

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

An  ALION Technical Center

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WALLACE CLEMENT SABINE

## Test Report

SPONSOR: **ClarkDietrich**  
West Chester, OH

Sound Transmission Loss  
**RAL™-TL19-096**

CONDUCTED: 2019-04-09

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ON: Insulated 24 in. on center steel stud gypsum board wall, 2 layers with RCSD on source side, 1 layer on receive side

### 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 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.

### SPECIMEN MEASUREMENTS & TEST CONDITIONS

The test specimen was designated by the sponsor as Insulated 24 in. on center steel stud gypsum board wall, 2 layers with RCSD on source side, 1 layer on receive side. The building contractor and RAL staff compiled the following construction specification as follows, in order of installation:

#### Plates / Base Track

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Trade Name: ProTRAK® 20 (18 mil)  
Dimensions: 2 @ 2438.4 mm (96 in.) x 31.75 mm (1.25 in.)  
Depth: 92.07 mm (3.625 in.)  
Steel Thickness: Nominal @ 0.46 mm (0.018 in.)  
Measured @ 0.48 mm (0.019 in.)  
Installation: Friction fit to test frame over foam sill sealer  
Overall Weight: 2.95 kg (6.5 lbs)  
Mass per Unit Length: 0.60 kg/m (0.41 lbs/ft)

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### Studs

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Trade Name: ProSTUD® 20 (18 mil)  
Dimensions: 5 @ 31.75 mm (1.25 in.) x 2743.2 mm (108 in.)  
Depth: 92.07 mm (3.625 in.)  
Steel Thickness: Nominal @ 0.46 mm (0.018 in.)  
Measured @ 0.48 mm (0.019 in.)  
Installation: Side studs screwed to test frame, other studs floating in track  
Fasteners: Type W bugle head drywall screws, 31.75 mm (1.25 in.) length  
Stud Spacing: 609.6 mm (24 in.) on center  
Overall Weight: 8.62 kg (19 lbs)  
Mass per Unit Length: 0.63 kg/m (0.42 lbs/ft)

*Note: A 6.35 mm (0.25 in.) diameter bead of acoustical sealant was used to seal both sides of the specimen where framing members met the test frame (0.45 kg (1 lbs) total).*

### Source Side

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#### Resilient Channel

Trade Name: RC Deluxe® Resilient Channel (RCSD)  
Dimensions: 6 @ 2438.4 mm (96 in.) x 63.5 mm (2.5 in.)  
Thickness: 12.7 mm (0.5 in.)  
Installation: Screwed to studs, rows spaced 609.6 mm (24 in.) on center  
Mounted horizontally with resilient flange facing up  
Resilient flange on bottom row facing down  
Fasteners: #8 wafer head stud screw, 12.7 mm (0.5 in.) length  
Overall Weight: 4.76 kg (10.5 lbs)  
Mass per Unit Length: 0.33 kg/m (0.22 lbs/ft)

#### Layer 1

Material: Type X gypsum board  
Dimensions: 1 @ 1219.2 mm (48 in.) x 2743.2 mm (108 in.)  
2 @ 609.6 mm (24 in.) x 2743.2 mm (108 in.)  
Thickness: 15.88 mm (0.625 in.)  
Installation: Screwed to resilient channel  
Fasteners: Type S bugle head drywall screws, 25.4 mm (1 in.) length  
Fastener Spacing: 304.8 mm (12 in.) on center  
Overall Weight: 72.35 kg (159.5 lbs)  
Mass per Unit Area: 10.82 kg/m<sup>2</sup> (2.22 lbs/ft<sup>2</sup>)

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**Source Side (continued)**

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**Layer 2**

Material: Type X gypsum board  
Dimensions: 2 @ 1219.2 mm (48 in.) x 2743.2 mm (108 in.)  
Thickness: 15.88 mm (0.625 in.)  
Installation: Screwed through Layer 1 to resilient channel  
Fasteners: Type S bugle head drywall screws, 41.28 mm (1.625 in.) length  
Fastener Spacing: 304.8 mm (12 in.) on center  
Overall Weight: 72.57 kg (160 lbs)  
Mass per Unit Area: 10.85 kg/m<sup>2</sup> (2.22 lbs/ft<sup>2</sup>)

**Cavity**

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Material: R-13 unfaced fiberglass insulation batts  
Dimensions: 4 @ 609.6 mm (24 in.) x 2743.2 mm (108 in.)  
Thickness: 88.9 mm (3.5 in.)  
Installation: Friction fit into cavities between studs  
Overall Weight: 8.39 kg (18.5 lbs)  
Density: 14.11 kg/m<sup>3</sup> (0.88 lbs/ft<sup>3</sup>)

**Receive Side**

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Material: Type X gypsum board  
Dimensions: 2 @ 1219.2 mm (48 in.) x 2743.2 mm (108 in.)  
Thickness: 15.88 mm (0.625 in.)  
Installation: Screwed to studs  
Fasteners: Type S bugle head drywall screws, 28.58 mm (1.125 in.) length  
Fastener Spacing: 203.2 mm (8 in.) on center at board perimeter  
304.8 mm (12 in.) on center at board field  
Overall Weight: 72.12 kg (159 lbs)  
Mass per Unit Area: 10.78 kg/m<sup>2</sup> (2.21 lbs/ft<sup>2</sup>)

*Note: Joints and screw heads on the outermost layers of both sides of the partition were treated with a thin bead of sealant and metal tape (0.23 kg (0.5 lbs) total). Fasteners at the top and bottom tracks were offset to avoid coupling the track to the studs.*

*The receive side gypsum board layer exhibited extra screw holes from its use in previous tests; these screw holes were treated with sealant and metal tape.*

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### Overall Specimen Measurements

Dimensions: 2.44 m (96.0 in) wide by 2.74 m (108.0 in) high  
Thickness: 0.15 m (6.0 in)  
Weight: 242.44 kg (534.5 lbs)  
Transmission Area: 6.689 m<sup>2</sup> (72 ft<sup>2</sup>)  
Mass per Unit Area: 36.25 kg/m<sup>2</sup> (7.42 lbs/ft<sup>2</sup>)

### Test Aperture

Size: 2.74 m (9.0 ft.) by 4.27 m (14.0 ft.)  
Filler Wall: Yes  
Sealed: Entire periphery (both sides) with dense mastic

### Test Environment

#### Source Room

Volume: 177.11 m<sup>3</sup>  
Temperature: 22.5 °C ± 1.7 °C  
Relative Humidity: 51.0 % ± 0.0 %

#### Receive Room

Volume: 178.33 m<sup>3</sup>  
Temperature: 22.8 °C ± 0.0 °C  
Relative Humidity: 49.5 % ± 1.0 %

#### 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

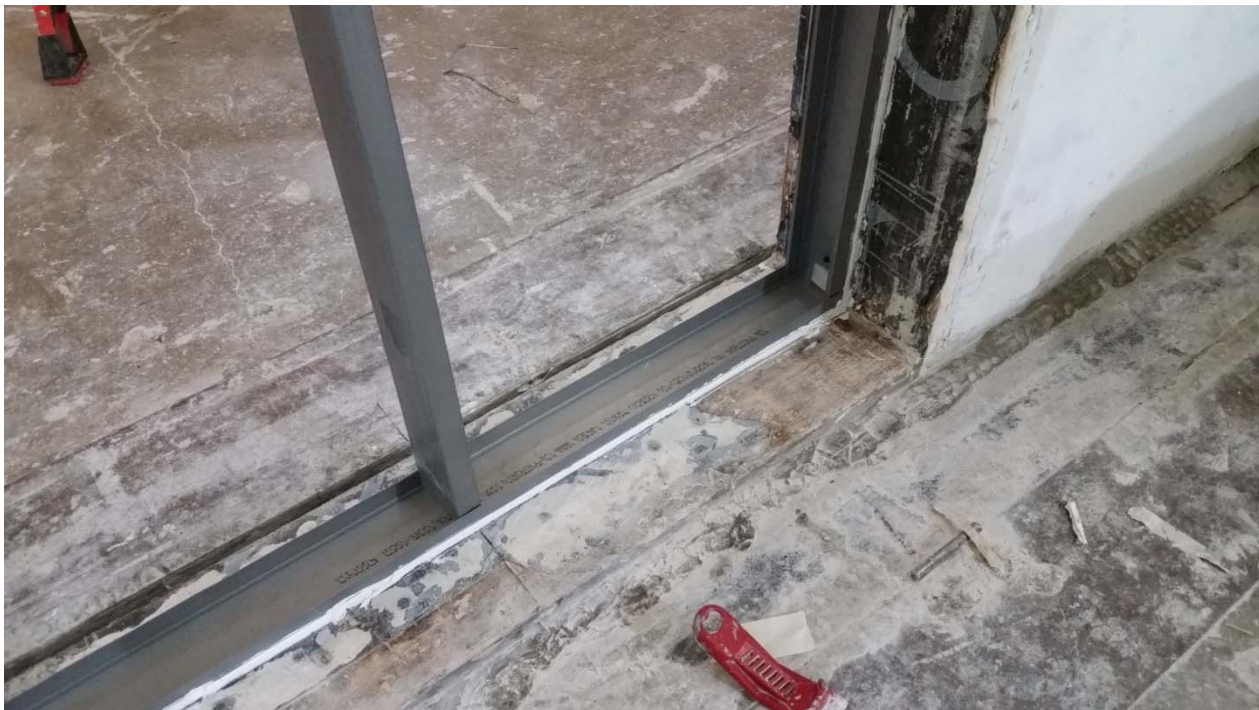


Figure 2 – Detail of perimeter framing member seals, floating studs

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Figure 3 – Stud cavity insulation and resilient channel installed



Figure 4 – Screw hole treatments at receive side gypsum board layer

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TEST RESULTS


Sound transmission loss values are tabulated at the eighteen standard frequencies. 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).

<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	25	0.69	0	800	62	0.41	0
125	36	0.66	6	1000	64	0.56	0
160	41	0.54	4	1250	64	0.46	0
200	46	0.42	2	1600	62	0.32	0
250	49	0.43	2	2000	55	0.27	7
315	54	0.34	0	2500	55	0.27	7
400	56	0.44	1	3150	60	0.31	2
500	59	0.30	0	4000	64	0.40	0
630	60	0.31	0	5000	68	0.57	0

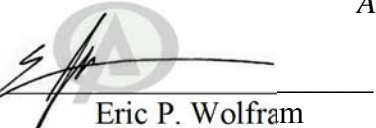
STC=58

ABBREVIATION INDEX

- FREQ. = FREQUENCY, HERTZ
- TL = TRANSMISSION LOSS, dB
- ΔTL = 95% CONFIDENCE INTERVAL FOR TL MEASUREMENTS, dB
- DEF. = DEFICIENCIES, dB BELOW STC CONTOUR (SUM OF DEF = 31)
- STC = SOUND TRANSMISSION CLASS

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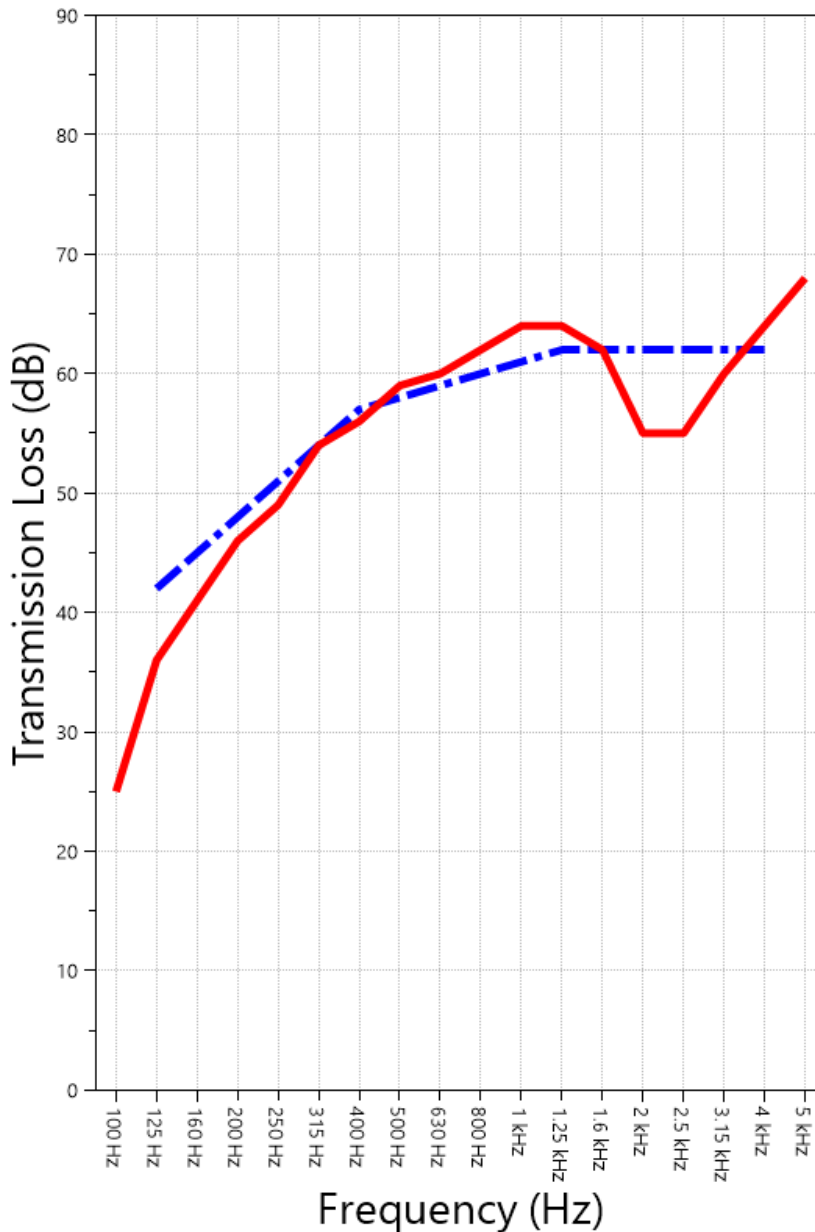
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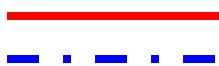
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**SOUND TRANSMISSION REPORT**

Insulated 24 in. on center steel stud gypsum board wall, 2 layers with RCSD on source side, 1 layer on receive side



**STC=58**



**TRANSMISSION LOSS**  
**SOUND TRANSMISSION CLASS CONTOUR**



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### **APPENDIX A: Extended Frequency Range Data**

Specimen: Insulated 24 in. on center steel stud gypsum board wall, 2 layers with RCSD on source side, 1 layer on receive side (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.*

1/3 Octave Band Center Frequency (Hz)	Sound Transmission Loss (dB)	$\Delta$ TL (Eq. A2.5) (dB)
31.5	20	1.76
40	20	0.83
50	15	0.96
63	11	0.78
80	21	0.78
100	25	0.69
125	36	0.66
160	41	0.54
200	46	0.42
250	49	0.43
315	54	0.34
400	56	0.44
500	59	0.30
630	60	0.31
800	62	0.41
1000	64	0.56
1250	64	0.46
1600	62	0.32
2000	55	0.27
2500	55	0.27
3150	60	0.31
4000	64	0.40
5000	68	0.57
6300	70	0.67
8000	70	0.60
10000	63	0.38
12500	58	0.40



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### APPENDIX B: Instruments of Traceability

Specimen: Insulated 24 in. on center steel stud gypsum board wall, 2 layers with RCSD on source side, 1 layer on receive side (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	2018-08-09	2019-08-09
Bruel & Kjaer Mic And Preamp D	Type 4943-B-001	2311440	2018-09-28	2019-09-28
Bruel & Kjaer Pistonphone	Type 4228	2781248	2018-08-06	2019-08-06
EXTECH Hygro 330	SD700	A083330	2018-09-07	2019-09-07
EXTECH Hygro 322	SD700	A083322	2018-09-07	2019-09-07

### APPENDIX C: Revisions to Original Test Report

Specimen: Insulated 24 in. on center steel stud gypsum board wall, 2 layers with RCSD on source side, 1 layer on receive side (See Full Report)

<u>Date</u>	<u>Revision</u>
2019-04-23	Original report issued

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END