1512 S BATAVIA AVENUE
GENEVA, IL 60134

630-232-0104

An ALION Technical Center

Test Report

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FOUNDED 1918 BY
WALLACE CLEMENT SABINE

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

Sound Absorption
RAL™-A19-220

CONDUCTED: 2019-05-29

ON: Roof Deck Assembly - 3.5DA, plastic mesh, 3.0 pcf fiberglass insulation, 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 fiberglass insulation, 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/m^3 (3.0 lbs/ft^3)

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/m^2 (2.14 lbs/ft^2)

Insulation

Materials:	Fiberglass insulation
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:	20.98 kg (46.25 lbs)
Density:	51.31 kg/m^3 (3.20 lbs/ft^3)

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)

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:	194.93 kg (429.75 lbs)
Mass per Unit Area:	28.4 kg/m² (5.82 lbs/ft²)
Calculation Area:	6.863 m² (73.87 ft²)

Test Environment

Room Volume:	291.98 m³
Temperature:	21.3 °C ± 0.0 °C (Requirement: ≥ 10 °C and ≤ 5 °C change)
Relative Humidity:	63.3 % ± 0.2 % (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.

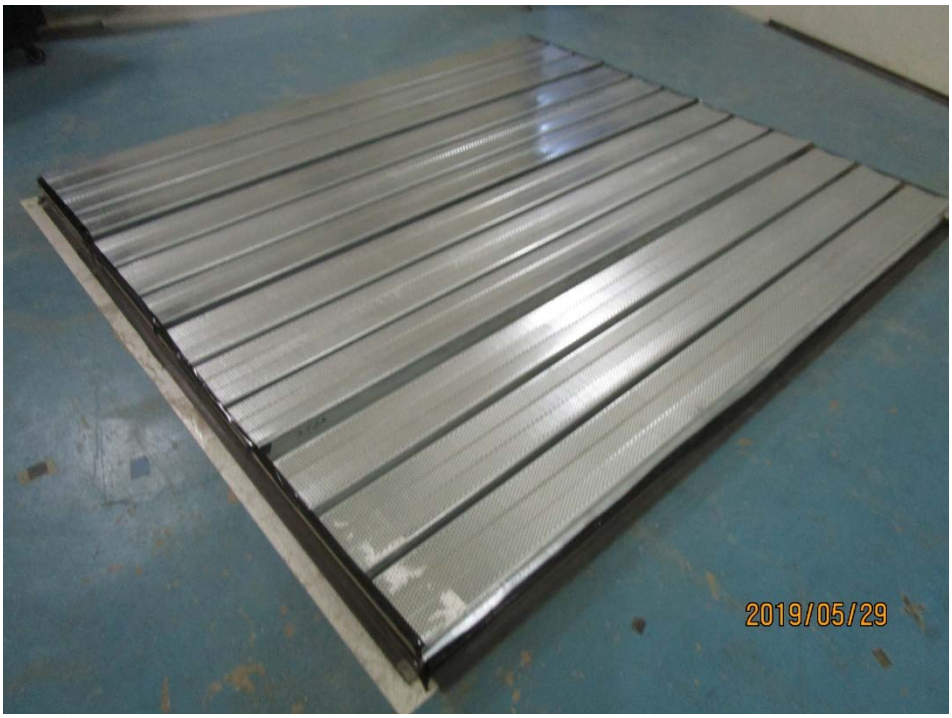

Figure 1 – Specimen mounted in test chamber

Figure 2 – Detail of specimen composition

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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	1.79	19.30	0.26
** 125	2.24	24.11	0.33
160	3.37	36.22	0.49
200	4.97	53.54	0.72
** 250	6.52	70.19	0.95
315	8.05	86.66	1.17
400	8.43	90.77	1.23
** 500	8.24	88.69	1.20
630	7.04	75.81	1.03
800	6.97	75.01	1.02
** 1000	6.84	73.68	1.00
1250	6.98	75.16	1.02
1600	6.83	73.49	0.99
** 2000	6.61	71.14	0.96
2500	5.90	63.52	0.86
3150	5.39	58.06	0.79
** 4000	5.11	54.99	0.74
5000	4.82	51.87	0.70

SAA = 1.01
NRC = 1.05

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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
Senior Experimentalist

Report by _____
Malcolm Kelly
Acoustical Test Engineer

Approved by _____
Eric P. Wolfram
Laboratory Manager

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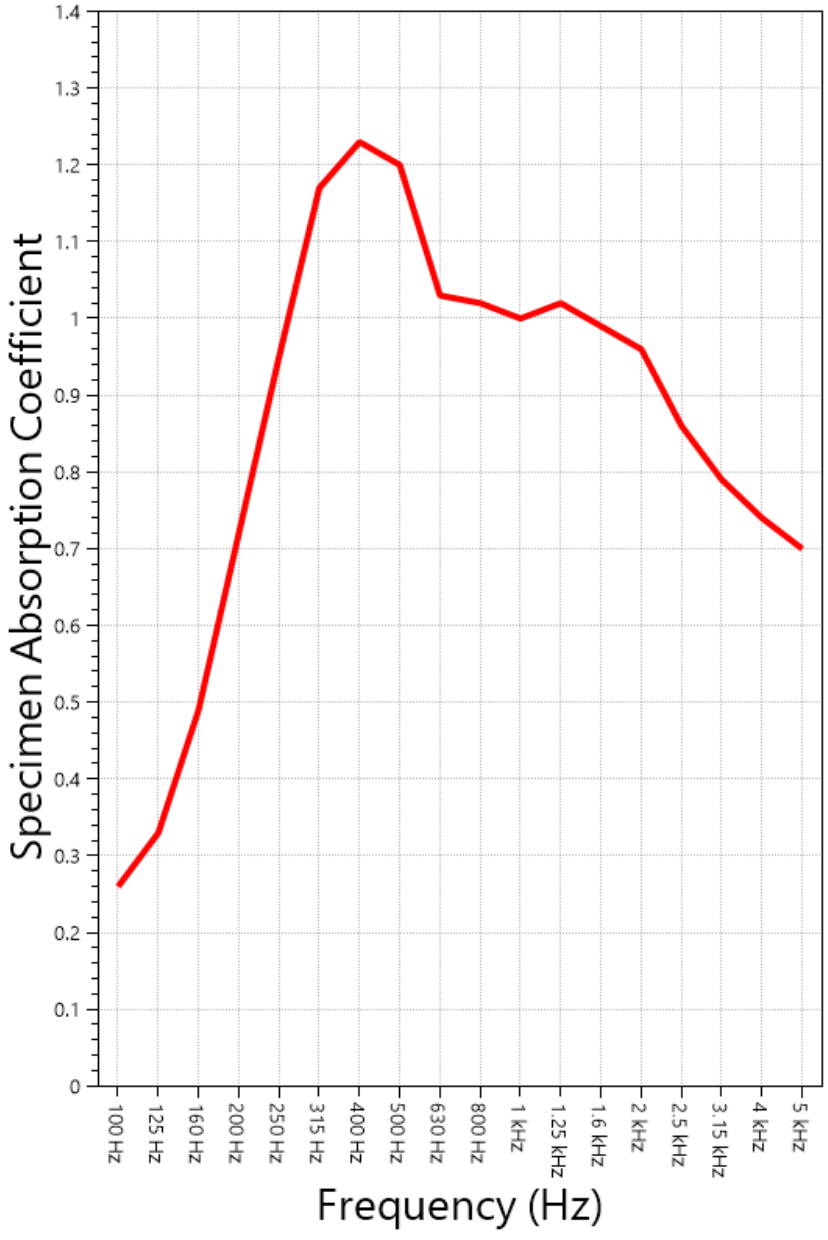
Date: 2019.06.07 14:23:41 -05'00'

SOUND ABSORPTION REPORT

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



SAA = 1.01
NRC = 1.05

APPENDIX A: Extended Frequency Range Data

Specimen: Roof Deck Assembly - 3.5DA, plastic mesh, 3.0 pcf fiberglass insulation, 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	7.12	0.10
40	-4.30	-0.06
50	0.62	0.01
63	7.01	0.09
80	7.71	0.10
100	19.30	0.26
125	24.11	0.33
160	36.22	0.49
200	53.54	0.72
250	70.19	0.95
315	86.66	1.17
400	90.77	1.23
500	88.69	1.20
630	75.81	1.03
800	75.01	1.02
1000	73.68	1.00
1250	75.16	1.02
1600	73.49	0.99
2000	71.14	0.96
2500	63.52	0.86
3150	58.06	0.79
4000	54.99	0.74
5000	51.87	0.70
6300	48.58	0.66
8000	45.21	0.61
10000	38.49	0.52
12500	31.82	0.43

APPENDIX B: Instruments of Traceability

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

Description	Model	Serial Number	Date of Certification	Calibration Due
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 fiberglass insulation, DensDeck (See Full Report)

Date	Revision
2019-06-06	Original report issued

END