

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

Test Report

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WALLACE CLEMENT SABINE

SPONSOR: **Aeroflex USA**
Sweetwater, TN

Sound Absorption
RAL™-A22-039

Page 1 of 9

CONDUCTED: 2022-02-03

ON: **AEROFLEX Breathe-EZ™ Duct Insulation (1" thick)**

TEST METHODOLOGY

Riverbank Acoustical Laboratories™ is accredited by the U.S. Department of Commerce, National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP) as an ISO 17025:2017 Laboratory (NVLAP Lab Code: 100227-0) and for this test procedure. The test reported in this document conformed explicitly with ASTM C423-17: "Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method." The specimen mounting was performed according to ASTM E795-16: "Standard Practices for Mounting Test Specimens During Sound Absorption Tests." A description of the measurement procedure and room specifications are available upon request. The results presented in this report apply to the sample as received from the test sponsor.

INFORMATION PROVIDED BY SPONSOR

The test specimen was designated by the sponsor as EZ-103648 AEROFLEX Breathe-EZ™ Duct Insulation. The following nominal product information was provided by the sponsor prior to testing. The accuracy of such sponsor-provided information can affect the validity of the test results.

Product Under Test

Trade Name: AEROFLEX Breathe-EZ™ Duct Insulation
Material ID: EZ-103648
Manufacturer: Aeroflex USA

SPECIMEN MEASUREMENTS & TEST CONDITIONS

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

Test Specimen

Dimensions: 6 pieces @ 933 mm (36.75 in.) by 1264 mm (49.75 in.)
Thickness: 27 mm (1.0625 in.)
Overall Weight: 8.62 kg (19 lbs)
Mass per Unit Volume: 45.1 kg/m³ (2.82 lbs/ft³)

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

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AEROFLEX USA
2022-02-03

RAL™-A22-039
Page 2 of 9

Overall Specimen Properties

Size: 2.8 m (110.25 in) wide by 2.53 m (99.5 in) long
Thickness: 27 mm (1.0625 in.)
Weight: 8.62 kg (19.0 lbs)
Mass per Unit Area: 1.22 kg/m² (0.25 lbs/ft²)
Calculation Area: 7.077 m² (76.18 ft²)

Test Environment

Room Volume: 291.98 m³
Temperature: 20.6 °C ± 0.1 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity: 59.55 % ± 4.5 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure: 100.1 kPa (Requirement not defined)

MOUNTING METHOD

Type A Mounting: The test specimen was laid directly against the test surface. Perimeter edges were sealed with metal framing and tape.

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

Test Report

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2022-02-03

RAL™-A22-039

Page 3 of 9



Figure 1 – Specimen mounted in test chamber



Figure 2 – Individual specimen panel

1512 S BATAVIA AVENUE
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Aeroflex USA
2022-02-03

RAL™-A22-039
Page 4 of 9

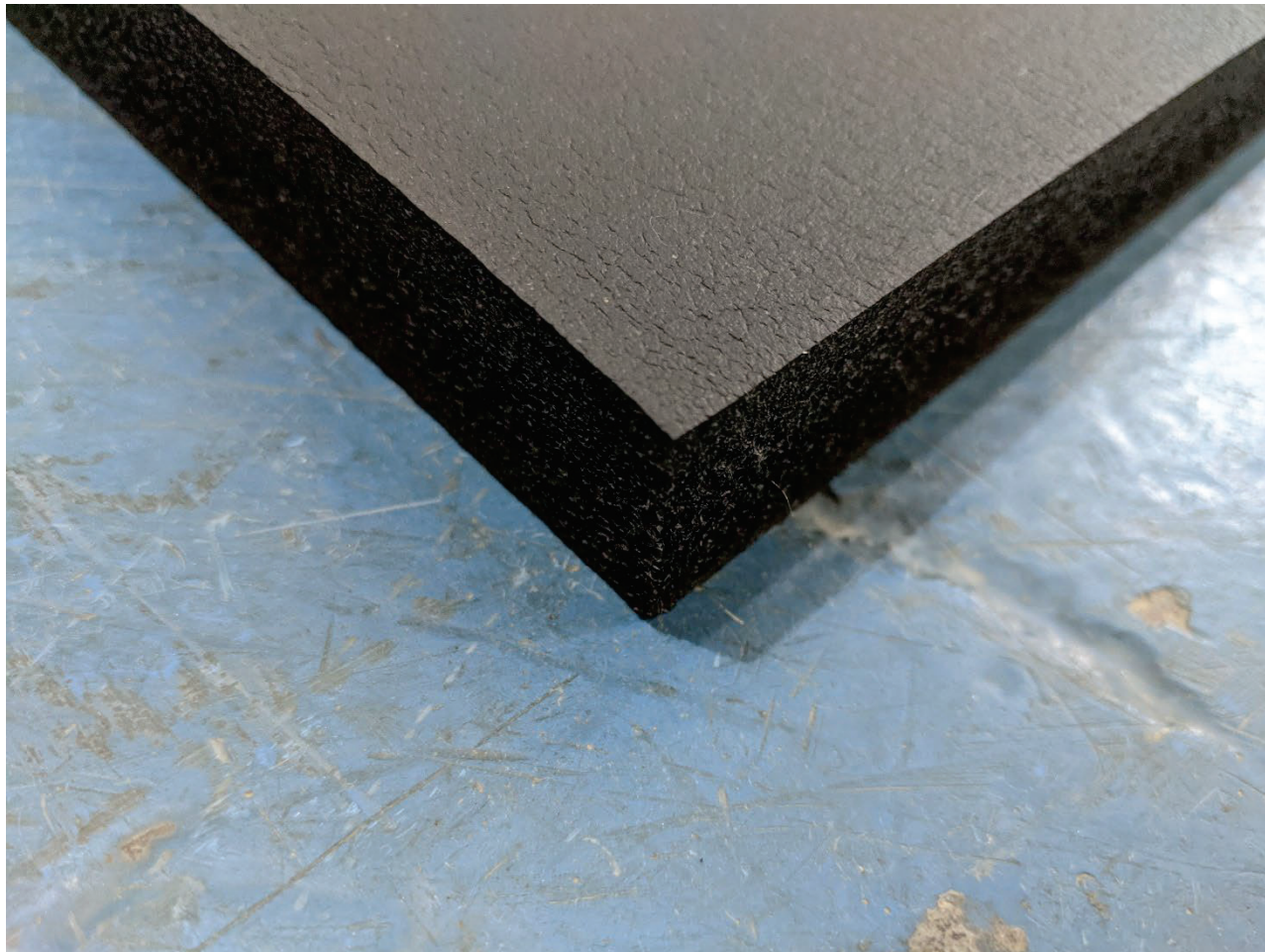


Figure 3 – Detail of specimen material

1512 S BATAVIA AVENUE
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 630-232-0104

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Aeroflex USA
 2022-02-03

RAL™-A22-039
 Page 5 of 9

TEST RESULTS

Specimen total absorption and absorption coefficient are tabulated at the eighteen standard frequencies. A graphic presentation of the data and additional information appear on the following pages.

1/3 Octave Center Frequency (Hz)	Total Absorption (m ²)	Total Absorption (Sabins)	Absorption Coefficient
100	-0.39	-4.24	-0.06
** 125	0.58	6.27	0.08
160	0.32	3.43	0.05
200	0.86	9.23	0.12
** 250	0.93	10.02	0.13
315	1.58	16.99	0.22
400	2.31	24.85	0.33
** 500	4.90	52.73	0.69
630	7.56	81.34	1.07
800	5.58	60.02	0.79
** 1000	3.11	33.50	0.44
1250	2.46	26.49	0.35
1600	2.34	25.19	0.33
** 2000	3.36	36.15	0.47
2500	3.78	40.63	0.53
3150	3.11	33.44	0.44
** 4000	3.24	34.86	0.46
5000	3.35	36.05	0.47

SAA = 0.46
NRC = 0.45

1512 S BATAVIA AVENUE
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630-232-0104

Test Report

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Aeroflex USA
2022-02-03

RAL™-A22-039
Page 6 of 9

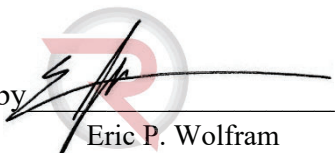
TEST RESULTS (continued)

The sound absorption average (SAA) is defined in ASTM C423-17 Section 3.1.1 as the arithmetic average of the sound absorption coefficients of a material for the twelve one-third octave bands from 200 Hz through 2500 Hz, inclusive, rounded to the nearest integer multiple of 0.01.

The noise reduction coefficient (NRC) is defined from previous versions of ASTM C423 as the arithmetic average of the sound absorption coefficients at 250 Hz, 500 Hz, 1000 Hz, and 2000 Hz, rounded to the nearest integer multiple of 0.05.

Tested by 
Marc Sciaky
Senior Experimentalist

Report by 
Keith Kimberling
Associate Test Engineer

Approved by 
Eric P. Wolfram
Laboratory Manager

 Digitally signed by
Eric P Wolfram
Date: 2023.10.11
11:18:01 -05'00'

1512 S BATAVIA AVENUE
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630-232-0104

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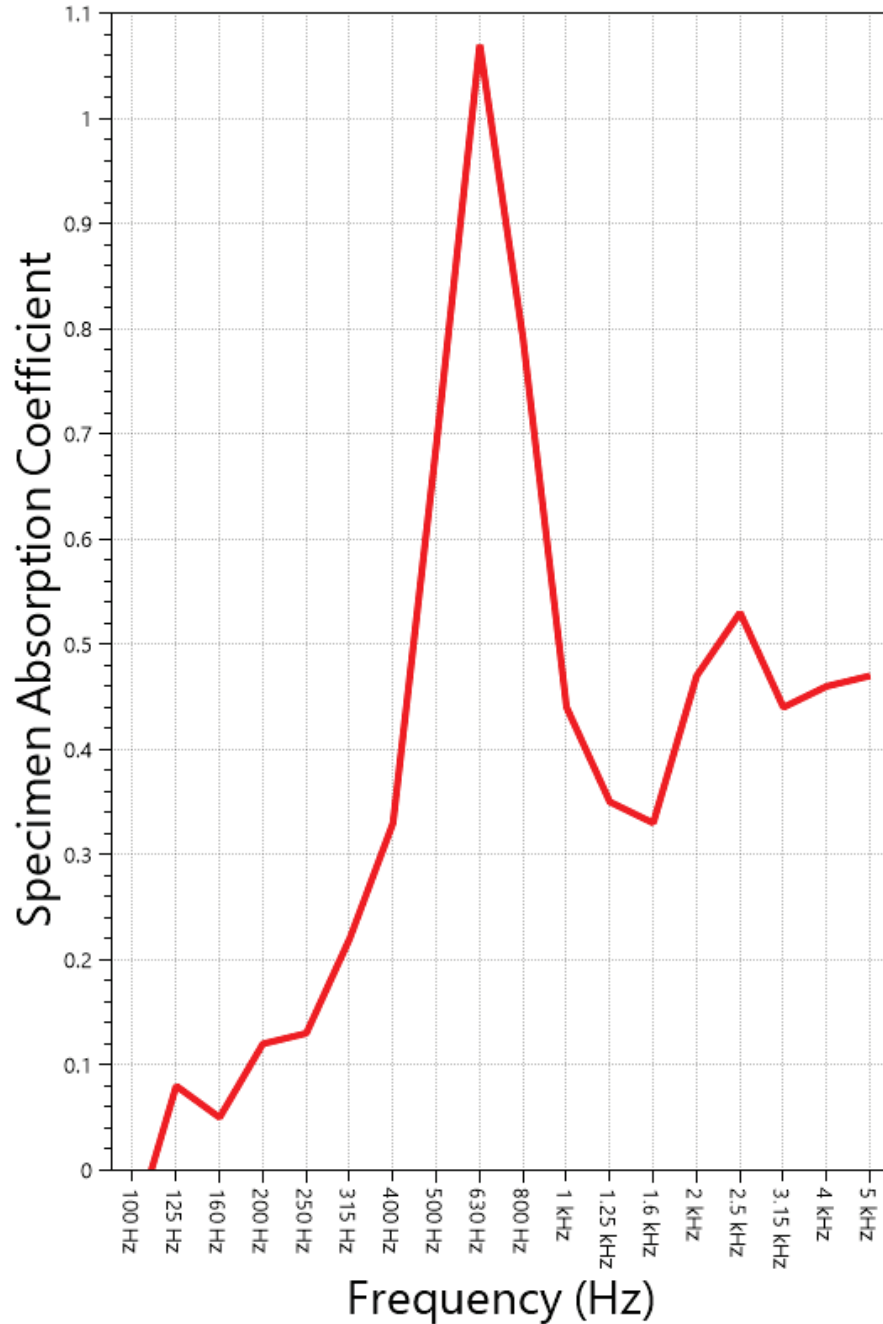
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2022-02-03

RAL™-A22-039

Page 7 of 9

SOUND ABSORPTION REPORT AEROFLEX Breathe-EZ™ Duct Insulation (1" Thick)



SAA = 0.46

NRC = 0.45



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Aeroflex USA
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RAL™-A22-039
 Page 8 of 9

APPENDIX A: Extended Frequency Range Data

Specimen: AEROFLEX Breathe-EZ™ Duct Insulation (See Full Report)

The following non-accredited data were obtained in accordance with ASTM C423-17, but extend beyond the defined frequency range of 100Hz to 5,000Hz. These unofficial results are representative of the RAL test environment only and intended for research & comparison purposes.

1/3 Octave Band Center Frequency (Hz)	Total Absorption (Sabins)	Absorption Coefficient
31.5	6.29	0.08
40	0.80	0.01
50	4.04	0.05
63	2.20	0.03
80	-14.06	-0.18
100	-4.24	-0.06
125	6.27	0.08
160	3.43	0.05
200	9.23	0.12
250	10.02	0.13
315	16.99	0.22
400	24.85	0.33
500	52.73	0.69
630	81.34	1.07
800	60.02	0.79
1000	33.50	0.44
1250	26.49	0.35
1600	25.19	0.33
2000	36.15	0.47
2500	40.63	0.53
3150	33.44	0.44
4000	34.86	0.46
5000	36.05	0.47
6300	39.97	0.52
8000	37.91	0.50
10000	37.64	0.49
12500	33.69	0.44

1512 S BATAVIA AVENUE
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630-232-0104

Test Report

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Aeroflex USA
2022-02-03

RAL™-A22-039
Page 9 of 9

APPENDIX B: Instruments of Traceability

Specimen: EZ-103648 AEROFLEX Breathe-EZ™ Duct Insulation (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	2021-07-01	2022-07-01
Bruel & Kjaer Mic And Preamp A	Type 4943-B-001	2311428	2021-07-13	2022-07-13
Bruel & Kjaer Pistonphone	Type 4228	2781248	2021-08-13	2022-08-13
EXTECH Hygro 999	SD700	A.106999	2021-05-11	2022-05-11

APPENDIX C: Revisions to Original Test Report

Specimen: AEROFLEX Breathe-EZ™ Duct Insulation (See Full Report)

<u>Date</u>	<u>Revision</u>
2022-02-18	Original report issued
2023-10-05	All Pages: Product ID was changed from “ULSM906-ASC1043 S2S” to “EZ-103648” and “Aerocel® ULS™” was changed to “AEROFLEX Breathe-EZ™” per sponsor request. -EPW

END

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SPONSOR: **Aeroflex USA**
Sweetwater, TN

Sound Absorption
RAL™-A22-116

Page 1 of 8

CONDUCTED: 2022-03-03

ON: **AEROFLEX Breathe-EZ™ Duct Insulation (1-1/2" thick)**

TEST METHODOLOGY

Riverbank Acoustical Laboratories™ is accredited by the U.S. Department of Commerce, National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP) as an ISO 17025:2017 Laboratory (NVLAP Lab Code: 100227-0) and for this test procedure. The test reported in this document conformed explicitly with ASTM C423-17: "Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method." The specimen mounting was performed according to ASTM E795-16: "Standard Practices for Mounting Test Specimens During Sound Absorption Tests." A description of the measurement procedure and room specifications are available upon request. The results presented in this report apply to the sample as received from the test sponsor.

INFORMATION PROVIDED BY SPONSOR

The test specimen was designated by the sponsor as EZ-1123648 AEROFLEX Breathe-EZ™ Duct Insulation. The following nominal product information was provided by the sponsor prior to testing. The accuracy of such sponsor-provided information can affect the validity of the test results.

Product Under Test

Trade Name: AEROFLEX Breathe-EZ™ Duct Insulation
Material ID: EZ-1123648
Manufacturer: Aeroflex USA

SPECIMEN MEASUREMENTS & TEST CONDITIONS

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

Test Specimen

Dimensions: 6 panels @ 940 mm (37 in.) by 1245 mm (49 in.)
Thickness: 39.37 mm (1.55 in.)
Overall Weight: 12.02 kg (26.5 lbs)
Mass per Unit Volume: 43.5 kg/m³ (2.72 lbs/ft³)

1512 S BATAVIA AVENUE
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Aeroflex USA
2022-03-03

RAL™-A22-116
Page 2 of 8

Overall Specimen Properties

Size: 2.82 m (111.0 in) wide by 2.49 m (98.0 in) long
Thickness: 39.37 mm (1.55 in.)
Weight: 12.02 kg (26.5 lbs)
Mass per Unit Area: 1.71 kg/m² (0.35 lbs/ft²)
Calculation Area: 7.018 m² (75.54 ft²)

Test Environment

Room Volume: 291.98 m³
Temperature: 20.7 °C ± 0.3 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity: 61.0 % ± 1.2 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure: 100.1 kPa (Requirement not defined)

MOUNTING METHOD

Type A Mounting: The test specimen was laid directly against the test surface. Perimeter edges were sealed with metal framing and tape.

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RAL™-A22-116

Page 3 of 8



Figure 1 – Specimen mounted in test chamber



Figure 2 – Detail of specimen material

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RAL™-A22-116
 Page 4 of 8

TEST RESULTS

Specimen total absorption and absorption coefficient are tabulated at the eighteen standard frequencies. A graphic presentation of the data and additional information appear on the following pages.

1/3 Octave Center Frequency (Hz)	Total Absorption (m ²)	Total Absorption (Sabins)	Absorption Coefficient
100	0.14	1.53	0.02
** 125	0.69	7.41	0.10
160	1.10	11.81	0.16
200	1.29	13.91	0.18
** 250	1.93	20.73	0.27
315	4.46	47.97	0.63
400	7.32	78.76	1.04
** 500	5.76	61.95	0.82
630	3.49	37.59	0.50
800	2.48	26.72	0.35
** 1000	2.55	27.43	0.36
1250	4.08	43.87	0.58
1600	4.66	50.12	0.66
** 2000	3.43	36.94	0.49
2500	3.93	42.28	0.56
3150	3.66	39.40	0.52
** 4000	3.72	40.08	0.53
5000	3.76	40.52	0.54

SAA = 0.54
NRC = 0.50

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RAL™-A22-116
Page 5 of 8

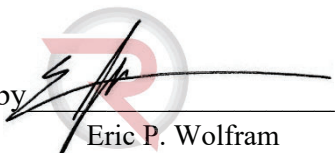
TEST RESULTS (continued)

The sound absorption average (SAA) is defined in ASTM C423-17 Section 3.1.1 as the arithmetic average of the sound absorption coefficients of a material for the twelve one-third octave bands from 200 Hz through 2500 Hz, inclusive, rounded to the nearest integer multiple of 0.01.

The noise reduction coefficient (NRC) is defined from previous versions of ASTM C423 as the arithmetic average of the sound absorption coefficients at 250 Hz, 500 Hz, 1000 Hz, and 2000 Hz, rounded to the nearest integer multiple of 0.05.

Tested by 
Marc Sciaky
Senior Experimentalist

Report by 
Keith Kimberling
Associate Test Engineer

Approved by 
Eric P. Wolfram
Laboratory Manager

Digitally signed
by Eric P Wolfram
Date: 2023.10.11
11:18:18 -05'00'

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Test Report

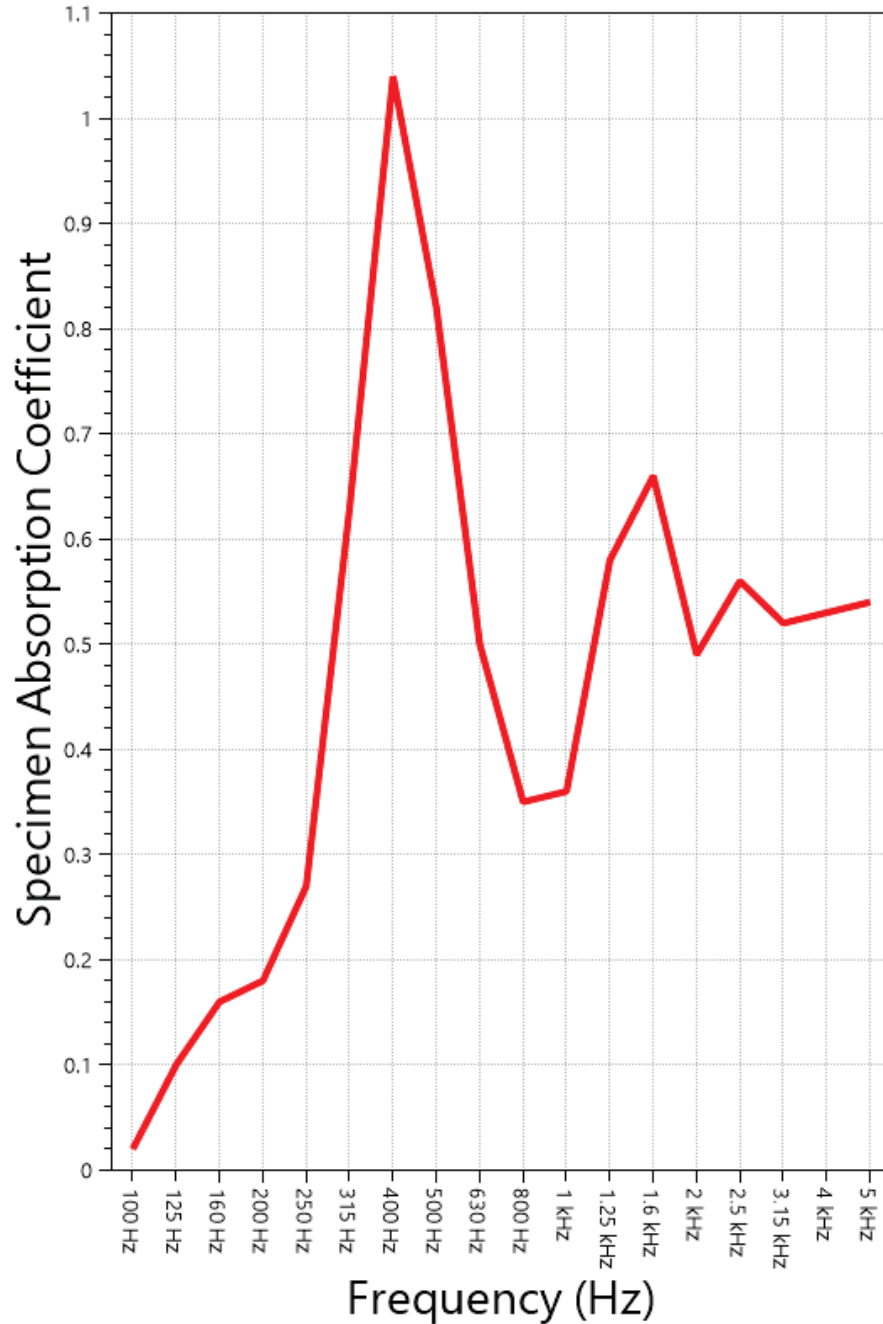
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2022-03-03

RAL™-A22-116
Page 6 of 8

SOUND ABSORPTION REPORT AEROFLEX Breathe-EZ™ Duct Insulation (1-1/2" Thick)



SAA = 0.54
NRC = 0.50



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RAL™-A22-116
 Page 7 of 8

APPENDIX A: Extended Frequency Range Data

Specimen: EZ-1123648 AEROFLEX Breathe-EZ™ Duct Insulation (See Full Report)

The following non-accredited data were obtained in accordance with ASTM C423-17, but extend beyond the defined frequency range of 100Hz to 5,000Hz. These unofficial results are representative of the RAL test environment only and intended for research & comparison purposes.

1/3 Octave Band Center Frequency (Hz)	Total Absorption (Sabins)	Absorption Coefficient
31.5	-10.81	-0.14
40	-1.49	-0.02
50	4.22	0.06
63	5.37	0.07
80	-0.34	0.00
100	1.53	0.02
125	7.41	0.10
160	11.81	0.16
200	13.91	0.18
250	20.73	0.27
315	47.97	0.63
400	78.76	1.04
500	61.95	0.82
630	37.59	0.50
800	26.72	0.35
1000	27.43	0.36
1250	43.87	0.58
1600	50.12	0.66
2000	36.94	0.49
2500	42.28	0.56
3150	39.40	0.52
4000	40.08	0.53
5000	40.52	0.54
6300	42.68	0.56
8000	39.49	0.52
10000	33.58	0.44
12500	24.46	0.32

1512 S BATAVIA AVENUE
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2022-03-03

RAL™-A22-116
Page 8 of 8

APPENDIX B: Instruments of Traceability

Specimen: EZ-1123648 AEROFLEX Breathe-EZ™ Duct Insulation (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	2021-07-01	2022-07-01
Bruel & Kjaer Mic And Preamp A	Type 4943-B-001	2311428	2021-07-13	2022-07-13
Bruel & Kjaer Pistonphone	Type 4228	2781248	2021-08-13	2022-08-13
EXTECH Hygro 999	SD700	A.106999	2021-05-11	2022-05-11

APPENDIX C: Revisions to Original Test Report

Specimen: EZ-1123648 AEROFLEX Breathe-EZ™ Duct Insulation (See Full Report)

<u>Date</u>	<u>Revision</u>
2022-03-09	Original report issued
2023-10-05	Page 1: Product ID was changed from “ULSM908-ACS11248 S2S” to “EZ-1123648” and “Aerocel® ULS™” was changed to “AEROFLEX Breathe-EZ™ Duct Insulation” per sponsor request. -EPW

END

1512 S BATAVIA AVENUE
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SPONSOR: **Aeroflex USA**
Sweetwater, TN

Sound Absorption
RAL™-A22-115

Page 1 of 8

CONDUCTED: 2022-03-03

ON: **AEROFLEX Breathe-EZ™ Duct Insulation (2" thick)**

TEST METHODOLOGY

Riverbank Acoustical Laboratories™ is accredited by the U.S. Department of Commerce, National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP) as an ISO 17025:2017 Laboratory (NVLAP Lab Code: 100227-0) and for this test procedure. The test reported in this document conformed explicitly with ASTM C423-17: "Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method." The specimen mounting was performed according to ASTM E795-16: "Standard Practices for Mounting Test Specimens During Sound Absorption Tests." A description of the measurement procedure and room specifications are available upon request. The results presented in this report apply to the sample as received from the test sponsor.

INFORMATION PROVIDED BY SPONSOR

The test specimen was designated by the sponsor as EZ-203648 AEROFLEX Breathe-EZ™ Duct Insulation. The following nominal product information was provided by the sponsor prior to testing. The accuracy of such sponsor-provided information can affect the validity of the test results.

Product Under Test

Trade Name: AEROFLEX Breathe-EZ™ Duct Insulation
Material ID: EZ-203648
Manufacturer: Aeroflex USA

SPECIMEN MEASUREMENTS & TEST CONDITIONS

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

Test Specimen

Dimensions: 6 pieces @ 940 mm (37 in.) by 1245 mm (49 in.)
Thickness: 45.72 mm (1.8 in.)
Overall Weight: 15.42 kg (34 lbs)
Mass per Unit Volume: 48 kg/m³ (3.0 lbs/ft³)

1512 S BATAVIA AVENUE
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2022-03-03

RAL™-A22-115
Page 2 of 8

Overall Specimen Properties

Size: 2.82 m (111.0 in) wide by 2.49 m (98.0 in) long
Thickness: 45.72 mm (1.8 in.)
Weight: 15.42 kg (34.0 lbs)
Mass per Unit Area: 2.2 kg/m² (0.45 lbs/ft²)
Calculation Area: 7.018 m² (75.54 ft²)

Test Environment

Room Volume: 291.98 m³
Temperature: 20.7 °C ± 0.1 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity: 60.1 % ± 0.0 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure: 100.2 kPa (Requirement not defined)

MOUNTING METHOD

Type A Mounting: The test specimen was laid directly against the test surface. Perimeter edges were sealed with metal framing and tape.

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2022-03-03

RAL™-A22-115
Page 3 of 8



Figure 1 – Specimen mounted in test chamber



Figure 2 – Detail of specimen material

1512 S BATAVIA AVENUE
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 630-232-0104

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Aeroflex USA
 2022-03-03

RAL™-A22-115
 Page 4 of 8

TEST RESULTS

Specimen total absorption and absorption coefficient are tabulated at the eighteen standard frequencies. A graphic presentation of the data and additional information appear on the following pages.

1/3 Octave Center Frequency (Hz)	Total Absorption (m ²)	Total Absorption (Sabins)	Absorption Coefficient
100	0.24	2.63	0.03
** 125	0.61	6.53	0.09
160	1.61	17.37	0.23
200	2.11	22.74	0.30
** 250	3.91	42.05	0.56
315	7.91	85.19	1.13
400	5.60	60.33	0.80
** 500	3.00	32.31	0.43
630	2.47	26.56	0.35
800	2.67	28.76	0.38
** 1000	4.39	47.29	0.63
1250	4.36	46.95	0.62
1600	3.33	35.81	0.47
** 2000	3.84	41.35	0.55
2500	3.54	38.12	0.50
3150	3.51	37.75	0.50
** 4000	3.42	36.79	0.49
5000	3.22	34.61	0.46

SAA = 0.56
NRC = 0.55

1512 S BATAVIA AVENUE
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2022-03-03

RAL™-A22-115
Page 5 of 8

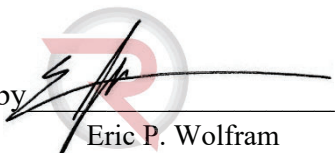
TEST RESULTS (continued)


The sound absorption average (SAA) is defined in ASTM C423-17 Section 3.1.1 as the arithmetic average of the sound absorption coefficients of a material for the twelve one-third octave bands from 200 Hz through 2500 Hz, inclusive, rounded to the nearest integer multiple of 0.01.

The noise reduction coefficient (NRC) is defined from previous versions of ASTM C423 as the arithmetic average of the sound absorption coefficients at 250 Hz, 500 Hz, 1000 Hz, and 2000 Hz, rounded to the nearest integer multiple of 0.05.

Tested by 
Marc Sciaky
Senior Experimentalist

Report by 
Keith Kimberling
Associate Test Engineer

Approved by 
Eric P. Wolfram
Laboratory Manager

 Digitally signed by
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Date: 2023.10.11
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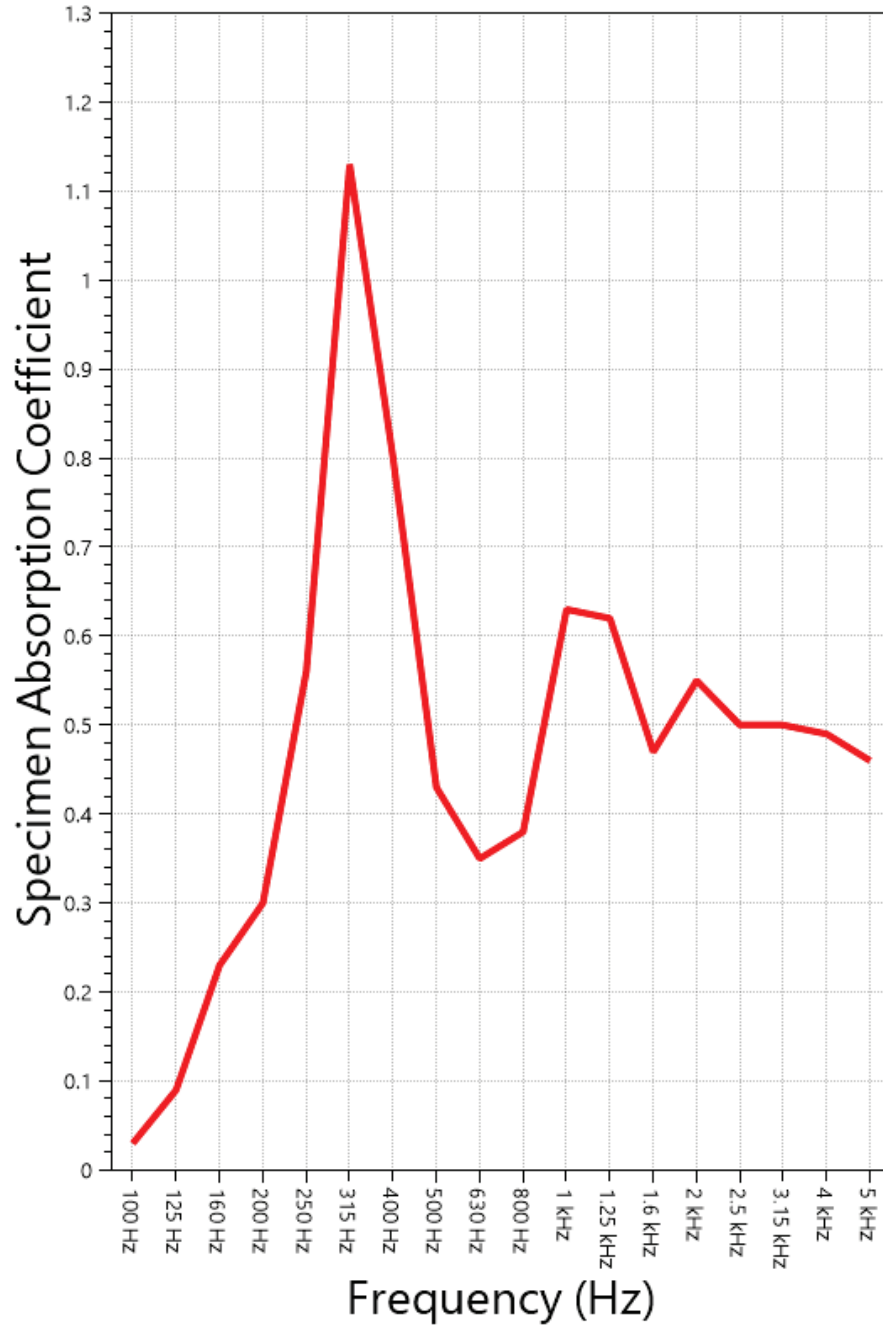
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RAL™-A22-115
Page 6 of 8

SOUND ABSORPTION REPORT
AEROFLEX Breathe-EZ™ Duct Insulation (2" Thick)



SAA = 0.56
NRC = 0.55



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 Page 7 of 8

APPENDIX A: Extended Frequency Range Data

Specimen: EZ-203648 AEROFLEX Breathe-EZ™ Duct Insulation (See Full Report)

The following non-accredited data were obtained in accordance with ASTM C423-17, but extend beyond the defined frequency range of 100Hz to 5,000Hz. These unofficial results are representative of the RAL test environment only and intended for research & comparison purposes.

1/3 Octave Band Center Frequency (Hz)	Total Absorption (Sabins)	Absorption Coefficient
31.5	-1.24	-0.02
40	-17.63	-0.23
50	9.94	0.13
63	-0.34	0.00
80	0.18	0.00
100	2.63	0.03
125	6.53	0.09
160	17.37	0.23
200	22.74	0.30
250	42.05	0.56
315	85.19	1.13
400	60.33	0.80
500	32.31	0.43
630	26.56	0.35
800	28.76	0.38
1000	47.29	0.63
1250	46.95	0.62
1600	35.81	0.47
2000	41.35	0.55
2500	38.12	0.50
3150	37.75	0.50
4000	36.79	0.49
5000	34.61	0.46
6300	32.47	0.43
8000	29.66	0.39
10000	24.05	0.32
12500	15.41	0.20

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RAL™-A22-115
Page 8 of 8

APPENDIX B: Instruments of Traceability

Specimen: EZ-203648 AEROFLEX Breathe-EZ™ Duct Insulation (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	2021-07-01	2022-07-01
Bruel & Kjaer Mic And Preamp A	Type 4943-B-001	2311428	2021-07-13	2022-07-13
Bruel & Kjaer Pistonphone	Type 4228	2781248	2021-08-13	2022-08-13
EXTECH Hygro 999	SD700	A.106999	2021-05-11	2022-05-11

APPENDIX C: Revisions to Original Test Report

Specimen: EZ-203648 AEROFLEX Breathe-EZ™ Duct Insulation (See Full Report)

<u>Date</u>	<u>Revision</u>
2022-03-09	Original report issued
2023-10-05	All Pages: Product ID was changed from “ULSM909-ACS11248 S2S” to “EZ-203648” and “Aerocel® ULS™” was changed to “AEROFLEX Breathe-EZ™” per sponsor request. -EPW

END