

## There's More than Meets the Eye — or the Ear!

**Double Hearing Protection** ( earmuffs over ear-plugs) may be used in very noisy areas for daily average exposures greater than about 105 dB(A). The rule of thumb is that properly fit double protection adds about **5 dB to the protection rating of the higher rated HPD**. Using plugs with a nominal protection of 20dB and muffs with a protection of 20 dB does NOT give 40 dB, but something closer to 25 dB.

**Hearing aids are NOT hearing protectors.** Most hearing aids are vented, making them useless as hearing protectors whether they are turned on or off. Do not use hearing aids in high noise areas; they can significantly aggravate noise exposure conditions.

**Electronic HPDs** come in two basic varieties. The communication/limiter headset consists of earmuffs with electronics built in to take either outside sounds or radio communication and electronically limit the level on the inside of the muff cup to a safe value. This can be used for highly mobile people, like fork lift drivers, who frequently go in and out of noisy areas.

**Active HPDs** use sound sensors, amplifiers, and speakers to generate "anti noise" or cancellation wave patterns to reduce the noise inside the earcup. The active technology, available in either an open-back-headset (like a Walkman™) or regular closed-cup earmuffs, is primarily effective for low-frequency (below 500 Hz) noise and for specialized applications, such as when combined with electronic communication systems. The open-back versions, which provide less than 10 dB of attenuation at and above 1000 Hz, are intended primarily for reducing annoyance rather than protecting from noise hazard.

## Hearing Protection Can Save Hearing

Hearing Protection Devices (HPDs) are one component of an effective hearing conservation programs. HPDs can protect the delicate hearing system from the effects of noise on the job and off.

HPDs come in various shapes, sizes, and protection levels. While there is an HPD to suit nearly every person and situation, no single HPD is right for every job, every person, or every noise environment.

HPDs must be selected and properly fitted based on the noise environment where they will be used. Too little protection does no good; too much can interfere with communication and result in employees feeling isolated from their surroundings.

This pamphlet is intended to show the various types of HPDs available and give some guidelines where each might be appropriate. NHCA endorses no specific manufacturer or distributor of HPDs.

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A practical guide to:

# Selecting Hearing Protection



National Hearing Conservation Association

*The mission of the  
National Hearing Conservation Association  
is to prevent hearing loss due to noise  
and other environmental factors  
in all sectors of society.*

# There's no such thing as the best...

There's no such thing as the "best" hearing protector. Needs vary by individuals, noise environment, on-the-job communication needs, interaction with other types of safety equipment, and other variables. The "best" HPD is the one that will be consistently and properly used, all day, every day. Keep in mind that the object is to obtain a good and comfortable seal against noise and that any leak

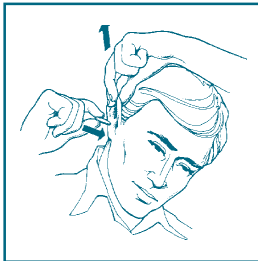


seriously compromises the protection offered by HPDs. Most environments require 15dB or less of real protection. The following are some HPD options:

## Formable Insert Plugs

Most popular varieties are made from expandable, slow-recovery foam. To use, slowly roll and compress plugs into a very thin cylinder and insert well into the ear canal. Fitting is easier if you reach around the head to pull the ear outward and upward during insertion (see figure).

**The Good:** Properly inserted, foam plugs offer among the best protection available and yet are found to be very comfortable for most wearers. **The Bad:** Some manual dexterity is required to roll and insert the plugs, they are subject to contamination in dirty environments, and they are generally treated as limited-use or "throw away" products.



## Premolded Plugs

These are typically molded from soft plastic which is preformed to fit the ear. Reach around the back of the head and pull outward and upward on the ear while inserting these plugs until they feel like they are sealing the ear. **The Good:** Premolded plugs are relatively easy to insert and are reusable. **The Bad:** Although some of the newer versions are one-sized products, many are sold in two or more sizes and must be individually sized for each ear. They can work loose while wearing and require resealing.

## Custom Molded Plugs

Individual impressions are made of each ear canal using a quick-curing material. For some products, the impressions themselves are coated and sealed to become reusable earplugs; for others, the impressions are sent to a lab to make a subsequent custom earmold. **The Good:** Some employees like the individual attention of having their own earplugs molded and fit, and for some ears custom earmolds are especially comfortable. **The Bad:** Custom plugs are expensive, especially when the employee/technician time is considered as a cost. Slight and normal changes in ear canal size may require taking new impressions.

*The "best" HPD is the one that will be consistently and properly used, all day, every day.*

## Semi-Inserts/Canal Caps

These consist of a lightweight band with soft rounded or conical pods or flexible tips that seal at or near the entrance of the ear canal. **The Good:** They can be useful for intermittent exposures, since they are quick to put on and

take off and easy to hang around the neck when not in use. **The Bad:** They generally provide less protection than either plugs or muffs and aren't usually recommended for continuous long-term use because of discomfort.

## Earmuffs

Consist of rigid cups with soft plastic cushions that fit around the pinna (outer ear) and against the head. The muffs must fully enclose and seal around the ears to properly block noise. **The Good:** Earmuffs are easy to use and fit, and to put on and take off, and therefore generally require less training in use. They provide consistent protection in most cases. **The Bad:** Safety glasses, long hair, and beards may interfere with a good seal, or the muffs themselves may interfere with other safety equipment like helmets and hoods. In addition, they may feel hot or heavy with long periods of use.

## Play it by the Numbers- Noise Reduction Estimates

Labeled Noise Reduction Ratings (NRRs) are based on optimized lab testing and bear little resemblance to what groups of users get in practice. Use the presence of such a rating not as a buying guide, but as an indicator that a device has been designed and tested for noise reduction. Labeled NRRs typically vary from 20-30 decibels; in practice the protection that can normally be achieved is about 10-20 decibels or less, especially when poorly fitted. This modest degree of protection may be sufficient for some industrial environments as long as the devices are worn consistently, however, the highest values of attenuation are achieved by wearing foam earplugs, earmuffs, or a combination of those two.