



Test Number: NOAL 21-1208

Test Method: ASTM E90-09 (2016): Laboratory Measurement of Airborne Sound Transmission of Building Partitions and Elements

Result Summary: STC 51

Test Date: December 2, 2021

Specimen: Wall Assembly

Test Site: 917 Rice Street, St. Paul, MN 55117

Report Date: December 15, 2021

Test Sponsors: CEMCO 13191 Crossroads Pkwy N., Ste 325, City of Industry, CA 91746  
Marino\WARE 100 Hendrick Drive Suite 200 McDonough, GA 30253  
Trim-Tex 3700 W Pratt Ave, Lincolnwood, IL 60712

Technician: E. Dick

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REPRODUCED  
SIGNATURE

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Heide Gross  
Laboratory Quality Manager

Test Date: December 2, 2021

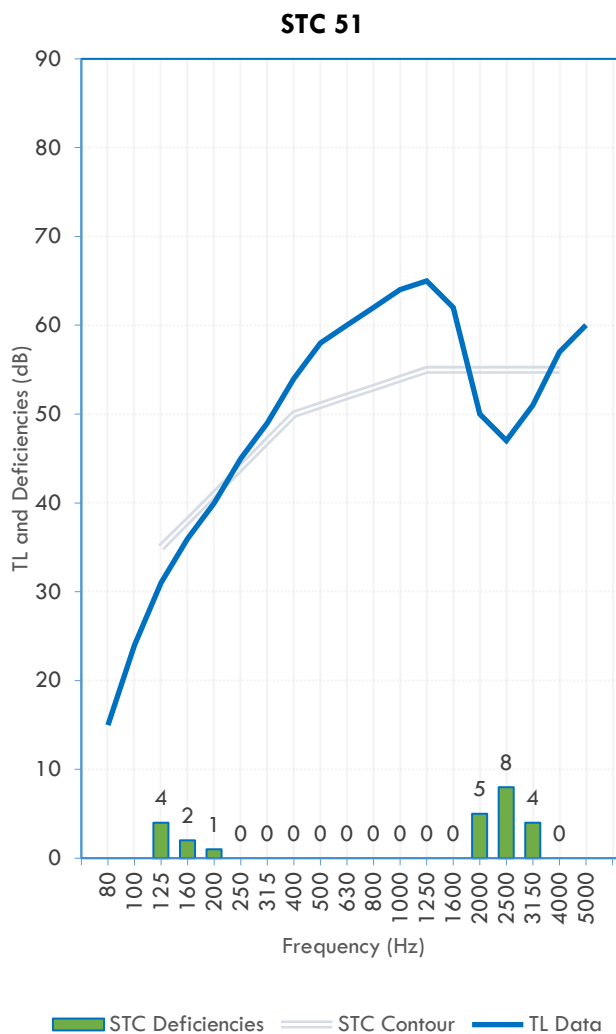
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Frequency (Hz)	TL (dB)	Deficiencies (dB)
80	15	
100	24	
125	31	4
160	36	2
200	40	1
250	45	-
315	49	-
400	54	-
500	58	-
630	60	-
800	62	-
1000	64	-
1250	65	-
1600	62	-
2000	50	5
2500	47	8
3150	51	4
4000	57	-
5000	60	-

Total Deficiencies 24



**ASSEMBLY ELEMENTS:**

(From Source Room Side to Receive Room Side)

Hardware	Trim-Tex® HOTROD® XL (12 lin ft at top)
Hardware	Trim-Tex® FIRE BEAD™ 2 Hour (8+8 lin ft at sides)
Sheathing	5/8" gypsum board Type X (vs); 1.625" #6 type S spaced 12" OC
Sheathing	5/8" gypsum board Type X (v); 1" #6 type S spaced 12" OC
Framing	3 5/8" CEMCO 18 mil (20EQ) steel studs spaced 24" OC
Insulation	R13 unfaced glass fiber batt insulation
Sheathing	5/8" gypsum board Type X (vs); 1" #6 type S spaced 12" OC
Hardware	Trim-Tex® HOTROD® XL (12 lin ft at top)
Hardware	Trim-Tex® FIRE BEAD™ 2 Hour (8+8 lin ft at sides)
See Appendix C on pages 6 and 7 for a full description of Assembly Elements	



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## **SPECIMEN DESCRIPTION**

The specimen is a wall assembly, and its elements are described below with results on page 2. Detailed information regarding the specimen is found in Appendix C on pages 6 and 7.

## **INSTALLATION AND DISPOSITION**

The wall assembly was originally constructed on December 2, 2021 at the St. Paul acoustic laboratory location.

Qualified representatives from North Orbit Acoustic Laboratories observed the installation process and inspected all major building elements when completed and prior to testing.

## **TEST METHODS**

Methods follow the published standards listed below. All values derived from single-direction transmission loss measurements.

ASTM E90-09 (2016): Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements

ASTM E413-16: Classification for Rating Sound Insulation

All results reported herein were derived from tests performed in full accordance with test method ASTM E90-09 (2016). The laboratory and measurement systems fully meet all requirements of the test standard and the requirements of ASTM E90-09 (2016) Annex A2: Qualification of room sound fields and microphone systems used for sampling.

North Orbit Acoustic Laboratory (NOAL) is accredited through A2LA certificate number 4240.01 for this test procedure. This test report relates only to the item(s) tested. This report shall not be used to claim product certification, approval, or endorsement by North Orbit Acoustic Laboratories or A2LA.

## **CONFIDENTIALITY**

The client has full control over this information and any release of information will be only to the client. The specific testing results are deemed to be confidential exclusively for the client's use. Reproduction of this report, except in full, is prohibited.

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## APPENDIX A: MEASUREMENT SETUP

### ENVIRONMENT

Source Room Temperature:	69.7° F [20.9° C]
Source Room Relative Humidity:	49.7%
Receiving Room Temperature:	71.7° F [22.1° C]
Receiving Room Relative Humidity:	51.6%

### SPECIMEN DIMENSIONS

Specimen Width:	12.0 ft [3.66 m]
Specimen Height:	8.0 ft [2.44 m]
Specimen Area:	96.0 s.f. [8.92 m <sup>2</sup> ]
Specimen Thickness:	5.5 in [14.0 cm]
Source Niche Depth:	16.1 in [41.0 cm]
Receiver Niche Depth:	3.6 in [9.2 cm]

### CHAMBER VOLUME - AIRBORNE TRANSMISSION

Source Room	7687.0 c.f. [217.7 m <sup>3</sup> ]
Receiver Room	12313.5 c.f. [348.7 m <sup>3</sup> ]

## INSTRUMENTATION

Description	Brand	Model	Serial
Analyzer	Sinus	Apollo	7510
Software	Sinus	Samurai	ver. 2.8.3
Microphone	Brüel & Kjær	4166	1727021
Microphone	Brüel & Kjær	4166	1727058
Preamplifier	Brüel & Kjær	2669C	2148242
Preamplifier	Brüel & Kjær	2669C	2300986
Rotating Boom	Brüel & Kjær	3923	1263440
Rotating Boom	Norsonic	265	29488
Calibrator	Brüel & Kjær	4231	2416109
Loudspeaker	ElectroVoice	EKX 15P	405165595900350019
Loudspeaker	ElectroVoice	EKX 15P	405165595900350218
Loudspeaker	ElectroVoice	EKX 15P	405165503900060219
Loudspeaker	ElectroVoice	EKX 15P	405165503900350221
Thermohydrometer	Digi-Sense	20250-21	192657769
Thermohydrometer	Kestrel	5200	2311344



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**APPENDIX B: CALCULATION RESULTS**

Freq. Band (Hz)	Spec TL (dB)	Data Flags (see below)	95% C.I. (dB)	Flanking Limit (dB)	STC Deficiencies (dB)
25					
32					
40					
50	16.7		±3.56	44.8	
63	14.6		±3.39	46.8	
80	15.0		±2.69	52.8	
100	24.3		±1.63	59.2	
125	31.3		±1.57	65.2	4
160	36.2		±1.30	69.7	2
200	40.0		±1.25	72.8	1
250	45.1		±0.80	77.7	-
315	49.1		±0.52	82.6	-
400	54.1		±0.55	88.3	-
500	57.9		±0.65	93.4	-
630	59.6		±0.51	95.6	-
800	62.3		±0.42	100.5	-
1000	64.4		±0.42	105.0	-
1250	64.7		±0.38	107.9	-
1600	61.6		±0.39	105.9	-
2000	50.3		±0.44	106.0	5
2500	47.3		±0.36	105.7	8
3150	51.1		±0.40	105.2	4
4000	56.5		±0.43	103.4	-
5000	59.8		±0.64	100.7	
6300					
8000					
10000					
Total deficiencies below STC contour (dB)					24
STC contour [ASTM E413]					51

Note: Composite 95% confidence intervals from room qualification testing. ASTM E1289 reference sample and repeatability data available upon request. The standard deviation of reproducibility is stated in ASTM E90 as <2 dB for frequencies from 125 Hz to 4 kHz. Flanking Limit derived from chamber flanking study. Extended frequency results below 80Hz and above 5000Hz are for reference only.



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## APPENDIX C: SPECIMEN ASSEMBLY DESCRIPTION

Overall Mass 695.1 lb [315.3 kg]

Surface Weight 7.2 PSF [35.3 kg/m<sup>2</sup>]

Building Element	Mass lb [kg]	Surface Weight PSF [kg/m <sup>2</sup> ]
Trim-Tex® HOTROD® XL (12 lin ft at top)	0.9 [0.4]	0.01 [0.05]
Trim-Tex® FIRE BEAD™ 2 Hour (8+8 lin ft at sides)	1.1 [0.5]	0.01 [0.06]
5/8" gypsum board Type X (vs); 1.625" #6 type S spaced 12" OC	210.0 [95.3]	2.19 [10.68]
5/8" gypsum board Type X (v); 1" #6 type S spaced 12" OC	210.0 [95.3]	2.19 [10.68]
3 5/8" CEMCO 18 mil (20EQ) steel studs spaced 24" OC	41.0 [18.6]	0.43 [2.09]
R13 unfaced glass fiber batt insulation	20.0 [9.1]	0.21 [1.02]
5/8" gypsum board Type X (vs); 1" #6 type S spaced 12" OC	210.0 [95.3]	2.19 [10.68]
Trim-Tex® HOTROD® XL (12 lin ft at top)	0.9 [0.4]	0.01 [0.05]
Trim-Tex® FIRE BEAD™ 2 Hour (8+8 lin ft at sides)	1.1 [0.5]	0.01 [0.06]

All materials were weighed prior to installation. Weights of fasteners, tape and sealant are not represented in the above totals.



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## APPENDIX C: SPECIMEN ASSEMBLY DESCRIPTION (CONTINUED)

The test sponsors supplied the Trim-Tex® HOTROD® XL, the Trim-Tex® FIRE BEAD™ 2 Hour, the gypsum panels, and the steel framing members (tracks and studs). All other materials were purchased through regional retail or wholesale channels.

### FRAMING

Framing was constructed on November 30, 2021, and was retained for subsequent tests in the series.

A steel stud frame was constructed within the perimeter of the laboratory test specimen opening. The frame consisted of 19 mil designated thickness 3 5/8" x 1 1/4" bottom track, 33 mil designated thickness 3 5/8" x 2 1/2" slotted top track, and seven each of 18 mil designated thickness (20 ga. equivalent) 3 5/8" x 1 7/16" studs installed vertically 24" on centers (OC). The steel tracks and studs were fastened together with two 7/16" #7 type S screws at each intersection.

Top Track: CEMCO 362CST25033 N

Bottom Track: CEMCO 362VXT125-19

Studs: CEMCO 362VXS144-18

### INSULATION

Glass fiber batt insulation was friction fit into the stud cavities. Insulation was 24" wide and 3 1/2" thick with an R-Value of R-13.

### SHEATHING

**Source Side:** Two layers of sheathing were applied to the source-room side of the framing.

Base layer: CertainTeed 5/8" Type X gypsum panels was applied parallel to the framing. The panels were attached to the frame with 1", #6 type S drywall screws at 12" OC.

Face layer: CertainTeed 5/8" Type X gypsum panels was applied parallel to the framing. The panels were attached to the frame with 1 1/2", #6 type S drywall screws at 12" OC. Joints were staggered one stud cavity to offset each layer.

**Receiver Side:** One layer of CertainTeed 5/8" Type X gypsum panels was applied parallel to the framing. The panels were attached to the frame with 1", #6 type S drywall screws at 12" OC. Joints were staggered one cavity on opposite sides.

Screws were power-driven. Screws were not installed along the top edges of either the source or receiver side of the specimen to allow free movement of the studs in the slotted track. The panels were trimmed and then shimmed at installation, so the panels were fastened to the studs with less than 3/8" gap at the bottom, less than 1/2" gap at the sides, and less than 5/8" gap at the top. Shims were removed after the panels were fastened and the seams were sealed on the source and receiving room sides with non-hardening acoustical sealant. The bottom edges of the specimen were sealed with non-hardening acoustical sealant, 2" wide polypropylene tape, and 7/8" dense putty tape, on both the source and receiving room sides. The gaps on the tops and sides of the specimen were sealed with the fire-rated drywall accessories.

### FIRE-RATED DRYWALL ACCESSORIES

Trim-Tex® HOTROD® XL fire-rated deflection bead was installed along the top of both the source side and receiver side; it was stapled every 2"-8" through the mud leg into the sheathing. Trim-Tex® FIRE BEAD™ 2 Hour fire-rated deflection bead was installed along the sides of the specimen; it was stapled every 2"-8" through the mud leg into the sheathing. Patching compound was applied over the mud legs. The patching compound was formulated for 5-minute working time and 10-14-minute setting time. The compound was allowed to dry for at least 15 minutes.

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**APPENDIX D: SINGLE-NUMBER CALCULATION TO ISO 717-1**

Freq. Band (Hz)	R <sub>i</sub> (R <sub>i</sub> ≡ TL) (dB)	Adj. Ref. Curve (dB)	Unfav. Deviat. (dB)	L <sub>i1</sub> Spectrum (dB)	L <sub>i1</sub> - R <sub>i</sub> Level (dB)	L <sub>i2</sub> Spectrum (dB)	L <sub>i2</sub> - R <sub>i</sub> Level (dB)
50	16.7						
63	14.6						
80	15.0						
100	24.3	32	8	-29.0	-53.3	-20.0	-44.3
125	31.3	35	4	-26.0	-57.3	-20.0	-51.3
160	36.2	38	2	-23.0	-59.2	-18.0	-54.2
200	40.0	41	1	-21.0	-61.0	-18.0	-58.0
250	45.1	44	-	-19.0	-64.1	-15.0	-60.1
315	49.1	47	-	-17.0	-66.1	-14.0	-63.1
400	54.1	50	-	-15.0	-69.1	-13.0	-67.1
500	57.9	51	-	-13.0	-70.9	-12.0	-69.9
630	59.6	52	-	-12.0	-71.6	-11.0	-70.6
800	62.3	53	-	-11.0	-73.3	-9.0	-71.3
1000	64.4	54	-	-10.0	-74.4	-8.0	-72.4
1250	64.7	55	-	-9.0	-73.7	-9.0	-73.7
1600	61.6	55	-	-9.0	-70.6	-10.0	-71.6
2000	50.3	55	5	-9.0	-59.3	-11.0	-61.3
2500	47.3	55	8	-9.0	-56.3	-13.0	-60.3
3150	51.1	55	4	-9.0	-60.1	-15.0	-66.1
4000	56.5						
5000	59.8						
Sum =			31	R <sub>A,1</sub> =	42.7	R <sub>A,2</sub> =	48.5
R <sub>w</sub> =			51	C =	-3.0	C <sub>tr</sub> =	-8.0

$$R_w(C; C_{tr}) = 51 (-3; -8)$$

$$R_w(C; C_{tr}; C_{50-3150}; C_{tr,50-3150}) = 51 (-3; -8; -7; -18)$$

$$R_w(C; C_{tr}; C_{100-5000}; C_{tr,100-5000}) = 51 (-3; -8; -2; -8)$$

$$R_w(C; C_{tr}; C_{50-5000}; C_{tr,50-5000}) = 51 (-3; -8; -6; -18)$$

Calculations according to the standard ISO 717-1 are based on an assumed equivalency of the ASTM and the corresponding ISO test methods. NOAL's scope of accreditation includes ASTM E90 and the test herein is performed according to this standard as described, but NOAL does not hold accreditation for the corresponding ISO standards.

The spectrum adaptation terms C and C<sub>tr</sub> characterize performance against two specific sound sources, A-weighted pink noise and A-weighted traffic noise respectively. The standard ISO 717-1 includes a discussion of "Use of Spectrum Adaptation Terms" in Annex A (informative).

Each spectrum adaptation term may additionally be reported with extended frequency bands included. The calculation above represents the primary frequency range. The results below the table show the calculated primary ratings as well all available extended-frequency ratings, so that this specimen may be compared against corresponding ratings of other specimens.