



You provide hearing protection and training for your noise-exposed workers. But how do you know your efforts are truly effective? How can you be confident your workers are consistently and correctly wearing their hearing protectors, and getting the protection they really need?

To be truly successful, a hearing loss prevention program must emphasize employee education, buy-in, and self-motivation. That's why pro-active companies now include Individual Fit Testing as an integral part of any hearing conservation program. Individual Fit Testing is recognized by

OSHA, NIOSH and prominent professional organizations as a best practice.

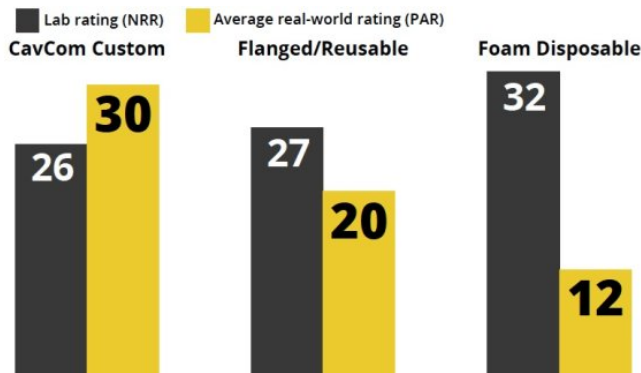
## NRR vs. PAR

When OSHA promulgated its Hearing Conservation Amendment for general industry in the early 1980s, the new regulation incorporated the Environmental Protection Agency's noise reduction rating (NRR) for estimating hearing protector performance. [The NRR](#) is a laboratory-derived estimate of the attenuation (sound reduction) that can be expected from a hearing protector. Shortly after the Hearing Conservation Amendment went into effect, however, it became evident that the actual amount of attenuation achieved in the workplace often fell short of the laboratory predicted NRR.

In 2008, an alliance between OSHA, NIOSH and the National Hearing Conservation Association recognized a new technology designed to obtain individualized hearing protection attenuation ratings for each worker. This group of experts acknowledged the limitations of relying on laboratory conditions and group statistics to predict an individual user's hearing protector performance in the field: *"The consequence of this approach is that an individual user may actually receive more but usually less attenuation than is stated on the hearing protector label."* Based on their review of research and emerging trends and technologies, the Alliance identified Individual Fit Testing as a [recommended best practice](#) for hearing conservation programs.

Individual fit testing of hearing protectors is similar in concept to fit testing for respirators. Preferred methods produce a single-number overall estimate of real-world attenuation for each worker; this measure is generally represented as a Personal Attenuation Rating or PAR. In our experience, hearing protection products that are [custom fitted](#) to individual workers are less susceptible to poor insertion, and generally perform better in the real world.

### Example real-world data:



## Data Sources

**CavCom Customs:** CavCom internal individual fit testing for over 300 industrial workers. Average PAR under everyday field conditions (tested with earplug fit as normally worn).

**Flanged and Foam:** Field testing of 390 steelworkers. Michael and Byrne (2002) "Current State of Insert-Type Hearing Protector Fit Testing." NHCA Spectrum, Vol. 19(1).

## Basics of Popular Individual Fit Test Equipment and Protocols

At CavCom, we often receive inquiries from customers about Individual Fit Test technology and available products. Unfortunately, at the current time, there is little standardization in equipment and protocols. We have reviewed numerous commercially available systems, and have determined that "real ear at threshold" (REAT) methodology typically provides the best opportunity for personal interaction and effective fitting and education of individual employees. You may choose to purchase your own equipment for in-house programs or ask CavCom's CAOHC-certified and experienced technical staff to do the testing, fitting and training for you.

### REAT (real ear at threshold)

This type of Fit Test is a familiar protocol, very similar to a routine hearing test. The individual employee listens for tones presented via earcups or speakers. The amount of protection, PAR, is calculated by comparing threshold results for open/unoccluded ears (no earplugs) to results when the individual's own earplugs are in place. Therefore, if the employee's hearing protector is the wrong size, worn out/damaged, or fitted incorrectly, REAT can reveal the problem. The test procedure is generally quick and easy to understand, although listeners with significant hearing loss may have difficulty or be unable to complete the test. Any manufacturer's insert hearing protector can be tested with this method.

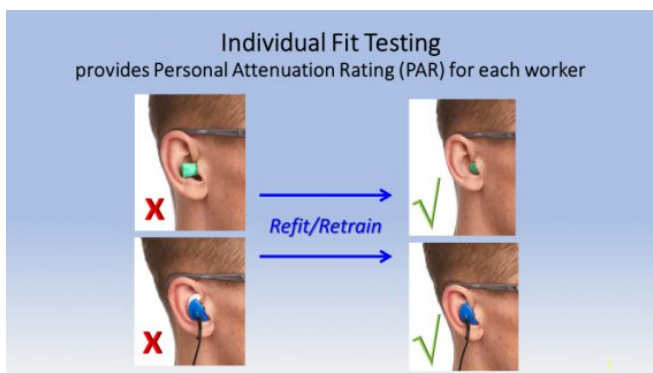
### MIRE (microphone in real ear)

In this type of test, a probe microphone is inserted into an earpiece or earplug placed in the user's ear canal, while test signals are presented via earcups or speaker. A calculated "pass/fail" or PAR is based on probe microphone measurements. This procedure requires use of a manufacturer-specific surrogate earplug with built-in microphone, or removal of core components of the worker's earplug to be replaced by the manufacturer's probe microphone apparatus. MIRE technology can only be used with the manufacturer's own earplugs and cannot provide a true "audit" of the worker's hearing protector as worn. The acoustic measure portion of the test does not require employee participation, but substantial attention to set-up/calibration of the microphone and speakers is imperative.

## Why CavCom conducts Individual Fit Testing using REAT technology

- **Universal:** allows you to test any manufacturer's insert hearing protector
- **Ability to audit real-world performance and fit:** tests each employee's own earplug without modification, the actual earplug the way it is typically fit and worn each day
- **Easy set-up:** REAT is a "relative measure" that compares occluded vs. unoccluded results for each worker; does not rely on precise placement/calibration of speakers and microphone
- **Gold standard:** REAT is as familiar as an annual hearing test and follows the same basic ANSI test protocol used for NRR (laboratory) testing

Lastly, no matter what type of Individual Fit Test protocol you choose, remember that test results alone do nothing to bolster compliance. A trained and qualified health and safety professional must take time to review PAR results for accuracy, retest if needed, and refit, retrain, coach, or fit alternate hearing protectors. The goal is to achieve adequate noise reduction and instill a sense of self-reliance for each individual user. That's what hearing conservation is all about.



## Assistance is a click away

To help you with hearing protector attenuation estimates for your workforce, we have created a quick and easy calculator for comparing NRR and PAR values for both single and dual hearing protector configurations. [Contact CavCom](#) to request our free hearing protection attenuation calculator and to learn more about our [Individual Fit Testing](#) services.

