

Improving In-Ear Comfort

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Research studies and real-world experience show when hearing protectors are not comfortable, workers avoid wearing them properly or consistently throughout the workday. And failing to use protectors correctly or taking them out during a workshift can dramatically reduce effectiveness.

Hearing protection and electronic earsets come in a variety of shapes, styles, sizes, materials, and noise reduction capabilities. With all of these choices, it can be difficult to decide which hearing protectors are best for your workers. Some safety managers mistakenly select a product based exclusively on the product's [Noise Reduction Rating \(NRR\)](#). Although the NRR must be sufficient to protect against workplace noise exposures, research shows that additional factors, such as the ability to communicate and convenience, comfort, and compatibility with other personal protective equipment are **more important** to predicting ultimate success.



The Importance of Comfort

Personal perceptions

Although personal preferences vary, we do know some basic realities about the role comfort plays in the selection and use of earsets and hearing protection devices (HPDs). In general, hearing protectors perceived to be softer, smoother, less cumbersome, and less restrictive are typically rated the most comfortable. Users may find the pressure of tight headbands or heaviness of earmuffs to be bothersome, especially when wearing them for long periods of time. For those workers using communication headsets, bulky boom-mics or heavy electronics can add to the burden. It's good to keep in mind that workers' first impressions can predict their long-term opinions about comfort of a given device. For summaries of general research relating to hearing protector comfort, see Davis (2008) and Byrne, et al. (2011).

Work Environment

Environmental factors also influence HPD comfort. In cold temperatures, many workers prefer earmuffs that are easy to use while wearing gloves and that provide some coverage of the outer ear for warmth. Conversely, ear plugs are generally preferred in hot environments. NIOSH researchers have found that heat and humidity increase significantly under earmuffs by asking volunteers to walk in an air-conditioned hallway for only 30 minutes (Davis and Shaw, 2011). Imagine the discomfort for workers performing a strenuous job during hot summer months during an 8- or 10-hour work shift.

PPE Compatibility

The use of other personal protective equipment (PPE) such as respirators, hard hats, and safety glasses, also can affect the comfort of HPDs. Earmuffs and communication headsets in particular may be considered more cumbersome and restrictive in combination with other headgear such as bump caps, hard hats, or blasting hoods--obvious drawbacks to comfort and use. An added concern is the possibility of PPE interference with the seal of the HPD, which is crucial to blocking dangerous noise.

Implications of Uncomfortable Hearing Protection

All too often we think of HPDs as a perceived nuisance that the worker "needs to get used to" or endure. But because we cannot monitor workers at all times, the individual's self-motivation is critical. Attitudes and beliefs about the hazards of noise and risk of hearing loss are important predictors of workers' correct and consistent use of hearing protectors, and so is comfort. Studies have shown that individuals report infrequent or even improper use when HPDs are uncomfortable (Morata, et al., 2001; Davis, 2008; Edelson, et al., 2009).

Implications of reduced wearing time of a properly fitted HPD can be significant. In order to fully achieve protection, an individual must wear an appropriate and well-fitted HPD for the entire noise exposure. Otherwise, the effective protection is significantly reduced. An example: A worker is fitted with a device with an NRR of 20 to sufficiently reduce noise in the workplace. If this employee wears the HPD only 75 percent of the workday, however, the effective NRR drops to approximately 10 dB. Wearing the device for only half of the work shift drops the effective NRR to a meager 5 dB (Berger, 2000). The result of an uncomfortable HPD can be reduced protection from noise and increased risk of noise-induced hearing loss.

Making Comfort a Priority

Although HPD comfort can be subjective and largely a personal choice, there are a few simple steps that can help improve HPD comfort in your workplace:

- **Lighten the load.** Some workers experience medical problems and should avoid ear plug or insert-style hearing protectors (severe earwax buildup, fungal infection, ear surgeries, etc.). Some individuals just don't like to stick anything in their ears. Earmuffs can be the best choice for these employees. But for most of us, the smaller and lighter, the better. Offering multiple earplug and lightweight earmuff options where possible will help improve the likelihood of achieving a comfortable and acceptable HPD for each employee.
- **Check for compatibility.** Fitting workers with HPDs and training them in proper use is required. It is important to consider, too, that hearing protectors are rarely worn in isolation. In the real world, workers often use HPDs in conjunction with safety glasses, hard hats, respirators, and other safety gear. The HPD may seem comfortable and a good fit in isolation, but once combined with other protective equipment, the end result is not ideal. If comfort is diminished, the likelihood that the HPD will be worn throughout the work shift decreases as well. For these reasons, it's important to have your employees suit up with all of their gear when fitting a hearing protector.
- **Conduct [individual fit testing](#).** We have known for a long time that laboratory measures of hearing protection attenuation, namely NRR values, do not accurately reflect the actual amount of protection achieved in the real world. In recent years, individual fit testing procedures for evaluating HPDs have been developed, similar in concept to fit testing for respirators. A single measure of protection is provided for each individual worker tested and is generally referred to as a Personal Attenuation Rating, or PAR. An alliance among OSHA, NIOSH, and the National Hearing Conservation Association has identified individual fit testing as a recommended best practice for hearing conservation programs (OSHA, NIOSH, NHCA Alliance, 2008). The alliance argues that when workers are involved in the fitting process, they will be more likely to achieve optimal fit, have a positive attitude about hearing loss prevention, and more likely to wear HPDs correctly and consistently at work.
- **Schedule a trial.** Even after the best fitting session possible, individuals won't really know how a hearing protector works until they try it. What seems a good choice of HPDs in your safety office or medical clinic may not hold true when the employee gets back to the job. And don't expect workers to simply "get used to" an uncomfortable hearing protector. Most studies show that comfort issues

will arise within 30 minutes of using a hearing protector and that these first impressions can be good predictors of longer-term comfort. After fitting any new HPD, we recommend you check back with the user later in the workday to ensure results are as expected.

Since worker comfort and correct usage are key factors in HPD acceptance and wear time, CavCom now offers more options than ever before. In our experience, it doesn't matter how good the technology; if the earset or HPD is uncomfortable, the worker isn't going to wear it properly. It's often said and is worth repeating that the "best" hearing protector is the one that is worn correctly and consistently whenever the worker is exposed to hazardous noise.

[Contact CavCom](#) for more information about options for choosing the hearing protectors and electronic earsets that are right for your workforce.

References

- CavCom *SoundBytes*. [The NRR: What's in a Number?](#)
- CavCom *SoundBytes*. [Custom Hearing Protection Solutions Promote Success](#).
- Berger EH (2000). Hearing protection devices. In: Berger EH, Royster LH, Royster JD, Driscoll DP, Layne M, editors. *The Noise Manual*, 5th Edition. Fairfax, VA: American Industrial Hygiene Association Press; 379-454.
- Byrne DC, Davis RR, Shaw PB, Specht BM, Holland AN (2011). Relationship between comfort and attenuation measurements for two types of earplugs. *Noise Health*, Mar-Apr; 13(51): 86-92.
- Davis RR and Shaw PB (2011). Heat and humidity buildup under earmuff-type hearing protectors. *Noise Health*, Mar-Apr; 13(51): 93-98.
- Davis RR (2008). What do we know about hearing protector comfort? *Noise Health* Jul-Sep; 10(40): 83-89.
- Edelson J, Neitzel R, Meischke H, Daniell W, Sheppard L, Stover B, Seixas N (2009). Predictors of hearing protection use in construction workers. *Ann Occ Hyg*, 53(6): 605-615.
- Morata TC, Fiorini AC, Fischer FM, Krieg EF, Gozzoli L, Colacioppo S (2001). Factors affecting the use of hearing protectors in a population of printing workers. *Noise Health*; 4:25-32
- Occupational Safety and Health Administration, National Institute for Occupational Safety and Health, and National Hearing Conservation Association Alliance (2008). Best Practice Bulletin: hearing protection-emerging trends: individual fit testing.

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