1512 S BATAVIA AVENUE
GENEVA, IL 60134

630-232-0104

Test Report

www.riverbankacoustics.com

FOUNDED 1918 BY
WALLACE CLEMENT SABINE

SPONSOR: **Acoustical Surfaces Inc.**
Chaska, MN

Sound Absorption
RAL™-A22-513

CONDUCTED: 2022-12-21

ON: Poly Max 4'x4' Baffle

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 C423-22: "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 Poly Max 4'x4' Baffle. 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

Product Name:	PET Fiber 4’ by 4’ Baffle Unit
Core Material:	PET Fiber
Core Nominal Thickness:	½”
Core Nominal Density:	12.5 lb pcf
Tile/Panel Dimensions:	48” by 48”
Manufacturer:	ASI

SPECIMEN MEASUREMENTS & TEST CONDITIONS

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

Test Specimen

Product Type:	Four (4) baffle clouds
Materials:	PET felt, 8 felt fins per cloud held together by 2 base pieces
Dimensions:	32 fins @ 273 mm (10.75 in.) by 1207 mm (47.5 in.) 8 base pieces @ 152 mm (6 in.) by 1207 mm (47.5 in.)
Felt Thickness:	12.15 mm (0.4785 in.)
Overall Weight:	25.06 kg (55.25 lbs)

Physical Measurements (per object)

Dimensions:	1.21 m (47.5 in) wide by 1.21 m (47.5 in) long
Thickness:	0.29 m (11.5 in)
Weight:	6.27 kg (13.81 lbs)

Test Environment

Room Volume:	291.98 m³
Temperature:	20.0 °C ± 0.1 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity:	62.75 % ± 1.5 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure:	100.2 kPa (Requirement not defined)

The array of objects covered 5.82 m^2 (62.7 ft^2) of the horizontal test surface (total treated area).

MOUNTING METHOD

Type J Mounting: The specimen is an array of 4 sound absorbing baffle clouds placed over cables such that the closest face is located approximately 1441 mm (56.75 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 two, with the cloud edges butted together.

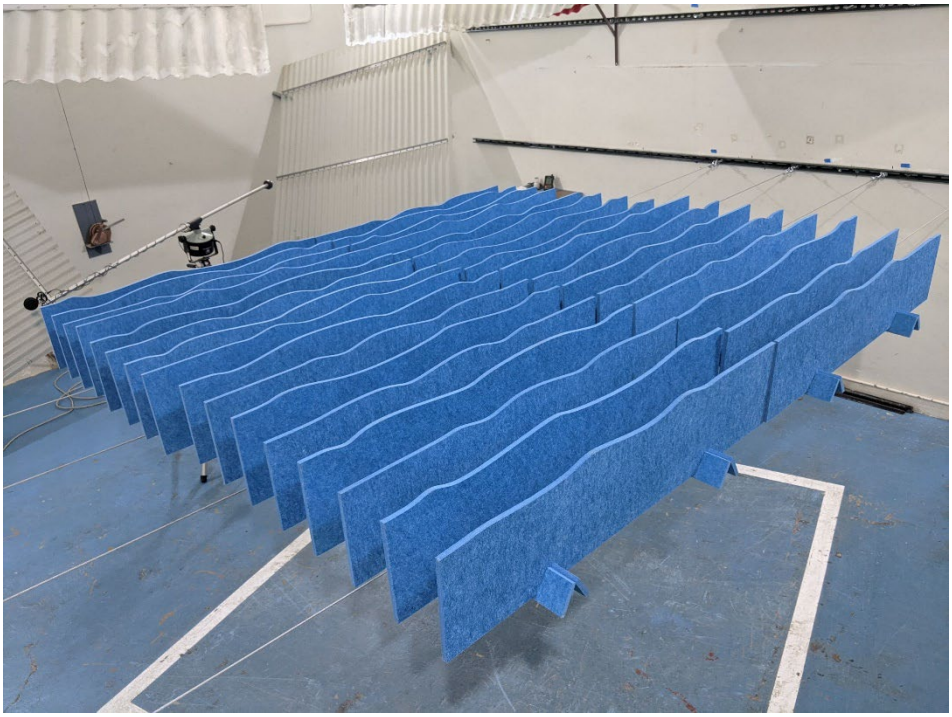

Figure 1 – Specimen mounted in test chamber

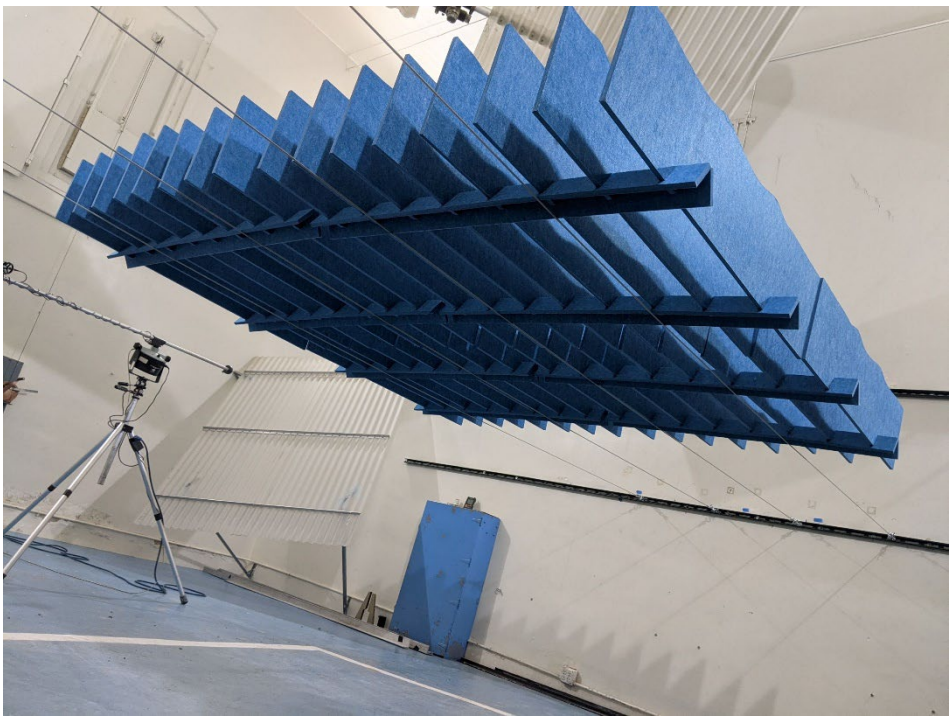

Figure 2 – Specimen mounted in test chamber

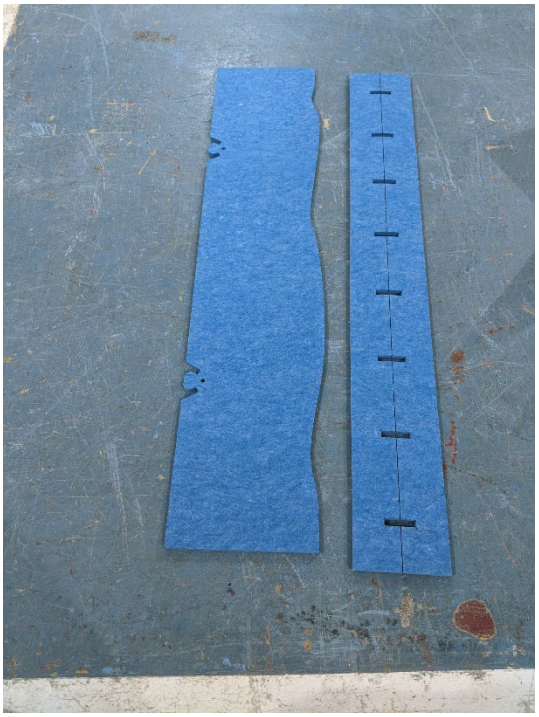

Figure 3 – Specimen fin piece (left) and base piece (right) prior to assembly

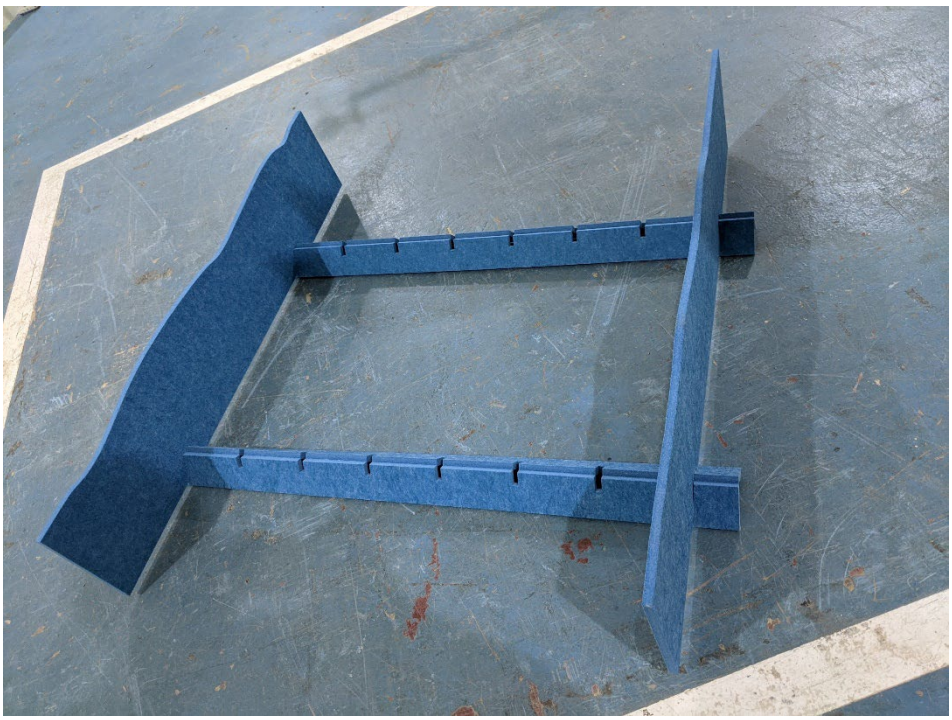

Figure 4 – Specimen baffle cloud partially assembled

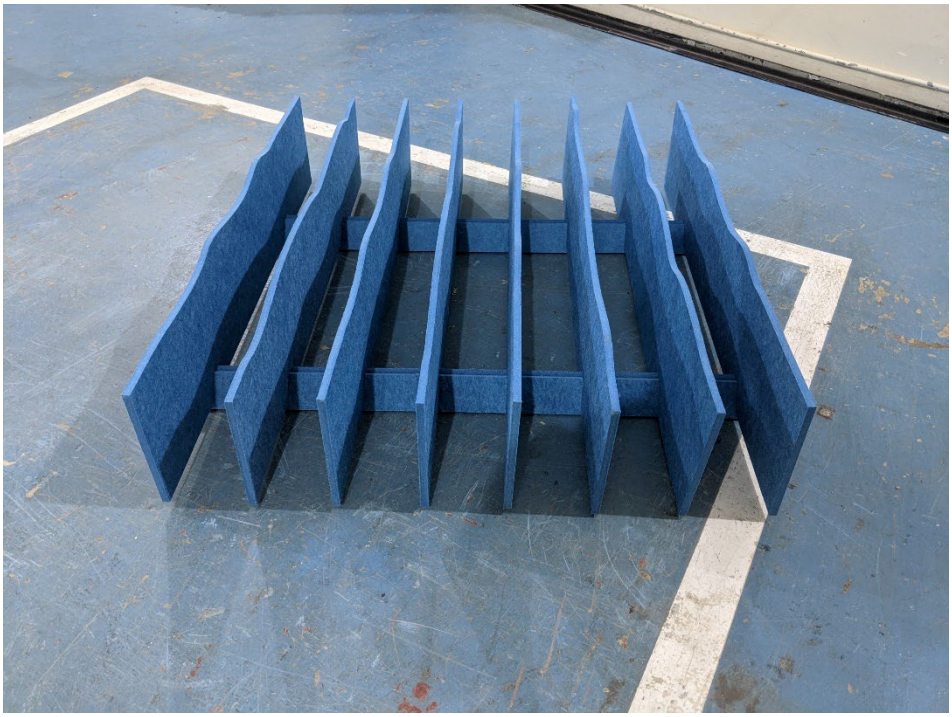

Figure 5 – Specimen baffle cloud assembled

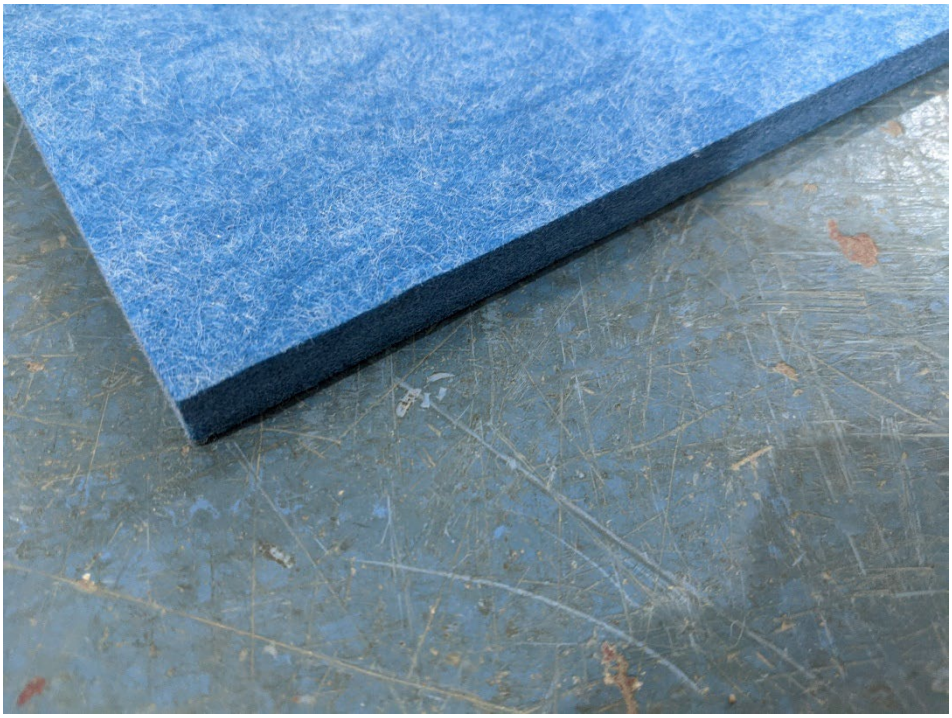

Figure 6 – Detail of specimen material

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	Total Absorption		Absorption per Object	
(Hz)	(m^2)	(Sabins)	(m^2 / Object)	(Sabins / Object)
100	0.46	5.00	0.12	1.25
** 125	0.93	9.97	0.23	2.49
160	1.21	13.02	0.30	3.25
200	2.13	22.89	0.53	5.72
** 250	2.77	29.85	0.69	7.46
315	3.62	38.98	0.91	9.74
400	4.24	45.68	1.06	11.42
** 500	4.89	52.60	1.22	13.15
630	5.53	59.54	1.38	14.88
800	6.44	69.35	1.61	17.34
** 1000	7.15	77.01	1.79	19.25
1250	7.88	84.77	1.97	21.19
1600	8.60	92.53	2.15	23.13
** 2000	9.63	103.61	2.41	25.90
2500	10.48	112.78	2.62	28.20
3150	10.76	115.83	2.69	28.96
** 4000	11.02	118.59	2.75	29.65
5000	11.12	119.69	2.78	29.92

Tested by Marc Sciaky
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Report by Keith Kimberling
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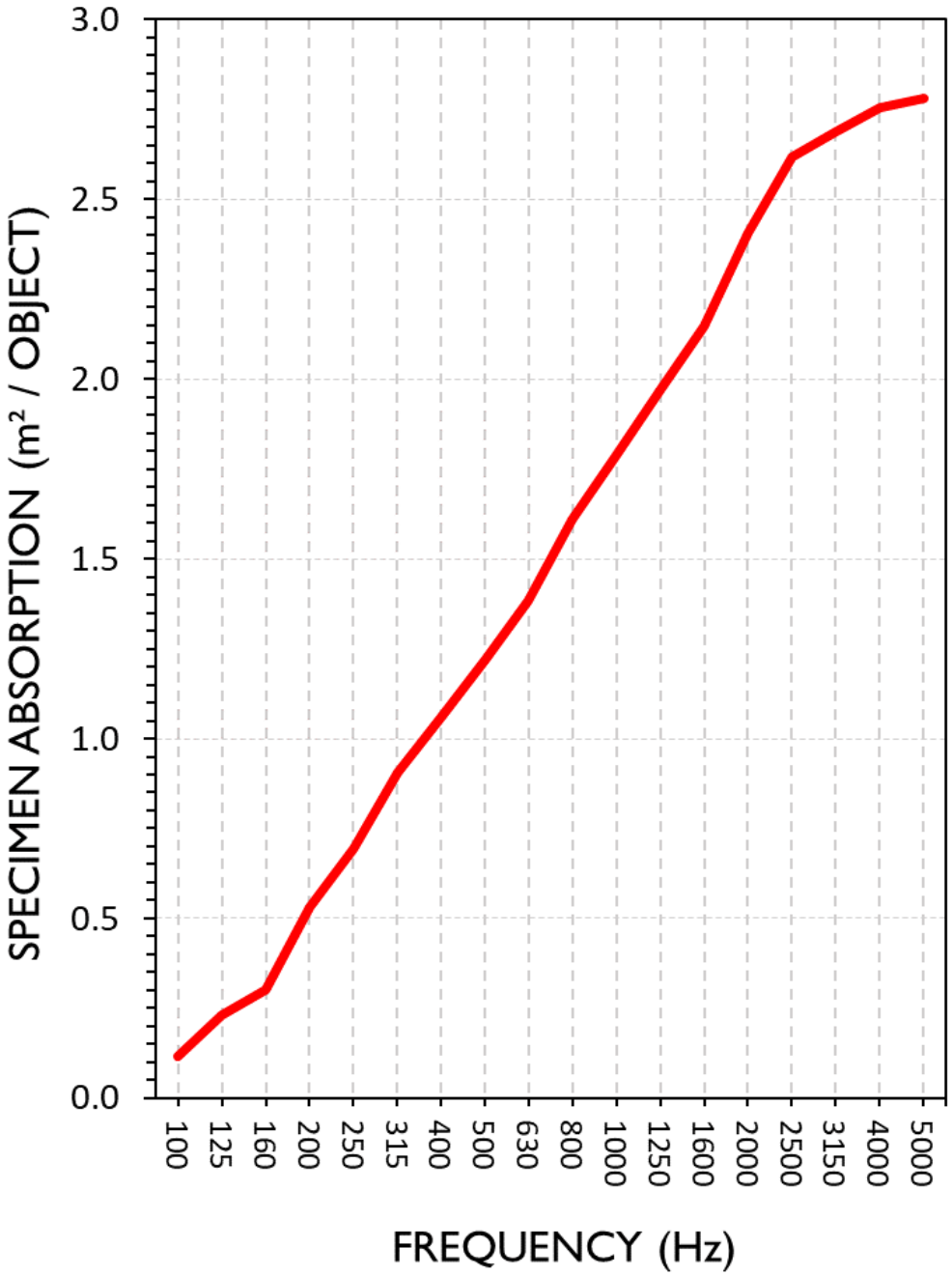
Test Engineer

Approved by
Eric P. Wolfram
Laboratory Manager

Digitally signed by Eric P Wolfram
Date: 2023.01.10 09:10:47 -06'00'

SOUND ABSORPTION REPORT

Poly Max 4'x4' Baffle



APPENDIX A: Extended Frequency Range Data

Specimen: Poly Max 4'x4' Baffle (See Full Report)

The following non-accredited data were obtained in accordance with ASTM C423-22, 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	0.95	10.25	0.24	2.56
40	0.47	5.03	0.12	1.26
50	-1.44	-15.52	-0.36	-3.88
63	0.15	1.60	0.04	0.40
80	0.36	3.89	0.09	0.97
100	0.46	5.00	0.12	1.25
125	0.93	9.97	0.23	2.49
160	1.21	13.02	0.30	3.25
200	2.13	22.89	0.53	5.72
250	2.77	29.85	0.69	7.46
315	3.62	38.98	0.91	9.74
400	4.24	45.68	1.06	11.42
500	4.89	52.60	1.22	13.15
630	5.53	59.54	1.38	14.88
800	6.44	69.35	1.61	17.34
1000	7.15	77.01	1.79	19.25
1250	7.88	84.77	1.97	21.19
1600	8.60	92.53	2.15	23.13
2000	9.63	103.61	2.41	25.90
2500	10.48	112.78	2.62	28.20
3150	10.76	115.83	2.69	28.96
4000	11.02	118.59	2.75	29.65
5000	11.12	119.69	2.78	29.92
6300	11.18	120.36	2.80	30.09
8000	11.20	120.58	2.80	30.15
10000	10.47	112.72	2.62	28.18
12500	11.00	118.35	2.75	29.59

APPENDIX B: Instruments of Traceability

Specimen: Poly Max 4'x4' Baffle (See Full Report)

Description	Model	Serial Number	Date of Certification	Calibration Due
System 1	Type 3160-A-042	3160-106968	2022-07-12	2023-07-12
Bruel & Kjaer Mic And Preamp C	Type 4943-B-001	2311439	2022-05-02	2023-05-02
Bruel & Kjaer Pistonphone	Type 4228	2781248	2022-07-22	2023-07-22
EXTECH Hygro 959	SD700	A099959	2022-03-22	2023-03-22

APPENDIX C: Revisions to Original Test Report

Specimen: Poly Max 4'x4' Baffle (See Full Report)

Date	Revision
2023-01-06	Original report issued

END

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Report Referenced: **RAL™-A22-513**

CONDUCTED: 2022-12-21

ON: Poly Max 4'x4' Baffle (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. Rating titles for these 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) Apparent 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. This method is not applicable in this case due to the tessellating design of the baffle clouds. 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 C423-22. 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, 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. This method is not applicable in this case. 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 C423-22. 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).

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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. This method is not applicable in this case. 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 C423-22. 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 5.82 m^2 (62.7 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 C423-22. 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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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 (ft^2)			Method 1	Method 2	Method 3	Method 4
Freq. (Hz)	Sabins	Sabins / Object	Apparent Abs. Coefficient From Total Coverage Area N/A	Apparent Abs. Coefficient From Total Exposed Surface Area N/A	Apparent Abs. Coefficient From One Face per Object N/A	Apparent Abs. Coefficient From Unextended Envelope Area (62.7 ft^2)
31.5	10.25	2.56	N/A	N/A	N/A	0.16
40	5.03	1.26	N/A	N/A	N/A	0.08
50	-15.52	-3.88	N/A	N/A	N/A	-0.25
63	1.60	0.40	N/A	N/A	N/A	0.03
80	3.89	0.97	N/A	N/A	N/A	0.06
100	5.00	1.25	N/A	N/A	N/A	0.08
125	9.97	2.49	N/A	N/A	N/A	0.16
160	13.02	3.25	N/A	N/A	N/A	0.21
200	22.89	5.72	N/A	N/A	N/A	0.37
250	29.85	7.46	N/A	N/A	N/A	0.48
315	38.98	9.74	N/A	N/A	N/A	0.62
400	45.68	11.42	N/A	N/A	N/A	0.73
500	52.60	13.15	N/A	N/A	N/A	0.84
630	59.54	14.88	N/A	N/A	N/A	0.95
800	69.35	17.34	N/A	N/A	N/A	1.11
1,000	77.01	19.25	N/A	N/A	N/A	1.23
1,250	84.77	21.19	N/A	N/A	N/A	1.35
1,600	92.53	23.13	N/A	N/A	N/A	1.48
2,000	103.61	25.90	N/A	N/A	N/A	1.65
2,500	112.78	28.20	N/A	N/A	N/A	1.80
3,150	115.83	28.96	N/A	N/A	N/A	1.85
4,000	118.59	29.65	N/A	N/A	N/A	1.89
5,000	119.69	29.92	N/A	N/A	N/A	1.91
6,300	120.36	30.09	N/A	N/A	N/A	1.92
8,000	120.58	30.15	N/A	N/A	N/A	1.92
10,000	112.72	28.18	N/A	N/A	N/A	1.80
12,500	118.35	29.59	N/A	N/A	N/A	1.89
		Apparent NRC:	**N/A**	**N/A**	**N/A**	**1.05**
		Apparent SAA:	**N/A**	**N/A**	**N/A**	**1.05**

Prepared by _____
Keith Kimberling
Test Engineer