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SOUND MASKING HEALTH & SAFETY OVERVIEW

Aquent
Boston, Massachusetts

Sound masking does not cause adverse health reactions

Sound masking is the introduction of a continuous, engineered spectrum of broadband sound, similar to the sound of airflow, into an environment to reduce the perceived intelligibility of speech. In office environments (which typically have a low ambient noise floor), this reduction in intelligibility has the benefits of increasing acoustic privacy, protecting confidentiality, and reducing distant conversational distractions thereby increasing workplace productivity. These benefits can also apply to patient rooms and exam rooms in medical facilities, while also helping alleviate sleep disruptions at night.

A question we're occasionally asked at trade shows and during educational webinars is whether sound masking is known to cause adverse physical reactions, such as headaches and/or nausea.

The short answer is that sound masking is proven to be perfectly safe. But a more detailed explanation follows.

The history of sound masking

Electronic sound masking systems have been successfully used in office buildings since the 1960s with no research or evidence suggesting adverse health effects may occur as a result of the systems' deployment. Although technological advances have allowed sound masking designs to become more sophisticated and effective, the basic approach has not changed: specialized electronics are used to drive loudspeakers which distribute a broadband sound (centered around the primary frequencies of human speech) throughout a space.

SOUND MASKING LEVEL (LOUDNESS)

Sound masking typically operates at a measured sound pressure level (SPL) of no more than 48 decibels A-weighted (dBA) in an open office. This sound masking level is significantly lower and set at 40 to 42 dBA in private offices. Such SPL levels are much lower than many common sounds, such as road noise when riding in an automobile or normal face-to-face conversation (which averages 65 dBA at three feet away). A-weighting is a filter process used to better represent sound level based on how humans perceive sound and is the standard for the measure of environmental noise levels. The Occupational Safety and Health Administration (OSHA) regulates safe occupational noise exposure levels in dBA SPL over time as published in Title 29 of the Code of Federal Regulations Part 1910.95. For an 8-hour period, the allowable continuous noise exposure is 90 dBA while 80 dBA is permissible for a 32-hour period. The full details of this regulation are available online at this OSHA webpage.

The decibel (dB) is an expression of a logarithmic relationship; therefore, 90 dBA represents an acoustic pressure exposure more than 125 times more powerful than the 48 dBA level of typical sound masking in an open office space. It is worth noting that sound masking solutions from Biamp are not capable of producing sound levels even approaching OSHA limits. The amplifier and loudspeaker assemblies are physically incapable of producing sufficient energy to pose a safety hazard.

SOUND MASKING IN MEDICAL FACILITIES

Sound masking is often used in medical office buildings, hospital patient rooms, dentist offices, and other exam rooms in different medical facilities to enhance and/or provide acoustic privacy for patients. In a hospital patient room, sound masking reduces sleep disturbances for the patient during nighttime hours. It is common for intruding sounds from outside the rooms to awaken the patient, or change their sleep state. The ability for an intruding sound to awaken a person largely depends on the level of the intruding sound compared to the background sound level (i.e., when it is quiet, intruding sounds are more audible and seem louder). By implementing a sound masking system, the background sound level can be raised which covers/masks intruding sounds, making them less audible and less likely to awaken a patient. Medical office buildings often use exam rooms for evaluating/communicating with patients. Many of these exam rooms lack sufficient acoustical separation between rooms, which often allows speech to be audible and intelligible through walls. Because constructing heavier walls to better block sound is prohibitively expensive, sound masking is often used to raise the background sound level and make speech less audible and unintelligible. This helps many facilities comply with HIPAA requirements at a reasonable cost.

ASTM INTERNATIONAL

ASTM International is a standards organization that provides test methodologies and guidelines for evaluating many different aspects of buildings and architecture. The ASTM E33 committee is comprised of acoustical consultants, manufacturers of acoustical products, and acoustical laboratories who recognize sound masking as a safe technology.

In 1970, ASTM formed a committee for building and environmental acoustics under the designation E33. The ASTM E33 committee is comprised of acoustical consultants, manufacturers of acoustical products, and acoustical laboratories. Since 1970, the E33 committee has produced hundreds of standards related to building acoustics, including four that reference sound masking as a safe and recommended technology:

ASTM E1374 – Standard Guide for Open Office Acoustics and Applicable ASTM Standards

ASTM E1573 – Standard Test Method for Evaluating Masking Sound in Open Offices Using A-Weighted and One-Third Octave Band Sound Pressure Levels

ASTM E1130 – Standard Test Method for Objective Measurement of Speech Privacy in Open Plan Offices Using Articulation Index

ASTM E2638 – Standard Test Method for Objective Measurement of Speech Privacy Provided by a Closed Room

THE IMPORTANCE OF PROPER INSTALLATION

Like all other professional audiovisual technologies, sound masking requires installation and tuning by a properly trained system integrator. A sound masking system that isn't installed correctly—with emitters (specially engineered loudspeakers) improperly spaced or wired out of sequence, and if there are two similar output channels next to each other—could create the comb-filtering effect. If a person is sitting precisely in the middle of those two emitters, it could potentially create an uneasiness (some refer to this as a phasing issue). But this shouldn't create any adverse effects and the issue can easily be addressed by installing the emitters in their proper locations.

Even when properly installed and tuned, a sound masking system introduces a new acoustical element in any environment. Which is why upon installation, the system should be programmed to gradually "ramp up" the volume at which it operates. This helps those within sound masking's range to become acclimated to the new background sound without disruption. The output should naturally blend in with any environment's existing acoustics and should be almost unnoticeable to those who work where sound masking is present.

CONCLUSION

OSHA and ASTM are just two of the organizations that recognize sound masking as a viable, safe technology for reducing speech intelligibility and noise-related distractions, thereby improving acoustic privacy and workplace comfort and productivity. Sound masking also protects patient confidentiality and helps patients sleep better while being treated in medical facilities.

As the pioneer in sound masking solutions and the developer of the Qt X sound masking platform, Biamp is dedicated to the safety and efficacy of our products and their implementation. To that end, Biamp makes our highly educated and experienced acoustical/engineering staff available for further discussion and ensures that our partner installers are trained on best practices.