

## CSA Standard Z107.56-94 Procedures for the Measurement of Occupational Noise Exposure

### Scope and Application:

This standard describes procedures for determining the occupational noise exposure level (Lex) of workers. This includes occupational noise exposure from all types of noise: continuous, pure tones and impulse. The standard presents several alternative methods of sampling noise exposure. The method chosen will depend on the individual situation and needs or extended to groups with similar noise exposure. The methods have been designed to provide results which will be representative of a workers noise exposure, while minimizing the duration and number of measurements. It can also be used to measure the noise exposure (Leq) from a given activity (e.g. particular machine) or given job.

### Definitions:

- **Crest factor** – The decibel (dB) difference between peak sound pressure level and equivalent sound pressure level measured over specified time interval.
- **Criterion duration** - The duration in hours (usually 8-hours) used as a basis for the measurement or calculation of noise exposure.
- **Equivalent sound level (Leq)** - Ten times the logarithm (base 10) of the time integral over a stated time (hours) of the squared A-weighted sound pressure.
- **Noise exposure level (Lex)** - Ten times the logarithm (base 10) of the time integral of the squared A-weighted sound pressure.

The 3 dB exchange rate (Leq, Lex) has been adopted. Noise exposure can be measured with three types of instruments: sound level meters, integrating sound level meters and noise dosimeters.

### **Instrumentation used to measure the occupational sound exposures:**

Integrated Sound Level Meter: measures the noise exposure (Leq) from different activities in an A-weighted network, in a dynamic range of 50 dB, a crest factor capability of 30 dB and Type 2 tolerance (ANSI Standard S1.4). These results can be used to further calculate the noise exposure of individuals or groups.

Noise dosimeter: is designed to be worn by the worker and measures their noise exposure (Leq). The dosimeter incorporates: an A-weighted network, dynamic range of 50 dB, a crest factor of 30 dB, Type 2 tolerance and a threshold level of at least 10 dB.

Sound level meter: is used when the sound level from each activity is steady. This meter meets the Type 2 requirements, an A-weighted network and is set on slow response.

### **Dosimeter measurements should be:**

- Representative of the daily activities performed by the worker
- Worker's noise exposure measurement is done on two separate occasions, when results are within 2 dB
- More measurements are taken, until the standard deviation of all measurements is less than 3 dB
- A single measurement with a logging dosimeter may be used in place of two separate measurements
- Measurements conducted on different workers working in similar acoustical environments, may be considered separate measurement repetitions

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**Dosimeter measurement procedures include:**

- Advising the employee being monitored
- A pre and post calibration and battery check
- Microphone located on the individual's shoulder and fastened to not interfere with safety or performance of the individual
- The dosimeter shall be reset and started according to manufacturer's instructions
- Dosimeter is set to standby at end of measurement period

**Dosimeter information recorded:**

- Employee's name, job title
- Tasks performed during measurement period
- Locations worked
- Measurement duration, date & time
- Instrument reading
- Shift duration
- Instrument make, model, serial number
- If the dosimeter does not allow direct reading of Leq, refer to Appendix C of this CSA Standard

**The report shall include:**

- Statement that measurements have been conducted in accordance with this standard
- Date(s) & location(s) of measurements
- Name(s) & employee number(s)
- Leq to nearest decibel for each individual or job measured
- Lex to nearest decibel for each individual job
- Description of job activities of the employee(s) & their shift duration
- Equipment used

**This bulletin contains a summary of excerpts taken from the Standard, for general information purposes only. This bulletin is not reflective of the complete requirements that the Standard prescribes.**

Note: *Manitoba Regulation M.R. 217/2006 Section 1.4 inconsistency:*

If there is an inconsistency between this regulation and a requirement contained in a publication, code or standard referenced in this regulation, the provisions in this regulation prevail.