Sound attenuation

Managing sound transfer for code and client.

Sound attenuation for floor/ceiling assemblies may be required to attain code ratings or to mitigate sound for a client. The best practice in residential, multi-family and light commercial applications is to have the assembly evaluated by one of several testing methods. Common methods of testing include field or lab testing, software modeling and estimating. Each method offers a different level of accuracy and cost. Usually these services are performed by an "Acoustical Consultant" to provide STC and IIC ratings. The higher the number, the quieter the floor/ceiling assembly.

A Sound Transmission Class (STC) rates how well a building's floor/ceiling assembly attenuates airborne sound, such as noise from stereos or human conversations. A common rating for standard residential assembly is 35-40 STC.

An Impact Insulation Class (IIC) is a rating of how well an assembly attenuates structure borne sound, such as noise generated from children running across the floor or dancing. A common rating for a residential floor/ceiling assembly is 35-45 IIC.

IBC Section 1207 mandates that all floor/ceiling assemblies in multi-residential buildings meet or exceed a rating of 50 for both STC and IIC.

There are thousands of building products that promote quieter living, from specialized sheetrock to adhesives to light weight concrete. When specifying these products it is crucial to always evaluate the entire floor/ceiling assembly and not the product by itself.

For Warmboard applications, we have several solutions that help increase STC and IIC numbers. Rubber mats interface easily and can be installed directly over our panels before installing the finish floor. The mats should not be penetrated by any type of fasteners. Carpet, tile, and floated engineered hardwood are easy to install. For nail down hardwoods, a 3/4" floating plywood underlayment is needed. These mats have very low R-values and are available in 1/4", 3/8" and 1/2" thicknesses. Reputable products include:

- Sound Shark by Sound Seal
- QTSCU by QT Sound Control
- Privacy Ultimate Underlayment by Sound Isolation Company

The Homasote 440 Sound Board Barrier also works well with Warmboard. These 4'x8' sound panels are available in 1/2", 5/8" and 3/4" thicknesses. They install over Warmboard, beneath the finish floor. The Homasote product can also be used in a ceiling application.

- Homasote 440 Sound Board Barrier

continue ▸

A resilient clip and a resilient channel also improve IIC and STC ratings. This technology uses the concept of decoupling the finish ceiling from the framing members. The clips are attached to the bottom of the ceiling joists, then a metal dry wall furring channel is installed followed by two layers of sheet rock. Common reputable products are:

- Iso Max by Kinetics
- Quiet Clips by Sound Isolation Company
- Genie Clips by Acoustigard

Over the years some design professionals have specified light weight concrete to help create a quieter living space. However, the APA (Engineered Wood Association) conducted a lab test with 1 5/8" lightweight concrete. The results showed that the addition of lightweight concrete over plywood provided little benefit overall to sound attenuation (APA document available by request).

Assembly with concrete: STC 53 IIC 74

- 1 5/8" light weight concrete, pad and carpet, 5/8" plywood, wood joists/3" insulation resilient channel, 5/8" gypsum wall board

Assembly without concrete: STC 48 IIC 69

- Pad and carpet, 5/8" plywood, wood joist/3" insulation, resilient channel, 5/8" gypsum wall board

In closure, sound attenuation is a complex science that may require a qualified consultant to help guide a project towards realistic goals. The products and methods we recommend are all practical solutions to help achieve a quieter living space. It is important to understand the sound industry as its products can be controversial.