

Acoustics

Atoll 3851 / 4851

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.

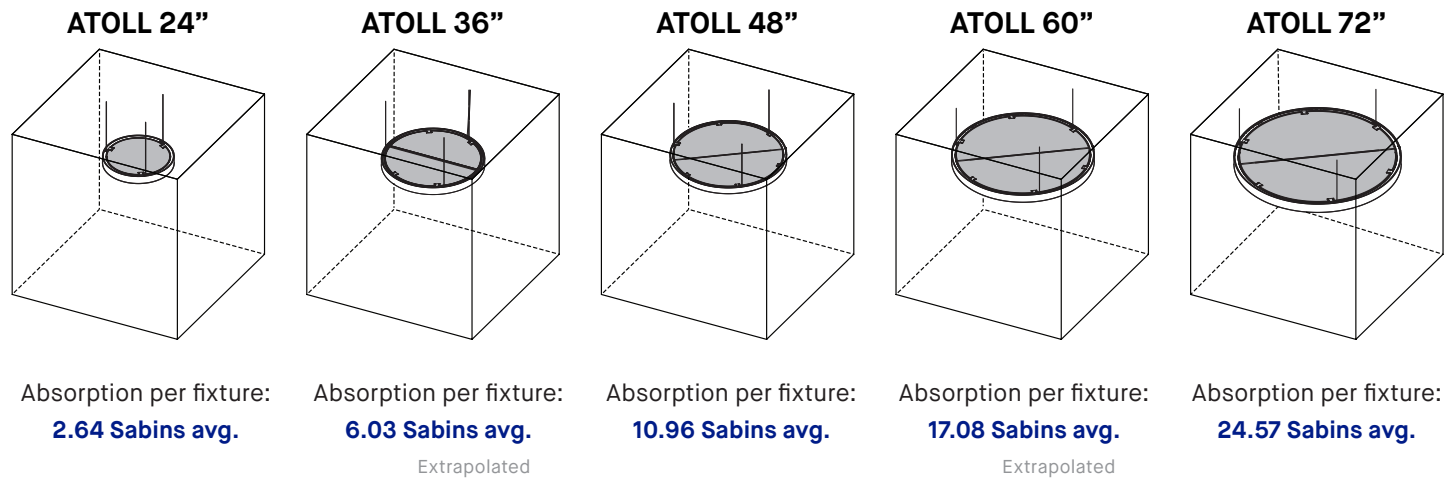
For the Atoll, we tested three sizes of the acoustics; the 24", 48" and the 72".

For the Ø24", a quantity of 15 were suspended in a 3x5 horizontal grid 12" apart at 56" from the test surface (ceiling).

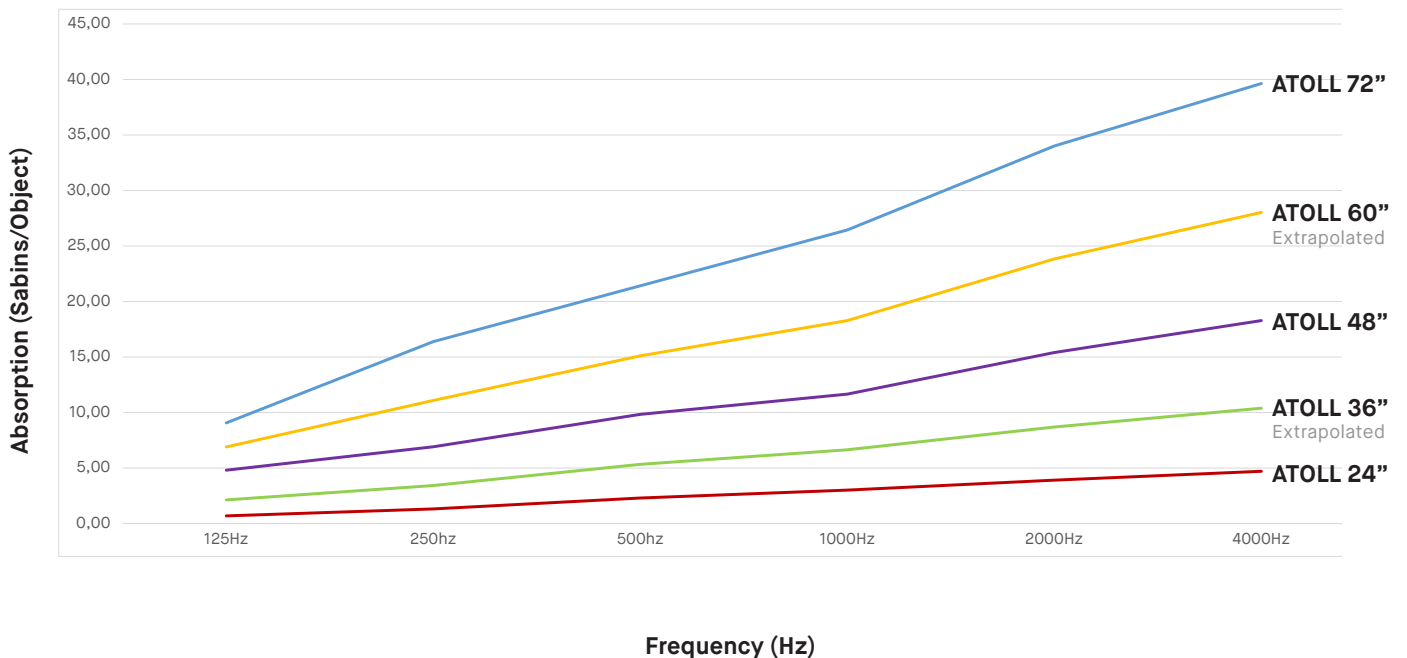
For the Ø48", a quantity of 4 were suspended in a 2x2 horizontal grid 24" apart at 58" from the test surface (ceiling).

For the Ø72", a quantity of 2 were suspended in a row 24" apart at 57" from the test surface (ceiling).

For more details please refer to Acoustic Lab results (link on product page).

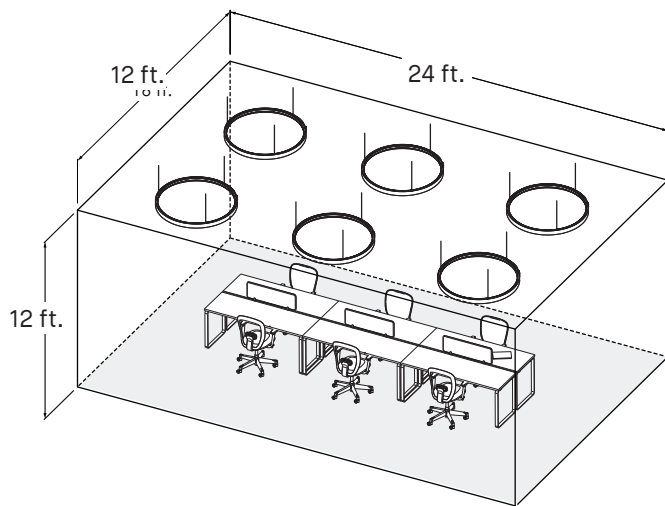


Sound Absorption



Reverberation time

Based on the test data, we are able to calculate the reverberation time of fixture layouts in a sample room and determine the improvement using the acoustic option. 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. Below is a scenario using the acoustic version of the luminaire demonstrating the improvement in reverberation time.



Scenario 1

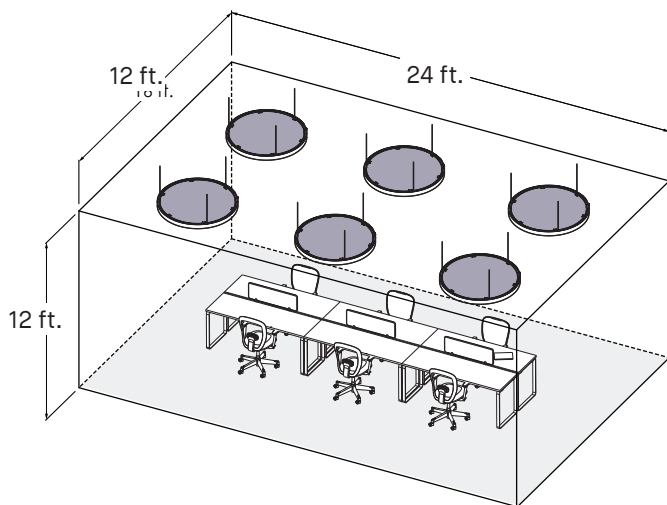
6X ATOLL 48" (4850-48) spaced 8 feet apart, suspended 36" from ceiling.

Average workplane illuminance

25 foot-candles

Reverberation time

1.29 seconds



Scenario 2

6X ATOLL acoustic 48" (4851-48) spaced 8 feet apart, suspended 36" from ceiling. The surface mounted ATOLL acoustic (3851-48) would obtain similar results.

Average workplane illuminance


25 foot-candles


Reverberation time (less is better)

0.945 seconds (reduced with acoustic)

Improvement

+36% better acoustics

 Carpet on concrete floor

 1/2" sheetrock walls and ceiling

[SEE THE ACOUSTIC DATA DOCUMENT ON OUR WEBSITE FOR MORE INFORMATION](#)

Résultats des tests acoustiques

Les tests acoustiques de nos luminaires nous permettent d'obtenir des données telles que la moyenne des Sabins par objet et le coefficient d'absorption sonore (Sabins/pi²). Un Sabin équivaut à 1 pi² d'absorption sonore parfaite.

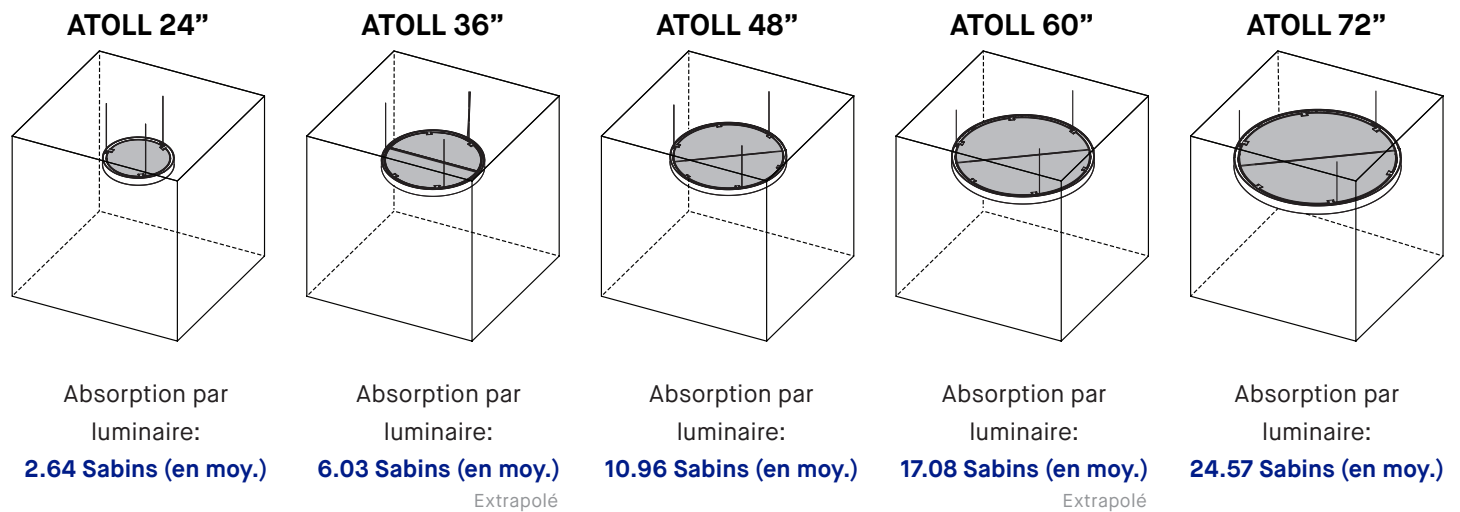
Pour l'Atoll, nous avons testé trois tailles d'acoustique : 24 po, 48 po et 72 po.

Pour le modèle Ø24 po, une quantité de 15 luminaires a été suspendue dans une grille horizontale de 3x5, espacée de 12 po à une hauteur de 56 po par rapport à la surface de test (plafond).

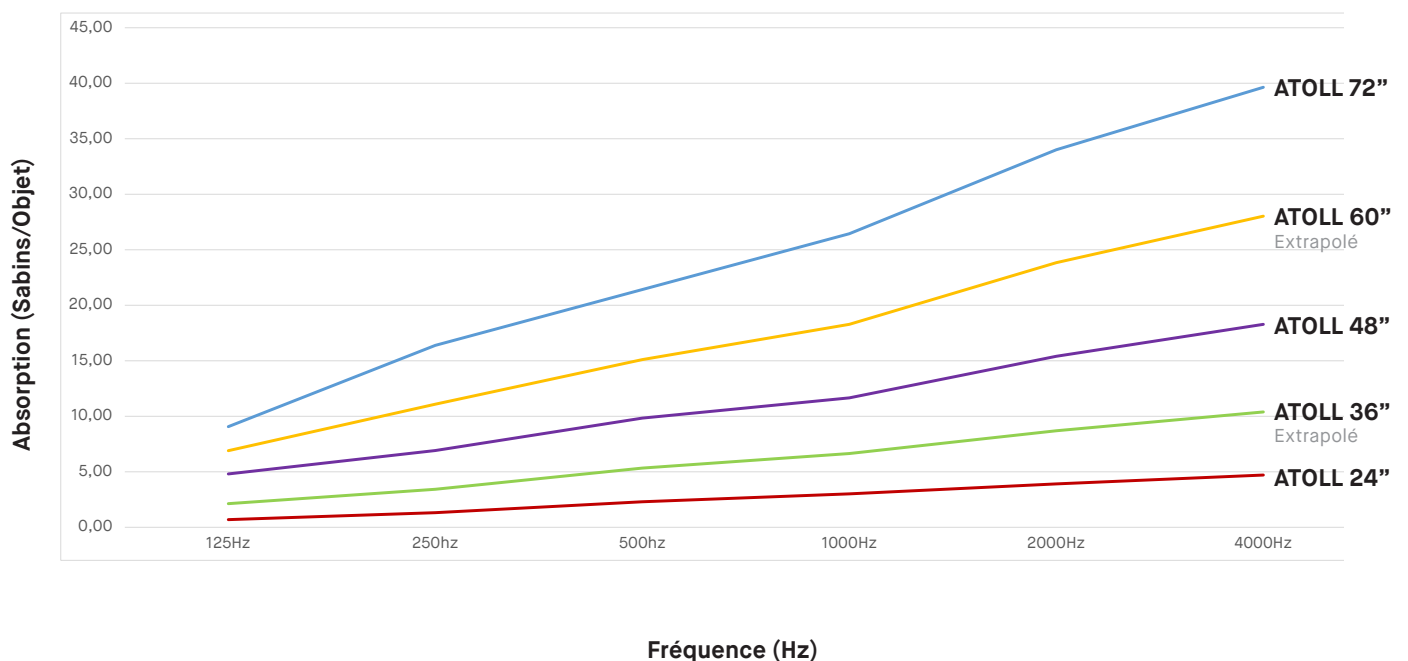
Pour le modèle Ø48 po, une quantité de 4 luminaires a été suspendue dans une grille horizontale de 2x2, espacée de 24 po à une hauteur de 58 po par rapport à la surface de test (plafond).

Pour le modèle Ø72 po, une quantité de 2 luminaires a été suspendue en ligne, espacée de 24 po à une hauteur de 57 po par rapport à la surface de test (plafond).

Pour plus de détails, veuillez vous référer aux résultats du laboratoire acoustique (lien sur la page du produit).

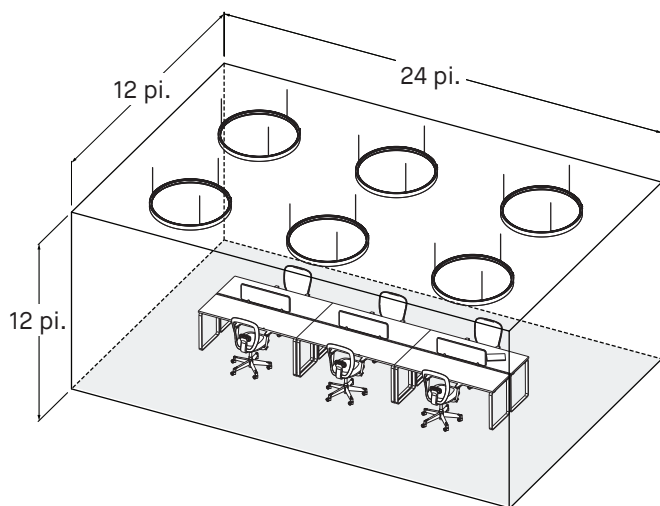


Absorption sonore



Temps de réverbération

À partir des données de test, nous sommes en mesure de calculer le temps de réverbération des dispositions de luminaires dans une salle d'échantillonnage et de déterminer l'amélioration grâce à l'option acoustique. Le temps de réverbération est le calcul du temps nécessaire pour que le son s'atténue de 60 dB dans un espace clos, en secondes. À titre de référence, la norme WELL recommande un temps de réverbération de 0,5 seconde pour les applications en espace ouvert et de 0,6 seconde pour une salle de conférence. Voici un scénario utilisant la version acoustique du luminaire pour démontrer l'amélioration du temps de réverbération.

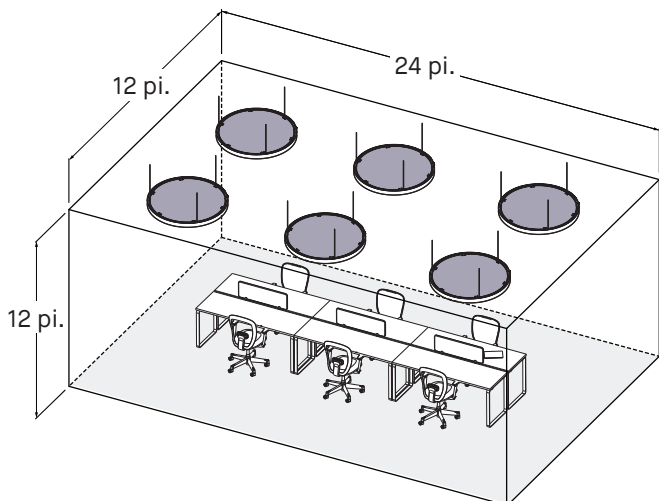


Scénario 1

6X ATOLL 48" (4850-48) espacés de 8 pieds l'un de l'autre, suspendus à 36 pouces du plafond.

Éclairage moyen du plan de travail
25 pieds-bougies

Temps de réverbération
1.29 secondes





Scénario 2

6X ATOLL acoustique 48" (4851-48) espacés de 8 pieds l'un de l'autre, suspendus à 36 pouces du plafond. Le modèle ATOLL acoustique monté en surface (3851-48) obtiendrait des résultats similaires.

Éclairage moyen du plan de travail
25 pieds-bougies

Temps de réverbération
(moins c'est mieux)
0.945 secondes
(réduites avec l'acoustique)
Amélioration
+36% meilleure acoustique

 Tapis sur un sol en béton

 Murs et plafond en plaques de plâtre de 1/2 pouce

CONSULTEZ LE DOCUMENT DE DONNÉES ACOUSTIQUES SUR NOTRE SITE WEB POUR PLUS D'INFORMATIONS

1512 S BATAVIA AVENUE
GENEVA, IL 60134
630-232-0104

Test Report

www.riverbankacoustics.com

FOUNDED 1918 BY
WALLACE CLEMENT SABINE

SPONSOR: **EUREKA**
Montréal, QC, Canada

Sound Absorption
RAL™-A23-121

CONDUCTED: 2023-05-03

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ON: 24" Diameter Felt Disc (5 rows of 3 baffles each, rows and baffles spaced 305 mm (12 in.) 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 24" Diameter Felt Disc (5 rows of 3 baffles each, rows and baffles spaced 305 mm (12 in.) 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: ACOUSTIC ACCESSORY – DISK -24
Material: Felt
Manufacturer: Eureka

SPECIMEN MEASUREMENTS & TEST CONDITIONS

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

Test Specimen

Materials: Felt baffles
Dimensions: 15 baffles @ 606 mm (23.875 in.) diameter
Thickness: 9.22 mm (0.363 in.)
Overall Weight: 6.46 kg (14.25 lbs)

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Physical Measurements (per object)

Dimensions: 0.61 m (23.875 in) wide by 0.61 m (23.875 in) long
Thickness: 0.01 m (0.363 in)
Weight: 0.43 kg (0.95 lbs)

Test Environment

Room Volume: 291.98 m³
Temperature: 17.4 °C ± 0.0 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity: 47.9 % ± 0.6 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure: 98.5 kPa (Requirement not defined)

Each sound absorbing object had an exposed surface area of 0.595 m² (6.41 ft²). The total exposed surface area of all sound-absorbing objects was 8.93 m² (96.1 ft²).

MOUNTING METHOD

Type JH-MOD Mounting: The specimen is an array of 15 spaced sound absorbing objects suspended from cables such that the closest face is located approximately 1486 mm (58.5 in.) from the horizontal test surface. This approximates the mounting method of a typical ceiling baffle installation. The objects were distributed in five (5) rows of three (3) objects each. Rows and the objects in each row were spaced 305 mm (12 in.) apart. The width of the installed object array was 4261 mm (167.75 in.) and the length of the installed object array was 2429 mm (95.625 in.). The area of extended continuous surface attributed to the object array was 12.5 m² (134 ft²).

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Figure 1 – Specimen mounted in test chamber



Figure 2 – Individual specimen baffle

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Figure 3 – Detail of specimen material

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2023-05-03**RAL™-A23-121**
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 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

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TEST RESULTS (continued)

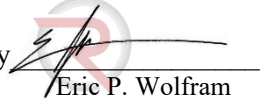
1/3 Octave Center Frequency (Hz)	Total Absorption		Absorption per Object		α_{array} (Sabins/ft ²) (SA/m ²)
	(m ²)	(Sabins)	(m ² / Object)	(Sabins / Object)	
100	0.37	3.99	0.02	0.27	0.03
** 125	0.98	10.56	0.07	0.70	0.08
160	1.20	12.91	0.08	0.86	0.10
200	2.04	21.91	0.14	1.46	0.16
** 250	1.85	19.96	0.12	1.33	0.15
315	2.77	29.83	0.18	1.99	0.22
400	2.79	29.98	0.19	2.00	0.22
** 500	3.21	34.59	0.21	2.31	0.26
630	3.48	37.45	0.23	2.50	0.28
800	3.90	41.99	0.26	2.80	0.31
** 1000	4.20	45.26	0.28	3.02	0.34
1250	4.64	49.98	0.31	3.33	0.37
1600	5.05	54.31	0.34	3.62	0.40
** 2000	5.45	58.67	0.36	3.91	0.44
2500	5.91	63.64	0.39	4.24	0.47
3150	6.34	68.29	0.42	4.55	0.51
** 4000	6.57	70.75	0.44	4.72	0.53
5000	7.14	76.84	0.48	5.12	0.57

Array-NRC 0.30 over 12.5 m² of extended continuous surface area

Array-SAA 0.30 over 12.5 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

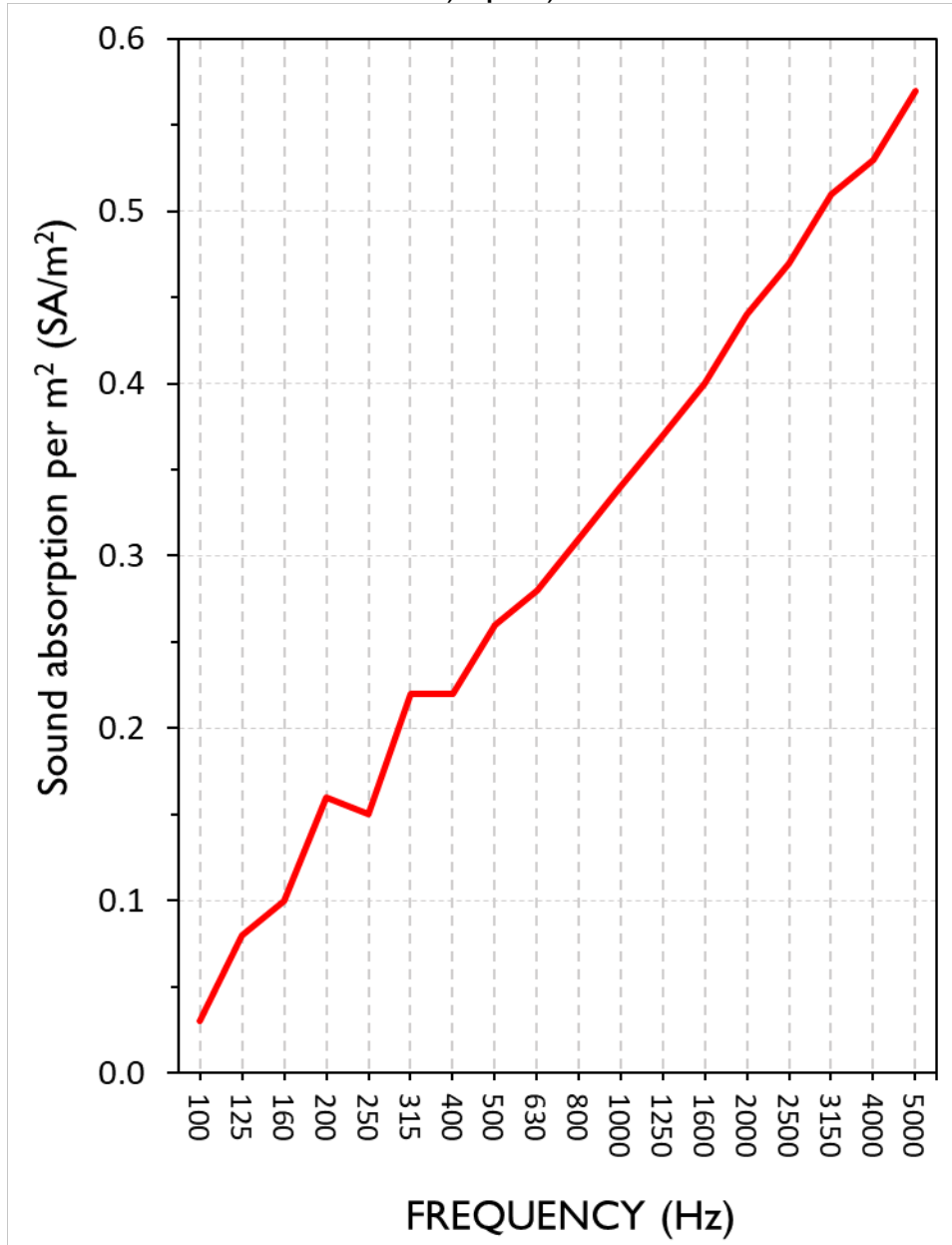
Note: Sound absorption per m² (SA/m²), and therefore the reported Single Number Ratings, are highly dependent on the exact sample shape, size, spacing, and extended continuous surface area present in the test and subsequent calculations. Changes to any of these parameters will change the resulting values.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

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SOUND ABSORPTION REPORT

24" Diameter Felt Disc (5 rows of 3 baffles each, rows and baffles spaced 305 mm (12 in.) apart)



Array-NRC 0.30 over 12.5 m² of extended continuous surface area

Array-SAA 0.30 over 12.5 m² of extended continuous surface area



NVLAP LAB CODE 100227-0

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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APPENDIX A: Extended Frequency Range Data

Specimen: 24" Diameter Felt Disc (5 rows of 3 baffles each, rows and baffles spaced 305 mm (12 in.) 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) (SA/m ²)
	(m ²)	(Sabins)	(m ² / Object)	(Sabins / Object)	
31.5	0.32	3.44	0.02	0.23	0.03
40	0.51	5.48	0.03	0.37	0.04
50	1.01	10.92	0.07	0.73	0.08
63	0.67	7.23	0.04	0.48	0.05
80	0.95	10.26	0.06	0.68	0.08
100	0.37	3.99	0.02	0.27	0.03
125	0.98	10.56	0.07	0.70	0.08
160	1.20	12.91	0.08	0.86	0.10
200	2.04	21.91	0.14	1.46	0.16
250	1.85	19.96	0.12	1.33	0.15
315	2.77	29.83	0.18	1.99	0.22
400	2.79	29.98	0.19	2.00	0.22
500	3.21	34.59	0.21	2.31	0.26
630	3.48	37.45	0.23	2.50	0.28
800	3.90	41.99	0.26	2.80	0.31
1000	4.20	45.26	0.28	3.02	0.34
1250	4.64	49.98	0.31	3.33	0.37
1600	5.05	54.31	0.34	3.62	0.40
2000	5.45	58.67	0.36	3.91	0.44
2500	5.91	63.64	0.39	4.24	0.47
3150	6.34	68.29	0.42	4.55	0.51
4000	6.57	70.75	0.44	4.72	0.53
5000	7.14	76.84	0.48	5.12	0.57
6300	7.25	78.08	0.48	5.21	0.58
8000	7.68	82.63	0.51	5.51	0.62
10000	7.57	81.50	0.50	5.43	0.61
12500	8.18	88.01	0.55	5.87	0.66



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APPENDIX B: Instruments of Traceability

Specimen: 24" Diameter Felt Disc (5 rows of 3 baffles each, rows and baffles spaced 305 mm (12 in.) 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	3160-106968	2022-07-12	2023-07-12
Bruel & Kjaer Mic And Preamp D	Type 4943-B-001	2311440	2022-09-28	2023-09-28
Bruel & Kjaer Pistonphone	Type 4228	2781248	2022-07-22	2023-07-22
EXTECH Hygro 639	SD700	A.103639	2022-12-07	2023-12-07

APPENDIX C: Revisions to Original Test Report

Specimen: 24" Diameter Felt Disc (5 rows of 3 baffles each, rows and baffles spaced 305 mm (12 in.) apart) (See Full Report)

<u>Date</u>	<u>Revision</u>
2023-05-15	Original report issued
2023-05-23	Page 1: Product name changed from "SLIM RING 4851-24" to "ACOUSTIC ACCESSORY – DISK -24" -EPW

END

SPONSOR: **EUREKA**
Montréal, QC, Canada

Sound Absorption
RAL™-A23-122

CONDUCTED: 2023-05-04

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ON: 48" Diameter Felt Disc (2 rows of 2 baffles each, rows and baffles spaced 610 mm (24 in.) 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 48" Diameter Felt Disc (2 rows of 2 baffles each, rows and baffles spaced 610 mm (24 in.) 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: ACOUSTIC ACCESSORY – DISK -48
Material: Felt
Manufacturer: Eureka

SPECIMEN MEASUREMENTS & TEST CONDITIONS

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

Test Specimen

Materials: Felt baffles
Dimensions: 4 baffles @ 1216 mm (47.875 in.) diameter
Thickness: 9.5 mm (0.374 in.)
Overall Weight: 6.92 kg (15.25 lbs)

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Physical Measurements (per object)

Dimensions: 1.22 m (47.875 in) wide by 1.22 m (47.875 in) long
Thickness: 0.01 m (0.374 in)
Weight: 1.73 kg (3.81 lbs)

Test Environment

Room Volume: 291.98 m³
Temperature: 16.6 °C ± 0.1 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity: 49.15 % ± 0.5 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure: 98.9 kPa (Requirement not defined)

Each sound absorbing object had an exposed surface area of 2.36 m² (25.4 ft²). The total exposed surface area of all sound-absorbing objects was 9.44 m² (102 ft²).

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 1480 mm (58.25 in.) from the horizontal test surface. This approximates the mounting method of a typical ceiling baffle installation. The objects were distributed in two (2) rows of two (2) objects each. Rows and the objects in each row were spaced 610 mm (24 in.) apart. The width of the installed object array was 3042 mm (119.75 in.) and the length of the installed object array was 3042 mm (119.75 in.). The area of extended continuous surface attributed to the object array was 13.3 m² (144 ft²).

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Figure 1 – Specimen mounted in test chamber



Figure 2 – Individual specimen baffle

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Figure 3 – Detail of specimen material

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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 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

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TEST RESULTS (continued)

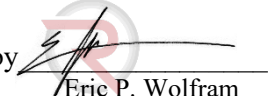
1/3 Octave Center Frequency (Hz)	Total Absorption		Absorption per Object		α_{array} (Sabins/ft ²) (SA/m ²)
	(m ²)	(Sabins)	(m ² / Object)	(Sabins / Object)	
100	1.39	14.95	0.35	3.74	0.10
** 125	1.80	19.36	0.45	4.84	0.13
160	1.80	19.40	0.45	4.85	0.14
200	2.67	28.79	0.67	7.20	0.20
** 250	2.57	27.69	0.64	6.92	0.19
315	3.21	34.55	0.80	8.64	0.24
400	3.28	35.28	0.82	8.82	0.25
** 500	3.65	39.34	0.91	9.83	0.27
630	3.89	41.92	0.97	10.48	0.29
800	3.99	42.93	1.00	10.73	0.30
** 1000	4.34	46.67	1.08	11.67	0.33
1250	4.82	51.93	1.21	12.98	0.36
1600	5.41	58.23	1.35	14.56	0.41
** 2000	5.73	61.67	1.43	15.42	0.43
2500	6.29	67.65	1.57	16.91	0.47
3150	6.35	68.39	1.59	17.10	0.48
** 4000	6.80	73.16	1.70	18.29	0.51
5000	7.07	76.06	1.77	19.01	0.53

Array-NRC 0.30 over 13.3 m² of extended continuous surface area

Array-SAA 0.31 over 13.3 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.

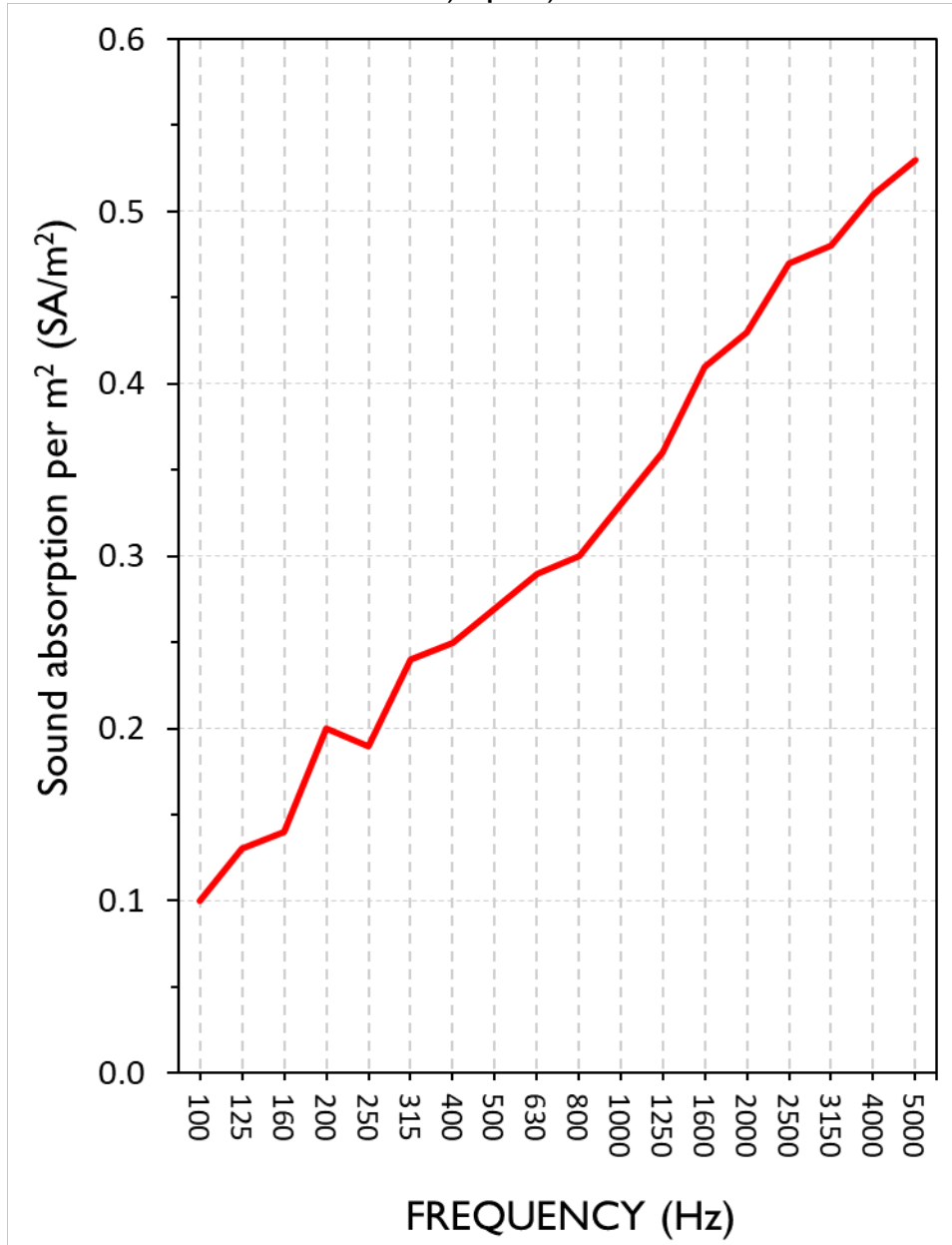
Test Report

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SOUND ABSORPTION REPORT

48" Diameter Felt Disc (2 rows of 2 baffles each, rows and baffles spaced 610 mm (24 in.) apart)



Array-NRC 0.30 over 13.3 m² of extended continuous surface area

Array-SAA 0.31 over 13.3 m² of extended continuous surface area



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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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APPENDIX A: Extended Frequency Range Data

Specimen: 48" Diameter Felt Disc (2 rows of 2 baffles each, rows and baffles spaced 610 mm (24 in.) 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	-0.29	-3.09	-0.07	-0.77	-0.02
40	-0.14	-1.52	-0.04	-0.38	-0.01
50	0.20	2.11	0.05	0.53	0.01
63	1.11	11.91	0.28	2.98	0.08
80	0.87	9.35	0.22	2.34	0.07
100	1.39	14.95	0.35	3.74	0.10
125	1.80	19.36	0.45	4.84	0.13
160	1.80	19.40	0.45	4.85	0.14
200	2.67	28.79	0.67	7.20	0.20
250	2.57	27.69	0.64	6.92	0.19
315	3.21	34.55	0.80	8.64	0.24
400	3.28	35.28	0.82	8.82	0.25
500	3.65	39.34	0.91	9.83	0.27
630	3.89	41.92	0.97	10.48	0.29
800	3.99	42.93	1.00	10.73	0.30
1000	4.34	46.67	1.08	11.67	0.33
1250	4.82	51.93	1.21	12.98	0.36
1600	5.41	58.23	1.35	14.56	0.41
2000	5.73	61.67	1.43	15.42	0.43
2500	6.29	67.65	1.57	16.91	0.47
3150	6.35	68.39	1.59	17.10	0.48
4000	6.80	73.16	1.70	18.29	0.51
5000	7.07	76.06	1.77	19.01	0.53
6300	7.49	80.66	1.87	20.16	0.56
8000	7.80	84.01	1.95	21.00	0.59
10000	7.75	83.46	1.94	20.86	0.58
12500	7.82	84.15	1.95	21.04	0.59



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APPENDIX B: Instruments of Traceability

Specimen: 48” Diameter Felt Disc (2 rows of 2 baffles each, rows and baffles spaced 610 mm (24 in.) 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	3160-106968	2022-07-12	2023-07-12
Bruel & Kjaer Mic And Preamp D	Type 4943-B-001	2311440	2022-09-28	2023-09-28
Bruel & Kjaer Pistonphone	Type 4228	2781248	2022-07-22	2023-07-22
EXTECH Hygro 639	SD700	A.103639	2022-12-07	2023-12-07

APPENDIX C: Revisions to Original Test Report

Specimen: 48” Diameter Felt Disc (2 rows of 2 baffles each, rows and baffles spaced 610 mm (24 in.) apart) (See Full Report)

<u>Date</u>	<u>Revision</u>
2023-05-15	Original report issued
2023-05-23	Page 1: Product name changed from “SLIM RING 4851-48” to “ACOUSTIC ACCESSORY – DISK -48” -EPW

END

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Sound Absorption
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ON: 72" Diameter Felt Disc (1 row of 2 baffles spaced 610 mm (24 in.) 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 72" Diameter Felt Disc. 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: ACOUSTIC ACCESSORY – DISK -72
Material: Felt
Manufacturer: Eureka

SPECIMEN MEASUREMENTS & TEST CONDITIONS

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

Test Specimen

Materials: Felt baffles
Dimensions: 2 baffles @ 1826 mm (71.875 in.) diameter
Thickness: 9.14 mm (0.36 in.)
Overall Weight: 10.89 kg (24 lbs)

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Physical Measurements (per object)

Dimensions: 1.83 m (71.875 in) wide by 1.83 m (71.875 in) long
Thickness: 0.01 m (0.36 in)
Weight: 5.44 kg (12.0 lbs)

Test Environment

Room Volume: 291.98 m³
Temperature: 16.7 °C ± 0.0 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity: 48.8 % ± 0.4 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure: 98.8 kPa (Requirement not defined)

Each sound absorbing object had an exposed surface area of 5.29 m² (56.9 ft²). The total exposed surface area of all sound-absorbing objects was 10.6 m² (114 ft²).

MOUNTING METHOD

Type JH-MOD Mounting: The specimen is an array of 2 spaced sound absorbing objects suspended from cables such that the closest face is located approximately 1454 mm (57.25 in.) from the horizontal test surface. This approximates the mounting method of a typical ceiling baffle installation. The objects were evenly distributed in a single row, spaced 610 mm (24 in.) apart. The width of the installed object array was 4261 mm (167.75 in.) and the length of the installed object array was 1826 mm (71.875 in.). The area of extended continuous surface attributed to the object array was 10.4 m² (111 ft²).

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Figure 1 – Specimen mounted in test chamber



Figure 2 – Individual specimen baffle

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Figure 3 – Detail of specimen material

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Page 5 of 9TEST 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 the following procedure:

$S_{array} = (w + w_1) \times (l + 0.3)$ If the set of objects consists of a single row of equal sized objects with equal space between each. (ASTM E423-23 X.2.3.2)

Where:

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

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

w_1 = the distance between objects in the array along the width, in meters

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

Note: A standard distance of 0.3 meters is added to the array length to account for the assumed area between this set of objects and an adjacent array of objects.

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

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TEST RESULTS (continued)

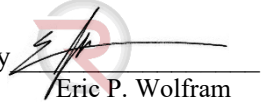
1/3 Octave Center Frequency (Hz)	Total Absorption		Absorption per Object		α_{array} (Sabins/ft ²) (SA/m ²)
	(m ²)	(Sabins)	(m ² / Object)	(Sabins / Object)	
100	2.25	24.24	1.13	12.12	0.22
** 125	1.69	18.16	0.84	9.08	0.16
160	2.08	22.38	1.04	11.19	0.20
200	3.06	32.96	1.53	16.48	0.30
** 250	3.05	32.79	1.52	16.39	0.29
315	3.70	39.81	1.85	19.90	0.36
400	3.69	39.71	1.84	19.86	0.36
** 500	3.98	42.84	1.99	21.42	0.38
630	4.22	45.45	2.11	22.73	0.41
800	4.57	49.19	2.29	24.60	0.44
** 1000	4.92	52.91	2.46	26.45	0.47
1250	5.33	57.40	2.67	28.70	0.52
1600	5.80	62.44	2.90	31.22	0.56
** 2000	6.32	68.01	3.16	34.01	0.61
2500	6.76	72.81	3.38	36.40	0.65
3150	6.99	75.20	3.49	37.60	0.67
** 4000	7.36	79.28	3.68	39.64	0.71
5000	7.77	83.66	3.89	41.83	0.75

Array-NRC 0.45 over 10.4 m² of extended continuous surface area

Array-SAA 0.45 over 10.4 m² of extended continuous surface area

Tested by 
Marc Sciaky
Senior Experimentalist

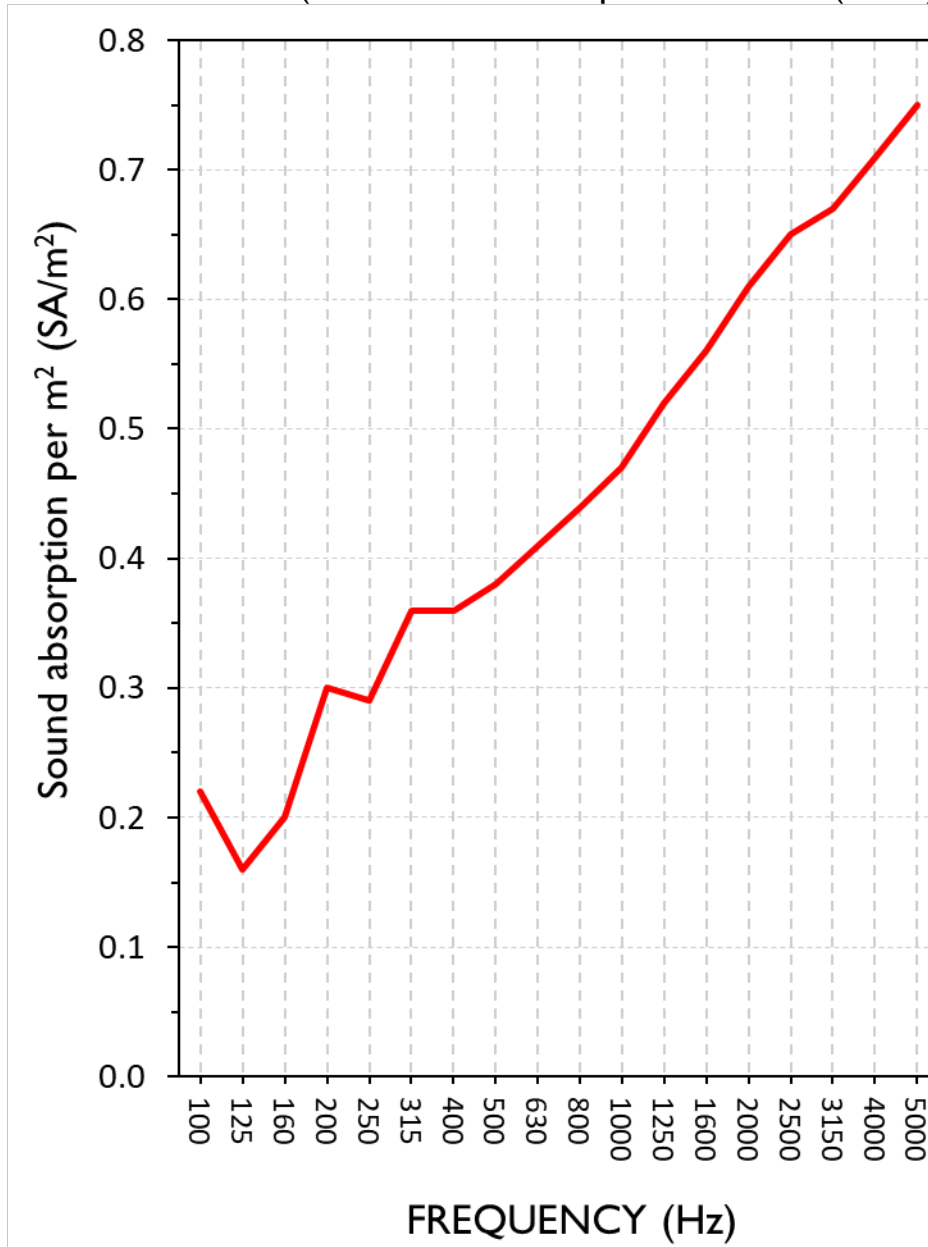
Report by 
Keith Kimberling
Test Engineer

Approved by 
Eric P. Wolfram
Laboratory Manager

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SOUND ABSORPTION REPORT

72" Diameter Felt Disc (1 row of 2 baffles spaced 610 mm (24 in.) apart)



Array-NRC 0.45 over 10.4 m² of extended continuous surface area
Array-SAA 0.45 over 10.4 m² of extended continuous surface area



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APPENDIX A: Extended Frequency Range Data

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31.5	0.01	0.06	0.00	0.03	0.00
40	0.66	7.09	0.33	3.55	0.06
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63	1.81	19.50	0.91	9.75	0.17
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4000	7.36	79.28	3.68	39.64	0.71
5000	7.77	83.66	3.89	41.83	0.75
6300	8.00	86.09	4.00	43.04	0.77
8000	8.67	93.29	4.33	46.65	0.84
10000	8.68	93.44	4.34	46.72	0.84
12500	8.95	96.37	4.48	48.19	0.86



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APPENDIX B: Instruments of Traceability

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2023-05-15	Original report issued
2023-05-23	Page 1: Product name changed from “SLIM RING 4851-72” to “ACOUSTIC ACCESSORY – DISK -72” per customer request. -EPW

END