

Test Report

FOR: **Auralex Acoustics**
Indianapolis, IN.

Sound Absorption
RAL™-A15-278

CONDUCTED: 2015-10-06

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ON: LENRD Bass Trap (J-Mount)

TEST METHOD

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 17025:2005 Laboratory (NVLAP Lab Code: 100227-0) and for this test procedure. The test reported in this document conformed explicitly with ASTM C423-09a: "Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method." The specimen mounting was performed according to ASTM E795-05(2012): "Standard Practices for Mounting Test Specimens During Sound Absorption Tests." A description of the measuring procedure and room qualifications is available upon request.

DESCRIPTION OF THE SPECIMEN

The test specimen was designated by the manufacturer as LENRD Bass Trap. A full internal inspection performed on the test specimen by Riverbank personnel verified the manufacturer's description.

LENRD Bass Trap (Angled)

Material: Open cell polyurethane foam
Dimensions: 36 at 304.80 mm (12.0 in.) wide by 603.25 mm (23.75 in.) long
Depth: Varies, 304.80 mm (12.0 in.) maximum
Density: 25.63 kg/m³ (1.60 lbs./ft³)*
Weight: 0.79 kg. (1.75 lbs.)

Test Environment

Volume: 292.0 m³ (10,311.0 ft³)
Temperature: 20.6±0.1°C (69.1±0.1°F)
Humidity: 60.3±1.3%
Barometric Pressure: 99.3 kPa.

Note: Each sound absorbing unit had an absorptive area (all exposed surfaces) of 0.35 m² (3.80 ft²). The total absorptive area (all exposed surfaces) of all sound-absorbing units was 12.71 m² (136.80 ft²). The array of units covered 13.24 m² (142.56 ft²) of chamber floor surface (total treated area).

MOUNTING METHOD

Type J Mounting: The specimen is a set of sound absorbing units installed with one surface in direct contact with the test surface and another in direct contact of the side wall of reverberation chamber. This approximates the corner mounting method typical of the actual product installation. The units were spaced approximately 25.40 mm (1.0 in.) apart (12 on North wall, 10 on South wall, 6 on West wall, 8 on east wall).



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Figure 1 - Specimen mounted in the test chamber.



Figure 2 - Detail of the test specimen.



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TEST RESULTS

Note: There is currently no standardized method for calculating Absorption Coefficients from spaced object absorbers. The sound absorption performance of spaced object absorbers should not be compared directly with specimens tested as a single rectangular area (e.g. mounting types A, E, etc.).

1/3 Octave Center Frequency (Hz)	Total Absorption (SI) (m ²)	Total Absorption (IP) (Sabins)	Absorption Coefficient Sabins/Unit
100	8.24	88.68	2.46
** 125	13.97	150.39	4.18
160	16.92	182.16	5.06
200	17.88	192.44	5.35
** 250	18.34	197.40	5.48
315	16.95	182.49	5.07
400	16.36	176.10	4.89
** 500	15.66	168.58	4.68
630	15.45	166.30	4.62
800	14.74	158.62	4.41
** 1000	13.46	144.92	4.03
1250	12.97	139.60	3.88
1600	12.19	131.17	3.64
** 2000	11.69	125.86	3.50
2500	11.51	123.85	3.44
3150	11.13	119.82	3.33
** 4000	11.18	120.38	3.34
5000	11.32	121.82	3.38

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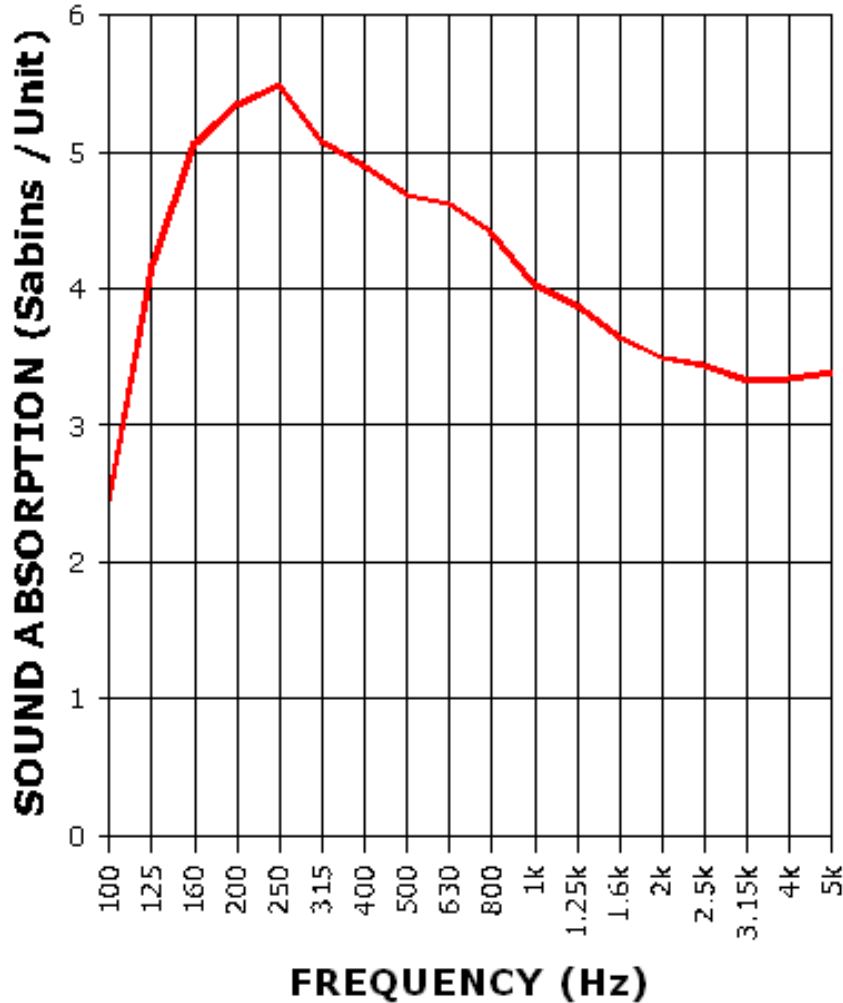
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SOUND ABSORPTION REPORT
LENRD Bass Trap



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APPENDIX A: Extended Frequency Range Data

Specimen: LENRD Bass Trap (See Full Report)

The following non-accredited data were obtained in accordance with ASTM C423-09a, 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)	Sabins per Unit
31.5	13.97	0.39
40	12.48	0.35
50	6.12	0.17
63	54.13	1.50
80	70.74	1.96
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100	88.68	2.46
125	150.39	4.18
160	182.16	5.06
200	192.44	5.35
250	197.40	5.48
315	182.49	5.07
400	176.10	4.89
500	168.58	4.68
630	166.30	4.62
800	158.62	4.41
1000	144.92	4.03
1250	139.60	3.88
1600	131.17	3.64
2000	125.86	3.50
2500	123.85	3.44
3150	119.82	3.33
4000	120.38	3.34
5000	121.82	3.38
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6300	123.66	3.43
8000	134.56	3.74
10000	137.01	3.81
12500	136.45	3.79



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APPENDIX B: Instruments of Traceability
Specimen: LENRD Bass Trap (See Full Report)

<u>Description</u>	<u>Model</u>	<u>Serial Number</u>	<u>Date of Certification</u>	<u>Calibration Due</u>
Bruel & Kjaer Pulse Analyzer	Type 3560-C	2647140	2015-04-08	2016-04-08
Bruel & Kjaer Mic And Preamp	Type 4943-B-001	2311427	2015-07-27	2016-07-27
G.R.A.S Pistonphone	Type42AF-1	80001	2015-08-14	2016-08-14
EXTECH-Temp	SD700	Q790841	2015-09-16	2016-09-16

END



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ON: LENRD Bass Trap (See Full Test Report for Details)

Appendix A to ASTM C423 Sound Absorption Test

Non-standard calculation of equivalent NRC Rating and Absorption Coefficients from spaced absorbers.

At this time ASTM C423 does not provide a standard method for determining absorption coefficients of spaced object absorbers. Tests of a set of sound absorbing objects spaced apart from each other will yield higher absorption rates than a specimen joined together as a single patch (A-Mount or E-Mount). For this reason it is unfair to provide NRC or absorption coefficient ratings for specimens that consist of a spaced set of absorbers. Despite this, the architectural industry has expressed great demand for a simple "single number" rating for these treatments. Likewise, acoustical consultants desire equivalent absorption coefficient data for use in acoustical modeling programs. The following is an attempt to appease these demands until ASTM develops a standard method for calculation. Several alternate non-standard calculation methods are provided. Riverbank Acoustical Laboratories prefers method 1.

Method 1) Apparent Sound Absorption Coefficient calculated from total test surface area covered.

The total sound absorption yielded by the specimen is divided by the total surface area of the reverberation room covered by the objects, including floor and wall surface. The angled bass traps covered 13.24 m² (142.56 ft²) of chamber surface area. Apparent Noise Reduction Coefficient (NRC) rating and Sound Absorption Average (SAA) figures are calculated from this data based on the methods described in ASTM C423-09a. In acoustical modeling applications, The apparent sound absorption coefficient data can be assigned to floor and wall surface segments for approximation of the bass trap absorption performance (assuming panel spacing is similar to that tested).

Method 2) Apparent Sound Absorption Coefficient calculated from total floor surface area covered.

The total sound absorption yielded by the specimen is divided by the total floor surface area covered by the objects base (0.18 m² (1.98 ft²) per unit x 36 units = 6.48 m² (71.25 ft²) of chamber's floor surface area). Apparent Noise Reduction Coefficient (NRC) rating and Sound Absorption Average (SAA) figures are calculated from this data based on the methods described in ASTM C423-09a. This method does not provide a fair comparison with materials mounted as a uniform patch (in A-mount or E-mount).

Method 3) Apparent Sound Absorption Coefficient calculated from total exposed surface area of specimen.

The total sound absorption yielded by the specimen is divided by the total surface area of all exposed specimen faces (0.35 m² (3.80 ft²) per unit x 36 units = 12.71 m² (136.80 ft²) total surface area). Apparent Noise Reduction Coefficient (NRC) rating and Sound Absorption Average (SAA) figures are calculated from this data based on the methods described in ASTM C423-09a. This method shows the actual absorption occurring at the exposed surfaces, but does not provide a fair comparison with materials mounted as a uniform patch (in A-mount or E-mount).

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Appendix A: Data Note: See full test report for details of mounting position, spacing and configuration as these parameters greatly affect sound absorption performance.

Specimen Absorption (US)			Method 1	Method 2	Method 3
			Apparent Abs. Coefficient From Total Coverage Area	Apparent Abs. Coefficient From Total Floor Coverage Area	Apparent Abs. Coefficient From Total Exposed Surface Area
Freq. (Hz)	Sabins	Sabins/Panel			
32	13.97	0.39	0.10	0.20	0.10
40	12.48	0.35	0.09	0.18	0.09
50	6.12	0.17	0.04	0.09	0.04
63	54.13	1.50	0.38	0.76	0.40
80	70.74	1.96	0.50	0.99	0.52
100	88.68	2.46	0.62	1.24	0.65
125	150.39	4.18	1.05	2.11	1.10
160	182.16	5.06	1.28	2.56	1.33
200	192.44	5.35	1.35	2.70	1.41
250	197.40	5.48	1.38	2.77	1.44
315	182.49	5.07	1.28	2.56	1.33
400	176.10	4.89	1.24	2.47	1.29
500	168.58	4.68	1.18	2.37	1.23
630	166.30	4.62	1.17	2.33	1.22
800	158.62	4.41	1.11	2.23	1.16
1,000	144.92	4.03	1.02	2.03	1.06
1,250	139.60	3.88	0.98	1.96	1.02
1,600	131.17	3.64	0.92	1.84	0.96
2,000	125.86	3.50	0.88	1.77	0.92
2,500	123.85	3.44	0.87	1.74	0.91
3,150	119.82	3.33	0.84	1.68	0.88
4,000	120.38	3.34	0.84	1.69	0.88
5,000	121.82	3.38	0.85	1.71	0.89
6,300	123.66	3.43	0.87	1.74	0.90
8,000	134.56	3.74	0.94	1.89	0.98
10,000	137.01	3.81	0.96	1.92	1.00
12,500	136.45	3.79	0.96	1.92	1.00
Apparent NRC:			1.10	2.25	1.15
Apparent SAA:			1.11	2.23	1.16

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