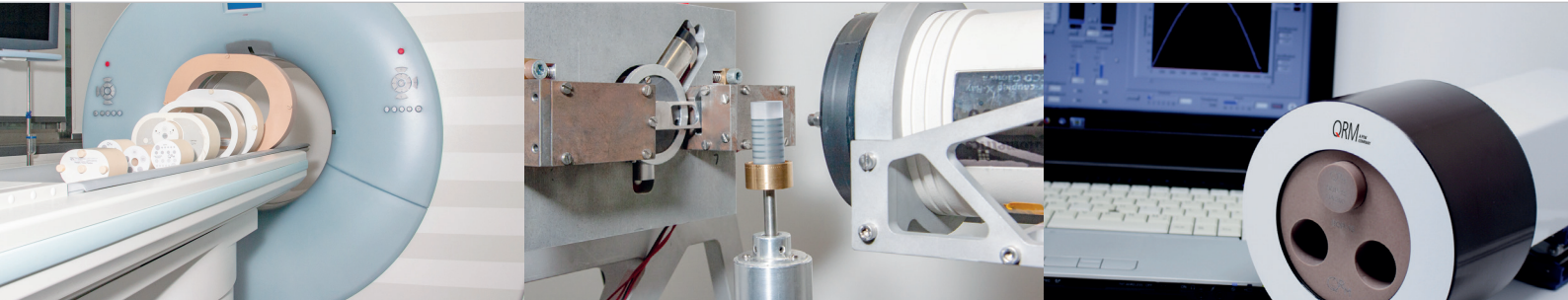


QRM Product Highlights

QRM A PTW
COMPANY



Phantoms for your needs.



QRM
A PFW
Company
Thorax

qrm.de

QRM - A PTW Company

A milestone in the history of both companies



- ▶ In 1922, PTW started being a pioneer in medical radiation measurements. Since then, PTW has always been and will continue to be at the forefront of advancing patient safety through innovation and cutting-edge measurement technology.
- ▶ In 1994, QRM (Quality Assurance in Radiology and Medicine) was founded by Professor Willi A. Kalender as a university spin-off of the Institute of Medical Physics in Erlangen, Germany, for the development, design, construction, and production of phantoms for quality assurance in X-ray imaging and associated procedures.
- ▶ Since April 2020 QRM is a subsidiary of PTW-Freiburg.

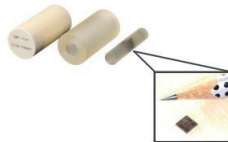
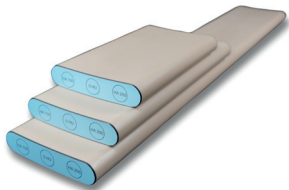


Image Quality

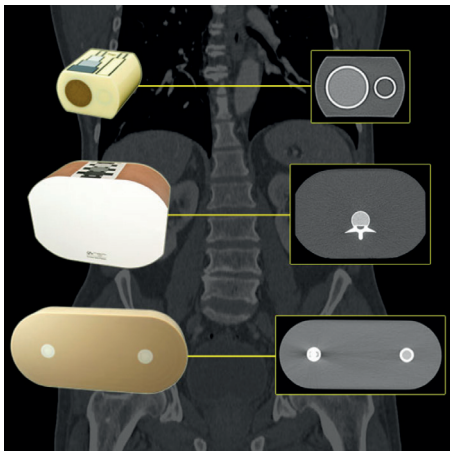
Bone Densitometry

Micro-CT

Customized solutions

Phantoms for your needs.

Powerful expertise in quality assurance



- ▶ Dedicated phantom solutions for diagnostic radiology, radiotherapy, bone densitometry (DXA and qCT), Micro-CT / Micro-PET for small animal research, Cone-Beam CT and many other applications
- ▶ Tissue-equivalent materials (TEM) mimic human tissues according to ICRU Reports 44 and 46
- ▶ Unique solutions: Micro-CT Bar Pattern Phantom
- ▶ Customized solutions according to your specification



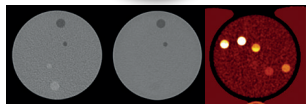
Image Quality Phantoms

Convenient testing of all relevant imaging parameters

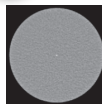


Cone-Beam Phantom

- ▶ Complete solution for the imaging performance of computed tomography (CT), and Cone-Beam CT
- ▶ Suitable to evaluate image quality parameters
 - CT value uniformity
 - CT value accuracy
 - Image noise
 - Contrast-to-noise ratio (CNR)
 - Spatial resolution (ESF, MTF, wedges)
 - Spatial resolution (visual, line pattern)
 - Geometric accuracy in-plane
 - Low-contrast capabilities



Dual Energy Phantom



Wire MTF Phantom



Cardio Calcium Scoring Phantom

Application	Dual-energy performance test	To assess in-plane spatial resolution of any X-ray imaging in 3D direction	To investigate the influence of scan parameters on the detectability of calcifications
Inserts	Several inserts with different CaHA and iodine concentrations	50 micron tungsten wire	9 inserts with different CaHA concentrations and sizes
Diameter	100 mm	60 mm (standard) 100 mm (with D100)	100 mm (insert size)
Base material	Water-equivalent	Resin or air	Tissue-equivalent (resin)

Image Quality Phantoms

Convenient testing of imaging parameters



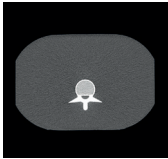
Spectral CT Phantom

- ▶ Test different types of computed tomography (CT) scanners with dual-energy, multi-energy or photon-counting protocols and post-processing techniques in terms of accuracy and consistency
- ▶ Different solid rods: Iodine, calcium, water and soft tissue-equivalent materials such as adipose, muscle, liver and lung
- ▶ Available with different tissue-equivalent inserts



Bone Densitometry Phantoms

Evaluation of the bone mineral density by DXA and qCT



European Spine Phantom

- ▶ To evaluate bone mineral density
- ▶ For cross-calibration of CT and DXA
- ▶ For DXA (dual-energy x-ray absorptiometry) and qCT (quantitative computed tomography)
- ▶ Three vertebrae (L1/L2/L3) with different dimensions and bone mineral content

Bone Density Calibration Phantom

- ▶ HU vs. CaHA calibration with respect to bone mineral density evaluation of bones
- ▶ Several options with different lengths and HA inserts
- ▶ Easy to use as placed directly under an object



Micro-CT Phantoms

Evaluate a wide range of image quality parameters



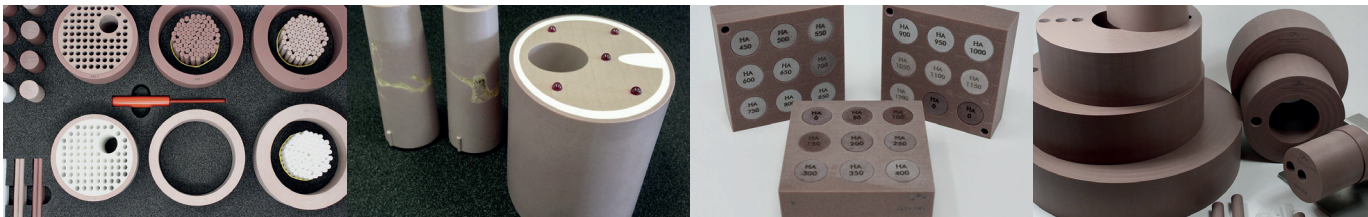
Micro-CT HA Phantom

- ▶ Worldwide standard for measuring small animal Micro-CT bone mineral density
- ▶ 5 different inserts with various CaHA densities (0, 50, 200, 800, and 1200 mg HA/cm³)
- ▶ Available diameters 4.5/10/20/25/32 mm

Micro-CT Bar Pattern Nano Phantom

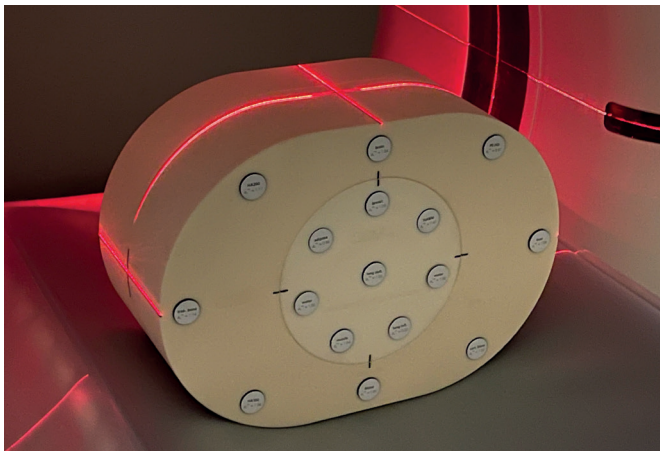
- ▶ For the evaluation of in-plane and axial high spatial resolution down to 1 micron
- ▶ Center and corner sections providing several bars and point patterns between 1-10 micron
- ▶ Chip with 2 actinomorphous stars

Customized phantoms for your needs.



Radiation Therapy Solutions

Comprehensive solution for electron density calibration and material differentiation



Comprehensive Electron Density Phantom

- ▶ To create electron density calibration curve of computed tomography (CT) scanners for treatment planning systems (TPS)
- ▶ Suitable for electron, photon, and proton therapy systems
- ▶ Multi-energy CT and photon-counting applications beyond your expectations
- ▶ Available materials: 8 body and 8 head inserts
- ▶ Tissue equivalent materials: Muscle, adipose, liver, blood, brain, bone, cortical bone, lung, breast, polyethylene
- ▶ Optional titanium, stainless steel, or aluminum inserts
- ▶ Calibration certificate with densities, electron density and effective Z



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