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Evaluation VerteTek Coat of Silence

Acoustical Evaluation of One and Two Sided Applications of VerteTek Coat of Silence Coating on a Steel Stud Gypsum Wall

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Introduction

This report has been prepared in order to document a testing program designed to quantify improvements in the acoustical characteristics of the VerteTek Coat of Silence™ coating systems.

The configurations consisted of conventional gypsum steel stud walls. The ASTM E90 acoustical test method was employed to measure the acoustical performance of the configurations. The configurations were tested for sound transmission loss as untreated standard constructions and with the same configuration as treated with the VerteTek Coat of Silence coating.

Each steel stud wall consisted of 3-5/8" thick 25 gauge steel studs (0.0155 in. thick) at 24 inches on center with 5/8" Type X gypsum board finish. The boards were attached using Type S bugle head screws at 12" on center. The cavities were empty as no insulation was used in the construction of these walls. The single vertical joints on each side were caulked and covered with foil tape. The perimeter was sealed with caulk tape and mortite putty as standard practice to eliminate sound flanking the specimen under test.

Testing was conducted at Orfield Laboratories located in Minneapolis, Minnesota. Orfield Laboratories is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) as an ISO / IEC 17025 laboratory for conducting ASTM E90 - 09 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

Construction, Assembly Preparation, and Testing

A steel stud wall as described above was constructed in the 8 ft. x 8 ft. test opening at Orfield Laboratories by the preferred contractors. The wall was tested for sound transmission loss and logged with a unique test identifier OL12346. (Hereafter this wall is referred to as Uncoated Wall). After testing, the wall remained installed in the

laboratory and the source side was coated with the VerteTek Coat of Silence coating system by Mike Stoutenburg of Acoustical Surfaces, Inc. of Chaska, MN. The applicator used an airless sprayer and the materials supplied by VerteTek. The materials were provided in nominal 5 gallon plastic paint buckets and labeled Coat of Silence Base Coat and Coat of Silence Finish Coat.

A base coat was applied and dried to the touch using forced air and then a finish coat was applied. The targeted final thickness of the coating was a range of 28 to 32 mils. Additionally two 4'x8', 5/8"gypsum boards were coated in order to facilitate testing of the two sided application of the steel stud wall subsequent to the one sided test. The coating system was allowed to cure in excess of 64 hours prior to testing. Post testing measurement of the system confirmed a base coat of 12 mils thick and a finish coat of 16 mils thick resulting in a total final coating thickness of 28 mils.

This wall with one side coated was tested for sound transmission loss and logged with a unique test identifier OL12348. (Hereafter this wall is referred to as One Side Coated Wall). Afterwards the gypsum panels on the receive side of the wall was removed and the two precoated gypsum panels were installed using the same fastening pattern and screw type.

This wall with both sides coated was tested for sound transmission loss and recorded with a unique test identifier OL12349. (Hereafter, this wall is referred to as Two Side Coated Wall).

Resulting Sound Attenuation Improvement

The following tables show the resultant improvement for sound attenuation with the coating using the transmission loss measurement data taken on the uncoated wall and the coated walls.

Improvement of One Side Coated Wall to Attenuate Sound

	12-0346	12-0348	
	(STC 39)	(STC 41)	Improvement of
Freq, Hz	Uncoated Wall	One Side Coated Wall	One Side Coated
80	12.3	11.8	NC
100	11.2	11.4	NC
125	20.6	23.3	2.7
160	21.4	20.9	NC
200	31.2	30.9	NC
250	29.8	30.1	NC
315	31.3	31.9	0.6
400	35.1	35.8	0.7
500	40.7	41.8	1.1
630	45.3	45.4	NC
800	49.3	49.5	NC
1000	50.8	50.7	NC
1250	51.9	52.3	NC
1600	49.6	49.8	NC
2000	38.6	39.6	1.0
2500	38.1	40.7	2.6
3150	41.9	44.4	2.5
4000	48.8	51.5	2.7
5000	53.3	55.5	2.2
6300	59.4	61.7	2.3
8000	63.4	64.9	1.5
10000	64.9	63.6	-1.3

NC: No Change

Note: The grayed out ranges are noted as insignificant.

Improvement of Two Sides Coated Wall to Attenuate Sound

Freq, Hz	12-0346 (STC 39) Uncoated Wall	12-0349 (STC 42) Two Side Coated Wall	Improvement of Two Sides Coated
80	12.3	11.4	NC
100	11.2	12.4	1.2
125	20.6	23.4	2.8
160	21.4	21.5	NC
200	31.2	31.8	0.6
250	29.8	30.6	0.8
315	31.3	33.0	1.7
400	35.1	36.7	1.6
500	40.7	42.8	2.1
630	45.3	46.6	1.3
800	49.3	50.3	1.0
1000	50.8	50.9	NC
1250	51.9	52.6	0.7
1600	49.6	49.6	NC
2000	38.6	41.0	2.4
2500	38.1	43.4	5.3
3150	41.9	46.9	5.0
4000	48.8	54.1	5.3
5000	53.3	58.2	4.9
6300	59.4	64.3	4.9
8000	63.4	67.5	4.1
10000	64.9	66.2	1.3

NC: No Change

Note: The grayed out ranges are noted as insignificant.

Notably pertinent to the discussion regarding the ability of any coating to reduce sound is the mass. Details regarding the mass of the walls tested are as follows:

Description	Overall Weight of Wall (lbs)	Surface Density (Gypsum Boards Or Boards and Coating (s)) (lbs/sq ft)
12-0346 Uncoated Wall	308.3	2.25
12-0348 One Side Coated Wall	320.7	2.43 (Coated Side) 2.24 (Uncoated Side)
12-0349 Two Side Coated Wall	336.0	2.45

Additional test details can be found in the formal test reports from Orfield Laboratories.

Significance of Results

In order to aid the reader the following table commonly used for human perception of changes in dB levels is provided below.

Perceptions of Increases / Decreases in Decibel Level	
Imperceptible Change	1dB
Barely Perceptible Change	3dB
Clearly Noticeable Change	5dB
About Twice as Loud	10dB

Whereas the above table is generalized it should be noted that people are very sensitive to the midrange frequencies from 800 to 5000 Hz. This is where most of our language is centered and changes in decibel levels centered along these frequencies can be much more impactful when compared to the same dB changes at frequencies outside this range.

Additionally, the table below has been prepared to help the user understand the results relative to the frequency and common tones.

Key Frequencies for Some Familiar Sounds

Hz	Common Sound
1000	Test Tone radio and TV put out when off the air
3000	Frequency that telephones are centered around
4000	The most irritating frequency (chainsaw freq)
4096	Highest note on a piano
5000-8000 Hz	Treble control on a stereo

In summary, the VerteTek Coat of Silence coating can provide a significant reduction within the 2500 and 6300 Hz frequency range and may be quite applicable for specific cases in which sound abatement is required. A graphical summary of the improvement provided by one and two sided application of the VereTek Coat of Silence Coating are shown below.