



# WHY MEASURE PATIENT DOSE?

You can't improve what you don't measure

Patient safety in radiation oncology is the focus of public attention and regulatory scrutiny. Greater complexity of treatments and evolving standards are further raising the bar for radiation safety, and increasing risk to healthcare organizations.

There are many reasons to independently verify planned dose during or prior to the first fraction of radiation treatment as part of a patient quality assurance program, including compliance with professional practice guidelines, risk reduction, and improved safety and quality of care.

Patient-specific dose measurements offer your organization an important tool for early identification and correction of potential errors or deficiencies in the delivery of prescribed dose. LANDAUER®'s OSL technology, featuring nanoDot® medical dosimeters and the microSTARii medical dosimetry system offer a simple, flexible, wireless complement to diodes or mosfets for in vivo<sup>1</sup> dosimetry, and can also be used with a QA phantom to verify machine output.



## microSTARii medical dosimetry system

- Immediate, independent verification of planned dose using nanoDot medical dosimeters
- Improved readout precision and durability with state-of-the-art pulsed OSL technology
- Fast, efficient single dosimeter readout
- Compact, lightweight and portable
- Operates with laptop

### LANDAUER's OSL-Based Dosimeters

The most trusted technology for measuring occupational radiation dose, now customized for medical dosimetry applications



nanoDot®  
Medical  
Dosimeter

<sup>1</sup> In vivo refers to superficial dose.



# microSTARii reader

## A user-friendly, accurate reader nanoDot dosimeters

The microSTARii reader is a mobile reader designed for measuring patient radiation dose with nanoDot dosimeters.

The microSTARii is designed for medical issues like radiation therapy and radiation imaging.

The microSTARii is controlled and monitored with the help of a dial and two LED indicators. The reader is attached by USB cable to an external computer on which management software is installed to control the data registration, the analyses, the configuration and the database management.



microSTARii reader

## > IN SITU DOSE MEASUREMENTS WITH AN EASY-TO-USE READER

### ▪ Compact, lightweight, portable

Our reader can be taken anywhere whenever immediate results are required.

### ▪ Plug-and-operate

microSTARii is used with a laptop. It doesn't require any gas, and plugs directly into an electrical socket.

### ▪ Quick reading

The process requires two steps only :

1. put the detector in the drawer of the microSTARii,
2. display of the dose.



microSTARii with open dial

Dimensions	Height = 103 mm Length = 152 mm width = 206 mm
Weight	2.33 kg
Power supply	110 - 220 V 1.5 A / 50 - 60 Hz
Gas	No
Operating Environment	5 °C to 40 °C < 70 % RH non-condensing
Storage Environment	-20 °C to 60 °C < 90 % RH non-condensing

Connectors	USB
Dosimeters	nanoDot Medical Dosimeters
Accuracy	+/- 5 %
Precision	5 %
Repeatability	≤ 1.0 %
Lower Limit of Detection	≤ 0.05 mSv

## EXPERT TESTIMONY

### RADIATION ONCOLOGY

#### Verify planned dose

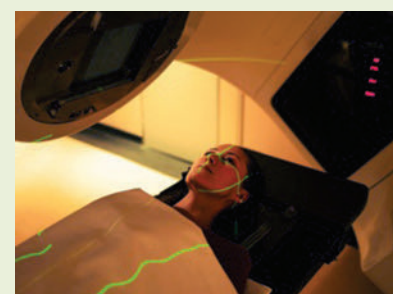
Join leading radiation oncology authorities by choosing LANDAUER's state-of-the-art OSL technology for dose verification.

#### Radiological Physics Center in the United States

For more than 30 years, the Radiological Physics Center (RPC) in partnership with the National Cancer Institute (NCI) has used TLDs for remote audits of photon and electron beam output, and energy verifications for electron beams, monitoring more than 1,700 radiation therapy facilities worldwide and measuring more than 13,000 beams annually. In 2010, after conducting a multi-year clinical evaluation of the technology, the RPC converted to use of OSL dosimeters in over 90 % of its remote audit program.

**" If I could only buy one dose verification system, I would buy OSLD, because OSL can do every measurement that TLD and diodes can do, plus measurements they cannot accurately capture."<sup>1</sup> - Paul A. Jursinic**

Paul A. Jursinic, Ph.D., is renowned among medical physicists for his rigorous focus on QA. Dr. Jursinic investigated a wide range of technologies for efficiency and precision in comparing measured dose with calculated dose output, and concluded that OSLs are a superior substitute for TLDs and diodes for in vivo dosimetric measurements, particularly for surface dose measurements.



<sup>1</sup> Paul A. Jursinic, Ph.D., West Michigan Cancer Center, Kalamazoo, MI 49007. pjursinic@wmcc.org

# nanoDot dosimeters

## A simple, flexible solution for measuring patient radiation dose

LANDAUER's nanoDot OSL-based medical dosimeter is the most effective tool to independently verify the quantity of dose delivered during radiation treatments and provides an inexpensive insurance policy to mitigate risk for your facility.

The nanoDot is a detector which allows you to get an immediate dose measure. It consists of just one 4 mm diameter badge of aluminium oxide powder doped with carbon,  $\text{Al}_2\text{O}_3\cdot\text{C}$ . Each detector is identified on the front by a unique code.

When it is read, the dosimeter must be removed from its sachet and inserted in a holder. Consisting of just one OSL badge, the measure does not allow differentiation between X- and gamma rays, and beta. Unlike the IPLUS dosimeter, you need to know in advance the energy type being measured.



nanoDot

### > ADVANTAGES

- **Know and traceable sensitivity**

Its sensitivity is indicated by a serial number.

- **Minimal angular or energy dependence > 1MeV**

- **Wide operating energy range**

nanoDot is an ideal solution for dose verification in radiation oncology and other point dose measurement applications.

- **Reanalysis capabilities** (non-destructive readout)

- **Can be sterilised**

The nanoDot badge is delivered with sealed packaging to avoid any contamination. This product can be cold sterilised using any sterilisation product which doesn't attack plastic.

- **A wide range of uses**

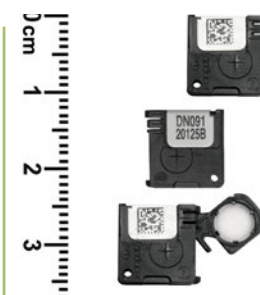
Dosimeter can be placed anywhere on the body is wireless and radiolucent. It can be used for in- and out-of-field measurements, including pacemaker dose.

- **A single point measurement**

Ideal for measuring dose at a point of interest, even in challenging clinical condition.

- **Buildup compatibility**

Dosimeter can be used without buildup to perform surface dose measurements or with buildup to make measurement at depth.\*



nanoDot  
Dot for single point  
measurement



nanoDot  
in plastic pouch

### > TECHNICAL PERFORMANCE

The nanoDot analysis results are based on the adjustment and calibration of the apparatus carefully carried out by you. They are expressed in absorbed dose.

Type of radiation	Measurement range	Minimum value	Maximum value
Photons (X- and gamma rays)	From 15 keV to 25 MeV	0.05 mGy	10 Gy
Beta / Electron beam	> 250 keV	0.05 mGy	10 Gy

Width	10 mm
Height	10 mm
Thickness	2 mm
Pouch	45mmx40mm

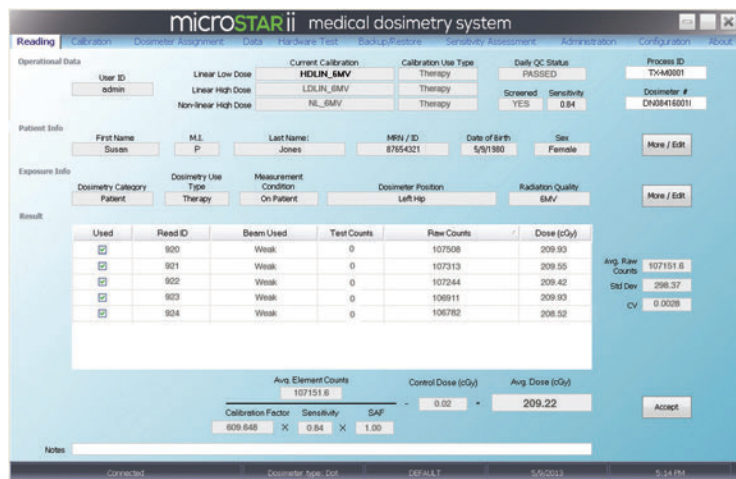
\* The reader calibration must be consistent with the clinical use mode in terms of build-up characteristics.

nanoDot dimensions



# microSTARii medical dosimetry system

## Customized to medical dosimetry applications



**microSTARii medical dosimetry system**

**Reading** | Calibration | Dosimeter Assignment | Data | Hardware Test | Backup/Restore | Sensitivity Assessment | Administration | Configuration | About

**Operational Data**

User ID: admin | Linear Low Dose: HDLIN\_6MV | Calibration Use Type: Therapy | Daily QC Status: PASSED | Process ID: TX440001  
 Linear High Dose: LDHLN\_6MV | Therapy: Screened: YES | Sensitivity: 0.84 | Dosimeter #: DN694160011  
 Non-linear High Dose: NL\_6MV | Therapy: Screened: YES | Sensitivity: 0.84

**Patient Info**

First Name: Susan | M.I.: P | Last Name: Jones | MRN / ID: 87554321 | Date of Birth: 5/9/1980 | Sex: Female | More / Edit

**Exposure Info**

Dosimetry Category: Patient | Dosimetry Use Type: Therapy | Measurement Condition: On Patient | Dosimeter Position: Left hip | Radiation Quality: 6MV | More / Edit

**Result**

Used	Read ID	Beam Used	Test Counts	Raw Counts	Dose (cGy)
<input checked="" type="checkbox"/>	800	Weak	0	107508	209.93
<input checked="" type="checkbox"/>	801	Weak	0	107313	209.55
<input checked="" type="checkbox"/>	802	Weak	0	107244	209.42
<input checked="" type="checkbox"/>	803	Weak	0	106911	209.93
<input checked="" type="checkbox"/>	804	Weak	0	106782	208.52

Avg. Raw Counts: 107151.6  
 Std Dev: 298.37  
 CV: 0.0028

Avg. Element Counts: 107151.6  
 Control Dose (cGy): 0.02  
 Avg. Dose (cGy): 209.22

Calibration Factor: 609.648 X | Sensitivity: 0.84 X | SAF: 1.00

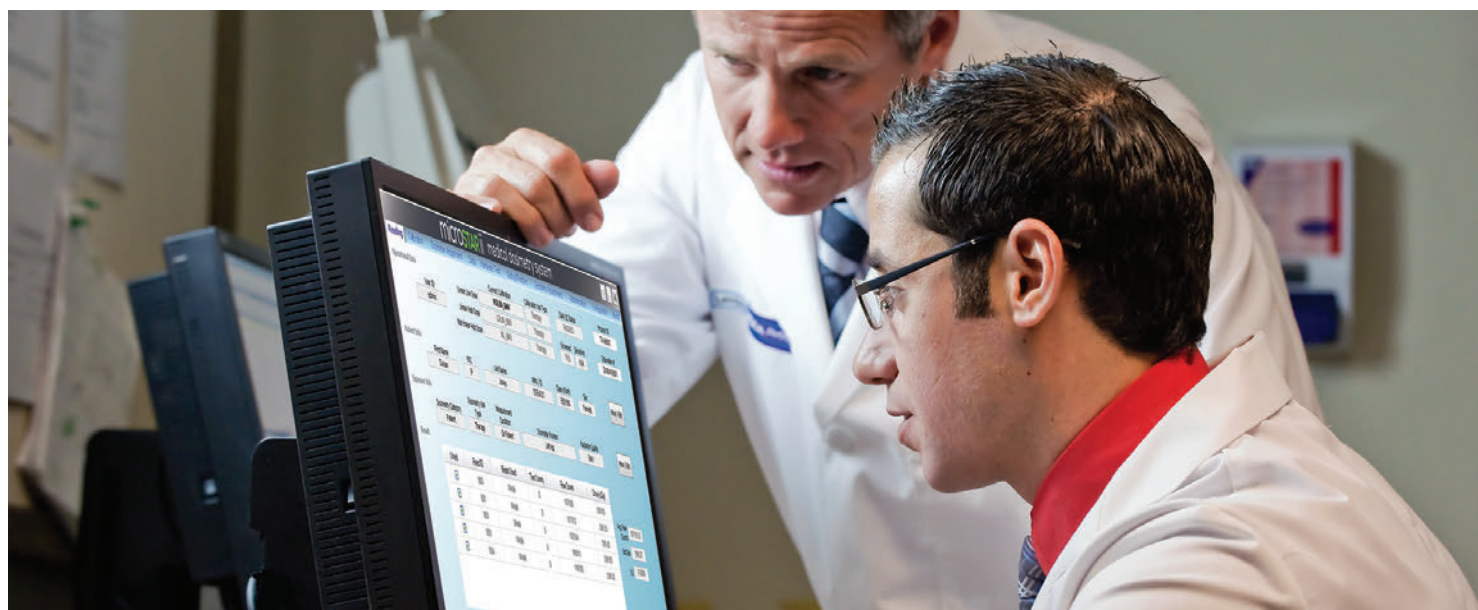
Notes: \_\_\_\_\_

Connected | Dosimeter type: DCF | DEFAULT | 5/9/2013 | 5:14 PM

LANDAUER's software is customized to medical dosimetry applications for streamlined analysis and reporting.

### ADVANTAGES

- **Built-in and automated QC functionality** for efficient implementation of the LANDAUER microSTARii reader Quality Assurance Program
- **Patient-centric workflow**, with additional fields for patient and exposure information
- **Automated re-reading capability** for improved accuracy and efficiency



The microSTAR® dosimetry reader is classified as a radiologic quality assurance instrument, and should not be used to adjust the radiation dose delivered to a patient.