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: **ClarkDietrich**
West Chester, OH

Sound Transmission Loss
RAL™-TL19-092

CONDUCTED: 2019-04-08

ON: Insulated steel stud gypsum board wall, 2 layers 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 steel stud gypsum board wall, 2 layers 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

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)

Studs

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

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 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^2 (2.21 lbs/ft^2)
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 studs
Fasteners:	Type S bugle head drywall screws, 50.8 mm (2 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:	72.8 kg (160.5 lbs)
Mass per Unit Area:	10.88 kg/m^2 (2.23 lbs/ft^2)

Cavity

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^3 (0.88 lbs/ft^3)

Receive Side

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^2 (2.21 lbs/ft^2)

Note: Joints and screw heads on the outermost layers of both sides of the partition were sealed with caulk 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.

Overall Specimen Measurements

Dimensions:	2.44 m (96.0 in) wide by 2.74 m (108.0 in) high
Thickness:	0.14 m (5.5 in)
Weight:	237.68 kg (524 lbs)
Transmission Area:	6.689 m² (72 ft²)
Mass per Unit Area:	35.55 kg/m² (7.28 lbs/ft²)

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 m³
Temperature:	22.8 °C ± 0.0 °C
Relative Humidity:	51.0 % ± 0.0 %

Receive Room

Volume:	178.33 m³
Temperature:	22.8 °C ± 0.0 °C
Relative Humidity:	50.0 % ± 0.0 %

Requirements

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

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


Figure 2 – Framing members installed in test aperture

Figure 3 – Typical sealing of perimeter framing members, detail of floating stud

Figure 4 – Stud cavity insulation partially installed

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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).

FREQ.	TL	ΔTL	DEF.	FREQ.	TL	ΔTL	DEF.
100	19	0.65	0	800	56	0.18	0
125	33	0.92	2	1000	57	0.10	0
160	37	0.69	1	1250	58	0.11	0
200	41	0.48	0	1600	54	0.18	1
250	44	0.36	0	2000	47	0.13	8
315	46	0.45	1	2500	49	0.09	6
400	49	0.25	1	3150	54	0.08	1
500	53	0.21	0	4000	58	0.09	0
630	55	0.19	0	5000	61	0.08	0

STC=51

ABBREVIATION INDEX

FREQ. = FREQUENCY, HERTZ
TL = TRANSMISSION LOSS, dB
ΔTL = 95% CONFIDENCE INTERVAL FOR TL MEAUREMENTS, dB
DEF. = DEFICIENCIES, dB BELOW STC CONTOUR (SUM OF DEF = 21)
STC = SOUND TRANSMISSION CLASS

Tested by _____
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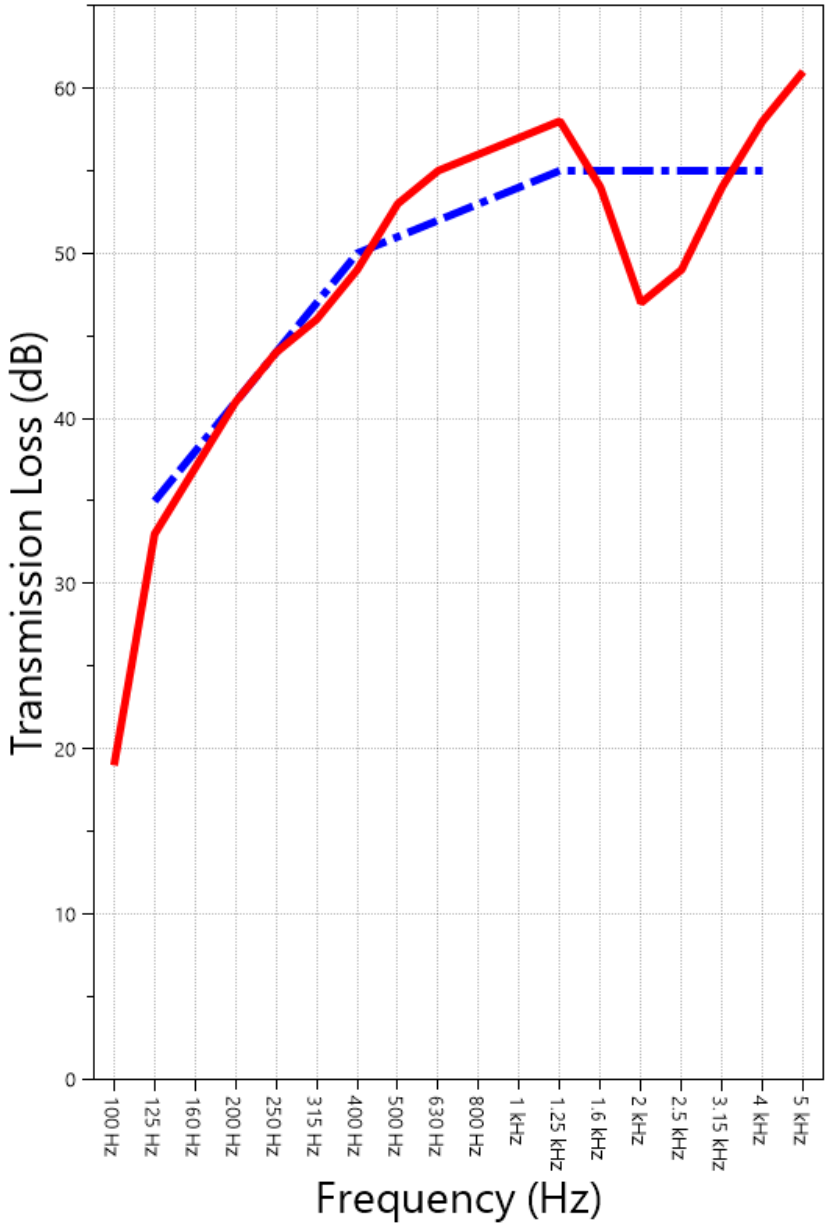
SOUND TRANSMISSION REPORT

Insulated steel stud gypsum board wall, 2 layers on source side, 1 layer on receive side



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TRANSMISSION LOSS

SOUND TRANSMISSION CLASS CONTOUR

APPENDIX A: Extended Frequency Range Data

Specimen: Insulated steel stud gypsum board wall, 2 layers 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)	**ΔTL (Eq. A2.5)** (dB)
31.5	19	1.65
40	20	0.86
50	18	0.96
63	16	0.51
80	15	0.56
100	19	0.65
125	33	0.92
160	37	0.69
200	41	0.48
250	44	0.36
315	46	0.45
400	49	0.25
500	53	0.21
630	55	0.19
800	56	0.18
1000	57	0.10
1250	58	0.11
1600	54	0.18
2000	47	0.13
2500	49	0.09
3150	54	0.08
4000	58	0.09
5000	61	0.08
6300	62	0.10
8000	62	0.13
10000	59	0.11
12500	54	0.15

APPENDIX B: Instruments of Traceability

Specimen: Insulated steel stud gypsum board wall, 2 layers on source side, 1 layer on receive side (See Full Report)

Description	Model	Serial Number	Date of Certification	Calibration Due
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 steel stud gypsum board wall, 2 layers on source side, 1 layer on receive side (See Full Report)

Date	Revision
2019-04-24	Original report issued

END