

## Test Report

FOR: **GIK Acoustics**  
Atlanta, GA

**Sound Absorption**  
**RAL-A16-223**

CONDUCTED: 2016-09-09

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ON: D-GIK (24"x48" panels)

### 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 D-GIK (24"x48" panels). A full internal inspection performed on the test specimen by Riverbank personnel verified the manufacturer's description.

#### Specimen

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Overall Dimensions: 8 @ 1219.2 mm (48 in.) x 603.25 mm (23.75 in.)

Overall Thickness: 109.73 mm (4.32 in.)

Weight: 67.02 kg (147.75 lbs.)

Face Material: Wood

Face Thickness: 5.66 mm (0.223 in.)

Backing: Fiberglass

Backing Thickness: 102.5 mm (4.035 in.)

Face Perforations:

Diameter: 9 @ 74.68 mm (2.94 in.), 8 @ 125.48 mm (4.94 in.)

4 @ 176.28 mm (6.94 in.), 8 @ 49.28 mm (1.94 in.)

Open Area: 0.25 m<sup>2</sup> (2.70 ft<sup>2</sup>)



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### Physical Measures (per unit)

Dimensions: 603.25 mm (23.75 in.) wide by 1.22 m (48.00 in.) long  
Thickness: 109.66 mm (4.317 in.)  
Area: 0.74 m<sup>2</sup> (8.00 ft<sup>2</sup>)

### Test Environment

Volume: 292.0 m<sup>3</sup> (10,311.0 ft<sup>3</sup>)  
Temperature: 22.9±0.0°C (73.3±0.0°F)  
Humidity: 61.1±0.3%  
Barometric Pressure: 98.5 kPa.

Each sound absorbing unit had an absorptive area (all exposed surfaces) of 1.87 m<sup>2</sup> (20.14 ft<sup>2</sup>). The total absorptive area (all exposed surfaces) of all sound-absorbing units was 14.97 m<sup>2</sup> (161.08 ft<sup>2</sup>). The array of units covered 8.32 m<sup>2</sup> (89.57 ft<sup>2</sup>) 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 evenly spaced along the walls of the chamber (3 on North wall, 2 on South wall, 2 on the East wall and 1 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 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	9.33	100.40	12.55
** 125	14.22	153.07	19.13
160	13.48	145.13	18.14
200	11.47	123.50	15.44
** 250	11.45	123.22	15.40
315	9.90	106.56	13.32
400	9.72	104.62	13.08
** 500	8.74	94.05	11.76
630	8.11	87.34	10.92
800	7.36	79.26	9.91
** 1000	6.72	72.29	9.04
1250	5.90	63.54	7.94
1600	5.43	58.43	7.30
** 2000	5.08	54.68	6.83
2500	4.53	48.79	6.10
3150	4.41	47.46	5.93
** 4000	4.30	46.31	5.79
5000	4.32	46.45	5.81

Tested by  Report by  Approved by   
 Marc Sciaky Experimentalist Miles Possing Acoustical Test Engineer Eric P. Wolfram Laboratory Manager



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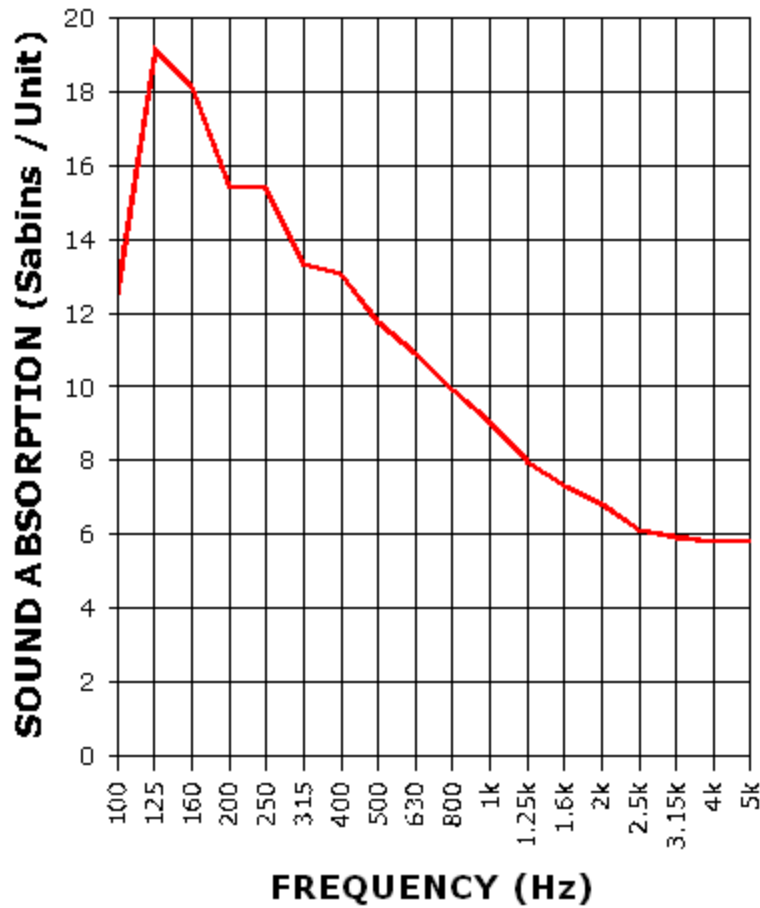
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SOUND ABSORPTION REPORT  
D-GIK (24"x48" panels)



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**APPENDIX A: Extended Frequency Range Data**

Specimen: D-GIK (24"x48" panels) (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	9.81	1.23
40	9.77	1.22
50	4.85	0.61
63	18.54	2.32
80	72.99	9.12
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100	100.40	12.55
125	153.07	19.13
160	145.13	18.14
200	123.50	15.44
250	123.22	15.40
315	106.56	13.32
400	104.62	13.08
500	94.05	11.76
630	87.34	10.92
800	79.26	9.91
1000	72.29	9.04
1250	63.54	7.94
1600	58.43	7.30
2000	54.68	6.83
2500	48.79	6.10
3150	47.46	5.93
4000	46.31	5.79
5000	46.45	5.81
<hr/>		
6300	49.29	6.16
8000	52.00	6.50
10000	63.49	7.94



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**APPENDIX B: Instruments of Traceability**

Specimen: D-GIK (24"x48" panels) (See Full Report)

<b><u>Description</u></b>	<b><u>Model</u></b>	<b><u>Serial Number</u></b>	<b><u>Date of Certification</u></b>	<b><u>Calibration Due</u></b>
Bruel & Kjaer Pulse Analyzer - System3	Type 3560-C	2647140	2016-04-12	2017-04-12
Bruel & Kjaer Mic And Preamp C	Type 4943-B-001	2311439	2016-03-17	2017-03-17
Bruel & Kjaer Pistonphone	Type 4228	2781248	2016-07-25	2017-07-25
Omega Digital Temp., Humid. And Pressure Recorder	OM-CP-PRHTemp2000	N11105	2015-09-30	2016-09-30

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ON: D-GIK (24"x48" panels) (See Full Test Report for Details)

### **Appendix C 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 test surface covered by the suspended baffles, including intermediate spaces. The baffle rigging covered  $8.32 \text{ m}^2$  ( $89.56 \text{ ft}^2$ ) of horizontal test 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 may be the most accurate method for comparing baffle arrays to ceiling tile products. In acoustical modeling applications, the apparent sound absorption coefficient data can be assigned to a single horizontal surface or plane in acoustical modeling software for approximation of baffle array performance (assuming baffle 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 ( $1.87 \text{ m}^2$  ( $20.14 \text{ ft}^2$ ) per baffle x 8 baffles =  $14.97 \text{ m}^2$  ( $161.08 \text{ ft}^2$ ) 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 baffle.**

The total sound absorption yielded by the specimen is divided by the surface area of one side of one large face for each baffle in the specimen ( $0.74 \text{ m}^2$  ( $7.92 \text{ ft}^2$ ) per baffle x 8 baffles =  $5.88 \text{ m}^2$  ( $63.33 \text{ ft}^2$ ) 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 is favored by some material manufacturers since it yields very high NRC figures, but does not provide a fair comparison with other ceiling tile or wall panel products.



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**Appendix D: 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/Baffle
31.5	9.81	1.23	0.11	0.06	0.15
40	9.77	1.22	0.11	0.06	0.15
50	4.85	0.61	0.05	0.03	0.08
<b>63</b>	18.54	2.32	0.21	0.12	0.29
80	72.99	9.12	0.81	0.45	1.15
100	100.40	12.55	1.12	0.62	1.59
<b>125</b>	153.07	19.13	1.71	0.95	2.42
160	145.13	18.14	1.62	0.90	2.29
200	123.50	15.44	1.38	0.77	1.95
<b>250</b>	123.22	15.40	1.38	0.76	1.95
315	106.56	13.32	1.19	0.66	1.68
400	104.62	13.08	1.17	0.65	1.65
<b>500</b>	94.05	11.76	1.05	0.58	1.49
630	87.34	10.92	0.98	0.54	1.38
800	79.26	9.91	0.88	0.49	1.25
<b>1,000</b>	72.29	9.04	0.81	0.45	1.14
1,250	63.54	7.94	0.71	0.39	1.00
1,600	58.43	7.30	0.65	0.36	0.92
<b>2,000</b>	54.68	6.83	0.61	0.34	0.86
2,500	48.79	6.10	0.54	0.30	0.77
3,150	47.46	5.93	0.53	0.29	0.75
<b>4,000</b>	46.31	5.79	0.52	0.29	0.73
5,000	46.45	5.81	0.52	0.29	0.73
6,300	49.29	6.16	0.55	0.31	0.78
<b>8,000</b>	52.00	6.50	0.58	0.32	0.82
10,000	63.49	7.94	0.71	0.39	1.00
<b>Apparent NRC:</b>			0.95	0.55	1.35
<b>Apparent SAA:</b>			0.95	0.53	1.34

Prepared by   
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