

RIVERBANK ACOUSTICAL LABORATORIES

1512 S BATAVIA AVENUE
GENEVA, IL 60134

An ALION Technical Center

RIVERBANK.ALIONSCIENCE.COM

630-232-0104

Test Report

FOUNDED 1918 BY
WALLACE CLEMENT SABINE

SPONSOR: **Avalon International Aluminum, LLC**
Tualatin, OR

Sound Transmission Loss
RAL™-TL21-348

CONDUCTED: 2021-11-29

Page 1 of 10

ON: Tacitus / Eagle System

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 E90-09 (2016): "Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements." The single number rating of the specimen was calculated according to ASTM E413-16: "Classification for Rating Sound Insulation." A description of the measurement procedure and room specifications is available upon request. The transmission loss values are for a single direction of measurement. 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 Tacitus / Eagle System. 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: Tacitus / Eagle
Manufacturer: Avalon International Aluminum, LLC
Glazing: Lam .2214 @ 5/32" clear tp rs, 30clear, 5/32" clear tp rs
Lam 0.342 @ 3/16" clear an rs, 60clear, 3/16" clear an rs
GLS 1321 @ 1/4" lami clear 0.30 a
Lam 2681 @ 1/4" clear an, 30clear, 1/4" clear an

SPECIMEN MEASUREMENTS & TEST CONDITIONS

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

Test Specimen

Materials: Double-double laminated glass separated by gap in metal frame
Frame Dimensions: 1211.3 mm (47.6875 in.) by 2432 mm (95.75 in.)
Frame Depth: 150.8 mm (5.9375 in.)
Glazing Composition*: Source side exterior @ 7.94 mm (0.3125 in.)
Source side gap @ 3.37 mm (0.1328 in.)
Source side interior @ 11.11 mm (0.4375 in.)
Middle air gap @ 92.07 mm (3.625 in.)



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Test Specimen (continued)

Glazing Composition*: Receive side exterior @ 12.7 mm (0.5 in.)
Receive side gap @ 1.19 mm (0.046875 in.)
**Receive side interior @ 6.35 mm (0.25 in.)
Daylight Opening: 1135.1 mm (44.6875 in.) by 2349.5 mm (92.5 in.)
Overall Weight: 266.26 kg (587 lbs)

*Note: Glass composition measurements are the arithmetic average of two interferometer measurements taken at the edge and center of each glazing assembly.

**Note: Test specimen receive side inner glass was cracked and sealed prior to arriving at RAL. Effects of cracks and sealant on acoustical performance undetermined.

Overall Specimen Measurements

Dimensions: 1.21 m (47.687 in) wide by 2.43 m (95.75 in) high
Thickness: 150.8 mm (5.9375 in.)
Weight: 266.26 kg (587.0 lbs)
Overall Area: 2.946 m² (31.71 ft²)
Mass per Unit Area: 90.38 kg/m² (18.51 lbs/ft²)

Test Aperture

Opening Size: 1.22 m (4.0 ft.) by 2.44 m (8.0 ft.)
Filler Wall: None
Aperture Size: 1.21 m (47.687 in) wide by 2.43 m (95.75 in) high
Transmission Area: 2.946 m² (31.71 ft²)
Sealed: Entire periphery (both sides) with dense mastic

Test Environment

Source Room

Volume: 178.33 m³
Temperature: 21.7 °C ± 0.0 °C
Relative Humidity: 48.5 % ± 1.0 %

Receive Room

Volume: 131.26 m³
Temperature: 22.2 °C ± 0.0 °C
Relative Humidity: 50.0 % ± 0.0 %

Requirements

Temperature: 22° C +/- 2° C, not more than 3° C change over all tests.
Relative Humidity: ≥ 30%, not more than +/- 3% change over all tests.

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Figure 1 – Specimen mounted in test opening, as viewed from source room (left) and receive room (right)



Figure 2 – Test specimen prior to installation in test openings

Proprietary

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TEST RESULTS

Sound transmission loss values are tabulated at the eighteen standard frequency bands. A graphic presentation of the data and additional information appear on the following pages. The precision of the transmission loss test data is within the limits set by the ASTM Standard E90-09 (2016). See Appendix A for identification of corrections applied to the reported data.

<u>FREQ.</u>	<u>TL</u>	<u>ΔTL</u>	<u>DEF.</u>	<u>FREQ.</u>	<u>TL</u>	<u>ΔTL</u>	<u>DEF.</u>
100	37	0.70	0	800	53	0.19	2
125	43	0.61	0	1000	55	0.21	1
160	36	0.66	4	1250	55	0.19	2
200	40	0.53	3	1600	56	0.16	1
250	45	0.33	1	2000	59	0.15	0
315	45	0.32	4	2500	62	0.13	0
400	46	0.18	6	3150	63	0.16	0
500	49	0.17	4	4000	65	0.18	0
630	52	0.23	2	5000	66	0.19	0

STC=53

ABBREVIATION INDEX

FREQ. = 1/3 OCTAVE BAND CENTER FREQUENCY, Hz

TL = TRANSMISSION LOSS, dB

ΔTL = 95% CONFIDENCE INTERVAL FOR TL MEASUREMENTS, dB

DEF. = DEFICIENCIES, dB BELOW SHIFTED STC CONTOUR (SUM OF DEF = 30)

STC = SOUND TRANSMISSION CLASS

Tested by

Marc Sciaky
Marc Sciaky
Senior Experimentalist

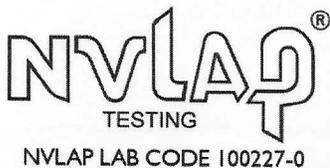
Report by

Keith Kimberling
Keith Kimberling
Associate Test Engineer

Approved by

Eric P. Wolfram
Eric P. Wolfram
Laboratory Manager

Digitally signed
by Eric P Wolfram
Date: 2021.12.14
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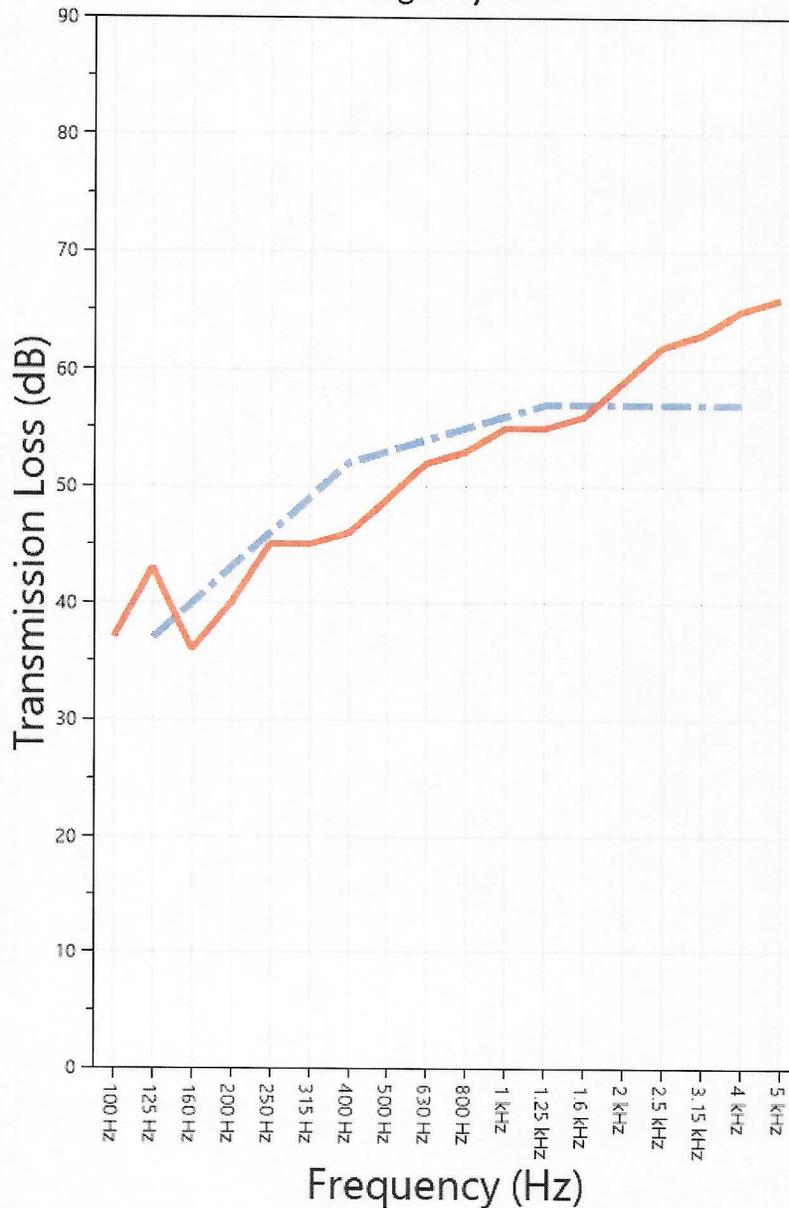
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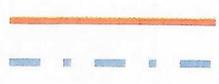
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SOUND TRANSMISSION REPORT

Tacitus / Eagle System



STC=53
OITC=46



TRANSMISSION LOSS
SOUND TRANSMISSION CLASS CONTOUR



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APPENDIX A: Extended Frequency Range Data

Specimen: Tacitus / Eagle System (See Full Report)

The following non-accredited data were obtained in accordance with ASTM E90-09 (2016), 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. Sampling precision observed during this procedure is reported below. Corrections are detailed in Appendix B.

1/3 Octave Band Center Frequency (Hz)	Sound Transmission Loss (dB)	Applicable Corrections	Δ TL (Eq. A2.5) (dB)	Repeatability (dB)
31.5	18	F	0.85	1.24
40	16		1.31	1.44
50	20		1.12	0.98
63	26		1.01	2.33
80	34	F	0.56	1.46
100	37		0.70	0.77
125	43	F	0.61	1.28
160	36		0.66	1.18
200	40		0.53	0.74
250	45		0.33	0.53
315	45		0.32	0.46
400	46		0.18	0.41
500	49		0.17	0.41
630	52		0.23	0.32
800	53		0.19	0.30
1000	55		0.21	0.29
1250	55		0.19	0.15
1600	56		0.16	0.18
2000	59		0.15	0.12
2500	62		0.13	0.28
3150	63		0.16	0.23
4000	65		0.18	0.18
5000	66		0.19	0.26
6300	67	AF	0.18	0.28
8000	63	AF	0.21	0.67
10000	55	AAF	0.27	0.93
12500	43		0.42	1.93



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APPENDIX B: Glossary of Standardized Corrections and Adjustments

Specimen: Tacitus / Eagle System (See Full Report)

<u>Mark</u>	<u>Interpretation</u>
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<i>A</i>	Measured sound pressure levels in the receive room are within 10 dB of the ambient noise level at the marked frequency band. Receive room levels used to calculate Transmission Loss are corrected according to ASTM E90 Section 10.3.
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<i>AA</i>	Measured sound pressure levels in the receive room are within 5 dB of the ambient noise level at the marked frequency band. Receive room levels used to calculate Transmission Loss are corrected according to ASTM E90 Section 10.3.1. Transmission Loss values calculated from levels corrected this way will be less than or equal to Transmission Loss values from a hypothetical test using the same specimen and a receive room with idealized ambient sound levels of $(-\infty)$ dB.
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<i>F</i>	The reported Transmission Loss is within 10 dB of the laboratory flanking limit at the marked frequency band. The measured performance of the specimen may be limited by the performance of the laboratory building structure at this frequency band.
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<i>Z</i>	The reported Transmission Loss at the marked frequency band has been corrected according to ASTM E90 Section A3.2.7 to account for possible sound transmission through the filler assembly.
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<i>ZZ</i>	The reported Transmission Loss at the marked frequency band has been corrected according to ASTM E90 Section A3.2.8 to account for possible sound transmission through the filler assembly. Transmission Loss values corrected this way will be less than or equal to Transmission Loss values from a hypothetical test using the same specimen and an idealized filler assembly with a Sound Transmission Class rating of (∞) .
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APPENDIX C: Glossary of Variability Metrics

Specimen: Tacitus / Eagle System (See Full Report)

Δ TL, the 95% confidence interval for reported transmission loss values, is calculated from the standard deviation of the sets of measurements for source room sound pressure level, receive room sound pressure level, and receive room sound absorption. This metric is calculated in an effort to quantify the combined influences of room geometry, microphone positioning, and other varying environmental conditions on reported results.

Repeatability, expressed as a 95% confidence interval, is calculated from the standard deviation of transmission loss as obtained from a set of six (6) consecutive tests conducted according to this test method by RAL on 2020-02-24. The tests were performed on a specimen composed of welded aluminum tubing, using the same test opening as used in this report. This metric provides an estimate of the variation in results that might be observed if the test were repeated with no change to the installed specimen. Note that repeatability will vary with the construction type.

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APPENDIX D: Determination of Outdoor Indoor Transmission Class (OITC)

Specimen: Tacitus / Eagle System (See Full Report)

The determination of the Outdoor Indoor Transmission Class (OITC) as reported below was made with explicit conformity to the procedures described in the ASTM E1332-16 test standard. Test Method ASTM E90-09 (2016) was used to obtain the sound transmission loss data. This rating is based on an average transportation noise source spectrum and an A-weighted sound level reduction, either of which may be inappropriate for some applications.

One-third Octave Band Center Frequency, Hz	Reference Sound Spectrum, dB	Test Specimen Transmission Loss, dB
80	103	34
100	102	37
125	101	43
160	98	36
200	97	40
250	95	45
315	94	45
400	93	46
500	93	49
630	91	52
800	90	53
1000	89	55
1250	89	55
1600	88	56
2000	88	59
2500	87	62
3150	85	63
4000	84	65

OITC = 46

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APPENDIX E: Instruments of Traceability

Specimen: Tacitus / Eagle System (See Full Report)

<u>Description</u>	<u>Model</u>	<u>Serial Number</u>	<u>Date of Certification</u>	<u>Calibration Due</u>
System 2	Type 3160-A-042	3160-106974	2021-08-13	2022-08-13
Bruel & Kjaer Mic And Preamp E	Type 4943-B-001	2311441	2021-04-16	2022-04-16
Bruel & Kjaer Pistonphone	Type 4228	2781248	2021-08-13	2022-08-13
EXTECH Hygro 662	SD700	A083662	2020-12-18	2021-12-18
EXTECH Hygro 663	SD700	A083663	2020-12-18	2021-12-18

APPENDIX F: Revisions to Original Test Report

Specimen: Tacitus / Eagle System (See Full Report)

<u>Date</u>	<u>Revision</u>
2021-12-06	Original report issued

END