

## Sound Transmission in Masonry Walls

Unwanted noise can be a major distraction in the home or work environment. Concrete masonry walls are often used for their ability to isolate and dissipate noise. Masonry walls block sound transmission over a wide range of frequencies. Also, it can effectively absorb noise thereby diminishing noise intensity.

Sound is characterized by its frequency and intensity. Frequency is the measure of the number of vibrations or cycles per second. Once cycle per second is defined as a hertz (Hz). The human ear can perceive sounds as low as 16 Hz to as high as 20,000 Hz. It is most sensitive to sounds between 500 and 5000 Hz. Human voices speaking in conversational tones have a frequency of appx. 500 Hz.

The intensity of sound is measured in decibels, a relative logarithmic intensity scale. For each 20 dB increase in sound, there is a corresponding tenfold increase in pressure. This logarithmic scale is appropriate for sound because the perception of sound by human ear is also logarithmic. To the human ear, a 10 dB sound level increase is perceived by the ear as a doubling of the loudness.

All solid materials have a natural frequency of vibration. If the natural frequency of a solid is at or near the frequency of the sound which strikes it, the solid will vibrate in sympathy with the sound, which will be regenerated on the opposite side of the wall. The vibration is stopped if the wall partition is heavy and rigid, like concrete masonry. The higher the density of the wall the more effective it is in absorbing the sound.

Sound transmission class (STC) provides an estimate of the performance of a wall in certain sound insulation applications. The STC of a wall is determined by comparing plotted transmission loss values to a standard contour. Sound transmission loss (STL) is the decrease in sound energy, in dB or airborne sound as it passes through a wall. The STC is a point on the graph that is based on transmission loss at the frequency of 500 Hz.

