RIVERBANK ACOUSTICAL LABORATORIES

1512 S BATAVIA AVENUE
GENEVA, IL 60134

630-232-0104

An **ALION** Technical Center

Test Report

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WALLACE CLEMENT SABINE

SPONSOR: **FabriTRAK Systems Inc.**
Mount Laurel, NJ

**Sound Absorption
RAL™-A20-438**

ON: 2 in. Fiberglass Baffle Covered with Fabri Felt (4 x 2 rectangular array)

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 17025:2017 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 2 in. Fiberglass Baffle Covered with Fabri Felt (4 x 2 rectangular array). 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:	Fiberglass Baffle
Materials:	Fiberglass covered with Fabri Felt
Thickness:	50.8 mm (2 in.)
Manufacturer:	FabriTRAK Systems Inc.

SPECIMEN MEASUREMENTS & TEST CONDITIONS

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

Test Specimen

Materials:	Semirigid panels covered with felt fabric
Dimensions:	8 @ 610 mm (24 in.) by 1219 mm (48 in.)
Thickness:	52.8 mm (2.078 in.)
Overall Weight:	36.17 kg (79.75 lbs)

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Physical Measurements (per object)

Dimensions:	0.61 m (24.0 in) wide by 1.22 m (48.0 in) long
Thickness:	52.8 mm (2.078 in.)
Weight:	4.52 kg (9.97 lbs)

Test Environment

Room Volume:	291.98 m³
Temperature:	22.0 °C $\pm$ 0.0 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity:	58.25 % $\pm$ 0.3 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure:	98.7 kPa (Requirement not defined)

Each sound absorbing object had an absorptive area (all exposed surfaces) of 1.67 m^2 (18 ft^2). The total absorptive area (all exposed surfaces) of all sound-absorbing objects was 13.38 m^2 (144 ft^2). The array of objects covered 6.41 m^2 (69 ft^2) of the horizontal test surface (total treated area).

MOUNTING METHOD

Type J Mounting: The specimen is an array of 8 spaced sound absorbing objects suspended from cables such that the closest face is located approximately 832 mm (32.75 in.) from the horizontal test surface. This approximates the mounting method of a typical ceiling baffle installation. The objects were distributed in two rows of four objects each. Rows were spaced 305 mm (12 in.) apart and objects in each row were spaced 762 mm (30 in.) on center.

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Figure 1 – Specimen mounted in test chamber

Figure 2 – Detail of specimen in test chamber

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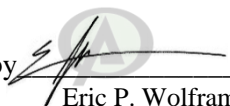
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TEST RESULTS

Note: There is currently no standardized method for calculating Absorption Coefficients from spaced object absorbers. The sound absorption performance of spaced object absorbers should not be compared directly with specimens tested as a single rectangular area (e.g. mounting types A, E, etc.).

1/3 Octave Center Frequency (Hz)	Total Absorption (m^2)	Total Absorption (Sabins)	Absorption per Object (m^2 / Object)	Absorption per Object (Sabins / Object)
100	1.34	14.44	0.17	1.81
** 125	1.58	16.96	0.20	2.12
160	2.23	24.04	0.28	3.00
200	3.38	36.39	0.42	4.55
** 250	3.95	42.53	0.49	5.32
315	5.16	55.58	0.65	6.95
400	5.96	64.13	0.74	8.02
** 500	9.78	105.30	1.22	13.16
630	11.26	121.21	1.41	15.15
800	12.00	129.11	1.50	16.14
** 1000	12.22	131.53	1.53	16.44
1250	12.49	134.46	1.56	16.81
1600	12.59	135.56	1.57	16.94
** 2000	12.35	132.98	1.54	16.62
2500	12.22	131.50	1.53	16.44
3150	11.94	128.48	1.49	16.06
** 4000	11.96	128.79	1.50	16.10
5000	12.32	132.59	1.54	16.57

Tested by _Marc Sciaky_
Marc Sciaky
Senior Experimentalist

Report by _Malcolm Kelly_
Malcolm Kelly
Test Engineer, Acoustician

Approved by _Eric P. Wolfram_
Eric P. Wolfram
Laboratory Manager

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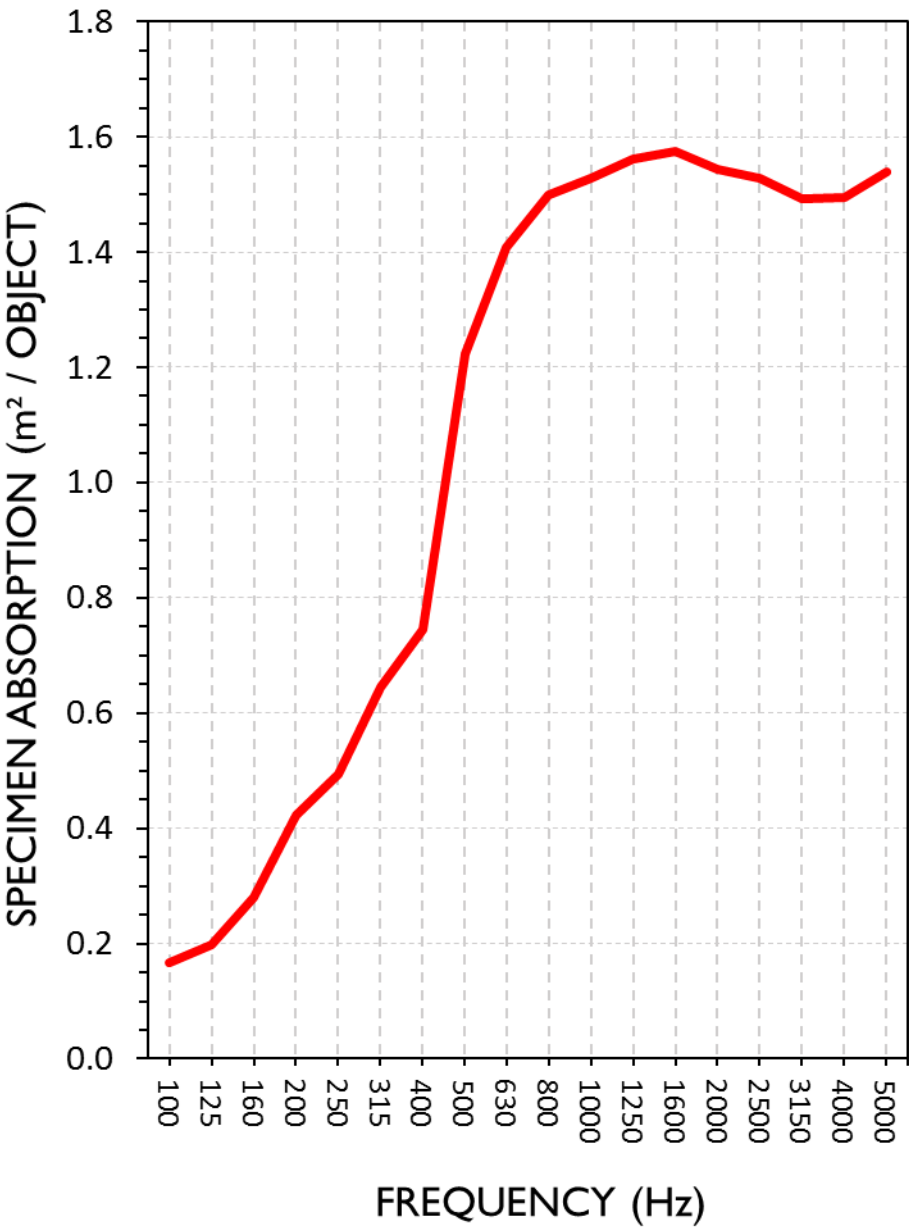
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SOUND ABSORPTION REPORT
2 in. Fiberglass Baffle Covered with Fabri Felt (4 x 2 rectangular array)

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Test Report

APPENDIX A: Extended Frequency Range Data

Specimen: 2 in. Fiberglass Baffle Covered with Fabri Felt (4 x 2 rectangular array) (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 (m^2)	Total Absorption (Sabins)	Absorption per Object (m^2 / Object)	Absorption per Object (Sabins / Object)
31.5	0.05	0.52	0.01	0.06
40	-0.51	-5.47	-0.06	-0.68
50	0.43	4.62	0.05	0.58
63	1.31	14.09	0.16	1.76
80	1.16	12.51	0.15	1.56
100	1.34	14.44	0.17	1.81
125	1.58	16.96	0.20	2.12
160	2.23	24.04	0.28	3.00
200	3.38	36.39	0.42	4.55
250	3.95	42.53	0.49	5.32
315	5.16	55.58	0.65	6.95
400	5.96	64.13	0.74	8.02
500	9.78	105.30	1.22	13.16
630	11.26	121.21	1.41	15.15
800	12.00	129.11	1.50	16.14
1000	12.22	131.53	1.53	16.44
1250	12.49	134.46	1.56	16.81
1600	12.59	135.56	1.57	16.94
2000	12.35	132.98	1.54	16.62
2500	12.22	131.50	1.53	16.44
3150	11.94	128.48	1.49	16.06
4000	11.96	128.79	1.50	16.10
5000	12.32	132.59	1.54	16.57
6300	12.51	134.64	1.56	16.83
8000	13.11	141.14	1.64	17.64
10000	13.83	148.85	1.73	18.61
12500	14.90	160.42	1.86	20.05

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APPENDIX B: Instruments of Traceability

Specimen: 2 in. Fiberglass Baffle Covered with Fabri Felt (4 x 2 rectangular array) (See Full Report)

Description	Model	Serial Number	Date of Certification	Calibration Due
System 1	Type 3160-A-042	3160-106968	2020-06-26	2021-06-26
Bruel & Kjaer Mic And Preamp A	Type 4943-B-001	2311428	2020-09-30	2021-09-30
Bruel & Kjaer Pistonphone	Type 4228	2781248	2020-08-12	2021-08-12
Omega Digital Temp., Humid. And Pressure Recorder	OM-CP-PRHTemp2000	P97844	2020-02-18	2021-02-18

APPENDIX C: Revisions to Original Test Report

Specimen: 2 in. Fiberglass Baffle Covered with Fabri Felt (4 x 2 rectangular array) (See Full Report)

Date	Revision
2020-11-03	Original report issued

END

SPONSOR: **FabriTRAK Systems Inc.**   Report Referenced: **RAL™-A20-438**
             Mount Laurel, NJ

CONDUCTED: 2020-10-28

ON: 2 in. Fiberglass Baffle Covered with Fabri Felt (4 x 2 rectangular array) (See Full Test Report for Details)

Appendix D to ASTM C423 Sound Absorption Test
Non-standard calculation of equivalent NRC Rating and Absorption Coefficients from spaced absorbers

At this time, ASTM C423 does not provide a standard method for determining absorption coefficients of spaced object absorbers. Tests of a set of sound absorbing objects spaced apart from each other will yield higher absorption rates than a specimen joined together as a single patch (A-Mount or E-Mount). For this reason it is unfair to provide NRC or absorption coefficient ratings for specimens that consist of a spaced set of absorbers. Despite this, the architectural industry has expressed great demand for a simple "single number" rating for these treatments. Likewise, acoustical consultants desire equivalent absorption coefficient data for use in acoustical modeling software. The following is an attempt to appease these demands until ASTM develops a standard method for calculation. Several alternate non-standard calculation methods are provided. Riverbank Acoustical Laboratories prefers method 1; ratings yielded from this method have titles with the prepended word "Equivalent". Rating titles for the remaining methods are prepended with the word "Apparent". These rating names and their associated acronyms are provided by RAL and shall not be misconstrued as originating from any current standard.

Method 1) Equivalent Sound Absorption Coefficient calculated from extended test specimen envelope
The total sound absorption yielded by the specimen is divided by the surface area of the test surface covered by the suspended objects, including intermediate spaces, with additional added area to allow theoretical extrapolation for larger arrays. The object rigging covered 6.41 m^2 (69 ft^2) of horizontal test surface area. With an extra 305 mm (12 in.) of width and 711.2 mm (28 in.) of length to account for the space between the tested array and what would be the next objects in a larger array, the surface area comes to 9.29 m^2 (100 ft^2). Equivalent sound absorption coefficients, and subsequently the Equivalent Noise Reduction Coefficient (E*NRC) and Equivalent Sound Absorption Average (E*SAA) ratings, are calculated using this surface area based on the methods described in ASTM C423-17. This may be the most accurate method for comparing object arrays to ceiling tile products. The equivalent sound absorption coefficient data can be assigned to a single horizontal surface or plane in acoustical modeling software for approximation of object array performance. Such approximations rely on the assumptions that object spacing is similar to that of the tested array across the entire surface, that gaps are negligibly small between adjacent rows of objects if the test specimen consists of a single row, and that the installation occurs over a perfectly reflective surface material.

Method 2) Apparent Sound Absorption Coefficient calculated from total exposed surface area of specimen
The total sound absorption yielded by the specimen is divided by the total surface area of all exposed specimen faces (1.67 m^2 (18 ft^2) per object x 8 objects = 13.38 m^2 (144 ft^2) total surface area). Apparent sound absorption coefficients, and subsequently the Apparent Noise Reduction Coefficient (A*NRC) and Apparent Sound Absorption Average (A*SAA) ratings, are calculated using this surface area based on the methods described in ASTM C423-17. This method shows the actual absorption occurring at the exposed surfaces, but does not provide a fair comparison with materials mounted as a uniform patch (in A-mount or E-mount).

Riverbank Acoustical Laboratories
1512 S. Batavia Ave.
Geneva, IL 60134-3302

Tel: 630-232-0104
Fax: 630-232-0138
Email: RAL@alionscience.com

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Appendix D (continued)

Method 3) Apparent Sound Absorption Coefficient calculated from one face per object

The total sound absorption yielded by the specimen is divided by the surface area of one side of one large face for each object in the specimen ($0.74 \ m^2$ ($8 \ ft^2$) per object x 8 objects = $5.95 \ m^2$ ($64 \ ft^2$) total surface area). Apparent sound absorption coefficients, and subsequently the Apparent Noise Reduction Coefficient (A*NRC) and Apparent Sound Absorption Average (A*SAA) ratings, are calculated using this surface area based on the methods described in ASTM C423-17. This method is favored by some material manufacturers since it yields very high NRC figures, but does not provide a fair comparison with other ceiling tile or wall panel products. Riverbank Acoustical Laboratories recommends that results obtained from this method be used for research and comparison purposes only; such results should not be used for marketed claims of product performance.

Method 4) Apparent Sound Absorption Coefficient calculated from specimen envelope without extension

The total sound absorption yielded by the specimen is divided by the rectangular test surface area covered by the suspended objects, including intermediate spaces. The object rigging covered $6.41 \ m^2$ ($69 \ ft^2$) of horizontal test surface area. Apparent sound absorption coefficients, and subsequently the Apparent Noise Reduction Coefficient (A*NRC) and Apparent Sound Absorption Average (A*SAA) ratings, are calculated using this surface area based on the methods described in ASTM C423-17. While similar in concept to Method 1, attempting to model any array larger than the tested specimen using these results would imply instances of adjacent objects with zero spacing scattered throughout the extrapolated array. Riverbank Acoustical Laboratories recommends that results obtained from this method be used for research and comparison purposes only; such results should not be used for marketed claims of product performance.

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Riverbank Acoustical Laboratories
1512 S. Batavia Ave.
Geneva, IL 60134-3302

Tel: 630-232-0104
Fax: 630-232-0138
Email: RAL@alionscience.com

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Appendix D: Data   Note: See full test report for details of mounting position, spacing, and configuration, as these parameters greatly affect sound absorption performance.

Freq. (Hz)	Sabins	Sabins / Object	Method 1 Equivalent Abs. Coefficient From Area of Total Coverage Area (100 ft²)	Method 2 Apparent Abs. Coefficient From Total Exposed Area (144 ft²)	Method 3 Apparent Abs. Coefficient From Area of One Face/Object (64 ft²)	Method 4 Apparent Abs. Coefficient From Area of Unextended Specimen Envelope (69 ft²)
31.5	0.52	0.06	0.01	0.00	0.01	0.01
40	-5.47	-0.68	-0.05	-0.04	-0.09	-0.08
50	4.62	0.58	0.05	0.03	0.07	0.07
63	14.09	1.76	0.14	0.10	0.22	0.20
80	12.51	1.56	0.13	0.09	0.20	0.18
100	14.44	1.81	0.14	0.10	0.23	0.21
125	16.96	2.12	0.17	0.12	0.26	0.25
160	24.04	3.00	0.24	0.17	0.38	0.35
200	36.39	4.55	0.36	0.25	0.57	0.53
250	42.53	5.32	0.43	0.30	0.66	0.62
315	55.58	6.95	0.56	0.39	0.87	0.81
400	64.13	8.02	0.64	0.45	1.00	0.93
500	105.30	13.16	1.05	0.73	1.65	1.53
630	121.21	15.15	1.21	0.84	1.89	1.76
800	129.11	16.14	1.29	0.90	2.02	1.87
1,000	131.53	16.44	1.32	0.91	2.06	1.91
1,250	134.46	16.81	1.34	0.93	2.10	1.95
1,600	135.56	16.94	1.36	0.94	2.12	1.96
2,000	132.98	16.62	1.33	0.92	2.08	1.93
2,500	131.50	16.44	1.32	0.91	2.05	1.91
3,150	128.48	16.06	1.28	0.89	2.01	1.86
4,000	128.79	16.10	1.29	0.89	2.01	1.87
5,000	132.59	16.57	1.33	0.92	2.07	1.92
6,300	134.64	16.83	1.35	0.94	2.10	1.95
8,000	141.14	17.64	1.41	0.98	2.21	2.05
10,000	148.85	18.61	1.49	1.03	2.33	2.16
12,500	160.42	20.05	1.60	1.11	2.51	2.32
Equivalent NRC:			**1.05**	N/A	N/A	N/A
Apparent NRC:			N/A	**0.70**	**1.60**	**1.50**
Equivalent/Apparent SAA:			**1.02**	**0.71**	**1.59**	**1.48**

Prepared by ___Keith Kimberling___

Keith Kimberling
Test Engineer, Acoustician