

1512 S BATAVIA AVENUE
GENEVA, IL 60134
630-232-0104

An  ALION Technical Center

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WALLACE CLEMENT SABINE

Test Report

FOR: **Turf Design**
Elgin, IL

Sound Absorption
RAL™-A18-350

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CONDUCTED: 2018-10-11

ON: Urban ceiling tiles, weighted shallow

TEST METHOD

Riverbank Acoustical Laboratories™ is accredited by the U.S. Department of Commerce, National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP) as an ISO 17025:2005 Laboratory (NVLAP Lab Code: 100227-0) and for this test procedure. The test reported in this document conformed explicitly with ASTM C423-17: "Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method." The specimen mounting was performed according to ASTM E795-16: "Standard Practices for Mounting Test Specimens During Sound Absorption Tests." A description of the measuring procedure and room qualifications is available upon request.

DESCRIPTION OF THE SPECIMEN

The test specimen was designated by the manufacturer as Urban ceiling tiles, weighted shallow. A full external visual inspection performed on the test specimen by Riverbank personnel verified the manufacturer's description.

Test Specimen

| | |
|--------------------|--------------------------------------------|
| Trade Name: | Urban |
| Materials: | Formed polyethylene terephthalate felt |
| Tile Dimensions: | 16 @ 609.6 mm (24 in.) x 609.6 mm (24 in.) |
| Wall Thickness: | 5 mm (0.197 in.) |
| Tile Type A | |
| Material ID: | 03856 |
| Quantity: | 1 |
| Overall Thickness: | 203.2 mm (8 in.) |
| Overall Weight: | 0.91 kg (2 lbs) |
| Tile Type B | |
| Material ID: | 03853 |
| Quantity: | 3 |
| Overall Thickness: | 152.4 mm (6 in.) |
| Overall Weight: | 2.72 kg (6 lbs) |
| Tile Type C | |
| Material ID: | 03798 |
| Quantity: | 5 |
| Overall Thickness: | 101.6 mm (4 in.) |
| Overall Weight: | 3.63 kg (8 lbs) |

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Test Specimen (continued)

Tile Type D

Material ID: 03795

Quantity: 7

Overall Thickness: 50.8 mm (2 in.)

Overall Weight: 4.31 kg (9.5 lbs)

Specimen Configuration

(test chamber east wall)

| | | | |
|---|---|---|---|
| D | B | D | C |
| D | C | B | D |
| C | A | D | C |
| D | B | D | C |

Physical Measures

Size: 2.44 m (96.0 in) wide by 2.44 m (96.0 in) long

Thickness: 0.2 m (8.0 in)

Weight: 11.57 kg (25.5 lbs)

Mass per Unit Area: 1.95 kg/m² (0.4 lbs/ft²)

Calculation Area: 5.946 m² (64 ft²)

Test Environment

Room Volume: 291.98 m³

Temperature: 20.8 °C ± 0.0 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)

Relative Humidity: 62.1 % ± 0.4 % (Requirement: ≥ 40 % and ≤ 5 % change)

Barometric Pressure: 98.7 kPa (Requirement not defined)

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Figure 1 – Specimen mounted in test chamber, as viewed from south wall



Figure 2 – Specimen mounted in test chamber, as viewed from west wall

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MOUNTING METHOD

Type E-415 Mounting: The test specimen was mounted with an airspace behind it. The number designates the distance in mm from the exposed face of the test specimen to the test surface, rounded to the nearest integer multiple of 5. For the purposes of this report, the mounting designation uses the point on the specimen face where minimum overall thickness was measured for reference. Perimeter edges were sealed with metal framing.

TEST RESULTS

1/3 Octave Center

| Frequency (Hz) | Total Absorption (m ²) | Total Absorption (Sabins) | Absorption Coefficient |
|-------------------|---------------------------------------|------------------------------|---------------------------|
| 100 | 4.19 | 45.15 | 0.71 |
| ** 125 | 7.91 | 85.10 | 1.33 |
| 160 | 5.19 | 55.83 | 0.87 |
| 200 | 5.90 | 63.47 | 0.99 |
| ** 250 | 6.09 | 65.53 | 1.02 |
| 315 | 4.99 | 53.75 | 0.84 |
| 400 | 4.61 | 49.58 | 0.77 |
| ** 500 | 4.90 | 52.74 | 0.82 |
| 630 | 5.58 | 60.04 | 0.94 |
| 800 | 5.34 | 57.47 | 0.90 |
| ** 1000 | 5.62 | 60.48 | 0.95 |
| 1250 | 5.65 | 60.85 | 0.95 |
| 1600 | 5.71 | 61.47 | 0.96 |
| ** 2000 | 5.86 | 63.07 | 0.99 |
| 2500 | 5.93 | 63.80 | 1.00 |
| 3150 | 5.88 | 63.34 | 0.99 |
| ** 4000 | 5.99 | 64.46 | 1.01 |
| 5000 | 6.19 | 66.64 | 1.04 |

SAA = 0.93

NRC = 0.95

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TEST RESULTS (Continued)

The sound absorption average (SAA) is defined in ASTM C423-17 Section 3.1.1 as the average, rounded to the nearest integer multiple of 0.01, of the sound absorption coefficients of a material for the twelve one-third octave bands from 200 Hz through 2500 Hz, inclusive.

The noise reduction coefficient (NRC) is defined from previous versions of ASTM C423 as the average of the sound absorption coefficients at 250 Hz, 500 Hz, 1000 Hz, and 2000 Hz, expressed to the nearest integer multiple of 0.05.

Tested by



Dean Victor
Senior Experimentalist

Report by



Malcolm Kelly
Acoustician

Approved by



Eric P. Wolfram
Laboratory Manager

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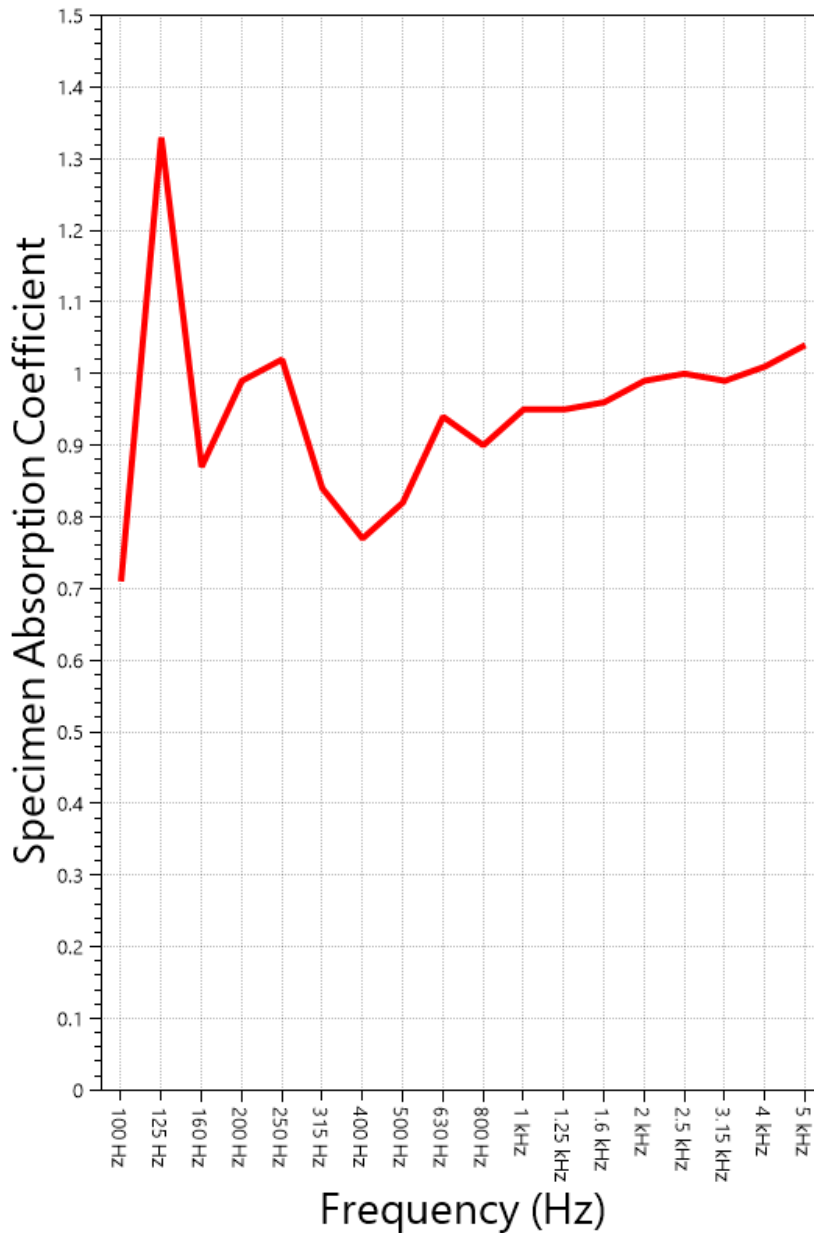
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SOUND ABSORPTION REPORT

Urban ceiling tiles, weighted shallow



SAA = 0.93

NRC = 0.95

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APPENDIX A: Extended Frequency Range Data

Specimen: Urban ceiling tiles, weighted shallow (See Full Report)

The following non-accredited data were obtained in accordance with ASTM C423-17, but extend beyond the defined frequency range of 100Hz to 5,000Hz. These unofficial results are representative of the RAL test environment only and intended for research & comparison purposes.

| 1/3 Octave Band Center Frequency (Hz) | Total Absorption (Sabins) | Absorption Coefficient |
|---------------------------------------------|------------------------------|---------------------------|
| 31.5 | 5.94 | 0.09 |
| 40 | 4.78 | 0.07 |
| 50 | 19.73 | 0.31 |
| 63 | 32.43 | 0.51 |
| 80 | 19.59 | 0.31 |
| 100 | 45.15 | 0.71 |
| 125 | 85.10 | 1.33 |
| 160 | 55.83 | 0.87 |
| 200 | 63.47 | 0.99 |
| 250 | 65.53 | 1.02 |
| 315 | 53.75 | 0.84 |
| 400 | 49.58 | 0.77 |
| 500 | 52.74 | 0.82 |
| 630 | 60.04 | 0.94 |
| 800 | 57.47 | 0.90 |
| 1000 | 60.48 | 0.95 |
| 1250 | 60.85 | 0.95 |
| 1600 | 61.47 | 0.96 |
| 2000 | 63.07 | 0.99 |
| 2500 | 63.80 | 1.00 |
| 3150 | 63.34 | 0.99 |
| 4000 | 64.46 | 1.01 |
| 5000 | 66.64 | 1.04 |
| 6300 | 65.12 | 1.02 |
| 8000 | 66.78 | 1.04 |
| 10000 | 67.39 | 1.05 |
| 12500 | 68.63 | 1.07 |

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APPENDIX B: Instruments of Traceability

Specimen: Urban ceiling tiles, weighted shallow (See Full Report)

| <u>Description</u> | <u>Model</u> | <u>Serial Number</u> | <u>Date of Certification</u> | <u>Calibration Due</u> |
|------------------------------------------------------|-----------------------|--------------------------|----------------------------------|----------------------------|
| System 1 | Type 3160-A-4/2 | 3160- 106968 | 2018-08-09 | 2019-08-09 |
| Bruel & Kjaer Mic And Preamp A | Type 4943-B-001 | 2311428 | 2018-09-28 | 2019-09-28 |
| Bruel & Kjaer Pistonphone | Type 4228 | 2781248 | 2018-08-06 | 2019-08-06 |
| Omega Digital Temp., Humid. And Pressure Recorder | OM-CP- PRHTemp2000 | P97844 | 2018-02-03 | 2019-02-03 |

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