

## HEARING PROTECTION DEVICES

Employers in B.C. must provide hearing protection devices (HPDs) to all workers exposed to excessive noise. The purpose of this, along with six other components of a noise control and hearing conservation program, is to prevent occupational noise-induced hearing loss, a compensable disease (see also **WCB Occupational Health and Safety Regulation, Section 7--Noise**, particularly 7.13 and 7.14).

HPDs are classified by the Canadian Standard Association Standard Z94.2-02; all HPDs fall into one of three Classes- A, B, C, or one of five Grades-0, 1, 2, 3, 4. The use of the term "Grade" is new to the Standard.

The Grade or Class of an HPD is based on the amount of sound reduction, called "attenuation", measured in a laboratory, but says *nothing* about how well that protector stops hearing loss. For example, Grade 4, or Class A, devices have more attenuation than Grade 2, or Class B, which in turn have more attenuation than Grade 1, or Class C. Depending on the circumstances, Grade 4 protectors may not be better than Grade 2 or 3. The protection a worker gets from an HPD depends on the fit of the protector and the wearing time while in noise. Removing an HPD during noise exposure will greatly reduce the protection, regardless of its Grade or Class.

Often NRR is listed on the HPD as well (this is a requirement in the United States). The Environmental Protection Agency (EPA) is currently reviewing this system, as it can be difficult to interpret for practical settings. Most manufacturers recommend "derating" the number provided. The derating systems vary, but typically involve reducing it by at least 50%. (An NRR of 26 would therefore be considered to provide 13dB of attenuation). This derating is not exact however. **Please think of the Class/Grade system when recommending or selecting hearing protection.**

### Selecting a Hearing Protector:

A number of factors **must** be considered in deciding which HPD is adequate for a worker (Regulation 7.14):

- daily noise exposure of worker (called "Lex")
- worker hearing ability
- communication demands on the worker
- use of other personal protective equipment
- temperature and climate
- physical constraints of the worker or work activity

The best opportunity to evaluate these criteria is during the annual hearing test. The tester should discuss all of these factors, make an appropriate recommendation to workers, and then provide feedback to employers.

#### a. Daily noise exposure of worker (Lex)

The goal of wearing an HPD is to reduce the noise level UNDER the device, reaching the ear canal, to approximately 75-80 dB—this level of protection is called "optimal". At this level, there is enough attenuation to protect the wearer's hearing as well as allow the wearer to be safe and work productively. If the noise level under the device is LESS than 75-80, then the wearer has too MUCH attenuation. **This is called "overprotection" and is not desirable.** At this level, the wearer may not be able to hear important safety and/or production information. If the noise level under the device is over 85 dBA, then this is "insufficient" protection and unacceptable. At this level, the wearer may sustain permanent hearing loss. Noise levels, under the HPD, of between 70-85 dBA are all acceptable.

The CSA Standard recommends certain Grades or Classes of hearing protection for certain daily noise exposures:

Daily Noise Exposure

less than 85 dBA  
85-89 dBA  
90-95 dBA  
95-100 dBA  
100-105 dBA

Recommended Grade/Class of HPD

no HPD needed  
Grade 1 or Class C  
Grade 2 or Class B  
Grade 3 or Class A  
Grade 4 or Class A

Note, these are recommendations only, not minimum or required. The important thing to remember is that the recommendation is based on the *daily average noise exposure* of the worker, not the noise levels of a piece of machinery. For example, a faller's chainsaw may produce noise levels of up to 115 dBA, but a faller's average daily noise exposure is about 102 dBA Lex, due to work stoppages throughout the day.

**Most occupations have Lex less than 95 dBA and according to the CSA Standard, Class B (or Grades 1/2) protection is recommended.**

**b. Worker hearing ability**

Hard of hearing workers simply do not like to wear conventional, highly attenuating hearing protection. Frequently, they report feeling unsafe, due to their inability to hear warning signals. Less attenuating protectors should be used, for example, Grade 2/Class B instead of Grade 3 or 4/Class A. Additionally, a protector with flatter, or more uniform attenuation (provides the same noise reduction for all pitches-- something regular earmuffs and earplugs DO NOT) is desirable. There are many specialty HPDs available now that provide a better listening environment for the hard of hearing.

**c. Communication demands on the worker**

The more demanding the worker's listening environment, the more important it is that a lower attenuating protector is used, even if the worker has normal hearing. See also the comments under b. above, regarding flat, or uniform, attenuation HPDs.

**d. Use of other PPE.**

Earplugs may be preferable for workers who wear a lot of other protective equipment, particularly respirators, safety glasses, and/or hard-hats.

**e. Temperature and climate**

Workers may prefer earmuffs in cold winters and earplugs in hot summers, or indoors. The more comfortable the protector, the more likely it is to be worn consistently.

**f. Physical constraints of the worker or work activity**

This includes small, very large, or hairy ear canals, prominent cheekbones, large head, large outer ears, etc. as well as required movements in a job. For example, workers who must do a lot of climbing in and out of equipment or other objects may prefer earplugs to earmuffs.

**CONCLUSION: If a worker likes a hearing protector, regardless of Grade or Class, whether an earmuff or earplug, he/she will wear it. Comfort will determine wearing time. If worn consistently, the protector will save the worker's hearing. There is no single universal protector which will take into account all selection criteria for all workers, so an employer must provide a choice of hearing protection devices – *both earmuffs and earplugs, and of all Grades/Classes.***