

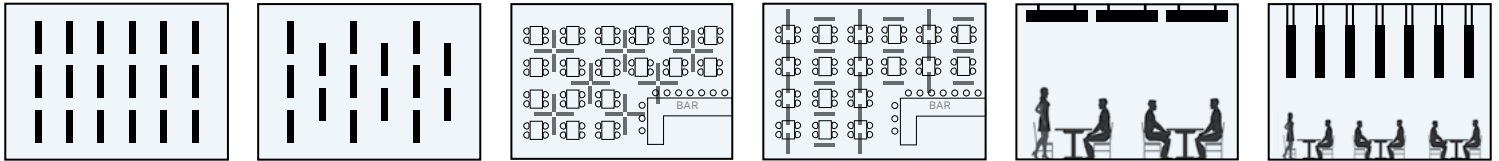
Understanding this Document

The layout you choose to suspend your baffles in, will have an impact on their performance. The tests on the following pages will show how density, spacing and suspension height effect acoustic performance, allowing you to optimize your design accordingly.

The key figure to look for is 'Array NRC.' This is the NRC (Noise Reduction Coefficient) value of the panel when placed in the particular array situation. Compare this to the panel's NRC when hanging by itself and you'll see the benefits of certain array layouts over others.

General Principles

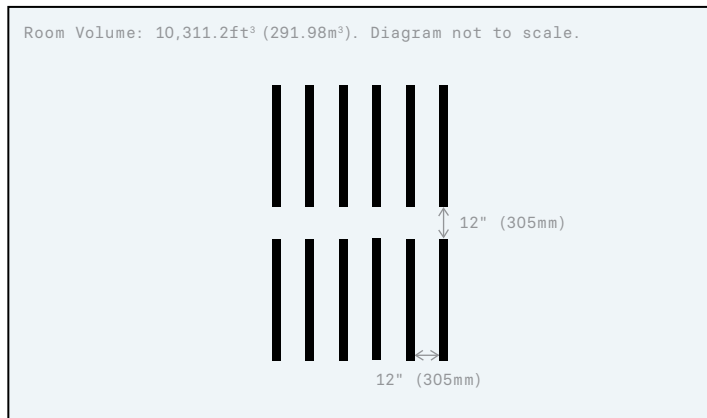
- **Density:** The number of baffles in a given area will determine the rate of sound absorption. This can vary depending on room size and noise levels.
- **Pattern:** Spread evenly for general sound control or alternate panel direction to absorb sound waves moving in multiple directions. Using a grid like 'tic-tac-toe' layout will improve the performance as more random energy will be absorbed in the room. Suspending the baffles in both X and Y axes will capture noise in both directions.
- **Suspension Height:** Leave a minimum 3" (76mm) of air space between the panel and ceiling, up to a maximum of 75" (150cm). Panels can be suspended horizontally or vertically.



Array Variations

Array 1 (Pages 3-12)

Broadway Saturna LP Baffles 48 x 12 x 1.5" (1,219 x 305 x 38mm)
 2x6 grid, 12" (305mm) between rows
 12" (305mm) between panels in row
 Suspended 41.5" (1,054mm) from the ceiling
 RAL™A24-479 Test

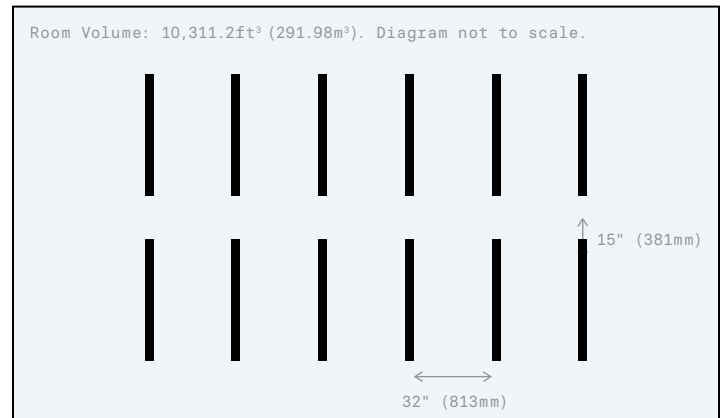


Array-NRC: 0.95

over 67.38ft² (6.26m²) of extended continuous surface area

Array 2 (Pages 13-22)

Broadway Saturna Baffles 48 x 12 x 1.5" (1,219 x 305 x 38mm)
 2x6 grid, 32" (813mm) between rows
 15" (381mm) between panels in row
 Suspended 42.25" (1,073mm) from the ceiling
 RAL™A24-471 Test



Array-NRC: 0.45

over 175.45ft² (16.3m²) of extended continuous surface area



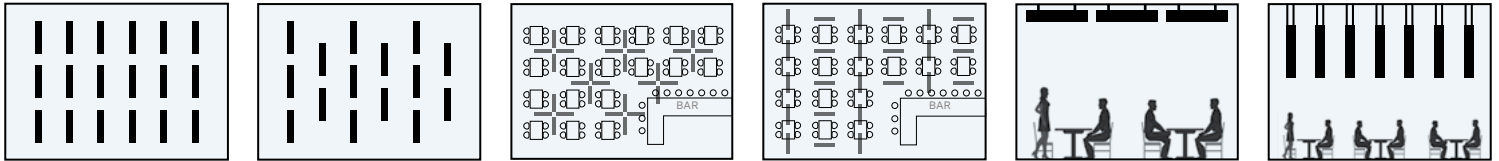
Understanding this Document

The layout you choose to suspend your baffles in, will have an impact on their performance. The tests on the following pages will show how density, spacing and suspension height effect acoustic performance, allowing you to optimize your design accordingly.

The key figure to look for is 'Array NRC.' This is the NRC (Noise Reduction Coefficient) value of the panel when placed in the particular array situation. Compare this to the panel's NRC when hanging by itself and you'll see the benefits of certain array layouts over others.

General Principles

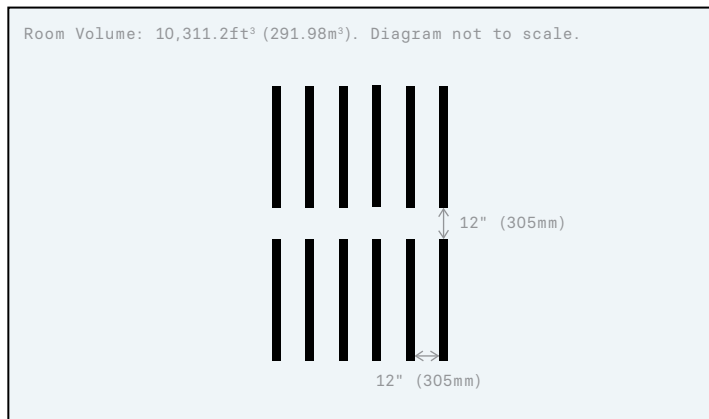
- **Density:** The number of baffles in a given area will determine the rate of sound absorption. This can vary depending on room size and noise levels.
- **Pattern:** Spread evenly for general sound control or alternate panel direction to absorb sound waves moving in multiple directions. Using a grid like 'tic-tac-toe' layout will improve the performance as more random energy will be absorbed in the room. Suspending the baffles in both X and Y axes will capture noise in both directions.
- **Suspension Height:** Leave a minimum 3" (76mm) of air space between the panel and ceiling, up to a maximum of 75" (150cm). Panels can be suspended horizontally or vertically.



Array Variations

Array 3 (Pages 23-32)

Broadway Saturna LP Baffles 48 x 12 x 1.5" (1,219 x 305 x 38mm)
 2x6 grid, 12" (305mm) between rows
 12" (305mm) between panels in row
 Suspended 41.5" (1,054mm) from the ceiling
 RAL™A24-473 Test

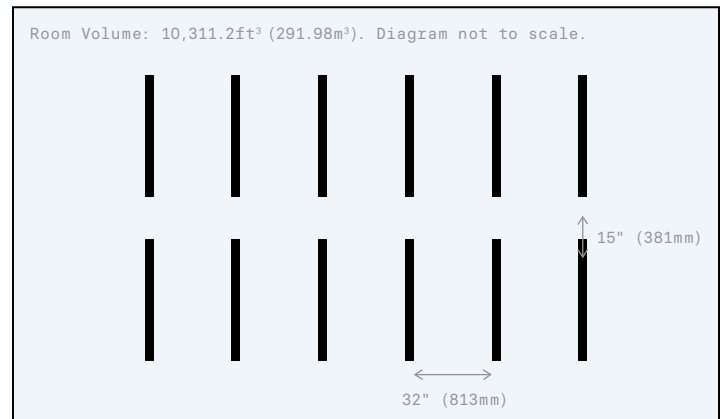


Array-NRC: 0.85

over 67.81ft² (6.30m²) of extended continuous surface area

Array 4 (Pages 33-42)

Broadway Saturna LP Baffles 48 x 12 x 1.5" (1,219 x 305 x 38mm)
 2x6 grid, 32" (813mm) between rows
 15" (381mm) between panels in row
 Suspended 42" (1,067mm) from the ceiling
 RAL™A24-472 Test



Array-NRC: 0.40

over 176.5ft² (16.4m²) of extended continuous surface area

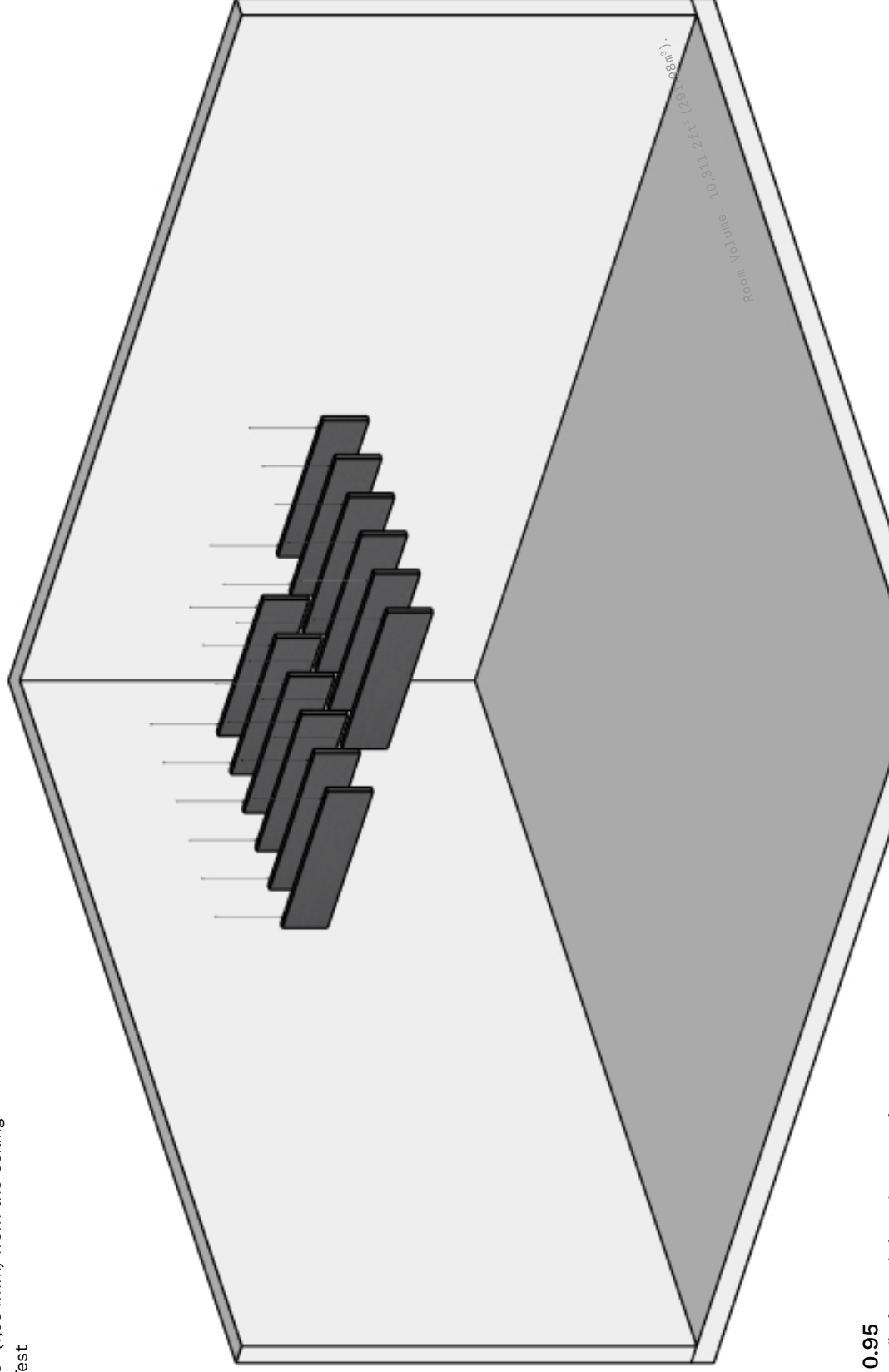


BROADWAY Baffles

Array 1

Saturna LP (Fabric Finish)

Broadway Saturna LP Baffles 48 x 12 x 1.5" (1,219 x 305 x 38mm)
2x6 grid, 12" (305mm) between rows
12" (305mm) between panels in row
Suspended 41.5" (1,054mm) from the ceiling
RAL™ A24-479 Test



Array-NRC: 0.95
over 67.38ft² (6.26m²) of extended continuous surface area



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Sound Absorption
RAL™-A24-479

CONDUCTED: 2024-12-13

Page 1 of 9

ON: Primacoustic - Saturna LP Baffles Fabric Finish (12 objects, 6 rows of 2 objects each, rows spaced 12" apart, objects in each row spaced 12" 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." 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 Primacoustic - Saturna LP Baffles Fabric Finish (12 objects, 6 rows of 2 objects each, rows spaced 12" apart, objects in each row spaced 12" 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

Product Name: Primacoustic - Saturna LP Baffles Fabric Finish
Manufacturer: Radial Engineering

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: Baffles
Dimensions: 12 baffles @ 39.24 mm (1.545 in.) wide by 1219 mm (48 in.) long
Depth: 305 mm (12 in.)
Overall Weight: 22.45 kg (49.5 lbs)

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2024-12-13

RAL™-A24-479
Page 2 of 9

SPECIMEN MEASUREMENTS & TEST CONDITIONS (continued)

Physical Measurements (per object)

Dimensions: 0.3 m (12.0 in) wide by 1.22 m (48.0 in) long
Thickness: 0.04 m (1.545 in)
Weight: 1.87 kg (4.12 lbs)

Test Environment

Room Volume: 291.98 m³
Temperature: 21.2 °C ± 0.1 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity: 60.9 % ± 0.4 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure: 100.7 kPa (Requirement not defined)

Each sound absorbing object had an exposed surface area of 0.863 m² (9.29 ft²). The total exposed surface area of all sound-absorbing objects was 10.4 m² (111 ft²).

MOUNTING METHOD

Type JV-MOD Mounting: The specimen is an array of 12 spaced sound absorbing objects suspended from cables such that the closest face is located approximately 1054 mm (41.5 in.) from the horizontal test surface. This approximates the mounting method of a typical ceiling baffle installation. The objects were distributed in six rows of two objects each, with rows spaced 813 mm (32 in.) apart and objects in each row spaced 381 mm (15 in.) apart. The width of the installed object array was 1749 mm (68.875 in.) and the length of the installed object array was 2743 mm (108 in.). The area of extended continuous surface attributed to the object array was 6.26 m² (67.4 ft²).

Radial Engineering
2024-12-13

RAL™-A24-479
Page 3 of 9



Figure 1 – Specimen mounted in test chamber



Figure 2 – Individual specimen object

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Test Report

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RAL™-A24-479
Page 4 of 9

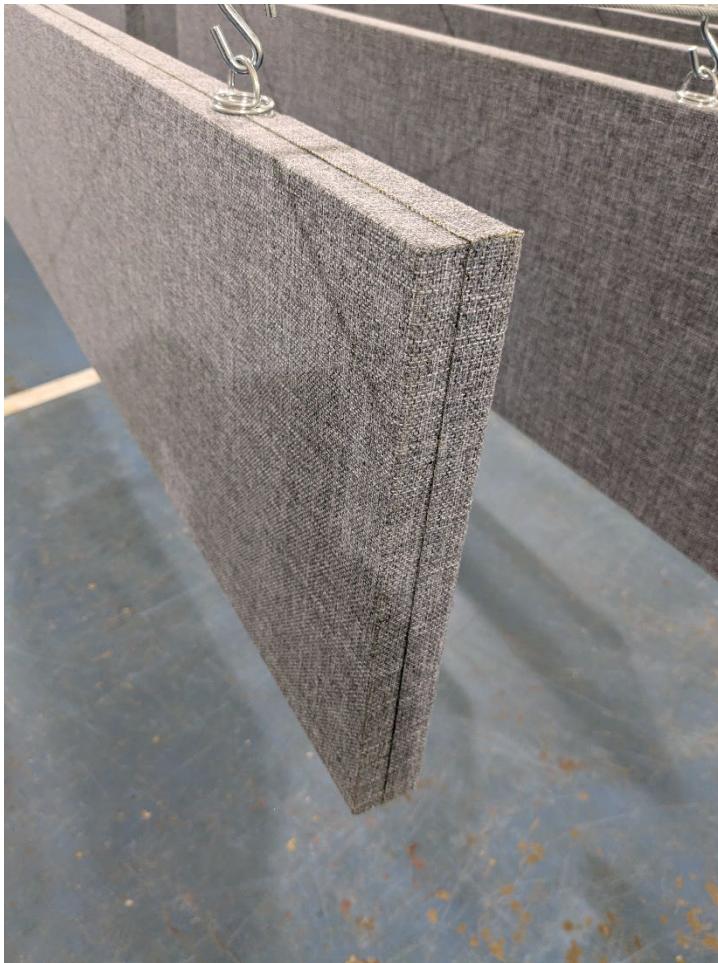


Figure 3 – Detail of specimen materials

Radial Engineering
2024-12-13

RAL™-A24-479
Page 5 of 9

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:

α_{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

Radial Engineering
2024-12-13

RAL™-A24-479
Page 6 of 9

TEST RESULTS (continued)

1/3 Octave Center Frequency (Hz)	Total Absorption		Absorption per Object		α_{array} (Sabins/ft ²) (SA/m ²)
	(m ²)	(Sabins)	(m ² / Object)	(Sabins / Object)	
100	0.35	3.72	0.03	0.31	0.06
** 125	0.08	0.90	0.01	0.08	0.01
160	0.88	9.48	0.07	0.79	0.14
200	1.41	15.18	0.12	1.27	0.23
** 250	2.39	25.68	0.20	2.14	0.38
315	3.30	35.54	0.28	2.96	0.53
400	3.81	40.98	0.32	3.42	0.61
** 500	4.59	49.37	0.38	4.11	0.73
630	5.39	58.05	0.45	4.84	0.86
800	6.95	74.78	0.58	6.23	1.11
** 1000	8.33	89.63	0.69	7.47	1.33
1250	8.92	96.05	0.74	8.00	1.43
1600	8.76	94.30	0.73	7.86	1.40
** 2000	8.58	92.33	0.71	7.69	1.37
2500	8.09	87.03	0.67	7.25	1.29
3150	7.75	83.40	0.65	6.95	1.24
** 4000	7.40	79.61	0.62	6.63	1.18
5000	7.23	77.85	0.60	6.49	1.16

Array-NRC 0.95 over 6.26 m² of extended continuous surface area

Array-SAA 0.94 over 6.26 m² of extended continuous surface area

Tested by 
Marc Sciaky
Senior Experimentalist

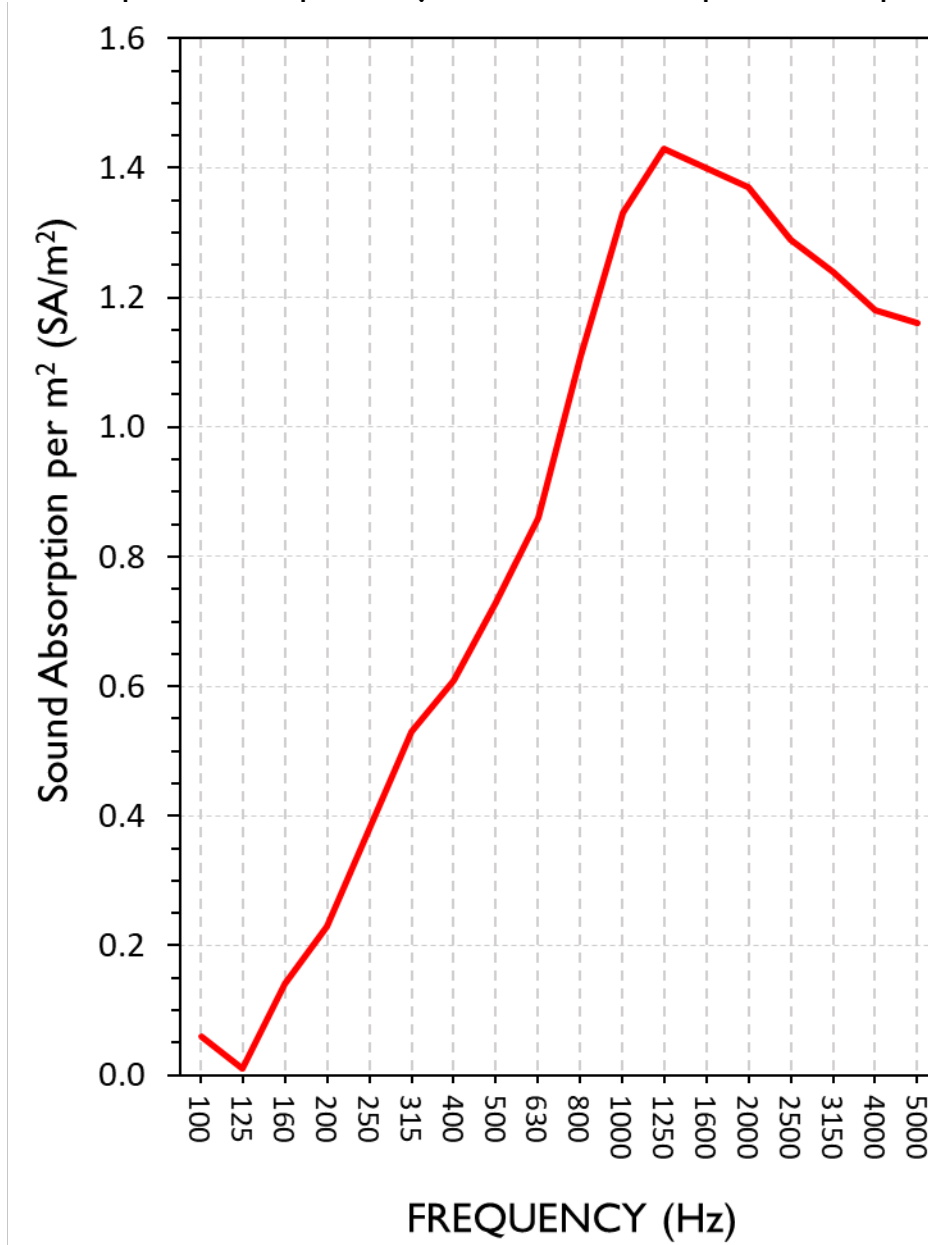
Report by 
Keith Kimberling
Test Engineer

Approved by 
Eric P. Wolfram
Laboratory Manager

Note: Sound absorption per m² (SA/m²), 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

Primacoustic - Saturna LP Baffles Fabric Finish (12 objects, 6 rows of 2 objects each, rows spaced 12" apart, objects in each row spaced 12" apart)



Array-NRC 0.95 over 6.26 m² of extended continuous surface area

Array-SAA 0.94 over 6.26 m² of extended continuous surface area

Radial Engineering
2024-12-13

RAL™-A24-479
Page 8 of 9

APPENDIX A: Extended Frequency Range Data

Specimen: Primacoustic - Saturna LP Baffles Fabric Finish (12 objects, 6 rows of 2 objects each, rows spaced 12" apart, objects in each row spaced 12" 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		α_{array} (Sabins/ft ²)
	(m ²)	(Sabins)	(m ² / Object)	(Sabins / Object)	(SA/m ²)
31.5	0.73	7.85	0.06	0.65	0.12
40	-0.39	-4.15	-0.03	-0.35	-0.06
50	-1.78	-19.17	-0.15	-1.60	-0.28
63	0.07	0.77	0.01	0.06	0.01
80	0.59	6.36	0.05	0.53	0.09
100	0.35	3.72	0.03	0.31	0.06
125	0.08	0.90	0.01	0.08	0.01
160	0.88	9.48	0.07	0.79	0.14
200	1.41	15.18	0.12	1.27	0.23
250	2.39	25.68	0.20	2.14	0.38
315	3.30	35.54	0.28	2.96	0.53
400	3.81	40.98	0.32	3.42	0.61
500	4.59	49.37	0.38	4.11	0.73
630	5.39	58.05	0.45	4.84	0.86
800	6.95	74.78	0.58	6.23	1.11
1000	8.33	89.63	0.69	7.47	1.33
1250	8.92	96.05	0.74	8.00	1.43
1600	8.76	94.30	0.73	7.86	1.40
2000	8.58	92.33	0.71	7.69	1.37
2500	8.09	87.03	0.67	7.25	1.29
3150	7.75	83.40	0.65	6.95	1.24
4000	7.40	79.61	0.62	6.63	1.18
5000	7.23	77.85	0.60	6.49	1.16
6300	7.38	79.47	0.62	6.62	1.18
8000	7.35	79.17	0.61	6.60	1.17
10000	7.15	77.01	0.60	6.42	1.14
12500	6.87	73.98	0.57	6.16	1.10



RIVERBANK ACOUSTICAL LABORATORIES IS ACCREDITED BY NVLAP (LAB CODE 100227-0) FOR ACOUSTICAL TESTING SERVICES IN ACCORDANCE WITH ISO/IEC 17025:2017 AND FOR THIS PROCEDURE. THIS REPORT MUST NOT BE USED BY THE CLIENT TO CLAIM PRODUCT CERTIFICATION, APPROVAL, OR ENDORSEMENT BY RAL, NVLAP, NIST, OR ANY AGENCY OF THE U.S. GOVERNMENT.

THIS REPORT SHALL NOT BE MODIFIED WITHOUT THE WRITTEN APPROVAL OF RAL. THE RESULTS REPORTED APPLY ONLY TO THE SPECIFIC SAMPLE SUBMITTED FOR TESTING; RAL ASSUMES NO RESPONSIBILITY FOR THE PERFORMANCE OF ANY OTHER SAMPLE.

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2024-12-13

RAL™-A24-479
Page 9 of 9

APPENDIX B: Instruments of Traceability

Specimen: Primacoustic - Saturna LP Baffles Fabric Finish (12 objects, 6 rows of 2 objects each, rows spaced 12" apart, objects in each row spaced 12" apart) (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	3160-106974	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: Primacoustic - Saturna LP Baffles Fabric Finish (12 objects, 6 rows of 2 objects each, rows spaced 12" apart, objects in each row spaced 12" apart) (See Full Report)

<u>Date</u>	<u>Revision</u>
2025-01-28	Original report issued

END

BROADWAY Baffles

Array 2

Saturna LP (Fabric Finish)

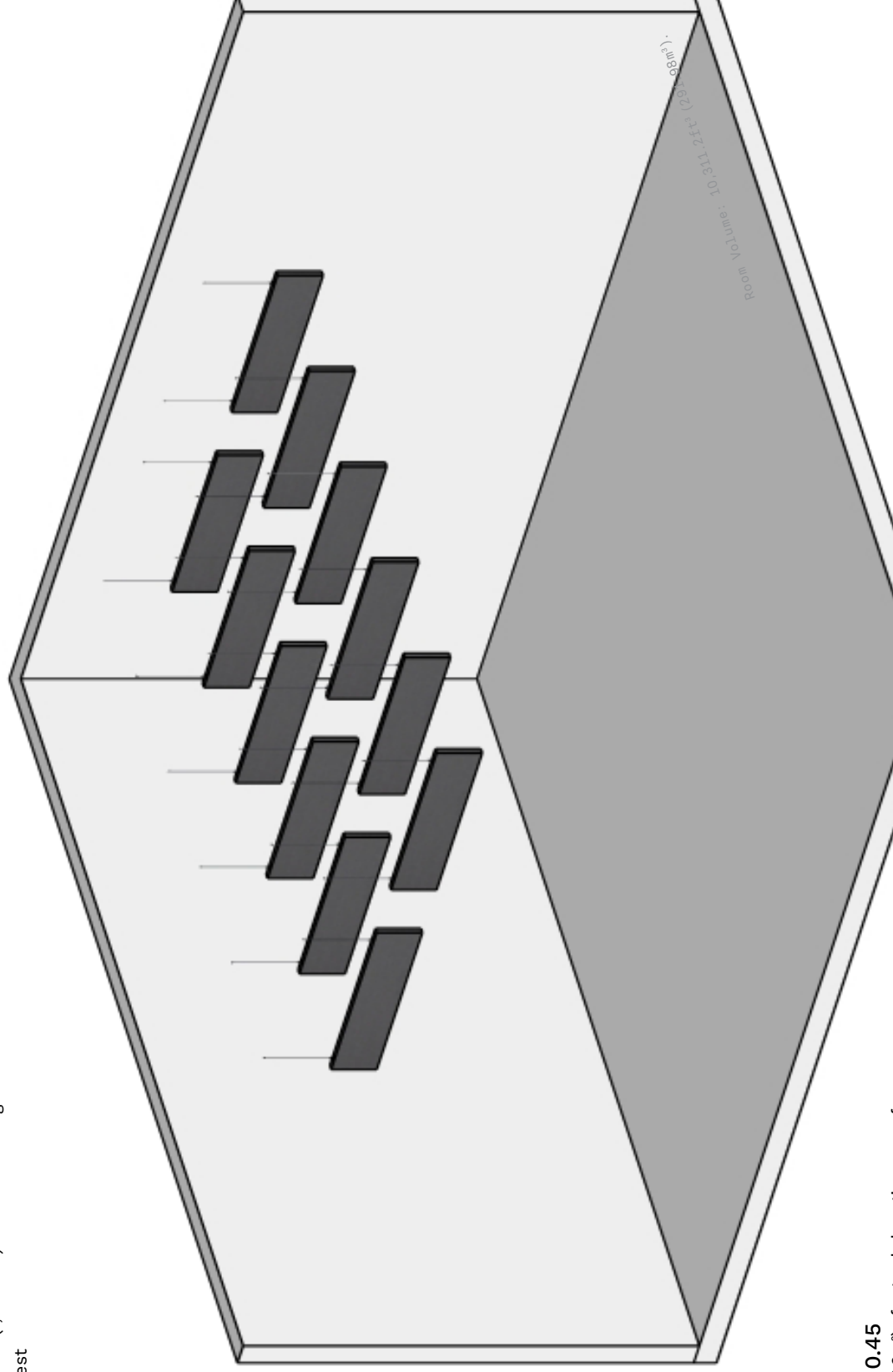
Broadway Saturna Baffles 48 x 12 x 1.5" (1,219 x 305 x 38mm)

2x6 grid, 32" (813mm) between rows

15" (381mm) between panels in row

Suspended 42.25" (1,073mm) from the ceiling

RAL™ A24-471 Test



Array-NRC: 0.45
over 175.45ft² (16.3m²) of extended continuous surface area



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Page 1 of 9

ON: Primacoustic - Saturna LP Baffles Fabric Finish (12 objects, 6 rows of 2 objects each, rows spaced 32" apart, objects in each row spaced 15" 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." 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 Primacoustic - Saturna LP Baffles Fabric Finish (12 objects, 6 rows of 2 objects each, rows spaced 32" apart, objects in each row spaced 15" 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

Product Name: Primacoustic - Saturna LP Baffles Fabric Finish
Manufacturer: Radial Engineering

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: Baffles
Dimensions: 12 baffles @ 39.24 mm (1.545 in.) wide by 1219 mm (48 in.) long
Depth: 305 mm (12 in.)
Overall Weight: 22.45 kg (49.5 lbs)

Radial Engineering
2024-12-11

RAL™-A24-471
Page 2 of 9

SPECIMEN MEASUREMENTS & TEST CONDITIONS (continued)

Physical Measurements (per object)

Dimensions: 0.3 m (12.0 in) wide by 1.22 m (48.0 in) long
Thickness: 0.04 m (1.545 in)
Weight: 1.87 kg (4.12 lbs)

Test Environment

Room Volume: 291.98 m³
Temperature: 21.2 °C ± 0.1 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity: 60.45 % ± 1.5 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure: 98.3 kPa (Requirement not defined)

Each sound absorbing object had an exposed surface area of 0.863 m² (9.29 ft²). The total exposed surface area of all sound-absorbing objects was 10.4 m² (111 ft²).

MOUNTING METHOD

Type JV-MOD Mounting: The specimen is an array of 12 spaced sound absorbing objects suspended from cables such that the closest face is located approximately 1073 mm (42.25 in.) from the horizontal test surface. This approximates the mounting method of a typical ceiling baffle installation. The objects were distributed in six rows of two objects each, with rows spaced 813 mm (32 in.) apart and objects in each row spaced 381 mm (15 in.) apart. The width of the installed object array was 4283 mm (168.625 in.) and the length of the installed object array was 2819 mm (111 in.). The area of extended continuous surface attributed to the object array was 16.3 m² (176 ft²).

Radial Engineering
2024-12-11

RAL™-A24-471
Page 3 of 9



Figure 1 – Specimen mounted in test chamber



Figure 2 – Individual specimen object

Radial Engineering
2024-12-11

RAL™-A24-471
Page 4 of 9

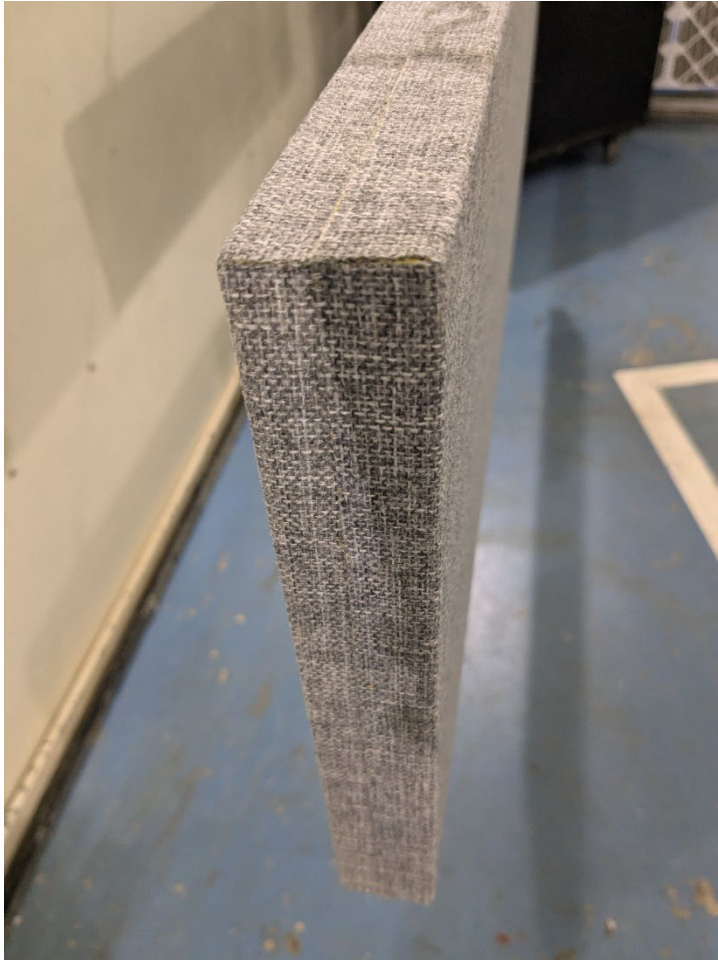


Figure 3 – Detail of specimen materials

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RAL™-A24-471
Page 5 of 9

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:

α_{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

Radial Engineering
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RAL™-A24-471
Page 6 of 9

TEST RESULTS (continued)

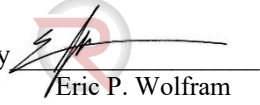
1/3 Octave Center Frequency (Hz)	Total Absorption		Absorption per Object		α_{array} (Sabins/ft ²) (SA/m ²)
	(m ²)	(Sabins)	(m ² / Object)	(Sabins / Object)	
100	0.51	5.54	0.04	0.46	0.03
** 125	0.51	5.50	0.04	0.46	0.03
160	1.21	13.07	0.10	1.09	0.07
200	1.70	18.34	0.14	1.53	0.10
** 250	2.27	24.44	0.19	2.04	0.14
315	3.38	36.34	0.28	3.03	0.21
400	4.35	46.78	0.36	3.90	0.27
** 500	5.61	60.36	0.47	5.03	0.34
630	6.84	73.66	0.57	6.14	0.42
800	8.57	92.28	0.71	7.69	0.53
** 1000	9.99	107.56	0.83	8.96	0.61
1250	10.40	111.97	0.87	9.33	0.64
1600	10.34	111.31	0.86	9.28	0.63
** 2000	10.19	109.66	0.85	9.14	0.62
2500	9.92	106.78	0.83	8.90	0.61
3150	9.31	100.24	0.78	8.35	0.57
** 4000	9.26	99.73	0.77	8.31	0.57
5000	9.23	99.32	0.77	8.28	0.57

Array-NRC 0.45 over 16.3 m² of extended continuous surface area

Array-SAA 0.43 over 16.3 m² of extended continuous surface area

Tested by 
Marc Sciaky
Senior Experimentalist

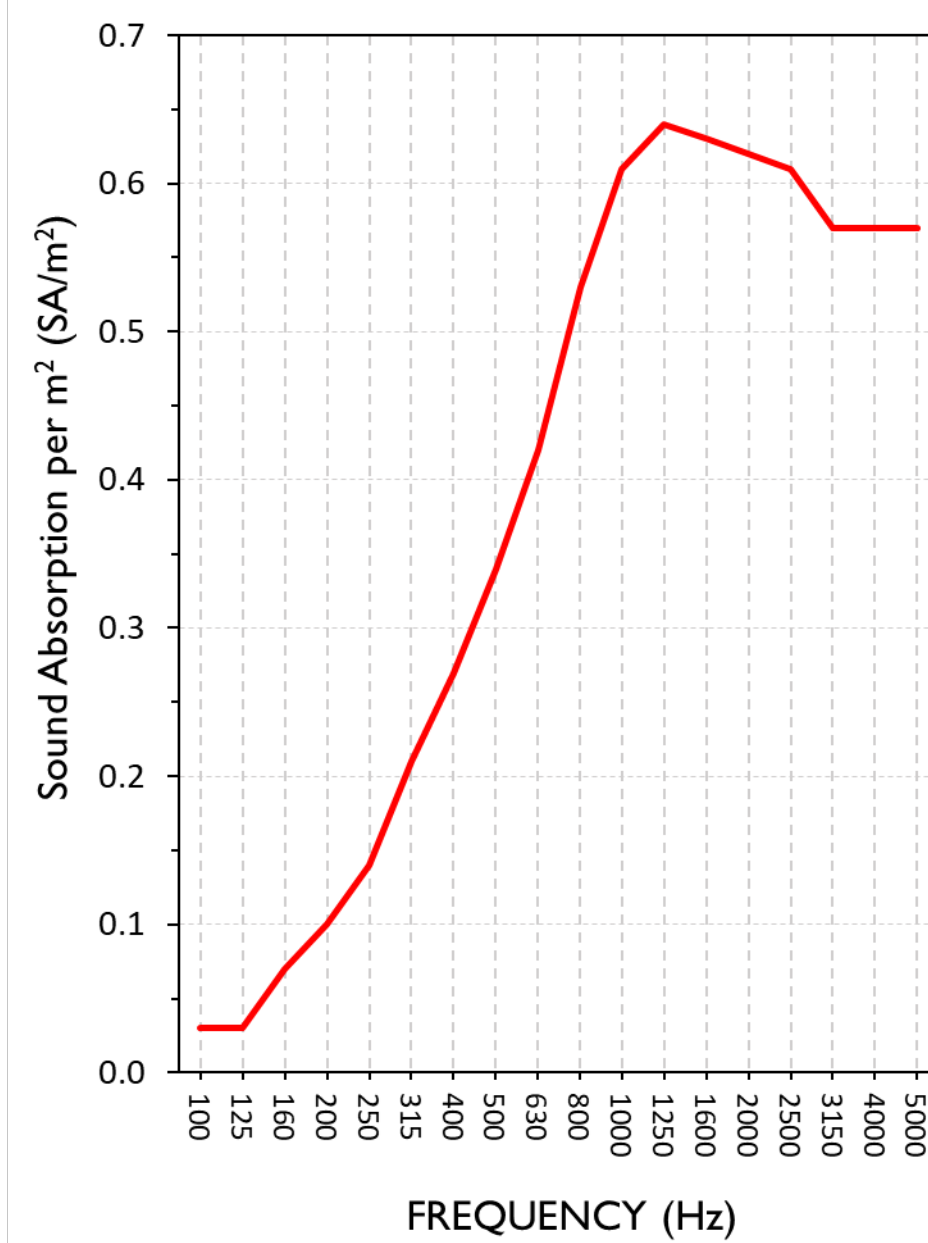
Report by 
Keith Kimberling
Test Engineer

Approved by 
Eric P. Wolfram
Laboratory Manager

Note: Sound absorption per m² (SA/m²), 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

Primacoustic - Saturna LP Baffles Fabric Finish (12 objects, 6 rows of 2 objects each, rows spaced 32" apart, objects in each row spaced 15" apart)



Array-NRC 0.45 over 16.3 m² of extended continuous surface area

Array-SAA 0.43 over 16.3 m² of extended continuous surface area

Radial Engineering
2024-12-11

RAL™-A24-471
Page 8 of 9

APPENDIX A: Extended Frequency Range Data

Specimen: Primacoustic - Saturna LP Baffles Fabric Finish (12 objects, 6 rows of 2 objects each, rows spaced 32" apart, objects in each row spaced 15" 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		α_{array} (Sabins/ft ²)
	(m ²)	(Sabins)	(m ² / Object)	(Sabins / Object)	(SA/m ²)
31.5	1.03	11.05	0.09	0.92	0.06
40	0.33	3.53	0.03	0.29	0.02
50	0.37	3.97	0.03	0.33	0.02
63	0.11	1.17	0.01	0.10	0.01
80	0.69	7.43	0.06	0.62	0.04
100	0.51	5.54	0.04	0.46	0.03
125	0.51	5.50	0.04	0.46	0.03
160	1.21	13.07	0.10	1.09	0.07
200	1.70	18.34	0.14	1.53	0.10
250	2.27	24.44	0.19	2.04	0.14
315	3.38	36.34	0.28	3.03	0.21
400	4.35	46.78	0.36	3.90	0.27
500	5.61	60.36	0.47	5.03	0.34
630	6.84	73.66	0.57	6.14	0.42
800	8.57	92.28	0.71	7.69	0.53
1000	9.99	107.56	0.83	8.96	0.61
1250	10.40	111.97	0.87	9.33	0.64
1600	10.34	111.31	0.86	9.28	0.63
2000	10.19	109.66	0.85	9.14	0.62
2500	9.92	106.78	0.83	8.90	0.61
3150	9.31	100.24	0.78	8.35	0.57
4000	9.26	99.73	0.77	8.31	0.57
5000	9.23	99.32	0.77	8.28	0.57
6300	9.39	101.09	0.78	8.42	0.58
8000	9.67	104.09	0.81	8.67	0.59
10000	9.95	107.10	0.83	8.92	0.61
12500	11.29	121.48	0.94	10.12	0.69

Radial Engineering
2024-12-11

RAL™-A24-471
Page 9 of 9

APPENDIX B: Instruments of Traceability

Specimen: Primacoustic - Saturna LP Baffles Fabric Finish (12 objects, 6 rows of 2 objects each, rows spaced 32" apart, objects in each row spaced 15" apart) (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	3160-106974	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: Primacoustic - Saturna LP Baffles Fabric Finish (12 objects, 6 rows of 2 objects each, rows spaced 32" apart, objects in each row spaced 15" apart) (See Full Report)

<u>Date</u>	<u>Revision</u>
2025-01-28	Original report issued

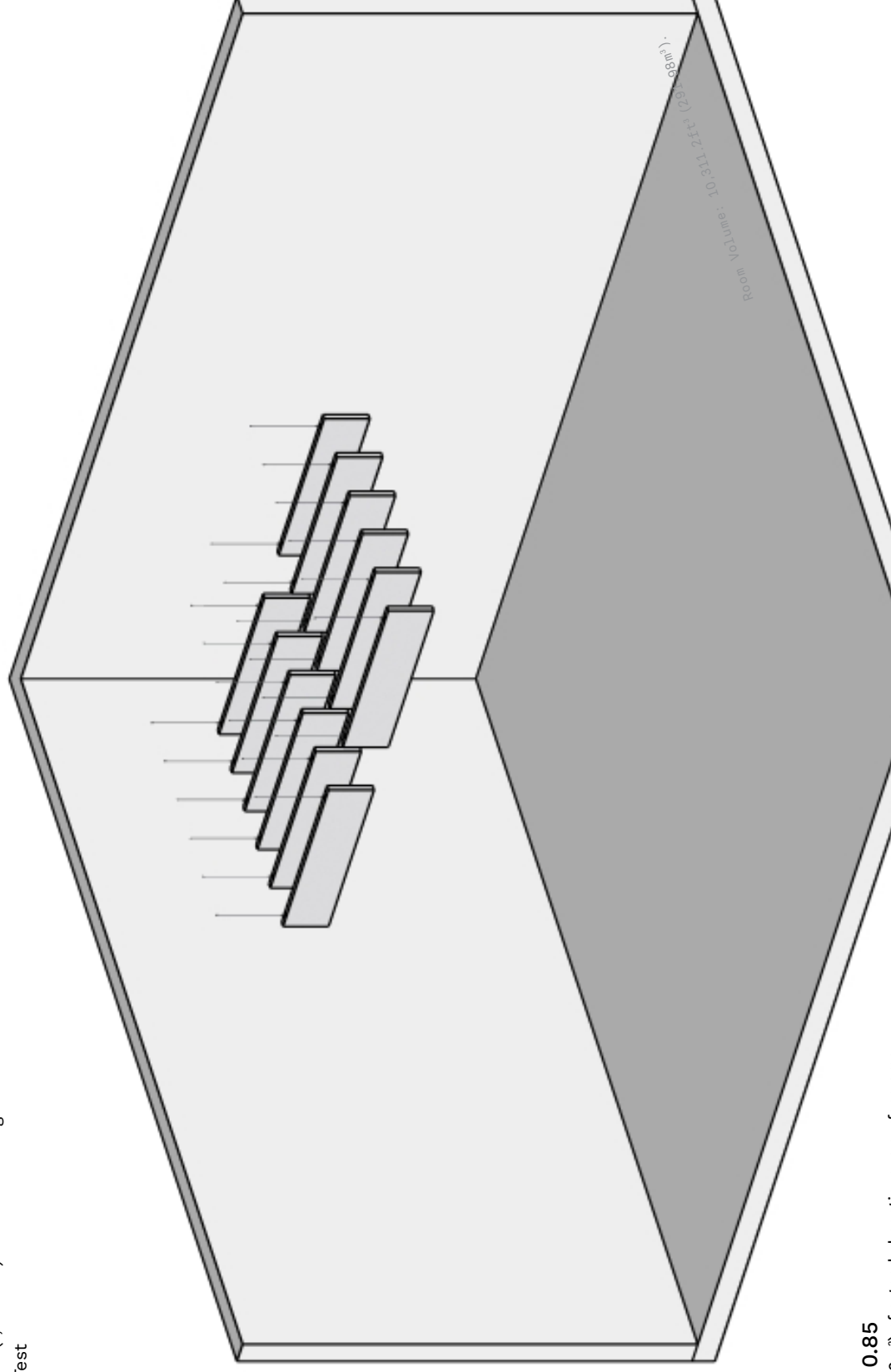
END

BROADWAY Baffles

Array 3

Saturna LP (Paintable Finish)

Broadway Saturna LP Baffles 48 x 12 x 1.5" (1,219 x 305 x 38mm)
2x6 grid, 12" (305mm) between rows
12" (305mm) between panels in row
Suspended 41.5" (1,054mm) from the ceiling
RAL™ A24-473 Test



Array-NRC: 0.85
over 67.8ft² (6.30m²) of extended continuous surface area



A Division of Radial Engineering Ltd.
1845 Kingsway Ave. Unit 1165, Port Coquitlam, BC V3C 0H3, Canada
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Sound Absorption
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CONDUCTED: 2024-12-11

Page 1 of 9

ON: Primacoustic - Saturna LP Baffles Paintable Finish (12 objects, 6 rows of 2 objects each, rows spaced 12" apart, objects in each row spaced 12" 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." 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 Primacoustic - Saturna LP Baffles Paintable Finish (12 objects, 6 rows of 2 objects each, rows spaced 12" apart, objects in each row spaced 12" 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

Product Name: Primacoustic - Saturna LP Baffles Paintable Finish
Manufacturer: Radial Engineering

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: Baffles
Dimensions: 12 baffles @ 40.98 mm (1.6135 in.) wide by 1219 mm (48 in.) long
Depth: 305 mm (12 in.)
Overall Weight: 26.54 kg (58.5 lbs)

Radial Engineering
2024-12-11

RAL™-A24-473
Page 2 of 9

SPECIMEN MEASUREMENTS & TEST CONDITIONS (continued)

Physical Measurements (per object)

Dimensions: 0.3 m (12.0 in) wide by 1.22 m (48.0 in) long
Thickness: 0.04 m (1.6135 in)
Weight: 2.21 kg (4.87 lbs)

Test Environment

Room Volume: 291.98 m³
Temperature: 21.2 °C ± 0.1 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity: 59.05 % ± 3.3 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure: 98.5 kPa (Requirement not defined)

Each sound absorbing object had an exposed surface area of 0.868 m² (9.34 ft²). The total exposed surface area of all sound-absorbing objects was 10.4 m² (112 ft²).

MOUNTING METHOD

Type JV-MOD Mounting: The specimen is an array of 12 spaced sound absorbing objects suspended from cables such that the closest face is located approximately 1054 mm (41.5 in.) from the horizontal test surface. This approximates the mounting method of a typical ceiling baffle installation. The objects were distributed in six rows of two objects each, with rows spaced 305 mm (12 in.) apart and objects in each row spaced 305 mm (12 in.) apart. The width of the installed object array was 1768 mm (69.625 in.) and the length of the installed object array was 2734 mm (107.625 in.). The area of extended continuous surface attributed to the object array was 6.30 m² (67.8 ft²).

Radial Engineering
2024-12-11

RAL™-A24-473
Page 3 of 9



Figure 1 – Specimen mounted in test chamber



Figure 2 – Individual specimen object

Radial Engineering
2024-12-11

RAL™-A24-473
Page 4 of 9



Figure 3 – Detail of specimen materials

Radial Engineering
2024-12-11

RAL™-A24-473
Page 5 of 9

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:

α_{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

Radial Engineering
2024-12-11

RAL™-A24-473
Page 6 of 9

TEST RESULTS (continued)

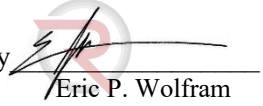
1/3 Octave Center Frequency (Hz)	Total Absorption		Absorption per Object		α_{array} (Sabins/ft ²) (SA/m ²)
	(m ²)	(Sabins)	(m ² / Object)	(Sabins / Object)	
100	0.10	1.09	0.01	0.09	0.02
** 125	0.11	1.18	0.01	0.10	0.02
160	0.69	7.42	0.06	0.62	0.11
200	1.00	10.76	0.08	0.90	0.16
** 250	1.96	21.14	0.16	1.76	0.31
315	3.19	34.36	0.27	2.86	0.51
400	3.46	37.26	0.29	3.11	0.55
** 500	3.96	42.58	0.33	3.55	0.63
630	5.41	58.28	0.45	4.86	0.86
800	6.91	74.35	0.58	6.20	1.10
** 1000	7.62	82.01	0.63	6.83	1.21
1250	7.99	85.99	0.67	7.17	1.27
1600	7.93	85.35	0.66	7.11	1.26
** 2000	7.89	84.90	0.66	7.08	1.25
2500	7.67	82.57	0.64	6.88	1.22
3150	7.37	79.31	0.61	6.61	1.17
** 4000	7.20	77.51	0.60	6.46	1.14
5000	7.13	76.76	0.59	6.40	1.13

Array-NRC 0.85 over 6.30 m² of extended continuous surface area

Array-SAA 0.86 over 6.30 m² of extended continuous surface area

Tested by 
Marc Sciaky
Senior Experimentalist

Report by 
Keith Kimberling
Test Engineer

Approved by 
Eric P. Wolfram
Laboratory Manager

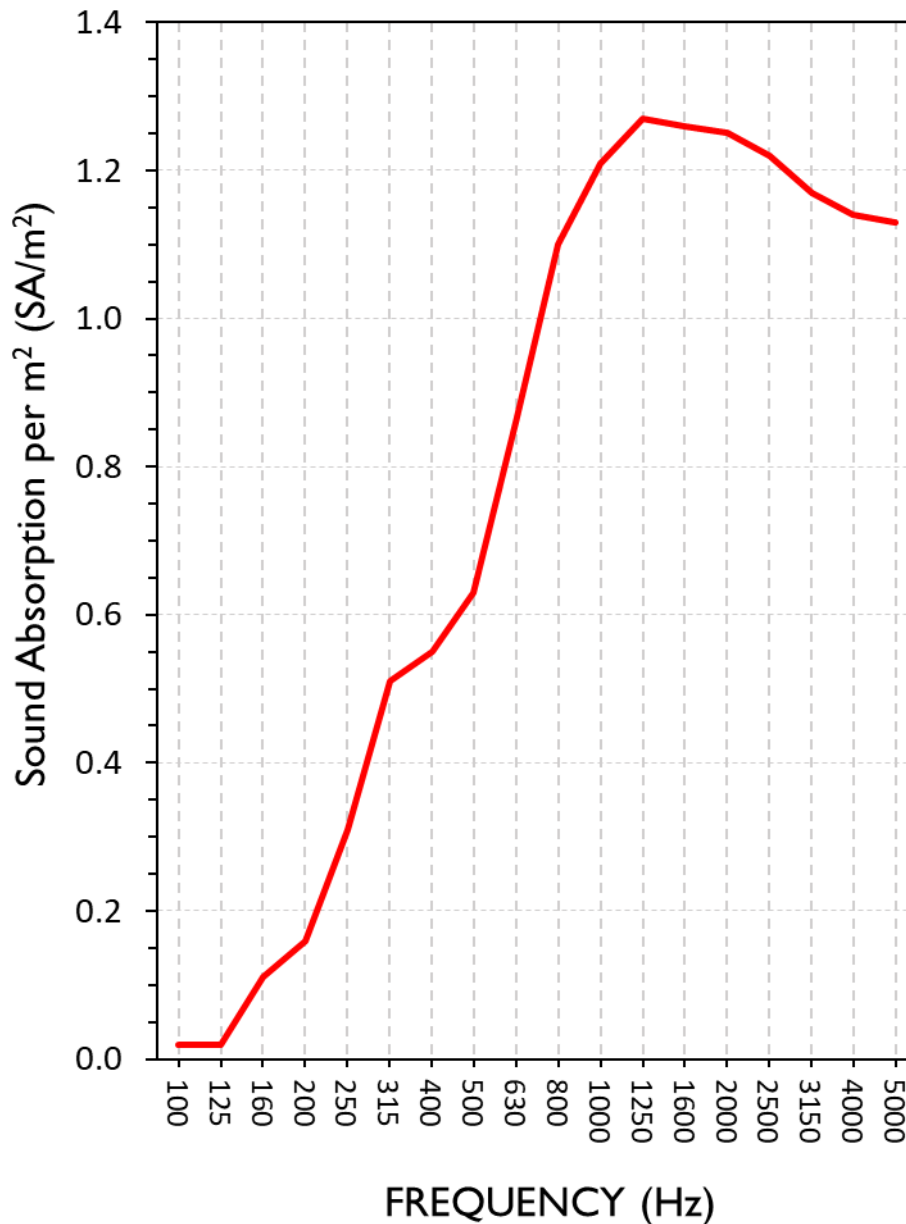
Note: Sound absorption per m² (SA/m²), and therefore the reported Single Number Ratings, are highly dependent on the exact sample shape, size, spacing, and extended continuous surface area present in the test and subsequent calculations. Changes to any of these parameters will change the resulting values. These presented results are valid only for the specific configuration present in this test.

Radial Engineering
2024-12-11

RAL™-A24-473
Page 7 of 9

SOUND ABSORPTION REPORT

Primacoustic - Saturna LP Baffles Paintable Finish (12 objects, 6 rows of 2 objects each, rows spaced 12" apart, objects in each row spaced 12" apart)



Array-NRC 0.85 over 6.30 m² of extended continuous surface area

Array-SAA 0.86 over 6.30 m² of extended continuous surface area



NVLAP LAB CODE 100227-0

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RAL™-A24-473
 Page 8 of 9

APPENDIX A: Extended Frequency Range Data

Specimen: Primacoustic - Saturna LP Baffles Paintable Finish (12 objects, 6 rows of 2 objects each, rows spaced 12” apart, objects in each row spaced 12” 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		α_{array} (Sabins/ft ²)
	(m ²)	(Sabins)	(m ² / Object)	(Sabins / Object)	(SA/m ²)
31.5	0.77	8.28	0.06	0.69	0.12
40	0.12	1.34	0.01	0.11	0.02
50	-0.45	-4.82	-0.04	-0.40	-0.07
63	0.17	1.87	0.01	0.16	0.03
80	0.20	2.11	0.02	0.18	0.03
100	0.10	1.09	0.01	0.09	0.02
125	0.11	1.18	0.01	0.10	0.02
160	0.69	7.42	0.06	0.62	0.11
200	1.00	10.76	0.08	0.90	0.16
250	1.96	21.14	0.16	1.76	0.31
315	3.19	34.36	0.27	2.86	0.51
400	3.46	37.26	0.29	3.11	0.55
500	3.96	42.58	0.33	3.55	0.63
630	5.41	58.28	0.45	4.86	0.86
800	6.91	74.35	0.58	6.20	1.10
1000	7.62	82.01	0.63	6.83	1.21
1250	7.99	85.99	0.67	7.17	1.27
1600	7.93	85.35	0.66	7.11	1.26
2000	7.89	84.90	0.66	7.08	1.25
2500	7.67	82.57	0.64	6.88	1.22
3150	7.37	79.31	0.61	6.61	1.17
4000	7.20	77.51	0.60	6.46	1.14
5000	7.13	76.76	0.59	6.40	1.13
6300	7.24	77.95	0.60	6.50	1.15
8000	7.32	78.83	0.61	6.57	1.16
10000	7.27	78.26	0.61	6.52	1.15
12500	7.53	81.03	0.63	6.75	1.19

Radial Engineering
2024-12-11

RAL™-A24-473
Page 9 of 9

APPENDIX B: Instruments of Traceability

Specimen: Primacoustic - Saturna LP Baffles Paintable Finish (12 objects, 6 rows of 2 objects each, rows spaced 12" apart, objects in each row spaced 12" apart) (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	3160-106974	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: Primacoustic - Saturna LP Baffles Paintable Finish (12 objects, 6 rows of 2 objects each, rows spaced 12" apart, objects in each row spaced 12" apart) (See Full Report)

<u>Date</u>	<u>Revision</u>
2025-01-28	Original report issued

END

BROADWAY Baffles

Array 4

Saturna LP (Paintable Finish)

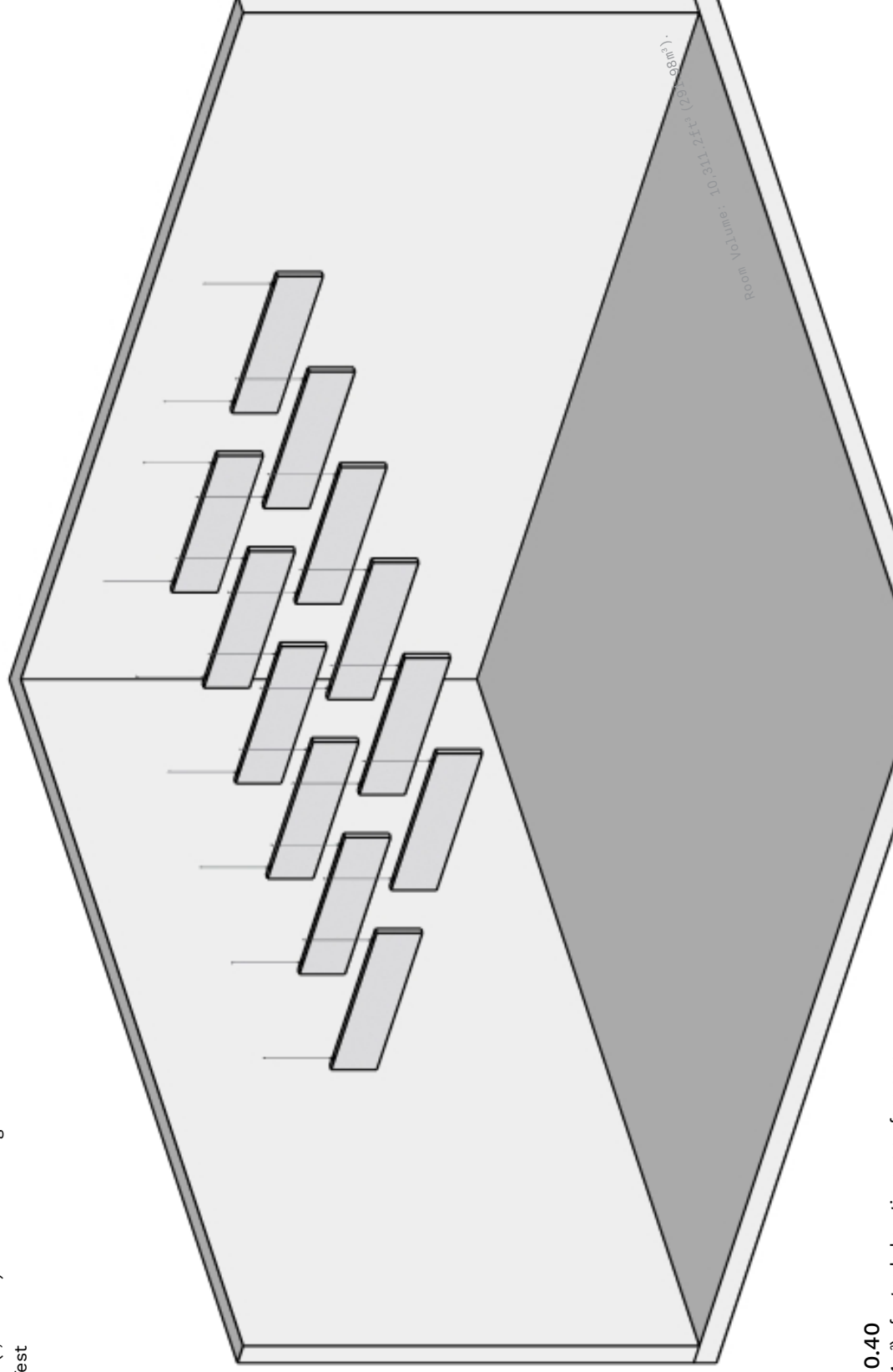
Broadway Saturna Baffles 48 x 12 x 1.5" (1,219 x 305 x 38mm)

2x6 grid, 32" (813mm) between rows

15" (381mm) between panels in row

Suspended 42" (1,067mm) from the ceiling

RAL™ A24-472 Test



Array-NRC: 0.40
over 176.5ft² (16.4m²) of extended continuous surface area



A division of Radial Engineering Ltd.
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Page 1 of 9

ON: Primacoustic - Saturna LP Baffles Paintable Finish (12 objects, 6 rows of 2 objects each, rows spaced 32" apart, objects in each row spaced 15" 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." 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 Primacoustic - Saturna LP Baffles Paintable Finish (12 objects, 6 rows of 2 objects each, rows spaced 32" apart, objects in each row spaced 15" 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

Product Name: Primacoustic - Saturna LP Baffles Paintable Finish
Manufacturer: Radial Engineering

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: Baffles
Dimensions: 12 baffles @ 40.98 mm (1.6135 in.) wide by 1219 mm (48 in.) long
Depth: 305 mm (12 in.)
Overall Weight: 26.54 kg (58.5 lbs)

Radial Engineering
2024-12-11

RAL™-A24-472
Page 2 of 9

SPECIMEN MEASUREMENTS & TEST CONDITIONS (continued)

Physical Measurements (per object)

Dimensions: 0.3 m (12.0 in) wide by 1.22 m (48.0 in) long
Thickness: 0.04 m (1.6135 in)
Weight: 2.21 kg (4.87 lbs)

Test Environment

Room Volume: 291.98 m³
Temperature: 21.1 °C ± 0.1 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity: 56.25 % ± 0.3 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure: 98.3 kPa (Requirement not defined)

Each sound absorbing object had an exposed surface area of 0.868 m² (9.34 ft²). The total exposed surface area of all sound-absorbing objects was 10.4 m² (112 ft²).

MOUNTING METHOD

Type JV-MOD Mounting: The specimen is an array of 12 spaced sound absorbing objects suspended from cables such that the closest face is located approximately 1067 mm (42 in.) from the horizontal test surface. This approximates the mounting method of a typical ceiling baffle installation. The objects were distributed in six rows of two objects each, with rows spaced 813 mm (32 in.) apart and objects in each row spaced 381 mm (15 in.) apart. The width of the installed object array was 4299 mm (169.25 in.) and the length of the installed object array was 2819 mm (111 in.). The area of extended continuous surface attributed to the object array was 16.4 m² (176 ft²).

Radial Engineering
2024-12-11

RAL™-A24-472
Page 3 of 9



Figure 1 – Specimen mounted in test chamber



Figure 2 – Individual specimen object

Radial Engineering
2024-12-11

RAL™-A24-472
Page 4 of 9



Figure 3 – Detail of specimen materials

Radial Engineering
2024-12-11

RAL™-A24-472
Page 5 of 9

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:

α_{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

Radial Engineering
 2024-12-11

RAL™-A24-472
 Page 6 of 9

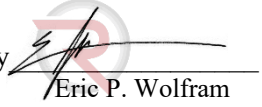
TEST RESULTS (continued)

1/3 Octave Center Frequency (Hz)	Total Absorption		Absorption per Object		α_{array} (Sabins/ft ²) (SA/m ²)
	(m ²)	(Sabins)	(m ² / Object)	(Sabins / Object)	
100	0.06	0.62	0.00	0.05	0.00
** 125	0.34	3.67	0.03	0.31	0.02
160	0.84	9.00	0.07	0.75	0.05
200	0.91	9.81	0.08	0.82	0.06
** 250	1.96	21.11	0.16	1.76	0.12
315	3.10	33.39	0.26	2.78	0.19
400	3.93	42.35	0.33	3.53	0.24
** 500	5.36	57.69	0.45	4.81	0.33
630	6.69	72.03	0.56	6.00	0.41
800	8.60	92.52	0.72	7.71	0.53
** 1000	9.22	99.20	0.77	8.27	0.56
1250	9.48	101.99	0.79	8.50	0.58
1600	9.55	102.82	0.80	8.57	0.58
** 2000	9.42	101.43	0.79	8.45	0.58
2500	9.48	102.05	0.79	8.50	0.58
3150	9.30	100.07	0.77	8.34	0.57
** 4000	9.37	100.81	0.78	8.40	0.57
5000	9.63	103.70	0.80	8.64	0.59

Array-NRC 0.40 over 16.4 m² of extended continuous surface area
Array-SAA 0.40 over 16.4 m² 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 m² (SA/m²), 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.



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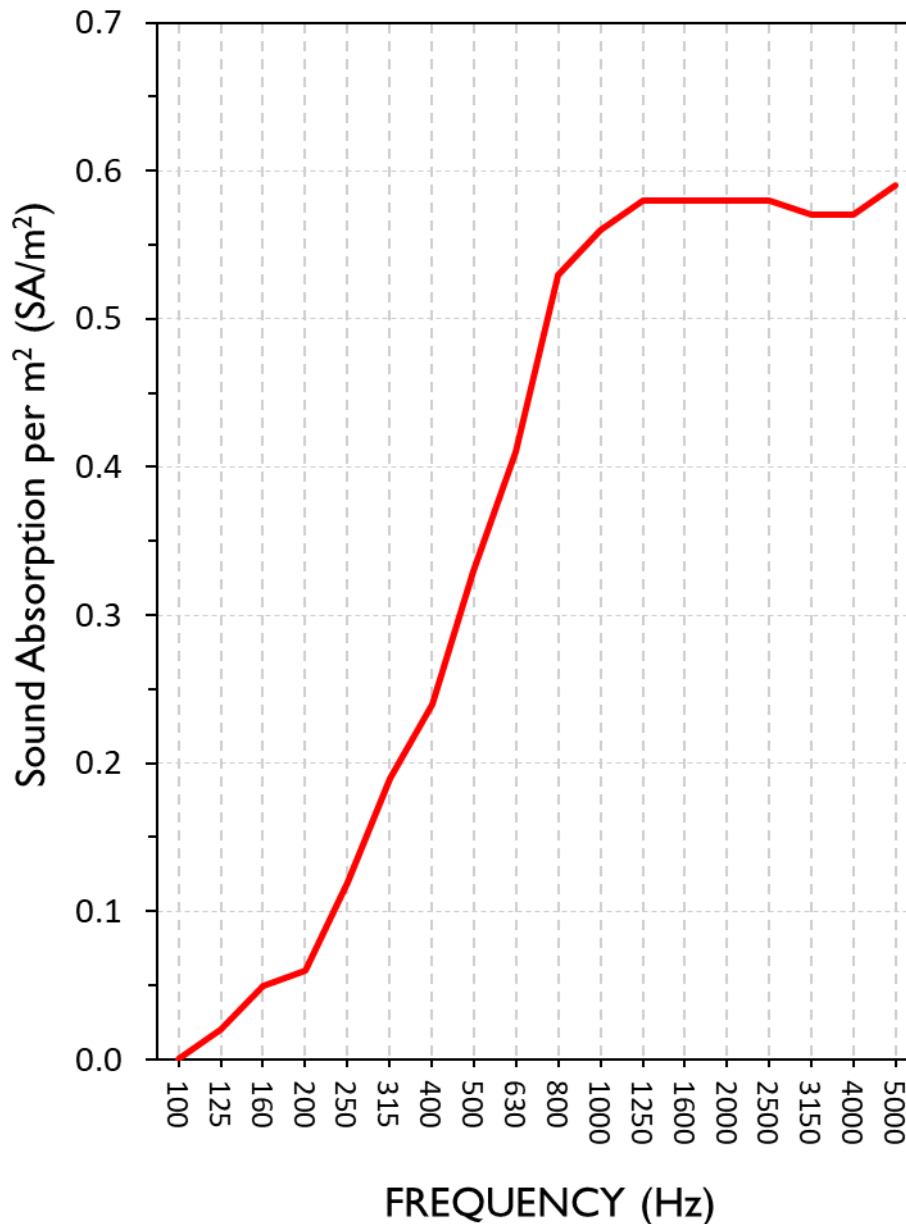
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Radial Engineering
2024-12-11

RAL™-A24-472
Page 7 of 9

SOUND ABSORPTION REPORT

Primacoustic - Saturna LP Baffles Paintable Finish (12 objects, 6 rows of 2 objects each, rows spaced 32" apart, objects in each row spaced 15" apart)



Array-NRC 0.40 over 16.4 m² of extended continuous surface area

Array-SAA 0.40 over 16.4 m² of extended continuous surface area

Radial Engineering
 2024-12-11

RAL™-A24-472
 Page 8 of 9

APPENDIX A: Extended Frequency Range Data

Specimen: Primacoustic - Saturna LP Baffles Paintable Finish (12 objects, 6 rows of 2 objects each, rows spaced 32" apart, objects in each row spaced 15" 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		α_{array} (Sabins/ft ²)
	(m ²)	(Sabins)	(m ² / Object)	(Sabins / Object)	(SA/m ²)
31.5	0.64	6.92	0.05	0.58	0.04
40	0.54	5.79	0.04	0.48	0.03
50	-0.73	-7.81	-0.06	-0.65	-0.04
63	-0.18	-1.93	-0.01	-0.16	-0.01
80	0.98	10.57	0.08	0.88	0.06
100	0.06	0.62	0.00	0.05	0.00
125	0.34	3.67	0.03	0.31	0.02
160	0.84	9.00	0.07	0.75	0.05
200	0.91	9.81	0.08	0.82	0.06
250	1.96	21.11	0.16	1.76	0.12
315	3.10	33.39	0.26	2.78	0.19
400	3.93	42.35	0.33	3.53	0.24
500	5.36	57.69	0.45	4.81	0.33
630	6.69	72.03	0.56	6.00	0.41
800	8.60	92.52	0.72	7.71	0.53
1000	9.22	99.20	0.77	8.27	0.56
1250	9.48	101.99	0.79	8.50	0.58
1600	9.55	102.82	0.80	8.57	0.58
2000	9.42	101.43	0.79	8.45	0.58
2500	9.48	102.05	0.79	8.50	0.58
3150	9.30	100.07	0.77	8.34	0.57
4000	9.37	100.81	0.78	8.40	0.57
5000	9.63	103.70	0.80	8.64	0.59
6300	10.22	110.02	0.85	9.17	0.62
8000	11.76	126.54	0.98	10.55	0.72
10000	12.72	136.88	1.06	11.41	0.78
12500	14.96	160.98	1.25	13.42	0.91



Radial Engineering
2024-12-11

RAL™-A24-472
Page 9 of 9

APPENDIX B: Instruments of Traceability

Specimen: Primacoustic - Saturna LP Baffles Paintable Finish (12 objects, 6 rows of 2 objects each, rows spaced 32" apart, objects in each row spaced 15" apart) (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	3160-106974	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: Primacoustic - Saturna LP Baffles Paintable Finish (12 objects, 6 rows of 2 objects each, rows spaced 32" apart, objects in each row spaced 15" apart) (See Full Report)

<u>Date</u>	<u>Revision</u>
2025-01-28	Original report issued

END