1512 S BATAVIA AVENUE
GENEVA, IL 60134

630-232-0104

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FOUNDED 1918 BY
WALLACE CLEMENT SABINE

SPONSOR: **Turf Design**
Elgin, IL

Sound Absorption
RAL™-A19-051

CONDUCTED: 2019-02-14

ON: Swell - Capped

TEST METHODOLOGY

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 are available upon request. The results presented in this report apply to the sample as received from the test sponsor.

INFORMATION PROVIDED BY SPONSOR

The test specimen was designated by the sponsor as Swell - Capped. The following nominal product information was provided by the sponsor prior to testing. The accuracy of such sponsor-provided information can affect the validity of the test results.

Product Under Test

Trade Name:	Swell – Capped
Manufacturer:	Turf Design

SPECIMEN MEASUREMENTS & TEST CONDITIONS

Through a full external visual inspection performed on the test specimen, Riverbank personnel verified the following information:

Test Specimen

Material:	Polyethylene terephthalate felt
Dimensions:	16 tiles @ 606.42 mm (23.875 in.) x 606.42 mm (23.875 in.)
Key Geometry:	Continuous 9 mm (0.354 in.) thick felt base
	Sixteen 9 mm (0.354 in.) thick felt fins per tile protruding from base
	Fins spaced 38 mm (1.496 in.) on center
	Spacing held by two (2) felt rails connected perpendicular to fins
Depth Profile:	Sinusoidal, minimum and maximum at endpoints of outermost fins
	Range of depth varies sinusoidally from fin to fin
	Maximum protrusion from base @ 139 mm (5.472 in.)
	Minimum protrusion from base @ 47 mm (1.85 in.)
Overall Weight:	36.51 kg (80.5 lbs)
Installation:	Tiles oriented such that corners of maximum and minimum depth align

Overall Specimen Properties

Size:	2.43 m (95.5 in) wide by 2.43 m (95.5 in) long
Thickness:	0.17 m (6.75 in)
Weight:	33.57 kg (74.0 lbs)
Mass per Unit Area:	5.7 kg/m² (1.17 lbs/ft²)
Calculation Area:	5.884 m² (63.34 ft²)

Test Environment

Room Volume:	291.98 m³
Temperature:	21.3 °C ± 0.1 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity:	66.1 % ± 0.2 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure:	97.3 kPa (Requirement not defined)

MOUNTING METHOD

Type E-400 Mounting: The test specimen was mounted with an airspace behind it. The numeral suffix in the designation is the distance in millimeters 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 the base felt tiles for reference. Perimeter edges up to this reference point were sealed with metal framing.

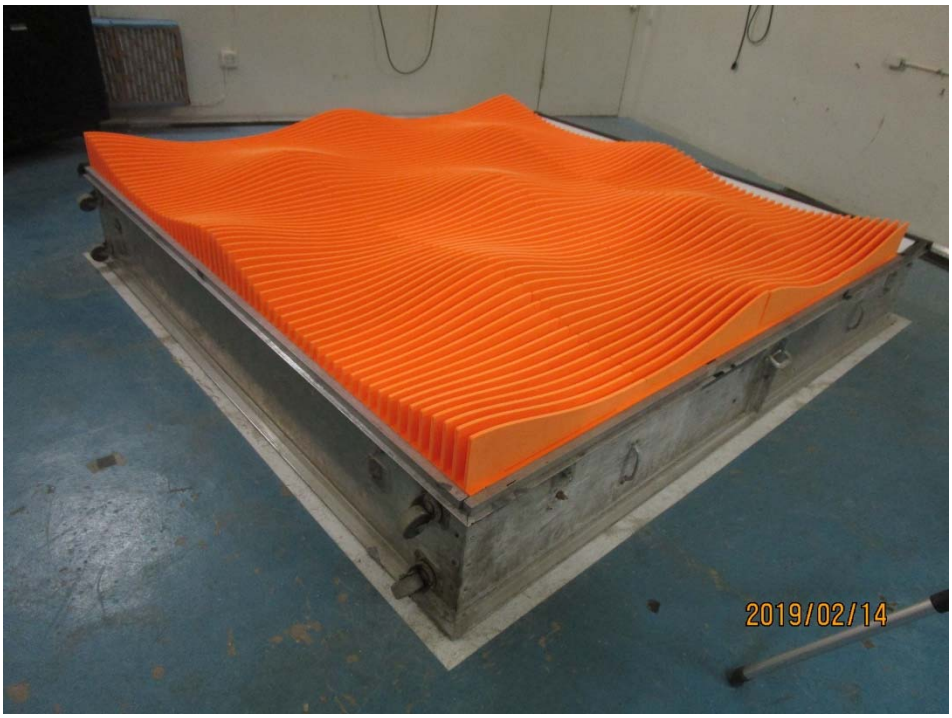

Figure 1 – Specimen mounted in test chamber

Figure 2 – Detail of specimen materials

Figure 3 – Individual tile, fin to fin endpoint depth profile

Figure 4 – Individual tile, individual fin depth profile

TEST RESULTS

Specimen total absorption and absorption coefficient are tabulated at the eighteen standard frequencies. A graphic presentation of the data and additional information appear on the following pages.

1/3 Octave Center Frequency (Hz)	Total Absorption (m^2)	Total Absorption (Sabins)	Absorption Coefficient
100	4.96	53.44	0.84
** 125	6.04	64.96	1.03
160	5.12	55.13	0.87
200	6.31	67.95	1.07
** 250	6.11	65.73	1.04
315	6.04	65.00	1.03
400	5.76	62.02	0.98
** 500	5.62	60.47	0.95
630	6.19	66.62	1.05
800	6.42	69.10	1.09
** 1000	6.28	67.61	1.07
1250	6.48	69.75	1.10
1600	6.83	73.54	1.16
** 2000	6.98	75.13	1.19
2500	7.27	78.20	1.23
3150	7.43	79.99	1.26
** 4000	7.67	82.51	1.30
5000	7.78	83.74	1.32

SAA = 1.08
NRC = 1.05

TEST RESULTS (continued)

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

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

Tested by _____
Marc Sciaky
Senior Experimentalist

Report by _____
Malcolm Kelly
Test Engineer, Acoustician

Approved by _____
Eric P. Wolfram
Laboratory Manager

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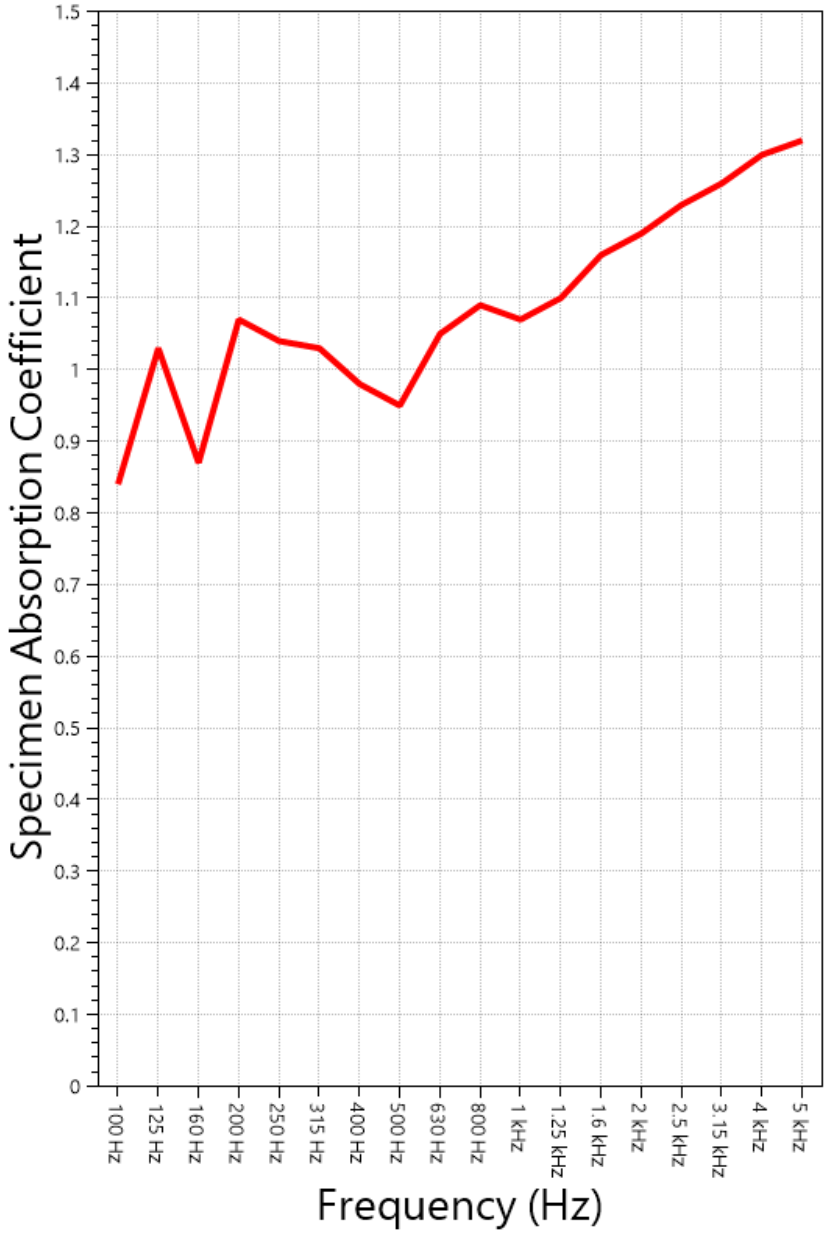
Date: 2019.04.16 13:37:32 -05'00'

SOUND ABSORPTION REPORT

Swell - Capped



SAA = 1.08
NRC = 1.05

APPENDIX A: Extended Frequency Range Data

Specimen: Swell - Capped (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	49.07	0.77
40	1.07	0.02
50	23.20	0.37
63	34.57	0.55
80	22.35	0.35
100	53.44	0.84
125	64.96	1.03
160	55.13	0.87
200	67.95	1.07
250	65.73	1.04
315	65.00	1.03
400	62.02	0.98
500	60.47	0.95
630	66.62	1.05
800	69.10	1.09
1000	67.61	1.07
1250	69.75	1.10
1600	73.54	1.16
2000	75.13	1.19
2500	78.20	1.23
3150	79.99	1.26
4000	82.51	1.30
5000	83.74	1.32
6300	84.41	1.33
8000	85.09	1.34
10000	88.45	1.40
12500	94.92	1.50

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APPENDIX B: Instruments of Traceability

Specimen: Swell - Capped (See Full Report)

Description	Model	Serial Number	Date of Certification	Calibration Due
System 1	Type 3160-A-042	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
EXTECH Hygro 662	SD700	A083662	2018-11-29	2019-11-29

APPENDIX C: Revisions to Original Test Report

Specimen: Swell - Capped (See Full Report)

Date	Revision
2019-02-18	Original report issued

END