

## Test Report

### Sound Absorption RAL-A16-343

CONDUCTED: 2016-11-29

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ON: Perforated Tin Ceiling Tiles with acoustical pad

### 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 Perforated Tin Ceiling Tiles with acoustical pad. A full inspection was performed on the test specimen by Riverbank personnel, verifying the manufacturer's description.

#### Ceiling Tiles

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Material: Tin plated steel  
Dimensions: 16 @ 606.55 mm (23.88 in.) x 606.55 mm (23.88 in.)  
4 @ 606.55 mm (23.88 in.) x 317.5 mm (12.5 in.)  
Thickness: 0.25 mm (0.01 in.)  
Overall Weight: 13.38 kg (29.5 lbs.)  
Perforations: Diameter: 0.56 mm (0.022 in.)  
Pitch: 5.25 mm (0.207 in.) On Center Square Pitch  
Open Area: 0.9% of Perforated Region

*Note: Seams between each tile were taped for test.*

#### Pads

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Material: 1.5 pcf poly-wrapped insulation  
Dimensions: 16 @ 606.55 mm (23.88 in.) x 606.55 mm (23.88 in.)  
4 @ 606.55 mm (23.88 in.) x 330.2 mm (13 in.)  
Thickness: 50.8 mm (2 in.)  
Overall Weight: 10.43 kg (23 lbs.)



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### Physical Measures

Overall Dimensions: 2.74 m (108.00 in.) wide by 2.43 m (95.50 in.) long  
Overall Thickness: 53.34 mm (2.10 in.)  
Overall Weight: 23.81 kg (52.50 lbs.)  
Area: 6.65 m<sup>2</sup> (71.60 ft<sup>2</sup>)  
Mass per Unit Area: 3.56 kg/m<sup>2</sup> (0.73 lbs./ft<sup>2</sup>)

### Test Environment

Volume: 292.0 m<sup>3</sup> (10,311.0 ft<sup>3</sup>)  
Temperature: 21.6±0.0°C (70.8±0.1°F) (Requirement: ≥10° C and ≤5° C change)  
Humidity: 64.0±0.6% (Requirement: ≥40% RH and ≤5% change)  
Barometric Pressure: 97.4 kPa. (Requirement not defined)



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# RIVERBANK ACOUSTICAL LABORATORIES

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WALLACE CLEMENT SABINE

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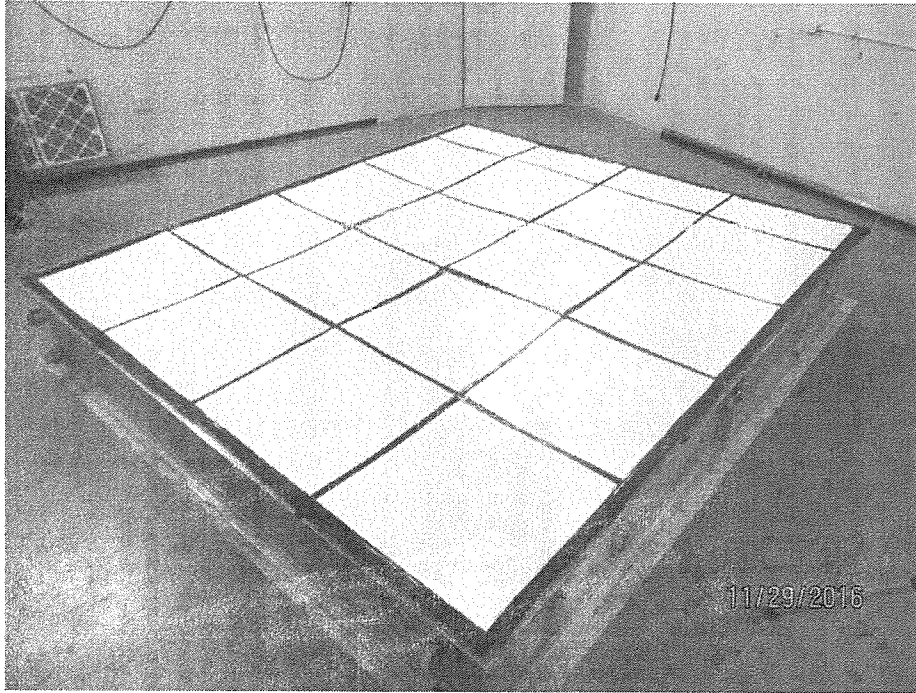


Figure 1 – Specimen mounted in the test chamber.

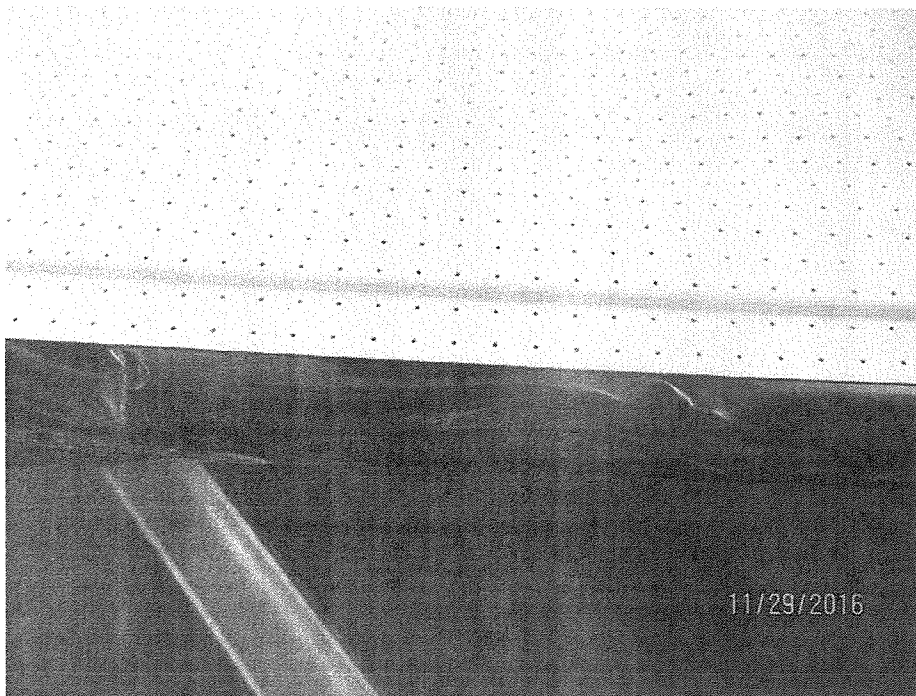


Figure 2 – Detail of the test specimen.



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### MOUNTING METHOD

Type E-400 Mounting: The test specimen was mounted with an airspace behind it. The number designates the distance in mm from the exposed face of the test specimen to the test surface. The perimeter was sealed using metal framing.

### TEST RESULTS

1/3 Octave Center Frequency (Hz)	Total Absorption (SI) (m <sup>2</sup> )	Total Absorption (IP) (Sabins)	Absorption Coefficient (Sabins / ft <sup>2</sup> )
100	6.93	74.65	1.04
** 125	5.52	59.39	0.83
160	5.27	56.69	0.79
200	6.33	68.10	0.95
** 250	6.28	67.58	0.94
315	5.76	61.99	0.87
400	5.91	63.64	0.89
** 500	6.64	71.52	1.00
630	6.75	72.63	1.01
800	6.57	70.74	0.99
** 1000	6.29	67.66	0.95
1250	5.38	57.87	0.81
1600	4.54	48.88	0.68
** 2000	3.69	39.75	0.56
2500	3.24	34.89	0.49
3150	2.98	32.11	0.45
** 4000	2.54	27.38	0.38
5000	2.18	23.48	0.33

**SAA = 0.85**

**NRC = 0.85**



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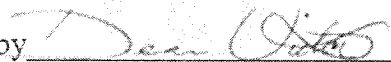
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### TEST RESULTS (Continued)

The sound absorption average (SAA) is defined as a single number rating, the average, rounded to the nearest 0.01, of the sound absorption coefficient of a material for the twelve one-third octave bands from 200 through 2500 Hz, inclusive.

The noise reduction coefficient (NRC) is defined from previous versions of this same test method as the average of the coefficients at 250, 500, 1000, and 2000 Hz, expressed to the nearest integral multiple of 0.05.

Tested by



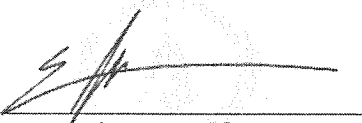
Dean Victor  
*Senior Experimentalist*

Report by



Miles Possing  
*Acoustician*

Approved by



Eric P. Wolfram  
*Laboratory Manager*



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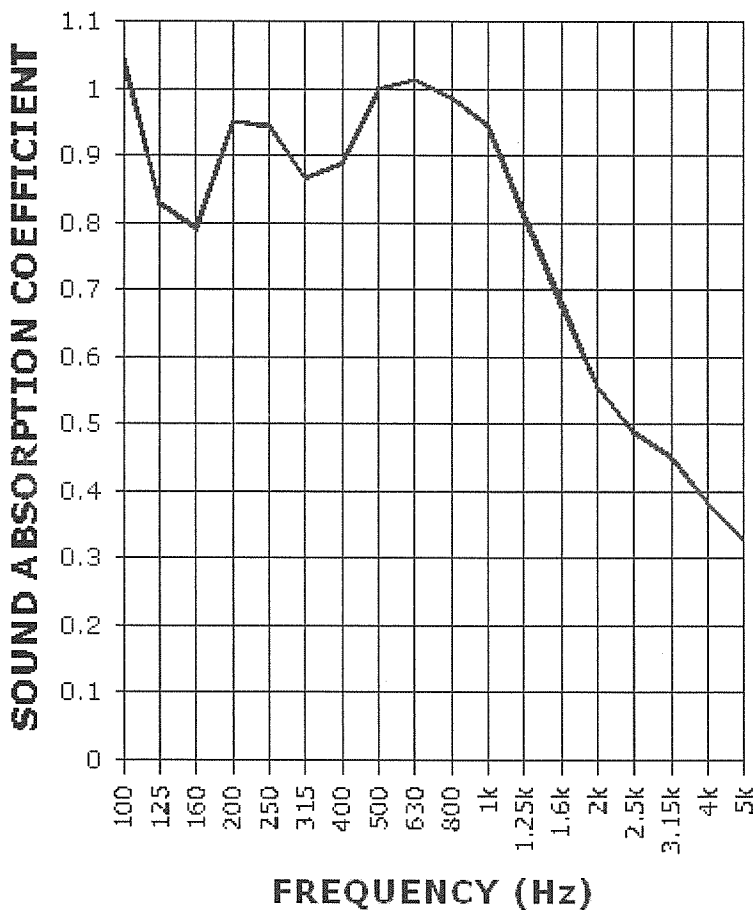
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## Test Report

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### SOUND ABSORPTION REPORT Perforated Tin Ceiling Tiles with acoustical pad



**SAA = 0.85**

**NRC = 0.85**



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## Test Report

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### APPENDIX A: Extended Frequency Range Data

Specimen: Perforated Tin Ceiling Tiles with acoustical pad (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)	Absorption Coefficient (Sabins / ft <sup>2</sup> )
31.5	27.96	0.39
40	31.05	0.43
50	75.12	1.05
63	39.39	0.55
80	48.03	0.67
100	74.65	1.04
125	59.39	0.83
160	56.69	0.79
200	68.10	0.95
250	67.58	0.94
315	61.99	0.87
400	63.64	0.89
500	71.52	1.00
630	72.63	1.01
800	70.74	0.99
1000	67.66	0.95
1250	57.87	0.81
1600	48.88	0.68
2000	39.75	0.56
2500	34.89	0.49
3150	32.11	0.45
4000	27.38	0.38
5000	23.48	0.33
6300	20.92	0.29
8000	17.32	0.24
10000	12.74	0.18
12500	3.33	0.05



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### APPENDIX B: Instruments of Traceability

Specimen: Perforated Tin Ceiling Tiles with acoustical pad (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 Analy	Type 3560-C	2647140	2016-04-12	2017-04-12
Bruel & Kjaer Mic And Pre	Type 4943-B-001	2311439	2016-03-17	2017-03-17
Bruel & Kjaer Pistonphone	Type 4228	2781248	2016-07-25	2017-07-25
EXTECH-Temp	SD700	A074985	2016-10-03	2017-10-03

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END



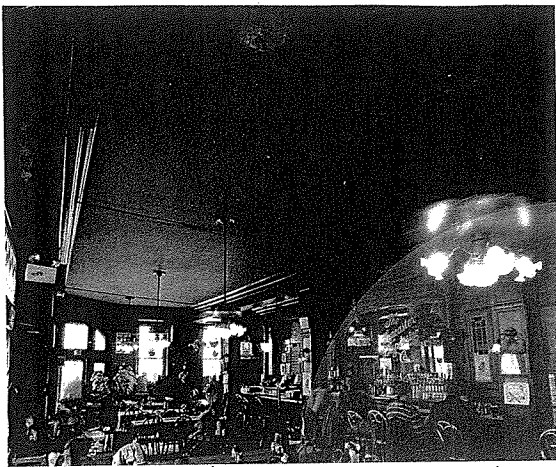
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**Before:** Plaster Ceiling

**After:** MetalWorks Tin 9/16" Tegular item 56003 Extra Microperforated in Copper with Filler Lay-in item 56009 Extra Microperforated in Copper



## Case Study

**Project:** Lancaster Dispensing Company

**Location:** Lancaster, PA

**Problem:** Space suffered acoustically from both high reverberation time and high levels of background noise; owner trying to upgrade the look of the space.

**Situation:** Plaster ceilings & walls, high ceiling, hardwood floors.

**Solution:** Installation of extra microperforated acoustical MetalWorks Tin ceiling panels backed with a fiberglass infill, reduced reverberation time by 44% and lowered background noise level up to 7 decibels.

### Lancaster Dispensing Company Acoustical Case Study

	Before	After
Reverberation Time (RT)	0.9 seconds	0.5 seconds
RT Reduction	-	44%
Occupied Noise Level in Decibels (dB)	72dB (15-25 people)	65dB (15-25 people)
	72dB (25-30 people)	67dB (25-30 people)

## Acoustical Performance

Total acoustical absorption for a suspended ceiling is calculated by multiplying the exposed surface area by the material NRC while "space absorbers" are directly measured. The installation of MetalWorks Tin extra microperforated panels in a reverberant space can significantly reduce the background noise and reverberation time, enhancing speech intelligibility. This can be extremely useful in high-traffic retail and hospitality spaces.

NOISE REDUCTION COEFFICIENT TESTS  
3100, 3120, 3141, 3144 PERFORATED PANELS  
RIVERBANK ACOUSTICAL LABORATORIES (RAL)

	INSULATION	NRC	TEST DATE	RAL TEST NO.
3100	PERF. 1-1/2 in. x 1-1/2 PCF	.8	1/9/92	RAL-A92-17
3100	PERF. 1-1/2 in. x 1 PCF	.85	1/9/92	RAL-A92-18
3100	PERF. 1 in. x 1-1/2 PCF	.8	1/9/92	RAL-A92-16
3100	PERF. 1 in. x 1 PCF	.75	1/9/92	RAL-A92-15
3120	PERF. 1-1/2 in. x 1-1/2 PCF	.55	1/10/92	RAL-A92-20
3120	PERF. 1-1/2 in. x 1 PCF	.6	1/10/92	RAL-A92-19
3120	PERF. 1 in. x 1-1/2 PCF	.65	1/10/92	RAL-A92-21
3120	PERF. 1 in. x 1 PCF	.6	1/10/92	RAL-A92-22
3141	PERF. 1-1/2 in. x 1-1/2 PCF	.9	1/8/92	RAL-A92-10
3141	PERF. 1-1/2 in. x 1 PCF	.9	1/8/92	RAL-A92-9
3141	PERF. 1 in. x 1-1/2 PCF	.85	1/8/92	RAL-A92-7
3141	PERF. 1 in. x 1 PCF	.8	1/8/92	RAL-A92-8
3141	PERF* 1-1/2 in. x 1-1/2 PCF	.9	1/10/92	RAL-A92-23
3144	PERF. 1-1/2 in. x 1-1/2 PCF	.85	1/9/92	RAL-A92-11
3144	PERF. 1-1/2 in. x 1 PCF	.85	1/9/92	RAL-A92-12
3144	PERF. 1 in. x 1-1/2 PCF	.85	1/9/92	RAL-A92-13
3144	PERF. 1 in. x 1 PCF	.8	1/9/92	RAL-A92-14

NOTE: 3100, 3141, 3144 utilized a 1/16 in. dia. round hole on .216 in. staggered reverse centers. Open area = 7.5%.

3120 utilized a 9/16 in. dia. round hole on 1-5/16 straight centers with an unperforated border of 2-7/16 in. Open area = 9.9%.

\* Panels only--No grid was used for comparison to RAL-A92-10..

All insulation used was encapsulated with a 2.25 mil thick plastic bag.

15/16 in. wide grid was used to frame each panel in all tests except RAL-A92-23 where no grid was used.



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### TEST REPORT FOR TRI-CITY INSULATION DISTRIBUTORS, INC.

Report No.: I2606.02-121-24

Date: 05/01/18

#### SCOPE

Intertek Building & Construction (B&C) was contracted by Tri-City Insulation Distributors, Inc., Linden, New Jersey, to evaluate the flame spread and smoke developed properties. Testing was conducted at the Intertek B&C test facility in York, Pennsylvania. Results obtained are tested values and were secured by using the designated test method(s). A summary of test results and the complete graphical test data is reported herein.

This report does not constitute performance certification of this product nor an opinion or endorsement by this laboratory.

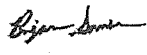
#### SUMMARY OF TEST RESULTS


Specimen I.D.: MWPE by Tri-City Insulation Distributors, Inc.

##### ASTM E84 Test Results

FLAME SPREAD INDEX	SMOKE DEVELOPED INDEX
0	5

For INTERTEK B&C:

COMPLETED BY: Ben Samson  
 TITLE: Technician – Fire Testing  
 SIGNATURE:   
Digitally Signed by: Benjamin Samson  
 DATE: 05/01/18

REVIEWED BY: Ethan Grove  
 TITLE: Manager – Fire Testing  
 SIGNATURE:   
Digitally Signed by: Ethan Grove  
 DATE: 05/01/18

BTS:ddr

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SGS U.S. Testing Company Inc.

US-D-076 04-03.1

Report No.:

149468

DATE: December 14, 2000

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CLIENT: Tri-City Insulation Distributors Inc.

**INTRODUCTION:**

This report presents test results of Flame Spread and Smoke Developed Values per ASTM E-84-98. The report also includes Material Identification, Method of Preparation, Mounting and Conditioning of the specimens.

The tests were performed in accordance with the specifications set forth in ASTM E-84-98, Standard Test Method for Surface Burning Characteristics of Building Materials, both as to equipment and test procedure. This test procedure is similar to UL-723, ANSI No. 2.5, NFPA No. 255 and UBC 42-1.

The test results cover two parameters: Flame Spread and Smoke Developed Values during a 10-minute fire exposure. Inorganic cement board and red oak flooring are used as comparative standards and their responses are assigned arbitrary values of 0 and 100, respectively.

**PREPARATION AND CONDITIONING:**

Sections of the material were arranged to form a 24" x 24" sample. The sample was laid on a 2-inch galvanized hexagonal wire mesh, supported by steel rods spanning the width of the tunnel.

The sample was conditioned at  $73^{\circ} \pm 5^{\circ}$  Fahrenheit and  $50 \pm 5\%$  relative humidity.

**TEST PROCEDURE:**

The tunnel was thoroughly pre-heated by burning natural gas. When the brick temperature, sensed by a floor thermocouple, had reached the prescribed  $105^{\circ}$  Fahrenheit  $\pm 5^{\circ}$  Fahrenheit level, the sample was inserted in the tunnel and test conducted in accordance with the standard ASTM E-84-98 procedures.

The operation of the tunnel was checked by performing a 10-minute test with Inorganic board on the day of the test.