

1512 S BATAVIA AVENUE  
GENEVA, IL 60134  
630-232-0104

An ALION Technical Center

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FOUNDED 1918 BY  
WALLACE CLEMENT SABINE

## Test Report

SPONSOR: **Riverbank Acoustical Laboratories**  
Geneva, IL

**Sound Transmission Loss**  
**RAL™-TL21-080**

CONDUCTED: 2021-02-26

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ON: 8 inch thick solid core concrete (no ceiling)

### 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 8 inch thick solid core concrete (no ceiling). 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

Material: Solid core concrete; local aggregate, grey cement  
Manufacturer: Dukane Precast

### SPECIMEN MEASUREMENTS & TEST CONDITIONS

The construction contractor (Seth Priser) and RAL staff compiled a detailed construction specification as follows, in order of installation:

#### Concrete Slab

Material: Precast concrete  
Dimensions: 4 @ 610 mm (24 in.) x 4267 mm (168 in.)  
Thickness: 203 mm (8 in.)  
Overall Weight: 5023.08 kg (11074 lbs)  
Mass per Unit Area: 482.75 kg/m<sup>2</sup> (98.875 lbs/ft<sup>2</sup>)  
Installation: Laid in test opening over 152.4 mm (6 in.) wide knee walls constructed from isolated wood framing  
Joint undersides sealed with acoustical caulk and tape  
Top of joints filled with general purpose sand, sealed with premixed masonry joint compound

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### Overall Specimen Measurements

Dimensions: 2.44 m (96.0 in) wide by 4.27 m (168 in.) long  
Thickness: 0.2 m (8.0 in)  
Weight: 5023.08 kg (11074.0 lbs)  
Overall Area: 10.405 m<sup>2</sup> (112 ft<sup>2</sup>)  
Mass per Unit Area: 482.75 kg/m<sup>2</sup> (98.88 lbs/ft<sup>2</sup>)

### Test Aperture

Opening Size: 4.27 m (14.0 ft) x 6.10 m (20.0 ft)  
Filler Wall: Yes  
Aperture Size: 2.44 m (96.0 in) wide by 3.86 m (152.0 in) long  
Transmission Area: 9.414 m<sup>2</sup> (101.33 ft<sup>2</sup>)  
Sealed: Entire periphery (both sides) with dense mastic

### Test Environment

#### Source Room

Volume: 130.71 m<sup>3</sup>  
Temperature: 22.9 °C ± 0.0 °C  
Relative Humidity: 40.65 % ± 0.1 %

#### Receive Room

Volume: 82.6 m<sup>3</sup>  
Temperature: 23.4 °C ± 0.1 °C  
Relative Humidity: 39.85 % ± 0.9 %

#### 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.



NVLAP LAB CODE 100227-0

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Figure 1 – Specimen mounted in test opening, as viewed from source room



Figure 2 – Specimen mounted in test opening, as viewed from receive room

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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	38	0.57	0	800	61	0.38	0
125	44	0.89	0	1000	64	0.34	0
160	42	0.82	3	1250	66	0.36	0
200	44	0.35	4	1600	69	0.37	0
250	44	0.50	7	2000	69	0.42	0
315	52	0.22	2	2500	73	0.38	0
400	52	0.23	5	3150	75	0.36	0
500	55	0.26	3	4000	76	0.35	0
630	57	0.25	2	5000	78	0.41	0

STC=58

### 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 = 26)
- STC = SOUND TRANSMISSION CLASS

Tested by *Marc Sciaky*  
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 Malcolm Kelly  
 Test Engineer, Acoustician

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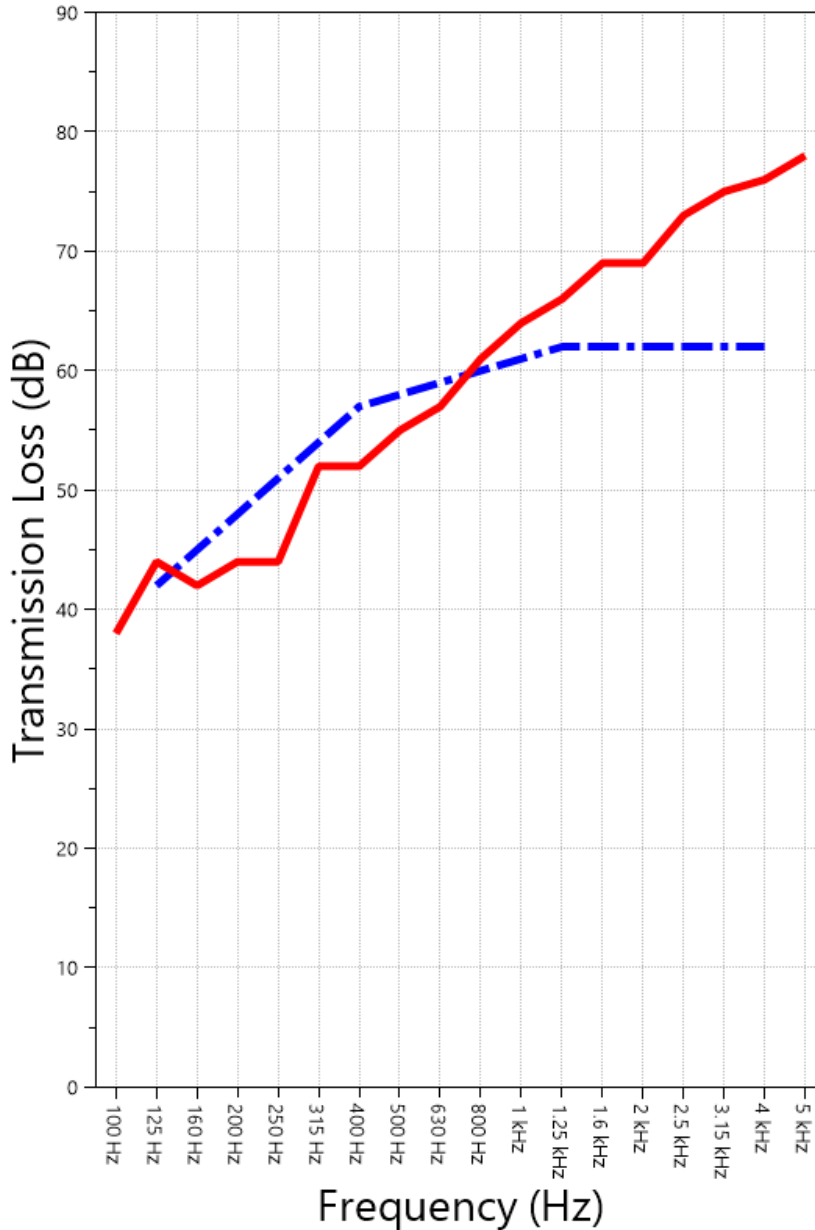
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### SOUND TRANSMISSION REPORT

8 inch thick solid core concrete (no ceiling)



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**TRANSMISSION LOSS**

**SOUND TRANSMISSION CLASS CONTOUR**

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### APPENDIX A: Extended Frequency Range Data

Specimen: 8 inch thick solid core concrete (no ceiling) (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	ΔTL (Eq. A2.5) (dB)	Repeatability (dB)
31.5	36	ZZ F	1.41	16.75
40	36	ZZ F	1.38	5.77
50	35	ZZ F	1.54	3.98
63	34	ZZ F	0.62	0.75
80	36	ZZ F	0.79	1.46
100	38	ZZ F	0.57	3.83
125	44	ZZ F	0.89	0.97
160	42	Z F	0.82	1.35
200	44	ZZ F	0.35	1.21
250	44	Z F	0.50	0.56
315	52	Z F	0.22	0.61
400	52	Z F	0.23	0.76
500	55	Z F	0.26	0.58
630	57	Z F	0.25	1.03
800	61	Z F	0.38	0.34
1000	64	Z F	0.34	0.78
1250	66	Z F	0.36	1.09
1600	69	Z	0.37	1.47
2000	69	Z	0.42	1.14
2500	73	Z	0.38	0.87
3150	75		0.36	0.90
4000	76		0.35	1.95
5000	78	Z A	0.41	3.09
6300	75	Z A	0.48	5.31
8000	71	Z	0.46	7.87
10000	64	Z A	0.47	6.75
12500	57	Z	0.44	6.94

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### APPENDIX B: Glossary of Standardized Corrections and Adjustments

Specimen: 8 inch thick solid core concrete (no ceiling) (See Full Report)

<u>Mark</u>	<u>Interpretation</u>
-------------	-----------------------

- |           |  |
|-----------|--|
| <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.   |
| <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. |
| <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.  |
| <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.  |
| <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 $(\infty)$ .  |

### APPENDIX C: Glossary of Variability Metrics

Specimen: 8 inch thick solid core concrete (no ceiling) (See Full Report)

$\Delta$ 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 from 2021-02-25 through 2021-03-04. The tests were performed on a specimen composed of a nominal 6 inch thick concrete slab, 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: Instruments of Traceability

Specimen: 8 inch thick solid core concrete (no ceiling) (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	2020-08-13	2021-08-13
Bruel & Kjaer Mic And Preamp C	Type 4943-B-001	2311439	2020-04-07	2021-04-07
Bruel & Kjaer Pistonphone	Type 4228	2781248	2020-08-12	2021-08-12
EXTECH Hygro 662	SD700	A083662	2020-12-18	2021-12-18
EXTECH Hygro 663	SD700	A083663	2020-12-18	2021-12-18

### APPENDIX E: Revisions to Original Test Report

Specimen: 8 inch thick solid core concrete (no ceiling) (See Full Report)

<u>Date</u>	<u>Revision</u>
2021-05-19	Original report issued

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END