

Acoustic Data

Roof 46300 / 74300

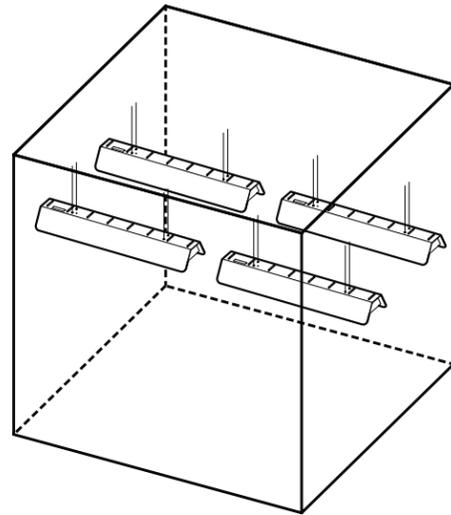
Acoustic test results

The acoustic testing of our fixtures enables us to get data such as the average Sabins per object and the sound absorbing coefficient (Sabins/ft²). One Sabins is the equivalent of 1ft² of perfect sound absorption.

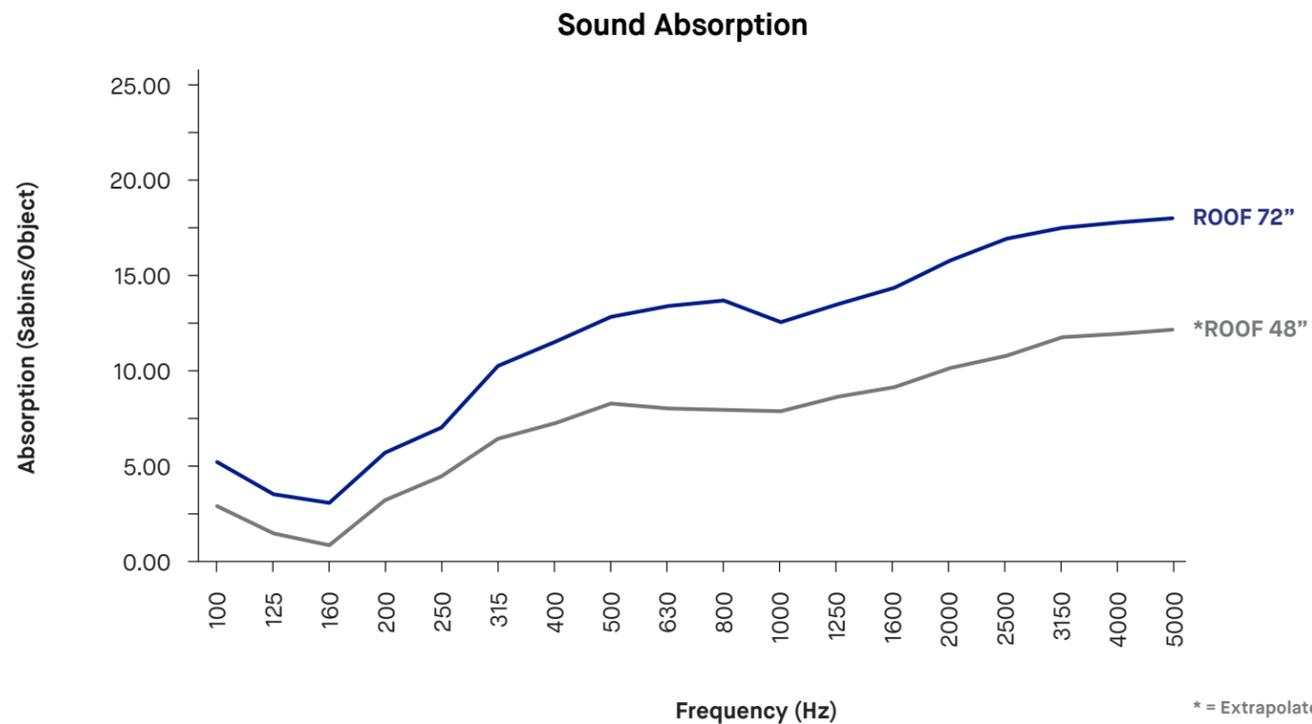
For the ROOF, we tested one variations of the fixture; the ROOF 72”.

These were tested on a square spacing grid of 30” and placed 46.5” from the test surface (ceiling).

ROOF 72” test

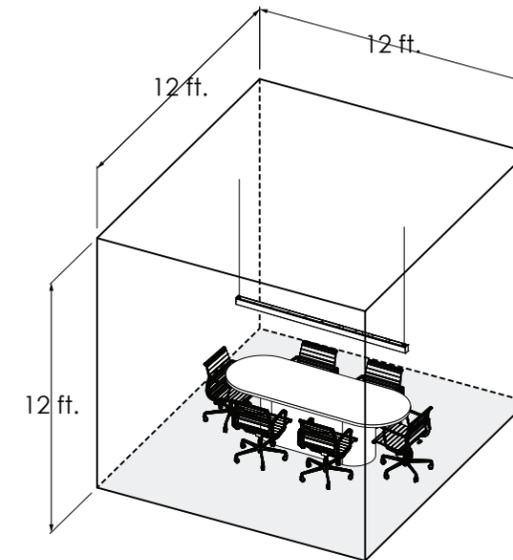


Avg. Absorption per fixture: **13.25 Sabins**



Reverberation time

Based on the test data, we are able to calculate the reverberation time of fixture layouts in a closed room and determine the extra amount (ft²) of sound absorbing material that would be required for a comfortable level. Reverberation time is the calculation of the time it takes for sound to fade by 60 dB in a closed space in seconds. As a reference, the WELL standard recommends a reverberation time of 0.5 seconds for an open office applications and 0.6 seconds for a conference room. Here are two acoustic scenarios using the STROKE & ROOF fixtures.



Scenario 1

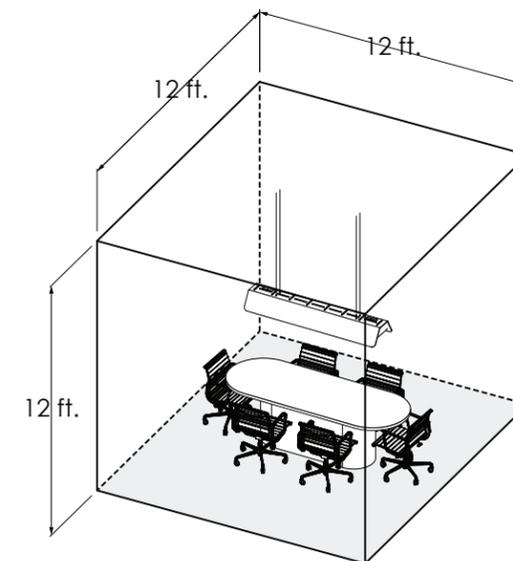
1x pendant STROKE 96”
hanging 96” from the ceiling.

Average workplane illuminance

16 fc

Reverberation time

1.052 seconds



Scenario 2

1x pendant ROOF 72”
hanging 96” from the ceiling.

Average workplane illuminance

19 fc

Reverberation time

0.899 seconds

+17% better acoustics

Carpet on concrete floor
 1/2” sheetrock walls and ceiling

ANNEXES

Roof 74300-72

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Test Report

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SPONSOR: **Eureka Lighting**
Montréal, QC, Canada

Sound Absorption
RAL™-A24-272

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CONDUCTED: 2024-07-09

ON: ROOF (4 units, 2 rows spaced 30" o.c., 2 units per 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 ROOF (4 units, 2 rows spaced 30" o.c., 2 units per 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: ROOF
Product ID: 74300D-72
Frame/Edge Description: CNC-Cut
Core Material: PET felt / PET plastic diffuser film
Core Nominal Thickness: 9mm / 10mil
Core Nominal Density: 1300g/m²
Nominal Dimensions: 9.13" x 17.5" x 72.0"
Manufacturer: Eureka Lighting

SPECIMEN MEASUREMENTS & TEST CONDITIONS

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

Test Specimen

Materials: PET type material, plastic fixture
Dimensions: 4 units @ 445 mm (17.5 in.) wide by 1829 mm (72 in.) long
Depth: With tabs @ 232 mm (9.125 in.)
Without tabs @ 222 mm (8.75 in.)
Overall Weight: 9.53 kg (21 lbs)



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Physical Measurements (per object)

Dimensions: 0.44 m (17.5 in) wide by 1.83 m (72.0 in) long
Thickness: 0.22 m (8.75 in)
Weight: 2.38 kg (5.25 lbs)

Test Environment

Room Volume: 291.98 m³
Temperature: 22.4 °C ± 0.1 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity: 59.4 % ± 4.2 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure: 98.4 kPa (Requirement not defined)

Each sound absorbing object had an exposed surface area of 2.64 m² (28.4 ft²). The total exposed surface area of all sound-absorbing objects was 10.5 m² (114 ft²). Note that for these values, the geometry of the specimen units was simplified to that of rectangular prisms.

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 1181 mm (46.5 in.) from the horizontal test surface. This approximates the mounting method of a typical ceiling baffle installation. The objects were distributed into two rows of two objects each, with rows spaced 762 mm (30 in.) on center, and objects in each row spaced 305 mm (12 in.) apart. The width of the installed object array was 1210 mm (47.625 in.) and the length of the installed object array was 3962 mm (156 in.). The area of extended continuous surface attributed to the object array was 6.52 m² (70.1 ft²).

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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 unit



Figure 4 – Detail of specimen materials

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TEST RESULTS

The preferred presentation of sound absorption test results for arrays of spaced objects is sound absorption (m²) per object and total sound absorption (m²) at each one-third-octave band

ASTM C423-23 Appendix X2 allows calculation of sound absorption per m² (SA/m²) 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, m²
- 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 m² (SA/m²) is calculated based on the following formula:

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

Where:

- α_{array} = sound absorption per m² (SA/m²) of extended continuous surface, no units,
- A_1 = absorption of the empty reverberation room, m² and
- A_2 = absorption of the room after the specimen has been installed, m².
- S_{array} = area of extended continuous surface attributed to the test specimen, m²

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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	1.93	20.74	0.48	5.18	0.30
** 125	1.36	14.62	0.34	3.65	0.21
160	1.30	14.02	0.33	3.50	0.20
200	2.28	24.51	0.57	6.13	0.35
** 250	2.79	30.06	0.70	7.52	0.43
315	3.73	40.14	0.93	10.03	0.57
400	4.19	45.06	1.05	11.27	0.64
** 500	4.84	52.09	1.21	13.02	0.74
630	4.89	52.65	1.22	13.16	0.75
800	4.96	53.36	1.24	13.34	0.76
** 1000	4.78	51.47	1.20	12.87	0.73
1250	4.98	53.60	1.25	13.40	0.76
1600	5.26	56.67	1.32	14.17	0.81
** 2000	5.67	60.98	1.42	15.25	0.87
2500	5.93	63.87	1.48	15.97	0.91
3150	6.27	67.49	1.57	16.87	0.96
** 4000	6.35	68.37	1.59	17.09	0.97
5000	6.65	71.63	1.66	17.91	1.02

Array-NRC 0.70 over 6.52 m² of extended continuous surface area
Array-SAA 0.69 over 6.52 m² of extended continuous surface area

Digitally signed
by Eric P Wolfram
Date: 2024.07.26
11:05:02 -05'00'

Tested by *Marc Sciaky*
Marc Sciaky
Senior Experimentalist

Report by *Keith Kimberling*
Keith Kimberling
Test Engineer

Approved by *Eric P. Wolfram*
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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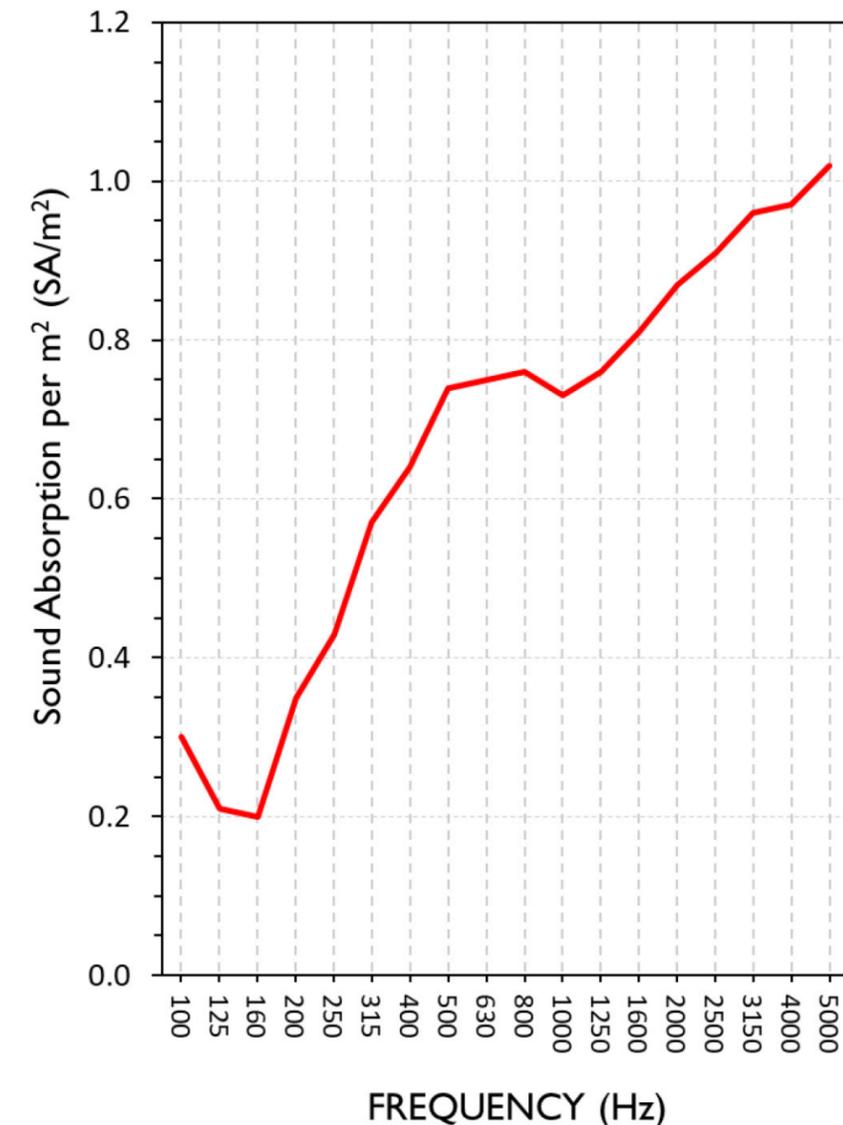
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SOUND ABSORPTION REPORT

ROOF (4 units, 2 rows spaced 30" o.c., 2 units per row spaced 12" apart)



Array-NRC 0.70 over 6.52 m² of extended continuous surface area
Array-SAA 0.69 over 6.52 m² of extended continuous surface area

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APPENDIX A: Extended Frequency Range Data

Specimen: ROOF (4 units, 2 rows spaced 30" o.c., 2 units per 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		C _{array} (Sabins/ft ²) (SA/m ²)
	(m ²)	(Sabins)	(m ² / Object)	(Sabins / Object)	
31.5	0.10	1.11	0.03	0.28	0.02
40	-0.34	-3.70	-0.09	-0.92	-0.05
50	0.29	3.16	0.07	0.79	0.04
63	1.15	12.43	0.29	3.11	0.18
80	1.39	14.99	0.35	3.75	0.21
100	1.93	20.74	0.48	5.18	0.30
125	1.36	14.62	0.34	3.65	0.21
160	1.30	14.02	0.33	3.50	0.20
200	2.28	24.51	0.57	6.13	0.35
250	2.79	30.06	0.70	7.52	0.43
315	3.73	40.14	0.93	10.03	0.57
400	4.19	45.06	1.05	11.27	0.64
500	4.84	52.09	1.21	13.02	0.74
630	4.89	52.65	1.22	13.16	0.75
800	4.96	53.36	1.24	13.34	0.76
1000	4.78	51.47	1.20	12.87	0.73
1250	4.98	53.60	1.25	13.40	0.76
1600	5.26	56.67	1.32	14.17	0.81
2000	5.67	60.98	1.42	15.25	0.87
2500	5.93	63.87	1.48	15.97	0.91
3150	6.27	67.49	1.57	16.87	0.96
4000	6.35	68.37	1.59	17.09	0.97
5000	6.65	71.63	1.66	17.91	1.02
6300	6.94	74.74	1.74	18.69	1.07
8000	7.60	81.85	1.90	20.46	1.17
10000	7.51	80.79	1.88	20.20	1.15
12500	8.10	87.14	2.02	21.79	1.24

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APPENDIX B: Instruments of Traceability

Specimen: ROOF (4 units, 2 rows spaced 30" o.c., 2 units per row spaced 12" apart) (See Full Report)

Description	Model	Serial Number	Date of Certification	Calibration Due
System 1	Type 3160-A-042	3160-106968	2023-07-17	2024-07-17
Bruel & Kjaer Mic And Preamp D	Type 4943-B-001	2311440	2023-12-20	2024-12-20
Bruel & Kjaer Pistonphone	Type 4228	2781248	2023-07-12	2024-07-12
EXTECH Hygro 959	SD700	A099959	2024-03-29	2025-03-29

APPENDIX C: Revisions to Original Test Report

Specimen: ROOF (4 units, 2 rows spaced 30" o.c., 2 units per row spaced 12" apart) (See Full Report)

Date	Revision
2024-07-25	Original report issued

END

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