

# QA & Dosimetry Solutions

Solutions that are reliable, accurate and easy to use.

---



**SUN NUCLEAR**  
corporation

# Industry Leading QA & Dosimetry

The right technology for the right application

**S**un Nuclear was founded in 1984 by an experienced team of radiation measurement scientists and engineers. Their objective was simple: to provide the community with a fresh approach to radiation measurement by improving the measurement quality while also streamlining the process. From the very beginning Sun Nuclear has provided the medical physics community with innovative and unique solutions that save valuable time and more importantly improve the integrity of the measurement. Sun Nuclear provided the first modular patient dosimetry system, the first routine QA device with a standard PC trending database, the first film-less 2D array, and the first programmable patient-specific gating and target motion QA solution. We believe that while others talk about innovation, we truly deliver it.

Sun Nuclear takes its role as an independent quality assurance company in the medical industry very seriously. We recognize the importance of both accuracy and precision when selecting detectors for our products. We believe quality assurance programs should be designed to enable error discovery, not hide it. This is why we only utilize small diode detectors in our patient plan verification systems. Sun Nuclear strives to select the right detector for the right application, and we utilize both ion chambers and diode detectors to achieve the best possible measurement. Our Daily QA 3 uses both ion chambers and diode detectors to accomplish five different tests simultaneously, with one radiation exposure.

Our reputation for quality and service resides in our ultimate goal - to exceed the expectations of our customers. With this goal, we are proud to be building 'Your Most Valuable QA & Dosimetry Tools' for radiotherapy treatment facilities worldwide.



Sophisticated treatments such as IGRT, IMRT and SRS demand an equally sophisticated QA regimen. Such treatments are collections of small beamlets with very steep dose gradients. Because these dose gradients are meant to tightly conform to patient anatomy and tumor volume, accurate verification of the dose gradients is critical. Physicists responsible for QA must understand that ionization chambers hide systemic errors that are traceable to the planning system, especially if beam model data was collected with an ionization chamber. The diode technology used by Sun Nuclear avoids the dose volume averaging problems seen with ion chambers to give a true point measurement and accurate verification of delivered dose gradients.

### MapCHECK™

---

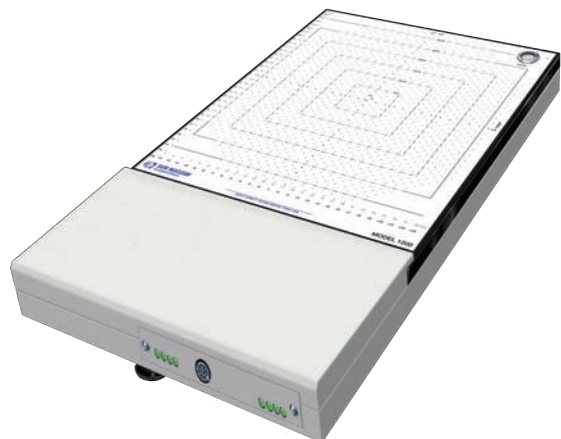
With more than five years of clinical use, the MapCHECK is the worldwide leader in filmless IMRT QA. It is preferred due to the small size of its diode detectors ( $0.000019\text{cm}^3$ ), higher sensitivity (10 times higher than ion chamber arrays) and its superior detector stability. The MapCHECK software has been developed to provide efficient and complete analysis tools such as DICOM structure import, MLC QA, and Beam QA, significantly reducing QA time.



### MapCHECK 2™

---

Building on the success of the original MapCHECK, the MapCHECK 2 offers 1536 diode detectors within a field size of 32x26cm. With uniform 7mm detector spacing across the entire array, the MapCHECK 2 has the highest detector density and the largest field size of any available 2D array and can provide real-time updates every 50ms.



## The Complete Solution



### MotionSim XY/4D™

The MotionSim mimics patient specific respiratory traces for accurate and realistic gating QA and target motion QA. MotionSim interfaces with reflectors or belts, and imports actual PTV motion to visualize the impact of the gated or 3D delivery to the moving target.

### MapPHAN™

MapPHAN is a water equivalent phantom that holds MapCHECK at isocenter for rotational dosimetry. Available at 5, 10, and 15cm planar depths, the MapPHAN supports both sagittal and coronal measurements.



### EPIDose™

EPIDose is an upgrade option for all MapCHECK systems. EPIDose is a completely independent method of converting any EPID image to dose for analysis in our MapCHECK software.

### MapCALC™

MapCALC is an independent 2D dose and MU calculation solution that operates directly in the MapCHECK software.\*

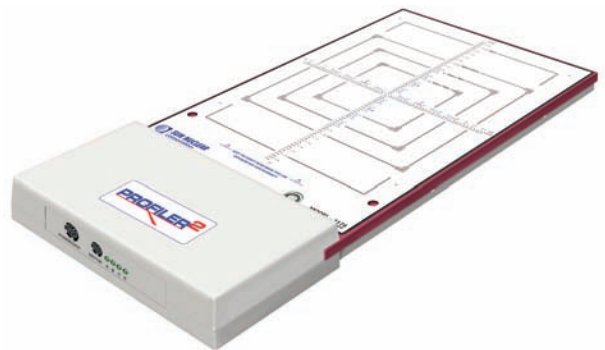


\*Does not require MapCHECK

**P**ROFILER's are essential time saving tools for machine QA applications. Whereas a water tank may take hours to setup for machine QA checks, PROFILER instruments set up in just minutes. PROFILER solutions eliminate the need for water tanks or film for weekly, monthly and most annual QA requirements. Measuring the full field in real-time with pulse synchronization, PROFILER 2 and IC PROFILER make it possible to identify time dependent beam anomalies that a single scanning chamber would miss.

## PROFILER 2™

The PROFILER 2 offers 139 diode detectors with a 33cm Y-axis and a 22cm X-axis and detector space of 4mm. PROFILER 2 is a real-time instrument making it an ideal tool for beam steering and diagnostics. The Isocentric Mounting Fixture (IMF) enables measurements at any gantry angle to steady gravity induced effects.



\*expected availability March 2009

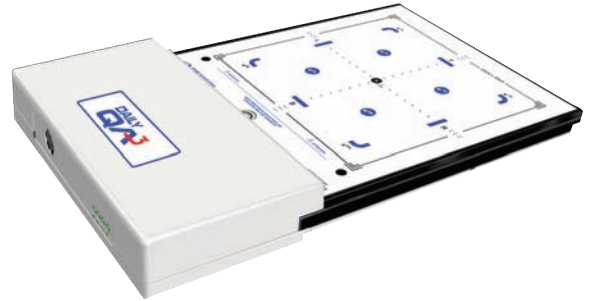
## IC PROFILER™

The IC PROFILER is designed for applications that do not require the pinpoint precision of diode detectors. For use in lieu of a water tank, the 32x32cm field with a diagonal length of 45cm, is the perfect instrument for intensive LINAC beam characterization, performance investigation, and benchmark studies. The narrow chamber design is only 2.9mm wide and minimizes dose volume averaging. 3D scans can be imported for comparison and an optional collapsible water tank (CWT)\* provides TMR/PDD data.

Daily QA solutions should offer accurate and efficient routine QA options. Each Sun Nuclear daily QA solution is designed with both the physicist and the therapist in mind to ensure the demands of both are met.

### Daily QA 3™

The Daily QA 3 utilizes 13 ion chambers and 12 diode detectors to simultaneously check output, flatness, symmetry, field size and energy, without the need to add buildup. Results are stored in an advanced database (ATLAS) for real-time trending. A true real-time wireless option is also available.



### ATLAS™ QA

ATLAS is a comprehensive and easy to use software solution designed to organize the task of QA and dosimetry for a radiation therapy facility or group of facilities. ATLAS is both a front end interface for routine data collection as well as a back end analysis engine for reporting and analysis.

### CHECKMATE 2™

CHECKMATE 2 offers fast and simple output checks for LINACs and Cobalt machines. CHECKMATE 2 uses a single vented ion chamber and automatically applies temperature and pressure corrections using built in sensors. Measured values appear on a large display for easy viewing.



IVD™ systems offer easy to use, accurate and real-time measurement of radiation dose to a patient during treatment. Our solutions offer operation with or without PC software, and the ability to expand up to 52 channels for TBI. The wireless rf-IVD 2 transmits dose data in real-time and eliminates cables lying across the treatment room floor.

### IVD 2™ & rf-IVD 2™

IVD 2 (wired) and the rf-IVD 2 (wireless) are recognized as the leader in diode based in-vivo dosimetry. Dose delivery is in real-time and automatic temperature corrections may be applied. Both a Control Module with a START/STOP operation and PC software are included with each system. Software features include a patient database, the ability to store and automatically apply correction factors, and an interface with R&V systems.



### ISORAD™ & QED™ Detectors

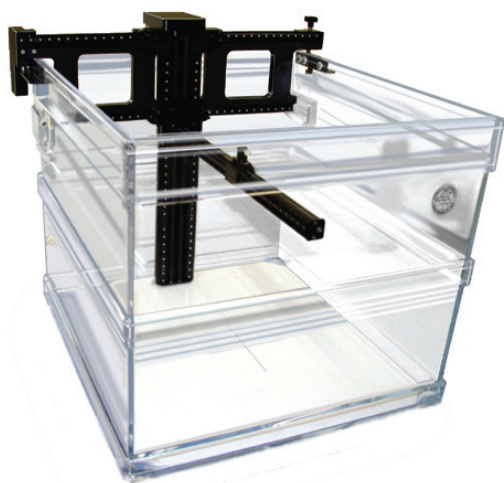
ISORAD and QED diode detectors are preferred for their superior stability, low dose rate dependence, and excellent reproducibility. Both models offer three energy ranges for photons (1-4MV, 6-12MV, 15-25MV) and the QED also offers an electron detector and a skin (scatter) detector. The ISORAD detector is the only commercially available cylindrical diode detector and offers near zero angular dependence.

MRT, IGRT, SRS and SBRT modalities all rely on small beams to contour dose to the target and avoid critical structures. In order for these modalities to be effective, they require accurate beam modeling using a small dosimeter that does not distort the beam penumbra and flatness – an effect which is common with scanning ionization chambers.

### EDGE Detector™

---

EDGE Detector is an ultra small diode detector (0.8 x 0.8mm) for beam scanning in high gradient and stereotactic fields. Compared to scanning ionization chambers, the EDGE gives approximately 80 times more signal even though it is over 5 times smaller in area. EDGE offers the same accuracy as ion chambers for PDD curves, but the EDGE delivers flatter profiles, sharper penumbra, and the REAL beam picture for treatment planning systems.



### 3D SCANNER™

---

3D SCANNER is a water phantom that is easily assembled for unique, fast and accurate measurement of therapeutic radiation beams. The scanning system is modular and consists of three high quality aluminum arms that can be setup in less than 10 minutes.

## TomoDose™

TomoDose was developed specifically for helical Tomotherapy machines and uses diode detectors for high precision beam measurements, a concept proven with the PROFILER and the MapCHECK. The advantage of the TomoDose is the unique detector geometry, consisting of a 50cm array with nine opposing arrays designed to easily fit into the TomoTherapy Hi-Art machine.



## MapCHECK™ & MapPHAN™

MapPHAN is a water equivalent phantom that holds MapCHECK at isocenter for rotational dosimetry. MapPHAN with MapCHECK has been successfully tested for RapidArc, TomoTherapy, and VMAT, and offers an accurate and convenient rotational dosimetry solution. Coronal and sagittal measurements are supported, and any new or existing MapCHECK user may upgrade to MapPHAN.

MapCHECK shown with the MapPHAN phantom for Rotational Dosimetry



The MapCHECK & MapPHAN in the sagittal orientation.



## SRS PROFILER™

SRS PROFILER™ is an advanced beam QA tool for stereotactic radiosurgery fields measuring output, flatness, symmetry, and field size with a single exposure. SRS PROFILER uses 125 detectors in a star-shaped array with detector spacing of just 4mm. For CyberKnife machines, the SRS PROFILER can be attached to the “birdcage” which firmly positions the instrument at 80cm SDD. Whereas film or water tanks are considerably time consuming for routine or beam measurements, SRS PROFILER sets up in minutes.



“Your Most Valuable QA & Dosimetry Tools”



argentina australia austria bahrain belgium brazil  
canada chile china colombia czech republic  
denmark egypt finland france germany greece  
iceland india iraq ireland israel italy japan jordan  
korea kuwait malaysia mexico netherlands new  
zealand norway oman philippines poland portugal  
qatar russia saudi arabia singapore south africa  
spain sweden switzerland taiwan thailand turkey  
united arab emirates united kingdom united states



Your Most Valuable QA & Dosimetry Tools



Sun Nuclear Corporation  
Corporate Headquarters  
425A Pineda Court  
Melbourne, Florida 32940

tel: +1 321 259-6862  
fax: +1 321 259-7979  
web: [www.sunnuclear.com](http://www.sunnuclear.com)