

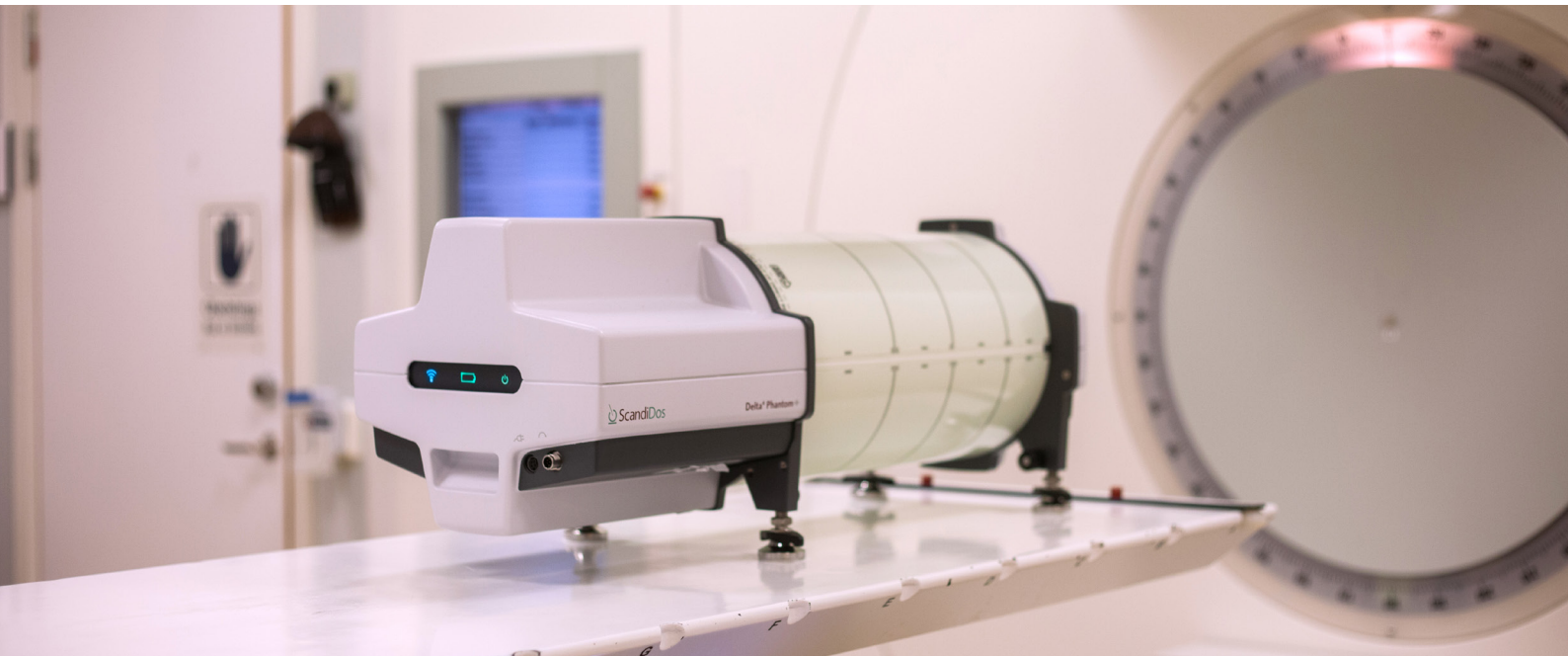
# Delta<sup>4</sup> Phantom+ Plastic Water<sup>®</sup>



**Delta<sup>4</sup>**  
by ScandiDos

Confidence | Safety | Accuracy | Efficiency

The Delta<sup>4</sup> Phantom+ is available with Plastic Water<sup>®</sup> DT material. The material has been chosen because of its capability to simulate water within a wide energy range <sup>[5]</sup>. For clinics who base all dosimetry on water and want to stay consistent, the Delta<sup>4</sup> Phantom Plastic Water version is the system of choice <sup>[6]</sup>



### *Water equivalence in diagnostic and therapeutic energies*

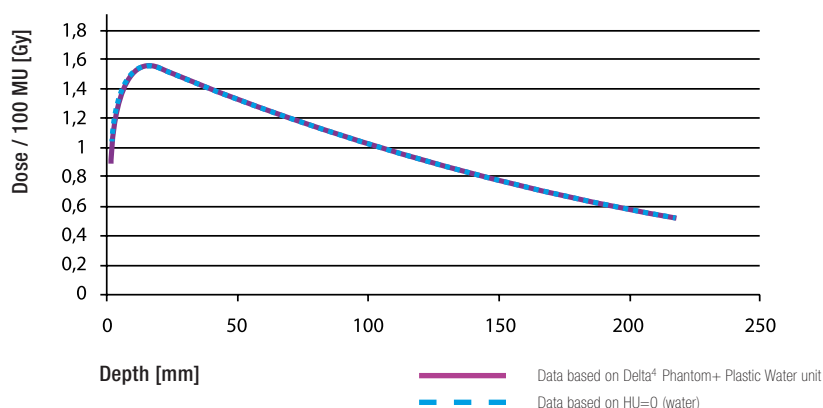
Pre-treatment verification using phantoms with non-water equivalent material is widely used in clinical practice. However, some dose calculation algorithms require extra attention when using these materials. Special consideration must be taken into account regarding:

- Density scaling artifacts <sup>[1]</sup>
- Non-appropriate scatter from material with density >1g/cm<sup>3</sup> [2,3]
- Absence of phantom material as a separate entry in the HU-electron density conversion table <sup>[4]</sup>

These factors may contribute to reduced accuracy in the dose determination in the phantom. Using a water equivalent phantom material eliminates these uncertainties and also provides consistency maintained in QA from calibration to patient QA.



### *Highest accuracy in dose determination*



### Reference

- <sup>1</sup> Dickof P. Density scaling artifact in dosimetry calculations. Journal of Applied Clinical Medical Physics, vol 6, No. 3, summer 2005
- <sup>2</sup> Bedford J L, Hansen V N, Lee Y K, Warrington A P. Accurate verification of IMRT and VMAT in PMMA diode array phantom. Radiotherapy Oncology Vol 96 Suppl 1 (ESTR 2010), 1321 poster 447
- <sup>3</sup> Bedford J L, Childs P J, Hansen V N, Mosleh-Shirazi M A, Verhaegen F, Warrington A P. Commissioning and quality assurance of the Pinnacle3 radiotherapy treatment planning system for external beam photons. The British Journal of Radiology 76 (2003), 163-176
- <sup>4</sup> Appendix "Validation of Oncentra Photon Dose using PMMA Phantoms". D192.739ENG-04 Oncentra MasterPlan – Physics and Algorithms
- <sup>5</sup> Heaton R et al. Dosimetric Evaluation of Plastic Water-Diagnostic Therapy. Poster PO-T-97, AAPM (2003)
- <sup>6</sup> D Matzen T, Isacsson U, Medin J. Plastic Water as phantom material during pre-treatment verification. Radiotherapy and Oncol, 99 no 1 (suppl.) (2011) p. 5-5.

# Delta<sup>4</sup> Phantom+ Plastic Water®

## Technical Specifications:

### Cylinder Phantom

Material	Plastic Water® DT
Diameter	22 cm
Length	40 cm
Total Length	71 cm
Total Weight	27 kg
Ion chamber insert in cylinder	Inserts for common cylindrical ion chambers available

### Detectors

Type	p-Si
Total number	1069
Layout	Distributed on coronal and sagittal plane
Max field size	20 x 38 cm <sup>2</sup> (when merging two consecutive measurements, otherwise 20 x 20 cm <sup>2</sup> )
Distance between detectors	
Central area (6 x 6 cm <sup>2</sup> )	5 mm (or 2.5mm in longitudinal direction when merging two consecutive measurements)
Outer area	10 mm
Size (radial x axial)	1 x 0.05 mm <sup>3</sup> = 0,00004cm <sup>3</sup>
Detector stability (6MV beam)	Better than 0.1 % per kGv, typically 0.04%/kGv

### Compatibility

Modalities	Photon beams, with and without flattening filter
Treatment Plan import	Any treatment planning system that can export DICOM RT Plan, RT Dose and RT Struct

### Wireless Communication

Wireless data communication protocol	Wi-Fi 802.11n
Battery operation capacity	>4 hours Rechargeable Li-ion battery - Power supply for charging included

Technical specifications are subject to change without notice

PlasticWater® is a registered trademark of Computerized Imaging Reference Systems, Inc. (C.I.R.S.) Inc.

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by ScandiDos

*Innovative and Efficient QA*  
[www.delta4family.com](http://www.delta4family.com)

## The ScandiDos mission

The Delta<sup>4</sup> family of products are developed, engineered and manufactured by ScandiDos, a company that strives to improve the treatment of patients with cancer worldwide. ScandiDos achieves this by reinforcing the confidence in radiotherapy clinics using innovative solutions that further individualize the radiation treatment, making the process safe and efficient. The Delta<sup>4</sup> Family of products delivers a comprehensive solution for radiation therapy and quality assurance, ensuring safe and accurate treatment. Today, we support our customers worldwide with offices and partners in Europe, USA and Asia, continuing our mission of **empowering professionals with power and performance.**

**ScandiDos AB, a worldwide leader in quality assurance solutions and dosimetry for radiation therapy.**

For more information about the Delta<sup>4</sup> family of products, please visit [www.delta4family.com](http://www.delta4family.com)

For more information about ScandiDos, please visit our corporate website at [www.scandidos.com](http://www.scandidos.com)

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