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

An ALION Technical Center

Test Report

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FOUNDED 1918 BY
WALLACE CLEMENT SABINE

FOR: **Turf Design**
Elgin, IL

Sound Absorption
RAL™-A18-322

CONDUCTED: 2018-09-28

ON: Voronoi 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 measuring procedure and room qualifications is available upon request.

DESCRIPTION OF THE SPECIMEN

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

Panel

Trade Name:	Voronoi
Material ID:	03804
Materials:	Formed polyethylene terephthalate felt
Dimensions:	16 @ 612.78 mm (24.125 in.) x 612.78 mm (24.125 in.)
Wall Thickness:	5 mm (0.197 in.)
Overall Thickness:	Minimum @ 51.56 mm (2.03 in.) Maximum @ 104.14 mm (4.1 in.)
Overall Weight:	11 kg (24.25 lbs)

Physical Measures

Size:	2.44 m (96.0 in) wide by 2.44 m (96.0 in) long
Thickness:	0.1 m (4.1 in)
Weight:	11.0 kg (24.25 lbs)
Mass per Unit Area:	1.85 kg/m² (0.38 lbs/ft²)
Calculation Area:	5.946 m² (64 ft²)

Test Environment

Room Volume:	291.98 m³
Temperature:	20.9 °C ± 0.1 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity:	67.15 % ± 0.5 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure:	99.1 kPa (Requirement not defined)

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NVLAP LAB CODE 100227-0

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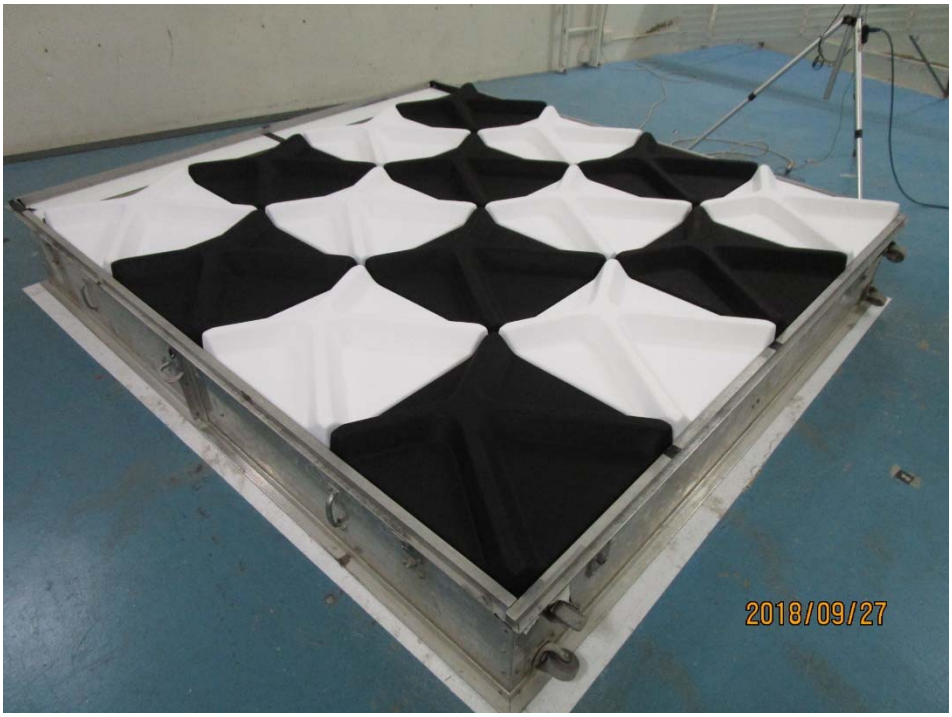

Figure 1 – Specimen mounted in test chamber

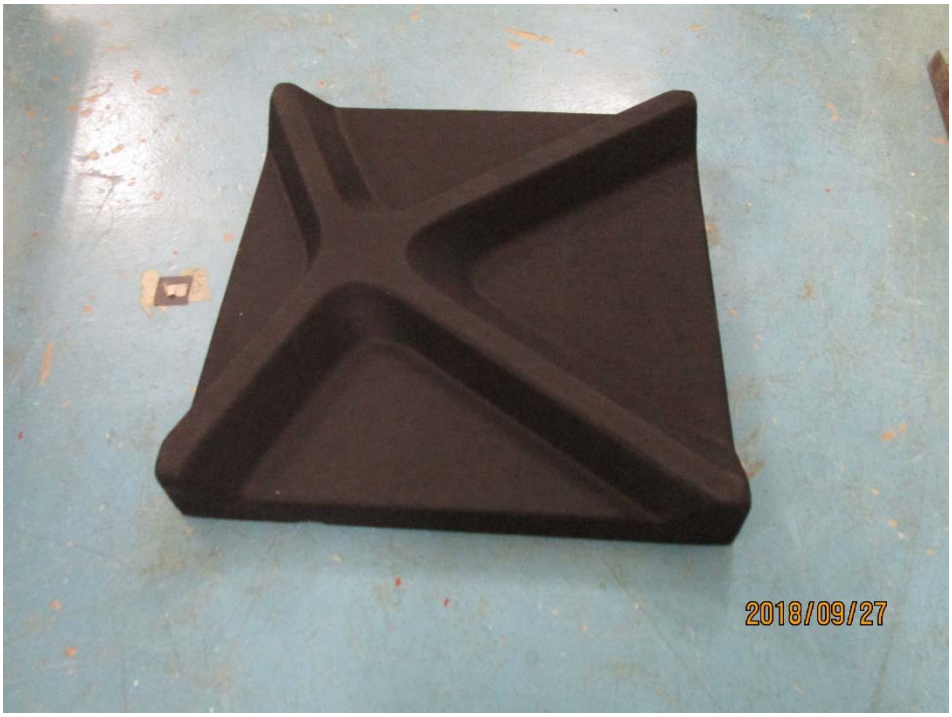

Figure 2 – Detail of individual panel

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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 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	4.85	52.24	0.82
** 125	5.45	58.72	0.92
160	5.03	54.09	0.85
200	5.44	58.56	0.91
** 250	5.48	58.95	0.92
315	5.32	57.23	0.89
400	4.67	50.23	0.78
** 500	4.72	50.80	0.79
630	5.53	59.50	0.93
800	5.48	58.95	0.92
** 1000	5.72	61.54	0.96
1250	5.70	61.37	0.96
1600	5.68	61.10	0.95
** 2000	5.73	61.72	0.96
2500	5.70	61.40	0.96
3150	5.74	61.83	0.97
** 4000	5.87	63.22	0.99
5000	6.08	65.41	1.02

SAA = 0.91
NRC = 0.90

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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

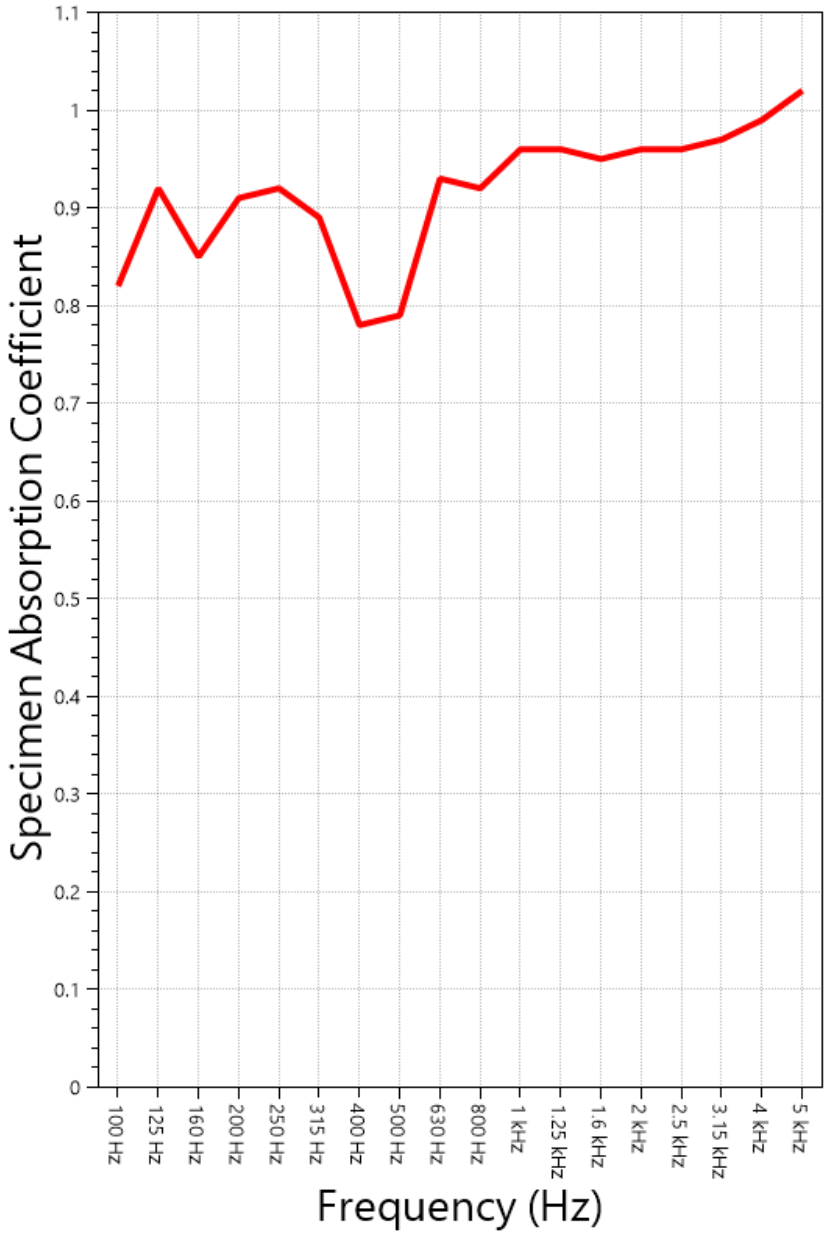
Report by_____
Malcolm Kelly
Acoustician

Approved by_____
Eric P. Wolfram
Laboratory Manager

Digitally signed by Eric P Wolfram
DN: cn=Eric P Wolfram, o=Alion Science & Technology, ou=Riverbank Acoustical Laboratories, email=ewolfram@alionscience.com, c=US
Date: 2018.11.05 09:57:31 -06'00'

SOUND ABSORPTION REPORT

Voronoi ceiling tiles



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APPENDIX A: Extended Frequency Range Data

Specimen: Voronoi 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	7.70	0.12
40	22.98	0.36
50	14.88	0.23
63	46.83	0.73
80	21.70	0.34
100	52.24	0.82
125	58.72	0.92
160	54.09	0.85
200	58.56	0.91
250	58.95	0.92
315	57.23	0.89
400	50.23	0.78
500	50.80	0.79
630	59.50	0.93
800	58.95	0.92
1000	61.54	0.96
1250	61.37	0.96
1600	61.10	0.95
2000	61.72	0.96
2500	61.40	0.96
3150	61.83	0.97
4000	63.22	0.99
5000	65.41	1.02
6300	64.72	1.01
8000	68.11	1.06
10000	71.07	1.11
12500	69.17	1.08

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APPENDIX B: Instruments of Traceability
Specimen: Voronoi ceiling tiles (See Full Report)

Description	Model	Serial Number	Date of Certification	Calibration Due
System 1	Type 3160-A-4/2	3160-106968	2018-08-09	2019-08-09
Bruel & Kjaer Mic And Preamp C	Type 4943-B-001	2311439	2018-03-27	2019-03-27
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

END

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