

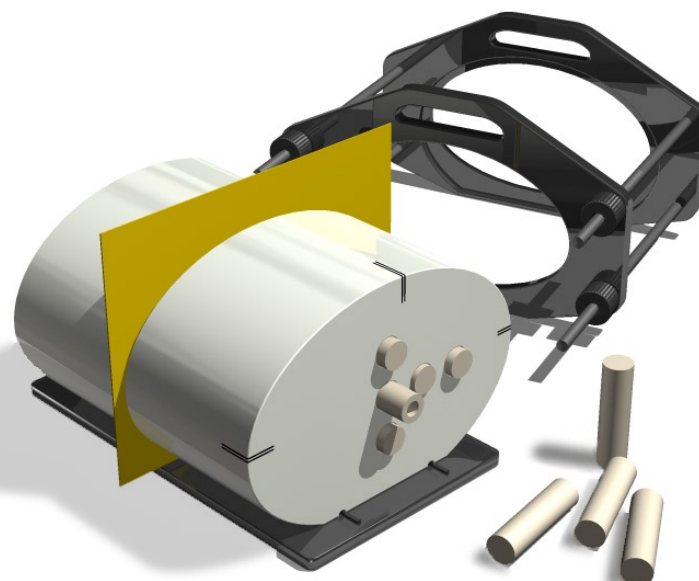
IMRT Homogeneous Phantom

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 30 cm long x 30 cm wide x 20 cm thick (PA). The phantom is constructed of proprietary tissue equivalent epoxy materials. Linear attenuations of the simulated tissues are within 1% of actual attenuation for bone and water from 50 keV 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



Model 002H5

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.*

Features

- 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



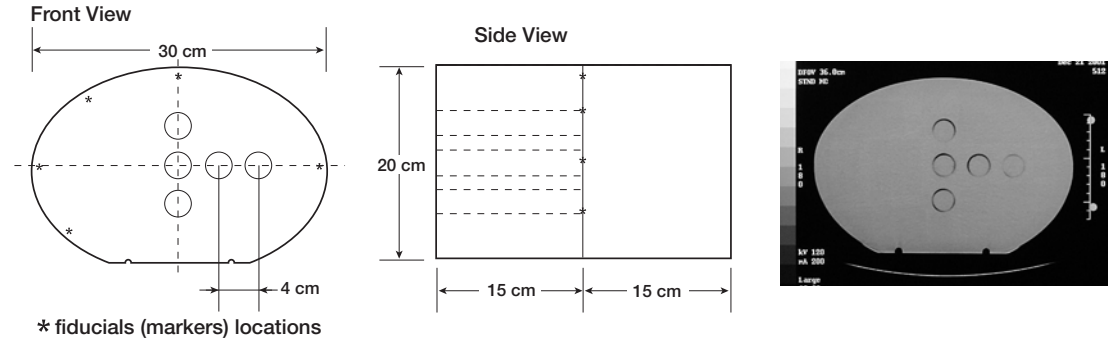
*Tissue Simulation &
Phantom Technology*

CIRS

2428 Alameda Avenue • Suite 316 • Norfolk, Virginia 23513 • USA
(800) 617-1177 • (757) 855-2765 • FAX (757) 857-0523
www.cirsinc.com • admin@cirsinc.com

IMRT Phantom Specifications:

Model 002H5



Model 002H5 Includes

Qty	Description
2	Tissue equivalent sections, one drilled to accommodate solid rod inserts
1	Set of CT to film fiducial markers
5	Water equivalent solid rod inserts
1	Water equivalent rod insert with ion chamber cavity
1	Alignment Base
1	Holding device

Ratios of IMRT Phantom Material⁽²⁾⁽³⁾

linear attenuation coefficients to reference tissues.

	Plastic Water-DT to H ₂ O	Average Bone to Ref ²	Lung (inhale) to Ref ³
En, MeV	Ratio, %	Ratio, %	Ratio, %
0.05	100.8	100.00	100.3
0.06	100.5	99.96	101.1
0.08	100.3	99.91	101.9
0.10	100.2	99.88	102.2
0.15	100.1	99.86	102.5
0.20	100.1	99.84	102.5
0.40	100.1	99.84	102.7
0.60	100.1	99.83	102.6
0.80	100.1	99.84	102.7
1.00	100.1	99.83	102.7
1.50	100.1	99.84	102.7
2.00	100.1	99.84	102.6
4.00	100.0	99.87	102.1
6.00	99.8	99.93	101.6
8.00	99.7	99.95	101.2
10.0	99.6	100.03	100.7
15.0	99.2	100.06	100.0
20.0	99.1	100.13	102.7
El. density	100.1	99.83	102.7
Density	1.039 g/cm ³	1.60 g/cm ³	0.21 g/cm ³

- The CIRS line of IMRT phantoms is compatible with the RIT 113 Software for film to plan analysis.
- ICRP 23, Report of the Task Group on Reference Man (1975).
- Woodard, H.Q., White, D.R., The Composition of Body Tissues, The British Journal of Radiology (1986) 59: 1209-1219

Optional Accessories

Model	Description
002BR	Single breast attachment
002FC	Film stack for small volume 3D image reconstruction
002GC	Gel dosimetry cassette
002HCV	Homogeneous section that accommodates 002FC or 002GC cassettes
002CTF	Set of CT to film fiducial markers for additional interfaces
002RW-CV5XX	Water equivalent rod insert with ion chamber cavity
002RB-CV5XX	Bone equivalent insert with ion chamber cavity
002RL-CV5XX	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)
002ED	Electron density reference plugs, set of 4 (lung, bone, muscle, adipose)
002CS	Foam lined carrying case
002SS-H	Water equivalent spacer slab (1 cm)

IMRT Verification System

CIRS 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. An interchangeable rod design allows the phantom to accommodate a multitude of dose measurement devices such as ion chambers, TLD, diodes and MOSFET's in the same location within the phantom. Phantom cross sections accommodate GafChromic® or standard ready-pack films.⁽¹⁾

Electron Density Reference Insert

	Density	Electron Density per cc x 10 ²³	Electron Density Relative to H ₂ O
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

*Refer to separate CIRS cavity and plug code list for available chamber cavities.