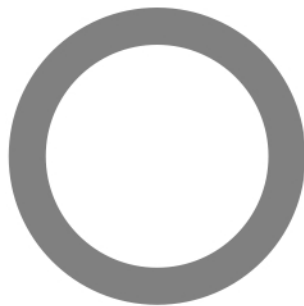


ASTM E 90-09: Laboratory Measurement of Airborne Sound Transmission of Building Partitions and Elements**Orfield** Laboratories Inc**Design Research Testing**

Acoustics / Vibration / Vision / Lighting / Architecture / Market Research

TEST

Client: **Cemco**
Report Date: **January 26, 2015**
Test Date: **October 27, 2015**
Test Number: **OL15-1008**

RESULT SUMMARY**STC=50****CLIENT****ADDRESS**

Cemco
263 North Covina Lane
City of Industry, CA 91744
(800) 775-2362

Prepared by:

ELECTRONICALLY
REPRODUCED
SIGNATURE

David M. Berg
Laboratory Manager

ACCREDITATION

For the scope of accreditation
under NVLAP code 200248-0

PREPARED BY

David M. Berg
Orfield Laboratories, Inc.
2709 East 25th Street
Minneapolis MN 55406
Voice (612) 721-2455
FAX (612) 721-2457

Reviewed By:

ELECTRONICALLY
REPRODUCED
SIGNATURE

Michael R. Role

Signatures are required on this document for an official laboratory test report.
Copies of this document without signatures are for reference only.

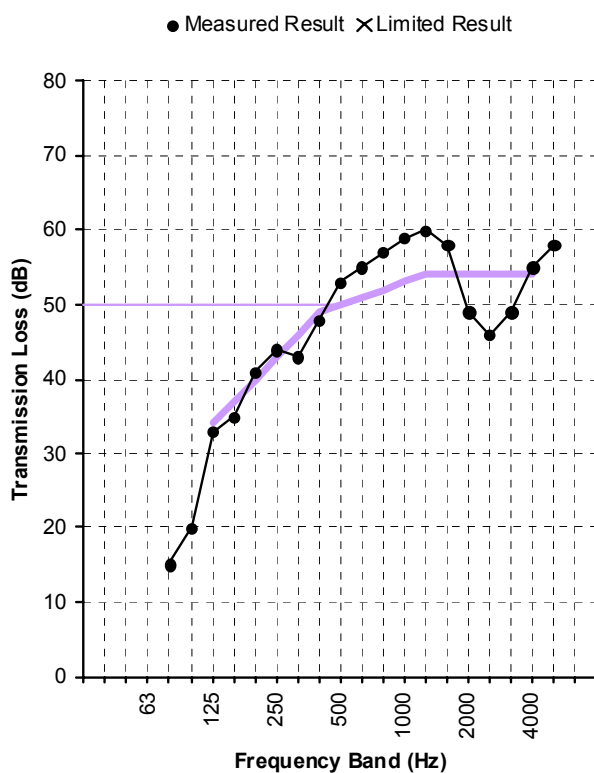




Test Date October 27, 2015
Specimen Wall Assembly

Method ASTM Standard E90
Technician D. Berg

Single Number Rating
STC = 50



Freq. (Hz)	TL (dB)	Def. (dB)
80	15	
100	20	
125	33	1
160	35	2
200	41	-
250	44	-
315	43	3
400	48	1
500	53	-
630	55	-
800	57	-
1000	59	-
1250	60	-
1600	58	-
2000	49	5
2500	46	8
3150	49	5
4000	55	-
5000	58	-
Total Deficiencies		25

* Estimate of lower limit

Assembly Elements (listed in order from source room side to receiver room side)

0.625" (5/8") type X gypsum (vs); 1.625" type S screw @ 12" O.C.
0.625" (5/8") type X gypsum (v); 1.25" type S screw @ 12" O.C.
Cemco FAS Track 1000 20 ga. top track
Cemco Viper 20 ga. eq. steel studs @ 24" O.C.
(3.5") fiberglass insulations (R13)
0.625" (5/8") type X gypsum (v); 1.25" type S screw @ 12" O.C.

_ Trim-Tex Deflection Bead at head
_ No sealant at top of wall

(h) = horizontal installation
(v) = vertical installation
(vs) = vertical installation with staggered seams



SPECIMEN DESCRIPTION

The specimen under test was a wall assembly. The elements in the assembly are described briefly below the results table and chart on page 2. Detailed information regarding the specimen may be found in Appendix C.

Test results pertain to this specimen only.

INSTALLATION AND DISPOSITION

The 3-5/8" steel track and frame was constructed on October 27, 2015. The framing and insulation were retained for subsequent tests in the series. Independent contractors fabricated the test specimen and sealed it in the specimen opening as described in the detailed sample description in Appendix C. Qualified representatives of Orfield Laboratories observed the installation progress, and visually inspected the specimen prior to testing.

TEST METHODS

The methods followed these published standards:

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

ASTM E413-10: *Classification for Rating Sound Insulation*

The values presented in this report are from single-direction transmission loss measurements.

** Orfield Laboratories, Inc. has been accredited by the U.S. Department of Commerce, National Institute of Standards and Technology (NIST) under their National Voluntary Laboratory Accreditation Program (NVLAP) for this test procedure. This report shall not be used to claim product certification, approval or endorsement by NVLAP, NIST, or any agency of the U.S. Government.*

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.



APPENDIX A: MEASUREMENT SETUP

Environment

Temperature	69°F [20.6°C]
Relative Humidity	50%

Specimen Area

Specimen Area	64.5 ft² [5.99 m²]
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Chamber Volume - Airborne Transmission

Source Room Volume	3284 ft³ [93.0 m³]
Receiving Room Volume	8281 ft³ [234.5 m³]

Chamber Volume - Impact Transmission

Source Room Volume	8281 ft³ [234.5 m³]
Receiving Room Volume	2062 ft³ [58.4 m³]

INSTRUMENTATION

Description	Brand	Model	S/N
Analyzer	Norsonic	Type 121	31185
Calibrator	Brüel & Kjær	Type 4230	372201
Microphone	Brüel & Kjær	Type 4134	296819
Microphone	Brüel & Kjær	Type 4134	1675265
Preamplifier	G.R.A.S.	TMS126AF	10038
Preamplifier	Brüel & Kjær	Type 2639	1312147
Rotating Boom	Brüel & Kjær	Type 3923	936491
Rotating Boom	Brüel & Kjær	Type 3923	2036583
Power Supply	Brüel & Kjær	Type WB1057	n/a
Loudspeakers	JBL	EON15	J149N-023374 J149N-024235 J149N-137360
Subwoofer	JBL	JRX-118SP	P0370-018539



APPENDIX B: CALCULATION RESULTS

Freq. Band (Hz)	Specimen T.L. (dB)	95% Conf. (dB)	Flanking Limit (dB)	STC Defic. (dB)
25				
31.5	29.4		40	
40	16.6		47	
50	20.0		43	
63	17.5		43	
80	14.9	±5.02	41	
100	20.4	±3.05	46	
125	32.7	±2.35	51	1
160	34.7	±2.38	55	2
200	41.4	±1.55	57	-
250	44.2	±1.09	60	-
315	43.3	±0.89	60	3
400	48.1	±0.74	61	1
500	52.6	±0.98	66	-
630	54.9	±0.93	68	-
800	57.3	±0.52	72	-
1000	58.7	±0.67	75	-
1250	60.0	±0.85	72	-
1600	58.3	±0.49	73	-
2000	48.7	±0.38	77	5
2500	45.8	±0.57	81	8
3150	49.2	±0.70	84	5
4000	55.0	±0.50	78	-
5000	57.9			
6300	61.3			
8000	63.2			
10000	61.4 *			
Total deficiencies below STC contour (dB)				25
STC contour [ASTM E413]				50

* Actual transmission loss of specimen may be higher than measured at this frequency band. Signal-to-noise in the receiving room less than 5 dB, therefore the result is "an estimate of the lower limit".

Note: 95% confidence intervals for T.L. measurements from room qualification data. ASTM 1289 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 from chamber flanking study. Extended frequency results below 80Hz and above 5000Hz are for reference only.



APPENDIX C: SPECIMEN ASSEMBLY DESCRIPTION

The following table shows the description of the wall assembly.

Overall Mass = 483.7 lb [219.4 kg]

Overall Surface Density = 7.50 PSF [36.61 kg/m²]

Element	Mass lb [kg]	Surf. Dens. PSF [kg/m ²]
0.625" (5/8") type X gypsum (vs); 1.625" type S screw @ 12" O.C.	144.0 [65.3]	2.23 [10.90]
0.625" (5/8") type X gypsum (v); 1.25" type S screw @ 12" O.C.	143.0 [64.9]	2.22 [10.82]
Cemco FAS Track 1000 20 ga. top track		
Cemco Viper 20 ga. eq. steel studs @ 24" O.C.	30.3 [13.7]	0.47 [2.29]
(3.5") fiberglass insulations (R13)	19.2 [8.7]	0.30 [1.45]
0.625" (5/8") type X gypsum (v); 1.25" type S screw @ 12" O.C.	143.9 [65.3]	2.23 [10.89]
_ Trim-Tex Deflection Bead at head	3.3 [1.5]	0.05 [0.25]
_ No sealant at top of wall		

(h) = horizontal installation

(v) = vertical installation

(vs) = vertical installation with staggered seams

Cemco FAS Track 1000 slotted track, Cemco ViperStuds and the Trim-Tex Deflection Bead were supplied by the Client. The type X gypsum board sheeting was also provided by the client and was shipped directly from a third party supplier. All other materials were purchased through local retail channels. All materials were weighed prior to installation. Weights of fasteners and sealant are not represented in the above totals.

FRAMING

A steel frame was constructed in the laboratory test opening. The framing consisted of a Cemco 20 gauge (.0346" thick) FAS Track 1000, slotted head track, a Cemco 3-5/8" x 1-1/4", 20 gauge equivalent (.0205" thick) steel bottom track, and 5 Cemco ViperStud, 3-5/8" x 1-1/4", 20 gauge equivalent (0.0205") steel studs installed 24" on center. The Cemco FAS Track 1000 slotted top track was fastened to the top of the test opening with screws and concrete anchors.

INSULATION

Fiberglass insulation batts were installed in the stud cavities. The insulation batts were 24" wide, 3.5" thick R13, and were friction fit into each of the 4 stud cavities.



SHEETING

The source room side sheeting consisted of two 5/8" thick gypsum board sheeting layers. The inner source room side sheeting consisted of two sheets of 5/8" thick type X gypsum board fastened parallel to the steel studs with 1-1/4" long, type S drywall screws spaced at 12" O.C. in the field and spaced at 8" at the sheet edges. The outer source room side sheeting layer was installed parallel to the studs with 1-5/8" type S drywall screws spaced at 12" O.C. in the field and spaced at 8" O.C. at the sheet edges. The outer layer of gypsum board sheets was split to stagger the seams from the inner layer. The three split sections consisted of one 24" wide section at each of the two sides and one 48" wide section in the center.

Both layers of gypsum board sheeting were cut short at the head to intentionally leave a gap of approximately 1/2" across the top.

The receiving room sheeting consisted of one 5/8" thick gypsum board sheeting layer. The receiving room sheeting was installed parallel to the studs with 1-1/4" type S drywall screws spaced at 12" O.C. in the field and spaced at 8" at the sheet edges.

The receiving room side gypsum board sheeting was cut short at the head to intentionally leave a gap of approximately 1/2" across the top.

Panels were shimmed at installation to leave a minimal gap at the bottom and the intentional 1/2" gap at the top. Shims were removed after sheeting was fastened and the perimeter at the sides and bottom edge was sealed on the source and receiving room sides with acoustic sealant, 1-7/8" wide, 2 mil aluminum foil tape and 7/8" dense putty tape. No sealant, foil tape, or putty tape was applied at the head edge on both the receiver and source room sides. The seams were sealed with acoustic sealant and 2 mil aluminum foil tape.

ADDITIONAL NOTES

- Trim-Tex Deflection Bead at head of wall – one side only



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

Freq. Band (Hz)	R_i (R_i ? TL) (dB)	Ref Curve (dB)	Unfav. Deviat. (dB)	L_{i1} Spectrum (dB)	$L_{i1} - R_i$ Level (dB)	L_{i2} Spectrum (dB)	$L_{i2} - R_i$ Level (dB)
50	20.0						
63	17.5						
80	14.9						
100	20.4	30	9.6	-29.0	-49.4	-20.0	-40.4
125	32.7	33	0.3	-26.0	-58.7	-20.0	-52.7
160	34.7	36	1.3	-23.0	-57.7	-18.0	-52.7
200	41.4	39	-	-21.0	-62.4	-18.0	-59.4
250	44.2	42	-	-19.0	-63.2	-15.0	-59.2
315	43.3	45	1.7	-17.0	-60.3	-14.0	-57.3
400	48.1	48	-	-15.0	-63.1	-13.0	-61.1
500	52.6	49	-	-13.0	-65.6	-12.0	-64.6
630	54.9	50	-	-12.0	-66.9	-11.0	-65.9
800	57.3	51	-	-11.0	-68.3	-9.0	-66.3
1000	58.7	52	-	-10.0	-68.7	-8.0	-66.7
1250	60.0	53	-	-9.0	-69.0	-9.0	-69.0
1600	58.3	53	-	-9.0	-67.3	-10.0	-68.3
2000	48.7	53	4.3	-9.0	-57.7	-11.0	-59.7
2500	45.8	53	7.2	-9.0	-54.8	-13.0	-58.8
3150	49.2	53	3.8	-9.0	-58.2	-15.0	-64.2
4000	55.0						
5000	57.9						
Sum =			28.2	$R_{A,1} =$	46.1	$R_{A,2} =$	39.5
$R_w =$			49	$C =$	-3	$C_{tr} =$	-10

$$R_w (C ; C_{tr}) = 49 (-3 ; -10)$$

$$R_w (C ; C_{tr} ; C_{50-3150} ; C_{tr, 50-3150}) = 49 (-3 ; -10 ; -6 ; -16)$$

$$R_w (C ; C_{tr} ; C_{100-5000} ; C_{tr, 100-5000}) = 49 (-3 ; -10 ; -2 ; -10)$$

$$R_w (C ; C_{tr} ; C_{50-5000} ; C_{tr, 50-5000}) = 49 (-3 ; -10 ; -5 ; -16)$$

Note: The calculations in ISO 717-1 are performed based on assumed equivalency of the ASTM and the corresponding ISO test methods. The test herein is performed according to the ASTM standards. Orfield Laboratories *does not* hold accreditation for ISO 140 or ISO 717 under their NVLAP scope of accreditation.

The spectrum adaptation terms C and C_{tr} 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. A calculation for the primary frequency range is shown above, but all available extended-frequency calculations were performed to compare against corresponding ratings of other specimens.