

AAPM CT Performance Phantom

Meets guidelines in AAPM Report #1 "Performance Evaluation and Quality Assurance of CT Scanners"

The CIRS Model 610 AAPM CT Performance Phantom offers the user a single test object that measures ten distinct CT performance parameters. The phantom design is based on the guidelines presented in Report #1 of the American Association of Physicists in Medicine Task Force on CT Scanner Phantoms. The goals of report #1 were to "(1) define 'performance' of a CT scanner and (2) describe methods of performance testing through utilization of particular phantoms."

A CT number linearity insert, high contrast resolution insert and slice width insert are housed in an 8.5" diameter PMMA water tank with quick disconnect valves for ease of filling and draining between use. Also included is a 0.25" bone equivalent ring that can be fit over the inserts to evaluate the effects of beam hardening.

A contrast test object is adhered to the bottom of the tank that includes two rows of cavities from 1 to 0.125" diameter. The cavities can be filled with various solutions for contrast evaluation. An aluminum alignment insert is incorporated in the lid of the



Model 610

Shown with optional low contrast insert.
(Model 610-05)

tank and can be interchanged with a polystyrene TLD insert for dose measurements.

A user's manual, holding cradle, filling tubes and other accessories are included.

Optional items:

Low contrast test object insert external whole-body resolution / noise ring or a foam lined carry case.

Measurement Capability

- Noise
- Sensitivity / Detectability
- Mechanical Alignment
- Beam Hardening
- Slice Thickness
- Size Independence
- Radiation Dose
- Spatial Uniformity
- HU Linearity
- Spatial Resolution and line spread function

Model 610 Specifications:

OVERALL DIMENSIONS

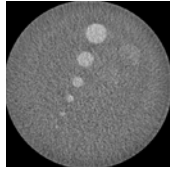
8.5 "OD x 15.5" L

EMPTY WEIGHT

17.25 lb

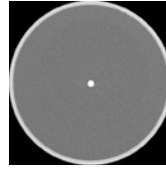
PHANTOM HOUSING:

PMMA cast tubing 8.5" OD, 8" ID
x 12.75" L with removable lid.



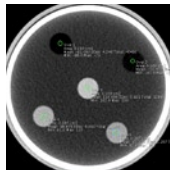
PART NO. 610-01-02 CONTRAST TEST OBJECT

(This option is only available with the purchase of a phantom body)
8.5" OD x 2.5" L solid acrylic equivalent disk block with 12 fillable cavities 2.25" deep. Two of each cavity with diameters: 1, 0.75, 0.50, 0.375, 0.25, and 0.125 inches, spaced twice their diameter apart from a centerline. Cavities can be easily filled from the outside with dextrose or sodium chloride solutions of various concentration.



PART NO. 610-01-05 ALIGNMENT PIN

0.25" Ø x 3" L aluminum pin with threaded attachment to housing cover plate.



PART NO. 610-02 CT NUMBER LINEARITY INSERT

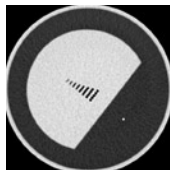
7.5" OD x 2.5" L includes 1" Ø. Rods of polyethylene, PMMA (acrylic), polycarbonate, polystyrene and nylon. Density values (g/cc) : polyethylene - 0.95, polystyrene - 1.05, nylon - 1.1, acrylic, - 1.19, polycarbonate, - 1.20.

PART NO. 610-05 BONE RING

7.65" ID x 0.2" wall thickness x 2.8" long cortical bone ring. Fits over linearity, resolution and slice thickness insert to harden the beam.

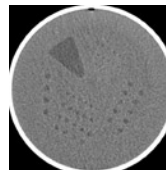
PART NO. 610-08 OPTIONAL - TLD INSERT

0.5" Ø x 3.5" L PMMA rod drilled 3 inch deep to accept TLD's. Can be swapped with Alignment pin in housing cover without removing the cover.



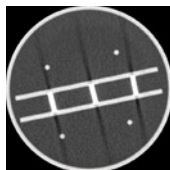
PART NO. 610-03 RESOLUTION INSERT

7.5" OD x 2.5" L with acrylic equivalent test object with eight sets of air thru holes (five holes per set) : Diameter of holes is 1.75, 1.5, 1.25, 1.00, 0.75, 0.61, 0.50, and 0.40 mm. Distance between each hole equal to hole diameter. Each row is 5mm apart. Insert also contains a 0.009" stainless steel wire positioned longitudinally for calculation of line-spread function.



PART NO. 610-06 OPTIONAL - LOW CONTRAST INSERT

8" OD x 1.18" L proprietary epoxy with CT density 6-10 HU above water. The test object contains a series of water-filled holes from 2.5 to 7.5 mm in Ø, in 0.5 mm steps. For each target size, the center-to-center distance between holes is twice the hole diameter.

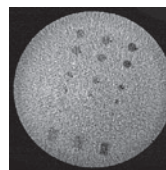


PART NO. 610-04 SLICE THICKNESS INSERT

7.5" OD x 3.5" L Contains three 0.025 x 1.00" aluminum strips angled at 45°, positioned on center and aligned vertically.

PART NO. 610-07 OPTIONAL - WHOLE BODY RESOLUTION AND NOISE RING

12" OD x 8.5" ID x 2.5" L Fits over phantom housing and contains the same test object as the Resolution Insert, at two locations 90° apart.



PART NO. 610-09 OPTIONAL - LOW CONTRAST INSERT - SPHERICAL TARGETS

8" OD x 1.18" L liver equivalent background. The test object contains spheres 5, 10 & 20 CTU below background and 3 reference plugs for each material used as spheres.