

Test Report

FOR: **Focal Point LLC**
Chicago, IL

Sound Absorption
RAL-A18-167

CONDUCTED: 2018-06-07

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ON: Skydome Edge Acoustic

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 Skydome Edge Acoustic. A full internal inspection performed on the test specimen by Riverbank personnel verified the manufacturer's description.

Spaced Absorbers

Trade Name: Skydome Edge Acoustic
Materials: Polyethylene terephthalate felt @ 9 mm (0.354 in.) thick on flat faces
Powder coated aluminum rim and mounting supports
Dimensions: 4 @ 1130.3 mm (44.5 in.) diameter x 92.07 mm (3.625 in.) high
Thickness: 92.07 mm (3.625 in.)
Average Unit Weight: 12.2 kg (26.9 lbs)
Overall Weight: 48.76 kg (107.5 lbs)

Physical Measures (per unit)

Dimensions: 1.13 m (44.50 in.) wide by 1.13 m (44.50 in.) long
Thickness: 92.08 mm (3.63 in.)
Weight: 12.2 kg (26.9 lbs)

Test Environment

Volume: 292.0 m³ (10,311.0 ft³)
Temperature: 21.4±0.0°C (70.5±0.0°F)
Humidity: 65.3±0.1%
Barometric Pressure: 98.8 kPa.

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Each sound absorbing unit had an absorptive area (all exposed surfaces) of 2.66 m² (28.64 ft²). The total absorptive area (all exposed surfaces) of all sound-absorbing units was 10.64 m² (114.56 ft²). The array of units covered 7.60 m² (81.84 ft²) of chamber floor surface (total treated area).

MOUNTING METHOD

Type J Mounting: The specimen is an array of spaced sound absorbing units suspended from a cable such that the bottom of the units is approximately 1422.4 mm (56 in.) above the horizontal test surface. This approximates the mounting method of a typical ceiling installation. The units were evenly distributed in two rows, each with two units. Units within each row were spaced 406.4 mm (16 in.) on center. Rows were spaced 610 mm (24 in.) on center.

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Figure 1 - Specimen mounted in test chamber



Figure 2 – Detail of individual absorber unit

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Figure 3 – Underside of test specimen

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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 (SI) (m ²)	Total Absorption (IP) (Sabins)	Absorption (Sabins/Unit)
100	1.99	21.47	5.37
** 125	1.99	21.41	5.35
160	1.62	17.48	4.37
200	2.62	28.15	7.04
** 250	2.34	25.24	6.31
315	3.17	34.17	8.54
400	3.32	35.69	8.92
** 500	3.79	40.84	10.21
630	4.29	46.19	11.55
800	4.80	51.65	12.91
** 1000	5.32	57.25	14.31
1250	5.76	62.02	15.51
1600	5.85	63.02	15.76
** 2000	5.66	60.92	15.23
2500	5.72	61.57	15.39
3150	5.86	63.09	15.77
** 4000	5.94	63.99	16.00
5000	6.12	65.92	16.48

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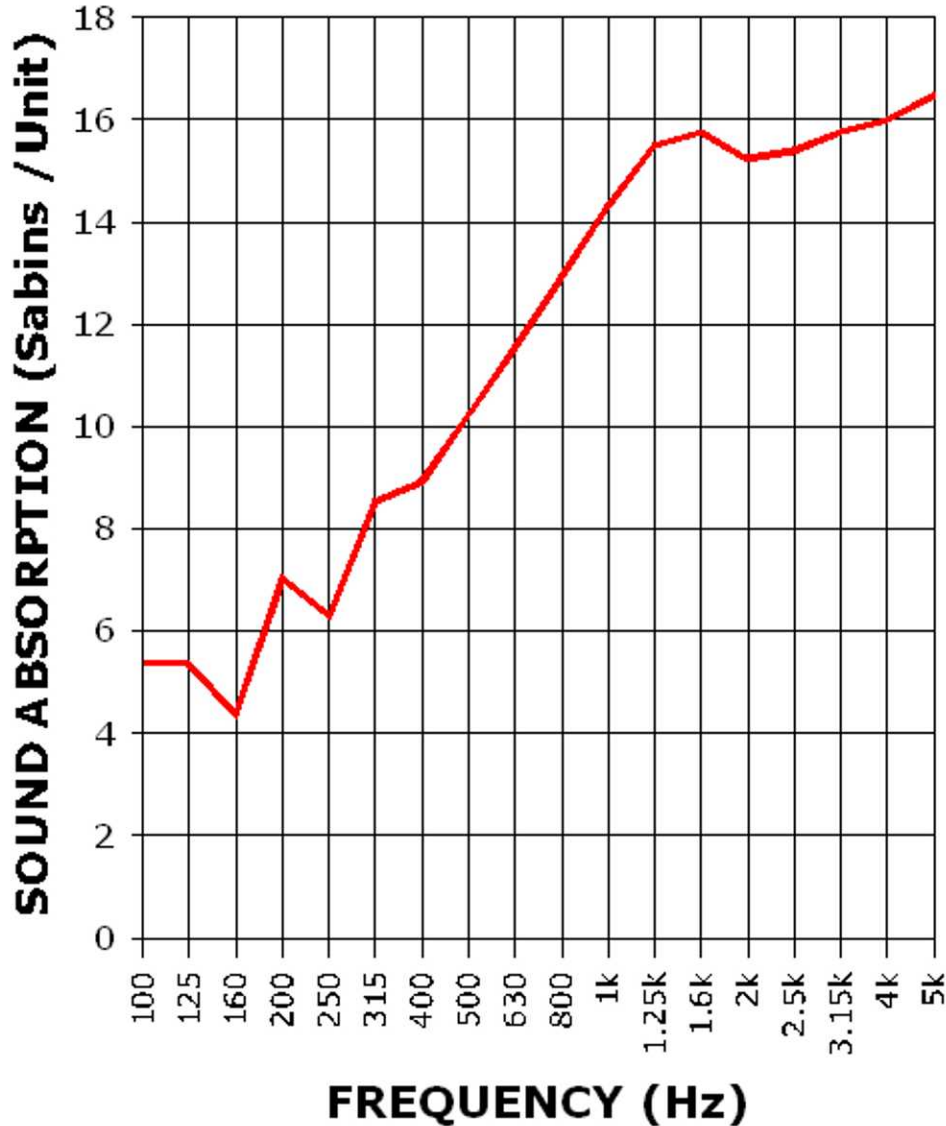
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SOUND ABSORPTION REPORT
Skydome Edge Acoustic



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APPENDIX A: Extended Frequency Range Data

Specimen: Skydome Edge Acoustic (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)	Sabins per Unit
31.5	0.79	0.20
40	-0.45	-0.11
50	6.38	1.59
63	1.84	0.46
80	12.38	3.09
100	21.47	5.37
125	21.41	5.35
160	17.48	4.37
200	28.15	7.04
250	25.24	6.31
315	34.17	8.54
400	35.69	8.92
500	40.84	10.21
630	46.19	11.55
800	51.65	12.91
1000	57.25	14.31
1250	62.02	15.51
1600	63.02	15.76
2000	60.92	15.23
2500	61.57	15.39
3150	63.09	15.77
4000	63.99	16.00
5000	65.92	16.48
6300	65.80	16.45
8000	70.90	17.73
10000	73.95	18.49
12500	79.06	19.76



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APPENDIX B: Instruments of Traceability

Specimen: Skydome Edge Acoustic (See Full Report)

<u>Description</u>	<u>Model</u>	<u>Serial Number</u>	<u>Date of Certification</u>	<u>Calibration Due</u>
Bruel & Kjaer Pulse Analyzer - System3	Type 3560-C	2647140	2018-04-20	2019-04-20
Bruel & Kjaer Mic And Preamp A	Type 4943-B-001	2311428	2017-09-22	2018-09-22
Bruel & Kjaer Pistonphone	Type 4228	2781248	2017-08-02	2018-08-02
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. 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 absorbers, including intermediate spaces. The absorber rigging covered 7.60 m² (81.84 ft²) 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 absorber 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 in acoustical modeling software for approximation of absorber array performance (assuming absorber 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 (2.66 m² (28.64 ft²) per absorber x 4 absorbers = 10.64 m² (114.56 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 absorber.

The total sound absorption yielded by the specimen is divided by the surface area of one flat circular face for each absorber in the specimen (1.00 m² (10.8 ft²) per absorber x 4 absorbers = 4.01 m² (43.2 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.

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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 (US)			Method 1	Method 2	Method 3
Freq. (Hz)	Sabins	Sabins/Unit	Apparent Abs. Coefficient From Total Coverage Area	Apparent Abs. Coefficient From Total Exposed Surface Area	Apparent Abs. Coefficient From One Face/Absorber
31.5	0.79	0.20	0.01	0.01	0.02
40	-0.45	-0.11	-0.01	0.00	-0.01
50	6.38	1.59	0.08	0.06	0.15
63	1.84	0.46	0.02	0.02	0.04
80	12.38	3.09	0.15	0.11	0.29
100	21.47	5.37	0.26	0.19	0.50
125	21.41	5.35	0.26	0.19	0.50
160	17.48	4.37	0.21	0.15	0.40
200	28.15	7.04	0.34	0.25	0.65
250	25.24	6.31	0.31	0.22	0.58
315	34.17	8.54	0.42	0.30	0.79
400	35.69	8.92	0.44	0.31	0.83
500	40.84	10.21	0.50	0.36	0.95
630	46.19	11.55	0.56	0.40	1.07
800	51.65	12.91	0.63	0.45	1.20
1,000	57.25	14.31	0.70	0.50	1.33
1,250	62.02	15.51	0.76	0.54	1.44
1,600	63.02	15.76	0.77	0.55	1.46
2,000	60.92	15.23	0.74	0.53	1.41
2,500	61.57	15.39	0.75	0.54	1.43
3,150	63.09	15.77	0.77	0.55	1.46
4,000	63.99	16.00	0.78	0.56	1.48
5,000	65.92	16.48	0.81	0.58	1.53
6,300	65.80	16.45	0.80	0.57	1.52
8,000	70.90	17.73	0.87	0.62	1.64
10,000	73.95	18.49	0.90	0.65	1.71
12,500	79.06	19.76	0.97	0.69	1.83
Apparent NRC:			0.55	0.40	1.05
Apparent SAA:			0.58	0.41	1.09

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