

LANDAUER®



RadWatch Dosimeter RadLight Reader

Deploy a portable, field-ready option
for tactical radiation monitoring

LANDAUER has developed the latest in tactical/field radiation monitoring technology



RadWatch ready-to-wear dosimeters are designed to offer superior performance to enhance accurate monitoring of radiological incidents and threats in the field. Employing robust optically stimulated luminescence (OSL) technology, the RadWatch features redundant dose assessment capabilities. It is designed to be read out on the RadLight Reader; both are engineered to withstand combat and other extreme environmental conditions experienced by firefighters and emergency responders.

The RadWatch dosimeter is designed to operate under field conditions and is sophisticated enough to measure low-level radiation dangers. Worn on the wrist or chest, it measures whole-body dose due to photons and neutrons. The RadWatch dosimeter has both a primary and secondary detector. The secondary sensor serves as backup for the primary sensor should the primary sensor be rendered inoperable under combat conditions. A built-in RFID chip, which holds identification sensor calibration data, stores dose results from the most recent analysis.

The RadWatch features OSL technology, trusted to monitor workers with exposure to ionizing radiation. All analytical data is stored in the RadLight Reader for later download to a computer via a USB connection facilitating additional analysis and reporting. Dosimeters to be read are simply inserted into the reader's drawer assembly, which automatically positions their built-in sensors for analysis by the photo-optical engine. The RadWatch and RadLight solution provides a legal dose of record useful for dose reconstruction, risk mitigation and legal defense.

Operating Principles

RadWatch assesses the absorbed dose to tissue (cGy) from neutrons and photons utilizing a primary detector comprised of three $\text{Al}_2\text{O}_3:\text{C}$ OSL discs of crystalline powder coated on a clear plastic film. Each disc in the sensor is enveloped by a specific filter assembly:

- Filter 1 indicates photon energy
- Filter 2 assesses doses due to photons
- Filter 3 assesses doses due to neutrons

The three filter assemblies are contained in a slide on the watch base, protected by the watch cover until inserted into the RadLight Reader, which automatically positions the slide over the photo-optical engine for analysis.



Cover

Base with Slide

Slide

Slide ID

THE RADWATCH ASSEMBLY

- RadWatch consists of three parts as shown.
- The slide ID is engraved on the slide and cover for easy reading and also encoded in the RFID that accompanies every slide.
- When assembled, the serial numbers on the three pieces will match.

OSL Technology

OSL analysis uses the pulsed stimulation method (POSL) operating at 1,000 cycles per second, with a pulse duration of 50 microseconds. Luminescence is assessed following each pulse.

Re-readability

- Non-destructive readout allows for the dosimeter to be read many times without sacrificing accuracy and precision
- Results can be validated through reanalysis, including third-party independent analysis, and are dose of record capable

Environmental integrity and durability

- Dosimeters and readers are insensitive to extreme temperatures, fine sand, chemical contaminants, pressure, and humidity, making them ideal for field conditions
- Dosimeters are maintenance-free and lightweight. No warm-up time is required for the RadLight reader

Minimal fading

- Dosimeter can be worn for longer periods without signal degradation

Performance Specifications

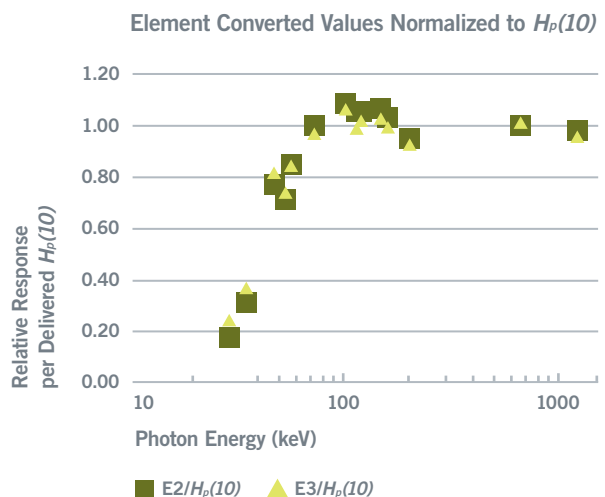
Radiations measured

- Gamma and x rays with energies above 50 keV
- Neutrons with energies above 0.5 MeV using OSL
- Neutrons with energies above thermal using Fluorescent Nuclear Track Detector (FNTD)

Detection range

- Photons: 0.005 cGy at a depletion of ~0.5% to 3,000 cGy (est.)
- Neutrons: 0.3 cGy (est.) to 3,000 cGy (est.) with OSL
- FNTD neutrons: 0.005 cGy (est.) to 5 cGy (est.)

RESPONSE OF RADWATCH DOSIMETER TO PHOTON FIELDS



RadLight Reader's Simple Operation

- **Push-button start** powers on the unit, initiating a startup protocol that correctly positions the slide puller.
- **Visual cues** ensure proper orientation when watch is placed in the drawer.
- **When drawer is pushed in**, reader automatically removes the slide from the watch base and positions each sensor to be read.
- **Integrated screen displays** key identification information, along with the total radiation dose and analytical results (photon and neutron dose), which are also written to the RadWatch RFID chip.



RadLight Portability and Power Requirements

The portable RadLight reader weighs five pounds with batteries and is made out of high-impact plastic that is resistant to scratches, dents, mildew, fungus and chemicals. The internal materials have been chosen to ensure no materials might become radioactive in the case of a significant neutron flux. All of the major repair-by-replacement parts in the RadLight are interchangeable from one unit to the next.

The RadLight reader can operate continuously on one set of four AA alkaline batteries for 21.5 hours in the temperature range of 18°C to 50°C. At very low temperatures (-10°C to -20°C) the operating time of the reader follows the low temperature performance of the batteries and the continuous operating time is reduced to about one-third that of normal temperatures. However, it is easy to keep batteries warm and maintain the normal operating time of the reader.

In continuous operation at all temperatures, the reader processes 2.4 dosimeters per minute, or 144 per hour, approximately 27 seconds per dosimeter.



OSL Benefits

LANDAUER's proprietary aluminum oxide Optically Stimulated Luminescence (OSL) technology offers many key advantages to those using the RadWatch in field conditions. The technology is designed to withstand the most severe conditions and maintain its integrity in any environment. The RadWatch dosimeter can be re-read numerous times while maintaining total cumulative dose, which saves both time and resources. There is also no risk of fade, allowing the dosimeters to be worn for longer periods of time while maintaining accuracy and efficiency.

FEATURE	BENEFITS	ADVANTAGE
Non-destructive readout	<ul style="list-style-type: none"> – Re-read dosimeters numerous times – Onsite interim analysis with portable RadLight reader – RFID participant and dose tracking 	No delay in dose assessments <ul style="list-style-type: none"> – Dose data validation – Central processing lab provides final NVLAP accredited dose of record analysis after use
Minimal loss of signal over time	Wear dosimeters for longer wear periods	Less administrative time in managing a dosimetry program with fewer exchange-outs
Unlimited access to LANDAUER Certified Health Physicists and Ph.D. physicists	<ul style="list-style-type: none"> – Technology support – Algorithm support – Abnormal dose investigation support – Regulation interpretations 	<ul style="list-style-type: none"> – Reliable answers and documentation – Credibility
Equipment redundancy	Emergency backup throughout the world and affords synchronization efforts across state and federal agencies	<ul style="list-style-type: none"> – No downtime – Third-party independent analysis

About LANDAUER

As the global leader in radiation monitoring research and development since 1954, LANDAUER has a long history of working with government and military entities to offer innovative solutions for first responders. Our military experience includes CRADA, the ARMY OCO initiative, DTRA Testing and mutual development of RadWatch and RadLight.

We're proud to offer better science, greater convenience, more accurate and timely radiation monitoring and a common platform that allows emergency response programs to intersect and provide mutual aid.

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