



Fermilab
ES&H Section

INDUSTRIAL HYGIENE PROCEDURES

QUEST AUDIODOSIMETER

10/92

OBJECTIVE

To provide guidance in the field use of the Quest Audiodosimeter.

DISCUSSION

The MICRO-15 Noise Dosimeter can be used as a personal noise dosimeter, an area monitor, or a sound level meter. All ES&H Section dosimeters are set at a 5dB exchange rate and 80 dB threshold level. Accuracy is +/- 0.2 dBA.

There are two possible interferences to accurate readings. The first is air turbulence which can cause a positive error. This is controlled with the use of a wind screen. The second is magnetic fields. Fields from magnets, generators, transformers, arc welding, radio transmitting can induce a current in the electronic circuitry of the audiodosimeter and cause erratic readings. If this is a problem, contact the ES&H Section.

EQUIPMENT

- Quest Audiodosimeter
- Quest Sound Level Meter Calibrator
- IH Sampling Notes or Noise Sampling Notes Form

PROCEDURES

1. Calibrate the dosimeter (see calibration procedures).
2. Press ON/OFF to turn the unit on.
3. Clear the MICRO-15 memory by simultaneously pressing and holding down the ON/OFF key and the PAUSE key for 5 seconds until the display shows a single zero and single colon.

4. Attach the microphone in a vertical position to the collar of the employee. Secure any excess cable. Periodically check the position of the microphone.
5. Press the run key. Record the start time on the sampling notes form.
6. Install the security cover and attach the unit to the employee's belt or pocket.
7. Explain to the employee the purpose of the sampling. Instruct the employee not to remove the dosimeter unless necessary, and not to cover the microphone with a coat or other outer garment.
8. Perform and record sound level meter readings with a sound level meter to identify potential noise sources.

Obtain and record the following information as necessary:

a) Employee Data

Distance from primary noise source

Exposure time pattern

Opinion of existing noise controls (if any) and suggestions for new controls

Hearing protection provided and its use

b) Machine/Process Data

Description of machine or process

Condition of Equipment

Sources and characteristics of noise

Possible engineering controls

c) Building Data

Size and shape of the room

Layout of equipment

Surface materials (ceiling, walls, floor)

Existing Controls

9. Remove the unit at the employee's lunch period, remove the cover and press PAUSE. After lunch, press RUN, replace the cover, and place the unit back on the employee. If this is not possible, record the amount of time the employee took for lunch. Also note break times.
10. At the end of the sampling period, remove the cover and press PAUSE. PAUSE may also be used to interrupt a run. Pressing RUN will resume the testing. Remove the unit from the employee. Record the stop time on the IH Sampling Notes form.
11. Press each data key and record **all** the results. These are the following:

PEAK LEVEL	The highest peak level recorded during the sampling period. The OSHA standard for impact/impulse noise is 140 dB. The recorded level can be erroneous since simply bumping against the microphone can cause a high reading. Record the reading, but if there seems no source for the very high reading, note this on the form.
SLOW MAX	The maximum level attained measured on SLOW response.
HTL L-AVG LTL L-AVG	L-AVG is the average sound level for the sample period. HTL stands for high threshold level. The high threshold is 90 dBA, which means anything below 90dBA is not recorded. This is mainly used to demonstrate compliance with the OSHA PEL of 90dBA. Since we do not use the OSHA PEL, this information is nice to know but not of significance for us. The LTL is the lower threshold level. The LTL is 80 dBA. We are using this to measure compliance with the TLV of 85 dBA (8 hour TWA).
HTL-DOSE LTL-DOSE	The accumulated noise dose expressed as a percent of the allowable dose for all noise above the threshold level. It is a percentage of the allowable limit. HTL is for a threshold of 90 dBA, and LTL is for a threshold of 80 dBA. The LTL is the only value of significance to us.
HTL-TWA LTL-TWA	This tells you the 8 hour time weighted average noise exposure. This is used if the sample period is less (or in some cases longer) than an eight hour period. It assumes zero exposure for any unsampled period of time and calculates the TWA. HTL is for a threshold of 90 dBA, and LTL is for a threshold of 80 dBA. The LTL is the only value of significance to us.
OL TIME	The time that the noise level has been above the overload level.

PAUSE TIME	The time the unit has been in the pause mode.
RUN TIME	The sample period.
3 dB LEQ	The integrated average sound level measured in decibels with a 3 dB exchange rate, no time constant and no threshold.
3 dB DOSE	The percent dose with a criterion level selected at 85 dBA
3 dB SEL	The total sound exposure level in decibels integrated over 1 second.

12. To erase the dose memory, press the ON/OFF and PAUSE keys simultaneously for 5 seconds.
13. Press the ON/OFF key for 5 seconds to turn the dosimeter off.
14. Evaluate the effectiveness of the hearing protection used.
 - a. Obtain the Noise Reduction Rating (NRR) of the hearing protection used.
 - b. Subtract 7 dB from the NRR.
 - c. Subtract the remainder from the A-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.
 - d. The estimated TWA should be below 85 dBA.
 - e. If ear plugs and muffs are used, add 5 dB to the NRR of the higher rated protector.
15. The attached form may be used to evaluate the TWA if the lunch period was included in the sample period.