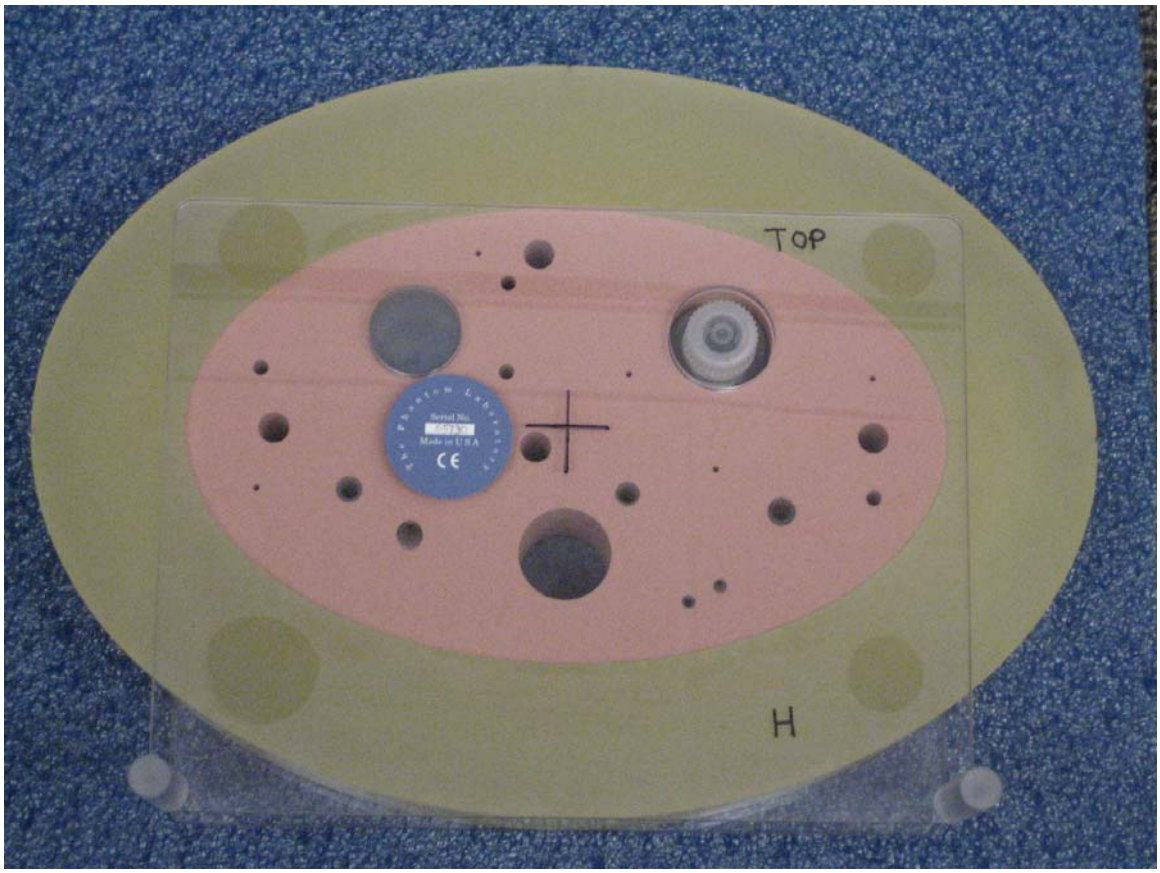
Scanning Procedure for the COPDGene Lung Phantom*



*** CTP674 L u n g P h a n t o m™**

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Phantom Description

1. COPDGene Lung Phantom

a. The COPDGene Lung Phantom is designed for performing comparative measurements between CT scanners. This phantom is not intended to replace current methods of comprehensive quality assurance testing. It is intended to offer additional density and geometrical information in monitoring CT scanners used in clinical “quantitative based” lung studies.

b. Each site must maintain its normal Standard Operating Procedures for regular calibration and maintenance on your CT scanner.

c. The COPDGene Lung Phantom consists of an outer ring (Catphan® Uniformity Material Ring) which simulates tissue attenuation and a central oval insert which simulates lung attenuation.

Schematic Drawing

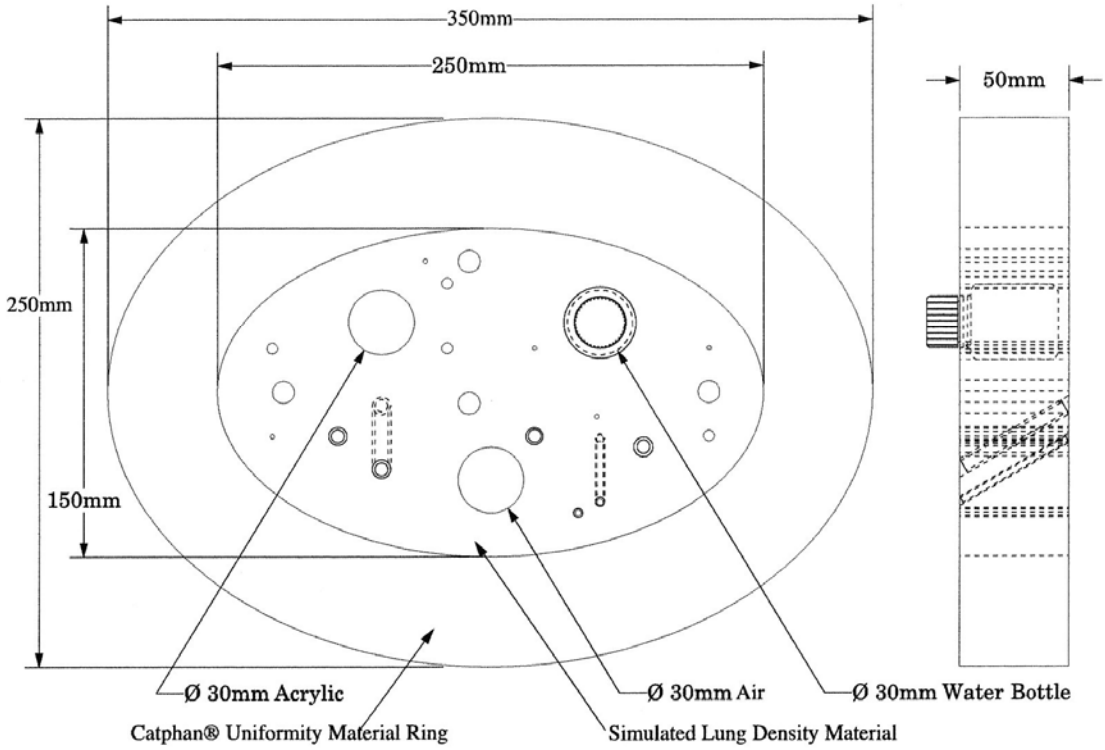

Figure 1

d. Due to a slight variation in between the thickness of the lung insert (pink foam) and the ring, the smooth side of the ring should be flush with the lung material.

e. The blue line on the outer ring is to assist alignment of the phantom with the CT scanner's alignment lights.

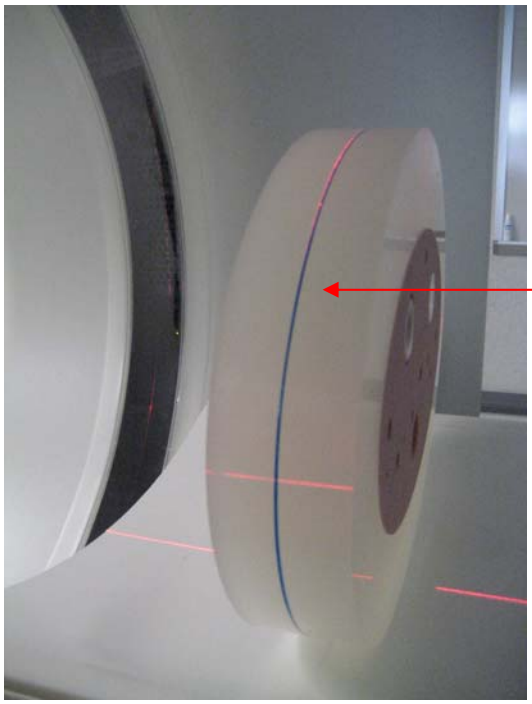

Figure 2

f. The reference materials used are air, water, and acrylic.

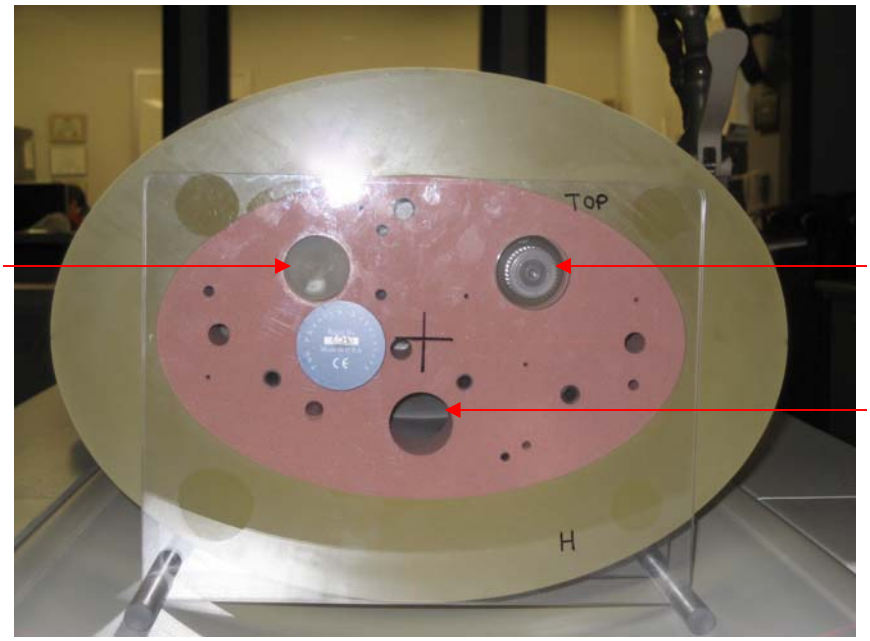

Figure 3

Phantom Setup

Important: Prior to scanning ensure that the water bottle is completely filled with ***DISTILLED WATER.*** The phantom should arrive at your site filled.

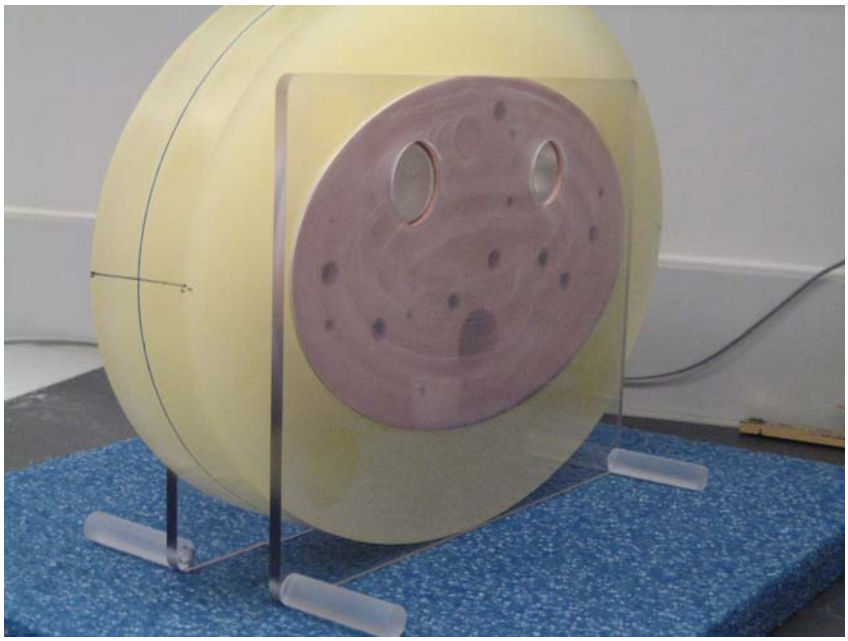

Figure 4

Step 1 The phantom will arrive to you without the legs of the base attached. Screw the legs into the acrylic plates.

Step 2 Prior to placing the phantom on the scanner table you must first ensure the water bottle top is sufficiently level with the back edge of the phantom. The bottle must be level with the phantom foam material not the protective plate.

Step 3 Place the phantom directly on the scanner table. There must be no other tables or boards below the phantom. The pad is removed for better leveling.

Step 4 Orient the phantom on the scanner table head-first, supine. The cap of the bottle is the head. The phantom is also marked with "H" for "head". (Figure 5)

Step 5 Align the phantom along the z axis with the laser light on your scanner using blue line on phantom's outer ring. (Figure 2)

Step 6 Align the phantom in the scanner cross hairs. Line up with the on the front of the phantom. (Figure 5)

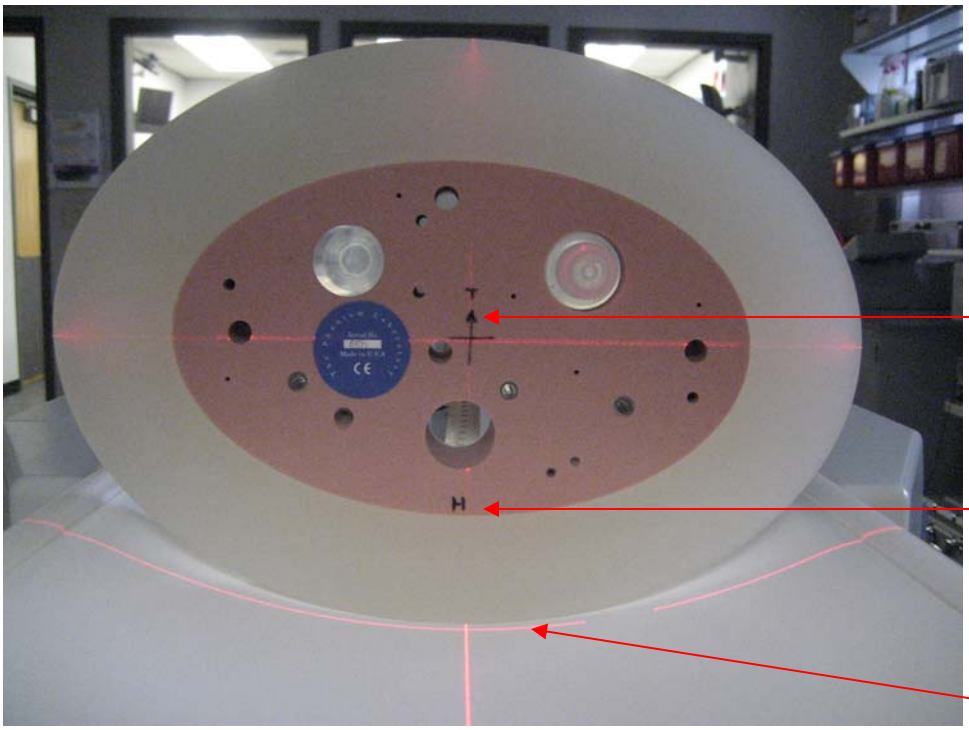

Figure 5

Step 7 Move the scanner table. Do not allow the phantom to go past the detector center line. (Figure 5)

Scan Protocol

Table 1.1 CT Inspiration Protocol

Scanner make	PHILIPS	PHILIPS	PHILIPS	SIEMENS	SIEMENS	GE	GE
Scanner model	64 slice	40 slice	16 slice	Sensation-64	Sensation-16	VCT-64	LS 16
Scan Type	Axial Helix	Axial Helix	Axial Helix	Spiral	Spiral	VCT Helical	Helical
Rotation Time (s)	0.5	0.5	0.5	0.5	0.5	See mA	See mA
Det. Configuration	64x0.625	40x0.625	16x0.75	64x0.6	16x0.75	64x0.625	16x0.625
Pitch	0.923	0.923	1.188	1.1	1.1	1.375 mm	1.375
Speed (mm/rot)	0.5	0.5	0.5	21.1	13.2	13.75	13.75
kVp	120	120	120	120	120	120	120
mAs, eff mAs, mA	mAs 200	mAs 200	mAs 200	eff. mAs 200	Eff. mAs 200	400 @ 0.5s	400 @ 0.5s
Dose modulation	Off	Off	Off	Off	Off	Off	Off
Algorithm	B	B	B	B31f	B31f	Standard	Standard
Thickness (mm)	0.9	0.9	0.9	0.75	0.75	0.625	0.625
Interval (mm)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
DFOV (cm)	365	365	365	365	365	365	365

Scan Protocol

Table 1.1 CT Expiration Protocol

Scanner make	PHILIPS	PHILIPS	PHILIPS	SIEMENS	SIEMENS	GE	GE
Scanner model	64 slice	40 slice	16 slice	Sensation-64	Sensation-16	VCT-64	LS 16
Scan Type	Axial Helix	Axial Helix	Axial Helix	Spiral	Spiral	VCT Helical	Helical
Rotation Time (s)	0.5	0.5	0.5	0.5	0.5	See mA	See mA
Det. Configuration	64x0.625	40x0.625	16x0.75	64x0.6	16x0.75	64x0.625	16x0.625
Pitch	0.923	0.923	1.188	1.1	1.1	1.375 mm	1.375
Speed (mm/rot)	0.5	0.5	0.5	21.1	13.2	13.75	13.75
kVp	120	120	120	120	120	120	120
mAs, eff mAs, mA	mAs 50	mAs 50	mAs 50	eff. mAs 50	Eff. mAs 50	100 @ 0.5s	100 @ 0.5s
Dose modulation	Off	Off	Off	Off	Off	Off	Off
Algorithm	B	B	B	B31f	B31f	Standard	Standard
Thickness (mm)	0.9	0.9	0.9	0.75	0.75	0.625	0.625
Interval (mm)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
DFOV (cm)	365	365	365	365	365	365	365

Scan Acquisition

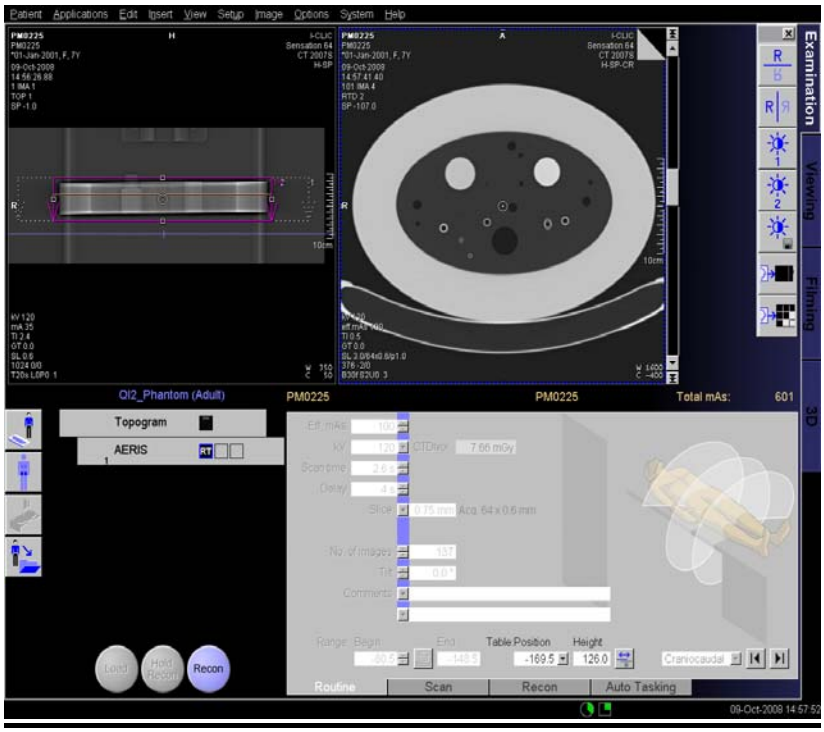

Figure 6

Phantom scan should include entire length of the phantom

Use 365cm field of view & 0.5mm slice spacing for isotropic resolution.

1. One scan for each COPDGene approved scanner should be completed using the COPDGene CT protocol. (Table 1.1) & (1.2)

2. Scan identification must include COPDGene site abbreviations, scanner ID and have COPDGene Lung Phantom in the scan label description. EX) Scanner one at Iowa will be: UIA01Phantom, Scanner 2 will be UIA02Phantom

3. Patient position should be head first supine**.** Run the scout scan head to foot.

4. Scan using both inspiration and expiration COPD protocols listed in table (1.1) & (1.2). Scanning must be accomplished with the phantom remaining in the same position for both scans.

5. Reconstruct the image using a (GE) standard, Philips B or Siemens B31 kernel only. The Display Field of View (DFOV) must be 365mm. and the (x,y) reconstruction coordinates must be (0,0) respectively.

Data Transfer

Complete the CT Scan Acquisition Form and send along with the CD with the copied reconstructed images of the phantom.

Contact Information

- Please contact Jered Sieren for any questions or concerns dealing with setup and scanning of the COPDGene Lung Phantom.

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- Please contact Heather Baumhauer for any transfer related issues.

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