

- Dosimetry you can count on for your long term solution with over 40 years of experience, innovation and support.
- One provider for all your dosimetry requirements with high vertical integration of materials, instruments, software, technology, service and support.
- We provide you with a completely integrated solution from one vendor.
- System tested to ANSI, IEC & ISO requirements.
- 100% QC on all dosimeter cards and new generation dosimeter holders with documentation available upon request.

### <sup>90</sup>Sr/<sup>90</sup>Y Internal Irradiator for Calibration and QC

- Dosimeter calibration under your total control so you do not have to rely on proprietary technology
- Calibration process totally automated in the reader to significantly reduce time and labor costs
- Only one calibration required for individual element calibration factors - far exceeding batch calibration accuracy
- Dosimeter stability allows extended intervals of several years between recalibration
- No need for an expensive and large <sup>137</sup>Cs source



### Model 6600 Plus Product Order Codes

Description	Order Code
Model 6600 Plus	6600 Plus TLD Reader
Model 6600 Plus with DXTRAD Option <i>Adds DXTRAD Extremity Finger Ring and EXTRAD Finger Pouch Capability</i>	6600 Plus TLD Reader DXTRAD
Model 6600 Plus with EXTRAD Option <i>Adds EXTRAD Finger Pouch Capability</i>	6600 Plus TLD Reader EXTRAD
<sup>90</sup> Sr/ <sup>90</sup> Y Internal Irradiator – 0.5 mCi	21989
x10 Neutral Density Filter Assembly	24584-1
x100 Neutral Density Filter Assembly	24584-2
x1000 Neutral Density Filter Assembly	24584-3
Spare Parts Kit	28633
N <sub>2</sub> Generator	500649

May be covered by one or more of the following patents: 4,727,253; 4,827,131; 4,827,132; 4,835,388; 4,975,589; 5,004,920; 5,065,031; 5,177,363; 5,179,291; 5,500,529 and 5,572,028.

### About Thermo Electron Corporation

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Control segment is dedicated to providing analytical instruments used in a variety of manufacturing processes and in-the-field applications, including those associated with safety and homeland security. Based near Boston, Massachusetts, Thermo has revenues of more than \$2 billion, and employs approximately 10,000 people in 30 countries. For more information, visit [www.thermo.com](http://www.thermo.com).

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### Harshaw TLD Model 6600 Plus Automated TLD Reader



The most technically advanced dosimetry system for whole body, extremity, neutron and environmental monitoring.

All in one Dosimetry Solution. The only system you will ever need.

## Features and Benefits

- **Based on proven worldwide success of the Model 6600**
- **One dosimetry solution, not multiple readers, for:**
  - whole body – betas, photons and neutrons with a single dosimeter
  - extremity
  - environmental
- **Significant labor and cost savings with enhanced dosimetry performance**
- **No requirement for a separate extremity system**
- **Significant time savings with automatic calibration capabilities**
- **Built-in automatic dosimeter calibration capability**
  - Lets you decide when to recalibrate
  - Puts you in control of your system
  - Non-proprietary technology
- **Exceeds IEC, ISO and ANSI performance requirements**
- **Extensive built-in automatic QC tests & high MTBF**
- **Flat Panel display and touchscreen operation**
- **TLD does not have the disadvantages of OSL materials and technologies**

## Dosimeters

TL dosimeter cards are available in varying forms and materials types.

TL material may be either standard or high sensitivity LiF material. The high sensitivity material allows extended monitoring periods of up to 6 months.

LiF has excellent energy response due to being near tissue equivalent, unlike  $Al_2O_3$  or  $CaSO_4$ .

For whole body personnel and environmental monitoring, the sensitive elements are securely fixed to sturdy aluminum cards with a barcode to ensure complete chain of custody.

TLD card holders with energy filters are supplied in gasket-sealed, polarized, tamper-evident forms with attachment to lapel or belt (eg for neutron dosimetry).

Different color stripes are available as an aid to recognize monthly, quarterly or special issue periods.

## Extremity Monitoring System

Featuring hot or cold sterilization, more efficient dosimeter handling and faster processing, the system comprises:

- A new extremity dosimeter using standard LiF:Mg,Ti or new high sensitivity LiF:Mg,Cu,P TLD material
- Permanent individual barcode ID's to ensure 100% chain of custody
- Sealed, disposable finger rings suitable for hot or cold sterilization
- Finger pouches suitable for cold

- sterilization
- Ring sealing and dosimeter extraction tools
- Carrier cards for reading dosimeters in the automatic readers

## WinREMS User Software

The reader is supplied complete with menu-driven software for implementation in the external PC. This includes:

- Main and setup menus
- Automatic calibration procedures for the reader, calibration dosimeters and field dosimeters
- Adjustable time-temperature profiles (TTPs)
- Read dosimeters function
- Use of neutral density filter to extend dose operating range
- Glow curve and temperature profile is available for display and further analysis
- Current integral and dose
- Dosimeter data tracking
- Date and time on each record
- Up to four regions of interest
- High and low dose alarm settings
- Tests for light response and dark current limits
- Reader quality assurance procedures
- Electronics QC
- Maintenance menu
- Compliance with latest ISO standards
- Electronic log book
- Optional analysis software

Optional Windows™ based dose calculation algorithms for personnel, environmental and extremity dosimetry that meet USA and International standards.

## Instrument Performance

### Radiations measured:

- Photons, energies >5 keV
- Neutrons, from thermal to fast
- Betas, energies >70 keV

### Linearity:

- LiF:Mg,Ti; <5%, 10  $\mu$ Gy to 1 Gy
- LiF:Mg,Cu,P; <5%, 1  $\mu$ Gy to 20 Gy

### Repeatability:

- <2% variation based on one standard deviation for 10 repeated dose measurements of 1 mGy (100 mrad) from  $^{137}Cs$

### Dosimeter reusability:

- $\geq$ 500 readouts (50 for extremity) with <10% sensitivity change

### Batch uniformity:

- <30% maximum deviation from the batch mean without application of element correction coefficients

MATERIAL	
LiF:Mg,Ti	LiF:Mg,Cu,P
<b>DOSE RANGES:</b>	
10 $\mu$ Gy – 1 Gy linear within 5%	1 $\mu$ Gy – 20 Gy linear within 5%
1 Gy to 100 Gy supralinear above 1 Gy	20 Gy to 100 Gy sublinear above 20 Gy
<b>FADING:</b> (using total integral)	
<20% in 3 months <5% in 3 months corrected	Negligible < 2% in 6 mo.
Residual TL signal: (%of reading, over the range without annealing)	
~ 0.2%	<1%
<b>RECOMMENDED TIME/TEMP, PROFILES</b>	
Pre-heat: 0 s 50 °C	10 s 165 °C
Acquisition: 13 1/3s 25 °C/s 300 °C	13 1/3s 15 °C/s 260 °C

## Dual PMTs

### Dynamic range:

- seven decades linear - extended high range with optional neutral density filters

### Capacity:

- 200 personnel / environmental or 400 EXTRAD or 800 DXTRAD extremity dosimeters per loading

### Throughput:

- LiF:Mg,Ti standard heating) 4-element dosimeters, 70/hr
- 2-element dosimeters, 120/hr
- EXTRAD dosimeters, 240/hr
- DXTRAD dosimeters, 280/hr

### Card identification:

- Codabar, interlaced 2 of 5, code 39

### Stabilities:

- Based on one standard deviation of 10 consecutive measurements:
  - Dose; better than 1  $\mu$ Gy
  - Ref. Light; short term stability, <0.5%
  - High voltage; short term stability,  $\pm$ 0.005%

### Warm up time:

- <20 minutes

### Dark current:

- <1  $\mu$ Gy  $^{137}Cs$  equivalent dark current

### Reference light:

- $^{14}C$ -activated  $CaF_2:Eu$

### Heating method:

- Linear controlled contactless heating using  $N_2$  gas or dry air

### Utility requirements:

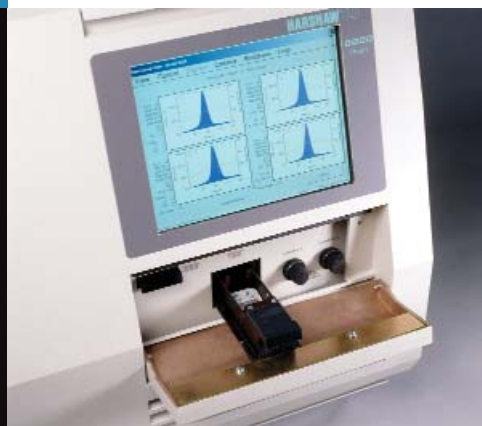
- Electrical supply; 100, 120, 220, 240 volts  $\pm$  10%, 50/60Hz.
- Power consumption, 180 VA
- Dry pre-purified  $N_2$  gas or dry air
- Idle mode 28 l/h (1 scfh)
- Maximum 850 l/h (30 scfh)

### Temperature range:

- Operating, 0°C to 40°C
- Storage, -10°C to 60°C

### Weight:

- 70 kg (154 lb)



The Harshaw TLD Model 6600 Plus is a very versatile medium capacity dosimetry solution. All you will need for your personal and environmental monitoring requirements, with significant built-in labor and cost-saving features.



Leading Dosimetry Services use Harshaw TLD Material.