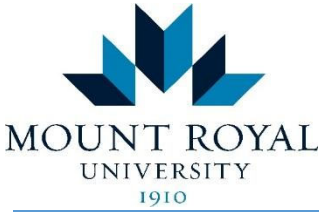


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**SAFETY PROGRAM:  
HEARING CONSERVATION AND  
NOISE CONTROL**

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## PREAMBLE

Noise is one of the most common occupational health hazards. Exposure to excessive noise can lead to hearing impairment and non-auditory effects such as stress and related physiological or behavioral effects which can affect the ability of workers to perform their tasks safely.

This Program has been written to meet Occupational Health & Safety (OHS) regulatory requirements and sets out the requirement for noise control and hearing conservation measures. The purpose of this Program is to aid in minimizing worker exposure to noise hazards present in the workplace and to promote hearing conservation. Mount Royal University's Hearing Conservation and Noise Control Program is designed to meet or exceed legislative requirements.

## SCOPE

This Program applies to all MRU employees who may be exposed to excessive noise (as defined by the Alberta OHS Code) when performing work on behalf of the University, whether on or off campus.

This Program and the information contained herein may also be shared and applied to student tasks and operations when applicable.

## LEGISLATION

Alberta's Occupational Health and Safety Code outlines the requirements for hearing conservation and noise control in Part 16, Noise Exposure. A copy of OHS Code Schedule 3, Table 1 (Occupational Exposure Limits for Noise) has been provided in Appendix A.

## RESPONSIBILITIES

Executive (President, Vice-Presidents):

- Provide management support and leadership necessary to provide a safe and healthy working environment for employees and students, in compliance with the Mount Royal Health and Safety Policy
- Ensure that adequate resources are available to implement appropriate measures, including the development of a noise management program

Associate Vice-Presidents, Deans, Directors, Department Heads and Managers:

- Ensure that this program is communicated to the employees
- Ensure worker compliance with this program
- Identify department work areas processes that have or may have noise hazards
- Manage a budget for noise assessments, audiometric testing, and noise control measures for their department (where needed)
- Ensure that employees within their area that require hearing protection are trained and competent and that associated records are maintained

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Supervisors / Chairs:

- Ensure that they and their direct reports are trained on and adhere to this program
- Ensure that noise hazards are identified on Position Hazard Assessments (PHA) when applicable
- Ensure that Field Level Hazard Assessments identify noise hazards and controls when applicable (e.g. when working on tasks or in areas with potential excess noise levels)
- Coordinate with Environmental Health & Safety to perform noise hazard assessments of new work processes and equipment when noise is identified as a potential hazard
- Implement noise reduction strategies including engineering and administrative controls as needed when introducing new work processes or equipment
- Select and provide hearing protection that meets or exceeds legislative requirements and is appropriate for the work activities to be performed
- Ensure workers are trained on the hazards of excess noise and on the correct use, care, limitations, and maintenance requirements of noise reduction controls and hearing protection devices as per manufacturer's specifications
- Maintain applicable employee training and personal protective equipment usage records
- Identify to Human Resources any employees that need to be included in the Health Surveillance Program for Noise Exposure, based on noise assessments and worker exposure
- Consult with the Environmental, Health & Safety (EH&S) Department if there are any concerns or questions regarding PPE or noise hazards, or to initiate noise assessments of a work area or task

MRU Employees (Staff, Faculty, or Volunteers):

- Comply with this program and its procedures regarding hearing conservation and noise control
- Use, inspect, and maintain implemented noise reduction controls
- Wear, maintain, inspect and understand the limitations of hearing protection devices as per the manufacturer's specifications
- Report deficiencies or concerns with PPE and other controls to their Supervisor
- Participate in hearing conservation training and Health Surveillance Program for Noise Exposure, when required
- Report to their Supervisor any newly identified noise hazards or work areas where a worker must raise their voice to be heard over background noise

Contractors:

- Prime contractors shall have a noise control and hearing conservation program in place that meets or exceeds legislative requirements and applies to their contractors on site, when applicable to their work scope on campus
- Contractors working under MRU shall have a noise control and hearing conservation program in place that meets or exceeds legislative requirements
- Report noise control hazards to the MRU representative, when they cannot be adequately controlled by the contractor, or when they may affect others on site
- Addressing noise hazards in a reasonably practicable manner, while keeping the MRU community in mind during work operations

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Environmental, Health & Safety (EH&S):

- Review this program annually, including associated training and documentation, and update as changes to legislation or best practices are implemented; review and updates are also required if audiometric test results identify trends suggesting that controls may not be effective at preventing occupational noise-induced hearing loss.
- Provide expertise and advice on noise control options and hearing conservation requirements to all levels of Management and Employees.
- Coordinate noise assessments to determine areas of potential exposure over 85 dBA and signage requirements.
- Verify that signage is posted on all entrances to areas determined to have noise levels equal or greater than 85 dBA, as determined by noise assessments.
- Receive, review, and investigate all incidents related to hearing conservation and noise control and provide recommendations for corrective action.

Facilities Management – Building Operations:

- Post signage on all entrance doors to locations determined to have noise levels equal to or greater than 85 dBA, as determined by noise assessment.
- Implement and document noise reduction strategies when constructing or modifying a work area, or introducing a new work processes or equipment.

Facilities Management – Planning and Project Delivery:

- Identify projects with a potential of introducing excessive noise levels due to the construction or modification of a space, or by the introduction of new work processes or equipment to a space.
- Ensure contractors have noise control and hearing conservation programs in place that meet or exceed legislative requirements, when applicable to job scopes.

Human Resources (HR):

- Maintain and facilitate a Health Surveillance Program for audiometric testing and noise exposure as defined in Part 16 of the Alberta OHS Code
- Inform workers whether their test results were normal or abnormal and organize follow-up assessments as required.
- Enlist a qualified and approved third-party provider to maintain medical records as outlined in the Alberta OHS Code and applicable privacy legislation.
- Inform Supervisors and EH&S if audiometric test results indicate that additional controls and/or a review of work processes should be conducted.
- Provide an annual summary of hearing test results to EH&S to enable trend monitoring.

## HAZARD ASSESSMENT

Noise hazards are considered during the completion of Position Hazard Assessments (PHAs). Where noise is identified as a hazard for a job position, task, or location, a noise exposure assessment will be completed to determine if workers are or may be exposed to noise levels greater than 85 dBA as a time

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weighted average (TWA), or greater than the exposure limits shown in Alberta OHS Code Schedule 3, Table 1 (available in Appendix A).

Examples of areas and positions that may include noise hazards:

- Mechanical Rooms
- Central Plant
- Emergency Generator Rooms
- Wood and Metal Workshops
- MRU Hangar
- Carpenters
- Plumbers
- Electricians
- Flight Instructors
- Auto Mechanic
- Grounds Operators
- Athletics personnel
- Building Maintenance Workers
- HVAC and Mechanical Maintenance Workers

#### NOISE EXPOSURE ASSESSMENTS

Noise assessments shall be completed before and after controls are implemented, to determine risk level and appropriate controls.

Noise exposure assessments will be performed by a competent certified third party, in accordance with the Alberta OHS Code and the Canadian Standards Association (CSA) Standards outlined therein.

Noise assessments should be conducted when the following conditions have been reported to EH&S:

- New equipment or work processes that generate noise are introduced to the workplace.
- Noise levels change due to equipment deterioration, changes in work practices or procedures, or other alterations to the work environment.
- Workers indicate they experience ringing in the ears, temporary changes in hearing, or increased levels of noise in their work area or during their work activities.
- Worker tasks change, resulting in an increase in the length of time they are exposed to noise.

Noise assessments will be conducted and interpreted by a competent person with equipment that meets the requirements outlined in the Alberta OHS Code. The selection of equipment used will be based on the type of information to be collected and the recommendations of the certified third party tester.

Noise assessments will be repeated if a change in equipment or process affects the noise level or the length of time a worker is exposed to noise.

#### NOISE ASSESSMENT RESULTS

Noise assessment results will be recorded and distributed to affected workers and supervisors. Results may also be forwarded to HR to aid in providing audiometric surveillance when required.

Noise assessment results will be retained for as long as the MRU is in operation within Alberta, as required by the Alberta OHS Code.

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## NOISE HAZARD CONTROLS

MRU adheres to the hierarchy of controls expressed in Part 2 of the Alberta OHS Code and the MRU Hazard Identification, Assessment and Control Procedure where hazard elimination, the use of engineering controls, and the use of administrative controls supersede the use of personal protective equipment as a hazard control measure.

### ELIMINATION AND SUBSTITUTION

The most effective control measure is to eliminate the source of noise, or to substitute the item making noise for something quieter. When available and reasonable, MRU will purchase and install lower noise emitting equipment and machinery when performing upgrades or replacements.

### ENGINEERING CONTROLS

Engineering controls are methods that are built into the design of a plant, equipment or process to minimize the hazard. They control the hazard at its source.

Four main types of engineering controls can be used to reduce or eliminate noise:

- **Substitution:** Replace noisy equipment, machinery or processes with quieter ones.
- **Modification:** Modify the way equipment operates so that it generates less noise, or modify the work area to reduce noise. Examples include installing a muffler on equipment, reducing equipment vibration by dampening or bracing, reducing reverberation in a work area by covering walls with sound-absorbing materials, improved lubrication of equipment, or operating equipment at a lower speed. Note that changes to equipment must follow manufacturer's recommendations.
- **Isolation:** Isolate workers from a noisy area by having them work in an enclosed room or by placing noisy equipment / machinery in an enclosure. Examples include segregating noisy areas with sound barriers and partitions and using sound absorbent material and covers over noisy equipment.
- **Maintenance:** Properly maintained equipment generates less noise than malfunctioning or poorly maintained equipment. Noise control equipment must also be properly maintained to be effective.

Developing engineering controls may involve engineers, safety and industrial hygiene personnel and the workers who operate, service and maintain the equipment. The effectiveness of the controls will depend on a thorough assessment of the noise source and individual worker exposure. The contribution of each noise source to the overall noise level must be considered.

### ADMINISTRATIVE CONTROLS

Administrative controls are used to control the hazard along the path between the hazard and the worker and include the following:

- **Procedures:** How a task is completed can affect the amount of noise generated, e.g. bending metal in a press instead of hammering it, or placing materials on the ground instead of dropping them. When reasonable, consider using quieter procedures and methods.

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- **Training:** Employee understanding of this Program and their role within it are fundamental to the program’s effectiveness. MRU employees who work in areas with noise levels at or above 85 dBA, or those exposed to noise at or above an 8 hour TWA of 85 dBA (or 80 dBA for 12 hour shifts) must review this document and be trained on noise-induced hearing loss and noise hazard controls, including the use of suitable hearing protection.
- **Signage:** Signage indicating that the use of hearing protection is required upon entering a space will be posted on all doors leading into an area where noise levels have been determined by a noise assessment to be 85 dBA or greater. Signage shall also be posted in areas where the noise may exceed 85 dBA when equipment is operating, indicating when hearing protection is required.

*Examples of signage posted at MRU:*



- **Scheduling:** Reducing the amount of time that workers are exposed to noise by using work / rest and job-rotation schedules. Exposure can also be reduced by limiting high-exposure operations to periods where fewer workers need to be in the area.
- **Audiometric Testing:** Noise-exposed workers must undergo regular audiometric testing. Testing is conducted to establish a baseline level as soon as practicable, but no later than six months after initial hire or after a worker is exposed to excessive noise due to a change in duties or job conditions; again within 12 months of the initial assessment; and at least every two years after that. Audiometric testing must be performed by an audiometric technician, and follow the guidelines provided in the Alberta OHS Code Part 16, Section 223.
- **Maintenance Program:** Well-maintained equipment can help to reduce noise. Ensure that equipment is maintained as per manufacturer’s instructions and that repairs are completed promptly.

**PERSONAL PROTECTIVE EQUIPMENT**

Appropriate hearing protection devices must be provided for workers when other control methods are inadequate. Hearing protection devices will also be supplied for those workers concerned with noise hazards regardless of the noise levels produced. The type of hearing protection must be capable of keeping noise exposure at the ear below the occupational exposure limits for noise as outlined in Schedule 3, Table 1 of the Alberta OHS Code.

Hearing protection must be CSA or ANSI approved and adequate for the level of noise it is required to protect from.

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Three types of hearing protection are available:

- **Ear plugs** are inserted into the ear canal. They may be pre-formed or moldable, and disposable, reusable, or custom molded.
- **Semi-insert ear plugs** consist of two ear plugs held by a rigid headband.
- **Ear muffs** consist of sound-attenuating material and soft ear cushions that fit over and around the ear, held together by a headband.

See [Appendix B](#) for information on the types of hearing protection available.

Hearing protection devices will be made available where signage has been posted, for use by personnel entering the area.

- In areas where double hearing protection is required (levels measured above 90 dBA, TWA), workers without double hearing protection are expected to leave the area when equipment is operating.

## DEFINITIONS

**Audiometric Testing:** An assessment performed to test an individual's ability to hear sound.

**dBA:** Decibels on the A scale. The A-weighted scale response to the frequency components of sound in the same way as the human ear.

**Employees:** Volunteers or individuals who are engaged to work for the University under an employment or apprenticeship contract, including Faculty, Staff, exempt Employees, Management Employees, and Undergraduate, Graduate or Postgraduate students carrying out work for the University.

**Hazard:** A situation, condition, or thing that may be dangerous to the safety or health of workers or the environment.

**L<sub>ex</sub>:** The level of a worker's total exposure to noise in dBA, averaged over the entire workday and adjusted to an equivalent 8-hour exposure, measured in accordance with AB OHS Code Section 216 and based on a 3 dB exchange rate.

**Noise-Exposed Worker:** An employee who is or may be exposed to noise in excess of 85 dBA (time weighted average) and/or the noise exposure limits in Schedule 3, Table 1. Noise-exposed workers must be included in a Health Surveillance Program for noise exposure, facilitated by the MRU Human Resources department.

**Occupational Noise-Induced Hearing Loss:** Permanent hearing impairment resulting from prolonged exposure to high levels of noise in a work environment.

**Personal Protective Equipment (PPE):** Equipment or garments designed to reduce or minimize exposure or contact to specific hazards (physical, chemical, ergonomic, or biological agents). PPE reduces the risk of injury or illness to the wearer. Examples of PPE include respirators, gloves, lab coats,



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ear plugs, hard hats, fall protection, safety glasses, and protective footwear. All PPE used at MRU must meet the appropriate CSA standard.

**Risk:** The chance of injury, damage, or loss. At MRU, risk is determined through the use of a Risk Assessment Matrix which assesses risk based on the potential consequence of an incident (1 = minor, 2 = moderate, 3 = severe) and the potential frequency of exposure to a hazard (1 = rare, 2 = occasional, 3 = often). Multiplying the estimated consequence by the estimated frequency provides a final risk score, where a score of 1 to 3 is low risk, 4 to 6 is medium risk, and 7 to 9 is high risk.

**Time-Weighted Average (TWA):** The level of a worker's total exposure to noise averaged over the workday, typically adjusted to an equivalent 8-hour exposure. Also known as  $L_{ex}$  in the Alberta OHS Code.

## REFERENCES

- Alberta Occupational Health and Safety Act, Regulation, and Code
- Canadian Centre for Occupational Health and Safety, Noise – Hearing Conservation Program
- Canadian Standards Association (CSA) Standards
- Z94.2-02, Hearing Protection Devices
  - Z107.56-13, Measurement of Noise Exposure

## REVISION HISTORY

| Date         | Revision | Notes                   |
|--------------|----------|-------------------------|
| October 2019 | 01       | Creation of Safety Work |

## APPENDICES

[Appendix A: OHS Code Schedule 3, Table 1](#)

[Appendix B: Types of Hearing Protection](#)

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## APPENDIX A: OHS CODE SCHEDULE 3, TABLE 1

**Schedule 3 Noise**

**Table 1 Occupational exposure limits for noise**  
 [ See sections 218, 219(1) ]

| <b>Exposure level (dBA)</b> | <b>Exposure duration</b> |
|-----------------------------|--------------------------|
| 82                          | 16 hours                 |
| 83                          | 12 hours and 41 minutes  |
| 84                          | 10 hours and 4 minutes   |
| 85                          | 8 hours                  |
| 88                          | 4 hours                  |
| 91                          | 2 hours                  |
| 94                          | 1 hour                   |
| 97                          | 30 minutes               |
| 100                         | 15 minutes               |
| 103                         | 8 minutes                |
| 106                         | 4 minutes                |
| 109                         | 2 minutes                |
| 112                         | 56 seconds               |
| 115 and greater             | 0                        |

**Note:** Exposure levels and exposure durations to be prorated if not specified

**APPENDIX B: TYPES OF HEARING PROTECTION**

Hearing protection shall be selected using CSA Standard Z94.2-14 “Hearing Protection Devices – Performance, Selection, Care, and Use”. The choice of hearing protection type is dependent on the level of noise, comfort for the user, and the suitability of the protection for the environment. It’s critical that the hearing protection reduces noise to an acceptable level (lower than 85 dBA).

To determine if a hearing protector adequately reduces the noise hazard, refer to the Noise Reduction Rating (NRR) values. NRR values range from 0 to 30, with higher numbers resulting in better protection. NRR numbers are established in a laboratory and usually overestimate the protection provided. To account for real world conditions, use the following calculation to determine the final level of noise exposure when using hearing protection:

- Subtract 7 from the NRR number (which is in decibels)
- Divide the result by 2
- Subtract this result from the original noise exposure level (in decibels)
- Example:
  - Original noise exposure = 90 dBA
  - NRR = 30 dBA
  - Final noise exposure = 90 dBA – [(30-7)/2] = **78.5 dBA**

A table outlining the types of hearing protection, their benefits and drawbacks is available below:

| Type of Hearing Protection     | Benefits  | Drawbacks   |
|--------------------------------|---|---|
| <b>Disposable Ear Plugs</b>    | Moldable, so fits a variety of ear canals<br>Inexpensive<br>Comfortable in hot / humid conditions<br>Small and easy to store<br>No maintenance                                | Can be difficult to insert correctly into the ear, reducing protection<br>Can irritate the ear canal<br>Easy to misplace<br>Requires good ear hygiene |
| <b>Custom Molded Ear Plugs</b> | Molded to fit the individual<br>Reusable – can last for years<br>Comfortable and good for atypical ear canal shapes<br>Can be worn with other protection without interference | Requires ear mold impression, so higher initial expense<br>Requires regular cleaning  |
| <b>Reusable Ear Plugs</b>      | Easy to insert / wear<br>Relatively economical  | Pre-formed, so don’t fit all workers<br>Doesn’t mold to ear<br>Requires regular cleaning  |

How to Use Ear Plugs: Roll the entire plug into a long, crease-free cylinder. Use the opposite hand to reach behind the head and pull the ear up and back to open the ear canal for the plug. Insert the plug and hold for about 20 seconds to allow it to expand and fill the canal. When removing, slowly twist

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| Type of Hearing Protection   | Benefits  | Drawbacks  |
|--|---|--|
| <p>earplug to break the seal. If removed too quickly while seal is in place, the suction could damage your eardrum.</p> <p>Clean reusable ear plugs with soap and water (no harsh cleaners) after each use to avoid infection. Rinse in clean water, squeeze out excess water, and air dry. Store in a case when not in use.</p> <p>For custom ear plugs, have the hearing care professional demonstrate proper insert and removal.</p>  |   |  |
| <b>Semi-insert Ear Plugs</b>   | <ul style="list-style-type: none"> <li>Easy to insert / wear</li> <li>Harder to lose</li> <li>Convenient in changing noise conditions (e.g. tool use)</li> </ul>  | <ul style="list-style-type: none"> <li>Less effective noise reduction than other types of ear plugs</li> </ul>   |
| <p>How to Use Semi-Insert Ear Plugs: Semi-insert ear plugs are held in place by the pressure of the head band. Insert the plugs into the ear and place the band over the head; the band can also sit under the chin to prevent interference with other protective equipment.</p> <p>If the ear plugs will be reused, clean with soap and water (no harsh cleaners), rinse with water and leave to air dry in clean location. Store in a case or bag when not in use.</p>   |   |  |
| <b>Ear Muffs</b>   | <ul style="list-style-type: none"> <li>Easy to wear and convenient in changing noise conditions (e.g. tool use)</li> <li>One size fits all</li> <li>Reusable</li> <li>Nothing to insert in canal</li> <li>Hard to lose</li> </ul> | <ul style="list-style-type: none"> <li>Heavier and less portable</li> <li>Uncomfortable in hot / humid conditions</li> <li>Can interfere with other protective equipment (hat, glasses)</li> <li>Pressure may be uncomfortable</li> <li>Requires regular cleaning</li> </ul> |
| <p>How to Use Ear Muffs: Adjust the cups on the earmuffs so that the headband fits comfortably over the crown of the head. For the best results, make sure the cushions of the muffs form as tight a seal as possible over the ears.</p> <p>Check for wear and tear regularly. Disassemble ear muffs to clean and make sure the sound-attenuating material inside the ear cushions doesn't get wet. Use soap and water, (no harsh chemicals), and rinse in clean water. Squeeze out excess water and air dry on a clean surface.</p> |   |  |