Tissue-Equivalent Phantom for Mammography

A Refined Quality Assurance Tool for Today's Advanced Imaging Systems

Proven simulation technology enables the use of tissue-equivalent, realistically-shaped phantoms for mammographic quality assurance.

CIRS resin material mimics the photon attenuation coefficients of a range of breast tissues. Average elemental composition of the human breast being mimicked is based on the individual elemental composition of adipose and glandular tissue 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.

The CIRS Model 011A Breast Phantom contains targets that are engineered to test the threshold of the new generation of mammography machines. Model 011A is 4.5 cm thick and simulates an average glandular tissue composition.

Model 011A

The Model 011A was designed to test the performance of any mammographic system. Objects within the phantom simulate calcifications, fibrous calcifications in ducts and tumor masses. Test objects within the phantom range in size from those that should be visible on any system to objects that will be difficult to resolve on the best mammographic systems.

CIRS mammography phantoms are also manufactured in 4 cm, 5 cm and 6 cm thicknesses with various glandular equivalencies.

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

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Model 011A Specifications

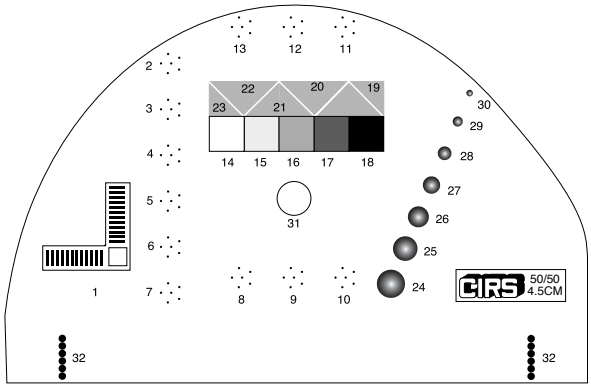
- **Line pair target**
  1. 20 lp/mm

- **Ca CO_3 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)
  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 Body**
  Length 12.5 cm
  Width 18.5 cm
  Height 4.5 cm
  Material Epoxy

- **Also Included**
  30x handheld microscope

Mammography QA documents for recording image evaluations and scores

Technical manual

Carrying case sold separately.

References:

1. Skubic S.E., Fatouros PP. Abosorbed Breast Dose: Dependence on Radiographic Modality and Technique, and Breast Thickness. RADIOLOGY,1986, 161:263-270.
2. 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.