

Test Report

SPONSOR: **Turf Design**
Elgin, IL

Sound Absorption
RAL™-A19-048

CONDUCTED: 2019-02-12

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ON: Assorted Switchblade tiles over fissured ceiling tiles - shallow weighting

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 Assorted Switchblade tiles over fissured ceiling tiles - shallow weighting. 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: Switchblade
Material ID: XG1, XG2, C3, C2, BG, AG
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 (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.)
2 @ 1212.85 mm (47.75 in.) x 330.2 mm (13 in.)
Thickness: 14.27 mm (0.562 in.)
Overall Weight: 20.18 kg (44.5 lbs)

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Test Specimen (continued)

Layer 2

Material: Polyethylene terephthalate felt
Dimensions: 28 @ 598 mm (23.543 in.) long x 27 mm (1.063 in.) thick
3 @ 295.27 mm (11.625 in.) long x 27 mm (1.063 in.) thick
Key Geometry: Center felt piece @ 9 mm (0.354 in.) thick @ 50 mm (1.969 in.) deep
9 mm (0.354 in.) thick felt pieces adhered to both sides of center piece

Type XG1

Quantity: 1
Depth Profile: Varies linearly, maxima at endpoints, minimum at midpoint
Maximum depth @ 152.4 mm (6 in.)
Minimum depth @ 63.5 mm (2.5 in.)

Type XG2

Quantity: 4
Depth Profile: Varies linearly, minima at endpoints, maximum at midpoint
Maximum depth @ 152.4 mm (6 in.)
Minimum depth @ 63.5 mm (2.5 in.)

Type C3

Quantity: 2 full length, 2 cut to accommodate mounting dimensions
Depth Profile: Flat
Depth @ 63.5 mm (2.5 in.)

Type C2

Quantity: 3
Depth Profile: Flat
Depth @ 152.4 mm (6 in.)

Type BG

Quantity: 14 full length, 1 cut to accommodate mounting dimensions
Depth Profile: Varies linearly, minimum and maximum at opposite endpoints
Maximum depth @ 152.4 mm (6 in.)
Minimum depth @ 63.5 mm (2.5 in.)

Type AG

Quantity: 4
Depth Profile: Varies linearly, minimum and maximum at opposite endpoints
Maximum depth @ 238.12 mm (9.375 in.)
Minimum depth @ 63.5 mm (2.5 in.)

Installation: Mounted vertically in square grid pattern over Layer 1
Tiles oriented such that depth is equal at all mating edges
See specimen configuration diagram on following page
Overall Weight: 9.07 kg (20 lbs)

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Specimen Layer 2 Configuration

TEST CHAMBER SOUTH WALL

| | | | |
|---------------|---------------|---------------|-----|
| C2 | BG | AG | |
| BG | BG | AG | AG |
| BG | BG | AG | |
| XG2 | BG | BG | XG2 |
| XG2 | XG1 | BG | |
| BG | BG | C2 | BG |
| XG2 | C2 | BG | |
| C3 | BG | BG | C3 |
| C3 (short) | BG (short) | C3 (short) | |

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Overall Specimen Properties

Size: 2.74 m (108.0 in) wide by 2.43 m (96.0 in) long
Thickness: 0.25 m (9.84 in)
Weight: 29.26 kg (64.5 lbs)
Mass per Unit Area: 4.39 kg/m² (0.9 lbs/ft²)
Calculation Area: 6.658 m² (71.67 ft²)

Test Environment

Room Volume: 291.98 m³
Temperature: 21.2 °C ± 0.0 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity: 66.2 % ± 1.0 % (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 Layer 1 for reference. Perimeter edges of Layer 1 were sealed with metal framing.

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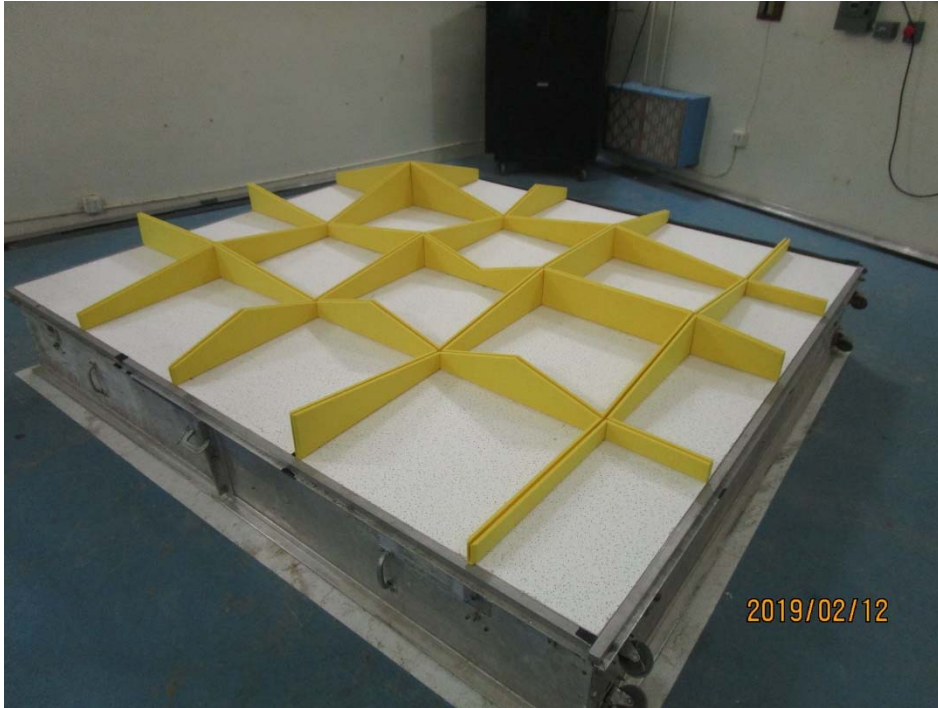


Figure 1 – Test specimen as viewed from northeast corner of mounting frame

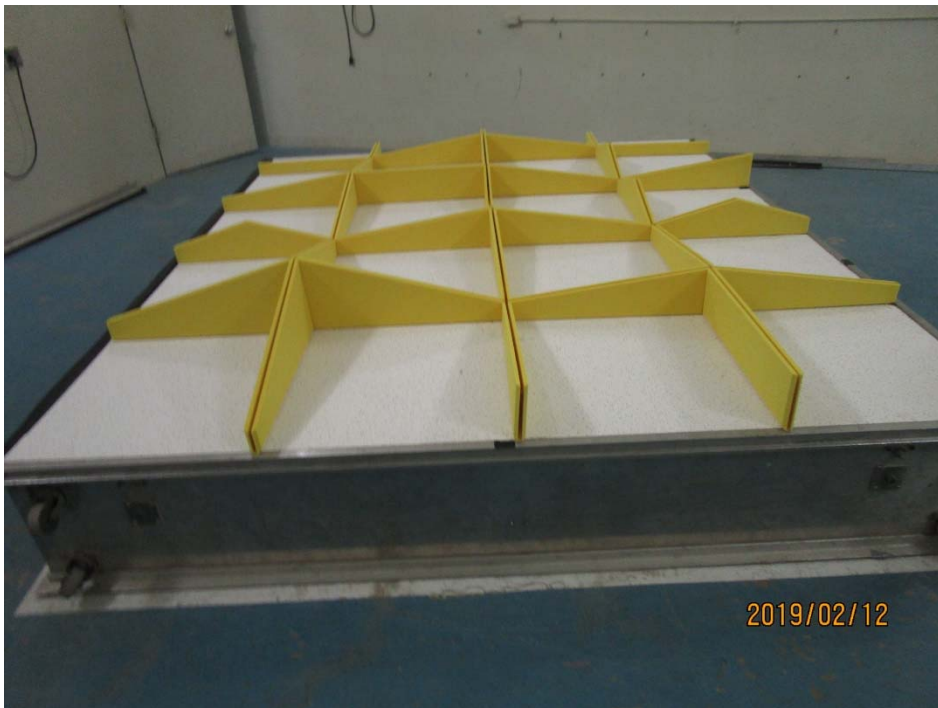


Figure 2 – Test specimen as viewed from South wall of test chamber

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Figure 3 – Test specimen as viewed from West wall of test chamber



Figure 4 – Detail of specimen materials

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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 | 4.48 | 48.20 | 0.67 |
| ** 125 | 3.62 | 38.95 | 0.54 |
| 160 | 3.31 | 35.59 | 0.50 |
| 200 | 3.31 | 35.58 | 0.50 |
| ** 250 | 3.67 | 39.47 | 0.55 |
| 315 | 4.06 | 43.66 | 0.61 |
| 400 | 4.45 | 47.94 | 0.67 |
| ** 500 | 5.10 | 54.95 | 0.77 |
| 630 | 5.52 | 59.45 | 0.83 |
| 800 | 5.83 | 62.74 | 0.88 |
| ** 1000 | 6.14 | 66.04 | 0.92 |
| 1250 | 6.29 | 67.74 | 0.95 |
| 1600 | 6.32 | 67.98 | 0.95 |
| ** 2000 | 6.38 | 68.71 | 0.96 |
| 2500 | 6.19 | 66.64 | 0.93 |
| 3150 | 6.26 | 67.34 | 0.94 |
| ** 4000 | 6.26 | 67.44 | 0.94 |
| 5000 | 6.12 | 65.86 | 0.92 |

SAA = 0.79

NRC = 0.80

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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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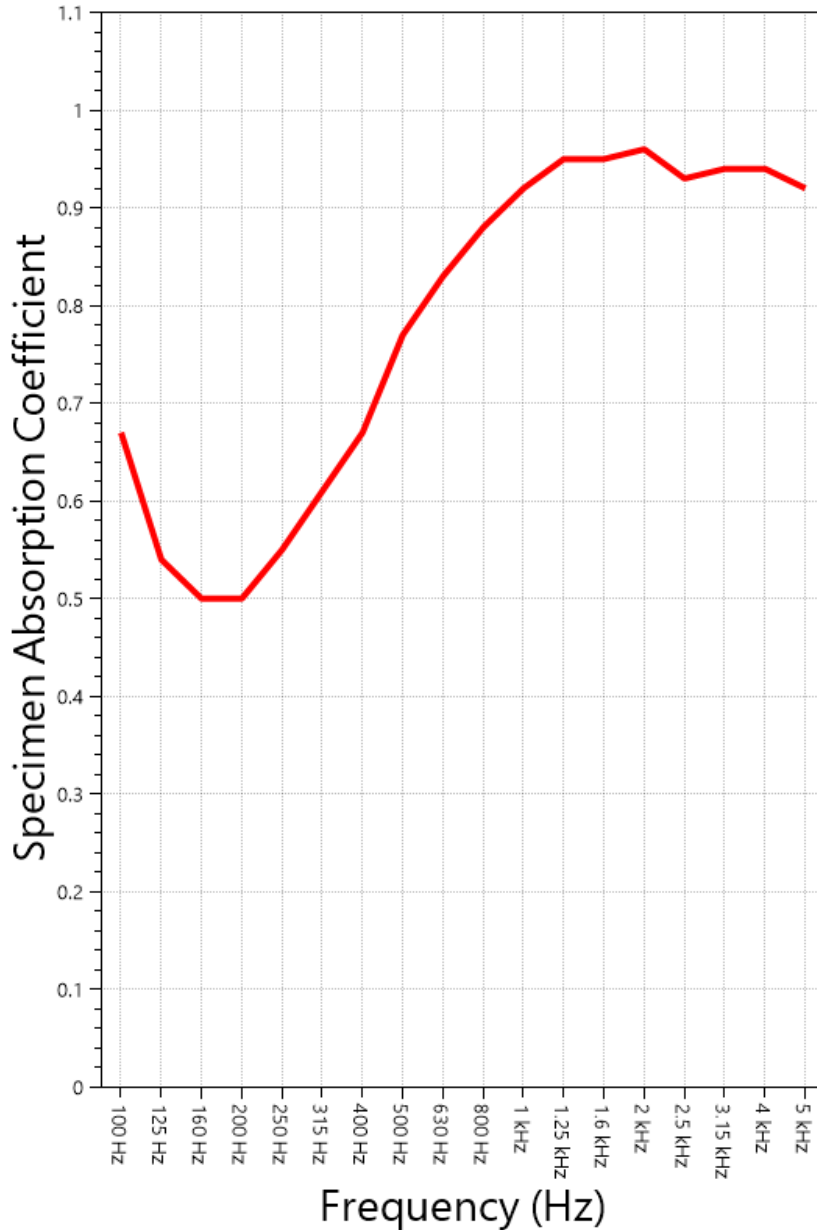
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SOUND ABSORPTION REPORT

Assorted Switchblade tiles over fissured ceiling tiles - shallow weighting



SAA = 0.79

NRC = 0.80

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APPENDIX A: Extended Frequency Range Data

Specimen: Assorted Switchblade tiles over fissured ceiling tiles - shallow weighting (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 | 53.21 | 0.74 |
| 40 | 48.58 | 0.68 |
| 50 | 45.23 | 0.63 |
| 63 | 23.62 | 0.33 |
| 80 | 54.76 | 0.76 |
| 100 | 48.20 | 0.67 |
| 125 | 38.95 | 0.54 |
| 160 | 35.59 | 0.50 |
| 200 | 35.58 | 0.50 |
| 250 | 39.47 | 0.55 |
| 315 | 43.66 | 0.61 |
| 400 | 47.94 | 0.67 |
| 500 | 54.95 | 0.77 |
| 630 | 59.45 | 0.83 |
| 800 | 62.74 | 0.88 |
| 1000 | 66.04 | 0.92 |
| 1250 | 67.74 | 0.95 |
| 1600 | 67.98 | 0.95 |
| 2000 | 68.71 | 0.96 |
| 2500 | 66.64 | 0.93 |
| 3150 | 67.34 | 0.94 |
| 4000 | 67.44 | 0.94 |
| 5000 | 65.86 | 0.92 |
| 6300 | 65.16 | 0.91 |
| 8000 | 63.19 | 0.88 |
| 10000 | 59.52 | 0.83 |
| 12500 | 57.07 | 0.80 |

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APPENDIX B: Instruments of Traceability

Specimen: Assorted Switchblade tiles over fissured ceiling tiles - shallow weighting (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-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: Assorted Switchblade tiles over fissured ceiling tiles - shallow weighting (See Full Report)

| <u>Date</u> | <u>Revision</u> |
|--------------------|------------------------|
| 2019-02-13 | Original report issued |

END