

**CA-SB1 -- GLBA -- PIPEDA
Oral Privacy Regulations**

More so than at any other time in history, an individual's health, credit, financial, and personal identity information is collected, recorded, and transmitted from institution to institution. The manner in which institutions handle this private information has been of concern for many years, with most of the emphasis being focused on the written or electronic transmissions.

With the dramatic rise of problems such as identity theft and other cases of misuse due to unauthorized transmission of personal information, there is now a new broader sweeping concern with regard to personal privacy. This new concern over the transmission of personal information is now being expanded to include oral communications.

Just as written or electronic transmissions need to be restricted to only those who are authorized to view them, so too is the need to limit who can overhear conversations containing that information. With the recent and pending enactment of state, national, and international laws regarding privacy (including oral) as it pertains to personal information, institutions are faced with the need to significantly increase their levels of speech privacy.

With the **VoiceArrest Speech Privacy System**, it is possible to achieve "normal speech privacy" (**AI**<0.2) at 12 ft. using only **48 decibels**, rather than the typical 51 to 54 decibels required by other sound-masking systems. This makes compliance with current and pending oral privacy regulations simple and cost effective.

It's possible to achieve certifiable privacy performance for addressing international, national and state privacy and security laws.

Articulation Index (AI) is defined by ASTM Standard E1130 [2002], Standard Test Method for Objective Measurement of Speech Privacy in Open Offices Using Articulation Index.



Speech Privacy Systems

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**Designed to Treat
Small Areas and Entire Buildings**

What is Disruptive Technology?

Disruptive technologies are broadly defined as those innovations that represent such a fundamentally radical change in accepted practices that they have the potential to render entire industries obsolete.

It's happened more in our lifetime than in any other period, as the vacuum tube, LP record, mainframe computers, and countless other technologies have been swept from homes and offices into museums.

The innovative **VoiceArrest Speech Privacy System** represents just such technology. It sets an entirely new standard for the sound masking industry.

- Low Voltage, Plug-&-Play System.
- Quieter and less intrusive, yet significantly improves speech privacy.
- Multi-channel system accurately simulates the sound of a high quality HVAC system.
- Provides a sound spectrum that delivers uniformly throughout the coverage area.
- Truly independent control of sound-masking level in open and closed office areas.
- Simple, less disruptive installation into existing facilities.

The world's best Oral Privacy "tool kit" will only have three tools in it, and most of these tools are available off-the-shelf. In addition, you can use them separately or in combination to achieve the level of privacy you need or want to achieve. They include:

- **NRC**-rated ceiling tiles (they absorb sound so that conversations don't "travel").
- **STC**-rated **HTL** curtains (they help block sound so that the person in the next bed can't overhear the conversation between a doctor and patient) .
- **Speech Privacy Systems**" (also known as "sound masking") that have been tested to meet the privacy standards.

Of the three tools in your HIPAA "tool kit", "**Speech Privacy Systems**" (sound masking) is the one that has the greatest impact.

No walls are needed to achieve oral privacy using "sound masking." This makes it an ideal solution for most financial institutions - bank lobbies, tax preparation offices, investment bankers - including financial management and investment advisory companies.

 **Factors That Contribute to a Comfortable, yet Effective, Background Sound System**

It should be obvious that adequate oral privacy can be obtained if the background sound level is high enough. If a person is seated under a particularly noisy return air grille, he or she may not be aware of intruding speech from other areas, and therefore, clearly has adequate oral privacy; however, that person may be annoyed by the excessive noise. Similarly, a background sound system can be turned up very loud until everyone has sufficient speech privacy, but this also results in annoyance. However, it is possible to design a system in which both requirements are met - adequate **speech privacy** and **freedom from annoyance**.

The first requirement is proper *tonal quality* or balance of frequencies in the background sound. A second requirement is that the background *sound level should not exceed approximately 48 dBA*. Finally, the sound must be *spatially uniform*, in both tonality and sound level, at the listener's ear elevation so that speech privacy levels don't change as the person moves about the lobby, reception area or office.



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Understanding the Levels of Speech Privacy

An **Articulation Index (AI)** is a measure of the **intelligibility of speech**, expressed as a percentage of speech that is understood by the listener when heard out of context. It is expressed as a number between 0 and 1.

The **American Society for Testing and Materials (ASTM)** E1130-90 precisely defines the levels of Speech or "Oral Privacy" as:

- **"Confidential Privacy"** - "Speech privacy may be described as 'confidential' when speech cannot be understood. This degree of speech privacy is indicated at Articulation Index values at or below 0.05."
- **"Normal Privacy"** - "At Articulation Index values between 0.05 and 0.20, 'normal' speech privacy is indicated. In this range, concentrated effort is required to understand intruding speech."
- **"Unacceptable Privacy"** - "Speech becomes more readily understood at Articulation Index values greater than 0.20. Some describe 'unacceptable' privacy as values above 0.30."
- **"No Privacy"** - At Articulation Index values above 0.40, there is essentially no privacy.

The **Privacy Index (PI)** is a measure for rating the speech privacy performance of an architectural space (or lack of speech intelligibility) where the PI is calculated from the Articulation Index according to the following:

PI = (1 - AI) * 100%.

- **"Confidential Privacy" = PI > 95%**
- **"Normal Privacy" = PI between 95 - 80%**
- **"Unacceptable Privacy" = PI between 80 - 60%**
- **"No Privacy" = PI < 60%**

NRC - Noise Reduction Coefficient
 The measure of acoustical absorption calculated at specific mid-range frequencies.

STC - Sound Transmission Coefficient
 A classification of the sound insulating properties of a material or structure.

Speech Privacy Systems - (Also Known As Sound Masking)
 A technology that was first developed in the late 1960s to meet the needs of security-conscious government agencies for confidentiality and privacy.

dBA - Relationship of perceived sound levels to dBAs:
 A 10 dBA increase in sound energy is perceived as a doubling in loudness.

Factors That Contribute Cont...

The importance of this last requirement, spatial uniformity, is not well understood even by some vendors of background sound systems. It is unusual to find systems that achieve uniformity of better than 4 or 5 dB in the important speech frequencies. Variances of this magnitude result in dramatic changes in speech privacy levels throughout the office if the system is properly adjusted so that the highest levels do not exceed 48 dBA.

As a result, most systems are adjusted for average levels of about 51 dBA to 53 dBA at many locations, causing annoyance to a significant percentage of users. Alternatively, the system is adjusted to a lower average level, compromising oral privacy. These factors, unfortunately, have contributed to the opinion among some users that background sound systems are either too loud or are not very effective.

The **VoiceArrest Speech Privacy System** delivers adequate speech privacy and freedom from annoyance at 45 dBA.

Advancements in Speech Privacy Methodology

Indirect Field Technology

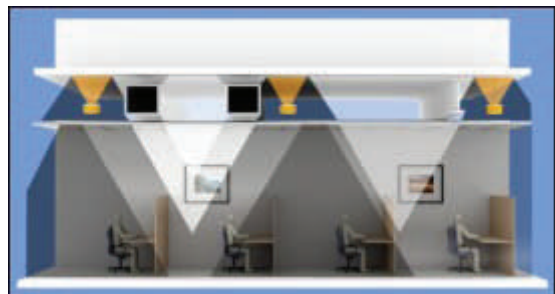
Until recently, virtually all speech privacy systems were designed and installed into the **plenum**. A typical speech privacy system uses loudspeakers *above* the suspended acoustical ceiling that *must be individually adjustable* to provide the correct frequency distribution and precise operating level of ambient sound, *at least if considered on an average basis throughout the space*.

However, achieving adequate spatial uniformity of ambient sound is a serious challenge faced by masking system designers, and it is a challenge that few are able to provide consistently using loudspeakers above the ceiling.

Even a 3 decibel variation from one workspace to another can have a dramatic effect on speech privacy. However, the performance of most systems varies by more than that primarily because of the sound attenuation characteristics of typical ceiling and plenum materials and openings that vary substantially from point to point.

Figure 1 illustrates the difficulty in achieving good uniformity with an above-ceiling system. The conventional wisdom is that the ceiling will "spread out" the sound in the plenum, improving the uniformity. What actually happens is that **the plenum typically causes a lack of uniformity**.

Practical plenums hide large structural elements, such as HVAC ductwork or structural beams, which effectively compartmentalize the sound. Even if the plenum is atypical and contains no large elements, openings in the ceiling for air returns and lighting fixtures permit proportionately more sound to be emitted below them.



For an animated presentation, visit:
<http://www.qtquiet.com/media/flash1.html>

Figure 1. Typical plenum and suspended ceiling acoustical variations cause non-uniformity in the background sound below. Ductwork and building beams compartmentalize the sound; acoustically absorbent fireproofing in some areas and not in others causes non-uniformity above, and openings for return air in the ceiling or light fixtures further deteriorate uniformity below. Typical variability below is 4 or 5 decibels.

Pleni ceiling.



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Recent innovations have now made it possible to use a ceiling-mounted speech privacy system that is able to provide much better uniformity of masking sound throughout typical open plan offices. This system uses **Direct Field Technology** with loudspeakers that radiate sound directly into the occupied space below rather than into the above-ceiling plenum.

The principal advantage of emitting the sound directly into the space below is that the non-uniformity caused by HVAC openings in the ceiling, or ventilation slots in lighting fixtures, or by building structural, fireproofing, large ducts or other mechanical components in the plenum no longer have any significant effect on the spatial distribution of masking sound.

By contrast with an above-ceiling system, the uniform gray in Figure 2 illustrates the good uniformity possible with an in-ceiling background sound system. By properly choosing emitters or speakers with ultra-wide dispersion, the background sound is very uniform at the listener's ear elevation.

Direct Field Technology - The use of ultra-wide angle dispersion emitters (speakers), radiating sound directly into the designated listening space below.



For an animated presentation, visit:
<http://www.qtquiet.com/media/flash2.html>

Figure 2. Ultra-wide dispersion emitters radiating directly into the listening space below results in spatial variability of less than 1 decibel throughout the office.

 **The VoiceArrest Direct Field Speech Privacy System Features**

- **Multi-Channel Technology**

VoiceArrest is a true four-channel speech privacy system. It comprises four separate incoherent channels all the way from the digital-generating source to the last emitter (speaker). Four channels accurately simulate the turbulent air eddies characteristic of HVAC system air movement sound generation. This allows the **VoiceArrest System** to sound entirely natural.

The VoiceArrest System sounds entirely natural and unobtrusive. Users are not subjected to harsh sound quality due to acoustical interference effects caused by adjacent coherent radiators (speakers) so common with plenum-based masking systems. Few, if any, visitors will even notice the **VoiceArrest System** running, and those who do will think they are hearing the HVAC system.

- **Optimum Spectrum**

The **VoiceArrest Speech Privacy System** provides a sound spectrum that delivers uniformly throughout the coverage area. Direct field technology means the spectrum is not **distorted by** the ceiling assembly or obstructions and variances in the plenum space above.

The **VoiceArrest System** is the only system whose coverage meets the ASTM E1041 requirements for spatial variation and temporal uniformity.

Amazingly, the variation in the spectral balance at any office or cubicle is typically within 1 decibel of optimum at any octave band over the entire critical voice frequency range of 250 Hz to 4,000 Hz.

Although typical plenum-masking systems may appear to exhibit fair uniformity as measured by an **A-Weighted Sound Pressure Level Meter**, their variation within the critical speech bands far exceeds that routinely provided by the **VoiceArrest Speech Privacy System**.

Distorted by the frequency-dependent acoustical transmission loss characteristics of the ceiling assembly or the acoustical spatial variance in the above-ceiling plenum space.

A-Weighted - A-Weighted Sound Pressure Level
 The standard measure of sound pressure level that approximates the sensitivity of the human ear at moderate sound levels. A-Weighted Sound Pressure Level de-emphasizes high and low frequencies because the ear poorly perceives these.



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- **Lower Operating Level**

The spatial and spectral uniformity delivered by the **VoiceArrest Speech Privacy System** permits its operation at substantially lower sound levels than competitive systems while maintaining masking effectiveness. While other masking systems must be operated at 51-54 dB with a well-designed system to comply with new oral privacy requirements for most locations, the **VoiceArrest Speech Privacy System** is normally operated at 48 dB under the same conditions.

A frequent comment by users experienced with plenum masking systems is that the **VoiceArrest Speech Privacy System** "*is not loud enough*" to provide good speech privacy. Yet objective comparative standard measurements of the **Articulation Index*** clearly demonstrate that **VoiceArrest** is at least as effective as louder plenum-based systems. The result is unsurpassed speech confidentiality with **dramatically reduced acoustical obtrusiveness and user awareness of the system.**

- **Truly Independent Control of Sound Levels in Open and Closed Office Areas**

A common issue in many offices is that the above-ceiling air plenum is shared by both open and closed offices areas. For reasons of economy, the separating walls often do not extend more than an inch or two above the suspended acoustical tile ceiling. Therefore, when masking is delivered to the open area at an appropriate level, sound in an enclosed office typically builds up to excessive levels, even if there are no masking loudspeakers above it. Until now, the only solution was to "starve" the adjacent open areas.

Direct Field Technology used by the **VoiceArrest System** means the masking sound intended for the open office area is entirely restricted to the open area. There is no unwanted bleed over effect into enclosed offices or conference rooms.

If masking is desired in the enclosed space, a separate zone can be provided, and its level is controlled independently.

- **Cost Effectiveness**

The **VoiceArrest Speech Privacy System** meets a compelling need by providing state-of-the-art speech privacy at a modest price. Configuring and installing does not require hiring engineering consultants, and since it's a low-voltage system, your facilities or maintenance personnel can install the system if desired. Therefore, speech privacy now becomes cost-effective, even for the smallest of office spaces.

The cost-effectiveness of the **VoiceArrest Speech Privacy System** is even more dramatic in larger spaces where a single Control Module can be used to treat up to 30,000 square feet. For areas larger than 30,000 square feet or where zone volume control is desired, simply use additional Control Modules.

With the **VoiceArrest Speech Privacy System**, you receive the highest quality system available, while saving over plenum-based systems.

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- **Determining Specific Needs**

Using **VoiceArrest** "Direct Field Speech Privacy Technology" eliminating the need for on site engineering analysis since the system isn't affected by distortions created by ceiling assemblies, or acoustical spatial variance in the above-ceiling plenum space.

We begin by gathering information about the area(s) in which the system is to be installed. Then by using a "floor plan", and if possible a "**reflected ceiling plan**", we determine the number and placement for the emitters needed.

If you decide to proceed with the project, we have installers nationwide ready to implement your new speech privacy system, or we will assist your own facilities group should they decide to do the installation.

Once installed, the **VoiceArrest Speech Privacy System** provides the proper tonal quality and sound levels with unsurpassed spatial uniformity into the designated areas without the need for time-consuming, costly tuning adjustments to compensate for acoustical effects.

reflected ceiling plan - A layout showing the positioning of the acoustic ceiling grid, and the location of light fixtures, air return grilles, sprinkler heads, or any other elements located on the acoustic ceiling tiles.



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