Whitepaper: A look into Acoustical Ratings & factors to consider in the selection of acoustical flooring

Author-Adam Clark-(LEED AP),
Vice President, Spectrim Floors

OVERVIEW:

Acoustics, as it relates to flooring, is the study of sound, noise, and vibration. Understanding the acoustical performance of your flooring product is essential.

There is a lot of smoke and mirrors regarding sound control. This document attempts to help educate on how to truly determine the effectiveness of a floor covering and its ability to reduce noise transfer.

This document analyzes in detail what the STC, IIC Ratings, and Delta IIC ratings mean and how they can have an impact on your property. We will also look at the best performance indicators and the best tests to determine the acoustic value that flooring provides for your projects.

I can remember when I was relocating our business and was living on the 3rd floor of an apartment. My 8-year old daughter was playing upstairs, nothing out of the ordinary for a child walking around in an apartment unit. The sound transmission vibrated to the lower floors and was bad enough that a downstairs neighbor knocked on our door to see if we were ok. This experience left me feeling quite uncomfortable, and for the next six months, anytime my daughter came over to play, I would always worry that tenants below were affected by her walking too loud. I felt so bad for the tenants below how had to deal with this constant issue with hearing footsteps. I think I speak for most of us when this is the exact situation that we want to avoid for apartment tenants and hotel guests during their stay.

The goal of this whitepaper is to provide comprehensive overview of the different acoustical test ratings, what they mean, how the ratings compare to each other via product type.-(Carpet/LVT/Acoustical LVT and Acoustical pad)

EXPLANATION OF STC, IIC & DELTA IIC RATINGS:

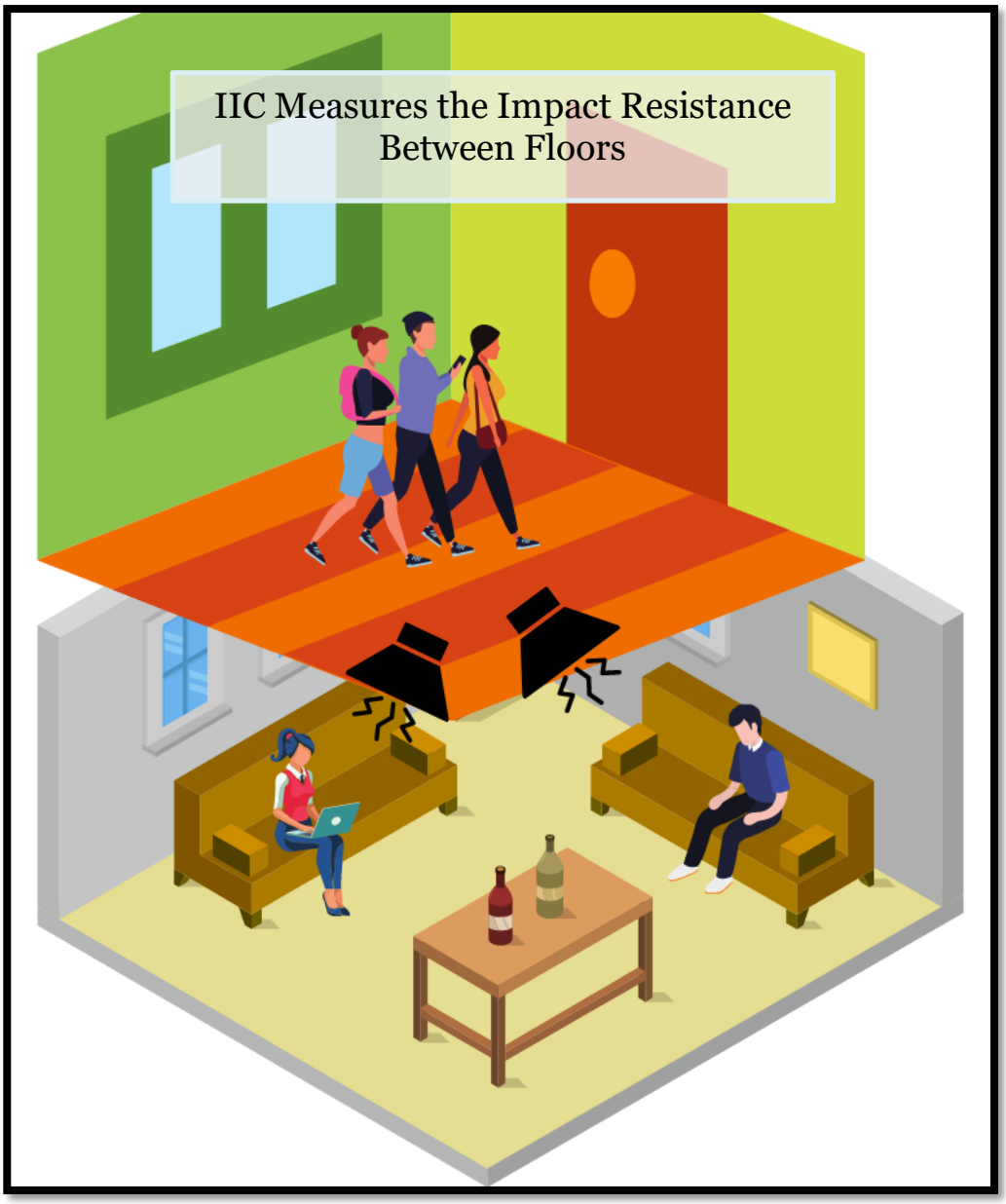
What is IIC-(Impact Insulation Sound)?

The IIC is a measurement of the sound transmitted in between floors. At its most simple term, the IIC rating is a measurement used to determine the floor covering effectiveness to stop sound transmission between floors. Impact noise is generated with a hammer machine tapping directly onto concrete or gypcrete floor.

As it relates to acoustic flooring, the flexibility of your floors, the denseness of the floor coverings, the floor's flexibility, and the floor assembly all play critical roles in determining the IIC Ratings.

IMPACT INSULATION: SOUND TRANSMISSION IN BETWEEN FLOORS:

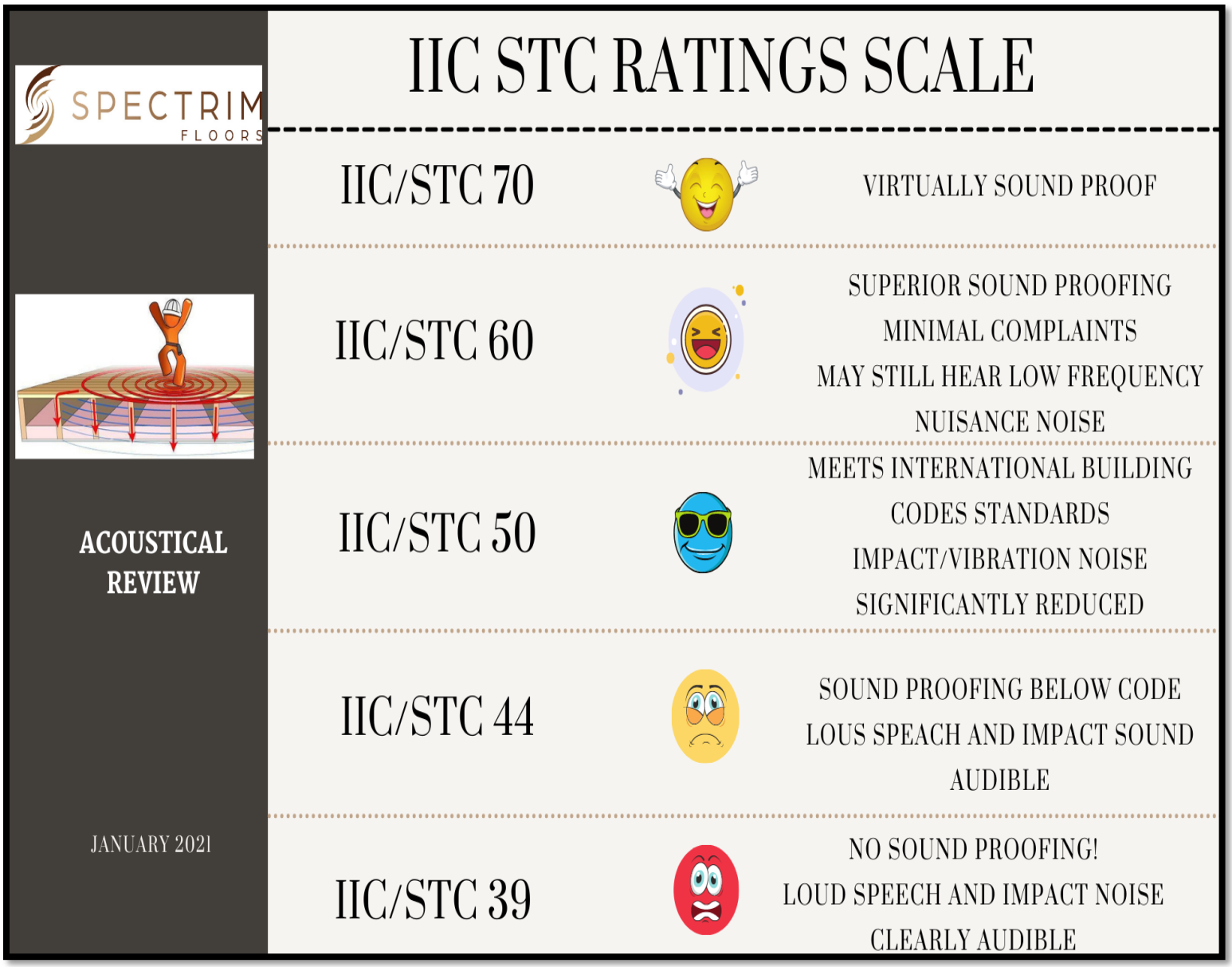
Impact Insulation Class (IIC) is a rating of how well a floor/ceiling assembly attenuates structure-borne sound. The IIC number is roughly the reduction in decibels that a partition creates in the 100 Hz to 3,150 Hz range when tapped by the testing machine. The easiest way to achieve the required IIC rating of 50 is to use carpet and underlayment as your flooring, which can give you 20+ points." *(Source: EV Studio Sound Transmission)*. There are also a number of underlayment options for harder surfaces which include LVT with a Sound Pad- (A 2 step process for installation of flooring and acoustics), and we feel that the strongest trend is to combine flooring and acoustics into one material which slashes your installation costs, makes it easier for scheduling crews, and the result is a better performing flooring product.



THE IIC METHOD OF TESTING FLOOR COVERINGS:

IIC stands for Impact Insulation Class. It is defined as a single number rating derived from the normalized impact sound pressure levels through a floor-ceiling assembly. The sound source is a standard tapping machine through which sound pressure levels radiate off the bottom of the assembly into a receiving room and are then normalized for the rating calculation. There are nearly unlimited systems this testing can be performed on." *(Intertek/Acoustical Testing-FAQ's)*

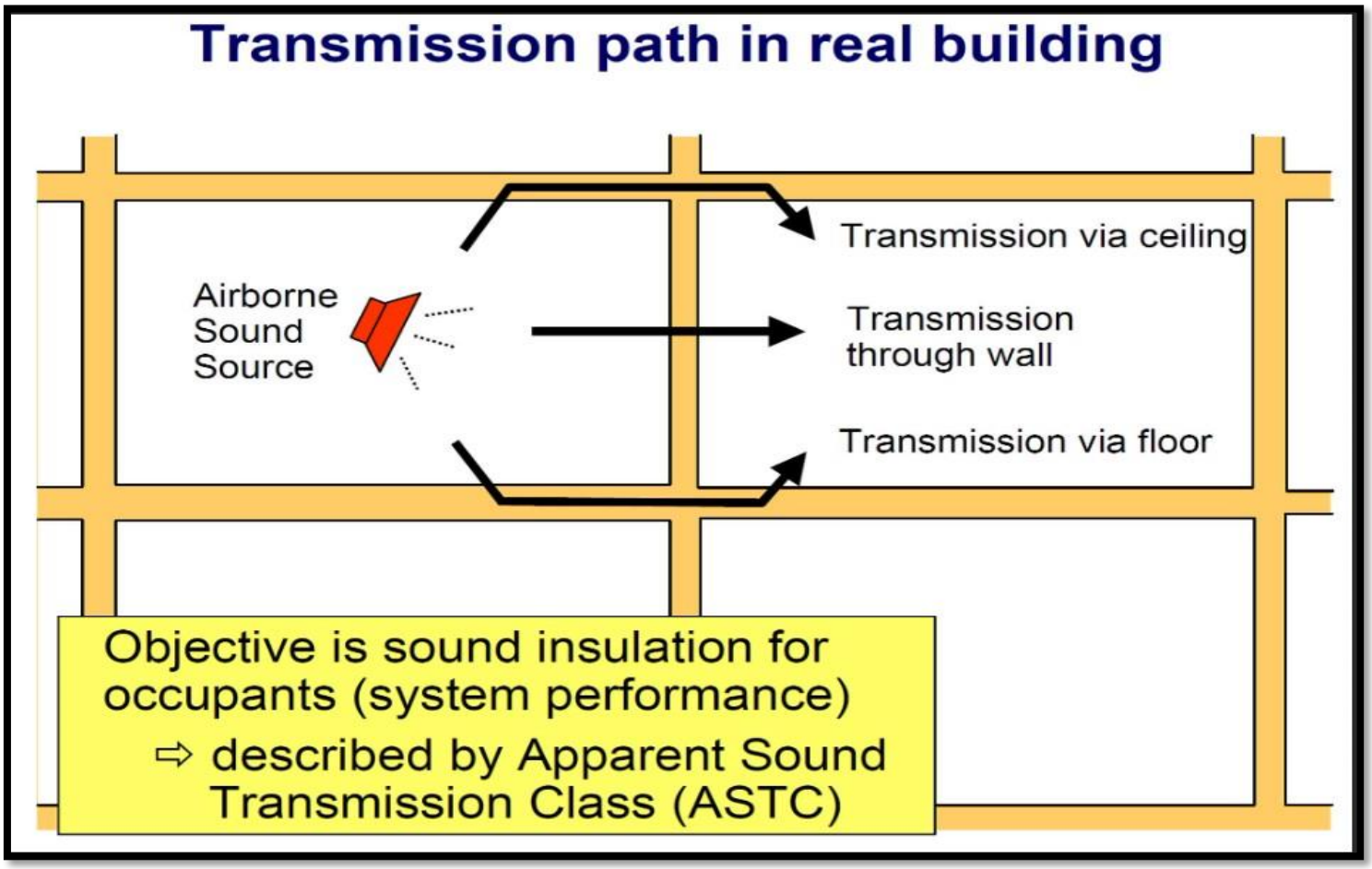
The floor assembly does have a direct correlation to the ratings achieved through these tests. It is essential to determine if the floor assembly is the same, or similar to what floor assembly you are using for your construction projects.



Test is known as the ASTME492-(Impact Sound Transmission through floor-ceiling Assembly

Sound Transmission Class (STC) is a rating of how well a building partition attenuates airborne sound. The STC number is roughly the reduction in decibels that a partition creates in the 125 Hz to 4,000 Hz range. Walls and floor/ceiling assemblies need to be insulated for airborne sound to achieve a STC of 50 or more. Typically you can find the sound rating for assemblies in the same location that you found the fire rating for the assembly. You can also contact manufacturers for more information on assemblies that use their products. If you choose to create your assembly and have it tested, it must have a minimum STC of 45 after it is tested. Where you have openings and penetrations in the assembly they must be adequately insulated to maintain the STC with the only exception being entry doors. (Source: EV Studio-STC&IIC)

STC Measures Airborne Sound



Test is known as the ASTME90-(Airborne Transmission Sound)

DELTA IIC: ISOLATING THE FLOOR COVERING FROM THE FLOOR ASSEMBLY

The **Delta IIC (ΔIIC)** shows the "IIC improvement value" of the product without the floor assembly. The testing is performed on a bare 6" concrete slab. To calculate the Delta IIC of Acoustical Flooring, the IIC of the concrete slab is subtracted from the IIC value of the luxury vinyl.

The Delta IIC is really the more transparent number because it shows by how many decibels the Acoustical Flooring reduces the sound transmission. It Is also the simplest number to compare across manufacturers or product lines, because it gives you the most accurate representation of a product's ability to reduce noise transmission in a finished building.

IC of Luxury Vinyl – IIC of Concrete = ΔIIC of Luxury Vinyl

-
- IIC testing is performed on 6" concrete slab without an underlayment or floor covering.
- IIC testing is performed on 6" concrete slab with the flooring and underlayment installed.
- The difference between the 2 tests above are calculated with and without the underlayment and flooring
- This difference determines the Delta IIC Rating

Test is known as the ASTME2179 Standard

COMPARISONS: LVT+ SOUND PAD/VERSUS ACOUSTICAL LVT FLOORING

Company	Product	Type:	Thicknes s	Delta IIC
Genie Matt	RST10	Acoustical Pad	9.5mm	23
Spectrim	Feather Walk™ 3.5mm	Attached Glue Down LVT+ Pad	3.5mm	24
Spectrim	Feather Walk™ 4.5mm	Attached Glue Down LVT+ Pad	4.5mm	25
Acoustimat	Acousti-Mat LP	Acoustical Pad	1.5mm	19

COMPARISONS: CARPET VERSUS ACOUSTICAL LVT FLOORING

Topping	IIC Rating/STC Rating	Description:
Vinyl Flooring	IIC 35-40	2mm, 3mm thicknes
3.5mm Spectrim Quiet Walk	IIC51, STC57, Delta IIC24	3/4" Gypcrete with an acoustical underlayment below the gypcrete
Spectrim 4.5mm Quiet Walk	IIC59, STC59, Delta IIC25	1" Gypcrete with a 1.5mm Maxxon Underlayment below the Gypcrete
Carpet & Foam Carpet pad	IIC56, STC45	Carpet and Foam carpet pad on 1/2" plywood, underlayment over 1/2" plywood subfloor. 1/2" gypsum wall board nailed to joist from underneath
Carpet & Foam Carpet pad	IIC70, STC52	Carpet and Foam carpet pad on 1/2" plywood, underlayment over 3/4" plywood subfloor. 1/2" gypsum wall board nailed to joist from underneath

(Source: Find any Floor)

GUIDELINES FOR SELECTION OF ACOUSTICAL FLOORING:

- Verify that the manufacturer's floor assembly is similar to the assembly that you are using for your projects.
- Always ask for the testing documents, do not rely on an STC or IIC number without confirming the used tests.
- Ensure that the test is done by a professional testing agency in the U.S. Many times, manufacturers will test using materials that are not used in the states, and these tests are not reliable.
- Ask if a Delta IIC Test was performed as this isolates the material from the floor assembly and provides the actual value.
- Recognize that different flooring types have different acoustical ratings and identify the other issues that can happen.
- Make sure you also pay attention to the acoustical performance of ceilings and walls. Oftentimes, customers will hire Acoustical Noise Experts who will help design the best acoustical designs for your projects.

Works Cited

Intertek: Acoustical Testing Frequently Asked Questions

Find Any Floor IIC/STC Ratings: http://www.findanyfloor.com/sound/IICRating.xhtml

EV Studio: www.evstudio.com

Spectrim Overview

Spectrim Floors is a full-service manufacturer & supplier of SPC Click, WPC Click, Glue Down, Rubber Base, and Acoustical flooring with our offices located in our 428,000 square foot plant in Bensalem, PA.

SPECTRIM FLOORS

For more information, visit www.spectrimfloors.com

Corporate Headquarters: 3433 Marshall Lane, Bensalem, PA 19020
PH: **(888) 505-9921**
For Flooring Inquiries, Please Email: adamc@spectrimbp.com