

The CIRS line of IMRT phantoms is designed to address the complex quality assurance and dose verification issues in the field.



IMRT Verification System

IMRT phantoms are manufactured from tissue equivalent materials that mimic within 1% from 50 KeV to 25 MeV for accurate simulation from CT planning to treatment delivery. The elliptical shape minimizes the CT artifacts associated with cubic phantoms and properly represents human anatomy in size and proportion. The uniformity of shape enhances accuracy of depth measurements. An interchangeable rod design allows the phantom to accommodate a multitude of dose measurement devices such as ion chambers, TLD, diodes and MOSFETs in the same location

within the phantom. Phantom cross sections accommodate GafChromic© or standard ready-pack films. Laser alignment markers and special radio opaque fiducials allow for easy CT to film registration.

The attached pages provide some comparative data and descriptions of the various features and standard phantom configurations that are available. If you can't find a standard configuration that meets your requirements or you would like additional information, contact CIRS customer service at 800-617-1177.

IMRT Phantom Material ⁽²⁾⁽³⁾

linear attenuation coefficients to reference tissues

En, MeV

Plastic Water-DT to H2O Ratio, %

Average Bone to Ref1 Ratio, %

Lung (inhale) to Ref2 Ratio, %

IMRT Phantom

Homogeneous



*Complete QA
from CT Imaging
to Dose Verification*

The CIRS Model 002H5 IMRT Phantom for Film and Ion chamber Dosimetry is designed to address the complex issues surrounding commissioning and comparison of treatment planning systems while providing a simple yet reliable method for verification of individual patient plans and delivery.

The 002H5 is homogeneous and elliptical in shape. It properly represents human anatomy in size and proportion. It measures 30cm long x 30cm wide x 20cm thick (PA). The phantom is manufactured from a unique proprietary material that faithfully mimics water within 1% from 50keV to 25 MeV.

Water equivalent interchangeable rod inserts accommodate ionization chambers allowing for point dose measurements in multiple planes within the phantom. The phantom also supports radiographic or GafChromic© film at mid-plane in the phantom for analysis of dose distributions. Optional inserts are available to support a variety of other detectors including TLD's, MOSFET, and diodes.

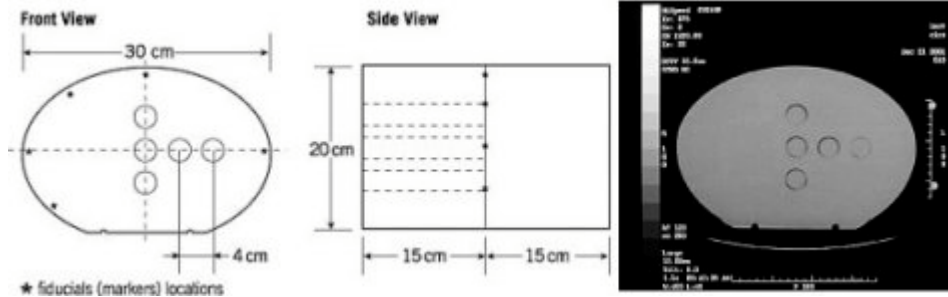
Handling, assembly and proper orientation of the phantom is made easy with the use of a unique alignment base and holding device. The surfaces of the phantom are etched for ease of laser alignment, and CT markers ensure accurate film to plan registration.

Phantom Benefits

- check 2D dose distributions (3D distributions optional)
- point dose measurements in multiple planes
- calibrate film with ion chamber
- quickly verify individual patient treatment plans
- correlate CTU to electron density

IMRT Phantom Specifications

Model 002H5



Model 002H5 Includes

Qty	Model	Description
n.2		15 cm tissue equivalent sections, one drilled to accommodate solid rod inserts
n.5	002CTF	CT to film fiducial markers
n.5		15cm long water equivalent rod inserts
n.1	002RW15	Water equivalent rod insert with ion chamber cavity
n.1		Alignment base
n.1		Holding device

Optional Accessories

- 002BR - Single breast attachment
- 002FC - Film stack for small volume 3D image reconstruction cassette
- 002HCV - Homogeneous section that accommodates 002FC or 002GC cassettes
- 002GC - Gel dosimetry
- 002RW15 - 15cm long water equivalent rod insert with ion chamber cavity
- 002RB15 - 15cm long bone equivalent insert with ion chamber cavity
- 002RL15 - 15cm long lung equivalent insert with ion chamber cavity
- 002LCV - Thorax region section that accommodates 002FC or 002GC cassettes
- 002SPH - Tissue equivalent rods for TLD's (set of 5)

Optional Electron Density Reference Inserts

Density:

Electron Density per cc x 10²³

Electron Density Relative to H₂O

H₂O: 1.00 / 3.34 / 1.000

Lung: 0.21/ 0.69 / 0.207

Bone: 1.60 / 5.03 / 1.506

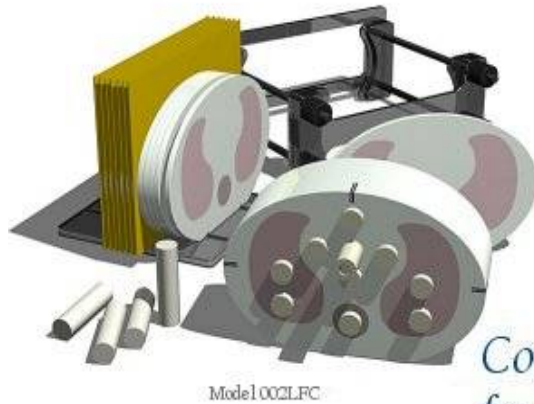
Muscle: 1.06 / 3.48 / 1.042

Adipose: 0.96/ /3.17 / 0.949

Plastic Water-Diagnostic/ Therapy Range: 1.04 / 3.35 / 1.003

IMRT Phantom

Thorax



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The CIRS Model 002LFC IMRT Thorax Phantom for Film and Ion chamber Dosimetry is designed to address the complex issues surrounding commissioning and comparison of treatment planning systems while providing a simple yet reliable method for verification of individual patient plans and delivery.

The 002LFC is elliptical in shape and properly represents an average human torso in proportion, density and two-dimensional structure. It measures 30cm long x 30cm wide x 20cm thick. The phantom is manufactured from unique proprietary materials that faithfully mimic water, bone and lung within 1% from 50keV to 25 MeV.

Tissue equivalent interchangeable rod inserts accommodate ionization chambers allowing for point dose measurements in multiple planes within the phantom. Hole placement allows verification in the most critical areas of the chest. One half of the phantom is divided into 12 sections, each 1 cm thick, to support radiographic or GafChromic® film. Optional inserts are available to support a variety of other detectors including TLD's, MOSFET, and diodes.

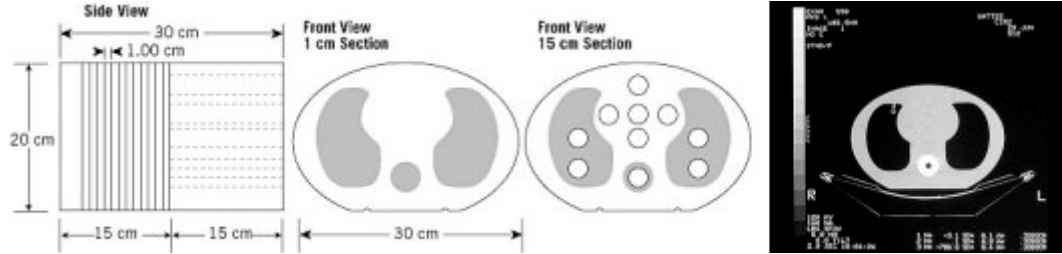
Handling, assembly and proper orientation of the phantom is made easy with the use of a unique alignment base and holding device. The surfaces of the phantom are marked for ease of laser alignment. Optional CT markers are available to ensure accurate film to plan registration.

Phantom Benefits

- verify heterogeneity corrections
- correlate CTU to electron density
- check dose distributions in sensitive areas
- check depth doses and absolute dose
- 2D and 3D isodoses
- calibrate film with ion chamber
- verify individual patient treatment plans

IMRT Phantom Specifications

Model OO2LFC



Model 00LFC Includes :

Qty Model Description

n.1		15 cm thorax section drilled to accommodate rod inserts
n.12		1 cm thorax sections
n.1		3 cm end section
n.1		Alignment base
n.1		Holding device
n.1	002RW15	15cm long water equivalent insert with ion chamber cavity
n.1	002RB15	15cm long Bone equivalent insert with ion chamber cavity
n.1	002RL15	15cm long lung equivalent insert with ion chamber cavity
n.5		15cm long water equivalent solid rod inserts
n.1		15cm long bone equivalent solid rod inserts
n.4		15cm long lung equivalent solid rod inserts

Optional Accessories :

- 002BR - Single breast attachment
- 002FC - Film stack for small volume 3D image reconstruction cassette
- 002GC - Gel dosimetry
- 002HCV- Homogeneous section that accommodates 002FC or 002GC cassettes
- 002LCV - Thorax region section that accommodates 002FC or 002GC cassettes
- 002SPH - Tissue equivalent rods for TLD's (set of 5)
- 002RW15 - 15cm long water equivalent rod insert with ion chamber cavity
- 002RB15 - 15cm long bone equivalent insert with ion chamber cavity

Optional Electron Density Reference Inserts :

Density:

Electron Density per cc x 10²³

Electron Density Relative to H2O

H2O: 1.00 / 3.34 / 1.000

Lung: 0.21 / 0.69 / 0.207

Bone: 1.60 / 5.03 / 1.506

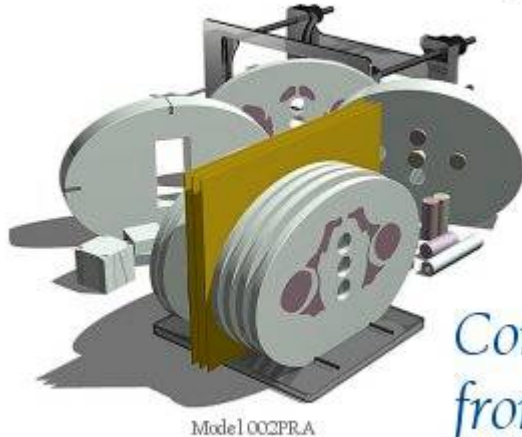
Muscle: 1.06 / 3.48 / 1.042

Adipose: 0.96 / 3.17 / 0.949

Plastic Water-Diagnostic/ Therapy Range: 1.04 / 3.35 / 1.003

IMRT Phantom

Pelvic 3D



*Complete QA
from CT Imaging
to Dose Verification*

The CIRS Model 002PRA IMRT phantom is designed to address the complex issues surrounding commissioning and comparison of treatment planning systems and verification of individual patient plans and delivery.

The CIRS 002PRA phantom properly represents human pelvic anatomy in shape, proportion and structure as well as density. This enables thorough analysis of both the imaging and dosimetry system. The phantom is manufactured from unique proprietary materials that faithfully mimic bone and water within 1% from 50keV to 25 MeV.

The phantom is elliptical in shape, approximates the size of an average patient, and has a tissue equivalent,

three dimensional skeleton. Tissue equivalent interchangeable rod inserts for ionization chambers allow for point dose measurements in multiple planes in the phantom and film calibration. The phantom also supports film dosimetry with not only standard radiographic films but also GafChromic® media. Optional inserts are available to support a variety of other detectors including TLD's, MOSFET, and diodes.

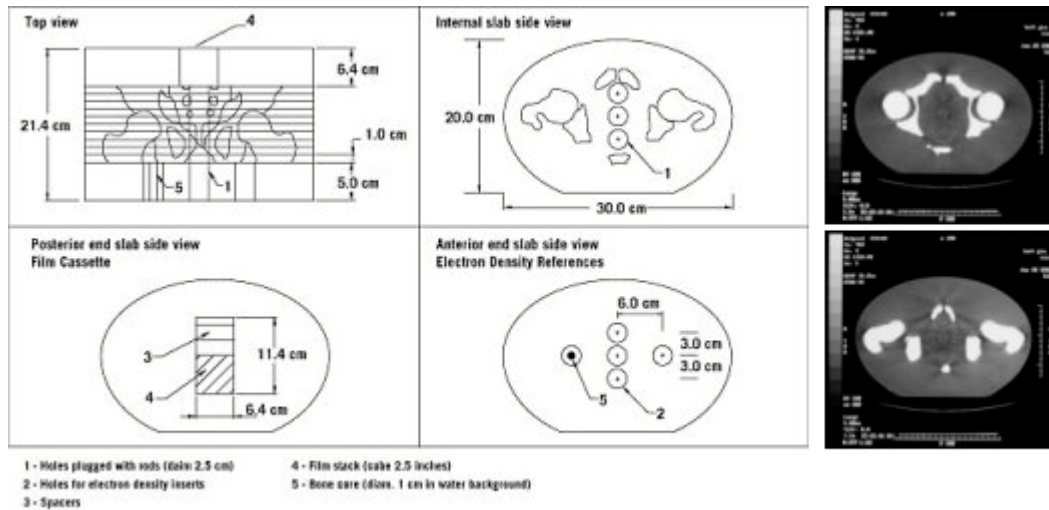
The Model 002PRA includes five different Electron Density reference plugs which can be interchanged in five separate locations within the phantom. The surface of the phantom is etched with grooves to ensure proper orientation of the CT slices and accurate film to plan registration.

Phantom Benefits

- verify heterogeneity corrections
- correlate CTU to electron density
- check dose distributions in sensitive areas
- check depth doses and absolute dose
- 2D and 3D isodoses
- verify individual patient treatment plans
- calibrate film with ion chamber

IMRT Phantom Specifications

Model 002PRA



Model 002PRA Includes

Qty	Model	Description
n.1		5 cm tissue equivalent electron density reference section with interchangeable inserts
n.10		1 cm thick contiguous 3D pelvic sections each drilled to accommodate rod inserts
n.1	002HCV	Homogeneous section that accommodates 002FC or 002GC cassettes
n.1	002RW15	15cm long water equivalent rod insert with ion chamber cavity
n.3		Water equivalent rod inserts
n.1		Alignment base
n.1		Holding device
n.5		Electron density reference plugs (set of 5 lung, bone, muscle, adipose, water)
n.1		5cm section for ED plugs

Electron Density Reference Inserts (Included)

Density:

Electron Density per cc x 10²³

Electron Density Relative to H₂O

H₂O: 1.00 / 3.34 / 1.000

Lung: 0.21 / 0.69 / 0.207

Bone: 1.60 / 5.03 / 1.506

Muscle: 1.06 / 3.48 / 1.042

Adipose: 0.96 / 3.17 / 0.949

Plastic Water-Diagnostic/ Therapy Range: 1.04 / 3.35 / 1.003

CHAMBERS

Cavity Code Accommodates

501	0.6cc Farmer-type chambers without build-up cap , PTW, Nuclear Enterprise (NE)	
502	0.6cc Farmer-type chambers with build-up cap, PTW, Nuclear Enterprise (NE)	
506	Capintec PR-06G with build-up cap	
507	Capintec PR-06C without build-up cap	
511A	Nuclear Enterprise (NE) 2533 without build-up cap	523 Victoreen X-10
511B	PTW N31003 0.3cc without build-up cap	524 Victoreen 550-6A T Ion Chamber without build-up cap
511C	PTW N31002 0.125cc without build-up cap	525 Wellhofer IC15 Ion Chamber without build-up cap
513	Exradin A-12	526 Capintec PR-06G without build-up cap
515	Exradin T-14 Microchamber	527 Wellhofer IC70 with build-up cap
517	0.2cc Farmer Chamber without Build-up Cap	528 Exradin Model 14SL
518	PTW 31006 without Build-up Cap	531 Exradin Model 1SL
520	PTW 23331 without Build-up Cap	532 Wellhofer CC13/IC10
521	Wellhofer IC3	533 Wellhofer CC01
522	NE 2611A without Build-up Cap	