Product Specifications

Harshaw 3500

TLD Reader

The Harshaw 3500 TLD Reader provides cost-effective measurements of the radiation dose absorbed by individual TLD elements: ribbons (chips), rods, micro-cubes or powders.

- Thermoelectric PMT cooler for maximum gain stability
- Measurement quality assurance
- Automatic background subtraction capability
- Easy to operate, service and maintain
- Compact and attractive
- Optional neutral density filters
- 600 °C (1112 °F) Tmax option

The Harshaw 3500 includes a sample drawer for a single element TLD dosimeter, a linear, programmable heating system and a cooled photomultiplier tube with associated electronics to measure the TL light output. The manually-operated Harshaw 3500 is used in medical physics, health physics, materials research, food irradiation and industrial applications.

Key Features

- Planchet heating incorporates welded thermocouple for best temperature reproducibility
- Heating profile includes pre-heat, acquire and anneal cycles
- Heating temperature capability up to 600 °C (1112 °F)
- 7 decade glowcurve acquisition range
- Optional neutral density filter to extend the high measurement range

System Specifications

Advantages of a separate computer

- Minimum initial investment
- Extremely flexible parametric adjustments, implemented in software
- The computer can be used for other purposes when not required for TLD
- Use of commercial software for data manipulation, report generation and storage

Applications

- Radiotherapy planning verification
- Total body irradiation dose verification
- Skin irradiation dose verification
- Stereotactic beam output factor measurement
- Critical organ dose verification
- Diagnostic dose studies
- CT dose measurement for quality assurance
- Environmental dosimetry
- Testing for irradiated food
- Radioactive dating
- High dose verification for electronic components

Dosimetry performance using LiF;Mg,Ti chips. (TLD-100)

Radiations measured: Photon, energies >5 keV; Neutron, thermal to 100 MeV; Electron/beta, energies >70 keV

Range: 10 µGy to 1 Gy (1 mrad to 100 rad) linear; 1 Gy to 20 Gy (100 rad to 2000 rad) supralinear

Tissue equivalence: nearly tissue equivalent

Fading: <20% in 3 months without thermal treatment; <5% in 3 months using preheat or glow curve deconvolution

Batch uniformity: ±15% std. dev. from the batch mean, tighter on special request

Residual TL signal: <0.2% of reading, over the range, without annealing

Repeatability: for 1 mGy (100 mrad) 137Cs doses, <2% STD DEV of 10 sequential measurements

Reuse: more than 500 per dosimeter with <10% sensitivity change

Threshold: <10 µGy (1 mrad) based on 2.26 std. dev. of 10 repeat readings of an unexposed dosimeter

The connectors for power, nitrogen supply and the external computer are situated on the rear panel.

Accessories

- Personal Computer and Laserjet Printer
- Programmable annealing oven
- Uninterruptible power supply
- N_2 gas flowmeter
- Vacuum tweezers
- 2210D Tabletop Irradiator
- Dosimeter storage tray
- Low temp annealing oven, high temp annealing furnace
- Stainless steel annealing tray assembly
- Aluminum chill block
- 600 °C (1112 °F) maximum temp option
- Glow Curve deconvolution
- Optional planchets to accommodate different types of TLD material

TL data acquisition parameter selections

- Application of Reader Calibration Factor (RCF), and Element Correction Coefficient (ECC)
- Automatic background subtraction
- Application of quality factor
- Raw data and glowcurve printing during acquisition
- ASCII export file generation
- Periodic PMT testing of noise and response to test light
- Alarm and stop if TL data exceeds preset limit
- Re-read TLD if TL data exceeds preset limit
- PMT noise and reference light QC checks (user defined)

TLD heating profile setup

- Selection of 1 from 10 pre-defined Time/Temperature Profiles (TTPs)
- Editing of: TTP titles, Region of Interest (ROI) limits, Calibration region, Preheat temperature and time, Maximum read temperature, Temperature ramp rate, Anneal temperature and time, Acquisition time

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