

April 19, 2013

360° Coatings

5556 Yahl Street
Naples, Florida 34109

Attention: Ms. Susan Anspach, Executive Director of Administration

Subject: **Serenity Coating**
Hilton Hotel, Pasadena, California
Acoustical Testing Summary of Results
VA Project No. 5155-001

Dear Susan:

Veneklasen Associates (VA) was contracted to perform apparent sound transmission class (ASTC) testing between guestrooms at the Hilton Hotel in Pasadena, California. The hotel is located at 165 South Los Robles Avenue, which is the corner of Los Robles Avenue and Cordova Street. The goal of the testing was to document the acoustical benefit of applying Serenity sound reduction coating to the existing wall assembly. This report provides a summary and evaluation of the test results. A technical test report, including the full data set for all of the tests, will be provided under separate cover.

Test Method

VA contracted Western Electro-Acoustic Laboratory (WEAL) to perform Apparent Sound Transmission Class (ASTC) testing on the guestroom demising wall assemblies. Testing was performed in accordance with ASTM standard E 336, "*Standard Test Method for Measurement of Airborne Sound Insulation in Buildings.*" WEAL is accredited by the United States Department of Commerce, National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP) for the test procedure.

The test procedure involves generating high sound levels in the source room using a pink noise source and a loudspeaker. The noise levels in the source and receiving rooms were measured by manually sweeping the microphone through the volume of the room with a sampling period of one minute. Measurements were performed of the background noise level in the receiving room with the source off, and the receiving room levels adjusted appropriately. The reverberation time in the receiving room was measured to calculate the amount of acoustical absorption in the receiving room. The apparent transmission loss of the partition at each frequency was calculated from the noise reduction, the acoustical absorption in the receiving room, and the area of the partition. The single number rating ASTC is calculated from the transmission loss at the frequencies between 125 and 4000 Hz.

In order to reduce variation between measurements as much as possible, all of the tests were performed by the same test engineer using the same equipment. The loudspeaker locations, sampling time, room sampling path were the same for all sets of measurements, as were the loudspeaker and microphone locations for the reverberation time measurements.

ASTC describes the apparent sound insulation of a partition. Because of flanking transmission, the actual transmission loss of the partition will usually be higher than the apparent transmission loss of the assembly. For each condition, testing was performed twice, once in each direction, to obtain forward and reverse apparent transmission loss. The forward and reverse values were averaged and used to compute the ASTC values reported below.

Tested Assemblies

Testing was performed in two pairs of guestrooms, 713/714 and 715/716. No destructive testing was performed and the exact construction of the wall assembly is described below. The description is based on our review of the building drawings and discussions with hotel engineering. Our understanding is that the wall construction is as follows:

- 1/2 inch gypsum board.
- 3-5/8 inch steel studs (spacing unknown).
- Batt insulation in cavity.
- 1/2 inch gypsum board.

The wall between rooms 715 and 716 included a connecting door assembly consisting of a pair of solid core wood doors. The doors had perimeter seals and a surface-mounted automatic drop bottom with aluminum threshold. VA observed that the seals were installed and appeared to be properly compressed when the doors were closed.

Guestrooms 713, 714, and 715 had double queen beds, while 716 had a single king bed. All guest rooms were the same size and had the same finishes. The floor was carpeted, and the walls were gypsum board with vinyl wall covering. The ceiling was concrete with a sprayed acoustic finish. Other furniture included a desk, dresser with television, end tables, and an armchair. At the exterior wall, the demising wall intersected the window mullion and the joint was caulked. The windows had full height drapery, and there was a through-wall air conditioner below the window. The wall tested was the headboard wall for both pairs of rooms.



Room 713



Room 716

Testing was performed on February 28, 2013, to document the existing condition. The Serenity coating was then applied to both sides of the walls as follows. (VA did not observe this process; the following description was provided by others.) The existing wall covering was removed. The Serenity product was applied with an airless sprayer at 3000 psi and a gun tip size of 519 and allowed to dry for 1–2 hours between coats. Two coats of Serenity Base Coat and one coat of Serenity Finish Coat were sprayed on both sides of the wall and both sides of the connecting doors. The coating was sprayed onto the adjacent perpendicular wall and ceiling surfaces by about one foot. The connecting door frame was filled with fire-rated expanding foam. The finishes and furnishing were returned to their original condition by the Hilton engineering staff.



Spraying first base coat



Spraying first base coat



Spraying second base coat



Spraying finish coat

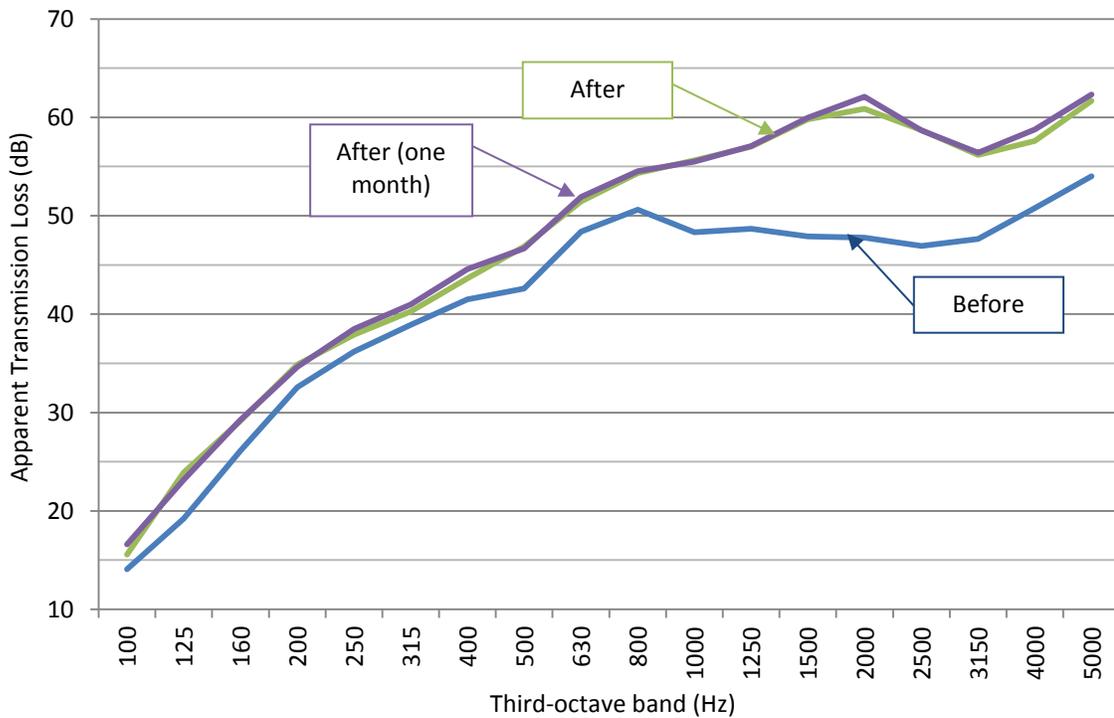
The testing of the coated assemblies was performed on March 11, 2013, and repeated on April 8, 2013. The purpose of the repeated testing was to verify that there were no changes in the performance of the coating after a one month cure period.

Acoustical Test Results

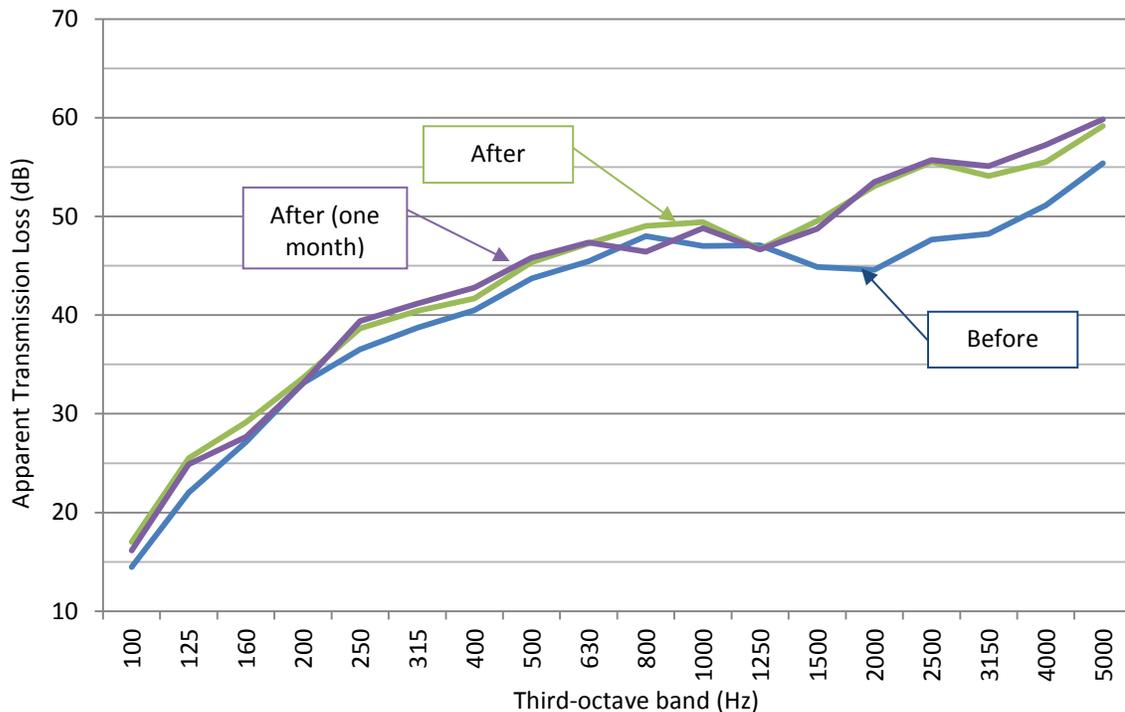
The results are shown in the following table. The apparent transmission loss spectra for the two pairs of guestrooms are graphed in Figures 1 and 2.

Location	Condition	ASTC
Guestrooms 713 and 714	Before coating	43
	After coating	48
	After coating (one month)	47
Guestrooms 715 and 716 (includes connecting door)	Before coating	44
	After coating	47
	After coating (one month)	46

Figure 1 – Guestrooms 713/714 (without connecting door)



For the guestrooms without the connecting door, there was essentially no change in the apparent transmission loss values after one month. The one point change in ASTC rating is indicative of the inherent uncertainty in the measurement procedure; there is no indication of any change in the performance of the assembly.

Figure 2 – Guestrooms 715/716 (with connecting door)


For the guestrooms with the connecting door, again the differences after one month were less than one dB and within the expected uncertainty of the measurement for most frequencies. However, there is a noticeable “dip” in the spectrum at 800 Hz which resulted in the one point decrease in ASTC rating. Based on our experience and from comparison of Figures 1 and 2, the transmission loss in this frequency range is controlled by the connecting door. VA suspects that this dip is due to a small leak in the seals of one of the doors. It is common for door seals to seal less tightly over time; this does not appear to be a change in the performance of the coating.

VA has the following conclusions from the test results.

1. For the assembly without connecting doors, the 360° coating improved the ASTC rating by 4–5 points. The ratings for both before and after conditions are primarily controlled by the low frequency transmission loss. The improvement in ASTC rating is due mostly to the 5 dB improvement at 125 Hz.
2. This change in ASTC rating, from mid-40’s to high-40’s, is a significant improvement. VA would expect a reduction in percentage of noise complaints with this change.
3. For assemblies with interconnecting doors, the 360° coating improved the ASTC rating by 3 points. The benefit at the low and very high frequencies was similar; it appears that the interconnecting door is limiting the performance in between (800–2000 Hz).
4. The *improvement of the coating* at high frequencies (from 1000 Hz and above) was **large (10 dB or more)**. In addition to reducing the noise level, this will change the character of sounds transmitted through the wall will change. Noise from adjacent units will tend to sound muffled, so that (for example) speech and music will be less intelligible.
5. There was no significant change in the performance of the coated assemblies after one month.



Veneklasen Associates

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Please feel free to contact us with any questions.

Sincerely,
Veneklasen Associates, Inc.

John LoVerde
Associate Principal

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