

Test Report

SPONSOR: **Catalyst Acoustics Group**
Agawam, MA

Sound Absorption
RAL™-A20-354

CONDUCTED: 2020-08-26

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ON: PET Baffle 7-1/2 in. (2x5 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 PET Baffle 7-1/2 in. (2x5 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: Canoe Baf1 4ft
Material: Polyethylene terephthalate felt
Manufacturer: Frasch

SPECIMEN MEASUREMENTS & TEST CONDITIONS

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

Test Specimen

Materials: Assembled semirigid felt paneling
Dimensions: 10 @ 1216.02 mm (47.875 in.) long x 228.6 mm (9 in.) deep
Width: Minimum at ends @ 18 mm (0.709 in.)
Maximum at center @ 190.5 mm (7.5 in.)
Key Geometry: Top and bottom panels recessed by 38.1 mm (1.5 in.)
Holes: Three (3) circular holes in top panel, open to hollow interior cavity
Center hole @ 78 mm (3.071 in.) diameter
Side holes, 2 @ 53 mm (2.087 in.) diameter, spaced 285.75 mm (11.25 in.) apart from center hole
Overall Weight: 13.95 kg (30.75 lbs)

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Physical Measurements (per object)

Dimensions: 0.23 m (9.0 in) wide by 1.22 m (47.875 in) long
Thickness: 0.19 m (7.5 in)
Weight: 1.41 kg (3.1 lbs)

Test Environment

Room Volume: 291.98 m³
Temperature: 22.8 °C ± 0.0 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity: 58.4 % ± 0.2 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure: 98.6 kPa (Requirement not defined)

Each sound absorbing object had an absorptive area (all exposed surfaces) of 1.03 m² (11.09 ft²). The total absorptive area (all exposed surfaces) of all sound-absorbing objects was 10.30 m² (110.90 ft²). The array of objects covered 10.97 m² (118.04 ft²) of the horizontal test surface (total treated area).

MOUNTING METHOD

Type J Mounting: The specimen is an array of 10 spaced sound absorbing objects suspended atop an array of cables such that the closest face of the objects is located approximately 1.52 m (60.0 in.) from the horizontal test surface. This approximates the mounting method of a typical ceiling baffle installation. The objects were distributed in 5 rows of 2, with rows spaced 0.76 m (30 in.) apart, and with objects in each row spaced 0.3 m (12 in.) apart.

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Figure 1 – Specimen mounted in test chamber



Figure 2 – Underside of individual specimen object, curved width profile

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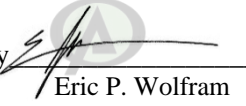
TEST RESULTS

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		Absorption per Object	
	(m ²)	(Sabins)	(m ² / Object)	(Sabins / Object)
100	0.79	8.52	0.08	0.85
** 125	1.47	15.84	0.15	1.58
160	1.60	17.18	0.16	1.72
200	2.23	23.96	0.22	2.40
** 250	2.43	26.21	0.24	2.62
315	3.38	36.43	0.34	3.64
400	3.87	41.63	0.39	4.16
** 500	4.78	51.51	0.48	5.15
630	5.40	58.12	0.54	5.81
800	5.86	63.10	0.59	6.31
** 1000	6.36	68.47	0.64	6.85
1250	6.73	72.40	0.67	7.24
1600	7.57	81.52	0.76	8.15
** 2000	7.82	84.12	0.78	8.41
2500	8.00	86.07	0.80	8.61
3150	8.24	88.70	0.82	8.87
** 4000	8.43	90.70	0.84	9.07
5000	8.62	92.78	0.86	9.28

Tested by 
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Report by 
Malcolm Kelly
Test Engineer, Acoustician

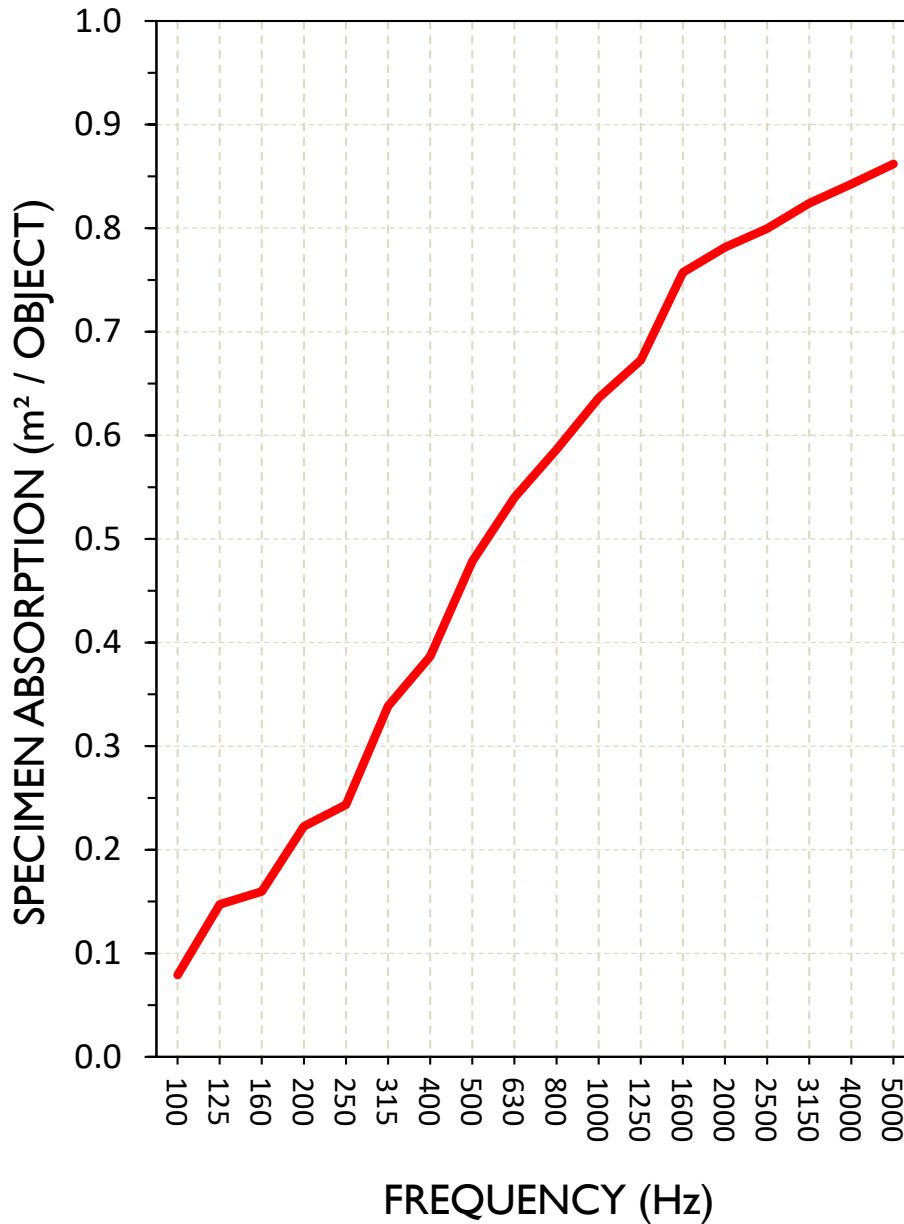
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SOUND ABSORPTION REPORT
PET Baffle 7-1/2 in. (2x5 rectangular array)



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APPENDIX A: Extended Frequency Range Data

Specimen: PET Baffle 7-1/2 in. (2x5 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		Absorption per Object	
	(m ²)	(Sabins)	(m ² / Object)	(Sabins / Object)
31.5	0.19	2.07	0.02	0.21
40	0.27	2.87	0.03	0.29
50	-0.99	-10.60	-0.10	-1.06
63	-0.09	-0.99	-0.01	-0.10
80	0.20	2.13	0.02	0.21
100	0.79	8.52	0.08	0.85
125	1.47	15.84	0.15	1.58
160	1.60	17.18	0.16	1.72
200	2.23	23.96	0.22	2.40
250	2.43	26.21	0.24	2.62
315	3.38	36.43	0.34	3.64
400	3.87	41.63	0.39	4.16
500	4.78	51.51	0.48	5.15
630	5.40	58.12	0.54	5.81
800	5.86	63.10	0.59	6.31
1000	6.36	68.47	0.64	6.85
1250	6.73	72.40	0.67	7.24
1600	7.57	81.52	0.76	8.15
2000	7.82	84.12	0.78	8.41
2500	8.00	86.07	0.80	8.61
3150	8.24	88.70	0.82	8.87
4000	8.43	90.70	0.84	9.07
5000	8.62	92.78	0.86	9.28
6300	8.53	91.84	0.85	9.18
8000	8.88	95.62	0.89	9.56
10000	8.75	94.23	0.88	9.42
12500	9.30	100.06	0.93	10.01

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APPENDIX B: Instruments of Traceability

Specimen: PET Baffle 7-1/2 in. (2x5 rectangular array) (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	2020-06-26	2021-06-26
Bruel & Kjaer Mic And Preamp A	Type 4943-B-001	2311428	2019-09-27	2020-09-27
Bruel & Kjaer Sound Level Calibrator	Type 4230	861609	2019-11-19	2020-11-19
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: PET Baffle 7-1/2 in. (2x5 rectangular array) (See Full Report)

<u>Date</u>	<u>Revision</u>
2020-09-03	Original report issued

END

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ON: PET Baffle 7-1/2 in. (2x5 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.

Method 1) Apparent Sound Absorption Coefficient calculated from total test surface area covered

The total sound absorption yielded by the specimen is divided by the total surface area of the test surface covered by the suspended objects, including intermediate spaces. The object rigging covered 10.97 m² (118.04 ft²) of horizontal test surface area. With an extra 762 mm (30 in.) of length and 304.8 mm (12 in.) of width to account for the space between the tested array and what would be the next object in a larger array, the surface area comes to 14.51 m² (156.13 ft²). Apparent Noise Reduction Coefficient (NRC) rating and Sound Absorption Average (SAA) figures are calculated from this data 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 apparent 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 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 (1.03 m² (11.09 ft²) per object x 10 objects = 10.30 m² (110.90 ft²) total surface area). Apparent Noise Reduction Coefficient (NRC) rating and Sound Absorption Average (SAA) figures are calculated from this data 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).

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 (0.28 m² (3.04 ft²) per object x 10 objects = 2.82 m² (30.36 ft²) total surface area). Apparent Noise Reduction Coefficient (NRC) rating and Sound Absorption Average (SAA) figures are calculated from this data 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.

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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.

Specimen Absorption			Method 1	Method 2	Method 3	
			Apparent Abs. Coefficient From Total Coverage Area	Apparent Abs. Coefficient From Total Exposed Surface Area	Apparent Abs. Coefficient From One Face/Baffle	
Freq. (Hz)	Sabins	Sabins / Object				
31.5	2.07	0.21	0.01	0.02	0.07	
40	2.87	0.29	0.02	0.03	0.09	
50	-10.60	-1.06	-0.07	-0.10	-0.35	
63	-0.99	-0.10	-0.01	-0.01	-0.03	
80	2.13	0.21	0.01	0.02	0.07	
100	8.52	0.85	0.05	0.08	0.28	
125	15.84	1.58	0.10	0.14	0.52	
160	17.18	1.72	0.11	0.15	0.57	
200	23.96	2.40	0.15	0.22	0.79	
250	26.21	2.62	0.17	0.24	0.86	
315	36.43	3.64	0.23	0.33	1.20	
400	41.63	4.16	0.27	0.38	1.37	
500	51.51	5.15	0.33	0.46	1.70	
630	58.12	5.81	0.37	0.52	1.91	
800	63.10	6.31	0.40	0.57	2.08	
1,000	68.47	6.85	0.44	0.62	2.26	
1,250	72.40	7.24	0.46	0.65	2.38	
1,600	81.52	8.15	0.52	0.74	2.69	
2,000	84.12	8.41	0.54	0.76	2.77	
2,500	86.07	8.61	0.55	0.78	2.84	
3,150	88.70	8.87	0.57	0.80	2.92	
4,000	90.70	9.07	0.58	0.82	2.99	
5,000	92.78	9.28	0.59	0.84	3.06	
6,300	91.84	9.18	0.59	0.83	3.03	
8,000	95.62	9.56	0.61	0.86	3.15	
10,000	94.23	9.42	0.60	0.85	3.10	
12,500	100.06	10.01	0.64	0.90	3.30	
			Apparent NRC:	0.35	0.50	1.90
			Apparent SAA:	0.37	0.52	1.90

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