



Sound Masking: Health & Safety Overview

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Does sound masking have any adverse health effects? The short answer is “no, sound masking is perfectly safe,” but a more detailed explanation follows.

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 the office environment, this reduction in intelligibility has the benefits of increasing acoustic privacy, protecting confidentiality of oral communication, and reducing noise-related distractions. These benefits can also apply to patient rooms and exam rooms in medical facilities, while also helping alleviate sleep disruptions at night.

History of Sound Masking

Electronic sound masking systems have been successfully used in office buildings since the 1960s in the U.S with no research or evidence suggesting adverse health effects related to their use. 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 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). 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. 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 the following webpage:

https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9735

The decibel is an expression of a logarithmic relationship; therefore, 90 dBA represents an acoustic pressure exposure over 125 times more powerful than the 48 dBA level of typical sound masking. It is worth noting that Cambridge Sound Management’s sound masking systems 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 while the patient is sleeping. It is not uncommon 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 (MOBs) make heavy use of 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.

FGI Guidelines

The Facilities Guidelines Institute (FGI) is the leading organization producing design and construction guidelines for healthcare facilities. Every four years, the institute publishes/renews a guidelines document titled "FGI Guidelines for Hospitals and Outpatient Facilities."

In the latest version of the guideline (2014), sound masking is referred to in Section 1.2-5.1 Acoustic Design where it recommends a maximum level of 48 dBA for any electronic sound masking system. The document also provides Sound Transmission Class (STC) requirements for wall constructions of exam rooms, whereby STC 50 is given for spaces without sound masking, and STC 40 is allowed for spaces with sound masking.

ASTM International

ASTM International is a standards organization that provides test methodologies and guidelines for evaluating many different aspects of buildings and architecture. 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:

1. [ASTM E1374 – Standard Guide for Open Office Acoustics and Applicable ASTM Standards](#)
2. [ASTM E1573 – Standard Test Method for Evaluating Masking Sound in Open Offices](#)
3. [ASTM E1130 – Standard Test Method for Objective Measurement of Speech Privacy in Open Plan Offices Using Articulation Index](#)
4. [ASTM E2638 – Standard Test Method for Objective Measurement of Speech Privacy Provided by a Closed Room](#)

The ASTM E33 committee is comprised of acoustical consultants, manufacturers of acoustical products, and acoustical laboratories who recognize sound masking as a safe technology.

Conclusion

OSHA, FGI, and ASTM are just a few 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 comfort. Sound masking also protects patient confidentiality and helps patients sleep better while being treated in medical facilities.

As the pioneer in direct-field sound masking technology and the developer of Qt Quiet Technology™ sound masking systems, CSM is dedicated to the safety and efficacy of our products and their implementation. To that end, CSM makes our highly educated and experienced acoustical/engineering staff available for further discussion and ensures that our partner installers are trained on best practices. Please do not hesitate to request further consultation on any specific concerns.