

# Tissue-Equivalent Phantoms for Mammography

Models 010 & 011A



## A REFINED QUALITY ASSURANCE TOOL FOR TODAY'S ADVANCED IMAGING SYSTEMS

Model 010 and 011A are tissue-equivalent, anthropomorphic phantoms designed to test performance of any mammographic system. Simulated calcifications, fibrous ducts, and tumor masses are embedded into the phantom as test objects. Test objects range in size to allow system checks at varying levels of difficulty.

Model 010 phantoms are available in 4, 5 and 6 cm thickness with specified glandular tissue compositions. Model 011A is 4.5 cm thick and simulates an average glandular tissue composition. Both phantoms include a removable 0.5 cm adipose tissue-equivalent layer.

CIRS resin material mimics the photon attenuation coefficients of a range of breast tissues. The average elemental composition of the mimicked tissue is based on the individual elemental compositions of adipose and glandular tissues as reported by Hammerstein.

Attenuation coefficients are calculated by using the "mixture rule" and the Photon Mass Attenuation and Energy Absorption Coefficient Table of J.H. Hubbell.

### Features

- Realistically Shaped
- Tissue Equivalent
- Monitor Image Quality & Dose

The methodology and design of these phantoms was developed by Dr. Panos Fatouros and his associates at the Medical College of Virginia.

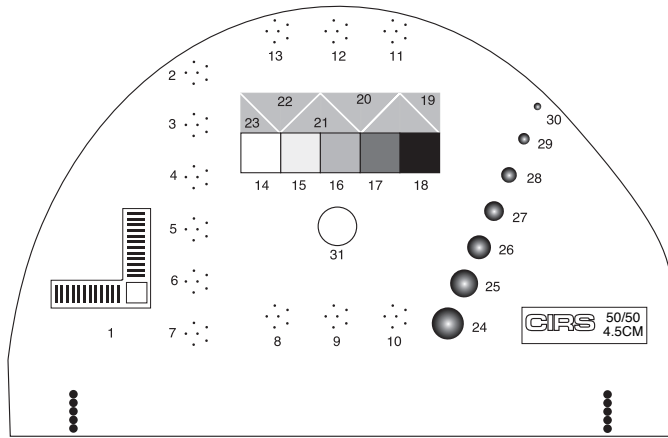
### References:

Hammerstein R., Miller D., White D., et al; Absorbed Dose in Mammography; *RADIOL-OGY*;130:485-491.

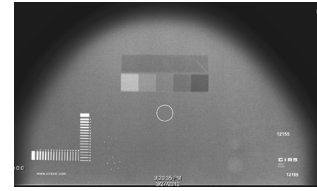
Hubbell J.H.; *INTERNATIONAL JOURNAL RADIATION ISOT*; Vol. 33:1269-1290; 1982.

Fatouros PP, Skubic S.E., Goodman H. The Development and Use of Realistically Shaped, Tissue- equivalent Phantoms for Assessing the Mammographic Process. *Radiology*, 1985 157(p):32.

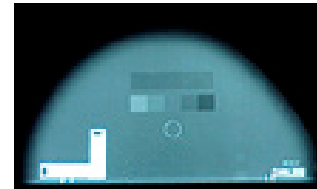
Skubic S.E., Fatouros PP. Absorbed Breast Dose: Dependence on Radiographic Modality and Technique, and Breast Thickness. *Radiology*,1986, 161:263-270.



SCHMATIC DRAWING



CT IMAGE



X-RAY IMAGE

SPECIFICATIONS

LINE PAIR TARGET

- 1. 5 to 20lp/mm (17 segments with 5 lines each)

CAC03 SPECS GRAIN SIZE (MM)

- 2. 0.130
- 3. 0.165
- 4. 0.196
- 5. 0.230
- 6. 0.275
- 7. 0.400
- 8. 0.230
- 9. 0.196
- 10. 0.165
- 11. 0.230
- 12. 0.196
- 13. 0.165

STEP WEDGE 1 CM THICK

- 14. 100% gland
- 15. 70% gland
- 16. 50% gland
- 17. 30% gland

18. 100% adipose  
NYLON FIBERS DIAMETER SIZE (MM)

- 19. 1.25
- 20. 0.83
- 21. 0.71
- 22. 0.53
- 23. 0.30

HEMISPHERIC MASSES

75% GLANDULAR / 25% ADIPOSE THICKNESS (MM)  
(MODEL 010B, 010D, 011A)  
55% GLANDULAR / 45% ADIPOSE THICKNESS (MM)  
(MODEL 010A, 010C)

- 24. 4.76
- 25. 3.16
- 26. 2.38
- 27. 1.98
- 28. 1.59
- 29. 1.19
- 30. 0.90

OPTICAL DENSITY

- 31. Reference zone

EDGE OF BEAM

- 32. Localization target

PHANTOM SPECIFICATIONS

Dimensions: 2.5 cm x 18.5 cm  
Weight: 2 lbs. (0.7 kg)

MATERIALS

Phantom: Epoxy Resin  
Specs: Calcium Carbonate

MODELS 010 & 011A INCLUDE

Tissue-Equivalent Mammography Phantom  
Aipose Tissue-equivalent layer (0.5 cm thick)  
User Guide  
48-Month Warranty

MODELS 010 & 011A OPTIONS

MODEL NO.	DESCRIPTION
010A	Tissue-Equivalent Mammography Phantom, 5.0 cm thick 30% Glandular/70% Adipose
010B	Tissue-Equivalent Mammography Phantom, 4.0 cm thick 50% Glandular/50% Adipose
010C	Tissue-Equivalent Mammography Phantom, 6.0 cm thick 20% Glandular/80% Adipose
010D	Tissue-Equivalent Mammography Phantom, 5.0 cm thick 50% Glandular/50% Adipose
011A	Tissue-Equivalent Mammography Phantom, 4.5 cm thick 50% Glandular/50% Adipose



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