

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™-A18-384

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CONDUCTED: 2018-11-20

ON: Voronoi tiles over fissured ceiling tiles

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 measurement procedure and room specifications is available upon request.

DESCRIPTION OF THE SPECIMEN

The test specimen was designated by the manufacturer as Voronoi tiles over fissured ceiling tiles. A full external visual inspection performed on the test specimen by Riverbank personnel verified the manufacturer's description.

Test Specimen (in order of installation)

Layer 1

Materials: Fissured ceiling tile, wet-formed mineral fiber substrate
Dimensions: 8 @ 1212.85 mm (47.75 in.) x 603.25 mm (23.75 in.)
Thickness: 15.88 mm (0.625 in.)
Overall Weight: 17.92 kg (39.5 lbs)

Layer 2

Trade Name: Voronoi
Materials: Formed polyethylene terephthalate felt
Tile Dimensions: 16 @ 609.6 mm (24 in.) x 609.6 mm (24 in.)
Overall Thickness: Maximum @ 101.6 mm (4 in.)
Minimum @ 50.8 mm (2 in.)
Tile Wall Thickness: 5 mm (0.197 in.)
Overall Weight: 11 kg (24.25 lbs)
Installation: Loose laid over Layer 1, tile orientation fixed

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Physical Measures

Size: 2.44 m (96.0 in) wide by 2.44 m (96.0 in) long
Thickness: 0.12 m (4.625 in)
Weight: 28.92 kg (63.75 lbs)
Mass per Unit Area: 4.86 kg/m² (1.0 lbs/ft²)
Calculation Area: 5.946 m² (64 ft²)

Test Environment

Room Volume: 291.98 m³
Temperature: 20.3 °C ± 0.1 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity: 62.35 % ± 0.1 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure: 99.3 kPa (Requirement not defined)

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Figure 1 – Specimen mounted in test chamber, as viewed from southwest corner of test chamber

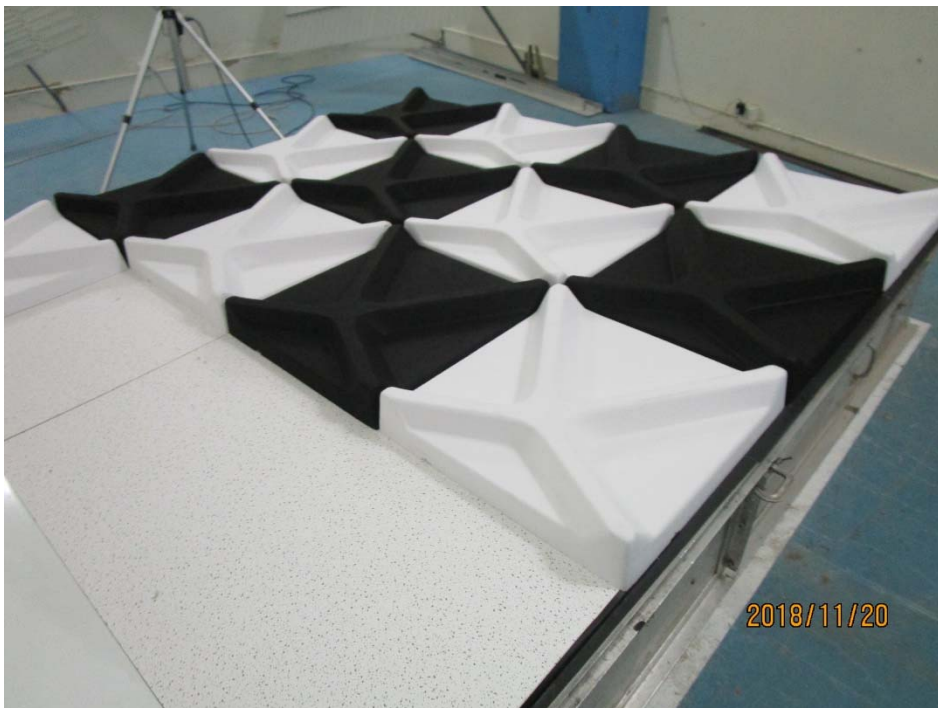


Figure 2 – Layer 2 partially installed over Layer 1

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MOUNTING METHOD

Type E-400 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 top face of Layer 1 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	3.18	34.22	0.53
** 125	3.16	33.99	0.53
160	3.32	35.76	0.56
200	3.65	39.33	0.61
** 250	3.87	41.66	0.65
315	4.80	51.67	0.81
400	5.52	59.44	0.93
** 500	6.45	69.47	1.09
630	6.85	73.71	1.15
800	7.16	77.08	1.20
** 1000	7.25	78.01	1.22
1250	7.13	76.73	1.20
1600	7.12	76.66	1.20
** 2000	6.96	74.88	1.17
2500	6.98	75.18	1.17
3150	6.59	70.94	1.11
** 4000	6.46	69.55	1.09
5000	6.81	73.27	1.14

SAA = 1.03

NRC = 1.05

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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


Marc Sciaky
Experimentalist

Report by


Malcolm Kelly
Acoustician

Approved by


Eric P. Wolfram
Laboratory Manager

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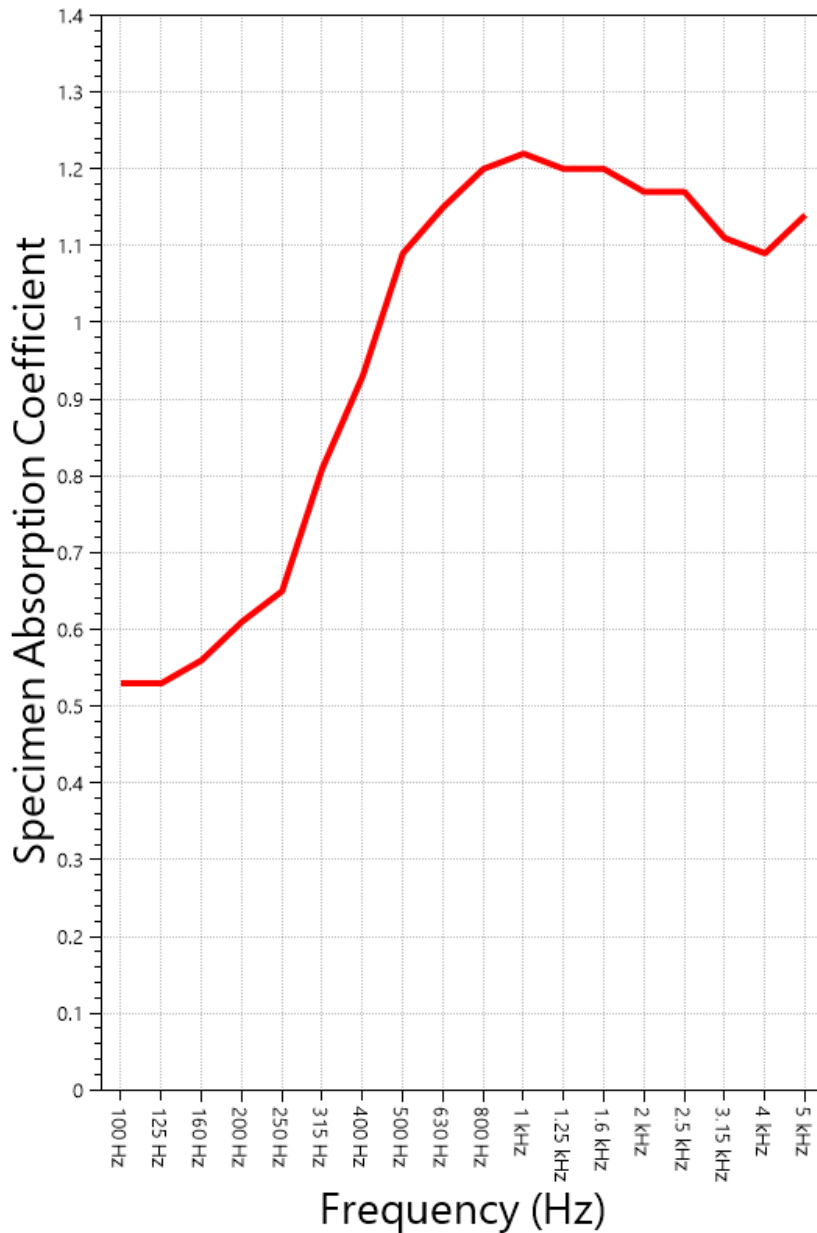
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SOUND ABSORPTION REPORT

Voronoi tiles over fissured ceiling tiles



SAA = 1.03

NRC = 1.05

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APPENDIX A: Extended Frequency Range Data

Specimen: Voronoi tiles over fissured ceiling tiles (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	30.22	0.47
40	12.58	0.20
50	10.32	0.16
63	23.41	0.37
80	34.39	0.54
100	34.22	0.53
125	33.99	0.53
160	35.76	0.56
200	39.33	0.61
250	41.66	0.65
315	51.67	0.81
400	59.44	0.93
500	69.47	1.09
630	73.71	1.15
800	77.08	1.20
1000	78.01	1.22
1250	76.73	1.20
1600	76.66	1.20
2000	74.88	1.17
2500	75.18	1.17
3150	70.94	1.11
4000	69.55	1.09
5000	73.27	1.14
6300	73.64	1.15
8000	73.90	1.15
10000	77.57	1.21
12500	81.14	1.27

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APPENDIX B: Instruments of Traceability

Specimen: Voronoi tiles over fissured ceiling tiles (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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