

## Ring Dosimeter for X, Gamma, and Beta Radiation

Landauer's ring dosimetry service provides comprehensive extremity radiation monitoring for workers required to manually manipulate or to work in close proximity to radioactive materials and radiation producing equipment. Landauer was the first facility to receive accreditation by the National Institute of Standards and Technology through NVLAP® (NVLAP Lab Code 100518-0) for ring and wrist dosimeters when the extremity dosimetry standards were first established.

Landauer's ring measures exposure due to x, beta, and gamma radiation with TL (thermoluminescent) technology. The TLD is the highest efficiency dosimeter of 100% TL grade lithium fluoride, with no binder.

Landauer dosimetry service includes a proven full range of diagnostic evaluation and reporting services, including direct computer access via the Internet to Landauer's database for exposure reports, shipment tracking and account maintenance transactions.



### Advanced Design

The TLD is safely encapsulated inside the identification cover. No separation of the TLD from the cover is possible, so the identity of the chip and the wearer is always maintained. The cover and TLD are independent of the ring base.

The identification on the cover is laser engraved preventing the print from smearing, peeling, or washing off. Rings can be worn in dry or wet working conditions and cold sterilized without compromising the integrity of the dosimeter. Information on the cover includes the account, participant, and serial numbers, the worker's name, the wear date and exchange frequency, the size, and on what hand the ring is to be worn.

Rings are available in small, medium and large to comfortably fit any user, and smooth edges allow rings to slide and fit inside surgical gloves. The ring base color changes (red, blue or black) each wear period to help identify wear dates.

### Department Groupings (Series)

Department groupings within accounts are available for an additional charge. This service segregates departments on dosimetry reports and laser etches the department (series) code on the ring cover.

### TLD Technology

Landauer's thermoluminescent (TLD) ring dosimeter measures radiation exposure due to x, beta, and gamma radiation with a lithium fluoride chip. During analysis in our laboratory, the TLD chip is heated causing it to become luminescent in proportion to the amount of radiation exposure. The luminescence is measured and a report of exposure results is generated. The glow curve of the readout that permits a more conclusive evaluation of radiation exposure can be retrieved and analyzed before the exposure report is generated if any anomaly appears.

The sum of the high energy beta, gamma and x radiation is reported as a shallow dose. If the ring dosimeter is exposed to radiation other than x-ray or gamma over 20 keV or high-energy beta, the value recorded may require further interpretation on your part. Landauer will furnish, on request, adjustment factors for any specified energy level.

### Accurate Calibration

Accurate determination of exposure is supported by calibrations using anatomically correct hand phantoms. This permits determination of the radiation scatter pattern caused by the many small bones of the hand and thus helps to ascertain dose to the hand based on the amount found on the ring dosimeter. Custom calibrations can be made to measure the low energies encountered with laboratory instruments such as electron microscopes and x-ray diffraction units.

### Analysis Assurance

Rings are scanned before processing using optical character recognition to accurately identify and track each dosimeter from receipt to report. The TLD is read automatically by laser, and the process is overseen by skilled technicians. The glow curve of the readout that permits a more conclusive evaluation of radiation exposure can be retrieved and analyzed before the exposure report is generated if any anomaly appears.

### Technical Specifications

- Highest efficiency dosimeter of 100% TL grade lithium fluoride, with no binder - one TLD per ring.
- Energy Range:  
Photon (x or gamma ray) - greater than 15 keV.  
Beta particle expressed as average energy - greater than 200 keV.
- Dose Measurement Range:  
Photon (x or gamma ray) - 30 mrem to 1,000 rem (300 µSv to 10 Sv).  
Beta particle - 40 mrem to 1,000 rem (400 µSv to 10 Sv).  
Detection outside these ranges can be requested.
- Rings can be cold sterilized in ethylene oxide and in disinfectants including Cidex® and Betadine®.
- NVLAP accredited in extremity dosimetry categories I to VII, NVLAP Lab Code 100518-0.
- HSE (Health and Safety Executive) United Kingdom approved for Extremity/Skin (TLD).
- DOELAP (Department of Energy Laboratory Accreditation Program) accredited.
- CNSC (Canadian Nuclear Safety Commission) authorized for use.