

1512 S BATAVIA AVENUE  
GENEVA, IL 60134

An ALION Technical Center

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630-232-0104

## Test Report

FOUNDED 1918 BY  
WALLACE CLEMENT SABINE

SPONSOR: **Turf Design**  
Elgin, IL

**Sound Absorption**  
**RAL™-A19-045**

CONDUCTED: 2019-02-05

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ON: Switchblade C1 over fissured ceiling tiles

### 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 Switchblade C1 over fissured ceiling tiles. 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: C1  
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)**

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**Layer 2**

Material: Polyethylene terephthalate felt  
Dimensions: 28 @ 598 mm (23.543 in.) x 236 mm (9.291 in.)  
3 @ 295.27 mm (11.625 in.) x 236 mm (9.291 in.)  
Thickness: Maximum @ 27 mm (1.063 in.)  
Minimum @ 23 mm (0.906 in.)  
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  
Three (3) pieces cut to fit mounting area dimensions  
Installation: Mounted vertically in square grid pattern, thickest edge facing Layer 1  
Overall Weight: 17.01 kg (37.5 lbs)

**Overall Specimen Measurements**

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Size: 2.74 m (108.0 in) wide by 2.43 m (95.5 in) long  
Thickness: 0.25 m (9.937 in)  
Weight: 37.19 kg (82.0 lbs)  
Mass per Unit Area: 5.59 kg/m<sup>2</sup> (1.14 lbs/ft<sup>2</sup>)  
Calculation Area: 6.658 m<sup>2</sup> (71.63 ft<sup>2</sup>)

**Test Environment**

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Room Volume: 291.98 m<sup>3</sup>  
Temperature: 21.3 °C ± 0.1 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)  
Relative Humidity: 64.15 % ± 1.1 % (Requirement: ≥ 40 % and ≤ 5 % change)  
Barometric Pressure: 99.3 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 – Specimen mounted in test chamber



Figure 2 – Detail of specimen materials, typical Switchblade joints

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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 <sup>2</sup> )	Total Absorption (Sabins)	Absorption Coefficient
100	4.70	50.55	0.71
** 125	4.35	46.84	0.65
160	4.99	53.68	0.75
200	5.07	54.59	0.76
** 250	5.32	57.26	0.80
315	5.31	57.12	0.80
400	5.41	58.18	0.81
** 500	5.56	59.84	0.84
630	6.01	64.72	0.90
800	6.28	67.61	0.94
** 1000	6.98	75.17	1.05
1250	7.31	78.69	1.10
1600	7.48	80.47	1.12
** 2000	7.50	80.73	1.13
2500	7.46	80.25	1.12
3150	7.48	80.52	1.12
** 4000	7.61	81.86	1.14
5000	7.47	80.38	1.12

**SAA = 0.95**

**NRC = 0.95**

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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.

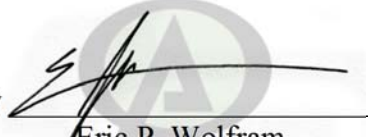
Tested by

  
Marc Sciaky  
Senior Experimentalist

Report by

  
Malcolm Kelly  
Test Engineer, Acoustician

Approved by

  
Eric P. Wolfram  
Laboratory Manager



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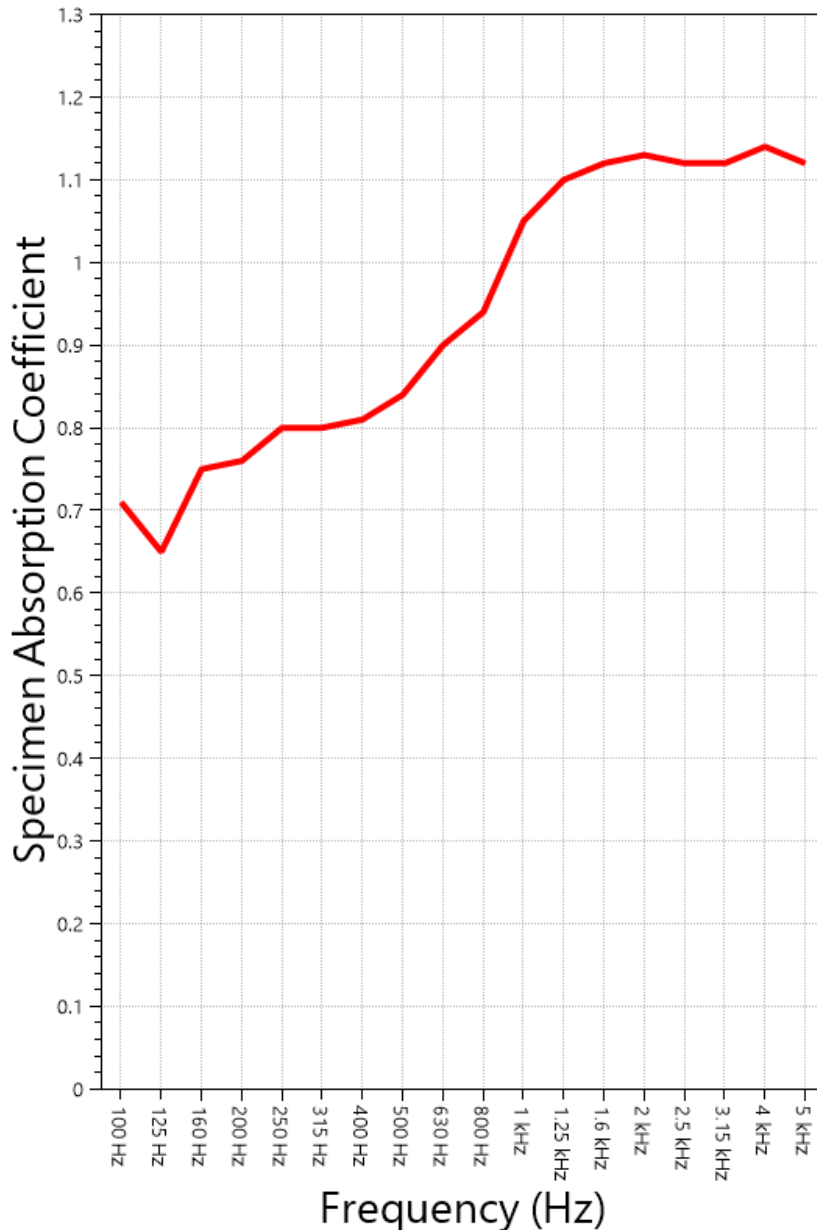
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### SOUND ABSORPTION REPORT

Switchblade CI over fissured ceiling tiles



**SAA = 0.95**

**NRC = 0.95**

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### **APPENDIX A: Extended Frequency Range Data**

Specimen: Switchblade C1 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	41.54	0.58
40	15.61	0.22
50	31.42	0.44
63	19.67	0.27
80	43.48	0.61
100	50.55	0.71
125	46.84	0.65
160	53.68	0.75
200	54.59	0.76
250	57.26	0.80
315	57.12	0.80
400	58.18	0.81
500	59.84	0.84
630	64.72	0.90
800	67.61	0.94
1000	75.17	1.05
1250	78.69	1.10
1600	80.47	1.12
2000	80.73	1.13
2500	80.25	1.12
3150	80.52	1.12
4000	81.86	1.14
5000	80.38	1.12
6300	82.54	1.15
8000	86.10	1.20
10000	85.14	1.19
12500	91.89	1.28

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### **APPENDIX B: Instruments of Traceability**

Specimen: Switchblade C1 over fissured ceiling tiles (See Full Report)

<b><u>Description</u></b>	<b><u>Model</u></b>	<b><u>Serial Number</u></b>	<b><u>Date of Certification</u></b>	<b><u>Calibration Due</u></b>
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: Switchblade C1 over fissured ceiling tiles (See Full Report)

<b><u>Date</u></b>	<b><u>Revision</u></b>
2019-02-06	Original report issued

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END