

Test Report

SPONSOR: **Vulcraft-Verco Group**
Norfolk, NE

Sound Absorption
RAL™-A19-223

CONDUCTED: 2019-05-29

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ON: Roof Deck Assembly - 3.5DA, plastic mesh, 3.0 pcf encapsulated fiberglass, DensDeck

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 17025:2005 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 Roof Deck Assembly - 3.5DA, plastic mesh, 3.0 pcf encapsulated fiberglass, DensDeck. 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

Corrugated Metal

Designation: 3.5DA
Manufacturer: Vulcraft-Verco Group

Insulation

Density: 48.1 kg/m³ (3.0 lbs/ft³)

SPECIMEN MEASUREMENTS & TEST CONDITIONS

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

Roofing Board

Trade Name: DensDeck
Materials: Gypsum board with glass mat facing
Dimensions: 4 @ 1219.2 mm (48 in.) x 1219.2 mm (48 in.)
2 @ 1219.2 mm (48 in.) x 304.8 mm (12 in.)
Thickness: 12.7 mm (0.5 in.)
Overall Weight: 69.85 kg (154 lbs)
Mass per Unit Area: 10.44 kg/m² (2.14 lbs/ft²)

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Insulation

Materials: Fiberglass insulation, encapsulated in polyethylene bags
Dimensions: 12 @ 2743.2 mm (108 in.) x 139.7 mm (5.5 in.)
Thickness: 88.9 mm (3.5 in.)
Installation: Inserted in ribs of corrugated metal (see below)
Overall Weight: 21.77 kg (48 lbs)

Corrugated Metal

Dimensions: 4 @ 2743.2 mm (108 in.) x 647.7 mm (25.5 in.)
Depth: 88.9 mm (3.5 in.)
Metal Thickness: 0.97 mm (0.038 in.)
Top Rib Opening: 25.4 mm (1 in.)
Bottom Rib Opening: 76.2 mm (3 in.)
Pitch: 203.2 mm (8 in.)
Perforations: Long flanges perforated
Circular holes @ 3.96 mm (0.156 in.) diameter
Triangular pitch @ 9.52 mm (0.375 in.) on center
Approximately 15.7 % open area
Installation: Loose laid over roofing board, perforations exposed to sound field
Joints overlapped at short flange, no fasteners
Overall Weight: 102.28 kg (225.5 lbs)

Plastic Mesh

Material: Plastic fibers bonded in square mesh
Dimensions: 12 @ 2743.2 mm (108 in.) x 165.1 mm (6.5 in.)
Thickness: 2.54 mm (0.1 in.)
Spacing: 1.5 mm (0.059 in.) thick fibers spaced 8.5 mm (0.335 in.) on center
Installation: Inserted between insulation and perforated metal flanges
Overall Weight: 1.81 kg (4 lbs)

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Overall Specimen Properties

Size: 2.74 m (108.0 in) wide by 2.5 m (98.5 in) long
Thickness: 0.1 m (4.0 in)
Weight: 195.73 kg (431.5 lbs)
Mass per Unit Area: 28.52 kg/m² (5.84 lbs/ft²)
Calculation Area: 6.864 m² (73.88 ft²)

Test Environment

Room Volume: 291.98 m³
Temperature: 21.4 °C ± 0.1 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity: 63.9 % ± 0.8 % (Requirement: ≥ 40 % and ≤ 5 % change)
Barometric Pressure: 98.1 kPa (Requirement not defined)

MOUNTING METHOD

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

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Figure 1 – Specimen mounted in test chamber



Figure 2 – Detail of specimen composition

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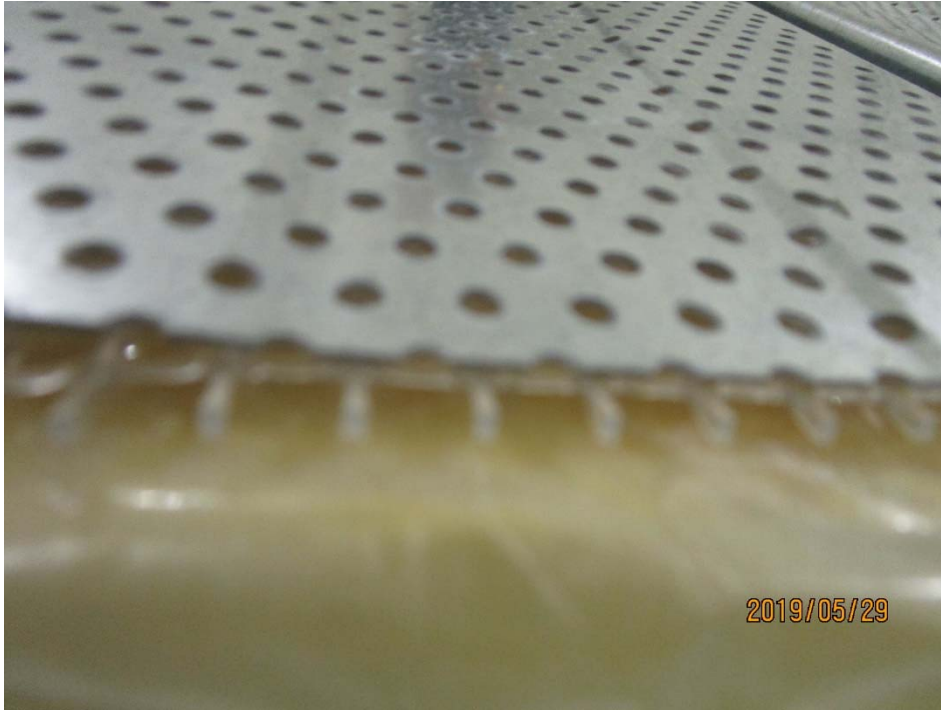


Figure 3 – Plastic mesh between insulation and perforated flange

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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 ²)	Total Absorption (Sabins)	Absorption Coefficient
100	2.47	26.59	0.36
** 125	3.85	41.43	0.56
160	4.88	52.54	0.71
200	7.09	76.33	1.03
** 250	7.55	81.22	1.10
315	8.17	87.95	1.19
400	8.46	91.08	1.23
** 500	7.75	83.47	1.13
630	6.86	73.83	1.00
800	6.63	71.39	0.97
** 1000	6.27	67.45	0.91
1250	6.25	67.31	0.91
1600	6.42	69.05	0.93
** 2000	6.46	69.50	0.94
2500	5.93	63.88	0.86
3150	5.13	55.20	0.75
** 4000	4.41	47.45	0.64
5000	4.00	43.03	0.58

SAA = 1.02
NRC = 1.00

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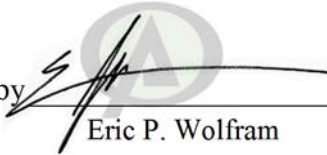
TEST RESULTS (continued)

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
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Report by 
Malcolm Kelly
Acoustical Test Engineer

Approved by 
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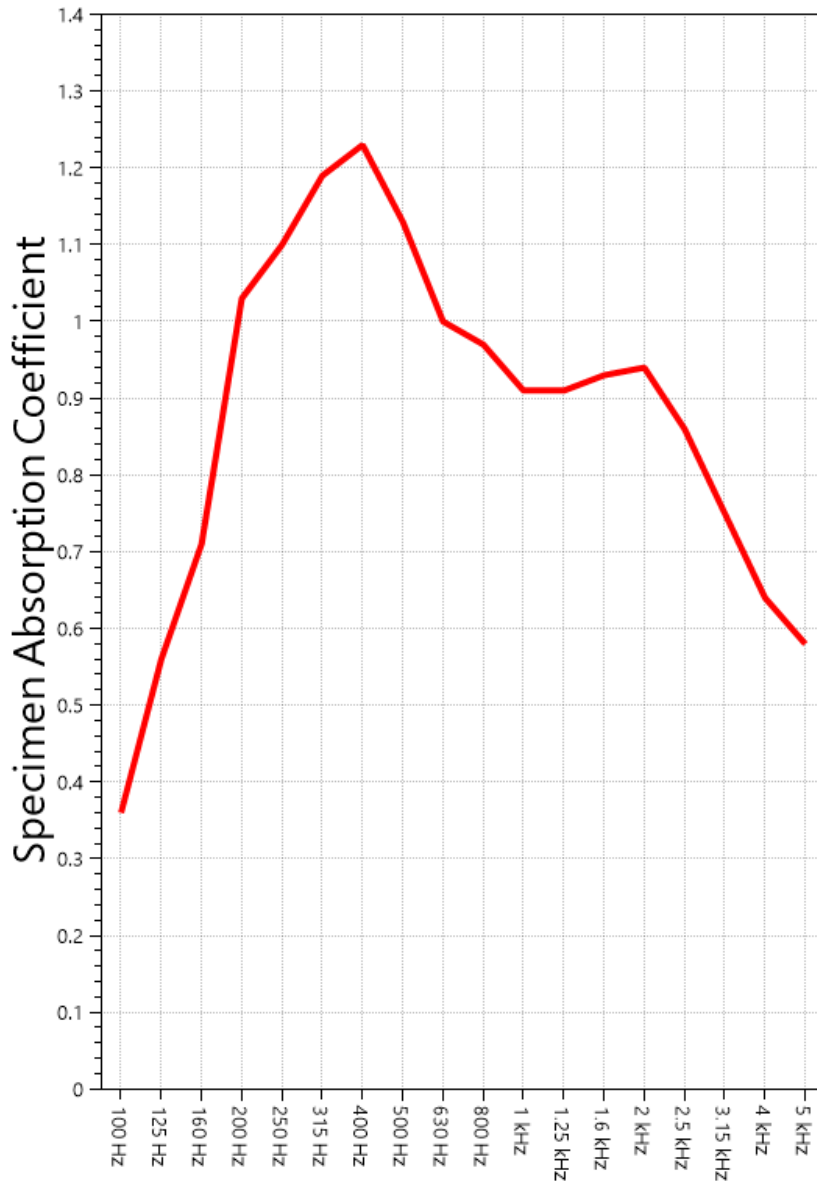
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SOUND ABSORPTION REPORT

Roof Deck Assembly - 3.5DA, plastic mesh, 3.0 pcf encapsulated fiberglass, DensDeck



Frequency (Hz)

SAA = 1.02

NRC = 1.00



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APPENDIX A: Extended Frequency Range Data

Specimen: Roof Deck Assembly - 3.5DA, plastic mesh, 3.0 pcf encapsulated fiberglass, DensDeck (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	-2.36	-0.03
40	0.82	0.01
50	4.02	0.05
63	13.70	0.19
80	7.77	0.11
100	26.59	0.36
125	41.43	0.56
160	52.54	0.71
200	76.33	1.03
250	81.22	1.10
315	87.95	1.19
400	91.08	1.23
500	83.47	1.13
630	73.83	1.00
800	71.39	0.97
1000	67.45	0.91
1250	67.31	0.91
1600	69.05	0.93
2000	69.50	0.94
2500	63.88	0.86
3150	55.20	0.75
4000	47.45	0.64
5000	43.03	0.58
6300	41.19	0.56
8000	46.16	0.62
10000	48.95	0.66
12500	48.11	0.65



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APPENDIX B: Instruments of Traceability

Specimen: Roof Deck Assembly - 3.5DA, plastic mesh, 3.0 pcf encapsulated fiberglass, DensDeck (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	2018-08-09	2019-08-09
Bruel & Kjaer Mic And Preamp A	Type 4943-B-001	2311428	2018-09-28	2019-09-28
Bruel & Kjaer Pistonphone	Type 4228	2781248	2018-08-06	2019-08-06
EXTECH Hygro 662	SD700	A083662	2018-11-29	2019-11-29

APPENDIX C: Revisions to Original Test Report

Specimen: Roof Deck Assembly - 3.5DA, plastic mesh, 3.0 pcf encapsulated fiberglass, DensDeck (See Full Report)

<u>Date</u>	<u>Revision</u>
2019-06-07	Original report issued

END