



Acoustical Terms

Absorption Coefficient: The fraction of the incident sound power that is absorbed by a material on a scale from 0 to 1.

Acoustic, Acoustical: Qualifying adjectives that describe something containing, producing, related to, or associated with sound. Acoustic usually pertains to hearing, while Acoustical pertains to the science of Acoustics.

Acoustics: (1) The science of sound, including its production, transmission, and reception. (2) The physical qualities that determine how a room sounds.

Ambient Noise: The background noise, including sounds from many sources near and far, associated with a given environment.

Anechoic Chamber: A laboratory test room where all surfaces are covered by sound absorbing material in an attempt to eliminate sound reflections.

A-weighting: A standard frequency weighting that de-emphasizes low-frequency sound similar to average human hearing response and approximates loudness and annoyance of noise.

Bandwidth: A specific range of frequency.

Coefficient: A unit of quantity generally scaling from 0 to 1.0.

Damping: The dissipation of sound or vibration. Damping reduces the velocity of vibrating molecules in an elastic medium at resonant frequencies, resulting in the more rapid dissipation of energy.

Dead Room: A room that is characterized by a large amount of sound-absorbing material and with little reverberation.

Decay: The decrease of sound or vibration with time. Decays are mostly readily observable subsequent to an impulse.

Decibel (dB): The measurement unit used in acoustics for expressing the logarithmic ratio of two sound pressures or powers. Typically used to describe the magnitude of a sound with respect to a reference level equal to the threshold of human hearing.

Diffraction: The process that bends a wave due to an obstacle or aperture.

Direct Sound: A wave radiated directly from a sound source that reaches a receiving point without reflections.

Echo: A distinctly audible sound reflection, usually considered undesirable.

Flutter: Distortion that occurs in sound reproduction as a result of undesirable speed variations during the recording, duplicating, or reproducing process.

Flutter Echo: Echoes occurring repetitively between a pair of surfaces.

Frequency: A descriptor for a periodic phenomenon. The frequency is equal to the number of times that pressure wave repeats in a specified period of time. In the case of sound and vibration, frequency is measured in units of Hertz (Hz).

Harmonic: A single component of a sound's spectrum that has a frequency that is an integer multiple of the fundamental frequency.

Hertz (Hz): A unit of measure for describing the frequency of a wave phenomenon, such as sound.

Impact Isolation Class (IIC): A single number rating derived from one-third octave band values of impact noise levels measured through a floor/ceiling system using a standard tapping machine. The IIC describes the impact noise insulating properties of a floor/ceiling assemble and approximates footfalls on hard-surfaced floors.

Loudness: The magnitude of the physiological sensation produced by sound, which varies directly with sound intensity and is also dependent on both frequency and time.

Masking: The process by which sensitivity to a sound decreased by the presence of another (masking) sound. Masking noise can be used to reduce the intelligibility or distraction of an intruding sound, such as speech.

Medium: A substance carrying a sound wave.

Mode: Any various stationary vibration patterns of which an oscillatory system is capable; for example, a standing wave in a room or a fundamental on a guitar string.

Noise: (1) Any undesired noise. (2) Any statistically random wave.

Noise Criteria (NC) Curves: A set of spectral curves used to obtain a single number rating describing the “noisiness” of environments for a variety of uses. NC is typically used to rate the relative loudness of a ventilation system.

Noise Isolation Class (NIC): A single-number rating representing the sound isolation between two enclosed spaces separated by a partition. The sound paths include the partition and flanking paths.

Noise Reduction (NR): The difference (reduction) in sound pressure level of sound transmitted through a building partition, usually measured in octave or one-third octave frequency bands.

Noise Reduction Coefficient (NRC): A single-number rating of the sound-absorption of a material equal to the arithmetic mean of the sound-absorption coefficients in the 250, 500, 1,000, and 2,000 Hz octave frequency bands rounded to the nearest multiple of 0.05.

Octave: A separation in frequency constituting doubling or halving of frequency.

Octave Band: A frequency band with the highest frequency being twice the lowest frequency defining the frequency range.

Pink Noise: Noise whose spectrum is filtered so that there is equal power in each octave band. For example, the sound power in the 63 Hz octave band is equal to the sound power in the 1,000 Hz octave band.

Pitch: The perceived frequency of a sound determined primarily by the fundamental frequency of the sound and also upon its harmonics and their relative sound pressure levels.

Psychoacoustics: The scientific study of human auditory perception.

Reflection: The phenomenon by which a sound wave is re-radiated (bounced) from a surface.

Refraction: The phenomenon by which the direction of a sound wave is changed due to the spatial variation in the speed of sound. For example, this occurs when sound travels through an atmosphere in which temperature changes with elevation above the ground.

Resonance: (1) The large amplitude vibration in a mechanical system caused by a relatively small stimulus having the same period as the natural vibration period of the system. (2) An increase in the sound pressure of one or more harmonics of sound.

Reverberation Time: The time (in seconds) required for the sound pressure level to decrease 60 dB in a room after a noise source is abruptly stopped. Reverberation time relates to a room’s volume and sound absorption.

Reverberation: Collection of time-delayed sounds following a direct sound the result from reflections indoors.

Room Constant (Absorption): The total acoustic absorption provided by objects and surface, including air, in a specific room.

Sabin: A unit of acoustic absorption equal to the absorption provided by a unit area of a perfect absorber.

Sound: (1) An oscillation in pressure, resulting from molecular motion, in a viscous or elastic medium such as air, water, wood, steel, etc. (2) Sound is an auditory sensation evoked by air molecules vibrating in a frequency range between 20 – 20k Hz.

Sound Absorption: The property of absorbing sound energy possessed by objects and surfaces, including air.

Sound Insulation: (1) The capacity of a structure to prevent sound from being transmitted from on space to another. (2) Insulation used in wall, floor, or ceiling cavity to add damping and decrease transmitted sound.

Sound Intensity (I): The rate of flow of energy per unit area in a specified direction.

Sound Isolation: Sound attenuation through a material or assembly.

Sound Masking System: An electronic system that generates noise to help render speech less intelligible.

Sound Power: The acoustical energy of a sound source independent of distance.

Sound Power Level: Sound power radiated by a sound source reported as a level in decibels referenced to 1 pico-watt.

Sound Pressure: The time varying pressure exerted in an elastic medium such as air, generally in the 20 – 20k Hz frequency range.

Sound Transmission Class (STC): A single-number rating derived from laboratory measurement of sound transmission loss. STC is calculated in accordance with ASTM E413, “Classification for Rating Sound Insulation.” The STC describes the sound-insulating properties in the 100 – 4k Hz frequency range, primarily for assessing speech transmission through a structure, such as a partition.

Sound Transmission Loss (TL): A laboratory measure of sound insulation indicative of the sound intensity flow transmitted through a partition without regard to the partition size, usually measured in one-third-octave band.

Spectrum: The relative magnitude of different frequency components that comprise a single wave.

Structure-borne Noise: Noise propagated through a structure and re-radiated as airborne noise.

Timbre: Perceived auditory sensation of “tone color” mainly dependent on sound spectrum.

Tone: A pure tone is a singular frequency produced by a sine wave.

Ultrasonic: Pertaining to signals involving frequencies above the range of human hearing.

Vibration: A periodic motion of molecules in an elastic medium with respect to equilibrium. Vibration by mechanical equipment can be a factor in structure-borne noise radiation.

Vibration Isolation: The methods used to reduce vibration in a structure caused by vibrating equipment, including the use of springs and elastomeric materials.

Wavelength: In a periodic wave, the distance between two points having the same phase in consecutive cycles along a line in the direction of propagation.

Weighting: A prescribed frequency response commonly provided by an electronic filter in a sound level meter.

White Noise: Noise having a frequency spectrum with equal power at each frequency.