

Laboratory Acoustical Test Report

FC22-0555R2

Impact Insulation Class and Sound Transmission Class

ASTM E492, E90

October 17, 2024

Test Assembly:

Urban Surfaces Studio 12/20 SPC Flooring
5000 PSI Concrete Slab

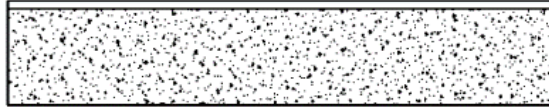
IIC-58

HIIC-61

LIIC-75

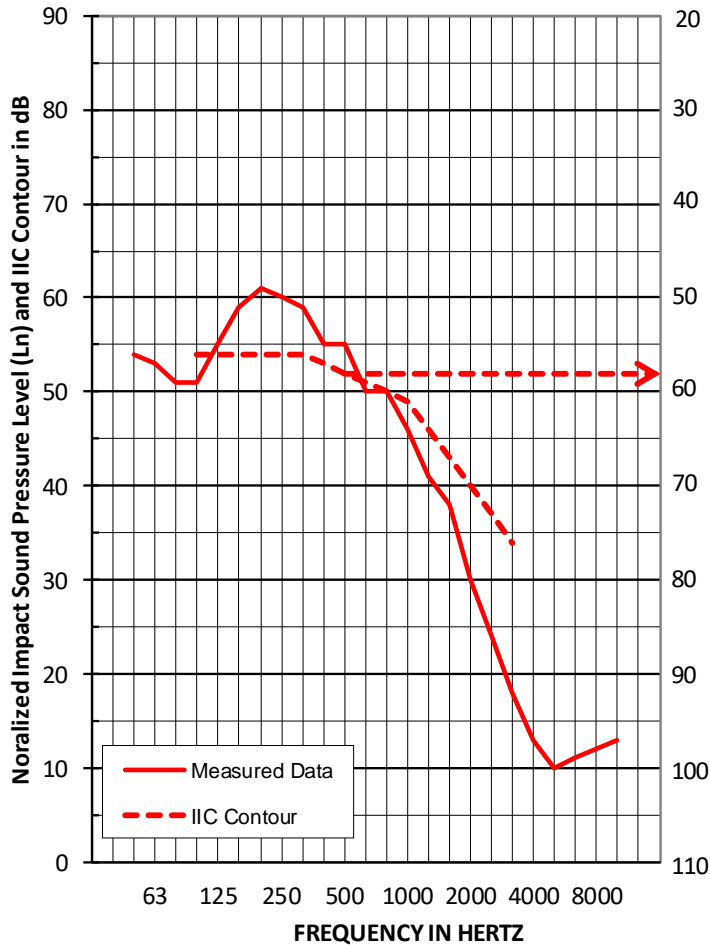
STC-55

Impact Insulation Class Test FC22-0555: IIC 58



| | |
|-----------------|---|
| Finish Flooring | 5 mm Urban Surfaces Studio 12/20 SPC Flooring |
| Assembly Type | 203.2 mm 5000 PSI Concrete |

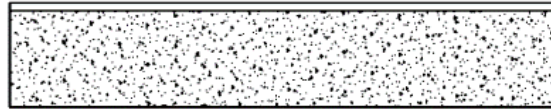
| | | |
|-----------------------------------|--------------------|-----------|
| Test Date: | September 18, 2022 | |
| Construction Date: | September 18, 2022 | |
| Test Specimen Area: | 11 | sq.m. |
| Receiving Room Volume: | 158 | cu.m. |
| Receiving Room Temperature: | 21.4-21.4 | degrees C |
| Receiving Room Relative Humidity: | 65-65 | percent |



| 95% Confidence | | |
|----------------|-------|-----------|
| Freq | Limit | Ln |
| 50 | 1.7 | 54 |
| 63 | 2.9 | 53 |
| 80 | 2.0 | 51 |
| 100 | 1.6 | 51 |
| 125 | 1.8 | 55 |
| 160 | 1.4 | 59 |
| 200 | 0.7 | 61 |
| 250 | 1.1 | 60 |
| 315 | 0.7 | 59 |
| 400 | 0.9 | 55 |
| 500 | 0.6 | 55 |
| 630 | 0.5 | 50 |
| 800 | 0.6 | 50 |
| 1000 | 0.6 | 46 |
| 1250 | 0.5 | 41 |
| 1600 | 0.5 | 38 |
| 2000 | 0.6 | 30 |
| 2500 | 0.5 | 24 |
| 3150 | 0.7 | <u>18</u> |
| 4000 | 1.0 | <u>13</u> |
| 5000 | 0.5 | <u>10</u> |
| 6300 | 0.5 | <u>11</u> |
| 8000 | 0.6 | <u>12</u> |
| 10000 | 0.7 | <u>13</u> |

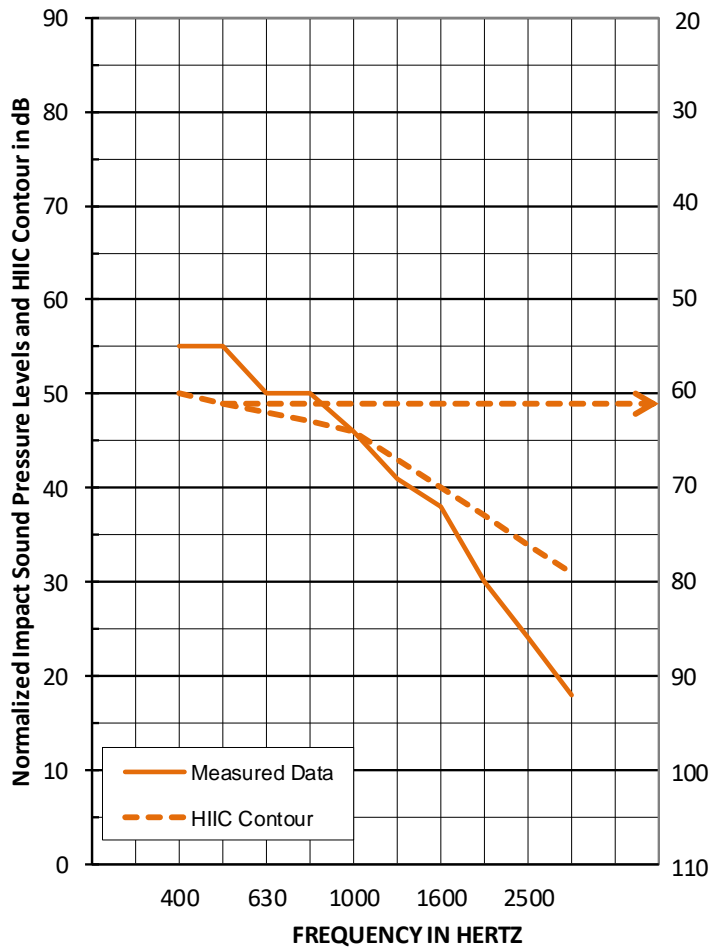
Background Affected

High-frequency Impact Insulation Class Test FC22-0555: HIIC 61



| | |
|-----------------|---|
| Finish Flooring | 5 mm Urban Surfaces Studio 12/20 SPC Flooring |
| Assembly Type | 203.2 mm 5000 PSI Concrete |

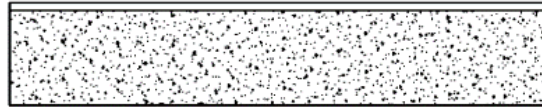
Test Date: September 18, 2022
 Construction Date: September 18, 2022
 Test Specimen Area: 11 sq.m.
 Receiving Room Volume: 158 cu.m.
 Receiving Room Temperature: 21.4-21.4 degrees C
 Receiving Room Relative Humidity: 65-65 percent



| 95% Confidence | | |
|----------------|-------|-----------|
| Freq | Limit | Ln |
| 400 | 0.9 | 55 |
| 500 | 0.6 | 55 |
| 630 | 0.5 | 50 |
| 800 | 0.6 | 50 |
| 1000 | 0.6 | 46 |
| 1250 | 0.5 | 41 |
| 1600 | 0.5 | 38 |
| 2000 | 0.6 | 30 |
| 2500 | 0.5 | 24 |
| 3150 | 0.7 | <u>18</u> |

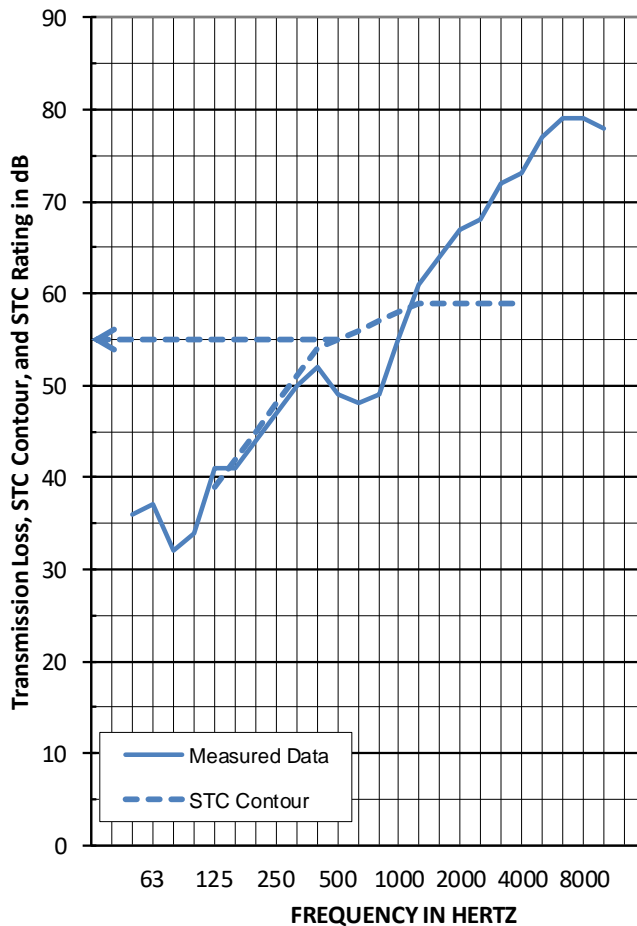
Background Affected

Sound Transmission Class Test FC22-0555: STC 55



| | |
|----------------------------------|---|
| Finish Flooring Assembly Type | 5 mm Urban Surfaces Studio 12/20 SPC Flooring 203.2 mm 5000 PSI Concrete |
|----------------------------------|---|

| | | |
|--|--------------------|-----------|
| Test Date: | September 18, 2022 | |
| Construction Date: | September 18, 2022 | |
| Test Specimen Area: | 11 | sq.m. |
| Source/Receiving Room Volume: | 190/158 | cu.m. |
| Source/Receiving Room Temperature: | 21.3/19.6 | degrees C |
| Source/Receiving Room Relative Humidity: | 65/65 | percent |



| Freq | TL |
|-------|-----------|
| 50 | 36 |
| 63 | 37 |
| 80 | 32 |
| 100 | 34 |
| 125 | 41 |
| 160 | 41 |
| 200 | 44 |
| 250 | 47 |
| 315 | 50 |
| 400 | 52 |
| 500 | 49 |
| 630 | 48 |
| 800 | 49 |
| 1000 | 55 |
| 1250 | 61 |
| 1600 | 64 |
| 2000 | 67 |
| 2500 | 68 |
| 3150 | 72 |
| 4000 | 73 |
| 5000 | <u>77</u> |
| 6300 | <u>79</u> |
| 8000 | <u>79</u> |
| 10000 | <u>78</u> |

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-75.

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 Studio 12/20 SPC Flooring, Finish Flooring;
- 5000 PSI Concrete Slab, Concrete Slab;

Total mass of the floor-ceiling assembly was 5852.3 kg, having an area density of 532.99 kg/m²).

| Product/Element | Thickness | Dimensions | Area | Area Density |
|-----------------------------|-----------|-------------------|----------------------|--------------------------|
| Urban Surfaces Studio 12/20 | 5 mm | 1219 mm x 178 mm | 10.98 m ² | 8.28 kg/m ² |
| Concrete Slab | 203.2 mm | 3023 mm x 3632 mm | 10.98 m ² | 524.71 kg/m ² |

2.2 Installation

The materials were installed in the following manner:

- Urban Surfaces Studio 12/20 SPC Flooring: Loose laid
- 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. No noticeable shrinkage or cracking was visible on the specimen.

The assembly was constructed on September 18, 2022.

3.0 TESTING PROTOCOL

This report summarizes laboratory acoustical testing contracted by Veneklasen to be completed for Veneklasen Associates on 5.0 mm Urban Surfaces Studio 12/20 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 18, 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 | | | 158.34 m ³ (5591.89 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