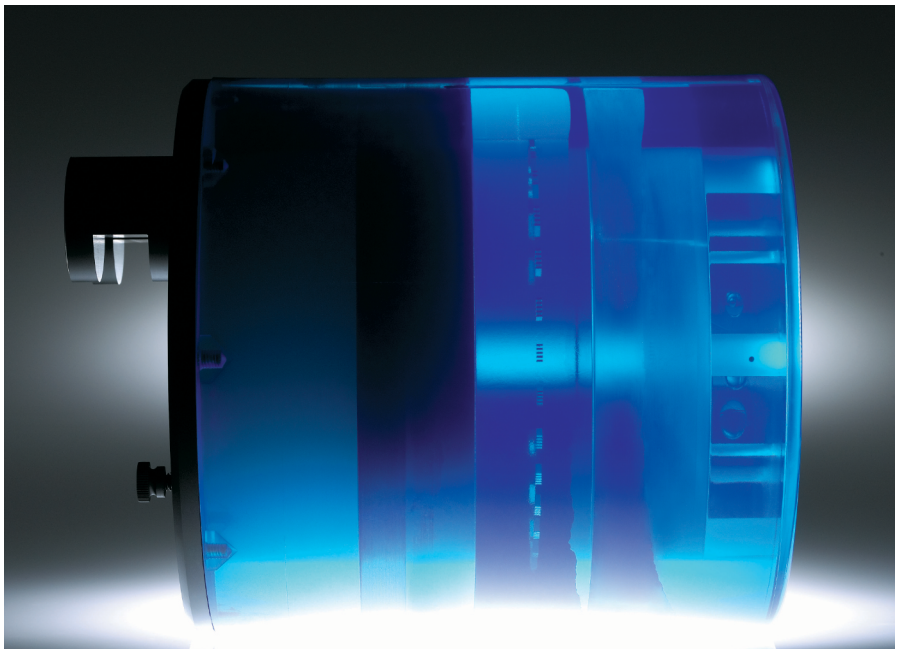
PART NUMBER
CTP600



Catphan® 600 CT Phantom

The sixth generation Catphan® 600 is designed to precisely measure imaging performance of multi-slice spiral and axial CT scanners. The Catphan® 600 design is based on extensive scientific research by David Goodenough, Ph.D. and CT phantom development by Phantom Laboratory. This versatile phantom can be used for measurements ranging from detailed acceptance testing to daily QA. This phantom is also a valuable tool when working to optimize imaging protocols.

The Catphan® 600's patented designs include many exclusive features that reduce measurement errors and enable easy setup for scanning. This design is also ideal for automated image quality evaluations. An integrated case mount allows the phantom to be positioned in the scanner supported off the end of the table, eliminating table artifacts. The case is also equipped with a level to aid in positioning. The Catphan® Phantom's universal mount allows for fast and easy positioning, which makes it ideal for daily quality assurance programs on any scanner.

The Catphan® 600 includes the following test modules:

CTP763: Slice width, pixel size and sensitometry (Teflon, Delrin Acrylic, Polystyrene, Water, LDPE, PMP, Air)

CTP591: Slice geometry and point source bead

CTP764: High resolution

CTP515: Low contrast with supra-slice and subslice contrast targets

CTP486: Image uniformity

Smári Image Analysis Service

The Catphan® 600 comes with two years of Smári, a powerful web-based image analysis service created by Phantom Laboratory. Smári delivers automated phantom image analysis and maintains measurements in a cloud based database for trend analysis, machine comparisons, and historical records.

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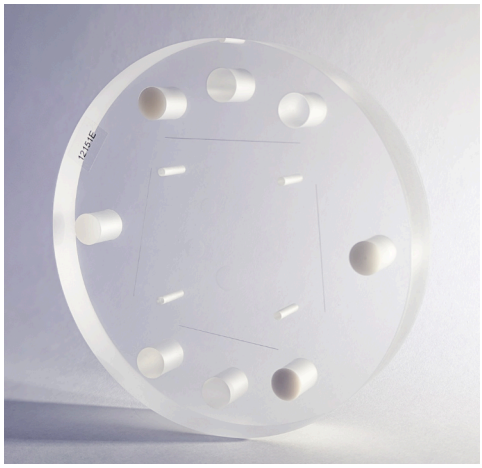
Smári features advanced automation. The user simply scans the complete phantom and uploads the image set. Smári will identify the images, run the tests, and provide a detailed report.

Summary of Catphan® 600 Phantom Tests

- scan slice geometry (slice width and slice sensitivity profile)
- high resolution (1 to 21 line pairs per cm)
- phantom position verification
- patient alignment system check
- low contrast sensitivity
- comparative subslice and supra-slice low contrast sensitivity
- spatial uniformity
- scan incrementation
- noise (precision) of CT systems
- circular symmetry
- sensitometry (linearity)
- pixel (matrix) size
- point spread function and modulation transfer function (MTF) for the x, y, and z axes



CTP763

Slice Geometry and Sensitometry Module

Diameter: 15 cm; Thickness: 25 mm

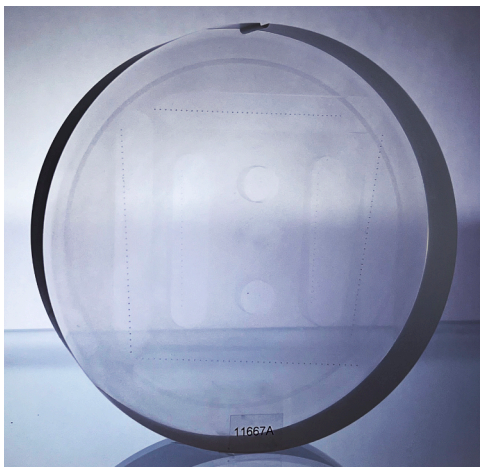
- scan slice geometry (slice width)
- circular symmetry
- phantom position verification
- sensitometry (CT number linearity)
- patient alignment system check
- pixel (matrix) size
- scan incrementation

For slice thickness measurements, two pairs of wire ramps opposed at 23°, instead of the 45° angle commonly used in phantoms, are used to produce a ramp image 2.4 times longer than normal. This greatly reduces the effects of imprecise image length measurements. Additionally, thin wire ramps reduce the over-range streaking artifacts found in more commonly used thicker ramps, particularly in thin slice geometry (1 mm or 2 mm slice widths). The two opposing pairs of ramps allow operators to easily verify whether the phantom is correctly aligned with the scanner axis. Gantry angles up to 10° can be verified by measuring the ratio between opposed ramps. The ramps can also be used to measure scanner table incrementation and alignment light accuracy.

The module includes sensitometry samples Teflon, Delrin, Acrylic, Polystyrene, LDPE, PMP, Air and a small vial for water.

Four test cylinders spaced 50mm apart are used to calculate pixel size by counting the number of pixels between the cylinders in the x and y directions.

The CTP763 module contains five acrylic spheres with diameters 2, 4, 6, 8, and 10 mm to evaluate the scanner's ability to identify spherical contrast objects.



CTP591

Bead Geometry Module

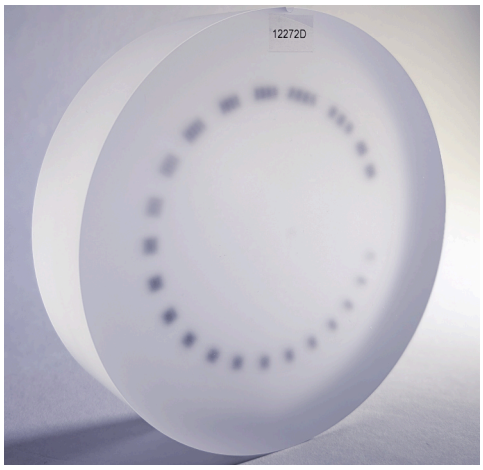
Diameter: 15 cm; Thickness: 40 mm

- slice width for thin slices
- slice width for thick slices
- MTF and SSP using 0.18 mm and 0.28 mm diameter point sources
- test on multiple slices in a multi-slice sequence

The CTP591 Bead Geometry Module contains both coarse bead ramps, with 1 mm z-axis increments, and precision ramps, with 0.25 mm z-axis increments. To maintain a strong signal with an appropriate diameter, the coarse ramps use 0.28 mm diameter tungsten carbide beads. The precision ramps use 0.18 mm tungsten carbide beads. The use of beads enables quick assessment and comparison of slice thickness in a multi-slice sequence, verifying consistency across the detector area.

The bead ramps are positioned in opposed pairs to eliminate errors caused by non-perpendicular alignment. There are 2 pairs of coarse ramps and 1 pair of precision ramps. The coarse ramps each contain 39 beads, traversing all but the last millimeter of the 40 mm module. The precision 0.25 mm ramps each contain 25 beads covering a 6 mm range.

For detailed MTF and SSP calculations, one 0.28 mm and one 0.18 mm diameter bead are located in the midplane of the module. In addition to the beads for thin slice, high resolution measurements, a 50 µm diameter tungsten MTF wire runs through the full 40 mm thickness of the module.



CTP764

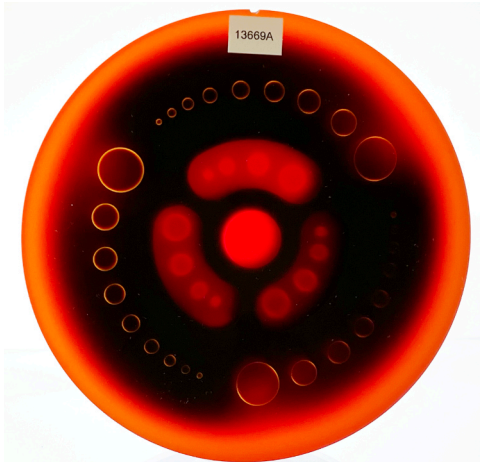
High Resolution Module

Diameter: 15 cm; Thickness: 40 mm

- scan slice geometry (slice width and slice sensitivity profile)
- high resolution (1 to 21 line pairs per cm)
- point spread function and modulation transfer function (MTF) for the x, y, and z axes

The unique design of the CTP764 minimizes visual artifacts by reducing the amount of high contrast material. The 2 mm thick aluminum contrast figures are cast into position on the radial gauge, which has resolution sections ranging from 1 to 21 line pairs per cm. This radial design pattern eliminates the possibility of streaking artifacts from other test objects.

The CTP764 module has two 0.28 mm diameter spherical tungsten carbide beads for MTF measurements, providing an alternative for MTF wires that are aligned poorly with the z axis. The point source beads also eliminate over-ranging problems and streaking artifacts that occur with some MTF wires by volume averaging the bead density with the surrounding material.



CTP515

Low Contrast Module

Diameter: 15 cm; Thickness: 40 mm

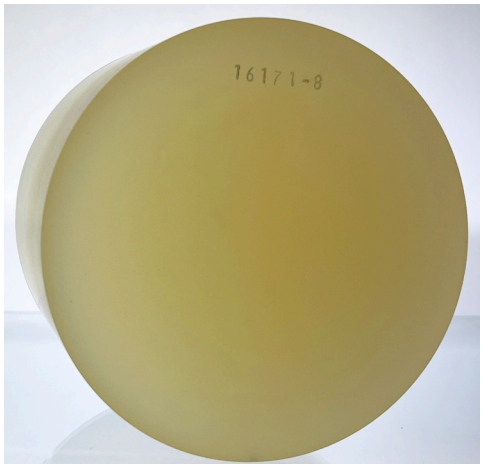
- low contrast sensitivity
- comparative subslice and supra-slice low contrast sensitivity

The CTP515 consists of a series of cylindrical rods of various diameters across three contrast levels to measure low contrast performance. The 40 mm long rods provide consistent contrast values at all z-axis positions, thereby avoiding any volume-averaging errors as you scan through the section. The low contrast rods and the background material have equivalent effective atomic numbers; only the density is varied to produce changes in the effective attenuation coefficients.

The 40 mm low contrast supra-slice contrast rod sets have three contrast levels: 0.3%, 0.5% and 1.0%. Across each contrast level the rod sets have graduated diameters of 2, 3, 4, 5, 6, 7, 8, 9, and 15 mm.

Unique subslice low contrast targets (truncated cylinders) have been included in this module for evaluation of the effectiveness of different scan protocols in resolving subslice low contrast

objects. Scanning the subslice targets with different reconstruction algorithms and settings such as slice width and pitch provides valuable information that may assist with the selection of optimal protocols for identifying small low contrast objects such as tumors. Subslice targets have a nominal 1.0% contrast and z-axis lengths of 3, 5, and 7 mm. For each of these lengths, there are targets with diameters of 3, 5, 7, and 9 mm.



CTP486

Uniformity Module
Diameter: 15 cm; Thickness: > 40 mm

- spacial uniformity
- noise (precision) of CT systems

The CTP486 does not leak and is not damaged by exposure to freezing temperatures because it does not use water. While water is generally considered the standard calibration material, many physicists prefer using our solid CTP486 image uniformity module because it provides consistent results. This module eliminates variations due to different water sources and is more convenient to use than modules using water-filled tanks. The CTP486 module is cast from a material that has a CT number within 2% (0-20 H) of water. This solid material's high radial and axial uniformity makes it an ideal substitute for water. It has been thoroughly tested over a wide variety of protocols in the x, y and z planes and has proven stable in all applications.

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