



# IMRT Thorax Phantom

Model 002LFC



*Model 002LFC showing optional water equivalent rod with ion cavity*

## COMPLETE QA FROM CT IMAGING TO DOSE VERIFICATION

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 and complete system QA from CT imaging to dose verification.

The 002LFC is elliptical in shape and properly represents an average human torso in proportion, density and two-dimensional structure. It measures 30 cm long x 30 cm wide x 20 cm thick. The phantom is constructed of proprietary tissue equivalent epoxy materials. Linear attenuations of the simulated tissues are within 1% of actual attenuation for water and bone, and within 3% for lung from 50 keV to 15 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. Additional 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 easy with the use of a unique alignment base and holding device. The surfaces of the phantom are marked for ease of laser alignment. CT markers are included to ensure accurate film to plan registration on the center film.\*

### Features

- 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 & other detectors\*

\*The CIRS line of IMRT phantoms is compatible with the RIT 113 software for film to plan analysis. GafChromic® is a registered trademark of International Specialty Products, Wayne, NJ.

900 Asbury Ave • Norfolk, Virginia 23513 • USA  
Tel: 800.617.1177 • 757.855.2765 • Fax: 757.857.0523

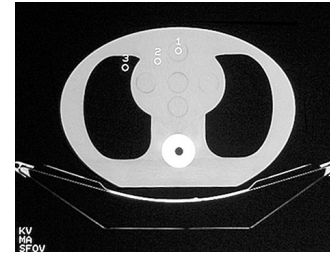
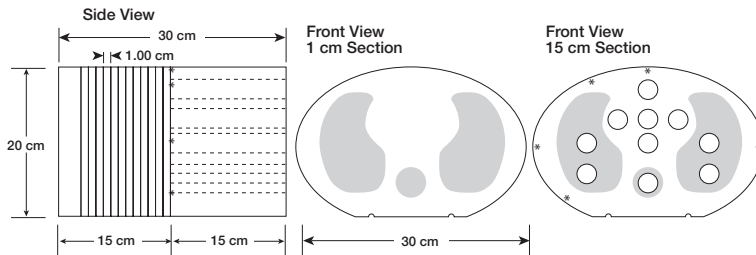
[WWW.CIRSINC.COM](http://WWW.CIRSINC.COM)

# CIRS

Tissue Simulation & Phantom Technology

IMRT VERIFICATION SYSTEM

CIRS IMRT phantoms are manufactured from tissue equivalent materials that mimic within 1% from 50 keV to 15 MeV for accurate simulation during all necessary steps of IMRT verification. The interchangeable rod design allows the phantom to accommodate many 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.



SPECIFICATIONS

|                            |  |
|----------------------------|--|
| <b>OVERALL DIMENSIONS:</b> | 43.2 cm x 38.1 cm x 22.9 cm<br>(17" x 15" x 9")  |
| <b>WEIGHT:</b>             | 11.2 kg (30 lb)  |
| <b>MATERIALS:</b>          | Phantom Body: Tissue Equivalent Epoxy Materials<br>Inserts: CIRS Tissue Equivalent Materials (epoxy resin based) |

MODEL 002LFC INCLUDES

| QTY | PART NO. | DESCRIPTION                                       |
|-----|----------|---|
| 1   |          | Thorax section drilled to accommodate rod inserts |
| 12  |          | 1 cm thorax sections                              |
| 1   |          | 3 cm end section                                  |
| 5   | 002RW-S  | Water equivalent solid rod inserts                |
| 1   | 002RB-S  | Bone equivalent solid rod insert                  |
| 4   | 002RL-S  | Lung equivalent solid rod inserts                 |
| 1   |          | Set of CT to film fiducial markers                |
| 1   |          | Alignment base                                    |
| 1   |          | Holding device                                    |
| -   |          | 60-Month Warranty                                 |

References:

Vatnitsky S. Commissioning of Radiotherapy Treatment Planning Systems: Testing for Typical External Beam Treatment Techniques. 1583rd ed. (Brunckhorst E, Gershkevitch E, Ibbott G, et al., eds.), IAEA. 2008.

Gershkevitch, Eduard, et al., Dosimetric Verification of Radiotherapy Treatment Planning Systems: Results of IAEA Pilot Study. 2008 Elsevier Ireland Ltd., Radiotherapy and Oncology 89 (2009) 338-346, pgs. 338-346, March 2009.

Zhao, Y. et al., Monte Carlo evaluation of a treatment planning system for helical tomotherapy in an anthropomorphic heterogeneous phantom and for clinical treatment plans. Med. Phys., vol. 35 (12), pgs. 5366-5374, December 2008.

Luo, W., et al., Analysis of image quality for real-time target tracking using simultaneous kV-MV imaging. Med. Phys., vol. 35 (12), pgs. 5501-5509, December 2008.

Brunckhorst E., et al., Commissioning of Radiotherapy Treatment Planning Systems: Testing for Typical External Beam Treatment Techniques. IAEA, International Atomic Energy Agency, IAEA-TECDOC-1583, pgs. 1-67, January 2008.

Altman, M., et al., A Novel Phantom for use in 3-dimensional In Vitro Cell Experiments. Med. Phys., vol. 33 (6), pgs. 2058-2059, Poster # SU-FF-T-40, June 2006.

©2013 Computerized Imaging Reference Systems, Inc. All rights reserved.  
Specifications subject to change without notice.  
Publication: 002LFC DS 071520

INSERT OPTIONS

\*Customers are encouraged to complete their order with the purchase of at least one (1) of each insert option listed below. Refer to separate CIRS cavity and plug code list for available chamber cavities.

| PART NO.         | DESCRIPTION  |
|------------------|--|
| 002RW<br>CVXX-XX | Water equivalent rod inserts with ion chamber cavity |
| 002RB<br>CVXX-XX | Bone equivalent insert with ion chamber cavity       |
| 002RL<br>CVXX-XX | Lung equivalent insert with ion chamber cavity       |

ADDITIONAL OPTIONS

| PART NO.  | 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   |
| 002LCV    | Thorax region section that accommodates 002FC or 002GC cassettes   |
| 002SPH    | Water equivalent rods for TLD's (set of 5 rods length 5cm)   |
| 002CTF    | Set of CT to film fiducial markers for additional interfaces   |
| 002ED     | Electron density reference plugs, set of 4 (lung, bone, muscle, adipose)   |
| 002SS-LFC | Thorax region spacer slab (1 cm)   |
| 9501      | Case for IMRT Phantoms (002H9K, 002LFC, 002PRA) when ordered with corresponding Cavity Slab (002HCV, 002LCV, 002PCV) |
| 9502      | Case for IMRT Phantoms (002H9K, 002LFC, 002PRA)  |
| 158200-09 | Precision Cut EBT3 Film Kit for Model 002FC, 038-05, 038-21 (Set of 25 inserts plus 6 calibration strips)            |

