Choosing the right Acoustical Underlayment
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Professionals involved with the installation of flooring must choose materials for a variety of projects. Whether selecting options for stone, tile, vinyl, hardwood, laminate or carpet installations, project teams are expected to be experts; to know the ideal solution for every scenario; and to deliver it on time and on budget. Beyond this baseline, however, is the need to deliver a space that performs behind the scenes to reduce and isolate foot fall or impact noise, and allow the space to function as intended – whether it's a commercial, home or public space.

Acoustical floor underlayments are becoming increasingly important on new and retrofit construction projects. As with any construction project, it is most cost effective to create an acoustically correct floor during the planning stage, rather than trying to correct the problem later in the process. By being more informed upfront, construction teams and product specifiers can eliminate the guesswork and choose a solution that performs as intended to deliver acoustically correct flooring in any environment.

A Guide to Understanding IIC, DELTA and STC

Sound is classified in two basic types; structure borne noise and airborne noise. Structure-borne noise, commonly referred to as footfall noise, would include activity that directly impacts the floor beneath you such as the dragging of furniture or stomping of feet. Airborne noise is the noise that surrounds you, such as a television in the background or music being played in another room.

What many project teams neglect are the critical ratings that denote noise control performance: IIC – Impact Insulation Class and STC – Sound Transmission Class, play an important role in guiding how well your flooring will perform, acoustically-speaking.

IIC is a value used for evaluating the performance of the floor/ceiling assembly from **structure-borne noise**. Floor underlayments in general are lightweight and designed specifically for impact isolation (IIC). The higher the number the better the performance. Weight & mass do not relate to the performance in reduction of structure borne noise.

DELTA is the impact insulation class provided by the acoustical underlayment. This is truest measurement of the sound controlling properties of the underlayment. The delta determined by the following: An IIC measurement is taken on the floor assembly prior to the inclusion of the acoustical underlayment and an IIC ratings are reported. The same test is then executed with the

underlayment in place, resulting in a higher IIC rating. The difference between these two reported numbers is referred to as the DELTA.

STC is a value for evaluating the performance of interior walls and the floor/ceiling assembly to stop or insulate **airborne noise**. The higher the STC number the better the ability of the assembly to block noise. Weight & mass play a major factor in the overall STC rating, the heavier the structure the higher the STC ratings will be.

It is necessary to understand the effect of noise and address the issue of noise transference early in the design process. By selecting building materials with appropriate STC and IIC ratings, and insuring proper installation, developers can help eliminate noise complaints and avoid the potential for problems at that build site in the future.

There are many local building codes for noise that can vary from state to state. Nationally there is the Uniform Building Code, BOCA (Building Officials and Code Administration) and International Building Code. The Uniform Building Code, BOCA and International Building Code, call for minimum STC and IIC ratings between 45 and 50 for design.

Planning for Performance

There is no one size fits all solution when looking for an effective floor underlayment. The higher quality underlayment's are typically designed and marketed by application as different floor coverings require different underlayment needs. There are glue down, floating and nailed floor options and the composition of these product ranges from rubber to cork to substrates made up of recycled content.

Underlayments for Wood

Common underlayments for wood are recycled rubber, cork, foam, wood composites and sheeted goods. The key attributes that all of these options share are a firm base and absence of moisture. When installing hardwood, the surface must always be clean, flat and dry. In sound control situations, wood underlayments are typically floated over or glued to the top floor. Rarely will it be acceptable to nail. There are underlayment options that offer a sleeper system that will allow you to nail ¾" solids without compromising installation. It is important to note that by using this method you won't penetrate the actual acoustical product, therefore you won't compromise the acoustic value.

Underlayment for Tile
The standard installation method for tile or vinyl is a thin set mortar, also referred to as a wet set installation method. Due to this install method, and the moisture associated with it, wood and wood composite underlayments are not recommended. With a thin set installation it is important to select an acoustical underlayment that is unaffected by moisture, and has the ability to bridge cracks and subfloor irregularities. Acceptable pads include variations of recycled rubber, cork, foam and sheeted goods. It is important to note that subfloor should have an L360 for deflection.

Underlayment for Vinyl
Due to the softness of vinyl flooring, it has limited resistance to footfall noise and easily indents. There are two types of energy that primarily effect sheet vinyl, LVT and LVP. The first is dynamic energy. This is the transfer of energy to the floor from people walking or rolling loads across the surface. These actions can indent the floor as well as negatively transfer sound to the space below. Static energy is brought about by objects in place for extended periods of time, such as a desk or chair. This too, can lead to indentions. That said, when selecting an underlayment for vinyl, it is critical that you select a firm product that can withstand the effects of both dynamic and static energy.

Underlayment for Carpet
Carpet is the most commonly installed floor covering application. Carpet inherently offers some level of sound control. When incorporating an acoustical underlayment, it is important to select an acoustical underlayment that has the right amount of firmness and cushion. You will retain appearance of the face fiber far longer by the addition of a cushion opposed to a hard surface below. In some cases a compromise must be met as the best combination of firmness and cushion may not necessarily provide the highest level of acoustical value. Additionally, the underlayment must have some density to it, otherwise, it can lead to premature stretching of the carpet, resulting in damage to the backing system and possible delamination.

Real World Results

A prime example of how advanced planning can deliver superior acoustical performance is the Pacifica Honolulu project. Pacifica Honolulu is a 46-floor building with a residential interior area of 430,000 square feet and 489 residential apartments. They were looking for an underlayment system specially designed for use under tile and stone floors that would increase the Impact Insulation Class (IIC) over the existing floor ceiling assembly.

The project utilized Cerazorb, by Sound Seal, as the solution. Cerazorb is a 5 mm thick underlayment system offering high energy impact with low weight

and will remain unchanged after repeated impact loads. Its unique design will not rot, swell or absorb water and is anti-microbial.