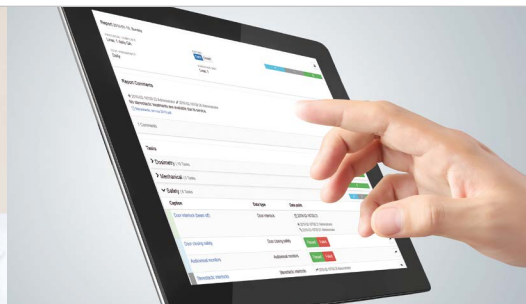
Product Highlights 2023

PTW THE DOSIMETRY COMPANY



ptwdosimetry.com

"The entrepreneurial spirit, engineering excellence and strong commitment to quality through constant innovation of the early days are part of our culture and still guide our company to this very day."
Dr. Christian Pychlau

Announcement: New Management Team since February 1, 2023

Dr. Christian Pychlau passes the leadership baton to Bernd Allgaier

Dr. Christian Pychlau, third-generation Managing Partner of PTW, who had co-led the family-owned dosimetry company since 1996, retired effective January 31, 2023. During his tenure, PTW grew from a small business to a major global player in the dosimetry market.

As of February 1, 2023, the new management team consists of Dr. Tobias Schüle, who has been leading PTW jointly with Dr. Pychlau since 2017, and Bernd Allgaier, who has been serving the company since 2000, last as Director Product Management.

VERIQA® - The Modular Software Platform

For comprehensive Patient QA

Treatment plan visualization
VERIQA module RT View

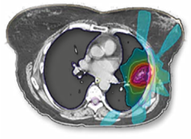
Treatment plan evaluation
VERIQA module RT Evaluate

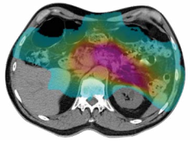
Pre-treatment verification
VERIQA module
RT MonteCarlo 3D

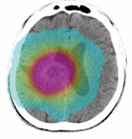
Pre-treatment and in vivo
verification VERIQA module
RT EPID 3D

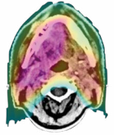
Your advantages

- One platform: From visualization and evaluation to verification and reporting- all in one modular platform, built on future-proof, client-server architecture
- Take your workflow efficiency to a next level and automate your processes
- Track and analyze your results with the automated integration of Track-it
- Clinically proven, independent 3D dose verification tools and calculation algorithms for reliable results, regardless of treatment complexity









	LUNG SBRT	Pancreas	Brain	Head and Neck
	3D / 7 beams 6 MV FFF	VMAT / 2 arcs / 180 CP[1] 6 MV - SIB[2]	VMAT / 1arc / 90 CP[1] 6 MV FFF	VMAT / 2arc / 180 CP[1] 6 MV - SIB[2]
PTV volume	46.45 cm³	589.26 cm³	264.48 cm³	907.74 cm³
Dose grid size	3 x 3 x 3 mm	3 x 3 x 3 mm	2 x 2 x 2 mm	2 x 2 x 2 mm
MC accuracy	1 %	1 %	0.5 %	0.5 %
Calculation time	12 sec	30 sec	46 sec	246 sec

Calculated on a dual 12-core Intel Xeon Silver 4214 2.2 GHz server with hyperthreading (48 logical cores).

VERIQA® RT MonteCarlo 3D

3D dose calculation with SciMoCa. Accurate. Fast. Automated.

“Secondary dose calculation systems should be completely independent from primary TPS. Accurate matching between the secondary dose calculational systems and the dosimetric characteristics of the linac is thereby essential for truly independent and valuable dose evaluation.”

Professor Sotiri Stathakis, Ph.D.
University of Texas Health Science Center, San Antonio

Your advantages

- Monte Carlo simulations are the most accurate method for dose calculation in radiotherapy treatment planning. With its ability to simulate the physics of photons and charged particles interacting with matter, Monte Carlo can accurately compute the dose under almost any circumstances
- VERIQA RT MonteCarlo 3D comes pre-installed on a powerful server, allowing for high-speed dose computations. Calculation results are available in less than 2 minutes
- Due to its specific beam modelling process, which is based on water phantom measurements, VERIQA RT MonteCarlo 3D performs truly independent dose calculations for a reliable secondary plan check

Automated pre-treatment and in vivo 3D EPID dosimetry
Provides you with one fully automated solution for both pre-treatment and in vivo patient dosimetry. It reduces your workload significantly and it enables true 3D patient dosimetry.

VERIQA® RT EPID 3D

True EPID dosimetry. Pre-treatment. In vivo. Fully automated.

“The VERIQA module RT EPID 3D is like a Swiss army knife: it delivers a fast patient QA solution and provides your radiotherapy treatment chain with an extra safety net.”

Dr. Anton Mans
Medical Physicist, Radiation Oncology
Department of The Netherlands Cancer Institute - Antoni van Leeuwenhoek Hospital (NKI-AVL), Amsterdam

Work in progress

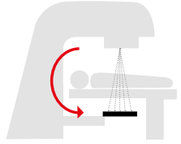
Your advantages

- Detect clinically relevant errors during pre-treatment and in vivo verification and quantitatively assess their dosimetric impact
- True 3D patient dosimetry: For both pre-treatment and in vivo dosimetry, reconstructed dose can be directly compared to the treatment planning dose in 3D and with dose-volume histograms (DVHs)
- Phantomless, efficient and fully automated
- Clinically proven back-projection algorithm: Successfully used at The Netherlands Cancer Institute - Antoni van Leeuwenhoek Hospital (NKI-AVL) for more than 75,000 patient treatments since 2005

Advanced 3D back-projection approach

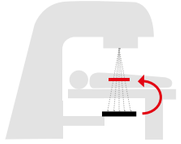
* For simplicity, the comparison of forward-projection and back-projection approach is explained using the example of in vivo EPID dosimetry. However, the same concept holds true for EPID-based pre-treatment dosimetry.

Forward approach*
Current standard of commercial products



Treatment plan is used to predict EPID images. Measured EPID images are compared against predicted EPID images.

Back-projection approach*
Used in VERIQA RT EPID 3D



EPID measured dose is back-projected into patient. Dose is reconstructed in patient anatomy and compared against planned dose.

Comparison level	EPID	Patient
Reference	Predicted EPID image/dose distribution	TPS
Visualization	2D only	3D
Comparison metrics	2D Gamma	3D Gamma, GVH, DVH
True composite (TC) as recommended by AAPM TG-218	✗	✓

Advanced 3D Back-Projection Approach

Based on the well-established algorithm of the NKI-AVL

“The EPID dose back-projection algorithm of VERIQA RT EPID 3D will offer a double benefit. It will verify treatment delivery by using in vivo EPID measurements as well as increase efficiency in pre-treatment verification by using EPID images acquired “in air”, thus eliminating the need for phantom positioning and re-planning.”

Igor Olaciregui
Software & Physics Lead, The Netherlands Cancer Institute - Antoni van Leeuwenhoek Hospital (NKI-AVL), Amsterdam

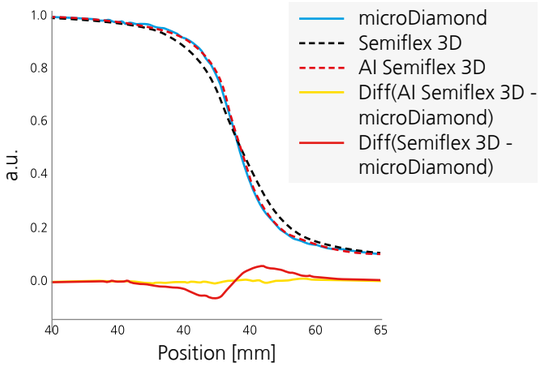
Unlike most EPID dosimetry solutions using the so-called “forward approach”, VERIQA RT EPID 3D enables a **true 3D dose verification** from the acquired EPID images by accurately reconstructing the dose **in** the patient anatomy. This enables **direct comparison with the planned patient dose** and the use of clinically relevant comparison metrics, such as patient dose-volume histograms (**DVHs**) for all treatment sites including those with significant tissue heterogeneities.

BEAMSCAN is the first water phantom which uses **artificial intelligence (AI)** to improve scan quality and significantly speed up profile and PDD measurements at the same time.

ptwbeamscan.com

BEAMSCAN® Software 4.5

Introducing artificial intelligence (AI) in dosimetry



Compensation of the volume effect

Your advantages

Artificial Intelligence advantages

- Deconvolution: Compensation of the Semiflex3D volume effect for profile measurements (for all energies, all linacs)
- Denoising: Denoise microDiamond profiles and PDDs
- (for all energies, all linacs)
- Improves scan quality
- Saves measurement time

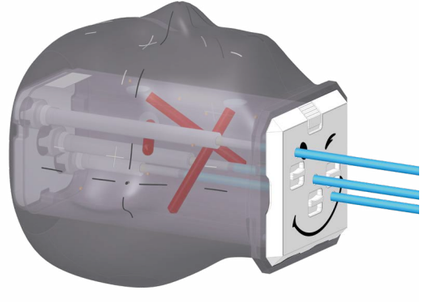
Additional advanced features:

- Automatic evaporation control
- Online data analysis
- Scan time predictor
- Ready-to-use task lists
- Small-field dosimetry features

As flexible as your needs.
The new modular phantom platform for high-precision radiotherapy and SRS/SBRT QA.

RUBY® - The Modular QA Phantom

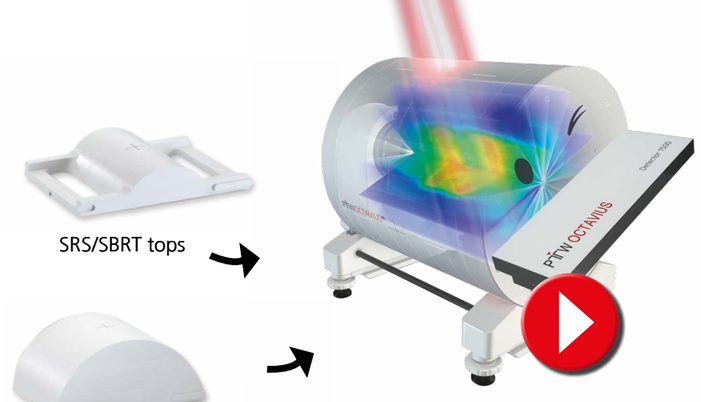
One Phantom. Multiple Inserts. System QA. Linac QA. Patient QA.



The new insert for multiple metastases applications

Your advantages

- Perform integrated tests of the entire treatment chain with one basic phantom by adding and expanding QA capabilities as and when you need them
- Technologically advanced, new modular phantom platform with powerful, ready-to-use application-specific inserts
- Comprehensive end-to-end testing of the entire SRS/SBRT treatment process with one single insert
- Measurement-based patient-specific plan verification, including non-coplanar treatments, with film and different detector types
- CT markers in phantom and all inserts for enhanced visibility

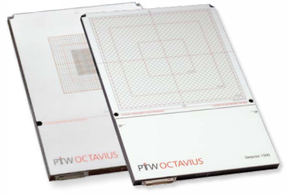


SRS/SBRT tops

Standard phantom top

Top for Machine QA

TPS independent 3D dose

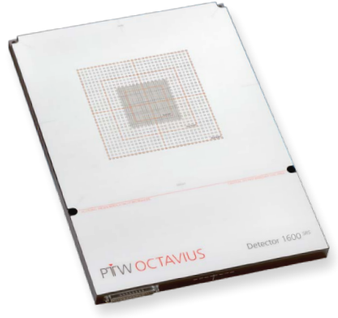


Detector modularity
Different detectors covering a full range of applications: from simple treatment plans to complex stereotactic procedures.

ptwoctavius.com

OCTAVIUS 4D

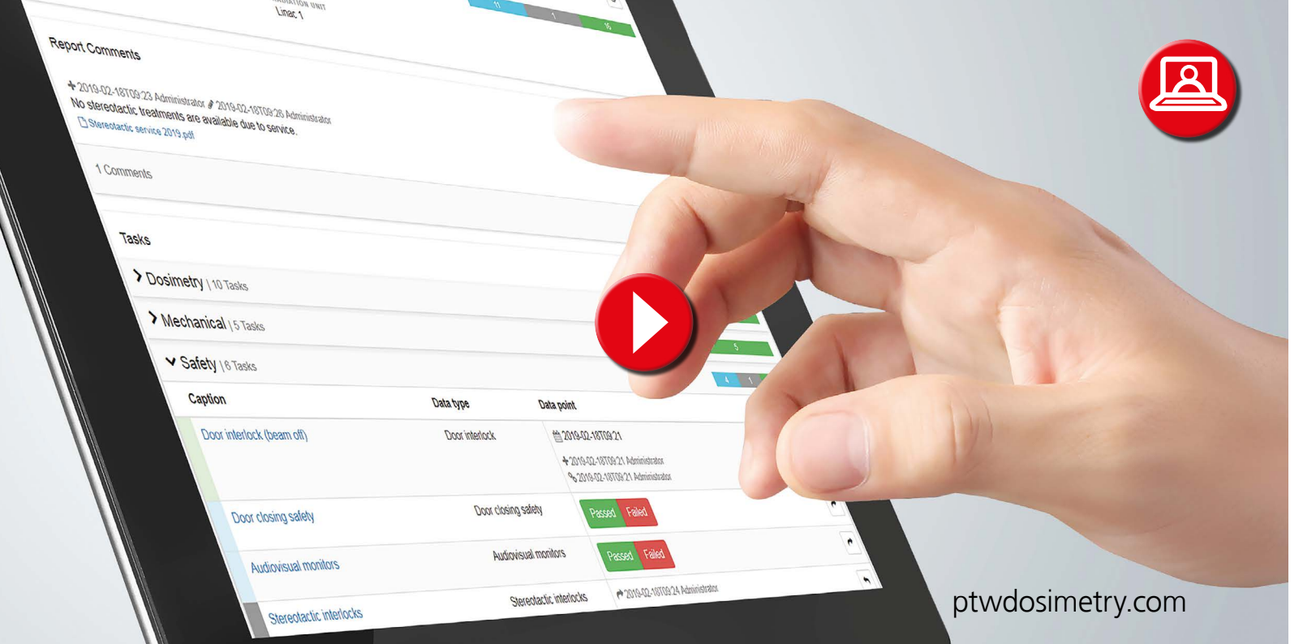
One phantom - modular solutions for 4D patient and machine QA



New high-resolution detector for multiple metastases applications: OCTAVIUS Detector 1600 SRS.
Also available for **MR linacs** and **particle therapy**.

Your advantages

- Time-dependent and angular-dependent dose measurement
- Synchronous phantom rotation with the linac gantry
- Detector array always perpendicular to the beam - no angular dependence
- The only 4D dose verification system that measures dose in the entire phantom volume
- Verification of treatments including non-coplanar beams, off-axis target volumes, large fields and treatment plans with multiple energies



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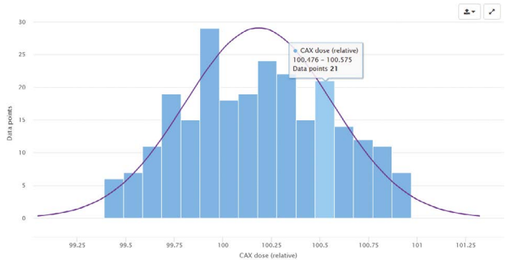
Track-it QA Data Management Software

New version 3.0 including statistical evaluation with box plots and histograms



See how Marienhospital Düsseldorf uses Track-it to optimize their QA procedures.

Your advantages

- Efficiently manage all QA data on a single platform
- Web-based application using desktop or mobile devices
- User-defined protocol templates to customize the application to the specific needs of your QA workflows
- Online or offline QA report generation, e.g. in vaults without wireless network
- Compliance with DIN 6847-5/-6, 6875-4 and TG-142 through predefined templates
- Traceability - recording of all main steps in the workflows, such as data entry, modification and linking to reports
- Trend analysis over time and across your treatment devices with versatile display options

NEW: COUCHFIX

Accurate positioning of PTW QA equipment on your treatment couch

Your advantages

- Fast, reproducible setup on treatment couch every time you use it
- Compatible with all major PTW QA systems:
  - RUBY
  - OCTAVIUS
  - OCTAVIUS 4D
  - QUICKCHECK webline
- One click setup – install and click in place

NEW: flashDiamond

Outstanding characteristics of a diamond detector - optimized for FLASH

To be used for research purposes only.

Your advantages

- Synthetic single crystal diamond detector optimized for ultra-high dose rates at pulsed beams
- microDiamond accuracy:
  - Minimal dose-rate and dose-per-pulse dependence
  - Excellent spatial resolution
  - Small deviation of absorbed dose to water even in the smallest field sizes
- Combine your flashDiamond with flashAdapter for optimal compatibility with PTW electrometers

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