

Test Report

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

Sound Absorption
RAL™-A20-087

CONDUCTED: 2020-02-10

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ON: Zyl 4 Decorative Pendant (11 units, modified rectangular array, nonstandard mounting)

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 Zyl 4 Decorative Pendant (11 units, modified rectangular array, nonstandard mounting). 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: Zyl 4 Decorative Pendant
Materials: Polyethylene terephthalate felt, aluminum
Manufacturer: Focal Point LLC

SPECIMEN MEASUREMENTS & TEST CONDITIONS

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

Test Specimen

Materials: Notched and folded semirigid felt paneling
Metal fixture and mounting hardware at center
Key Geometry: Regular nonagonal prisms, side length @ 110 mm (4.331 in.)
Felt paneling @ 9 mm (0.354 in.) thick
Height @ 435 mm (17.126 in.)
Quantity: 11
Overall Weight: 20.75 kg (45.75 lbs)

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Physical Measurements (per unit)

Dimensions: 0.32 m (12.5 in) wide by 0.32 m (12.5 in) long
Thickness: 0.43 m (17.125 in)
Weight: 1.55 kg (3.42 lbs)

Test Environment

Room Volume: 291.98 m³
Temperature: 21.0 °C ± 0.2 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity: 66.15 % ± 0.1 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure: 99.3 kPa (Requirement not defined)

Each sound absorbing unit had an absorptive area (all exposed surfaces) of 0.58 m² (6.25 ft²). The total absorptive area (all exposed surfaces) of all sound-absorbing units was 6.38 m² (68.70 ft²). The array of units covered 11.69 m² (125.84 ft²) of the horizontal test surface (total treated area).

MOUNTING METHOD

Type J Mounting: The specimen is an array of 11 spaced sound absorbing fixtures suspended from cables such that the closest face of the fixtures is located approximately 838.2 mm (33 in.) from the horizontal test surface. This approximates the mounting method of a typical ceiling baffle installation. The fixtures were distributed among 3 rows, with a row of 3 units between two rows of 4 units. Rows were spaced 1219.2 mm (48 in.) on center. Fixtures within the center row were spaced 1981.2 mm (78 in.) on center. Fixtures within the other rows were spaced 1295.4 mm (51 in.) on center.

Note: The specimen mounting is similar to the Type J mounting described in ASTM E795-16, though the absorptive area of the specimen is less than the minimum absorptive area of 10 m² specified in Section 15.4. The number of units in the specimen was selected to maximize absorptive area for the unit spacing of interest while preserving adequate distance from test chamber surfaces and measurement instrumentation.

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Figure 1 – Specimen mounted in test chamber



Figure 2 – Detail of individual fixture

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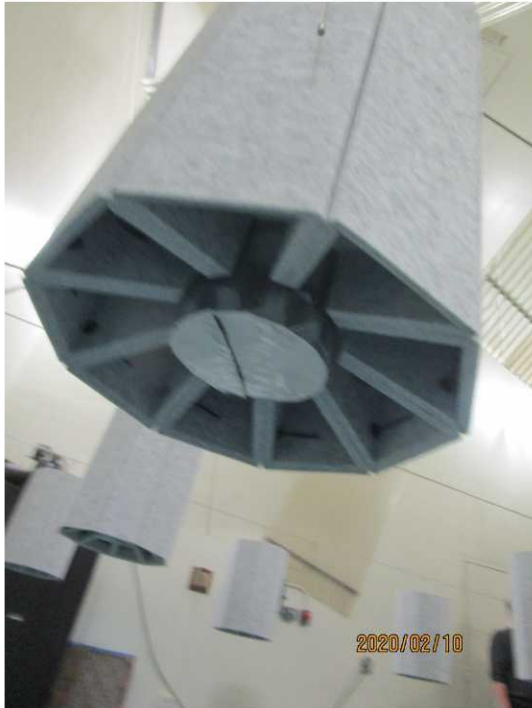


Figure 2 – Underside of individual fixture

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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 Unit	
	(m ²)	(Sabins)	(m ² / Unit)	(Sabins / Unit)
100	1.28	13.82	0.12	1.26
** 125	1.03	11.09	0.09	1.01
160	1.19	12.82	0.11	1.17
200	1.71	18.40	0.16	1.67
** 250	2.47	26.55	0.22	2.41
315	3.36	36.15	0.31	3.29
400	3.45	37.15	0.31	3.38
** 500	3.27	35.19	0.30	3.20
630	3.77	40.62	0.34	3.69
800	4.64	50.00	0.42	4.55
** 1000	5.22	56.19	0.47	5.11
1250	5.66	60.95	0.51	5.54
1600	6.07	65.37	0.55	5.94
** 2000	6.12	65.90	0.56	5.99
2500	6.88	74.06	0.63	6.73
3150	7.20	77.48	0.65	7.04
** 4000	7.31	78.72	0.66	7.16
5000	7.60	81.86	0.69	7.44

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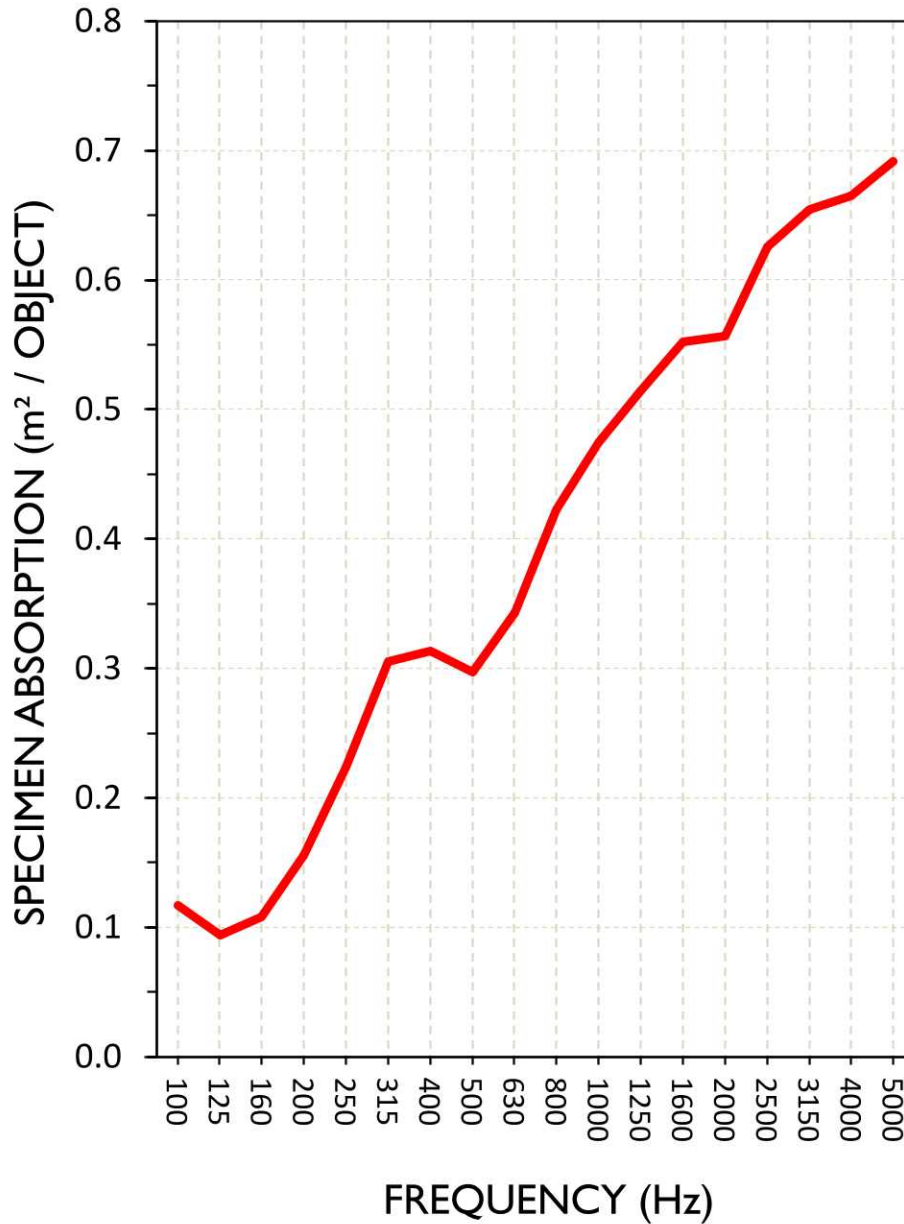
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SOUND ABSORPTION REPORT

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APPENDIX A: Extended Frequency Range Data

Specimen: Zyl 4 Decorative Pendant (11 units, modified rectangular array, nonstandard mounting) (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 Unit	
	(m ²)	(Sabins)	(m ² / Unit)	(Sabins / Unit)
31.5	-0.20	-2.15	-0.02	-0.20
40	-0.36	-3.85	-0.03	-0.35
50	0.38	4.10	0.03	0.37
63	1.61	17.29	0.15	1.57
80	0.87	9.32	0.08	0.85
100	1.28	13.82	0.12	1.26
125	1.03	11.09	0.09	1.01
160	1.19	12.82	0.11	1.17
200	1.71	18.40	0.16	1.67
250	2.47	26.55	0.22	2.41
315	3.36	36.15	0.31	3.29
400	3.45	37.15	0.31	3.38
500	3.27	35.19	0.30	3.20
630	3.77	40.62	0.34	3.69
800	4.64	50.00	0.42	4.55
1000	5.22	56.19	0.47	5.11
1250	5.66	60.95	0.51	5.54
1600	6.07	65.37	0.55	5.94
2000	6.12	65.90	0.56	5.99
2500	6.88	74.06	0.63	6.73
3150	7.20	77.48	0.65	7.04
4000	7.31	78.72	0.66	7.16
5000	7.60	81.86	0.69	7.44
6300	8.21	88.32	0.75	8.03
8000	8.76	94.33	0.80	8.58
10000	9.41	101.26	0.86	9.21
12500	11.50	123.77	1.05	11.25

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APPENDIX B: Instruments of Traceability

Specimen: Zyl 4 Decorative Pendant (11 units, modified rectangular array, nonstandard mounting) (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	2019-06-25	2020-06-25
Bruel & Kjaer Mic And Preamp A	Type 4943-B-001	2311428	2019-09-27	2020-09-27
Bruel & Kjaer Pistonphone	Type 4228	2781248	2019-08-09	2020-08-09
EXTECH Hygro 662	SD700	A083662	2019-12-04	2020-12-04

APPENDIX C: Revisions to Original Test Report

Specimen: Zyl 4 Decorative Pendant (11 units, modified rectangular array, nonstandard mounting) (See Full Report)

<u>Date</u>	<u>Revision</u>
2020-02-27	Original report issued

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ON: Zyl 4 Decorative Pendant (11 units, modified rectangular array, nonstandard mounting) (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 fixtures, including intermediate spaces. The fixture rigging covered 11.69 m² (125.84 ft²) of horizontal test surface area. With an extra 901.7 mm (35.5 in.) of length and 977.9 mm (38.5 in.) of width to account for the space between the tested array and what would be the next fixture in a larger array, the surface area comes to 19.09 m² (205.46 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 fixture 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 fixture array performance. Such approximations rely on the assumptions that fixture 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 (0.58 m² (6.25 ft²) per fixture x 11 fixtures = 6.38 m² (68.70 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 fixture

The total sound absorption yielded by the specimen is divided by the surface area of one side the vertical rectangular faces for each fixture in the specimen (0.43 m² (4.64 ft²) per fixture x 11 fixtures = 4.74 m² (50.99 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 / Unit				
31.5	-2.15	-0.20	-0.01	-0.03	-0.04	
40	-3.85	-0.35	-0.02	-0.06	-0.08	
50	4.10	0.37	0.02	0.06	0.08	
63	17.29	1.57	0.08	0.25	0.34	
80	9.32	0.85	0.05	0.14	0.18	
100	13.82	1.26	0.07	0.20	0.27	
125	11.09	1.01	0.05	0.16	0.22	
160	12.82	1.17	0.06	0.19	0.25	
200	18.40	1.67	0.09	0.27	0.36	
250	26.55	2.41	0.13	0.39	0.52	
315	36.15	3.29	0.18	0.53	0.71	
400	37.15	3.38	0.18	0.54	0.73	
500	35.19	3.20	0.17	0.51	0.69	
630	40.62	3.69	0.20	0.59	0.80	
800	50.00	4.55	0.24	0.73	0.98	
1,000	56.19	5.11	0.27	0.82	1.10	
1,250	60.95	5.54	0.30	0.89	1.20	
1,600	65.37	5.94	0.32	0.95	1.28	
2,000	65.90	5.99	0.32	0.96	1.29	
2,500	74.06	6.73	0.36	1.08	1.45	
3,150	77.48	7.04	0.38	1.13	1.52	
4,000	78.72	7.16	0.38	1.15	1.54	
5,000	81.86	7.44	0.40	1.19	1.61	
6,300	88.32	8.03	0.43	1.29	1.73	
8,000	94.33	8.58	0.46	1.37	1.85	
10,000	101.26	9.21	0.49	1.47	1.99	
12,500	123.77	11.25	0.60	1.80	2.43	
			Apparent NRC:	0.20	0.65	0.90
			Apparent SAA:	0.23	0.69	0.93

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