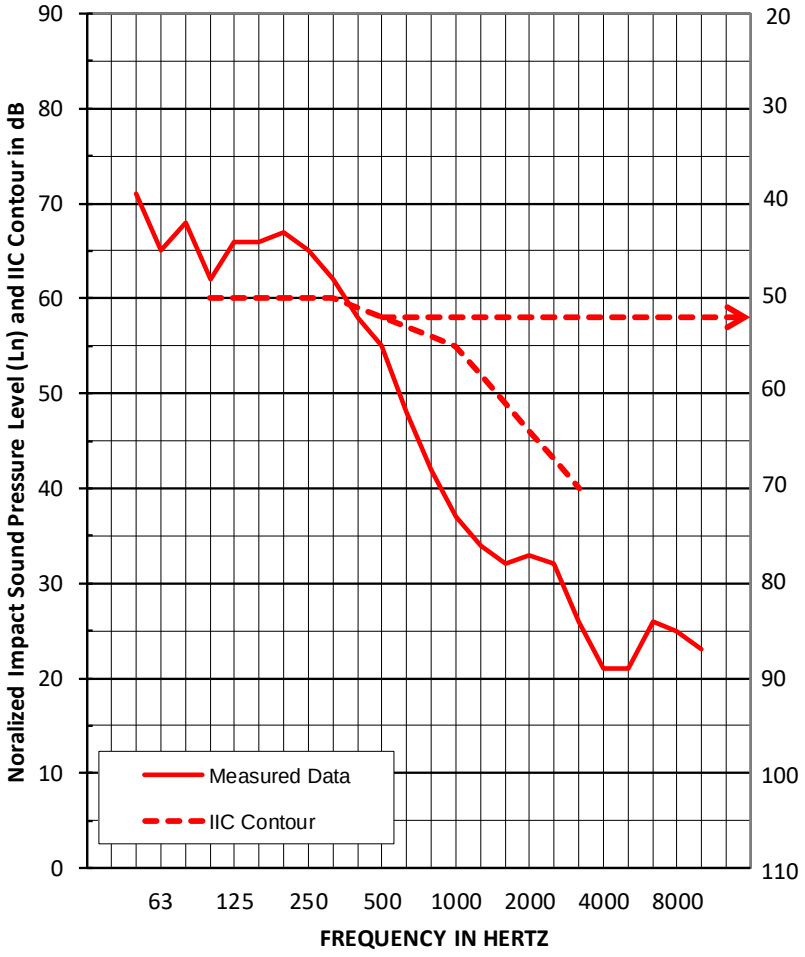
Veneklasen Associates
1711 16th Street
Santa Monica, California

Impact Insulation Class Test FC22-0558: IIC 52



Finish Flooring	6 mm Urban Surfaces SoundTec SPC Flooring
Gypsum Concrete	19.1 mm USG Levelrock 2500
Oriented Strand Board Sheathing	18.8 mm OSB
Fiberglass Insulation	88.9 mm Johns Manville Unfaced R-13
Open Web Truss	457.2 mm York PB Truss L/360
Resilient Channel	12.7 mm ClarkDietrich RC Deluxe™
Gypsum Panel	15.9 mm USG SHEETROCK® Brand FIRECODE® C Core

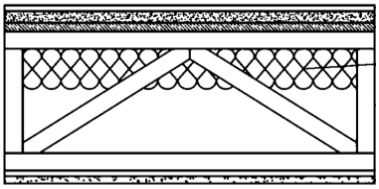
Test Date:	September 20, 2022	
Construction Date:	September 20, 2022	
Test Specimen Area:	11	sq.m.
Receiving Room Volume:	156	cu.m.
Receiving RoomTemperature:	21.6-21.6	degrees C
Receiving Room Relative Humidity:	52-52	percent



Freq	95% Confidence Limit	Ln
50	1.7	71
63	2.7	65
80	1.5	68
100	1.3	62
125	0.8	66
160	0.7	66
200	0.9	67
250	0.6	65
315	0.7	62
400	0.4	58
500	0.3	55
630	0.2	48
800	0.3	42
1000	0.4	37
1250	0.4	34
1600	0.4	32
2000	0.3	33
2500	0.3	32
3150	0.7	26
4000	1.2	21
5000	2.0	21
6300	2.6	26
8000	2.5	25
10000	2.3	23

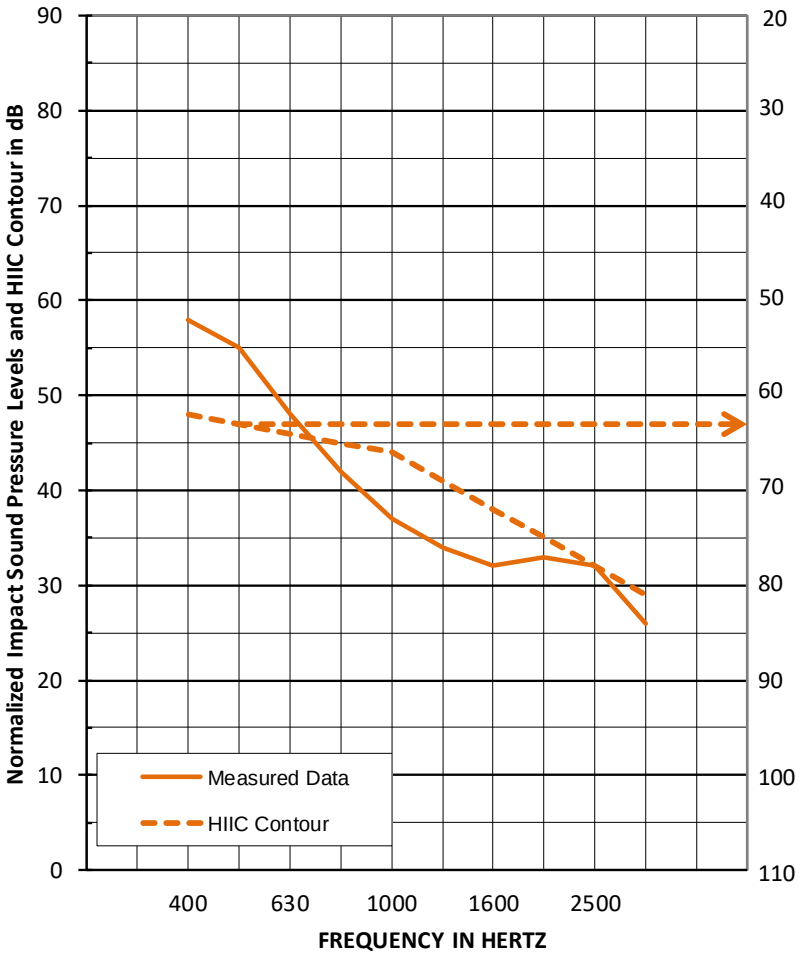
No Ln values were affected by background noise or flanking.

High-frequency Impact Insulation Class Test FC22-0558: HIIC 63



Finish Flooring	6 mm Urban Surfaces SoundTec SPC Flooring
Gypsum Concrete	19.1 mm USG Levelrock 2500
Oriented Strand Board Sheathing	18.8 mm OSB
Fiberglass Insulation	88.9 mm Johns Manville Unfaced R-13
Open Web Truss	457.2 mm York PB Truss L/360
Resilient Channel	12.7 mm ClarkDietrich RC Deluxe™
Gypsum Panel	15.9 mm USG SHEETROCK® Brand FIRECODE® C Core

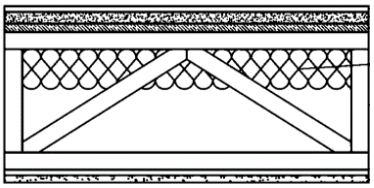
Test Date:	September 20, 2022	
Construction Date:	September 20, 2022	
Test Specimen Area:	11	sq.m.
Receiving Room Volume:	156	cu.m.
Receiving RoomTemperature:	21.6-21.6	degrees C
Receiving Room Relative Humidity:	52-52	percent



Freq	95% Confidence Limit	Ln
400	0.4	58
500	0.3	55
630	0.2	48
800	0.3	42
1000	0.4	37
1250	0.4	34
1600	0.4	32
2000	0.3	33
2500	0.3	32
3150	0.7	26

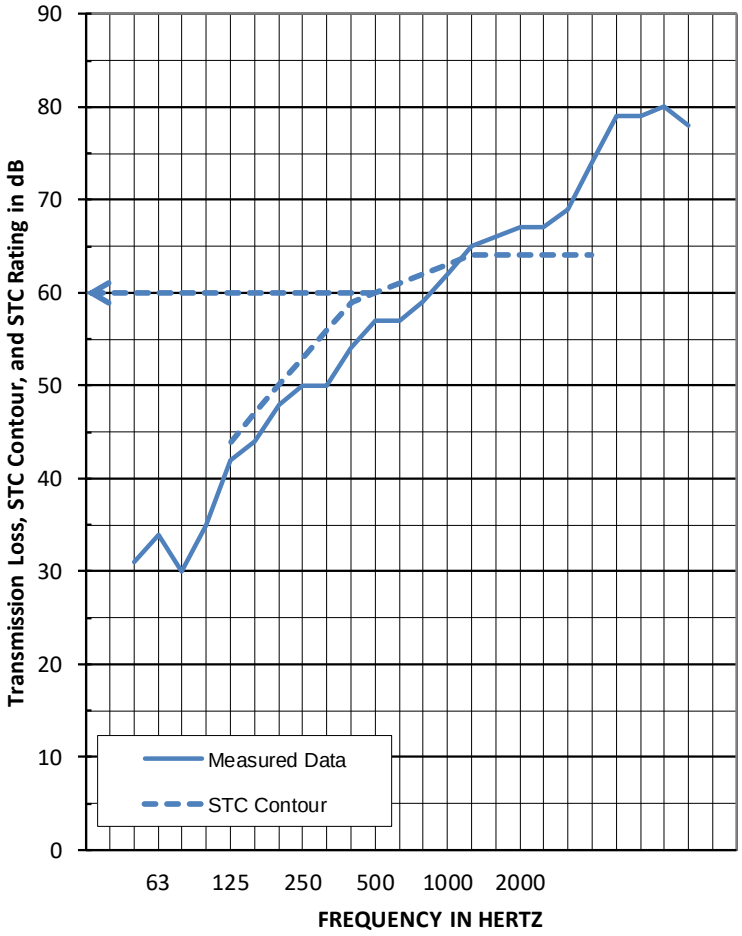
No Ln values were affected by background noise or flanking.

Sound Transmission Class Test FC22-0558: STC 60



Finish Flooring	6 mm Urban Surfaces SoundTec SPC Flooring
Gypsum Concrete	19.1 mm USG Levelrock 2500
Oriented Strand Board Sheathing	18.8 mm OSB
Fiberglass Insulation	88.9 mm Johns Manville Unfaced R-13
Open Web Truss	457.2 mm York PB Truss L/360
Resilient Channel	12.7 mm ClarkDietrich RC Deluxe™
Gypsum Panel	15.9 mm USG SHEETROCK® Brand FIRECODE® C Core

Test Date:	September 20, 2022	
Construction Date:	September 20, 2022	
Test Specimen Area:	11	sq.m.
Source/Receiving Room Volume:	190/156	cu.m.
Source/Receiving Room Temperature:	21.6/20.5	degrees C
Source/Receiving Room Relative Humidity:	52/52	percent



Freq	TL
50	**31**
63	**34**
80	30
100	**35**
125	**42**
160	**44**
200	**48**
250	**50**
315	50
400	54
500	57
630	57
800	59
1000	62
1250	65
1600	66
2000	67
2500	67
3150	69
4000	74
5000	**79**
6300	79
8000	80
10000	**78**

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-43.

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 SoundTec SPC Floor, Finish Flooring;
- USG Levelrock 2500, Gypsum Concrete;
- Oriented Strand Board Sheathing;
- Johns Manville Unfaced R-13, Fiberglass Insulation;
- York PB Truss L/360, Open Web Truss;
- ClarkDietrich RC Deluxe™, Resilient Channel;
- USG SHEETROCK® Brand FIRECODE® C Core, Gypsum Panel;

Total mass of the floor-ceiling assembly was 922.1 kg, having an area density of 70.9 kg/m^2).

Product/Element	Thickness	Dimensions	Area	Area Density
Urban Surfaces SoundTec SPC Flooring	6 mm	1219 mm x 178 mm	10.98 m^2	9.41 kg/m^2
USG Levelrock 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
Johns Manville Unfaced R-13	88.9 mm	521 mm x 3023 mm	10.98 m^2	1.32 kg/m^2
York PB Truss L/360	457.2 mm	88.9 mm x 2934 mm	7 trusses	19.05 kg/truss
ClarkDietrich RC Deluxe™	12.7 mm	67 mm x 3454 mm	31.05 lin m	0.33 kg/m
USG SHEETROCK® Brand FIRECODE® C Core	15.9 mm	1219 mm x 3023 mm	10.98 m^2	11.9 kg/m^2

2.2 Installation

The materials were installed in the following manner:

- Urban Surfaces SoundTec SPC Flooring: Loose laid
- 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 Sheathing: 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 Truss: 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.

The assembly was constructed on September 20, 2022.

3.0 TESTING PROTOCOL

This report summarizes laboratory acoustical testing contracted by Veneklasen to be completed for Veneklasen Associates on 6.0 mm Urban Surfaces SoundTec SPC Flooring. The scope of the acoustical testing is for Impact Insulation Class (IIC), High-frequency Impact Insulation Class (HIIC), Low-frequency Impact Insulation Class (LIIC), and Sound Transmission Class (STC), in accordance with ASTM standards E492, E90.

The tests were conducted on September 20, 2022. 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	04/22
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02587	04/22
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02608	04/22
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02609	04/22
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02610	04/22
2-Channel Analog Input	National Instruments	NI 9250	2-Channel Analog Input	INT02612	04/22
Microphone Calibrator	Norsonic	34093	Acoustical Calibrator	65105	10/21
Receive Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	63741	06/22
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63740	04/22
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	64340	10/21
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	63744	09/21
Receive Room Microphone	PCB Piezotronics	378B20	Microphone and Preamplifier	65968	01/22
Receive Room Environmental Indicator	Comet	T7510	Temperature and Humidity Transmitter	63810 63811	10/21 10/21
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	65103	02/22
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	64902	12/21
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	63739	07/22
Source Room Microphone	PCB Piezotronics	378C20	Microphone and Preamplifier	63742	04/22
Source Room Microphone	PCB Electronics	378C20	Microphone and Preamplifier	64906	04/22
Source room environmental indicator	Comet	T7510	Temperature and humidity transmitter	63812	10/21
Tapping Machine	Norsonic	Nor277	Tapping Machine	INT00936	02/22
Test Chamber Receive Room Volume			155.77 m^3 (5500.85 ft^3)		
Test Chamber Source Room Volume			190 m^3 (6709.79 ft^3)		

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

Photo 2: View of Receive Chamber, bottom of ceiling observed