Health and Safety Standard

HEARING PROTECTION

1 PURPOSE

This standard supports the Hazard/Aspect and Risk Assessment Policy and establishes the requirements for protecting workers and contractors from exposure to hazardous levels of noise and to reduce the incidence of noise-induced hearing loss.

2 SCOPE

This standard identifies the elements for the implementation and maintenance of an effective Noise Control and Hearing Conservation Program in recognition that continuous worker exposure to high levels of noise can result in hearing loss or damage. The following elements are covered:

- Identification of Noise Exposure
- Exposure Measuring & Monitoring
- Hearing Conservation Plan Requirements
- Noise Control Methods
- Hearing Protection: selection, use, inspection, care and provisioning
- Training

This standard outlines the minimum requirements that shall be met or exceeded by SaskPower workers and contractors. Failure to comply may result in injuries, damage to equipment and property, performance management or any combination thereof.

The use of the word “shall” within this standard denotes a mandatory action, whereas the use of the word “should” or “may” denotes a recommended action.

3 DEFINITIONS

The following definitions apply to this standard:

Audiometric Technician – the person conducting audiometric tests, who must meet the requirements set out in Appendix 4 of the Saskatchewan Occupational Health and Safety publication, “Audiometric Testing in Saskatchewan”.

Decibel (dB) – a logarithmic measurement of sound pressure.

Decibel A Scale (dBA) – the sound pressure level in decibels measured on the A scale of a sound level meter. When the A-weighting scale is selected, the meter will mimic the way the human ear responds to sound.

Decibel (dBA Lex) – the level of a worker's total exposure to noise, in dBA, averaged over an entire workday and adjusted to an equivalent eight-hour exposure.

Earmuff – a hearing protector usually consisting of a headband and ear cups with a soft outer ring or cushion intended to fit snugly against the sides of the head.

Earplug – a hearing protector worn within the external ear canal (an insert or aural earplug) or against the entrance to the external ear canal (a semi-insert or semi-aural earplug).

Equivalent A-weighted Sound Level (L_{eq}) – L_{eq} is the equivalent steady sound level of a noise energy-averaged over time. It is the energy actually measured by a sound level meter or noise dosimeter on the dBA scale.

Hearing Conservation Plan – a written plan that includes identification and assessment of noise exposure hazards in the workplace, the provision of appropriate controls, monitoring employee exposures and regular review.

Hearing Protection Device (HPD) – a personal device also referred to as a hearing protector, worn as a barrier to reduce the sound level entering the ear in order to diminish the harmful auditory and/or annoying subjective effects of sound.

Hearing protection devices **are not approved by** the Canadian Standards Association, instead manufacturers rate the noise attenuation of their device(s) in a laboratory setting using ANSI Method S3.19-1974 or S12.6-2016 in accordance with US Environmental Protection Agency (EPA) regulations.

Noise – unwanted sound that causes harm or that interferes with communication.

Noise Exposure – exposure to any unwanted sound. Overexposure is considered to be > 85 dBA $L_{ex, 8}$ by OH & S.

Noise Exposure Level ($L_{ex, 8h}$) – L_{ex} is the noise exposure level.

$L_{ex, 8h}$ is the sound level energy-averaged over 8 hours expressed in dBA, which would give the same daily noise exposure dose as the varying noise over a typical full shift.

Noise Reduction Rating (NRR) – a single number representing the reduction of sound pressure (attenuation) a HPD provides under controlled laboratory conditions when measured in accordance with ANSI Method S3.19-1974. The higher the NRR value, the

greater the average reduction of sound pressure across the range of human speech frequencies.

Octave Bands – normalized bands of frequency into which audible sound is divided for frequency analysis. One-third octave bands further divide each octave into three segments.

Single Number Rating [SNR(SF_{84})] – is derived from ANSI S12.6, Method B, providing a nominal protection performance of 84% of the subject population (*e.g.,* SNR(SF84) = 20, will provide 20 dB or more attenuation to 84% of the users in a well-run hearing conservation program).

Supervising Health Professional – A physician, audiologist or a registered nurse certified in audiometric testing and meeting the requirements of Appendix 4 of OH & S Publication - Audiometric Testing in Saskatchewan.

4 REQUIREMENTS

4.1 IDENTIFICATION OF NOISE EXPOSURE

Noise exposure hazards shall be identified with applicable controls to be applied via documented Hazard/Aspect and Risk Assessment (HARA).

Workers are to report any noise hazards, hearing protection defects or symptoms of hearing damage to their supervisor/manager.

4.2 EXPOSURE MEASURING AND MONITORING

Where tasks are required to be performed in identified noise exposure work areas, worker exposure shall be assessed by a competent person.

4.2.1 NOISE EXPOSURE ASSESSMENT

A **noise survey** and an exposure evaluation shall be conducted in accordance with an approved method and by a competent person in work areas where noise levels may exceed 80 dBA to identify hazardous noise sources.

The competent person who evaluates the sources of noise are to recommend necessary corrective action(s) in consultation with the local Occupational Health Committee.

Noise levels shall be **re-measured** when:

- Altering, renovating or repairing the place of employment;

- Introducing new equipment that may result in a significant change in noise levels or occupational noise exposure; or
- Modifying any process at the place of employment may result in a significant change in noise levels or occupational noise exposure.

4.2.1.1 NOISE SURVEILLANCE RECORDS

All noise level measurements, evaluations and corrective actions shall be documented and retained at each Division for as long as the Division is operational.

4.2.2 AUDIOMETRIC TESTING

Audiometric testing and counselling shall be administered by a competent person and arranged **every two years** (24 months) or less as required for workers exposed to noise ≥ 85 dBA L_{ex} or where noise levels exceed 90 dBA to identify workers who are showing early warning signs of noise induced hearing loss.

Appropriate counselling based on the test results are to be under the direction of a supervising health professional.

4.2.2.1 AUDIOMETRIC TEST RECORDS

Audiometric test results and relevant health histories must be kept in confidence by the supervising health professional and/or the audiometric technician.

Upon the informed consent of the employee, **audiometric test results** and relevant health histories shall be retained in accordance with the SaskPower Personal Information Privacy Policy and the Records and Information Policy.

SaskPower shall retain copies of all **audiometric statistical summary** reports in accordance with the SaskPower Personal Information Privacy Policy and the Records and Information Policy.

4.3 HEARING CONSERVATION PLAN

Where noise exposures exceed 85 dBA L_{ex}, a **written hearing conservation plan** shall be developed and reviewed **at least every three years** in consultation with the local Occupational Health Committee and is to be overseen by a supervisor. The written plan shall be readily available for reference by workers and include:

- Methods and procedures for assessing noise exposure of workers;
- Methods for controlling noise including engineering and administrative controls;
- The selection, use and maintenance of hearing protection;

- Training on noise exposure, control, and hearing protection;
- Maintenance of Exposure Records;
- Requirements for audiometric testing; and
- A schedule for reviewing the plan and applicable procedures.

4.4 NOISE CONTROL METHODS

Noise levels in areas where workers may be required or permitted to do work shall be reduced to achieve the lowest reasonably practicable noise level through design or modification. The means to reduce noise levels and duration of exposure may include:

- Eliminating or modifying the noise source;
- Substituting quieter equipment, tools, or processes;
- Enclosing the noise source;
- Installing acoustical barriers or sound-absorbing materials; and
- Amending work schedules or task sharing to limit exposure time.

Any areas in which the measurements show noise levels in excess of 80 dBA **shall be clearly marked by a sign** indicating the range of noise levels.

When elimination, substitution, engineering, and administrative controls cannot consistently and practicably reduce the worker's noise exposure to below 85 dBA $L_{ex,\ 8}$, then **hearing protection devices shall be provided** to workers and be used where required. This requirement also applies to workers who occasionally visit these identified work sites/areas.

4.5 HEARING PROTECTION

Workers are responsible for selecting, using, inspecting, and caring for their hearing protection in accordance with the requirements of this standard which were derived from the CSA Z94.2-14 Hearing Protection Devices - Performance, Selection, Care, and Use (R2019).

4.5.1 SELECTION

Required hearing protection identified as per a HARA, hearing conservation plan, noise survey and/or signage shall be selected according to the desired noise reduction by one of the three CSA Z94.2 Selection Methods based on noise levels. The below CSA methods are listed in increasing potential accuracy and difficulty of use:

a) Use of classes – pre-assigns the HPDs according to defined attenuation ranges;

In most instances, the simplest method of classification using the CSA table below will provide sufficient accuracy with consideration given to the variability inherent in measuring noise levels and attenuation values.

To provide the best balance between sufficient protection and avoidance of overprotection, HPDs with a class assignment should be selected for a given exposure (i.e., one should not choose a significantly greater class than the minimum recommended).

$L_{ex,8}$ (dBA)	**Recommended Minimum Class**
≤ 90	C
> 90 up to and including 95	B or BL
> 95 up to and including 105	A or AL
>105	*Dual Hearing Protection

Notes: Values reflect an approximate built-in 10 dB derating. Devices with an L designation should be selected for noise with low-frequency content.
*Refer to Section 4.5.1.1.1.

b) Use of single number like NRR or SNR(SF_{84}); and

c) Use of the octave-band approach.

When selecting hearing protection, the following factors should be considered:

- Worker comfort and suitability;
- The equipment's compatibility with other safety equipment;
- Temperature, humidity, air pressure, and other relevant workplace conditions;
- Equipment ease of use; and
- Worker's ability to communicate.

4.5.1.1 ASSESSMENT OF SELECTED HPD FOR ADEQUATE PROTECTION

4.5.1.1.1 NOISE EXPOSURE RANGE 85 DBA $L_{EX,8}$ TO 105 DBA $L_{EX,8}$

Hearing protection shall be adequate to reduce ambient levels below 85 dBA but not less than 70 dBA at the worker's ear. **Over-protection** will have a negative effect on communication.

The simplest method for assessing if the selected hearing protector is adequate for ambient noise exposures above 85 dBA $L_{ex, 8}$ but below 105 dBA $L_{ex, 8}$ is to use the manufacturer's Noise Reduction Rating number after applying a de-rating factor for the type of hearing protector. The NRR is printed on the original manufacturer's packaging.

The manufacturer's Noise Reduction Rating (NRR, computed based on ANSI Standard S3.19 data) shall be de-rated as follows, to account for the significantly reduced protection under real world condition of use:

Device Type	**Predicted dBA effective at the ear**
Earplugs	L_{eq} – [(NRR x 0.5) – 3]
Earmuffs	L_{eq} – [(NRR x 0.7) – 3]
Earplugs used under earmuffs	L_{eq} – [(NRR of highest rated device + 5) x (0.65) – 3]

Note: Additional -3 dBA adjustment is applied to the NRR to calculate effective dBA sound levels at the ear from measured ambient noise levels in dBA.

4.5.1.1.2 NOISE EXPOSURES ABOVE 105 dBA $L_{EX, 8}$

When the noise exposure exceeds 105 dBA $L_{ex, 8}$ both earplugs and muffs shall be worn together.

For ambient noise exposures greater than or equal to 105 dBA $L_{ex, 8}$ the Octave Band Computation (CSA Z94.2 Method "C") is required to accurately predict the noise reduction. Contact the Health and Safety Department to obtain technical assistance in this situation.

4.5.1.1.3 SELECTION FOR EXTENDED WORK SHIFTS

For extended work shifts (*e.g.,* 12-hour shifts), the exposure limit used in selecting a HPD must be reduced. For situations where the available noise protection is unable to reduce the exposure to 85 dBA, the time of exposure during a work shift must be also reduced.

The table below provides the adjusted hour by hour noise exposure limits equivalent to 85 dBA $L_{ex, 8}$:

Exposure Time (hours)	Adjusted Exposure Limit, dBA $L_{ex\ 8}$
3 min 45 s	106
0.25	100
0.5	97.0
1	94.0
2	91.0
4	88.0
5	87.0
6	86.3
7	85.6
8	85.0
9	84.5
10	84.0
11	83.6
12	83.2
13	82.9
14	82.6
15	82.3
16	82.0

4.5.1.1.4 SELECTION OF HPDS FOR SPECIAL CIRCUMSTANCES

Selection of HPDs for any special cases such as for hearing loss, communication and audibility needs, a combination of noise and ototoxic chemicals or vibration shall be done in consultation with the Health and Safety Department.

4.5.2 USE

Hearing Protectors shall be not be modified and are to be used as per the manufacturer specifications and instructions.

A proper fit shall be ensured when using hearing protectors:

- Earplugs are placed into (not against) the entrance of the ear canal to form a seal.
- Earmuffs are placed snugly against the sides of the head to form an airtight seal around the ear. Hair, jewelry, or clothing worn shall not be worn in such a manner as to be caught between the cushion of the muffs and the head. Protective eye wear that comes between the cushion of the muff and the head will reduce the protective capability of the earmuffs.

4.5.3 INSPECTION

Hearing protectors shall be inspected for obvious wear or defects prior to use and replaced where necessary:

- Inspect earplugs for dirt, damage, deformation, or extreme hardness.
- Inspect muffs for possible defects such as cracked cups, hardened or deformed cushions, or leaking liquid-filled cushions. Inspect band tension for loosening.

4.5.4 CARE

Hands are to be cleaned before handling disposable and reusable ear plugs.

Re-usable earplugs and earmuffs shall be cleaned regularly according to the manufacturer's requirements.

Earmuff cushions shall be replaced in accordance with the manufacturer's instructions as soon as they lose their shape, become hard or brittle, show evidence of cracks, or otherwise lose their performance qualities. If in doubt, replace.

4.5.5 PROVISIONING

Hearing protection shall meet the applicable requirements listed in section 4.5.1 and be supplied through SaskPower Central Stores or through the Division's purchasing process.

4.6 TRAINING

Training shall be provided on the hearing conservation plan that includes:

- Effects of noise exposure and the selection, use and maintenance of hearing protectors.
- Use, maintenance and calibration of monitoring equipment when required.

5 IMPLEMENTATION

The requirements of this version of the standard are to be met within six months of the approval date at which time the previous version will be superseded.

6 RESOURCES

6.1 INTERNAL RESOURCES

Related Policies:	Hazard/Aspect and Risk Assessment Policy Personal Information Privacy Policy Records and Information Policy
Related Standards:	Hazard/Aspect and Risk Assessment Standard
Additional Information:	Safety Briefing #24: Hearing Protection

6.2 EXTERNAL RESOURCES

Related Legislation:	*The Occupational Health and Safety Regulations, 2020, Part VII (99) Exposure to Noise & VIII Noise Control and Hearing Conservation*
References:	WorkSafe Saskatchewan – "Audiometric Testing in Saskatchewan"
Related Standards:	CAN/CSA Z94.2-14 Hearing Protection Devices - Performance, Selection, Care, and Use (R2019)
Additional Information:	WorkSafe Saskatchewan – Preventing Noise Exposure Fact Sheet

Ownership

Division:	Human Resources and Safety
Department:	Health and Safety
Review Frequency:	3 years
Approved by:	Health & Safety Council
Approval Date:	March 24, 2021

Document History

Revised by	Revision Purpose	Date
M Browatzke	Scheduled Review Cycle	March 24, 2021
K Hammond	Scheduled Review Cycle	March 3, 2018
D Fulton	Scheduled Review Cycle	September 13, 2017
Health and Safety Department	Scheduled Review Cycle	July 17, 2013