

ConeBeam Phantom (EXPERT)

The QRM-ConeBeam-Phantom is the most suitable tool to evaluate the imaging performance of computed-tomography (CT), cone-beam and flat-panel CT scanners.

The QRM-ConeBeam Phantom was designed to cover the whole range of image quality achievable with this type of imaging equipment.

The phantom offers the possibility to assess image quality metrics in accordance with national and international standards (e.g. DIN IEC 61223-3-5 or DIN IEC 61223-2-6). The following image quality metrics can be obtained:

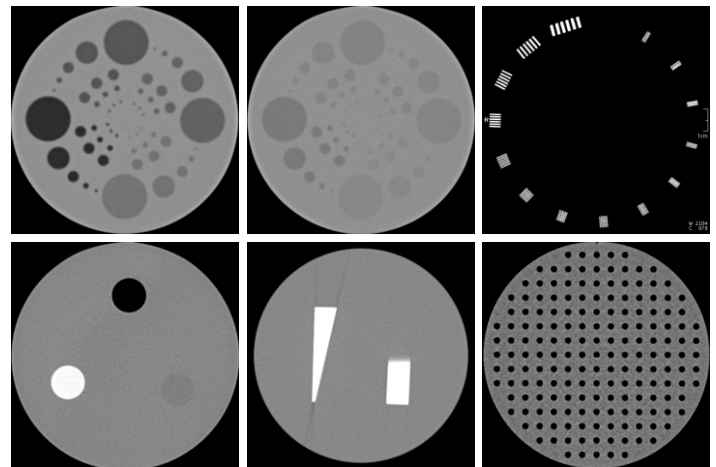
- CT value uniformity
- CT value accuracy
- image noise
- contrast-to-noise ratio
- spatial resolution (ESF, MTF, wedges)
- spatial resolution (visual, bar pattern)
- geometric accuracy in-plane
- low-contrast capabilities

The ConeBeam Phantom is essential to fully quantify the imaging performance of volumetric X-ray scanners and to compare different systems or technical solutions.

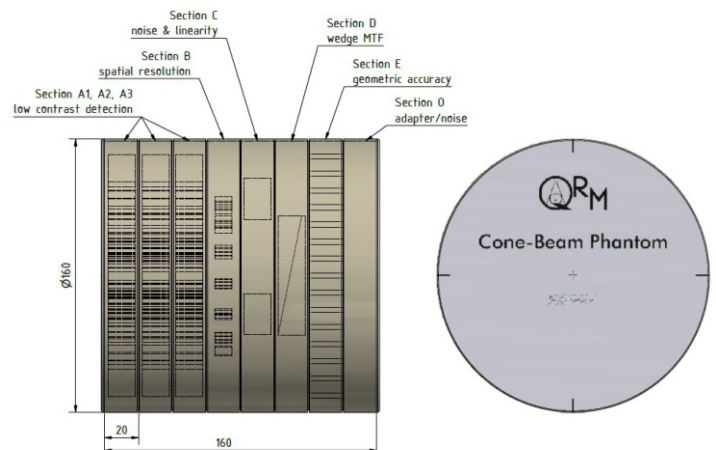
In addition to the overall image quality of cone-beam scanners, the associated dose should be measured using CT dosimetry phantoms. The CT Dose Index (CTDI) methodology can be applied to all types of cone-beam scanners.



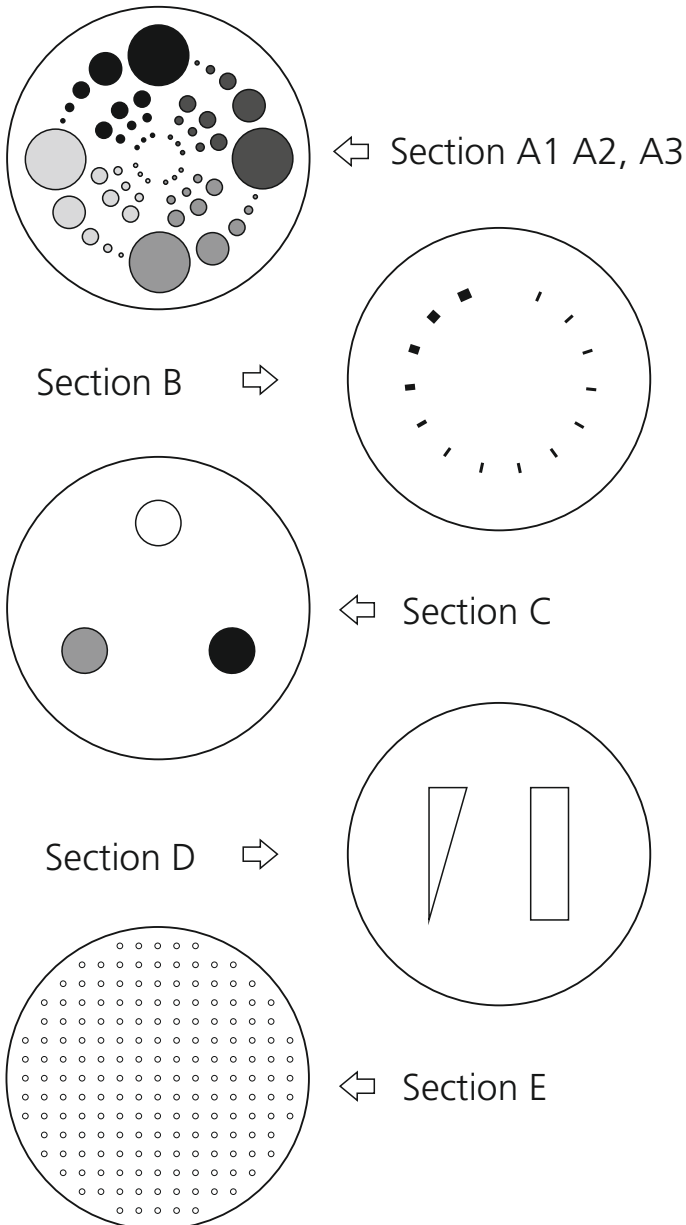
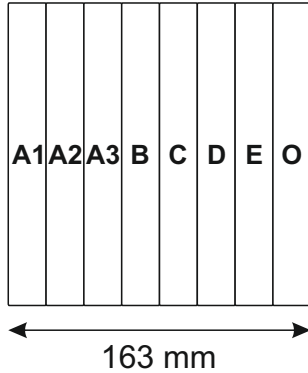
The QRM-ConeBeam-Phantom



Axial CT-images of the different sections of the ConeBeam phantom



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Specifications

Overall dimensions:

Diameter (xy): 160 mm

Height (z): 163 mm

Section height: 20 mm

Phantom body: tissue equivalent (at 120 kV)

The phantom body comprises 8 sections:

Section A1, A2, A3 - Contrast resolution

Sect. A1: contrast steps -60, -90, -120, -200 HU

Sect. A2: contrast steps -20, -25, -30, -45 HU

Sect. A3: contrast steps -3, -5, -10, -15 HU

Inserts diameter in steps of 2, 4, 8, 16 and 32 mm respectively.

Section B - Spatial resolution

14 circular aligned line patterns varying from 4 to 30 lp / cm

Section C - Scaling & noise

3 inserts (D = 24 mm) providing bone equivalent material (400 mg CaHA / ccm), water equivalent (CTWater[®]) and air.

Section D - MTF edges

Two PTFE wedges perpendicularly aligned for evaluating the MTF in different orientations.

Section E - Geometric distortion

Hole grid, consisting of 177 holes (D=3mm) to measure the geometric distortion in the image

Section O - Plain

Measure noise and homogeneity, optional space for custom-made adapter for individual mounting

References: [1] Gupta R, Grasruck M, Suess C, et al.

Ultra-high resolution flat-panel volume CT: fundamental principles, design architecture, and system characterization. Eur Radiol. 2006;16:1191–205.