

**Test Report**FOR: **Auralex Acoustics**  
Indianapolis, IN.**Sound Absorption**  
**RAL™-A15-328**

CONDUCTED: 2015-11-05

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ON: Studio 6 Foam Panel

**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 Studio 6 Foam Panel. A full internal inspection performed on the test specimen by Riverbank personnel verified the manufacturer's description.

**Studio6 Foam Panel**

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Material:	Polyurethane foam
Material ID:	E-20
Dimensions:	Eight at 609.60 mm (24.0 in.) wide by 1.22 m (48.0 in.) long
Thickness:	152.40 mm (6.00 in.)
Density:	32.04 kg/m <sup>3</sup> (2.0 lbs./ft <sup>3</sup> )*
Weight (per unit):	3.16 kg (6.97 lbs.)
Mass per Unit Area:	4.25 kg/m <sup>2</sup> (0.87 lbs./ft <sup>2</sup> )

*Note: A 69.85 mm (2.75 in.) incision was made down the center of each unit (back surface only)*

**Test Environment**

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Volume:	292.0 m <sup>3</sup> (10,311.0 ft <sup>3</sup> )
Temperature:	22.5±0.0°C (72.5±0.0°F)
Humidity:	63.0±0.2%
Barometric Pressure:	98.8 kPa.

\* = Information provided by manufacturer and not verified by RAL.

Each sound absorbing unit had an absorptive area (all exposed surfaces) of 1.94 m<sup>2</sup> (20.91 ft<sup>2</sup>). The total absorptive area (all exposed surfaces) of all sound-absorbing units was 15.54 m<sup>2</sup> (167.28 ft<sup>2</sup>). The array of units covered 3.50 m<sup>2</sup> (37.68 ft<sup>2</sup>) of chamber surface, including floor and wall (total treated area).



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THE RESULTS REPORTED APPLY ONLY TO THE SPECIFIC SAMPLE SUBMITTED FOR TESTING; RAL ASSUMES NO RESPONSIBILITY FOR THE PERFORMANCE OF ANY OTHER SPECIMEN.

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### 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 508.0 mm (20.0 in.) (3 on North wall, 2 on South wall, 1 on the east wall and 2 on West 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 Report****Auralex Acoustics**  
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Page 4 of 7**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 <sup>2</sup> )	Total Absorption (IP) (Sabins)	Absorption Sabins/Unit
100	10.35	111.45	13.93
** 125	13.42	144.49	18.06
160	13.70	147.51	18.44
200	13.08	140.78	17.60
** 250	14.18	152.67	19.08
315	12.72	136.89	17.11
400	12.93	139.23	17.40
** 500	12.77	137.51	17.19
630	12.66	136.29	17.04
800	11.96	128.73	16.09
** 1000	11.47	123.46	15.43
1250	10.77	115.89	14.49
1600	10.54	113.41	14.18
** 2000	10.41	112.00	14.00
2500	10.19	109.66	13.71
3150	9.82	105.68	13.21
** 4000	9.64	103.78	12.97
5000	9.60	103.37	12.92

Tested by   
Marc Sciaky  
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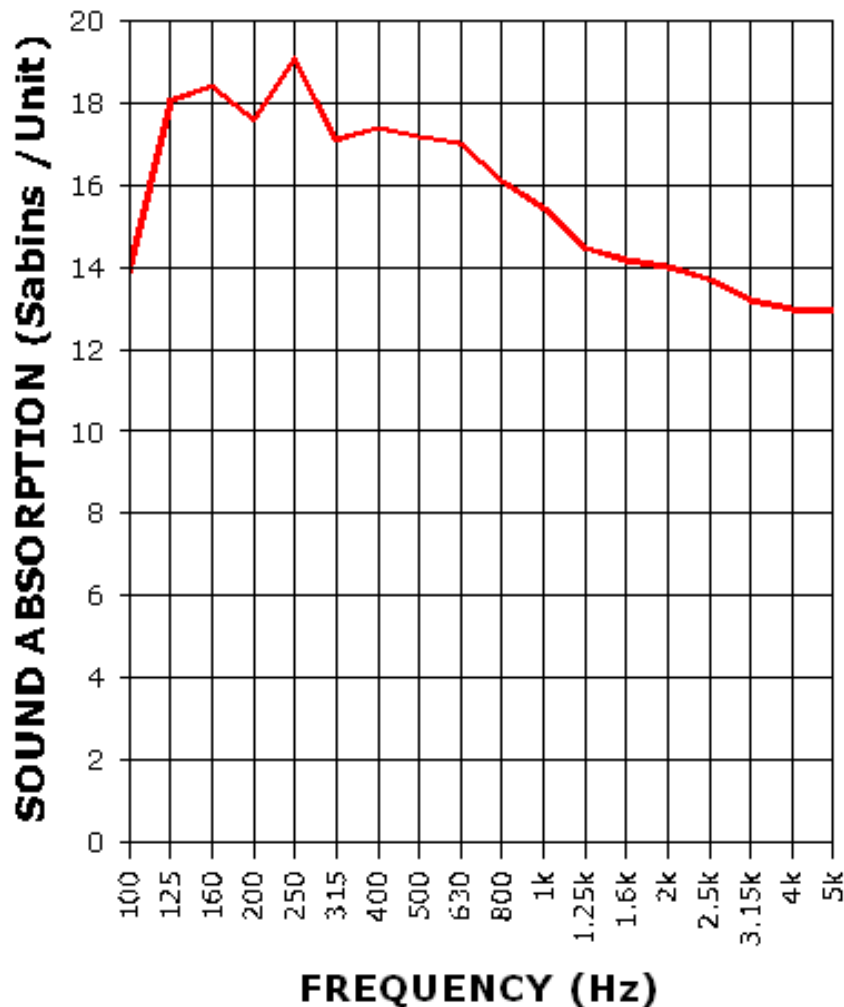
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### SOUND ABSORPTION REPORT Studio 6 Foam Panel



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### **APPENDIX A: Extended Frequency Range Data**

Specimen: Studio 6 Foam Panel (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	12.27	1.53
40	17.12	2.14
50	20.70	2.59
63	54.28	6.78
80	80.80	10.10
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100	111.45	13.93
125	144.49	18.06
160	147.51	18.44
200	140.78	17.60
250	152.67	19.08
315	136.89	17.11
400	139.23	17.40
500	137.51	17.19
630	136.29	17.04
800	128.73	16.09
1000	123.46	15.43
1250	115.89	14.49
1600	113.41	14.18
2000	112.00	14.00
2500	109.66	13.71
3150	105.68	13.21
4000	103.78	12.97
5000	103.37	12.92
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6300	103.57	12.95
8000	102.23	12.78
10000	99.44	12.43
12500	94.51	11.81



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### APPENDIX B: Instruments of Traceability

Specimen: Studio 6 Foam Panel (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
Omega Digital Temp., Humid. And Pressure Recorder	OM-CP- PRHTemp2000	N11105	2015-09-30	2016-09-30

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END



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ON: Studio 6 Foam Panel (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 array of units covered  $3.50 \text{ m}^2$  ( $37.68 \text{ ft}^2$ ) 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 a bass traps absorption performance (assuming panel spacing is similar to that tested).

#### **Method 2) 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 ( $1.94 \text{ m}^2$  ( $20.91 \text{ ft}^2$ ) per panel x 8 panels =  $15.52 \text{ m}^2$  ( $167.28 \text{ ft}^2$ ) 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).

#### **Method 3) Apparent Sound Absorption Coefficient calculated from one face per panel.**

The total sound absorption yielded by the specimen is divided by the combined surface area of the largest face of each panel in the specimen ( $0.68 \text{ m}^2$  ( $7.33 \text{ ft}^2$ ) per panel x 8 panels =  $5.44 \text{ m}^2$  ( $58.64 \text{ ft}^2$ ) 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.



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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
Freq. (Hz)	Sabins	Sabins/Unit	Apparent Abs. Coefficient From Total Coverage Area	Apparent Abs. Coefficient From Total Exposed Surface Area	Apparent Abs. Coefficient From One Face/Panel
<b>31.5</b>	<b>12.27</b>	<b>1.53</b>	<b>0.33</b>	<b>0.07</b>	<b>0.21</b>
40	17.12	2.14	0.45	0.10	0.29
50	20.70	2.59	0.55	0.12	0.35
<b>63</b>	<b>54.28</b>	<b>6.78</b>	<b>1.44</b>	<b>0.32</b>	<b>0.93</b>
80	80.80	10.10	2.14	0.48	1.38
100	111.45	13.93	2.96	0.67	1.90
<b>125</b>	<b>144.49</b>	<b>18.06</b>	<b>3.83</b>	<b>0.86</b>	<b>2.46</b>
160	147.51	18.44	3.91	0.88	2.52
200	140.78	17.60	3.74	0.84	2.40
<b>250</b>	<b>152.67</b>	<b>19.08</b>	<b>4.05</b>	<b>0.91</b>	<b>2.60</b>
315	136.89	17.11	3.63	0.82	2.33
400	139.23	17.40	3.70	0.83	2.37
<b>500</b>	<b>137.51</b>	<b>17.19</b>	<b>3.65</b>	<b>0.82</b>	<b>2.34</b>
630	136.29	17.04	3.62	0.81	2.32
800	128.73	16.09	3.42	0.77	2.20
<b>1,000</b>	<b>123.46</b>	<b>15.43</b>	<b>3.28</b>	<b>0.74</b>	<b>2.11</b>
1,250	115.89	14.49	3.08	0.69	1.98
1,600	113.41	14.18	3.01	0.68	1.93
<b>2,000</b>	<b>112.00</b>	<b>14.00</b>	<b>2.97</b>	<b>0.67</b>	<b>1.91</b>
2,500	109.66	13.71	2.91	0.66	1.87
3,150	105.68	13.21	2.80	0.63	1.80
<b>4,000</b>	<b>103.78</b>	<b>12.97</b>	<b>2.75</b>	<b>0.62</b>	<b>1.77</b>
5,000	103.37	12.92	2.74	0.62	1.76
6,300	103.57	12.95	2.75	0.62	1.77
<b>8,000</b>	<b>102.23</b>	<b>12.78</b>	<b>2.71</b>	<b>0.61</b>	<b>1.74</b>
10,000	99.44	12.43	2.64	0.59	1.70
12,500	94.51	11.81	2.51	0.56	1.61
Apparent NRC:			<b>3.50</b>	<b>0.80</b>	<b>2.25</b>
Apparent SAA:			3.42	0.77	2.20

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