Introduction

As acoustics is the science of sound + vibration, the timbre of the sound or vibration energy is affected dramatically by the behaviour and character of the medium or material on which it travels. Simply put, the characteristics of the air or materials the energy touches or travels through affects the timbre and quality of the sound/vibration. Consequently, material science is an elemental part of acoustical design.

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Decibel (dB)

A logarithmic ratio unit of measure which is one-tenth of one bel, named after Alexander Graham Bell in the early years of telephony. It is typically referenced to a voltage reference for use with audio or acoustic meters. (0 VU) There are weightings or filters which adapt the db for different uses, such as human hearing. These weightings are designated by a letter after the symbol. For example, the weighting which adjusts for the human ear's fletcher munson curve is called the "A" weighting and is designated by the following symbol: dB A. There are 5 in total: A, B, C, D and Z. The Z weighting is actually no filter, just pure raw information and is widely used by acousticians and in testing..

Acoustic Resolution | NPS/ft2

Acoustic Resolution is a measure of acoustical performance based on the number of Non-Parallel Surfaces in each square foot of a device. (in relation to it's backplane) This is denoted with the symbol NPS/ft^2 and was created as a unit of measure to accurately quantify acoustic resolution. It was necessitated by a lack of existing measurement and to adapt to a dramatic increase in performance between Quantum Acoustics™ devices and Traditional Acoustic panels. Acoustical resolution is directly related to acoustical performance: higher resolution values result in higher acoustical performance. Like physics and nature, there is no upper limit to acoustic resolution, it is only limited by the technology of the time and materials science. In this way It differs from the sabine and NRC which have upper limits.

Absorption Coefficient (Sabine)

One "Sabin" is one unit of sound absorption, named after Wallace Clement Sabine who founded the field of architectural acoustics while at Harvard University. 1 sabin is set as 100% sound absorption. This applies to both imperial and metric units of measure. 1 metric sabin is a material with 100% sound absorption in one square meter. 1 imperial sabin is a material with 100% sound absorption in one square foot. The most often used example of 100% sound absorption is an open window in a wall..

Sweet Spot

The spot on a racquet, club or bat where it makes the most effective contact with the ball.

OITC | Outdoor-Indoor Transmission Class

OITC is a measure of sound isolation between outdoor and indoor spaces with more emphasis given toward the lower band of audible frequencies. Like most isolation standards it tests in a limited range of frequency: 80 hz to 4000 hz. (Note: human hearing range is from 20 hz to 20,000 hz.)

NRC | Noise Reduction Coefficient

NRC or Noise Reduction Coefficient is an average of all the materials and the system holding it and their ability to absorb sound energy. The American Society for Testing and Materials (ASTM) has standardized testing procedures to measure NRC including frequencies from 100 hz to 5000 hz. (Note: human hearing range is from 20 hz to 20,000 hz.) It is most commonly used for ceiling tiles and other wall or ceiling mounted acoustical absorbers.

STC | Sound Transmission Class

STC is a unit of measure of how much airborne sound energy is attenuated across a boundary wall, ceiling, floor, door or partition. It is mostly used for interior spaces but there are test procedures for exterior uses as well. While measure in db, a sound transmission class rating is expressed in STC. Example if a wall isolates 42 dB between the two adjoining spaces, it is said to be rated for 42 STC, not 42 dB. Standardized testing is performed on frequencies from 125 hz to 4000 hz. (Note: human hearing range is from 20 hz to 20,000 hz.).

NIC | Noise Insulation Class

NIC is a unit of measure of sound isolation between spaces like STC. Also like NIC is measure in decibels (db) but represented in NIC. Example; the wall between the office and the conference room has a rating of 42 NIC. Unlike STC, NIC uses both on site testing of the space after construction in addition to including more variables in the extensive pre-build calculations. NIC tests test from 125 hz to 4000 hz. (Note: human hearing range is from 20 hz to 20,000 hz.)

IIC | Impact Insulation Class

IIC is a unit of measure of isolation of impact sounds between floors and spaces in buildings. The most common example of an impact sound is footsteps or footfalls. It measures sound between 100 hz and 3150 hz using a standardized ASTM test and a tapping machine to simulate actual footfalls. Like STC and NIC, a higher number of IIC means more isolation and therefore higher performance.