

## Test Report

SPONSOR: **Kirei USA, LLC**  
Solana Beach, CA

**Sound Absorption**  
**RAL™-A20-327**

CONDUCTED: 2020-08-04

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ON: 12mm Echo Panel Material

### 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 12mm Echo Panel Material. 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: Echo Panel  
Thickness: 12 mm (0.472 in.)  
Manufacturer: Kirei

### SPECIMEN MEASUREMENTS & TEST CONDITIONS

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

#### Test Specimen

Material: Semirigid felt paneling  
Dimensions: 2 @ 1155.7 mm (45.5 in.) 2743.2 mm (108 in.)  
1 @ 155.57 mm (6.125 in.) x 2743.2 mm (108 in.)  
Thickness: Overall @ 12.22 mm (0.481 in.)  
Surface Features: Regularly spaced notches parallel to panel lengths  
Triangular profile, maximum width at panel face  
Notches @ 14 mm (0.551 in.) wide x 7.5 mm (0.295 in.) deep  
Spacing @ 78 mm (3.071 in.) on center  
Overall Weight: 16.22 kg (35.75 lbs)  
Installation: Notches exposed to sound field, edges butted at joints

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### Overall Specimen Properties

Size: 2.47 m (97.125 in) wide by 2.74 m (108.0 in) long  
Thickness: 0.01 m (0.481 in)  
Weight: 16.22 kg (35.75 lbs)  
Mass per Unit Area: 2.4 kg/m<sup>2</sup> (0.49 lbs/ft<sup>2</sup>)  
Calculation Area: 6.767 m<sup>2</sup> (72.84 ft<sup>2</sup>)

### Test Environment

Room Volume: 291.98 m<sup>3</sup>  
Temperature: 22.6 °C ± 0.2 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)  
Relative Humidity: 58.9 % ± 0.6 % (Requirement: ≥ 40 % and ≤ 5 % change)  
Barometric Pressure: 99.0 kPa (Requirement not defined)

### MOUNTING METHOD

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

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Figure 1 – Specimen mounted in test chamber



Figure 2 – Detail of specimen material, notch features

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### 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 <sup>2</sup> )	Total Absorption (Sabins)	Absorption Coefficient
100	0.52	5.59	0.08
** 125	0.36	3.89	0.05
160	0.29	3.15	0.04
200	0.32	3.41	0.05
** 250	0.22	2.39	0.03
315	0.59	6.39	0.09
400	0.69	7.47	0.10
** 500	1.22	13.18	0.18
630	1.88	20.26	0.28
800	2.83	30.51	0.42
** 1000	3.66	39.45	0.54
1250	4.51	48.56	0.67
1600	5.15	55.41	0.76
** 2000	5.88	63.30	0.87
2500	6.37	68.56	0.94
3150	6.68	71.87	0.99
** 4000	7.01	75.43	1.04
5000	7.03	75.66	1.04

**SAA = 0.41**

**NRC = 0.40**

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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  
Marc Sciaky  
Senior Experimentalist

Report by Malcolm Kelly  
Malcolm Kelly  
Acoustical Test Engineer

Approved by Eric P. Wolfram  
Eric P. Wolfram  
Laboratory Manager

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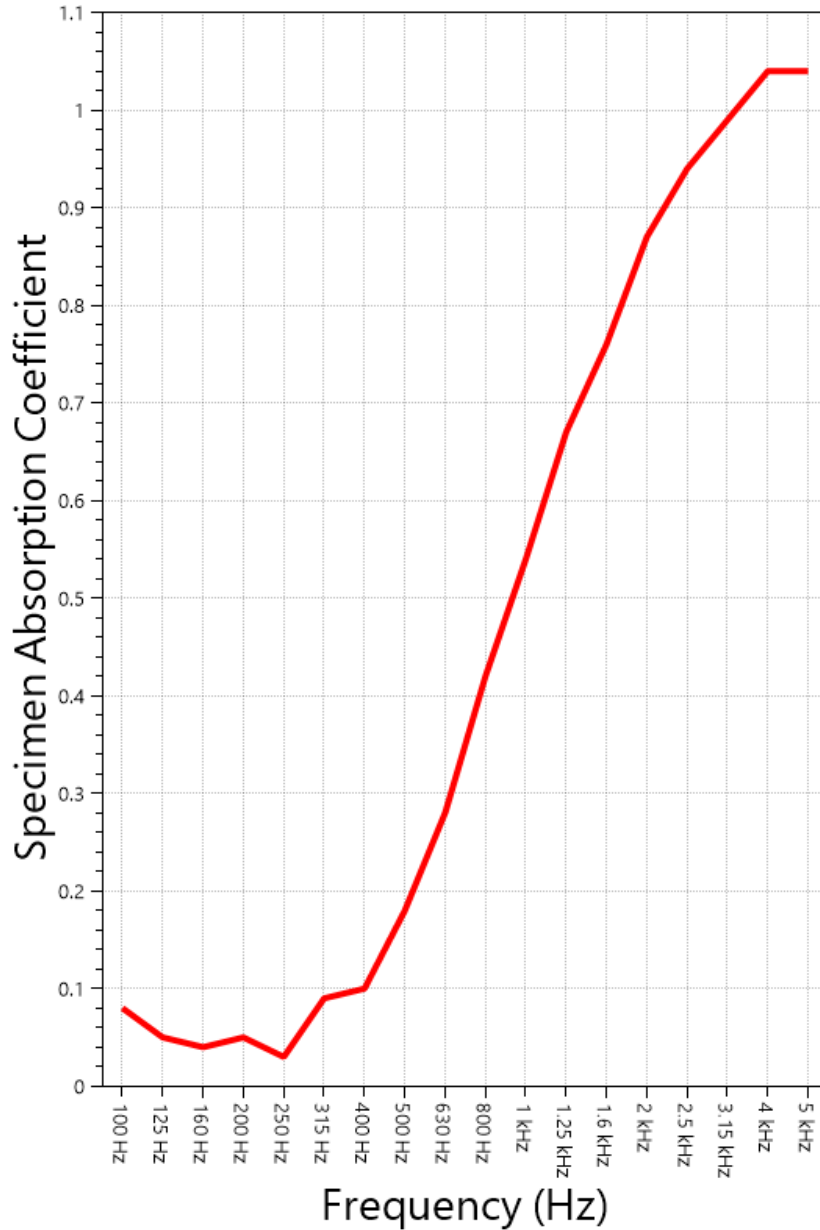
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SOUND ABSORPTION REPORT  
12mm Echo Panel Material



**SAA = 0.41**  
**NRC = 0.40**

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### APPENDIX A: Extended Frequency Range Data

Specimen: 12mm Echo Panel Material (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	-0.83	-0.01
40	1.00	0.01
50	11.60	0.16
63	3.87	0.05
80	1.54	0.02
100	5.59	0.08
125	3.89	0.05
160	3.15	0.04
200	3.41	0.05
250	2.39	0.03
315	6.39	0.09
400	7.47	0.10
500	13.18	0.18
630	20.26	0.28
800	30.51	0.42
1000	39.45	0.54
1250	48.56	0.67
1600	55.41	0.76
2000	63.30	0.87
2500	68.56	0.94
3150	71.87	0.99
4000	75.43	1.04
5000	75.66	1.04
6300	77.49	1.06
8000	77.92	1.07
10000	76.91	1.06
12500	77.71	1.07

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### APPENDIX B: Instruments of Traceability

Specimen: 12mm Echo Panel Material (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	2020-06-26	2021-06-26
Bruel & Kjaer Mic And Preamp A	Type 4943-B-001	2311428	2019-09-27	2020-09-27
Bruel & Kjaer Pistonphone	Type 4228	2781248	2019-08-09	2020-08-09
Omega Digital Temp., Humid. And Pressure Recorder	OM-CP-PRHTemp2000	P97844	2020-02-18	2021-02-18

### APPENDIX C: Revisions to Original Test Report

Specimen: 12mm Echo Panel Material (See Full Report)

<u>Date</u>	<u>Revision</u>
2020-09-09	Original report issued

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END