

SPONSOR: **Carnegie Fabrics, LLC**  
Rockville Centre, NY

**Sound Absorption**  
**RAL™-A24-395**

CONDUCTED: 2024-09-30

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ON: Tessellate Cloud (4 units, 2 rows of 2 units each, rows spaced 36" apart, units in each row spaced 36" apart)

### 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 C423-23: "Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method", except that the total surface area of the installed specimen array was less than the required 10 m<sup>2</sup> stated in section 9.3.1. The specimen mounting was performed according to ASTM E795-23: "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 Tessellate Cloud (4 units, 2 rows of 2 units each, rows spaced 36" apart, units in each row spaced 36" apart). 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**

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Product Name: Kirei Tessellate Cloud  
Surface Area: Each unit @ 1.9263 m<sup>2</sup> (20.7335 ft<sup>2</sup>)  
Manufacturer: Carnegie Fabrics, LLC  
Product Type: Acoustical PET Cloud

### SPECIMEN MEASUREMENTS & TEST CONDITIONS

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

#### **Test Specimen**

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Dimensions: 4 clouds @ 845 mm (33.25 in.) wide by 845 mm (33.25 in.) long  
Depth: 270 mm (10.625 in.)  
Overall Weight: 15.42 kg (34 lbs)

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### Physical Measurements (per object)

Dimensions: 0.84 m (33.25 in) wide by 0.84 m (33.25 in) long  
Thickness: 0.27 m (10.625 in)  
Weight: 3.86 kg (8.5 lbs)

### Test Environment

Room Volume: 291.98 m<sup>3</sup>  
Temperature: 22.0 °C ± 0.1 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)  
Relative Humidity: 59.65 % ± 0.5 % (Requirement: ≥ 40 % and ≤ 5 % change)  
Barometric Pressure: 98.5 kPa (Requirement not defined)

Each sound absorbing object had an exposed surface area of 1.93 m<sup>2</sup> (20.7 ft<sup>2</sup>). The total exposed surface area of all sound-absorbing objects was 7.70 m<sup>2</sup> (82.9 ft<sup>2</sup>). These surface area values have been provided by the test sponsor. Note that the total surface area of the installed specimen array was less than the required 10 m<sup>2</sup> stated in section 9.3.1

### MOUNTING METHOD

Type JH-MOD Mounting: The specimen is an array of 4 spaced sound absorbing objects suspended from cables such that the closest face is located approximately 1435 mm (56.5 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 objects each, with rows spaced 914 mm (36 in.) apart and objects in each row spaced 914 mm (36 in.) apart. The width of the installed object array was 2604 mm (102.5 in.) and the length of the installed object array was 2604 mm (102.5 in.). The area of extended continuous surface attributed to the object array was 12.4 m<sup>2</sup> (133 ft<sup>2</sup>).

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Figure 1 – Specimen mounted in test chamber



Figure 2 – Specimen mounted in test chamber

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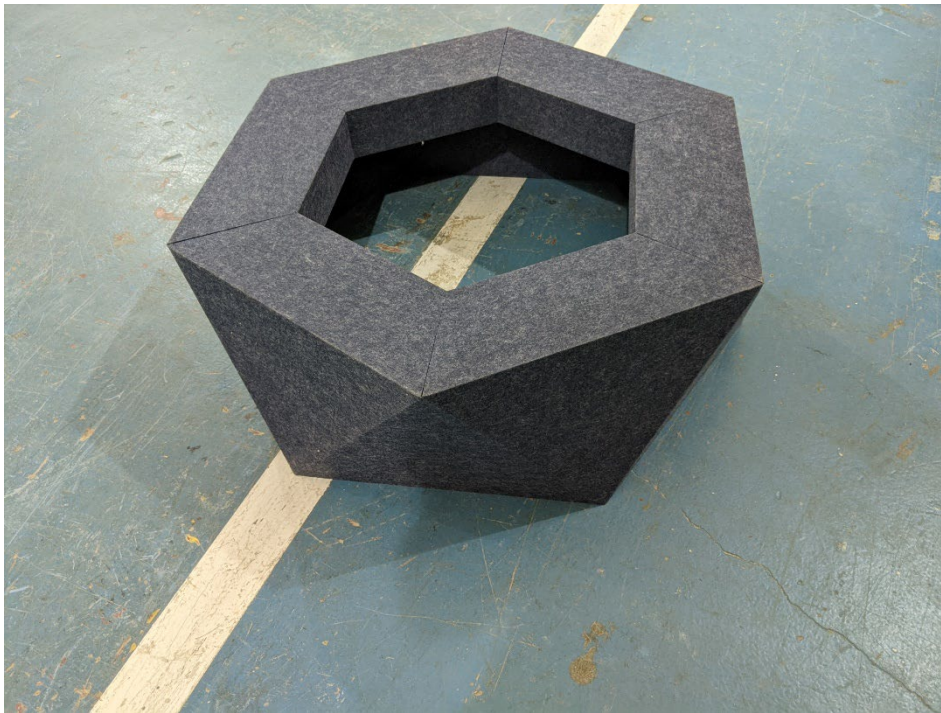


Figure 3 – Individual specimen baffle

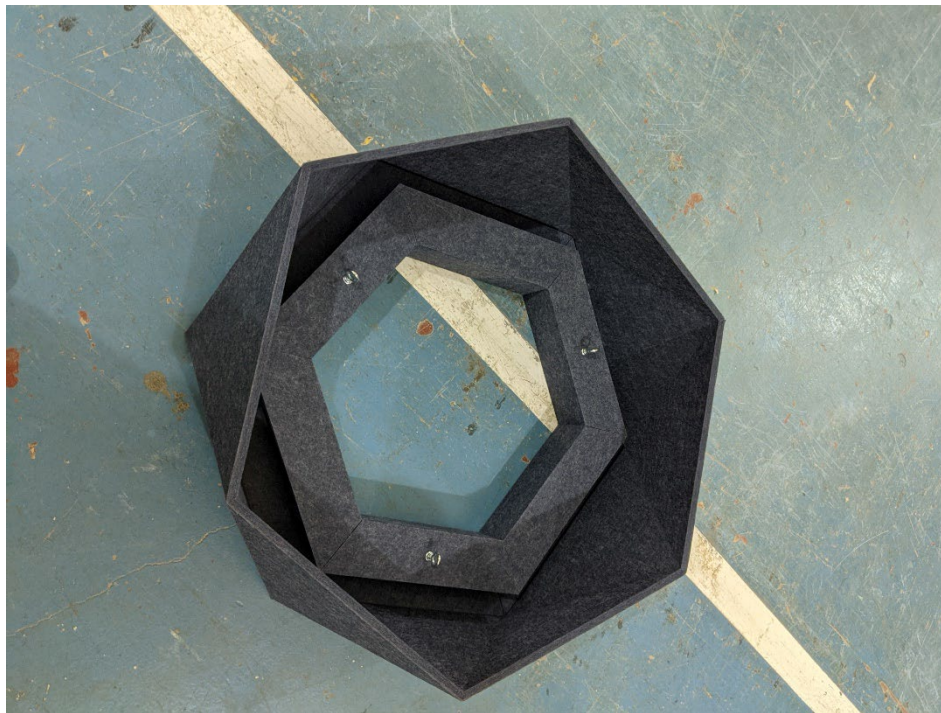


Figure 4 – Individual specimen baffle

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### TEST RESULTS

The preferred presentation of sound absorption test results for arrays of spaced objects is sound absorption ( $m^2$ ) per object and total sound absorption ( $m^2$ ) at each one-third-octave band

ASTM C423-23 Appendix X2 allows calculation of sound absorption per  $m^2$  ( $SA/m^2$ ) based on the projected horizontal surface area attributable to an array of objects. The extended continuous surface area used in this calculation is to be determined using the following procedure:

$S_{array} = (w + w_1) \times (l + l_1)$  If the set of objects consists of a rectangular array of equal sized objects with equal space between each object in a row and equal space between rows. (ASTM E423-23 X.2.3.1)

Where:

$S_{array}$  = area of extended continuous surface attributed to the test specimen,  $m^2$

$w$  = the measured width of the installed object array, in meters

$w_1$  = the space between objects in the array along the width, in meters

$l$  = the measured length of the installed object array, in meters

$l_1$  = the space between objects in the array along the length, in meters

The sound absorption per  $m^2$  ( $SA/m^2$ ) is calculated based on the following formula:

$$\alpha_{array} = (A_2 - A_1)/S_{array}$$

Where:

$\alpha_{array}$  = sound absorption per  $m^2$  ( $SA/m^2$ ) of extended continuous surface, no units,

$A_1$  = absorption of the empty reverberation room,  $m^2$  and

$A_2$  = absorption of the room after the specimen has been installed,  $m^2$ .

$S_{array}$  = area of extended continuous surface attributed to the test specimen,  $m^2$

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TEST RESULTS (continued)

1/3 Octave Center Frequency (Hz)	Total Absorption		Absorption per Object		$\alpha_{array}$ (Sabins/ft <sup>2</sup> ) (SA/m <sup>2</sup> )
	(m <sup>2</sup> )	(Sabins)	(m <sup>2</sup> / Object)	(Sabins / Object)	
100	0.92	9.92	0.23	2.48	0.07
** 125	0.73	7.85	0.18	1.96	0.06
160	0.90	9.66	0.22	2.42	0.07
200	1.73	18.62	0.43	4.65	0.14
** 250	2.07	22.33	0.52	5.58	0.17
315	2.63	28.29	0.66	7.07	0.21
400	2.96	31.91	0.74	7.98	0.24
** 500	3.66	39.36	0.91	9.84	0.30
630	4.03	43.34	1.01	10.83	0.33
800	4.39	47.22	1.10	11.81	0.35
** 1000	4.73	50.91	1.18	12.73	0.38
1250	5.05	54.31	1.26	13.58	0.41
1600	5.31	57.10	1.33	14.28	0.43
** 2000	5.62	60.52	1.41	15.13	0.45
2500	6.06	65.21	1.51	16.30	0.49
3150	6.12	65.85	1.53	16.46	0.49
** 4000	6.19	66.66	1.55	16.67	0.50
5000	6.27	67.50	1.57	16.87	0.51

**Array-NRC 0.35** over 12.4 m<sup>2</sup> of extended continuous surface area  
**Array-SAA 0.33** over 12.4 m<sup>2</sup> of extended continuous surface area

Tested by   
Marc Sciaky  
Senior Experimentalist

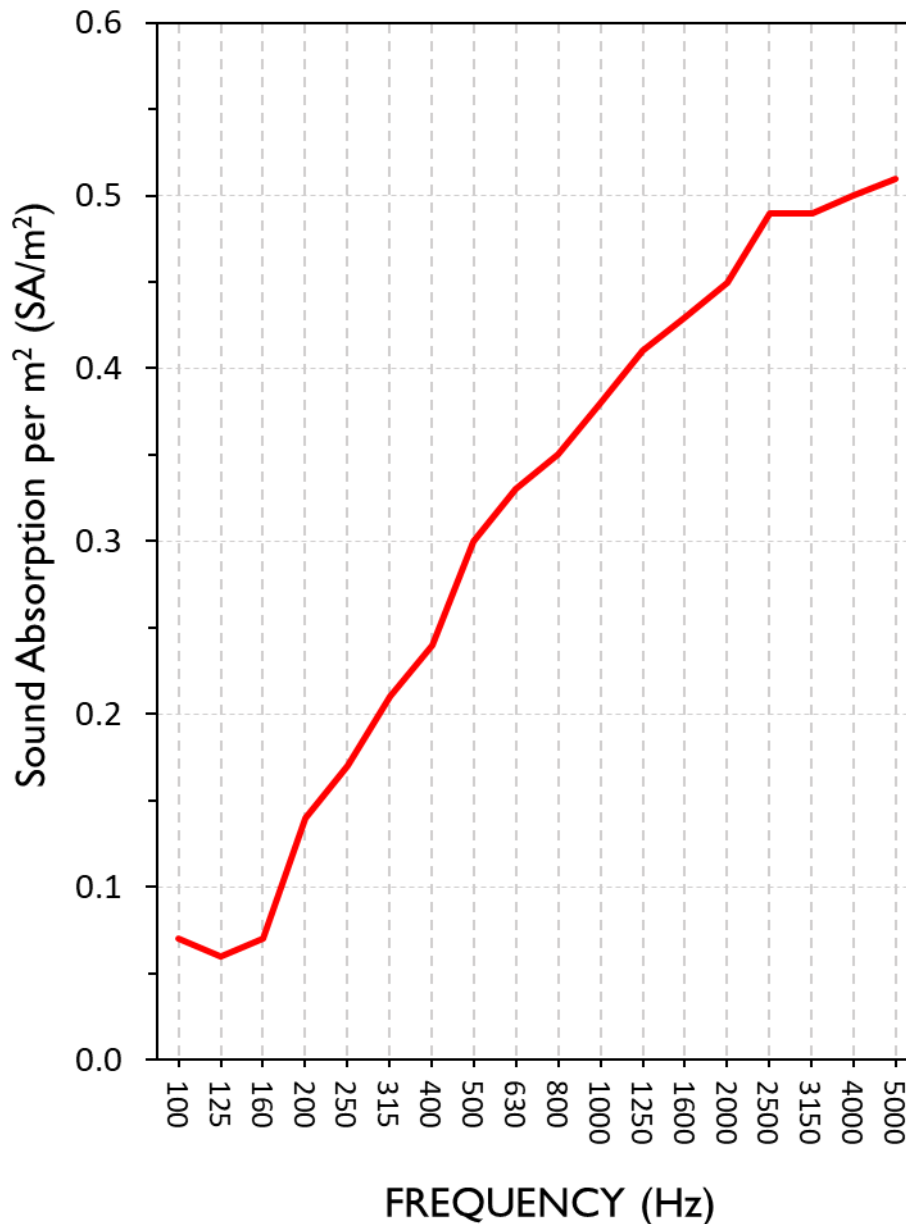
Report by   
Keith Kimberling  
Test Engineer

Approved by   
Eric P. Wolfram  
Laboratory Manager

*Note: Sound absorption per m<sup>2</sup> (SA/m<sup>2</sup>), and therefore the reported Single Number Ratings, are highly dependent on the exact sample shape, size, spacing, and extended continuous surface area present in the test and subsequent calculations. Changes to any of these parameters will change the resulting values. These presented results are valid only for the specific configuration present in this test.*

**SOUND ABSORPTION REPORT**

Tessellate Cloud (4 units, 2 rows of 2 units each, rows spaced 36" apart, units in each row spaced 36" apart)



**Array-NRC 0.35** over 12.4 m<sup>2</sup> of extended continuous surface area

**Array-SAA 0.33** over 12.4 m<sup>2</sup> of extended continuous surface area



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### APPENDIX A: Extended Frequency Range Data

Specimen: Tessellate Cloud (4 units, 2 rows of 2 units each, rows spaced 36" apart, units in each row spaced 36" apart) (See Full Report)

*The following non-accredited data were obtained in accordance with ASTM C423-23, 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		$\alpha_{array}$ (Sabins/ft <sup>2</sup> )
	(m <sup>2</sup> )	(Sabins)	(m <sup>2</sup> / Object)	(Sabins / Object)	(SA/m <sup>2</sup> )
31.5	-0.03	-0.30	-0.01	-0.07	0.00
40	-0.03	-0.35	-0.01	-0.09	0.00
50	-0.59	-6.38	-0.15	-1.60	-0.05
63	0.59	6.39	0.15	1.60	0.05
80	0.53	5.75	0.13	1.44	0.04
100	0.92	9.92	0.23	2.48	0.07
125	0.73	7.85	0.18	1.96	0.06
160	0.90	9.66	0.22	2.42	0.07
200	1.73	18.62	0.43	4.65	0.14
250	2.07	22.33	0.52	5.58	0.17
315	2.63	28.29	0.66	7.07	0.21
400	2.96	31.91	0.74	7.98	0.24
500	3.66	39.36	0.91	9.84	0.30
630	4.03	43.34	1.01	10.83	0.33
800	4.39	47.22	1.10	11.81	0.35
1000	4.73	50.91	1.18	12.73	0.38
1250	5.05	54.31	1.26	13.58	0.41
1600	5.31	57.10	1.33	14.28	0.43
2000	5.62	60.52	1.41	15.13	0.45
2500	6.06	65.21	1.51	16.30	0.49
3150	6.12	65.85	1.53	16.46	0.49
4000	6.19	66.66	1.55	16.67	0.50
5000	6.27	67.50	1.57	16.87	0.51
6300	6.36	68.41	1.59	17.10	0.51
8000	6.10	65.66	1.52	16.41	0.49
10000	5.93	63.80	1.48	15.95	0.48
12500	5.96	64.18	1.49	16.04	0.48



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### **APPENDIX B: Instruments of Traceability**

Specimen: Tessellate Cloud (4 units, 2 rows of 2 units each, rows spaced 36" apart, units in each row spaced 36" apart) (See Full Report)

<b><u>Description</u></b>	<b><u>Model</u></b>	<b><u>Serial Number</u></b>	<b><u>Date of Certification</u></b>	<b><u>Calibration Due</u></b>
System 1	Type 3160-A-042	3160-106974	2024-08-15	2025-08-15
Bruel & Kjaer Mic And Preamp G	Type 4943-B-001	2525858	2024-05-07	2025-05-07
Bruel & Kjaer Pistonphone	Type 4228	2781248	2024-07-19	2025-07-19
EXTECH Hygro 959	SD700	A099959	2024-03-29	2025-03-29

### **APPENDIX C: Revisions to Original Test Report**

Specimen: Tessellate Cloud (4 units, 2 rows of 2 units each, rows spaced 36" apart, units in each row spaced 36" apart) (See Full Report)

<b><u>Date</u></b>	<b><u>Revision</u></b>
2024-10-23	Original report issued

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END