

7.0 Proper wearing of TLDs

For all other practices the TLDs are worn outside the lead apron or clothing to help estimate the dose absorbed by body parts not covered by the apron. However, for interventional radiology one TLD should be worn outside the apron to estimate dose absorbed by body parts not covered by apron while another TLD under the apron to estimate the deep dose to the organs. Ring dosimeters to measure dose at the extremities should be used.



Figure 1: Dosimeter placements

8.0. Wearing Period of TLDs

The TLD wearing period is three months. However, AEC may prescribe a different wearing period for the practice depending on the risk. After the wearing period, these TLDs should be returned with the names of the wearers and received by AEC for reading, annealing and calibration. When a TLD is used for a very long time without being read, annealed and calibrated, the accumulated dose stored on the TLD decays and becomes inaccurate. Therefore, exceeding the wearing period should be avoided.

9.0 Storage of TLDs

Store your radiation dosimeter in a designated, low-background area, such as a badge board or desk drawer, safely away from radiation sources, extreme heat, and direct sunlight. Never leave badges in treatment rooms where scatter radiation can skew your exposure readings

10.0 Accidental exposure of TLDs

Accidental exposure is when an individual receives an exposure in error when no exposure of any kind was intended. In case of an accidental exposure;

- 1) Immediately contact the Radiation Safety Officer (RSO) or contact AEC for further guidance
- 2) Return the TLD(s) immediately to AEC for reading and assessment.

11.0 Reading TLDs at AEC

AEC uses an automatic TLD reader (Model Harshaw 6600) as shown in figure 3



Figure 2: TLD Reader at AEC

12.0 Fees for Dosimetry Services

- 1) The fee for reading, annealing and calibration is Shs 10,000 per TLD
- 2) The charges for each lost/ damaged TLD is 700,000/=

13.0 Obligations of Radiation workers

- 1) Comply with set rules and procedures for use of TLDs
- 2) Report accidental radiation exposures to the employer.

14.0 Obligations of employers

- 1) Provide TLDs to workers
- 2) Provide resources for reading, annealing and calibration of TLDs
- 3) Put in place procedures for use, storing and transportation of TLDs
- 4) Report any accident /incident on radiation exposure.

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ATOMIC ENERGY COUNCIL

DOSIMETRY SERVICES AT ATOMIC ENERGY COUNCIL



VISION

A nation safe and secure from harmful radiation

MISSION

To regulate the peaceful applications of atomic energy for the protection of people and environment from harmful effects of radiation.

1.0 Introduction

Personal radiation dosimetry is the measurement, tracking, and recording of an individual person's exposure to ionizing radiation over time. It uses small portable devices called dosimeters to ensure that workers in fields like medicine, nuclear energy, and industry stay safely within the legal exposure limits.

Section 13 of Atomic Energy Act Cap. 154 (AEA) mandates AEC to offer dosimetry services for the purposes of monitoring radiation workers.

In Uganda, personal dosimeters are used in healthcare, Industry, research, emergency situations and patient protection.

A Radiation worker is any person who is potentially exposed to radiation as a result of his/her occupation.

2.0 Reasons for occupational Exposure monitoring of radiation workers

Monitoring of Radiation workers;

- i) Detects changes in radiation levels at work places due to system failures or degradation.
- ii) Provides information to evaluate doses in an event of accidental radiation exposure.
- iii) Ensures that radiation doses of radiation workers are below the regulatory limits and kept As Low As Reasonable Achievable.
- iv) Enables use of dose records as a supplement to medical investigations when workers become sick or claim to be affected by radiation.

3.0 Methods used to measure Radiation doses of workers

A) Active dose monitoring

Electronic dosimeters are used to provide direct readings of radiation doses.

Examples: Handheld survey meters, Geiger counters, and electronic personal dosimeters (EPDs)

Advantages: Immediate feedback; excellent for fieldwork or emergency response

Limitations: Higher cost, more maintenance, requires the use of a passive dosimeter that constitutes the dose of record

B). Passive dose monitoring

Dosimeters which accumulate dose are worn by the workers, the doses are processed and determined using a reader after use. Passive dosimeters include Thermoluminescent dosimeters (TLDs) as shown in figure 1

Examples: TLD dosimeter badge, OSL dosimeter badge

Advantages: Reliable, affordable, compliant with NRC and state monitoring requirements

Limitations: Delayed feedback until post-processing

4.0 Justification for using (TLDs)

Atomic Energy Council uses TLDs to monitor radiation workers because they are;

- 1)Relatively cheap to acquire
- 2)Small in size which saves space for storage
- 3)Suitable for automatic processing.
- 4)Adequately strong and dust tight
- 5)Easy to identify using Serial numbers and colour codes
- 6)Used to measure a wide range of doses
- 7)Reusable
- 8)Sensitive to low dose and respond linearly to dose.
- 9)Easy to use

5.0 What you get from AEC Dosimetry Services

- a. A dosimetry badge (TLDs)
- b. Quarterly dose reports.
- c. Dosimetry Inspections reports
- d. Training on radiation safety and ALARA Principles
- e. Investigation reports in case of high radiation

6.0 Consideration for the choice of Personal Monitoring techniques

Selecting the right personal radiation detector goes beyond just meeting regulations. Organizations must take proactive steps to ensure accurate, consistent, and dependable monitoring for every employee who works near ionizing radiation. The following factors can help you determine which radiation dosimeter best suits your environment, personnel, and compliance needs.

A. Sensitivity

Sensitivity is one of the most important considerations when selecting a radiation dosimeter. Different dosimeter types detect different radiation energies and levels, and not all dosimeter badges are designed to measure every form of exposure. Understanding your workplace's specific radiation sources (whether X-ray, gamma, or beta) ensures you choose a dosimeter badge that can detect and record the appropriate energy range.

B. Accuracy

Accuracy is critical when protecting occupational radiation workers. A dosimeter's ability to accurately measure and record dose exposure ensures both worker safety and organizational compliance

C. Compliance Requirements

Staying compliant means understanding which dosimeter badge types, wear periods, and dose-reporting methods meet the standards for your specific operation.