



**SAFE
WORK**

**S
A
F
E**
SPOT THE HAZARD
ASSESS THE RISK
FIND A SAFER WAY
EVERYDAY

**EVERYONE'S
RESPONSIBILITY**



Guideline for Hearing Conservation and Noise Control

February 2007

Manitoba 

Guideline

for Hearing Conservation and Noise Control

**Workplace Safety & Health
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Table of Contents

| | |
|--|----|
| <i>Introduction</i> | 2 |
| Workplace Safety and Health Regulatory Requirements..... | 2 |
| <i>Specific Regulatory Requirements</i> | 3 |
| Noise Exposure Assessments | 3 |
| Sound Control Measures | 3 |
| Hearing Protection..... | 3 |
| <i>Employer's Role</i> | 4 |
| <i>Worker's Role</i> | 4 |
| <i>What is Sound?</i> | 4 |
| Sound Can Be Dangerous..... | 5 |
| How is Sound Measured? | 5 |
| What High-Decibel Sound Does To You | 5 |
| <i>Exposure to Sound</i> | 6 |
| How is Exposure Measured?..... | 6 |
| How Long is Too Long?..... | 6 |
| How Much Exposure is Dangerous? | 7 |
| <i>Hearing Loss</i> | 7 |
| <i>How is Hearing Loss Measured?</i> | 7 |
| <i>Hearing Protection</i> | 8 |
| <i>Education</i> | 9 |
| <i>Monitoring the Problem</i> | 9 |
| <i>Summary (of Regulatory Requirements)</i> | 10 |

INTRODUCTION

Introduction

Exposure to high noise levels is the cause of noise induced hearing loss (NIHL). This exposure can be linked to illnesses such as headaches, stress, increased blood pressure and increased irritability. High noise levels can also affect a worker's ability to work safely.

Workplace Safety and Health Regulation Requirements

Part 12 of the Workplace Safety and Health Regulation (M.R. 217/2006), regarding Hearing Conservation and Noise Control, requires employers to ensure workers are not exposed to noise levels that may cause hearing loss.

This part of the regulation follows three principles:

1. It is more effective to reduce the noise levels in the workplace than to rely on hearing protection to protect workers.
2. Effective training and periodic hearing tests will provide workers with appropriate knowledge about the effects of high noise exposure levels.
3. When it is not possible to reduce noise levels, use of personal hearing protection is required.

This guideline provides practical help in developing and maintaining a hearing conservation program in your workplace. A workplace where workers are likely to be exposed to sound exposure levels of more than 80 dBA (Lex) — the level of a worker's total exposure to noise averaged over the entire work day — must follow a program. The program must be tailored to the severity of sound exposure at your workplace.

SPECIFIC REGULATORY REQUIREMENTS

Noise Exposure Assessments (Section 12.2)

Employers must determine what noise levels workers are exposed to before putting a hearing conservation program in place. To do this, a noise exposure assessment must be conducted according to the requirements of the CAN/CSA Standard – Z107.56-06, *Measurement of Occupational Exposure to Noise*. A noise exposure assessment is needed when:

- a worker is likely to be exposed to noise levels above 80 dBA
- an alteration, renovation, or repair of the workplace may change the noise levels
- new equipment (that may change the noise levels) is introduced into the workplace
- changes to a work process may change the noise levels
- a worker provides the employer with evidence of NIHL that may be attributed to the workplace

Employers must post written reports of the assessment in a prominent location at the workplace.

Sound Control Measures (Section 12.4(1))

If a noise exposure assessment indicates that workers are exposed to levels above 85 dBA (Lex), employers must use sound control measures to reduce the noise exposures to below 85 dBA (Lex). Sound control measures are engineering or administrative controls that eliminate, control or reduce noise exposure, including:

- replacing, changing or eliminating noisy equipment (ex: rearranging to block or increase distances between sound sources and workers, maintenance programs)
- changing buildings or structures (ex: sound dampening walls, installing barriers)
- changing operations or work processes (ex: limit length of time worker is exposed to noise, do noisy jobs during lunch times)

Hearing Protection (Section 12.4(2))

Employers must provide hearing protection on request by workers exposed to sound levels over 80 dBA (Lex). The use of hearing protectors that meet the requirements of CAN/CSA Standard Z94.2-02, *Hearing Protection Devices – Performance, Selection, Care, and Use* is required when sound exposure levels are at 85 dBA (Lex) or higher.

EMPLOYER'S ROLE

Employer Responsibilities

Every employer must understand that a safe and healthy workplace is a legal obligation and a practical necessity.

Part 12 of the Workplace Safety and Health Regulation, Hearing Conservation and Noise Control, requires the employer to assess the workplace for noise exposure. If the noise exposure levels are above 85 dBA (Lex), the employer must put a hearing conservation program into action. This includes applying sound control measures where possible or providing hearing protection (at no cost to the worker) that reduces the worker's exposure to below 85 dBA (Lex).

The employer is also responsible for providing audiometric testing (at no cost to the worker) for all workers exposed to noise levels above 85 dBA (Lex). When workers are exposed to noise levels above 80 dBA (Lex), the employer must provide hearing protection for workers who request it.

WORKER'S ROLE

Worker Responsibilities

The more workers understand what hearing conservation is about, the more they will be able to help make the hearing conservation program effective. Make it your business to learn about sound hazards and hearing loss. You'll be able to make suggestions and avoid dangers if you understand the risks.

Workers must also ensure they follow the employer's hearing conservation program. This includes:

- following procedures outlined by the employer
- using control measures designed for reducing noise
- wearing personal protective equipment where required

Workers can also tell the employer what is working to reduce noise levels or offer suggestions on what might help reduce noise levels.

WHAT IS SOUND?

Sound is a series of waves or air pressure changes that make our eardrums vibrate. Tiny nerves in our ears respond to the vibrations and send signals to our brains where they are recognized as sound.

As the wavelength is reduced, sound increases in pitch or frequency. Frequency is measured in Hertz (Hz). Healthy human ears can hear wavelengths from 20 up to 20,000 Hz. The typical range of the human voice is 500 to 5,000 Hz. Individual sounds are generally made up of a mixture of frequencies. As the height of the wave increases, sound becomes more intense. We perceive sound intensity as volume. Sound intensity is measured in decibels (dB).

Sound can be dangerous

Your hearing can be damaged without you knowing it. Volume, or loudness, is your impression of how intense sound is, but sounds can be more intense than you realize. The effect on your hearing depends on both intensity and how long you are exposed to intense sound.

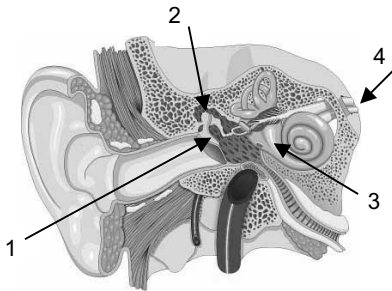
Hearing damage cannot be corrected. Although a hearing aid may help you by amplifying sound volume, it does not give you back your lost hearing.

How is sound measured?

An instrument called a sound level meter measures the decibel level. A sound level meter measures the intensity or volume of sound at a specific time and place. Accurate measurements are important because a difference of only a few decibels can have an enormous effect on your hearing. Typical meters measure decibels that are A-weighted (dBA). The A-weighting allows the sound level meter to detect sound much like a human ear by measuring intensity within the frequency range normal human ears can hear.

Measuring the decibel level and exposure time shows the amount of sound energy you are exposed to in the workplace. The term dBA (Lex) describes a worker's total sound exposure over an entire work shift. This exposure value is determined using a noise dosimeter. Knowing your dBA (Lex) exposure level is the first step in hearing conservation.

What high-decibel sound does to you



- | |
|---|
| <ol style="list-style-type: none">1. Eardrum2. Middle ear3. Inner ear4. Nerve leading to brain |
|---|

When the eardrum vibrates, it moves three tiny bones in your middle ear. This movement transmits the vibration to fluid in your inner ear. Movement of this fluid is picked up by tiny hair cells that transfer the movement to nerves. The nerves send signals to your brain, where they are recognized as sound.

Exposure to high-decibel sound for a long time can eventually damage the tiny hair cells. Consequently, fewer signals are sent to the brain and you don't hear as well. Because the hair cells cannot be replaced or restored, the damage is permanent. Hearing aids only amplify the sounds for your ear. They do not restore proper function to a damaged inner ear.

EXPOSURE TO SOUND

How is exposure measured?

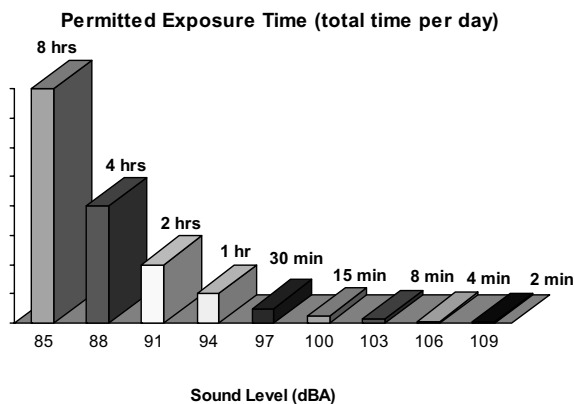
It is important to recognize that the exposure of a worker is determined by measuring both the sound intensity and the length of time the worker is exposed to that noise energy level. A noise dosimeter or an integrating sound level meter is able to calculate these average exposure values.

How long is too long?

It depends on the dBA level. Most sounds made by people and found in nature are harmless even over a very long time. Loud sound, however, can damage your hearing after long exposures. Extremely loud sound can deafen you instantly.

If people are exposed repeatedly and for long periods, sound starts to be harmful at about 80 dBA. At 90 dBA, sound seems about twice as loud, but it's much more dangerous. This 10 decibel increase means the sound is **10 times** more intense. At 100 decibels — a 20 decibel increase — the sound is **100 times** more intense than at 80 decibels.

As sound levels increase, exposure times for each worker must be reduced. In Manitoba, a three decibel per doubling rule is used. That means that for every three dBA (Lex) increase in the sound exposure, the allowed times are reduced by one-half.



Generally, you must be exposed to high-decibel sound for an extended period before you notice hearing loss. By that time, serious damage may have been done.

Although the sound may not have seemed uncomfortable, it was destroying your inner ear's hair cells and the damage cannot be reversed.

How much exposure is dangerous?

The higher the sound level, the less time it takes damage to occur. In Manitoba, hearing conservation measures must begin whenever workers are exposed to more than 80 dBA. In general, if you can't understand a loud voice from a distance of one metre (one yard) because of background sound, you're likely in a harmful noise environment.

| | | | |
|-----------------|----------------|-----------------|-------------|
| | 100 dBA | Severe | |
| | 95 dBA | High | |
| | 90 dBA | Moderate | |
| | 85 dBA | Low | |
| Exposure | 80 dBA | Very Low | Risk |

HEARING LOSS

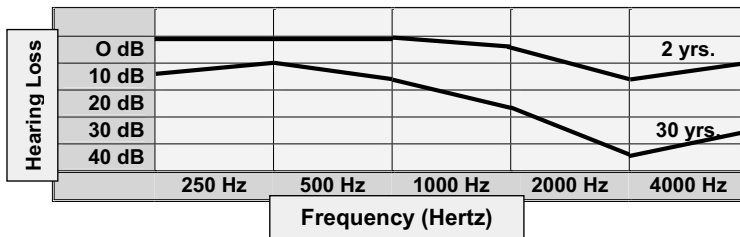
How is hearing loss measured?

An audiometric or hearing test measures how well you hear sounds at different frequencies or pitches. Pitches are what we practice on the “do, re, mi” scale, but a hearing test covers a far wider range. A graph called an audiogram shows test results. Reviewing graphs made over years of monitoring detects changes to your hearing sooner than you are able to notice.

The audiogram is an important tool because often the first sign of noise induced hearing loss is when it detects significantly reduced ability to hear high-pitched sounds (about 4,000Hz). Early warning is vital to correcting problems in the workplace before more harm happens.

In section 12.4(2)(c) of Part 12 of the Workplace Safety and Health Regulation, the employer is required to provide audiometric tests free for workers exposed to noise levels above 85 dBA. A baseline test is required within 70 days of the worker’s first exposure to the noise level. After the initial baseline test, audiometric testing is required annually.

Effects of exposure to high decibel sound



HEARING PROTECTION

Hearing Protectors

There are two types of hearing protectors available:

- ear muffs consisting of a headband and ear cup with a soft outer ring or cushion fitting tightly against the ear or sides of the head around the ear
- ear plugs worn in the external ear canal or in the entrance to the external ear canal

The type of hearing protection selected depends on the noise exposure levels. There are three classes of hearing protectors:

- Class A — used when noise exposure levels are between 95 dBA (Lex) and 105 dBA (Lex). Generally, hearing protectors with a noise reduction rating (NRR) of 24 will fit into this category. The noise reduction rating lists the amount of decibels that the protectors will reduce the noise levels.
- Class B — used when noise levels are between 90 dBA (Lex) and 95 dBA (Lex). Generally, hearing protectors with NRR between 17 and 24 will fit into this category.
- Class C — used when noise levels are less than 90 dBA (Lex). Generally, hearing protectors with NRR of less than 17 will fit into this category.

At noise levels above 105 dBA (Lex), using earplugs and earmuffs together is recommended.

Select and fit hearing protectors carefully to make sure they give effective protection and cause minimum discomfort to the user. Repair or replace any worn out seals promptly. Let workers choose from several effective types of hearing protectors. They are more likely to use equipment that is comfortable for them. Instruct workers to replace disposable earplugs every day and clean reusable ones regularly.

Hearing protectors must be worn — and worn correctly — at all times when working in harmful noise environments. Properly selected and worn protectors can provide effective protection from high exposures, but their continued use can be very inconvenient.

EDUCATION

Worker education

Education is required where exposure to sound levels is more than 80 dBA (Lex) to make sure workers are aware of sound hazards. Be sure to discuss with workers the fitting, care and use of hearing protectors provided to them.

Workers exposed to sound levels of 85 dBA (Lex) or higher, need further education about the limitations of hearing protectors.

MONITORING

Monitoring the problem

A hearing conservation program will not be effective unless it is ongoing. Because hearing loss develops slowly and because it is subtle, your exposure to workplace noise and your hearing ability requires checking regularly. Whenever you detect a problem, take action to correct it.

SUMMARY

Regulatory Requirements

Workplaces where noise exposure may be a problem must have the noise exposure levels assessed. If average noise exposure levels in a workplace are 80 dBA or lower, no action is required. However, noise exposure levels need periodic checking to ensure they remain at safe levels. If your workplace noise exposure level is above 80 dBA, programs to protect your hearing are required, as shown below.

| All Workplaces Above 80 dBA (Lex) | All Workplaces Above 85 dBA (Lex) |
|--|---|
| <ul style="list-style-type: none"> • Periodic noise exposure measurements must be taken and workers informed of the results. • All workers must receive training about the hazards of the level of noise they experience or are likely to experience. • If requested by a worker, the employer must provide hearing protectors and instruct the worker in selection, use and maintenance of hearing protection. | <ul style="list-style-type: none"> • All measures taken for 80 dBA exposure must also be taken for 85 dBA exposure. • Employers must determine the practicality of using sound control measures. • If sound control measures are not practical, work practice controls must be considered. • If sound control measures do not limit the exposure to 85 dBA (Lex) or less: <ul style="list-style-type: none"> • Hearing protection is mandatory. • Information on hearing protector limitations and instruction on their fitting and care must be provided to workers. • Periodic reassessment of the practicality of engineering and work practice controls to limit noise exposure is required. • Audiometric tests must be performed on workers no later than 70 days after workers are initially exposed to the workplace noise level and once every year after the initial test. • Warning signs indicating that the area has a harmful noise level must be posted prominently at the entrance to all work areas where sound is above 85 dBA. |

