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Occupational Safety and Health Administration

Directorate of Technical Support and Emergency Management

Hearing Protector Fit Testing: Ensuring Appropriate Noise Protection at Work

Safety and Health Information Bulletin

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Introduction

Hearing protector fit testing (HPFT) is a critical advancement in workplace hearing conservation and is recognized as a best practice (OSHA et al., 2008; OSHA, 2017). HPFT is not required under OSHA's Occupational Noise Exposure standards (29 CFR 1910.95; 29 CFR 1926.52), but can be a valuable training tool for workers. HPFT measures the amount of noise reduction (attenuation) a hearing protection device (HPD) provides and can help train workers on what a properly inserted earplug "feels like" in the ear. This tool allows workers to select the most effective HPDs that are comfortable, can be inserted correctly, and provide adequate noise reduction while allowing them to hear important communication and warning signals necessary for safety in the workplace. Since OSHA noise standards were enacted, several HPFT systems[1] have become readily available to employers and can be a valuable part of an effective hearing conservation program (HCP).

Background

Repeated workplace noise exposure of 85 A-weighted decibels (dBA) or higher is considered hazardous and is a significant contributor to health issues such as hearing loss, cardiovascular diseases, and workplace injuries. Approximately 20% of workers exposed in high-noise industries, such as construction, manufacturing, mining and utilities suffer from noise-induced hearing loss. However, workers in any other industry (e.g., musicians, childcare workers, indoor athletes) may also experience noise-induced hearing loss when exposed to hazardous noise levels without adequate hearing protection. Elimination, substitution, and engineering controls should be prioritized to reduce noise exposures for workers. Hearing protection also helps reduce worker noise exposure and the risks for the adverse health outcomes that may follow. For safety, however, workers must be able to hear communication and warning signals around them while wearing HPDs.

Figure 1- Example of a safety helmet.

Each worker's ear canal size and shape are unique. An individualized HPD fit test provides a measure of how well the earplug fits the worker, given these differences. HPFT tells the worker how well the HPD is inserted and how

[1] The terms HPFT "systems" or "devices" are used interchangeably to refer to the equipment/technology used to conduct HPFT.

much noise attenuation that HPD is providing. This measure of noise reduction is called a "personal attenuation rating" (PAR) and is used in conjunction with noise exposure levels measured in the workplace to determine whether the individual achieved or exceeded the noise reduction needed to protect hearing. This individualized fit helps workers select appropriate HPDs to prevent occupational noise-induced hearing loss without stopping them from hearing important sounds.

There are two types of HPFT systems:

-**Subjective HPFT devices** require workers to respond to sounds played through headphones. The worker is usually tested without hearing protectors first to establish a baseline, then inserts HPDs and is tested again to establish a PAR. These systems offer more flexibility because they allow for testing a variety of HPDs but are also more time-consuming.

-Objective HPFT devices use a dual-microphone to measure a test sound inside and outside an inserted earplug that has been modified with a microphone. Workers do not need to respond to sound stimuli, therefore testing time is typically faster than subjective devices. However, objective HPFT devices may only test a specific brand or brands of earplugs instead of the selection of HPDs available for use by workers in the workplace.

Regulations and Guidance

OSHA regulates occupational noise exposure in the general industry, construction, and maritime industries. Employers are required to provide a variety of suitable HPDs and ensure proper fit and effective noise attenuation for all workers exposed to noise levels of 85 A-weighted decibels (dBA) or greater over an 8-hour time-weighted average (TWA). When considering HPDs to make available to workers, employers must use a method listed in Appendix B of the OSHA Occupational Noise Exposure Standard to estimate the attenuation of HPDs and select a variety of HPDs that are capable of adequate noise reduction. Of the methods listed in Appendix B, employers frequently use the noise reduction rating (NRR). The NRR is a laboratory-derived number that estimates the amount of potential noise attenuation a given HPD could provide.

In 1998, the National Institute for Occupational Safety and Health (NIOSH) recommended derating the manufacturer labeled NRR to better estimate worker's hearing protector attenuation, given that the labeled NRR is rarely achieved in real-world workplace settings[2]. NIOSH updated its recommendations[3] in 2025 to include individual quantitative HPFT to ensure optimal HPD attenuation, instead of NRR de-rating methods. HPFT helps overcome the limitations of the NRR by verifying actual HPD noise attenuation for the individual worker. Importantly, however, PAR cannot be substituted for NRR when selecting HPDs to make available to workers. Employers must still use one of the mandatory methods in Appendix B of OSHA's Occupational Noise Exposure Standard to choose a selection of HPDs that are capable of providing adequate noise attenuation. Once the worker selects an HPD from those options, HPFT can help verify adequate individual noise attenuation.

Additionally, OSHA's Occupational Noise Exposure Standard (29 CFR 1910.95) requires employers to train workers on the purpose, advantages, disadvantages, and attenuation of various HPDs, as well as how to properly select, fit, use, and care for HPDs. An OSHA letter of interpretation explained that employers may use HPFT as a training tool as part of their compliance with the training requirements in OSHA's general industry Occupational

[2] Measuring How Well Earplugs Work | NIOSH | CDC

[3] These 2025 NIOSH recommendations supersede the HPD derating guidance in Chapter 1 (Section 1.5) and Chapter 6 of the *NIOSH 1998 Criteria for a Recommended Standard – Occupational Noise Exposure*.

Noise Exposure Standard, 29 CFR 1910.95(k)(3)(ii). HPFT can also be used to support requirements in the construction Occupational Noise Exposure Standard (29 CFR 1926.52) and document individual HPD determination and fitting required by the construction Hearing Protection Standard (29 CFR 1926.101(b)).

While HPFT is not required in the OSHA Noise Exposure Standards (29 CFR 1910.95; 29 CFR 1926.52), OSHA acknowledges the value of HPFT in the OSHA Technical Manual and has implemented HPFT for its own workers enrolled in a HCP. Records generated by HPFT also help employers document their efforts to comply with requirements in the OSHA noise standards (29 CFR 1910.95; 29 CFR 1926.52; 29 CFR 1926.101). Employers covered under OSHA-approved State Plans should comply with applicable State requirements for occupational noise exposure, which may vary from Federal OSHA standards.

Items to Consider

When selecting an HPFT device for the workplace, employers should consider several factors, such as those shown in Table 1 below.

Table 1. Factors Employers Should Consider When Implementing HPFT.

Factors	**Considerations**
Does the device meet applicable standards?	Choose a system that meets the requirements in ASA/ANSI 12.71-2018 – The Acoustical Society of America/American National Standards Institute *Performance Criteria for Systems that Estimate the Attenuation of Passive Hearing Protectors for Individual Users.*
How much will the system cost and what is included?	Ensure quotes itemize equipment/services that are included in the cost, e.g., initial costs, hardware, software license fees (one-time or recurring), manufacturer support, maintenance and calibration fees and frequency.
Is the HPFT device able to test all HPDs available in the workplace?	Subjective systems can be used to test any earplug. Objective systems may need special, modified HPDs to be used for testing. This may limit HPFT to only certain brands of earplugs or muffs. If these systems are used, employers should ensure the brands/styles used in testing are available for workers to use when HPDs are needed. At this time, HPFT does not measure the combined attenuation of two HPDs worn together.
Can people who have hearing loss be tested?	Subjective systems may be limited if workers have hearing loss in the tested frequencies. Objective HPFT devices are not affected by hearing loss. Consult manufacturer guidance.
Will the HPFT system monitor background noise and ensure it does not interfere with testing?	Background noise can interfere with *subjective* HPFT devices. The ASA/ANSI S12.71-2018 Standard provides guidance on maximum permissible ambient noise levels (MPANLs) allowable during HPFT. Some devices monitor background noise simultaneously and pause the test if background noise is too loud. Testing resumes when noise levels are in the permissible range again. Background noise does not interfere with *objective* HPFT systems.
How long will testing take?	Subjective systems usually provide a PAR in 5-10 minutes. Objective systems provide a PAR in a few seconds.
How are PAR results reported?	"Pass/fail" may be useful if noise exposure levels are constant. If noise exposure levels in the workplace are variable, or in safety sensitive positions where over-protection is a concern, a numerical PAR value may be more useful than a "pass/fail" PAR result.

Implementing HPFT

When implementing HPFT, employers should consider HPFT for all personnel enrolled in an HCP. While there are no specific requirements for personnel who conduct HPFT, they should be knowledgeable about how to use hearing protectors and be able to coach others in proper hearing protector insertion. Safety and health personnel, healthcare professionals/technicians, or any hearing loss prevention advocate can learn to perform HPFT. Courses for hearing conservationist certification that include HPFT training are available and may be helpful for additional personnel training, if desired.

HPFT should be performed in accordance with the manufacturer instructions. This may include daily calibration when fit testing is conducted, as well as assessment of background noise levels (for subjective HPFT systems) if this is not incorporated into the HPFT device. To comply with the OSHA Occupational Noise Exposure Standard, as noted above, employers must use a method listed in Appendix B to select and make available to workers a variety of suitable HPDs that are capable of providing adequate noise attenuation and are appropriate for the specific environment in which they are intended to be used. The worker chooses an HPD from that selection, inserts the HPDs, and HPFT is performed to measure attenuation. If a worker does not initially achieve the target PAR, the person conducting the test may intervene to retrain and/or refit the worker, choosing a different HPD if needed. HPFT is repeated, using the typical HPFT process[4] shown in Figure 1, until the worker achieves the target PAR. Once achieved, workers should note what the properly seated earplug "feels like" in the ear. Workers can ensure proper fit by replicating this feeling in the ear each time they wear HPDs.

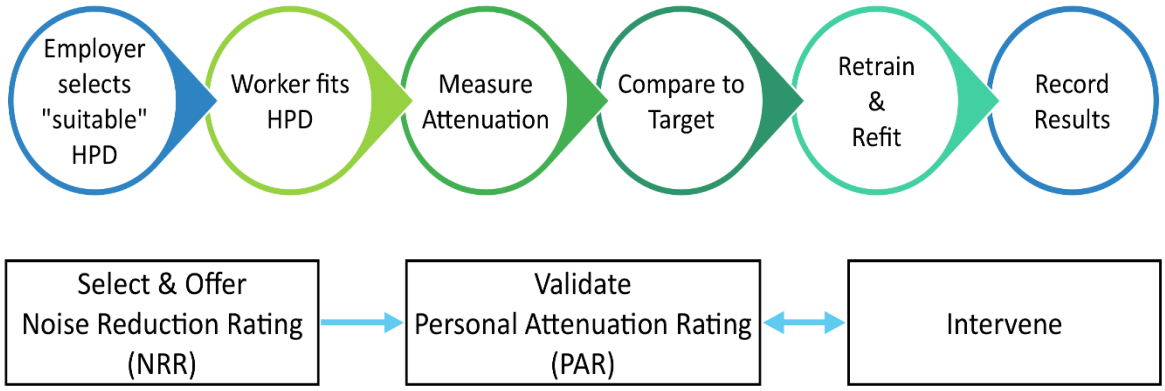

Figure 2- HPFT Process (National Occupational Research Agenda (NORA), May 2025.)

Employers and workers can use the PAR to determine the worker's estimated exposure by subtracting the PAR from the noise levels obtained in noise monitoring (**Estimated Exposure (dBA) = Noise Level (dBA) – PAR (dBA)**)[5]. Alternately, they can use PAR to determine the recommended maximum noise level (**Recommended Maximum Noise Level (dBA) = 85 + PAR (dBA**)).

The best time to implement HPFT is before hearing loss occurs. When HPFT is used as part of a safety and health program, employers can use the following suggestions to guide the timing and frequency of HPFT as part of their HCP:

[4] Additional information can be found at "Fit Testing for Hearing Protection: A Practical Introduction for Your Workplace"
[5] The PAR value does not require derating like the NRR.

- Conduct initial fit test prior to entry into the HCP and exposure to hazardous noise, or as soon as possible after enrollment.
- Provide annual HPFT to document that workers are trained to achieve adequate attenuation and properly fit their HPDs.
- When a worker has a standard threshold shift (STS), conduct HPFT to help employers comply with follow-up procedures required by the OSHA Occupational Noise Exposure Standard 29 CFR 1910.95(g)(8).
- Use HPFT proactively to help prevent hearing loss when a worker has an early indicator for hearing loss such as tinnitus, a temporary threshold shift that resolves on follow-up audiogram, or other signs of early warning for hearing loss.

When new HPDs are introduced into inventory or a worker begins wearing new HPDs compared to the ones previously fit tested.

Conclusion

While HPFT is not required in the OSHA Occupational Noise Exposure Standards, OSHA recognizes the value of HPFT as a best practice to ensure proper fit and attenuation of HPDs while training workers how to select, fit, use, and care for HPDs. OSHA uses HPFT for its workers enrolled in a hearing conservation program. HPFT technology continues to evolve, but several cost-effective, commercial systems are readily available. Employers who are considering HPFT should evaluate their options, incorporate HPFT into internal policies to ensure standardized processes are followed, and maintain records created with HPFT to document their efforts to comply with OSHA standards (29 CFR 1910.95; 29 CFR 1926.52; 29 CFR 1926.101). Employers should also ensure they comply with all regulatory HPFT standards that apply to the location(s) of their worksite(s), e.g., where employers are covered under OSHA-approved State Plans, the requirements may vary from federal standards.

Resources

OSHA's Website: The OSHA public website provides information on workplace safety and health, including hearing protection requirements. Employers and workers can find information about OSHA standards related to personal protective equipment (PPE) and hearing protectors.

OSHA's Occupational Noise Exposure Safety and Health Topics Page: This OSHA web page provides extensive information on workplace noise, including health effects, exposure and controls, hearing conservation program, hearing loss in construction and additional resources.

OSHA Field Safety and Health Management System (SHMS) Manual. Chapter 16. Hearing Conservation.
This chapter documents OSHA's Hearing Conservation Program which incorporates HPFT as a training tool to teach workers to properly insert earplugs and ensure adequate noise reduction.

OSHA Noise Standards:

A. General Industry:
   1) Occupational Noise Exposure (29 CFR 1910.95): This standard applies to general industry, longshoring, and maritime operations. The purpose of the standard is to protect employees from the effects of noise exposure and states that "the employer shall administer a continuing, effective hearing conservation program, as described in paragraphs (c) through (o) of this section whenever employee noise exposures equal or exceed an 8-hour-time-weighted average sound level (TWA) of 85 decibels as measured on the A scale (slow response) or, equivalently, a dose of fifty percent"

(1910.95(c)). The standard also describes requirements for hearing protectors (1910.95(i)(1)-(5)) as well as hearing protector attenuation (1910.95(j)(1)-(4) and training (1910.95(k)(1)-(3)(iii)), among other requirements.

B. Construction Industry:
   1) Occupational Noise Exposure (29 CFR 1926.52) – This standard directs employers to administer a continuing, effective hearing conservation program in all cases where the sound levels exceed the values shown within the standard.
   2) Hearing Protection (29 CFR 1926.101) – This standard includes the requirements for providing and using hearing protectors and states "ear protective devices inserted in the ear shall be fitted or determined individually by competent persons".

Recording Criteria for Cases Involving Occupational Hearing Loss (29 CFR 1904.10): This regulation includes requirements for recording a case of occupational hearing loss on the OSHA Form 300, Log of Work-Related Injuries and Illnesses. For employers covered by OSHA's occupational injury and illness recordkeeping regulation, if an employee's hearing test (audiogram) reveals that the employee has experienced a work-related Standard Threshold Shift (STS) in hearing in one or both ears, and the employee's total hearing level is 25 decibels (dB) or more above audiometric zero (averaged at 2000, 3000, and 4000 Hz) in the same ear(s) as the STS, the employer must record the case on the OSHA 300 Log.

ASA/ANSI 12.71-2018 - The Acoustical Society of America/American National Standards Institute *Performance Criteria for Systems that Estimate the Attenuation of Passive Hearing Protectors for Individual Users:* This standard sets performance criteria for HPFT systems to improve accuracy and specify methods for computing results (i.e., the PAR).

Fit Testing for Hearing Protection: A Practical Introduction for Your Workplace. National Occupational Research Agenda (NORA) Hearing Loss Prevention Work Group (May 2025). This document provides an overview of HPFT for employers.

How to Contact OSHA

To discuss a health and safety issue at work, contact OSHA toll-free at 1-800-321-6742 (OSHA) or by email or contact your nearest OSHA office.

This Safety and Health Information Bulletin is not a standard or regulation, and it creates no new legal obligations. The Bulletin is advisory in nature, informational in content, and is intended to assist employers in providing a safe and healthful workplace. Pursuant to the Occupational Safety and Health Act (OSH Act), employers must comply with hazard-specific safety and health standards and regulations promulgated by OSHA or by a state with an OSHA-approved State Plan. In addition, pursuant to Section 5(a)(1), the General Duty Clause of the Act, employers must provide their employees with a workplace free from recognized hazards likely to cause death or serious physical harm. Employers can be cited for violating the General Duty Clause if there is a recognized hazard and they do not take reasonable steps to prevent or abate the hazard. However, failure to implement any recommendations in this Safety and Health Information Bulletin is not, in itself, a violation of the General Duty Clause. Citations can only be based on standards, regulations, and the General Duty Clause.

There are 29 OSHA-approved occupational safety and health State Plans. State Plans are required to have standards and enforcement programs that are at least as effective as federal OSHA's and may have different or more stringent standards. More information about State Plans is available at: https://www.osha.gov/stateplans.