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An ALION Technical Center

Test Report

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WALLACE CLEMENT SABINE

FOR: **ezoBord**
Elgin, IL

Sound Absorption
RAL-A18-329

CONDUCTED: 2018-10-03

ON: Acoustic Net - 3/8 in. (9 mm)

TEST METHOD

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 measuring procedure and room qualifications is available upon request.

DESCRIPTION OF THE SPECIMEN

The test specimen was designated by the manufacturer as Acoustic Net - 3/8 in. (9 mm). A full internal inspection performed on the test specimen by Riverbank personnel verified the manufacturer's description.

Test Specimen

Material:	Polyethylene terephthalate
Overall Dimensions:	2406.65 mm (94.75 in.) x 2413 mm (95 in.)
Assembly:	22 members arranged in square grid
	Members spaced approximately 215.9 mm (8.5 in.) on center
Thickness:	Individual members @ 8.89 mm (0.35 in.) thick
	Variable width profile, minimum 147.57 mm (5.81 in.),
	maximum 254 mm (10 in.)
Overall Weight:	13.95 kg (30.75 lbs)

Physical Measures

Dimensions:	2.41 m (95.0 in) wide by 2.41 m (94.75 in) long
Thickness:	0.25 m (10.0 in)
Weight:	13.95 kg (30.75 lbs)

Test Environment

Room Volume:	291.98 m^3
Temperature:	21.0 °C ± 0.1 °C
Relative Humidity:	71.2 % ± 0.8 %
Barometric Pressure:	98.2 kPa

The total absorptive area (all exposed surfaces) of all sound-absorbing units was 20.28 m^2 (218.29 ft^2). The array of units covered 5.81 m^2 (62.51 ft^2) of chamber floor surface (total treated area).

MOUNTING METHOD

Type J Mounting: The specimen is a single sound absorbing unit suspended atop an array of cables with the curved faces down such that the bottom surface of the specimen is approximately 1498.6 mm (59 in.) from the horizontal test surface. This approximates the mounting method of a typical ceiling absorption product installation.

Figure 1 - Specimen mounted in test chamber

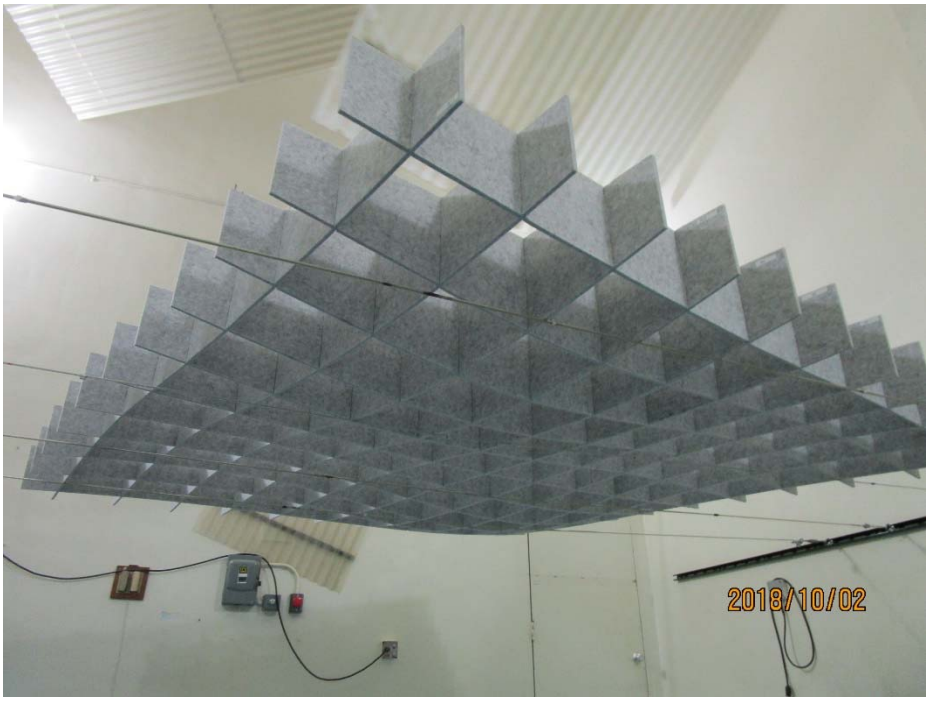


Figure 2 – Underside of mounted specimen

Figure 3 – Inverted specimen prior to mounting, variable width profile

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.).

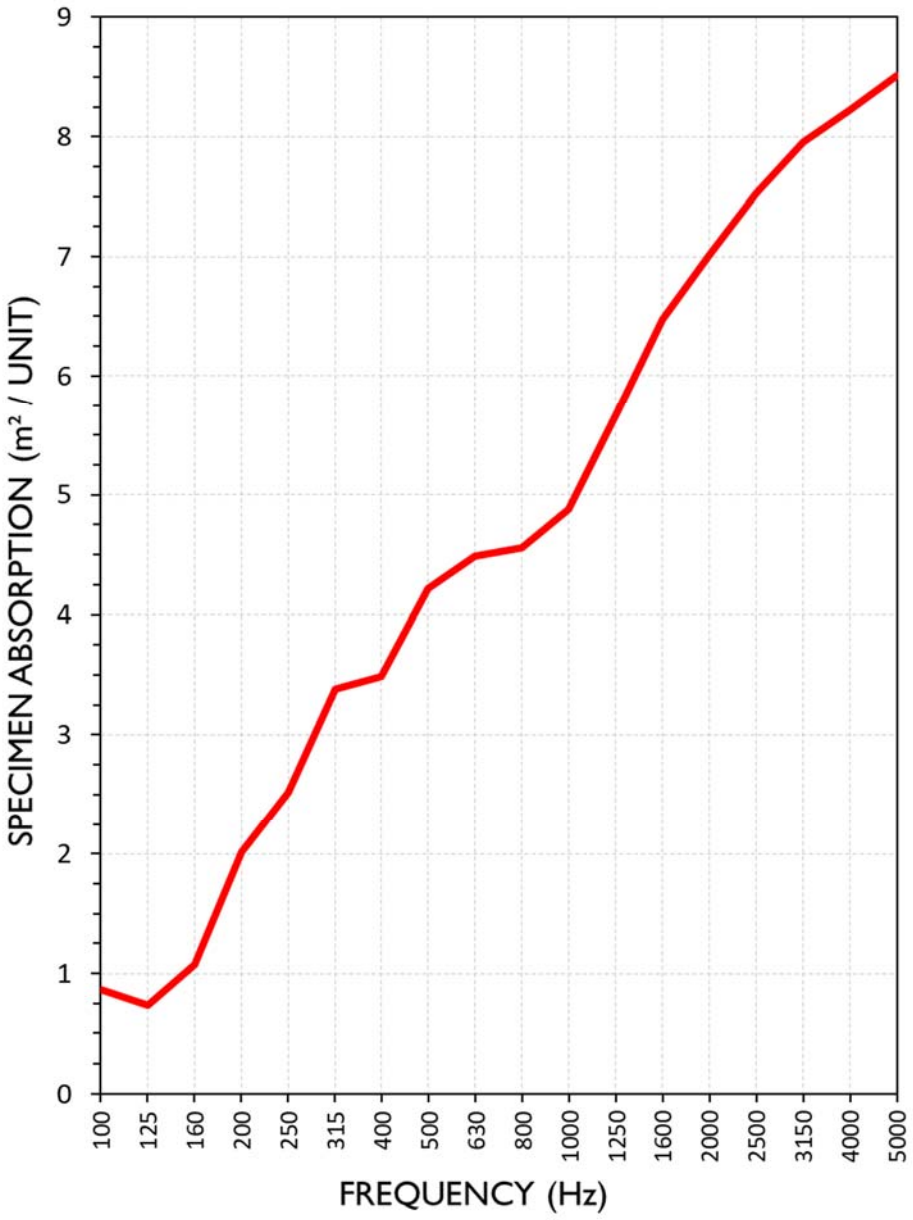
1/3 Octave Center Frequency	**Total Absorption**	
(Hz)	(m^2)	(Sabins)
100	0.87	9.31
** 125	0.74	7.94
160	1.08	11.59
200	2.02	21.72
** 250	2.52	27.09
315	3.38	36.39
400	3.49	37.56
** 500	4.21	45.37
630	4.49	48.28
800	4.56	49.05
** 1000	4.88	52.56
1250	5.67	61.01
1600	6.47	69.67
** 2000	7.01	75.49
2500	7.52	81.00
3150	7.95	85.59
** 4000	8.23	88.57
5000	8.51	91.64

Digitally signed by Eric P Wolfram
DN: cn=Eric P Wolfram, o=Alion Science & Technology, ou=Riverbank Acoustical Laboratories, email=ewolfram@alionscience.com, c=US
Date: 2018.10.16 13:36:48 -05'00'

Tested by Dean Victor — *Senior Experimentalist*
Report by Malcolm Kelly — *Acoustical Test Engineer*
Approved by Eric P. Wolfram — *Laboratory Manager*

SOUND ABSORPTION REPORT

Acoustic Net - 3/8 in. (9 mm)



APPENDIX A: Extended Frequency Range Data

Specimen: Acoustic Net - 3/8 in. (9 mm) (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)
31.5	0.19	2.07
40	0.64	6.92
50	0.20	2.13
63	1.71	18.41
80	0.57	6.16
100	0.87	9.31
125	0.74	7.94
160	1.08	11.59
200	2.02	21.72
250	2.52	27.09
315	3.38	36.39
400	3.49	37.56
500	4.21	45.37
630	4.49	48.28
800	4.56	49.05
1000	4.88	52.56
1250	5.67	61.01
1600	6.47	69.67
2000	7.01	75.49
2500	7.52	81.00
3150	7.95	85.59
4000	8.23	88.57
5000	8.51	91.64
6300	8.58	92.37
8000	8.63	92.90
10000	8.75	94.20
12500	8.15	87.70

APPENDIX B: Instruments of Traceability

Specimen: Acoustic Net - 3/8 in. (9 mm) (See Full Report)

Description	Model	Serial Number	Date of Certification	Calibration Due
System 1	Type 3160-A-4/2	System 1	2018-08-09	2019-08-09
Bruel & Kjaer Mic And Preamp C	Type 4943-B-001	2311439	2018-03-27	2019-03-27
Bruel & Kjaer Pistonphone	Type 4228	2781248	2018-08-06	2019-08-06
Omega Digital Temp., Humid. And Pressure Recorder	OM-CP-PRHTemp2000	P97844	2018-02-03	2019-02-03

END

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Appendix C 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 programs. The following is an attempt to appease these demands until ASTM develops a standard method for calculation. Multiple 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 specimen, including intermediate spaces. The specimen rigging covered 5.81 m^2 (62.51 ft^2) of horizontal test 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 may be the most accurate method for comparing specimen arrays to ceiling tile products. In acoustical modeling applications, the apparent sound absorption coefficient data can be assigned to a single horizontal surface or plane for approximation of specimen array performance (assuming specimen spacing is similar to that tested).

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, as obtained from client CAD drawings (20.28 m^2 (218.29 ft^2). 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).

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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
Freq. (Hz)	Sabins	Apparent Abs. Coefficient From Total Coverage Area	Apparent Abs. Coefficient From Total Exposed Surface Area
31.5	2.07	0.03	0.01
40	6.92	0.11	0.03
50	2.13	0.03	0.01
63	18.41	0.29	0.08
80	6.16	0.10	0.03
100	9.31	0.15	0.04
125	7.94	0.13	0.04
160	11.59	0.19	0.05
200	21.72	0.35	0.10
250	27.09	0.43	0.12
315	36.39	0.58	0.17
400	37.56	0.60	0.17
500	45.37	0.72	0.21
630	48.28	0.77	0.22
800	49.05	0.79	0.22
1,000	52.56	0.84	0.24
1,250	61.01	0.98	0.28
1,600	69.67	1.11	0.32
2,000	75.49	1.21	0.35
2,500	81.00	1.29	0.37
3,150	85.59	1.37	0.39
4,000	88.57	1.42	0.41
5,000	91.64	1.47	0.42
6,300	92.37	1.48	0.42
8,000	92.90	1.49	0.43
10,000	94.20	1.51	0.43
12,500	87.70	1.40	0.40
	Apparent NRC:	**0.80**	**0.25**
	Apparent SAA:	**0.81**	**0.23**

Prepared by
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