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Acoustic Control:

Specify resilient channels for cost-effective, high-STC acoustical wall assemblies

Michael C. Kerner, Posted 04/02/2012

In the current economy, it's important to give clients more bang for their buck. One way to do this on projects where acoustic control is a high priority is to incorporate resilient channels into the wall assembly. Teamed with fiberglass batt insulation and gypsum board, resilient channels are a viable and cost-effective solution to the problem of sound transmission from room to room. In this article, we'll go over how resilient channels function and offer suggestions for specifying the best resilient channel for the job.

Basic Resilient Channel Specs

The resilient channel is a decoupler that allows the attachment of the gypsum board to the studs without the two components touching. This separation breaks the transmission of sound waves through walls. Most of them are manufactured from 25-gauge steel and measure 1/2-inch deep, with holes in the leg of the channel for screws that fasten it to the framing members.

The most commonly used resilient channels today follow the first resilient channel design-Chicago-based United States Gypsum's (USG) RC-1-introduced in the 1960s. Since the RC-1's debut, its design has been extensively tested and widely accepted as the best-performing resilient channel in wall, ceiling and floor assemblies. It features a long, slotted hole with circular ends that are wider than the middle portion of the slot. Commonly referred to as "dog bones," these slots are 3 inches long and 3/8-inch wide in the center.

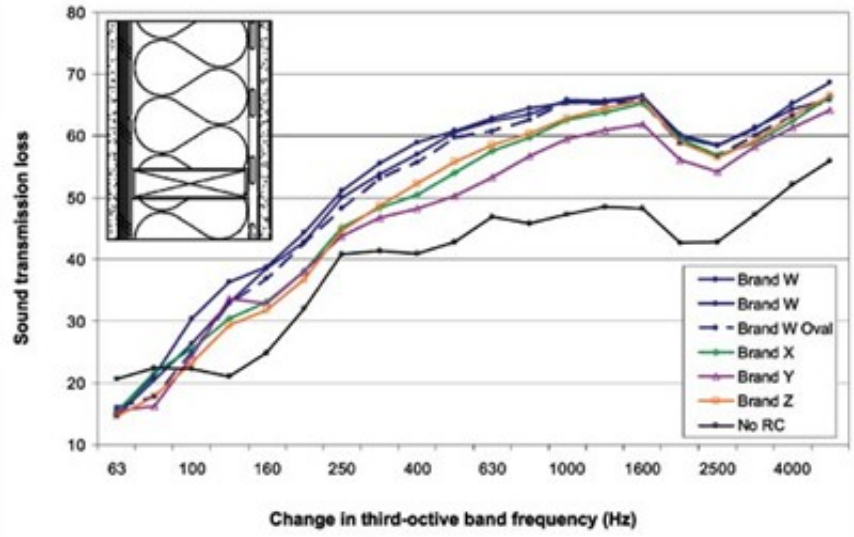
With their elongated holes, RC-1-style resilient channels are less rigid than the other wall assembly components, allowing them to dampen the vibrations of the sound waves. And, since it has only one attachment leg, it makes less contact with the studs than a normal two-legged hat channel. There have been resilient channels over the years that have employed a variety of different oval or circular hole patterns and spacing through the years that yield lesser results when compared to the original USG design, currently manufactured by ClarkDietrich Building Systems, West Chester, Ohio.

Testing and Rating Resilient Channels

Studies have shown over the years that the brand and model of resilient channel selected for a wall assembly

can make a significant difference in its overall acoustical performance. (Loverde, John and Dong, Wayland. "Quantitative Comparisons of Resilient Channel Designs and Installation Methods." Veneklasen Associates, 2009) The tests the products have undergone follow the protocols of ASTM E336, Standard Test Method for Measurement of Airborne Sound Insulation in Buildings; ASTM E90, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; and ASTM E 413, Classifications of Rating Sound Insulation.

The sound measurement most often required for wall construction is sound transmission class (STC), an integer-number rating of how well an assembly reduces airborne sound. Testing to determine an STC rating is conducted on the entire wall assembly and usually includes a range of 16 standard frequencies. The wall assembly to be tested is built and sealed within a wall frame located between two rooms that have controlled climates and are acoustically sealed from external noise. Sound is generated in one room, with the amount of noise passing through the wall assembly measured once it reaches the other side. The transmission loss from the frequencies recorded during the test are plotted on a sound pressure level graph (See Graph), with the results compared to a standard reference curve. This determines the STC rating for the tested assembly.



Another method for measuring the STC of a wall assembly is to not generate sound and measure the amount of ambient noise, or background noise, that passes through the wall. For example, if background noise enters the wall at a particular decibel reading and the sound measured on the other side of the wall is lower, the difference is the STC for that wall assembly. The higher the STC rating, the better the wall is at preventing airborne sound transmission through the assembly.

By installing one brand of resilient channel in a particular wall assembly design and testing it against another brand installed in the same assembly design, acousticians can get an accurate picture of how the resilient channels affect STC rating. Before specifying a resilient channel for a project, be sure to research its performance in such tests.

Conclusion

Specifying high-performance resilient channels and pairing them with sound-absorbent insulation can allow clients to have a high-STC wall assembly at a fraction of the cost of assemblies made with today's newer, more expensive wall materials. It's a great way to give them more for their money at a time when that's often

what matters most.

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