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

An MALION Technical Center

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Test Report

FOR: Turf Design

Elgin, IL

Sound Absorption

RALTM-A18-381

CONDUCTED: 2018-11-20 Page 1 of 9

ON: Port tiles, mixed configuration over fissured ceiling tiles

TEST METHOD

Riverbank Acoustical LaboratoriesTM 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 Port tiles, mixed configuration 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)

Laver 2

Trade Name: Port

Materials: Formed polyethylene terephthalate felt

Tile Dimensions: 16 @ 609.6 mm (24 in.) x 609.6 mm (24 in.)

Overall Thickness: 101.6 mm (4 in.) Tile Wall Thickness: 5 mm (0.197 in.)

Weights: Type A, 5 @ 4.08 kg (9 lbs)

Type B, 4 @ 3.18 kg (7 lbs) Type C, 4 @ 1.59 kg (3.5 lbs) Type D, 2 @ 1.59 kg (3.5 lbs)

Overall Weight @ 10.43 kg (23 lbs)

Installation: Loose laid over Laver 1



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Specimen Configuration, Layer 2

(test chamber east wall)

A	С	A	В
С	A	D	C
В	С	В	D
A	C	A	В

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: 28.35 kg (62.5 lbs)

Mass per Unit Area: 4.77 kg/m² (0.98 lbs/ft²)

Calculation Area: 5.946 m² (64 ft²)

Test Environment

Room Volume: 291.98 m³

Temperature: $20.3 \, ^{\circ}\text{C} \pm 0.1 \, ^{\circ}\text{C}$ (Requirement: $\geq 10 \, ^{\circ}\text{C}$ and $\leq 5 \, ^{\circ}\text{C}$ change) Relative Humidity: $62.95 \, ^{\circ}\text{M} \pm 0.1 \, ^{\circ}\text{M}$ (Requirement: $\geq 40 \, ^{\circ}\text{M}$ and $\leq 5 \, ^{\circ}\text{M}$ change)

Barometric Pressure: 99.5 kPa (Requirement not defined)



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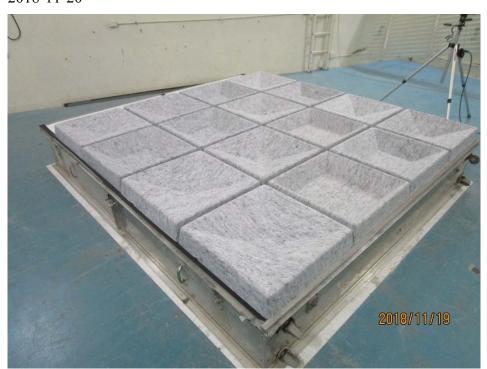


Figure 1 – Specimen mounted in test chamber, as viewed from southwest corner of test chamber



Figure 2 – Port tile types A (upper left), B (upper right), C (lower left), and D (lower right)



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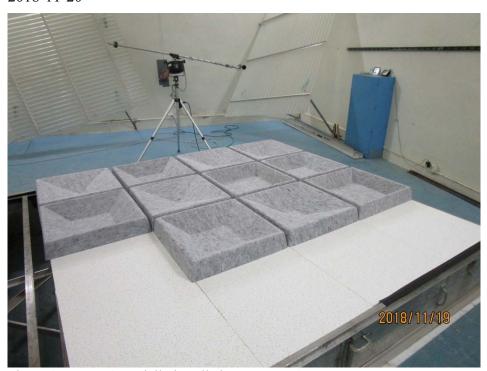


Figure 3 – Layer 2 partially installed over Layer 1



Figure 4 – Detail of specimen materials



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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	Total Absorption	Total Absorption	Absorption
(Hz)	(m^2)	(Sabins)	Coefficient
100	4.56	49.11	0.77
** 125	3.24	34.86	0.54
160	3.77	40.62	0.63
200	3.80	40.88	0.64
** 250	4.30	46.26	0.72
315	5.22	56.20	0.88
400		64.00	
400	5.76	61.99	0.97
** 500	6.65	71.60	1.12
630	7.14	76.89	1.20
800	7.16	77.10	1.20
** 1000	7.26	78.13	1.22
1250	7.15	76.93	1.20
1600	6.87	73.95	1.16
		73.93	1.10
** 2000	6.67		
2500	6.84	73.64	1.15
3150	6.94	74.69	1.17
** 4000	7.06	75.95	1.19
5000	7.15	76.91	1.20

SAA = 1.05 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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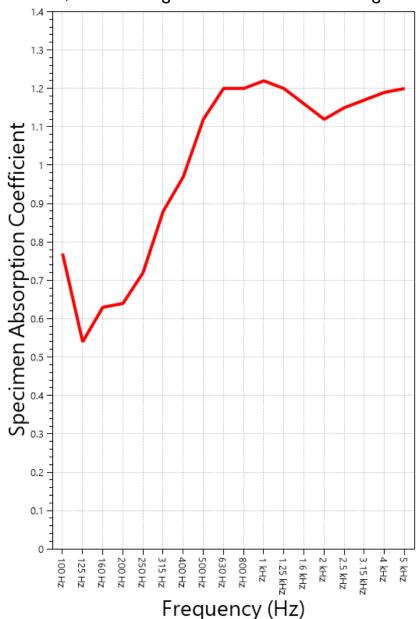
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SOUND ABSORPTION REPORT

Port tiles, mixed configuration over fissured ceiling tiles



SAA = 1.05

NRC = 1.05



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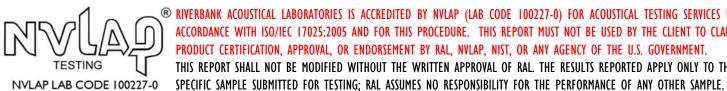
APPENDIX A: Extended Frequency Range Data

1/2 Octova Dand

Specimen: Port tiles, mixed configuration 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	Total Absorption	Absorption
(Hz)	(Sabins)	Coefficient
31.5	11.82	0.18
40	22.62	0.35
50	30.73	0.48
63	42.32	0.66
80	45.57	0.71
100	49.11	0.77
125	34.86	0.54
160	40.62	0.63
200	40.88	0.64
250	46.26	0.72
315	56.20	0.88
400	61.99	0.97
500	71.60	1.12
630	76.89	1.20
800	77.10	1.20
1000	78.13	1.22
1250	76.93	1.20
1600	73.95	1.16
2000	71.81	1.12
2500	73.64	1.15
3150	74.69	1.17
4000	75.95	1.19
5000	76.91	1.20
6300	78.62	1.23
8000	80.56	1.26
10000	80.13	1.25
12500	86.60	1.35



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APPENDIX B: Instruments of Traceability

Specimen: Port tiles, mixed configuration over fissured ceiling tiles (See Full Report)

		Serial	Date of	Calibration
Description	Model	Number	Certification	<u>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

END

