

MAMMOGRAPHIC ACCREDITATION PHANTOM

Helps ensure optimum image quality and peak performance of the mammographic system!

- Complies with ACR phantom specifications and QC requirements.
- Contains test objects to simulate indications of breast cancer...punctate calcifications, tissue fibrillar extensions in adipose tissue, and tumor-like masses.
- Ideal for monitoring the overall performance of your mammographic imaging system...x-ray generator, film processor, and screen-film combination.
- Equivalent in x-ray attenuation to a 4.5 cm compressed "average" breast.

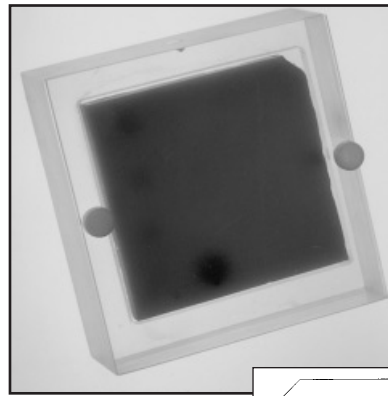
The Mammographic Accreditation Phantom will assist you in complying with MQSA and the American College of Radiology (ACR) Quality Control Programs. This phantom is intended for use as an integral part of the Mammographic Quality Control Program, and when used to perform routine mammographic QC, it will help you quickly, easily and accurately evaluate the overall imaging performance of your mammographic system. This phantom will detect imaging changes so you can make the necessary corrections in order to maintain your system at peak performance!

The Mammographic Accreditation Phantom was designed to test the performance of a mammographic system by a quantitative evaluation of the system's ability to image small structures similar to those found clinically. Objects within the phantom simulate calcifications, fibrous calcifications in ducts, and tumor masses.

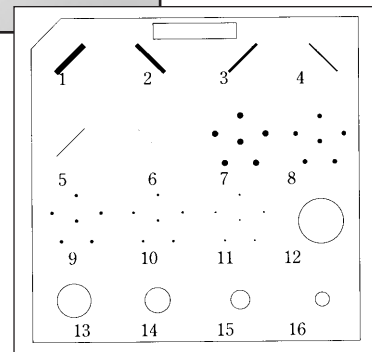
The phantom is also designed to determine if a mammographic system can detect small structures that are important in the early detection of breast cancer. Test objects within the phantom range in size from those that should be visible on any system, to objects that will be difficult to see even on the best mammographic system.

The 4.4 cm-thick phantom is made of a 7 mm wax block insert containing 16 sets of test objects, a 3.4 cm thick acrylic base, and a 3 mm thick cover. The phantom approximates a 4.5 cm compressed breast of average glandular/adipose composition. Included in the wax insert are aluminum-oxide (Al_2O_3) specks that simulate microcalcifications. Six different nylon fibers simulate fibrous structures and five different size lens-shaped masses simulate tumors.

Each phantom includes a 4 mm x 1 cm diameter Acrylic Contrast Test Disk, Faxitron X-ray Image, and Magnifying Glass.



**Essential
for MQSA
Compliance!**



Options:

Optional are two 2 cm acrylic plates to check the automatic exposure control of the mammography unit. The addition of these two plates, when combined with the overall 4.4 cm thickness of the phantom, will allow the system to be checked in varying thicknesses of 2 cm to 8.5 cm. Both of these items are recommended by ACR in their Mammography Quality Control Procedure.

SPECIFICATIONS:

WAX INSERT:

Nylon Fibers:	Al_2O_3 Specks:	Masses (Thickness):
1) 1.56 mm	7) 0.54 mm	12) 2.00 mm
2) 1.12 mm	8) 0.40 mm	13) 1.00 mm
3) 0.89 mm	9) 0.32 mm	14) 0.75 mm
4) 0.75 mm	10) 0.24 mm	15) 0.50 mm
5) 0.54 mm	11) 0.16 mm	
6) 0.40 mm		

PHANTOM BODY:

Material: Acrylic

Dimensions:

Overall: 10.8 cm L x 10.15 cm W x 4.4 cm thick

Acrylic Base: 1³/₈" thick (3.4 cm)

Cover: 1¹/₈" thick (3 mm)

Acrylic Contrast Test Disk: 4 mm x 1 cm diameter

Weight: 1.2 lbs (0.55 kg)

18-220 Mammographic Accreditation Phantom, Including Acrylic Contrast Test Disk, Faxitron X-ray Image, and Magnifying Glass

18-237 Optional Set of Two Acrylic Plates, each 10 x 10 x 2 cm thick

18-205 Acrylic Disc, 4 mm thick x 1 cm diameter

89-220 Insulated Carrying/Storage Case

The American College of Radiology recommends this type of product in their quality assurance program.

STEREOTACTIC BREAST BIOPSY ACCREDITATION PHANTOM*

The fast, easy way to test image quality on digital biopsy mammography units and qualify for ACR accreditation.

- The phantom contains test objects that are similar to those found in the Mammographic Accreditation Phantom specified by the American College of Radiology (ACR).
- The extended top edge of the phantom allows ease of positioning on recumbent biopsy units.
- The phantom's small size allows it to be imaged in its entirety in a *single exposure* when used with a digital biopsy unit.
- Enables you to determine if the images are similar to or better than screen-film.

The Problem

In the past, there was not an easy way to compare the image quality of conventional and digital biopsy mammography units, because the field of view on the digital system is typically much smaller than the 24 x 30 cm field of view on conventional mammo-graphy units. In order to image the Mammographic Accreditation Phantom (specified by the ACR) on the biopsy units, the user has to move the phantom to various positions in order to obtain four separate images, to be sure all objects were imaged. This is a very inconvenient, time consuming task.

Problem Solved!

How? The small size of the phantom permits fast, easy comparison of conventional and digital image quality, because you can attain an image of the entire unit in a single exposure! The objects are some of the same ones found in the Mammographic Accreditation Phantom specified by the ACR, so it makes comparison of the two imaging systems easy.

SPECIFICATIONS:

Dimensions:

Cast Acrylic Base Block: 25/8" x 21/2" x 111/16" thick
(6.66 cm x 6.42 cm x 4.03 cm)

Weight: 8.7 oz (1.20 kg)

18-250 Stereotactic Breast Biopsy
Accreditation Phantom

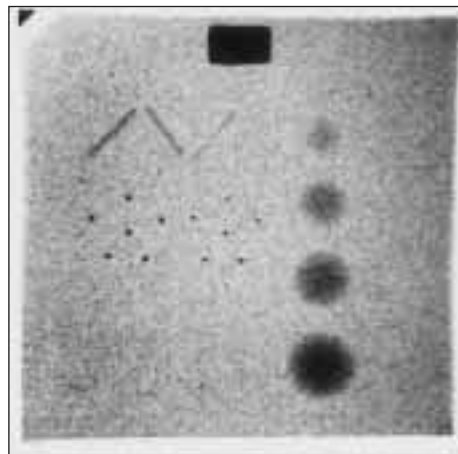


* Designed by Carol Mount, R.T. (R) (M), and Joel E. Gray, Ph.D., Department of Diagnostic Radiology, Mayo Clinic, Rochester, MN 55905. Manufactured under licensing agreement with Mayo Foundation for Medical Education and Research.

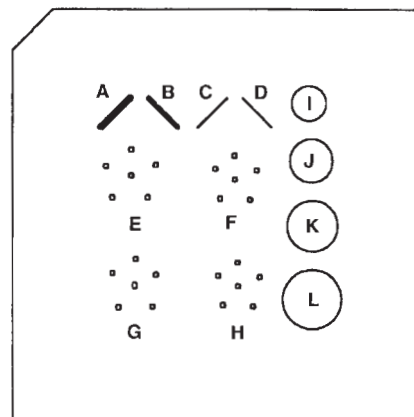
The only phantom recommended in
the ACR Stereotactic Biopsy Accreditation
QC Manual!



Phantom with image evaluation insert.



Digital image demonstrating image evaluation insert.



WAX INSERT

FIBERS

- A. 0.93 mm nylon fiber
- B. 0.74 mm nylon fiber
- C. 0.54 mm nylon fiber
- D. 0.32 mm nylon fiber

SPECKS

- E. 0.54 mm speck
- F. 0.32 mm speck
- G. 0.24 mm speck
- H. 0.20 mm speck

MASSES

- I. 0.25 mm (thickness) mass
- J. 0.50 mm (thickness) mass
- K. 0.75 mm (thickness) mass
- L. 1.00 mm (thickness) mass

**Accepted by the ACR for use in its
Stereotactic Breast Biopsy
Accreditation Program.**

CONTRAST DETAIL PHANTOM FOR MAMMOGRAPHY

Optimized for digital imaging.

- Easy-to-use, compact, and lightweight.
- Closely simulates scattering conditions of the breast.
- Rotatable support plate accommodates prone-position x-ray units. The plate can be returned to a position which does not interfere with placement of the phantom on flat surfaces.
- Geometrically-increasing hole *depths* result in linearly-increasing x-ray transmission.
- Geometrically-increasing hole *diameters* enable quantitative measurement of the contrast threshold of the mammographic system.

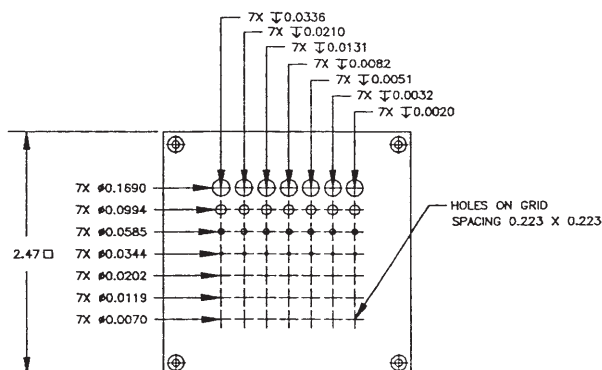
The Contrast Detail Phantom for Mammography is designed to provide a means of quantitatively testing and monitoring the total performance of an entire mammographic imaging chain. Its small size, as well as the number and distribution of holes simulating embedded objects, make this phantom particularly useful in evaluating digital spot mammography systems. With 49 holes generating subtle contrast variations, the phantom makes it possible to detect small changes in overall system performance.

Nuclear Associates' Contrast Detail Phantom for Mammography contains a 7 x 7 matrix of objects. The diameter of each row of objects decreases from 0.169" to 0.007". In each row, the subject contrast decreases from approximately 6.6% to 0.41% at mammographic energies.

A Good Imaging System Should Resolve at Least the Following Objects:

Row Number	Minimum Number of Objects Detected
1	6
2	6
3	5
4	4
5	2
6	1
7	0

Minimum Detectability Score: 24/49



Rotatable support plate accommodates prone-position x-ray units.

Nuclear Associates' Contrast Detail Phantom for Mammography is easy to use... Simply place the phantom on the image receptor surface in the same position as a breast. Position the x-ray tube and compression device as in a craniocaudal examination. When using the phantom on prone-position breast biopsy systems, use the rotating top plate of the phantom and the compression device to secure the phantom against the image receptor. Choose the appropriate kV and mAs factors (26 kV and 60 mAs works well on most systems), or select automatic exposure control.

SPECIFICATIONS:

Phantom Material: Plexiglas™

Dimensions: 2.47" x 2.47" x 2.47" thick

Weight: 1.2 lbs (.58 kg)



18-252 Contrast Detail Phantom for Mammography

Object Diameter		
Row Number	Object Diameter (Inches) (mm)	
1	0.169	4.292
2	0.099	2.524
3	0.058	1.485
4	0.034	0.873
5	0.020	0.513
6	0.011	0.302
7	0.007	0.177

Object Depth and Contrast			
Column Number	Object Depth (Inches) (mm)		Typical Contrast at Mammographic Energies (%)
1	0.033	0.853	6.60
2	0.021	0.533	4.20
3	0.013	0.332	2.60
4	0.008	0.208	1.70
5	0.005	0.129	1.00
6	0.003	0.080	0.65
7	0.002	0.050	0.41

CONTRAST AND RESOLUTION MAMMOGRAPHY PHANTOM*

With a single exposure you can:

- Measure the contrast and dynamic range of the imaging system.
- Easily measure the system resolution of the focal spot length and width on mammography units (with optional Model 07-555 Test Pattern).

With the optional Model 07-555 Resolution Test Pattern you can:

- Determine if the entire dynamic range can be visualized on both the soft copy display, as well as on film.
- Determine if the film image appears similar to the soft copy display. (For the best calibration possible, you should use the SMPTE Test Pattern in addition to the Model 07-555 Test Pattern.)†

The Contrast and Resolution Mammography Phantom is designed with an extended top edge to aid the user in positioning it on recumbent biopsy tables.

On digital mammography units, this phantom can test the high contrast spatial resolution of the system with the results being viewed on the monitor. The focal spot high contrast resolution can also be determined by placing a conventional mammography cassette behind the phantom and making an appropriate exposure. The grey scale step wedge can be used to visually test the dynamic range of the digital imaging system by viewing it on the monitor. It can also aid in the setup of hardcopy cameras.

**One Exposure
is All You Need!**



It is suggested that a resolution test pattern from 5-20 LP/mm be used to evaluate the condition of the focal spot. Instead of making focal spot measurements which can be ambiguous, an accurate determination of the x-ray tube's resolution ability can be measured by using Nuclear Associates' Model 07-555 Test Pattern. (See page 125.)

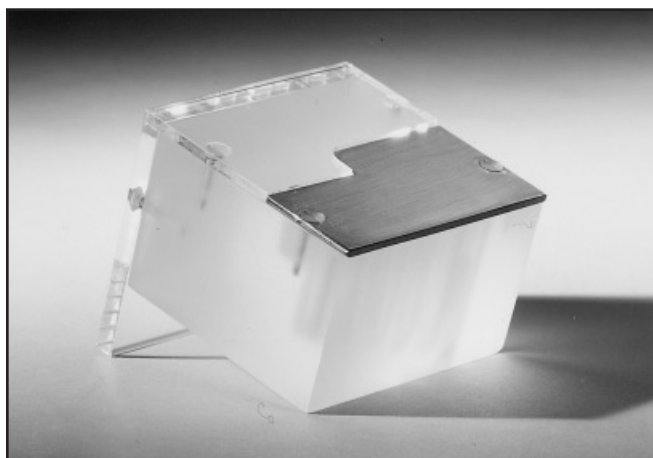
On conventional mammography units, the phantom can be used to meet the ACR guidelines for testing focal spot resolution. The ACR suggests placing a resolution target 4.5 cm above the image receptor and imaging twice: once parallel to the anode-cathode axis and once rotated 90 degrees. With two resolution targets, this can be achieved in a single exposure. The grey scale step wedge can also be used to check the dynamic range of the entire system, indicate processing problems, and variation in film emulsion.

* Designed by Carol Mount, R.T. (R) (M), and Joel E. Gray, Ph.D., Department of Diagnostic Radiology, Mayo Clinic, Rochester, MN 55905. Manufactured under licensing agreement with Mayo Foundation for Medical Education and Research.

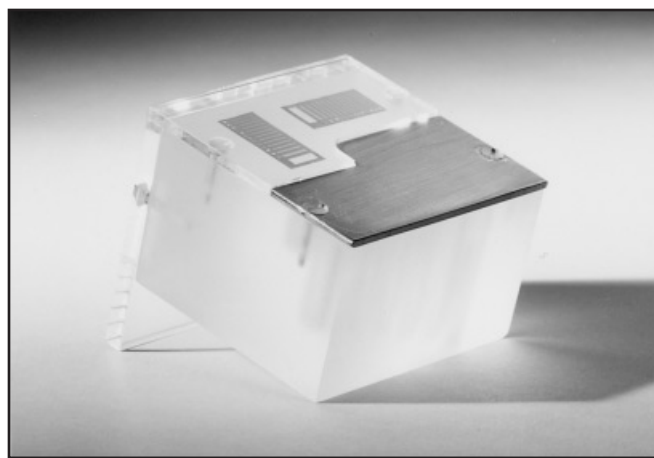
† Nuclear Associates' Medical Imaging Test Pattern Generator (Model 07-495 on page 72), Portable Multiformat Test Pattern Generator (Model 07-499 on page 68) and the Programmable Video Test Pattern Generator (Model 07-891 on page 69) are available to meet this requirement.



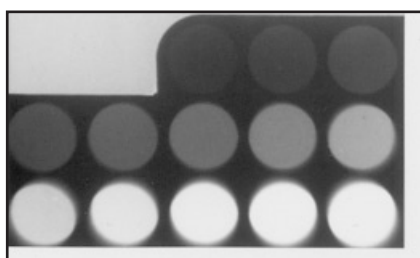
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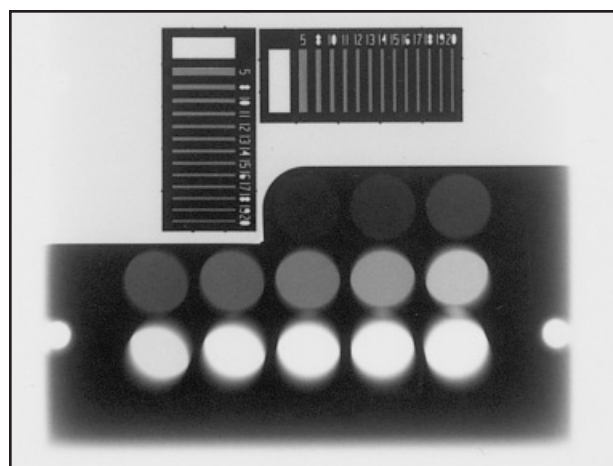
Phantom with 13-step air wedge for contrast evaluation and aluminum attenuator.



Phantom with two 5-20 LP/mm test patterns (optional) in parallel and perpendicular orientation. Also includes an air step wedge with aluminum attenuator.



Digital image demonstrating air step wedge.



A digital image demonstrating the resolution test patterns (optional) and air step wedge.

PHANTOM SPECIFICATIONS:

Materials: Cast acrylic block with aluminum plate

Dimensions: 6.66 cm x 6.4 cm x 4.3 cm thick

Weight Without Test Patterns: 8 oz

18-251 Contrast and Resolution Mammography Phantom, Without Test Pattern 07-555

RESOLUTION TEST PATTERN SPECIFICATIONS:

Material: Gold nickel construction (equivalent to 25 microns of lead or 2.6 mm of aluminum)

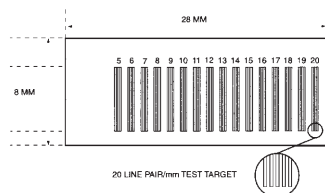
Length: 25 mm

Width: 12.5 mm

Thickness: .0175 mm

(.0152 mm gold, 0.0025 mm nickel)

07-555 Resolution Test Pattern

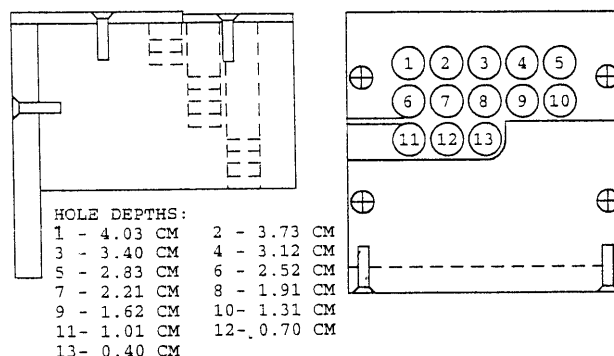


When ordered with the phantom, the test pattern(s) will be inserted into the phantom and shipped complete. If you already have the Resolution Test Pattern, you may quickly and easily insert the test pattern into the phantom by removing two screws on top of the phantom. Be sure to place the test pattern into the phantom block in either one of the orientations shown in the photos above.

18-251-1000 Contrast and Resolution Mammography Phantom with One 07-555 Test Pattern

18-251-2000 Contrast and Resolution Mammography Phantom with Two 07-555 Test Patterns

Drawing showing hole depths.

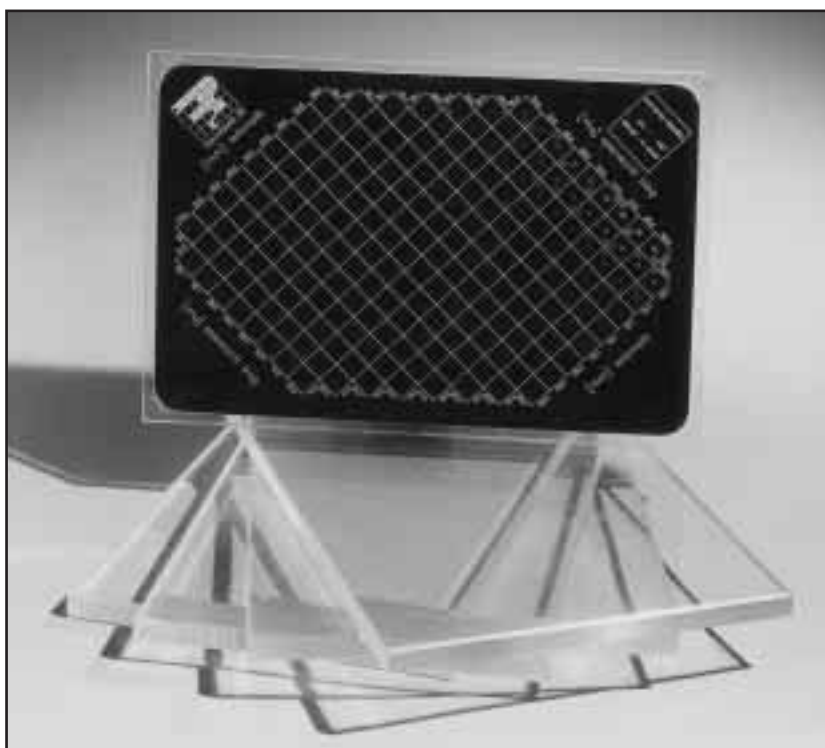


**Don't Spend Another Day Without
the Products You Need. . .
Order Today!**

CDMAM 3.3 PHANTOM*

Specifically developed to determine if mammographic images are indicating objects with very low contrast and very small diameter.

**For Full-Field
Analog and
Digital Units!**



The **CDMAM 3.3** was specially developed to facilitate the task of detecting very low contrast and very small details in mammography systems. With the phantom the “threshold contrast” as a function of the object diameter can be determined and plotted in a Contrast-Detail curve.



If you want the very best images, you need the very best mammographic phantom!

The “Gold Standard” CDMAM 3.3 Phantom Provides:

- **Comparison of image quality with various screen-film combinations.**
- **Evaluation of conventional, as well as digital and stereotactic modalities.**
- **Determination of the optimum exposure technique, e.g., by variation of tube potential.**
- **Comparison of image quality at various object thicknesses, by variation of the amount of Plexiglas at a fixed density.**

The **CDMAM 3.3** (Contrast Detail Mammography) Phantom was developed to evaluate conventional mammographic x-ray equipment, film, and cassettes. However, with the increase of digital imaging in mammography, especially when performing stereotactic breast needle biopsies and preoperative needle localizations, the phantom can aid in achieving improved image quality, processing, display quality, and speed in these new modalities!

Quality control of the technical aspects of mammographic equipment usually is performed by measurement of the physical parameters of the x-ray equipment, screen-film combination, developing process, and observation conditions.

However, the main issue in quality control should be the assurance that absolutely correct information (with as much anatomic detail as possible) about the tissue under examination, be transferred to the radiologist! *To facilitate this, the CDMAM 3.3 Phantom was developed!*

What Makes the CDMAM 3.3 Phantom So Special?

Nuclear Associates' **CDMAM 3.3** Phantom consists of an aluminum base with gold discs (99.99% pure gold) of varying thicknesses and diameters, which is attached to a Plexiglas cover. The 5 mm thick Plexiglas cover (PMMA plate) has a 2 mm deep cavity which accommodates the aluminum base with gold discs. The assembly (PMMA and aluminum) has a Plexiglas-equivalent thickness of 10 mm, under standard mammography-exposure conditions.

The aluminum base is .05 mm thick Al 1050 (99.5% pure aluminum). The base has been polished and anodized black. Precisely measured gold discs of varying thickness (range = 0.05 to 1.60 μ m) and diameter (range = 0.10 to 3.20 μ m) have been attached to the base by means of evaporation. Finally, the base has been airbrushed to protect the gold discs.

(Continued on the next page)

THE “GOLD STANDARD” OF MAMMOGRAPHIC PHANTOMS!

The discs are arranged in 16 rows and 16 columns. Within a row, the disc diameter is constant, with logarithmically increasing diameter. *The precision of the disc diameter and thickness makes the CDMAM 3.3 Phantom an ideal tool for conducting contrast-detail and other image quality experiments.*

A line pattern has been engraved onto the Plexiglas cover and treated with paint containing aluminum. The x-ray image will show a number of squares ordered in 16 columns and 16 rows, with the disc diameter shown for each row, and the disc thickness for each column.

About the “Gold Standard” CDMAM 3.3 Phantom...

Nuclear Associates' CDMAM 3.3 Phantom includes a set of four Plexiglas plates, which are used for the simulation of different breast thicknesses. The plates are 10 mm thick and the same dimensions as the phantom. The plates are marked in one corner, for identification of the configuration of Plexiglas and phantom in an x-ray image. The phantom and Plexiglas plates match the standard mammography film size (18 x 24 cm).

Under standard mammography-exposure conditions (Mo-anode, 30 μ m Mo-filtration, 28 kV), the phantom has a Plexiglas-equivalent thickness of 10 mm.

The actual attenuation of the CDMAM 3.3 Phantom depends on the configuration of the phantom and Plexiglas plates. The effective energy of the phantom plane will be higher when more Plexiglas is added to the top and bottom of the phantom.

Using the CDMAM 3.3 Phantom is Easy!

To make an x-ray image, the CDMAM 3.3 Phantom should be positioned on the bucky with the smallest disc diameters at the thorax side, in combination with one or more Plexiglas plates. The markings on the Plexiglas plates should be aligned at the thorax side of the bucky. On digital stereotactic systems with smaller fields of view, specific portions of the phantom can easily be imaged as well.

The density of the image has to be checked after the film has been processed. In a series of CD images, all images should approximately have the same densities in a reference-position on the film.

SPECIFICATIONS:

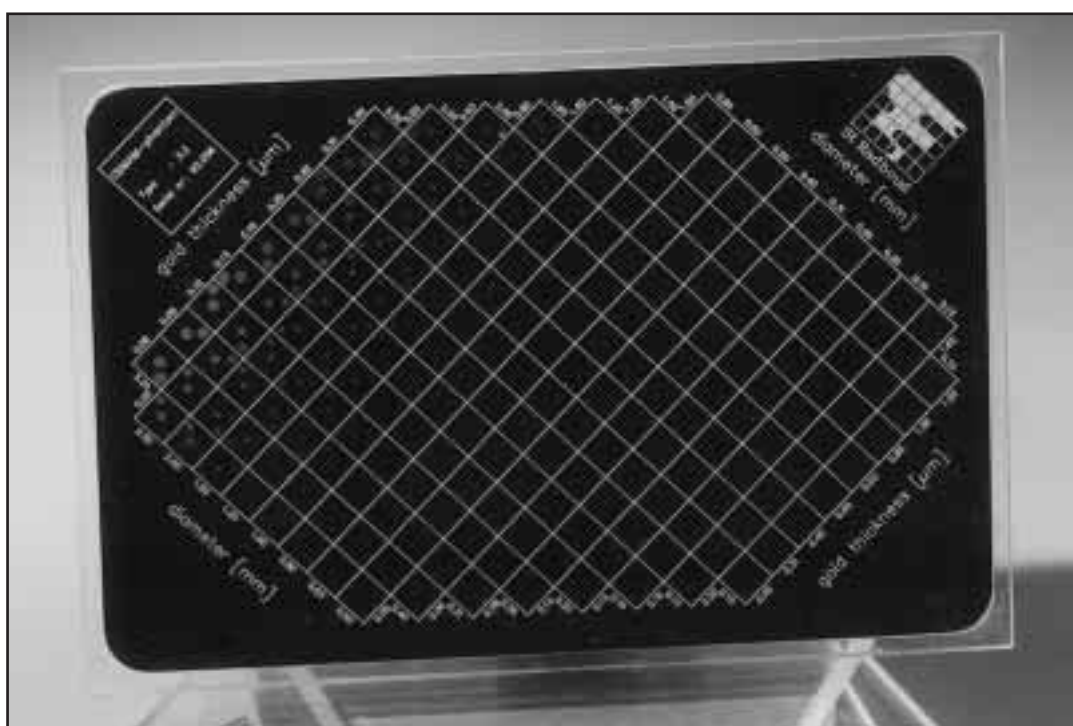
Dimensions: Plexiglas Plates: 9.45" L x 6.38" W x .40" thick (240 mm x 162.5 mm x 10 mm)

Aluminum Base: 240 mm x 162.5 mm x .5 mm thick

Weight: 4.54 lbs (2.06 kg)

18-227 CDMAM 3.3 Phantom, Including Four Plexiglas Plates

* Developed by M.A.O. Thijssen, Ph.D., K.R. Bijkerk, MSc. and J.M. Lindeyer, BSc., Project: Quality Assurance in Mammography (QAMAM), Department of Diagnostic Radiology, University Hospital, St. Radboud, Nijmegen, The Netherlands.



TISSUE-EQUIVALENT MAMMOGRAPHY PHANTOM

A refined quality control tool for today's advanced imaging systems.

- Includes a free videotape, created by the American College of Radiology (ACR), entitled "Level-One Quality Control: An Instructional Video for the Mammography Technologist."
- Objects within the phantom simulate calcifications, fibrous calcifications in ducts, and tumor masses.

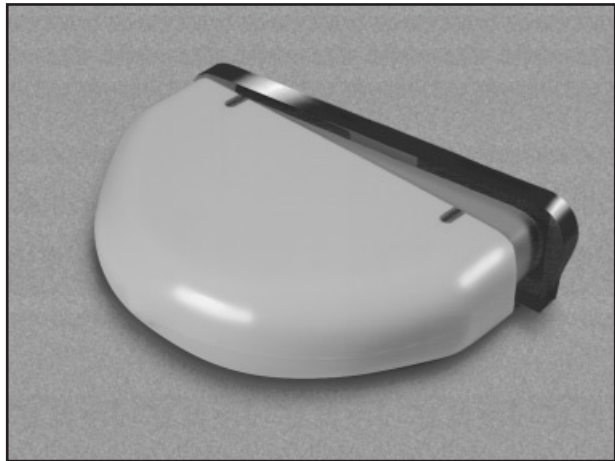
Proven simulation technology enables the use of tissue-equivalent, realistically-shaped phantoms for mammographic quality control.

This breast phantom contains targets that are engineered to test the threshold of the new generation of mammography machines.

The phantom is 4.5 cm thick, simulates a 50% glandular tissue composition and is designed to test the performance of a mammographic system by a quantitative evaluation of the system's ability to image small structures similar to those found clinically. The phantom is designed to determine if your system can detect small structures that are important in early detection of breast cancer. Test objects within the phantom range in size from those that should be visible on any system to objects that will be difficult to see in the best mammographic systems.

The phantom includes a 30x hand-held microscope and mammography QA documents for recording image evaluations and scores.

FREE
Mammographic QC
Videotape with Purchase!

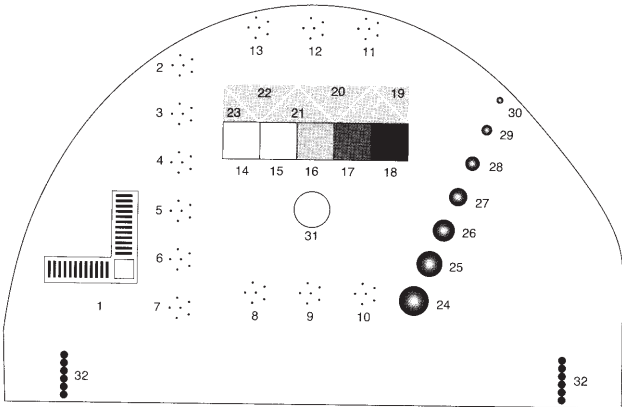


SPECIFICATIONS:

- | | |
|--|---|
| <ul style="list-style-type: none">• Line-Pair Target
1) 20 lp/mm• Calcium Carbonate Specks
Grain size (mm)
2) .130
3) .165
4) .196
5) .230
6) .275
7) .400
8) .230
9) .196
10) .165
11) .230
12) .196
13) .165• Step Wedge (1 cm thick)
14) 100% gland
15) 70% gland
16) 50% gland
17) 30% gland
18) 100% gland | <ul style="list-style-type: none">• Nylon Fibers
Diameter (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 Beam
32) localization target |
|--|---|

References:
Skubic S.E., Fatouros P.P., "Absorbed Breast Dose: Dependence on Radiographic Modality and Technique, and Breast Thickness", *Radiology*, 61 (1986), 263-270.
Fatouros P.P., Skubic S.E., Goodman H., "The Development and Use of Realistically Shaped, Tissue-Equivalent Phantoms for Assessing the Mammographic Process," *Radiology*, 32 (1985), 157.

- Material:** Epoxy
Dimensions: 12.5 cm L x 18.5 cm W x 4.5 cm H
Weight: 2.2 lbs (1.0 kg)
- 18-222** Tissue-Equivalent Mammography Phantom, Including Videotape, Hand-Held Microscope, and Mammography QA Recording Documents
- 89-417** Foam-Lined Carrying/Storage Case



MAMMOGRAPHY PHANTOM RESEARCH SET*

Satisfies the full range of size, glandularity and thickness combinations encountered in clinical mammography.

- Enables evaluation of image quality under varying degrees of thickness and glandularity.
- Provides the most accurate, reliable test for radiation dose.
- Ensures consistent production of diagnostically useful images.

The Mammography Phantom Research Set includes tissue-equivalent phantoms 4, 5 and 6 cm thick. Each phantom contains identical embedded details. The glandular content of each phantom is 50%, 30%, and 20% respectively. Also included are phototimer compensation plates enabling a range of thicknesses from .5 cm to 7 cm with a glandular content of 30%, 50% and 70%. One Compensation Plate contains embedded details for evaluation of image quality. A 30x power hand-held microscope and heavy-duty foam-lined carrying case are included.

Weight of set: 21.4 lbs (10 kg)

The phantoms are composed of resin materials that mimic 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.

SPECIFICATIONS:

• Line-Pair target

- 1) 20 lp/mm

• Calcium Carbonate Specks

Grain size (mm)

- 2) .130
- 3) .165
- 4) .196
- 5) .230
- 6) .275
- 7) .400
- 8) .230
- 9) .196
- 10) .165
- 11) .230
- 12) .196
- 13) .165

• Step Wedge (1 cm thick)

- 14) 100% gland
- 15) 70% gland
- 16) 50% gland
- 17) 30% gland
- 18) 100% adipose

• Fibers

Nylon in wax insert
Diameter (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

18-223 Mammography Phantom Research Set, Including Hand-Held Microscope and Carrying/Storage Case



Embedded Details of Phototimer Compensation Plate

• Contrast Step Wedge

(5 mm thickness)

- 1) Adipose tissue
- 2) Glandular tissue

• Hemispheric Masses

75% Glandular Tissue

Thickness (mm)

- 3) 3.16
- 4) 2.38
- 5) 1.98
- 6) 1.59
- 7) 1.19
- 8) 0.90

• Calcium Carbonate Specks (mm)

- 9) .39
- 10) .27
- 11) .23
- 12) .20
- 13) .16
- 14) .13

• Tabular Alumina Specks (mm)

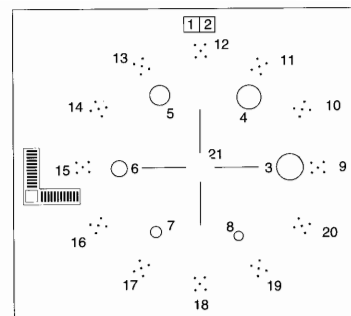
- 15) .39
- 16) .27
- 17) .23
- 18) .20
- 19) .16
- 20) .13

• Line-Pair Test Target

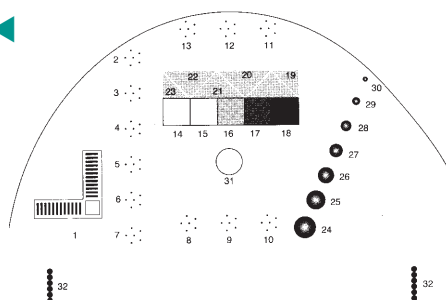
20 lp/mm

• Fibril

- 21) Diameter = 8.7 micron plus cladding



Phototimer Compensation Plate



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

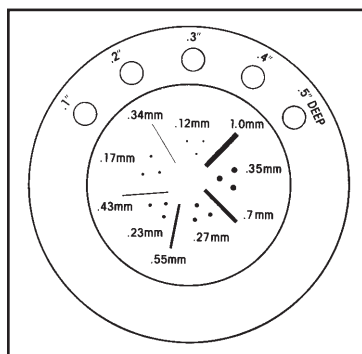
MAMMOGRAPHIC QC PHANTOM*

For evaluating total imaging performance of a mammographic system.

- Five-step air wedge gauges image contrast.
- Acrylic attenuators simulate additional thickness of breast tissue.
- Test objects more closely simulate mammographic indications of breast cancer.
- Test objects are situated in a clockwise progressive orientation for easier interpretation.

This phantom is designed for evaluating x-ray generator, screen-film combination and film processor. It is intended as an integral part of a complete mammography quality assurance program.

The phantom contains test objects simulating two mammographic indications of breast cancer: punctate calcifications and soft tissue fibrillar extensions in adipose tissue.



FREE REPRINT AVAILABLE

Leonard Stanton and Theodore Villafana, "Quality Assurance Breast Phantoms for Screen-Film Mammography: Design and Use, *Applied Radiology*, (Nov. 1989). Request reprint #405D.



SPECIFICATIONS:

Acrylic Base Block: Equivalent in x-ray attenuation to an approximately 4 cm compressed average breast. The acrylic base block also contains a five-step air wedge to gauge for image contrast.

Base Block Dimensions: 10 cm diameter x 3.7 cm thick.

Test Pattern: Consists of simulated microcalcifications and fibrillar structures embedded in a round wax block. The simulated calcifications are five sets of calcium carbonate specks ranging in diameter from 0.12 mm through 0.35 mm. The soft tissue fibrils are simulated by five nylon fibers ranging in diameter from 0.34 mm through 1.0 mm.

The Test Object Assembly: Located 3 cm from the bottom, to indicate any excessive geometric blur.

Two Acrylic Plates: 0.8 cm thick x 10 cm diameter, each of which simulates 1.0 cm of additional average breast tissue.

Weight: 1.12 lbs (.50 kg)

18-221 Mammographic QC Phantom

89-220 Insulated Carrying/Storage Case

* Designed by Leonard Stanton, M.S., Hahnemann University; Philadelphia, PA 19102.

ANTHROPOMORPHIC BREAST PHANTOM

Tests mammography systems under near-clinical conditions.



This rugged phantom has the same imaging and attenuation characteristics as a human breast of 50% glandular tissue and 50% adipose tissue. Molded from tissue-equivalent material, the phantom provides an image the size and shape of a 5 cm compressed breast. This special design provides low, medium and high detail resolution components for a precise life-like breast image.

The phantom is encased in a clear, durable acrylic case to prevent artifacts and contamination. A plastic lip on the bottom of the case butts-up against the cassette holder for easy positioning, and to prevent slippage. Also included are a 5-25 lp/mm bar pattern for convenient testing of resolution, and a stepwedge pattern for measuring optical density and evaluating latitude.

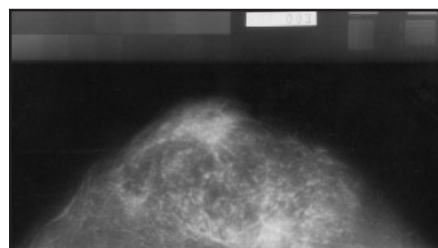
SPECIFICATIONS:

Construction: Acrylic case, molded tissue-equivalent breast material, mercury-enhanced film.

Dimensions: 7.4" L x 4.5" W x 2.5" thick (18.8 x 11.4 x 6.4 cm)

Weight: 1.6 lbs (0.7 kg)

18-226 Anthropomorphic Breast Phantom, Including Bar Pattern and Step Wedge Pattern



SINGLE-EXPOSURE HIGH CONTRAST RESOLUTION PHANTOM

Perform quality control inspections of mammography system resolution with just one exposure!

- Rugged.
- Easy-to-use.
- Cost-effective.

This phantom incorporates two 17.5 micrometer-thick gold-nickel alloy bar patterns positioned at 90 degrees. This allows the assessment of resolution perpendicular and parallel to the anode-cathode axis in just one exposure! Each pattern has segments from 5 lp to 20 lp/mm and is equivalent to 25 micrometers of lead, or 2.6 mm of aluminum at 20 keV.

The bar patterns are permanently embedded in a thin acrylic wafer, to protect them from wear and damage.

The phantom body is available in BR-12 or BR50/50. It enables consistent, reproducible positioning of the bar pattern at 4.5 cm above the breast support plate at 1 cm from the chest wall, centered laterally (as recommended by the American College of Radiology).

The bar pattern can also be positioned at a variety of heights for more thorough evaluations.

The phantom includes a 30x hand-held microscope.



SPECIFICATIONS:

Phantom Body:

Material: BR12 or BR50/50

Dimensions: 125 mm L x 100 mm W x 20 mm H

Weight: 1.3 lbs (.57 kg)

Target:

Material: Gold/nickel construction equivalent to 25 micrometers of lead, or 2.6 mm of aluminum

Dimensions: 28 mm L x 8 mm W x .0175 mm H

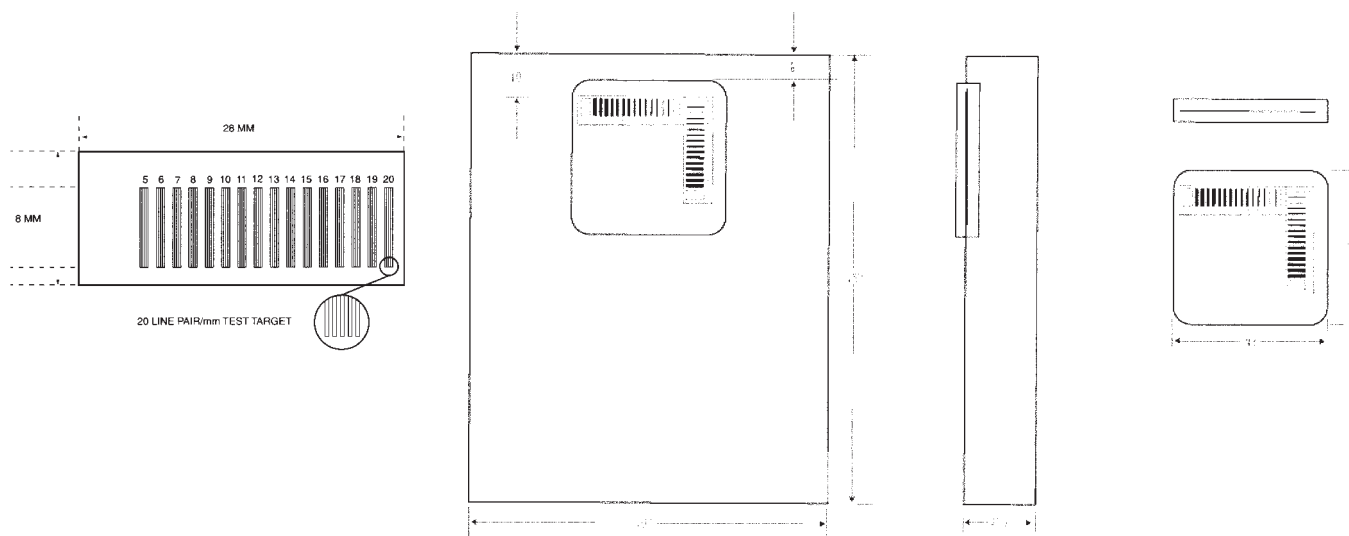
18-216 Single-Exposure High Contrast Resolution Phantom, BR-12,

Includes Hand-Held Microscope

18-216-1000 Single-Exposure High Contrast Resolution Phantom, BR50/50,

Includes Hand-Held Microscope

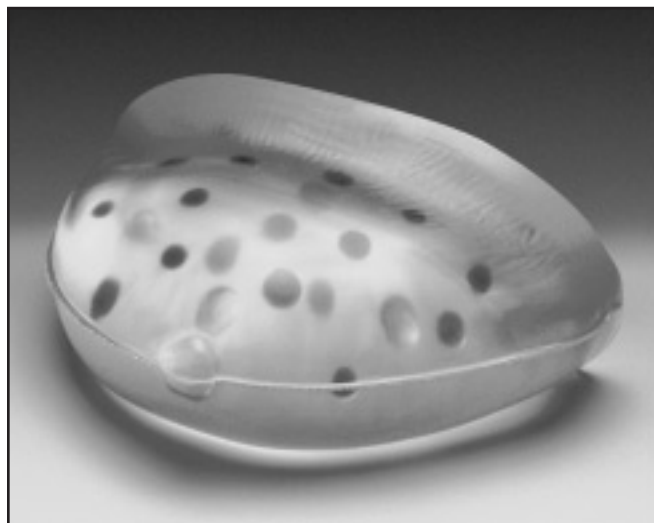
Meets ACR Guidelines!



STEREOTACTIC NEEDLE BIOPSY TISSUE-EQUIVALENT TRAINING PHANTOM

The ideal teaching tool and training phantom for practicing mammographic stereotactic needle biopsy.

**A Must for Every
Mammography
Facility!**



With the increasing use of stereotactic breast biopsy procedures, it is essential that radiology healthcare providers maintain and increase their needle biopsy skills! This tissue-equivalent phantom is a MUST for every mammography facility!

- **Compressible.**
- **Contains cysts, dense masses and calcifications.**
- **Proprietary gel simulates physical density and mass attenuation of BR-12.**
- **Gel will not dry out after initial needle punctures, thus extending storage life.**
- **Physical consistency similar to human tissue, combined with an elastic, skin-like membrane, enables palpation of embedded structures and accurately simulates needle resistance.**
- **Anthropomorphic shape allows for accurate simulation of breast compression.**
- **Can also be used for system QC.**

A comprehensive mammography quality control program must provide assurances that all aspects of the mammography equipment are operating at optimum levels. The automated stereotactic breast biopsy procedure depends on several variables for accurate needle placement. Thus, for patient safety, this system must be properly maintained and evaluated.

This versatile phantom was designed to assist in training technologists and physicians in the use of a stereotactic system, and for verifying the proper operation of mammographic stereotactic biopsy systems.

Because the phantom closely mimics properties of the human breast, it is also an ideal teaching tool and practice medium for mammographic needle biopsy procedures. It should also be used whenever a new system is installed or repaired, to ensure accurate needle placement.

This training phantom is also an excellent research and development/demonstration tool for manufacturers of mammography equipment.

The phantom should be stored in a cool place. The phantom should be discarded after all the tumors have been aspirated.

SPECIFICATIONS:

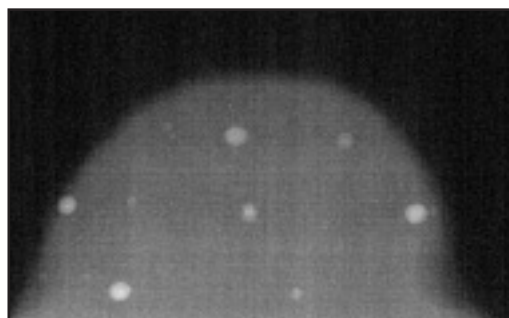
Targets	Color	Dimensions	Quantity	Position
Cystic Masses:	green	5 to 12 mm	6	random
Dense Masses:	black	5 to 12 mm	6	random
Microcalcifications:	orange	.3 to .35 mm	two clusters	Mid-plane on right & left sides

Dimensions: 10 cm L x 5 cm H; 1500 cc

Weight: 2 lbs

18-228 Stereotactic Needle Biopsy Tissue-Equivalent Training Phantom

Save When You Buy 3 or More



TRIPLE-MODALITY BIOPSY TRAINING PHANTOM

Tissue-equivalent under x-ray, ultrasound and MRI.

- Compressible.
- Ideal for physician and technologist training, and quality control.
- Physical density and attenuation characteristics accurately simulate that of an average 50% glandular breast (BR-12 equivalent).
- Flesh-like consistency allows for the palpation of embedded lesions while accurately simulating needle resistance found in human tissue.
- Anthropomorphic shape is suitable for compression mammography, ultrasound or MRI examinations.

Suspect lesions discovered in x-ray mammography must often be evaluated under ultrasound to aid diagnosis and in some cases, use of MRI may be indicated. This phantom is an ideal training device because it can be imaged under three modalities and was designed specifically for needle biopsy.

The Triple-Modality Biopsy Training Phantom is a disposable phantom that was designed to closely mimic the properties of the human breast, making it an extremely useful accessory for training technologists and physicians, as well as for verifying the proper operation of a mammographic biopsy system.

Training

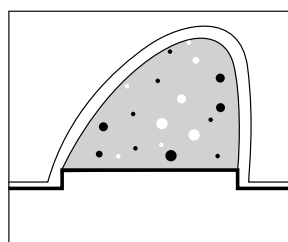
With the increasing use of breast biopsy procedures, it is essential that radiology healthcare providers maintain and increase their needle biopsy skills. This training phantom is a must for every mammography facility.

Quality Control

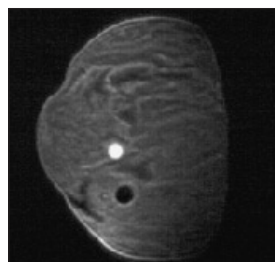
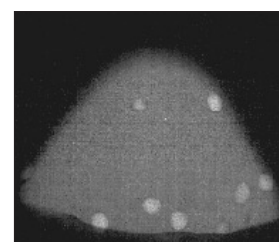
The breast biopsy procedure depends on several variables for accurate needle placement. Thus, for patient safety, the system must be properly maintained and evaluated. A comprehensive mammography quality control program must provide assurances that all aspects of the mammography equipment are operating at optimum levels. The Triple-Modality Biopsy Training Phantom is the ideal tool for such a program. Additionally, the phantom can and should be used whenever a new system is installed or repaired, to ensure accurate needle placement.

Research and Development

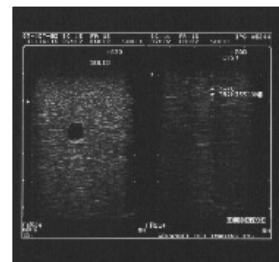
This cost-effective phantom is also an excellent research and development/demonstration tool for manufacturers of mammography equipment.



Targets: Dense and cystic masses X-ray mammography



MRI



Ultrasound

SPECIFICATIONS:

Material: Zerdine™ 1

Targets:

Dense Masses: 2 and 8 mm in diameter for core biopsy

Cystic Masses: 3 to 10 mm in diameter for needle aspiration

Volume: 500 cc

Dimensions: 12 cm L x 10 cm W x 9 cm H

Weight: 1 lb/.44 kg

18-229 Triple-Modality Biopsy Training Phantom
Save When You Buy 3 or More

Discounts on Quantity Purchases are Available!

1) U.S. Patent No. 5196343

MAMMO-CUBE STEREOTACTIC CORE BIOPSY PHANTOM

The most cost-effective and economical phantom for teaching, training and QC.

A comprehensive mammography quality control program is an essential part of every mammography department, and so is the Mammo-Cube Stereotactic Core Biopsy Phantom. This tissue-equivalent phantom is designed to help maximize peak performance of all aspects of mammography equipment, as well as improve healthcare provider core biopsy skills, thereby promoting patient safety.

- Proprietary gel simulates physical density and mass attenuation of BR-12.
- Gel will not dry out after initial needle punctures, thus extending storage life.
- Physical consistency similar to human tissue enables palpation of embedded lesions and accurately simulates needle resistance.
- Includes six dense masses, 5 mm to 12 mm in diameter.
- Designed to accommodate standard compression paddle windows.

Nuclear Associates' Mammo-Cube Stereotactic Core Biopsy Phantom is a highly-versatile phantom that is designed specifically for:

- Training technologists and physicians in the use of a stereotactic system.
- Radiology healthcare providers, as a means by which to maintain and increase their core biopsy skills.
- Research and development applications.
- Use by manufacturers of stereotactic equipment as a demonstration tool.



SPECIFICATIONS:

Embedded Lesions: Six dense masses, 5 mm to 12 mm in diameter

Proprietary Gel: Simulates the physical density and mass attenuation of BR-12. The gel will not dry out after initial needle punctures, thus extending storage life

Physical Consistency: Similar to human tissue and combined with an elastic, skin-like membrane which enables palpation of embedded structures and accurately simulates needle resistance

Care: The phantom should be stored in a cool place, and discarded after all lesions have been biopsied

Dimensions: 7 cm L x 6.5 cm W x 4.5 cm H*

Weight: 5 oz*

* Individual cube dimensions and weights may vary by 10%.

18-229-1313 Mammo-Cube Stereotactic Core Biopsy Phantom

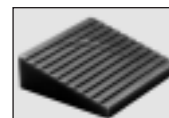
Save When You Buy 3 or More



Discounts on Quantity Purchases are Available!

See Also...

Nuclear Associates is proud to offer a full line of high-quality step wedges for all of your sensitometry needs.



See Radiology/Fluoroscopy Section, Page 50

TISSUE-EQUIVALENT ULTRASOUND NEEDLE BIOPSY PHANTOM

This patient-equivalent phantom is the perfect training device for ultrasound-guided needle biopsy procedures!



- Developed to improve skills in the art of ultrasound-guided needle biopsy procedures.
- Allows physicians to improve their hand/eye coordination, build confidence, and increase and maintain their needle biopsy skills.
- Flesh-like consistency allows for the palpation of embedded lesions while accurately simulating needle resistance found in human tissue.
- Ideal for evaluation of new equipment or test procedures prior to clinical use.
- Simulates an average breast in the supine position.

In order to provide good quality assurance and patient safety, it is essential that physicians, radiologists, and mammographers be trained in the ever-increasing use of needle biopsy.

The Nuclear Associates Tissue-Equivalent Ultrasound Needle Biopsy Phantom meets this need. Suspect lesions discovered in x-ray mammography often must be evaluated under ultrasound to aid in the diagnosis. This realistic, flesh-like phantom is the ideal training device...it accurately mimics the ultrasound characteristics of tissue found in an average human breast.

The size and shape of the phantom simulates that of an average breast in the supine position. A special holding tray facilitates proper hand position during the training procedures. Protected by a membrane, the phantom's flesh-like consistency enables palpation of the larger embedded masses, while also simulating needle resistance.



The Tissue-Equivalent Ultrasound Needle Biopsy Phantom was designed and developed by practitioners skilled in the art of ultrasound-guided needle biopsy procedures.

SPECIFICATIONS:

Material: Zerdine™ 1

Phantom Dimensions: 12 cm W x 15 cm L x 7 cm H; 600 cc

Targets: Six cystic masses, 8 to 15mm, randomly positioned.
Six dense masses, 6 to 12mm, randomly positioned.

Weight: 1.78 lbs (.81 kg)

84-332 Tissue-Equivalent Ultrasound Needle
Biopsy Phantom

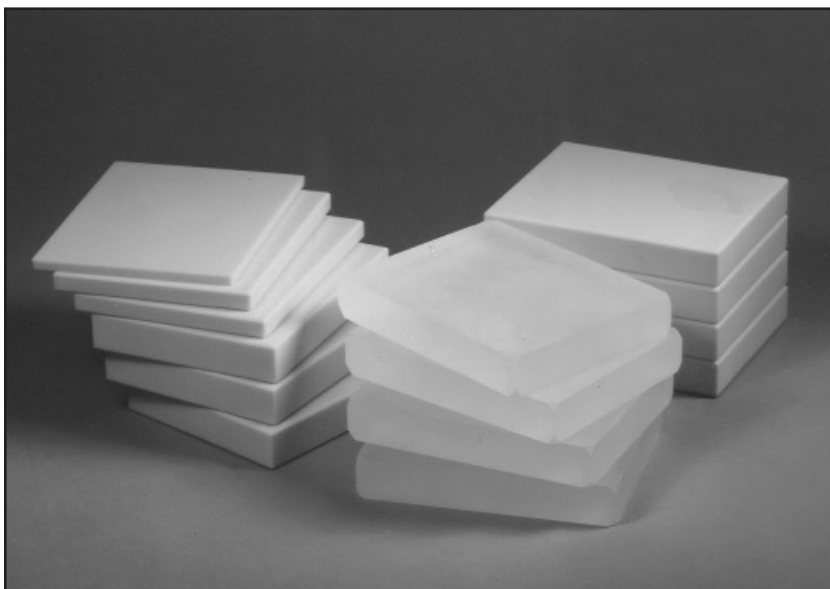
Save When You Buy 3 or More

1) U.S. Patent No. 5196343

**Discounts on Quantity
Purchases are Available!**

* Developed by Don Jacobson, Ph.D.

MAMMOGRAPHY PHOTOTIMER CONSISTENCY TEST TOOL



- Available in either acrylic or tissue-equivalent BR-12 material.*
- Should be used to test thickness tracking.

The mammographic unit's automatic exposure control should be capable of maintaining optical density within ± 0.15 OD as the voltage is varied from 25 to 35 kVp, and as breast thickness is varied from 2 to 8 cm for each technique. Test images taken of uniform phantoms of varying thicknesses should not differ by more than 0.30 OD from each other. These tests should be carried out over the kVp range customarily used by the mammography center.

The Phototimer Consistency Test Tool is available in two materials: acrylic, and for more accurate results, in breast-tissue-equivalent BR-12 material. Both are supplied in uniform 2.0 cm slabs to produce thicknesses of 2, 4, 6 and 8 cm.

18-203 Phototimer Consistency Test Tool, Set of Four Acrylic Slabs (10 x 12.5 x 2 cm thick), Weight: 3 lbs (1.34 kg)

18-204 Phototimer Consistency Test Tool, Set of Four BR-12 Slabs (10 x 12.5 x 2 cm thick), Weight: 2.2 lb (1 kg)

18-238 Phototimer Consistency Test Tool Research Set of Six BR-12 Slabs (includes three 10 x 12.5 x 2 cm thick, two 10 x 12.5 x 1 cm thick, and one 10 x 12.5 x .5 cm thick), Weight: 2.6 lbs (1.2 kg)

MAMMOGRAPHY PHANTOM MATERIAL

Available in either acrylic or tissue-equivalent BR-12.

For testing...

- Automatic Exposure Control (AEC)
- Collimator Assessment
- Artifact Evaluation

The American College of Radiology's Committee on Quality Assurance in Mammography (Medical Physicist's Manual) recommends, as part of the required test equipment, this phantom material.

18-224 Acrylic, One Sheet 18 cm x 24 cm x 2 cm
Weight: 2 lbs (.92 kg)

18-225 BR-12, Two Sheets, 18 cm x 24 cm x 2 cm,
Weight: 3.8 lbs (1.7 kg)

* BR-12 is a designation (D.R. White, et al.) of certain epoxy resin formulations which react to x-ray in the mammographic energy range (15–30 keV) in the same manner as human tissue. The tissue-simulation properties for these slabs are maximized at 20 keV (28 kVp $\pm$). The glandular equivalency of this material is 45% in the mammographic range.

Mammography, and X-Ray Film Processor Quality Control Compliance Software Programs

AutoMAMM Deluxe...AutoSTPP and AutoMAMM

**The Only Hassle-Free, Stress-Free, Paper-Free, Windows-Compatible
Recordkeeping Software Programs That Almost Make Quality Control Fun!**

► AutoMAMM Mammography QC Software

- The answer to MQSA QC Compliance.
- Tracks all data, forms, and plots required by MQSA.
- Performs calculations for repeat analysis, film processor five day (or any number of days) averaging, and film processor crossover calculations. (See the bottom of this page.)

► AutoSTPP X-Ray Film Processor QC Software

- Performs x-ray film processor quality control **IN SECONDS** with *any* Nuclear Associates sensitometer and densitometer and virtually all other brands.
- Measures and analyzes the data...generate comprehensive reports including: control charts, D Log E curves, corrective action forms and more. (See the top of the next page.)

AutoMAMM Deluxe

The best of both programs!

- The ultimate QC software program combines x-ray film processor QC and mammography QC compliance into one easy to use Windows-based program.

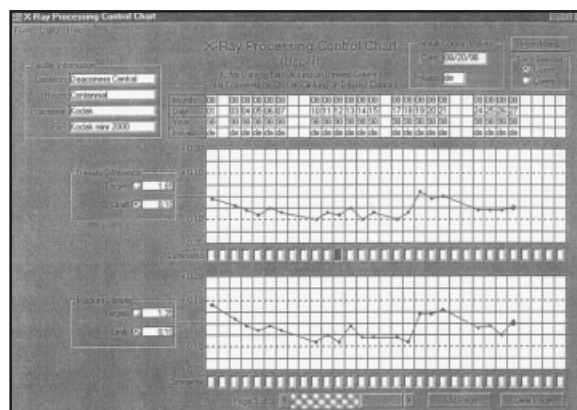
18-129 AutoMAMM Deluxe: Includes both AutoMAMM Mammography QC Software and AutoSTPP Film Processor QC Software in one program.



AutoMAMM MAMMOGRAPHY QC COMPLIANCE SOFTWARE PROGRAM.

A Windows-based program designed to assist the mammography technologist in documenting, plotting, and presenting MQSA QA data.

- AutoMamm provides all the charts you are familiar with:
 - Visual Checklist
 - Daily Checklist
 - Monthly Checklist
 - Phantom Control Charts
 - Repeat Analysis
 - Technique Charts
- Reprint charts any time you like.
- Date checking feature identifies which tests are past due.
- Allows you to enter comments for any line item.
- Mouse-controlled entry of data: Pass, Fail, Pass with Comment, Fail with Comment, or no entry.
- Identifies out-of-band points.
- Automatically performs all calculations of the repeat analysis.
- Construct your own mammography technique chart.
- Charts mammography phantom test results.
- Allows you to plot up to five phantom films for a given day.



- Lets you quickly and easily change your target values without having to begin a new chart.
- Handles an unlimited number of mammographic units.
- Allows the export and/or import of data files.
- Analyzes the data according to ACR recommendations.
- Facilitates compliance with MQSA, ACR, JCAHO, and state requirements.

18-102 AutoMAMM Mammography QC Compliance Software Program

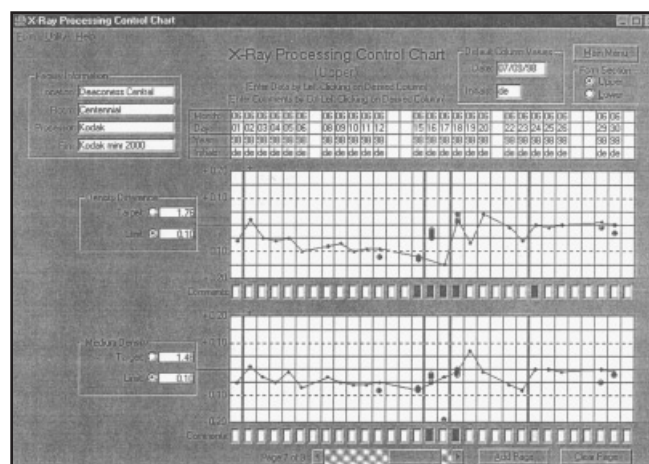
Compatible with Windows '95, '98 or NT Platform

(Continued on the next page)

AutoSTPP X-RAY FILM PROCESSOR QC SOFTWARE

The Windows™-based program for sensitometric testing of processor performance.

- Data may be entered manually or captured directly from selected densitometers with RS-232C port.
- Define your own target values.
- Target values can be easily changed; no re-plotting required!
- Comments can be recorded daily to clarify and record action taken.
- Performs five-day (or any number of days) averaging automatically.
- Performs cross-over calculations and automatically re-establishes target values.
- Unlimited number of processors can be tracked.
- Processor data may be tracked for years within the same data file.
- Re-prints charts any time you like.
- Prints out H & D curves.
- Identifies out-of-band points and indicates the possible source of the problem.
- Allows up to five data points to be entered for a given day, for a given processor.



- Allows the export and/or import of data files.
- Analyzes the data according to ACR recommendations.
- Facilitates compliance with MQSA, ACR, JCAHO, and state requirements.

18-109 AutoSTPP Film Processor QC Software

PC Requirements:

IBM or IBM-compatible with 16 Mbytes of RAM. Compatible with Windows '95 or '98, and NT platform. Hard Drive: 200 megabytes. Graphics Adapter: 800 x 600 VGA mode required. Ports: One RS-232C; one parallel communications port. Printer: Any Windows '95-compatible printer.

MAMMOGRAPHY SCREEN-FILM CONTACT TEST TOOL *

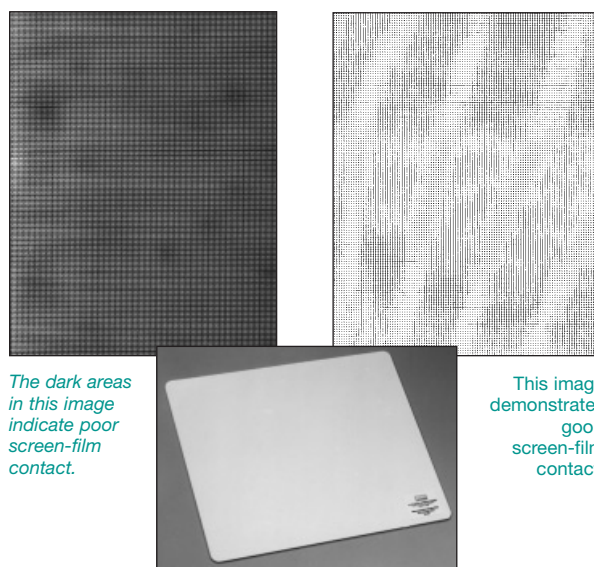
- Identifies poor screen-film contact in cassettes.
- Identifies problems that can affect image sharpness.

Proper screen-film contact is essential for optimum image quality. The loss of contact and resolution is critical in areas of tiny calcifications or very subtle nodules. Contact testing should be performed on a routine basis to ensure the best possible image quality.

Because of the high resolution imaging capabilities of mammographic screen-film systems (16 to 20 cycles/mm vs. a conventional system with 4 to 8 cycles/mm), a fine mesh contact tool should be used to detect areas of poor contact. The Mammography Screen-Film Contact Test Tool consists of a copper screen with 40 wires per inch, laminated in white vinyl-covered plastic (with the equivalent density of 4 cm thickness of acrylic).

Just lay the contact tool over the cassette. Move the compression device as close as possible to the x-ray tube, and make an exposure. Process the film and look for screen-film clarity across the film. Dark areas indicate poor screen-film contact.

You Can See the Difference!



The dark areas in this image indicate poor screen-film contact.

This image demonstrates good screen-film contact.

SPECIFICATIONS:

Dimensions: 28.5 cm x 33.5 cm

Weight: 1.05 lbs. (.48 kg)

18-207 Mammography Screen-Film Contact Test Tool

* Designed by Joel E. Gray, Ph.D., Professor Emeritus, Department of Radiology, Mayo Clinic®, Rochester, MN 55905. Manufactured under licensing agreement with Mayo Foundation for Medical Education and Research.

MAMMOGRAPHY QC COMPLIANCE KIT

- Helps keep mammographic equipment working perfectly...delivering optimum quality images at lowest dose possible!
- Facilitates compliance with MQSA, ACR, and State quality control requirements!
- Easy to use, highly accurate instruments and accessories needed for daily testing!

Mammograms are only as accurate as the systems that produce them. Keeping these systems in peak working condition is paramount in producing sharp, high quality images! Because every mammography system deteriorates with time, it is important that you maintain an ongoing quality control program; one that can detect even the smallest changes in your imaging chain...from x-ray generator to x-ray film processor.

This Mammography Quality Control Compliance Kit contains the most needed products that will allow you to implement a comprehensive QC program and comply with MQSA regulations, ACR recommendations, and State requirements.

Contains all the essential products recommended by the American College of Radiology in their quality assurance program.



Mammo QC Compliance Kit includes:

Model	Description
18-220	Mammographic Accreditation Phantom (See page 121)
07-417	Hand-Held Dual-Color Sensitometer (See page 378)
07-443	Deluxe Digital Clamshell Densitometer (See page 379)
07-402	Film Processor Digital Thermometer (See page 383)
18-207	Mammography Screen-Film Contact Test Tool (See page 139)
18-241	Mammography Compression Scale (See page 141)
18-205	Acrylic Contrast Test Disc (See page 121)
18-231	Fixer-Retention Chemical Kit (See page 384)
18-235	Hypo-Estimator Comparison Strip (See page 384)
18-234	Mammography Cassette Wipes (See below)
18-290-1000	Radiologic Technologist's Quality Control Manual (See page 99)
89-290	Durable Storage/Carrying Case

Weight of kit: 32 lbs (14.4 kg)

18-290 Mammography Compliance QC Kit

See Also...

- **X-Ray Test Patterns**
See Radiology/Fluoroscopy Section, Page 32
- **Slit Cameras**
See Radiology/Fluoroscopy Section, Page 35
- **Mammography Focal Spot Test Stand**
See Radiology/Fluoroscopy Section, Page 36
- **X-Ray Pinhole Assembly**
See Radiology/Fluoroscopy Section, Page 38



MAMMOGRAPHY CASSETTE WIPES

Prevent misdiagnosis caused by dust artifacts!



Mammography cassettes require special attention to make certain that the screen is clean of any dirt and dust particles, to prevent any potential artifacts in the mammogram.

The Mammography Cassette Wipe is a special material that is soft, absorbent, lint-free, and has anti-static properties...ideal for use in cleaning dust and dirt on video displays and monitors. The wipes are 8" x 12".

Weight of box: 1.5 lbs (.66 kg)

18-234 Mammography Cassette Wipes, Box of 100



Request a FREE Sample!

HIGH-PRECISION ELECTRONIC MAMMOGRAPHY COMPRESSION SCALE

Strain-gauge system provides the most accurate readings...Ideal for service use.

- Alerts user to compression force changes, for enhanced patient comfort and safety.
- Highly accurate readings (to .25 pound) determine if equipment is providing adequate compression in manual and power modes.
- Reads in pounds and kilograms.
- Features serial communications port for computer interfacing.
- Includes a detachable, remote wall-mountable display unit, for convenient viewing.

For adequate compression of the breast, the compression force should range from 25 to 40 pounds in both manual and power drive modes. Verification testing should be done initially, then semi-annually and whenever reduced compression is suspected, so that appropriate internal adjustments can be made.

This high-precision scale features a strain-gauge weighing system that provides the most accurate readings! Scale capacity is 100 pounds (45 kilograms). An overload protection system prevents damage in the event of accidental compression in excess of 100 pounds.

The easy-to-read LCD head is detachable, for added convenience. It includes a six-foot cord and wall bracket for remote wall mounting. A serial communications port permits interfacing with a computer. *The scale is easy to use:* Simply place it on the cassette holder. Place the protective foam spacer on the scale (which protects the compression device and provides a more uniform compression force). Activate the compression device in either the manual or power mode and allow it to operate until it stops automatically. Then read and record the compression force.

**AN INTEGRAL
PART OF ANY
QC PROGRAM!**



SPECIFICATIONS:

Power: Operates on an AC adapter (included), or one 9V battery, (not included)

Dimensions: 14 1/2" x 10 5/8"

Weight: 5 lbs, 2 oz

18-241-4426 High-Precision Electronic Mammography Compression Scale, Includes Foam Spacer and Adapter

MAMMOGRAPHY COMPRESSION SCALE

It's easy to use! Simply place the scale on the cassette holder, centered under the compression device. Place the protective foam spacer on the scale (which protects the compression device and provides a more uniform compression force). Activate the compression device in either the manual or power mode and allow it to operate until it stops automatically. Then read and record the compression force.

SPECIFICATIONS:

Foam Spacer: 6 1/2" x 9 1/2" x 1 5/8"

Dimensions: 10 1/2" x 10" x 2" high

Weight: 3 lbs, 2 oz

18-241 Mammography Compression Scale, Includes Foam Spacer



The American College of Radiology recommends this type of product in their quality assurance program.

GRID VIEW™ BREAST BIOPSY TRANSPORT & IMAGING SYSTEM*

An accurate, time-saving system for transporting, imaging and identifying breast biopsies.

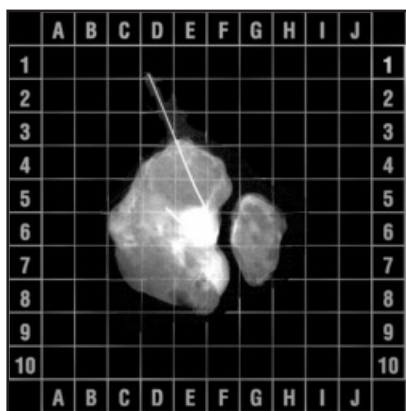
- Reduces surgery time through improved imaging turnaround.
- Improves communication between surgery, radiology and pathology.
- Eliminates physical handling of specimen in radiology.
- Reduces exposure to blood-borne pathogens.
- Eliminates the need for needles or wires.
- Meets all OSHA requirements for specimen handling.

The GRID-VIEW System from Nuclear Associates enables the breast biopsy procedure to be performed faster, easier and more accurately than ever before! With GRID-VIEW there is no longer an open, exposed specimen which must be handled a number of times. There is no longer a delay between the specimen being brought down from surgery to radiology to be placed on a makeshift imaging board. And with GRID-VIEW, there is no longer any guesswork as to the orientation of the specimen!

The GRID-VIEW System is composed of a sealable plastic container that contains a radiopaque grid which is lettered and numbered for accurate orientation. Once the top of the GRID-VIEW container is closed, the specimen is compressed onto the grid, making it stationary and ready for transport.

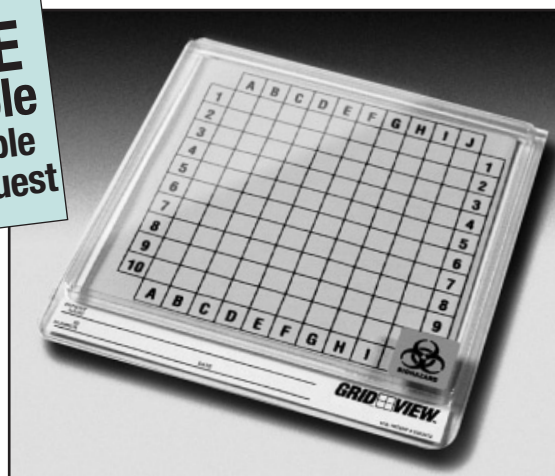
Using GRID-VIEW Makes Your Job Easy:

1. Biopsy tissue is placed in GRID-VIEW container.
2. GRID-VIEW container is delivered to radiology for confirmation image.
3. GRID-VIEW container with biopsy is delivered undisturbed to pathology with the x-ray image.
4. Specimen is compared with x-ray image by pathologist.



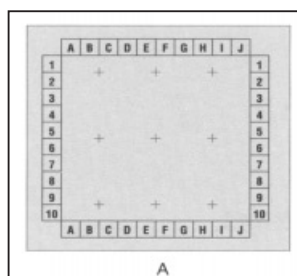
**FREE
Sample
Available
on Request**

**FREE
SAMPLE**



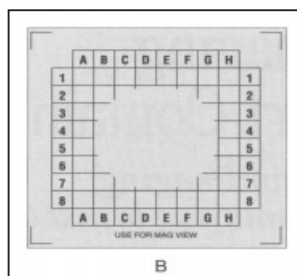
Choose From Three Grid Designs...

18-230-1000 Grid-View System,
Sold in Packages of 12,
Weight: 1lb (.44 kg)



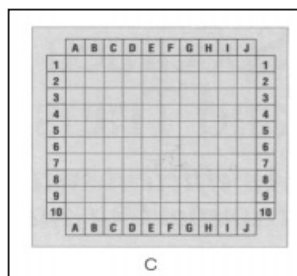
**Sold by the Case
(case contains
12 packages,
or 144 units)**

18-230-2000 Grid-View System,
Sold in Packages of 12,
Weight: 1lb (.44 kg)



**Sold by the Case
(case contains
12 packages,
or 144 units)**

18-230-3000 Grid-View System,
Sold in Packages of 12,
Weight: 1lb (.44 kg)



**Sold by the Case
(case contains
12 packages,
or 144 units)**

*U.S. Patent No. 5383472

VIEW MARKERS FOR MAMMOGRAPHY

Labeling in accordance with ACR program requirements!



- Meets all requirements for standardized terminology set forth by the MQSA and American College of Radiology.
- Standardized labeling of mammography films is essential to ensure that films are not misinterpreted.

As stated in the American College of Radiology Mammography Quality Control Manual, it is required that all mammography films are labeled to prevent misinterpretation. These View Markers are in accordance with ACR requirements.

The markers are radiopaque, and each is equipped with an attached “super hold” suction cup. Firm, gentle pressure will hold the suction cup in place on the side of the mammography unit.

Choose from the following kits:

- **Standard Kit** (normal requirement) consists of eight markers for the most frequently used positions.
- **Specialty Kit** consists of 14 specialty markers.
- **Full-Service Kit** consists of 22 markers (Standard plus 14 specialty markers) for use with all possible positions.

LABELING CODES FOR POSITIONING*		
	Labeling Code	Purpose
Laterality		
Right	R**	
Left	L**	
Projection Position		
Mediolateral oblique	MLO	Standard view
Craniocaudal	CC	Standard view
90° Lateral		
Mediolateral	ML	Localize, define
Lateromedial	LM	Localize, define
Spot Compression	SPOT	Define
Magnification	M**	Define
Exaggerated craniocaudal	XCCL	Localize
Cleavage	CV	Localize
Axillary tail	AT	Localize, define
Tangential	TAN	Localize, define
Rolled lateral	RL (rolled lateral) †	Localize, define
Rolled medial	RM (rolled medial) †	Localize, define
Caudocranial	FB (from below)	Define
Lateromedial oblique	LMO	Define
Superolateral to		
inferomedial oblique	SIO	Define
Implant displaced	ID	Augmented breast

† Used as a suffix after the projection. For example, LCCRL equals Left Craniocaudal Upper Breast Tissue Rolled Laterally.

* Taken from ACR Mammography Quality Control Radiologic Technologist Manual.

**Used as a prefix before the projection. For example, RMMLO equals Right Magnification Mediolateral Oblique.

Each marker includes a suction cup. Each set includes a holder (the small set gets a small holder, the larger sets get a larger holder).

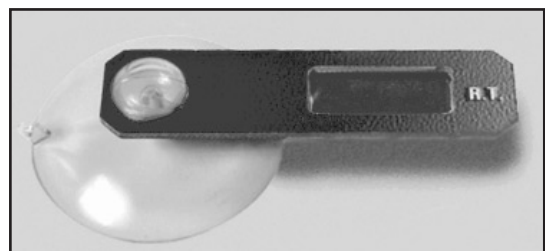
Individual markers, holders, and replacement suction cups are also available.

- 18-210-8000** Standard Kit of 8 View Markers,
Weight: .50 lb (.24 kg)
- 18-210-1400** Specialty Kit of 14 View Markers,
Weight: 1.0 lb (.5 kg)
- 18-210-2200** Full-Service Kit of 22 View Markers,
Weight: 1.75 lbs (.78 kg)

PERSONAL ID MARKER

In order to comply with MQSA and ACR requirements for labeling mammograms, it is required that technologists who perform the examination be identified.

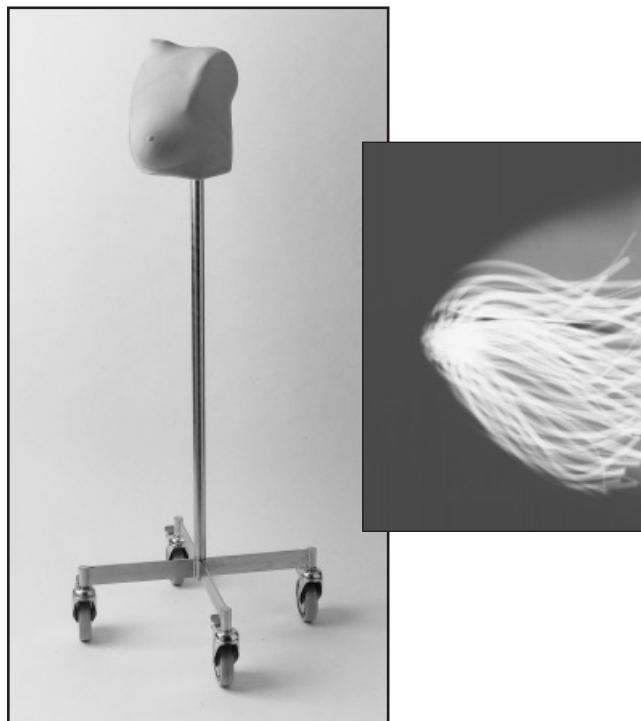
This ID marker enables you to conform to this requirement. Weight: Less than one pound



18-210-1407 Personal ID Marker

MAMMO...MAMMOGRAPHY TRAINING PHANTOM

For “hands-on” positioning training.



Positioning for craniocaudal viewing.

- **Teaches training for craniocaudal and mediolateral oblique views.**

Using this excellent phantom, students can learn the significance of technical factors for breast examinations, and may take unlimited exposures of the phantom to judge their performance!

MAMMO was developed by training experts whose guidelines were that of a simple image with good contrast and within the range of normal technical factors. Because breast architecture is too complex to be duplicated exactly for every part of the range of images encountered in clinical practice, *MAMMO is not intended as a quality control tool.*



◀ *Positioning for mediolateral oblique view.*

Before compression, MAMMO's internal structure may be compared to a set of “nested parachute strings” of progressively increasing size, with the apex bonded inside the nipple. One of the “parachute strings” has an embedded calcification used to teach “cone-down” procedures. MAMMO presents positioning cues similar to a real patient, for craniocaudal and mediolateral views.

MAMMO can be pulled forward and compressed, then radiographed with standard techniques.

As mammo breast compression reaches a position within 5 mm of the correct compression limit, a red indicator lamp signals caution. This indicates that MAMMO is approaching the end of its range, requiring the student to take the same care for final compression with the MAMMO, as would be required with an actual patient.

A metal rod projecting from the back of MAMMO is joined with a bracket mounted on the vertical support post. The phantom's working height can be adjusted to simulate patients of varying heights. This mounting system allows MAMMO to be rotated about the post, and angled up or down. The phantom also bends from side to side to simulate medical lateral and axillary lateral projections. A hooked rod is used to increase curvature for the mediolateral view. MAMMO's interior contains a “muscle” to guide positioning for this view.

MAMMO's anterior and posterior skins are bonded together to seal the interior for the nest of “parachutes.” This space is filled with a stable, fat-simulating liquid.

Weight: 50 lbs (23 kg)

18-243 MAMMO Mammography Training Phantom, with Stand

**If you don't see it, ask for it. . .
We are always adding new items to our
product line, and may have exactly what
you're looking for!**

DIAGNOSTIC BREAST PHANTOM

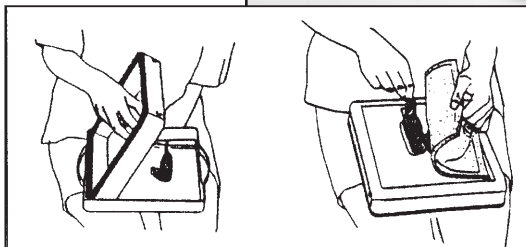
Perfect for cyst aspiration, palpation and self-diagnosis training.

Nuclear Associates' Diagnostic Breast Phantom responds to gentle palpation in a life-like way, and is designed for training across a range of applications, including self-diagnosis, cyst aspiration and other hands-on procedures for nurses, doctors and specialists.

The phantom contains a simulated carcinoma, fibroadenoma and a benign cyst, which can be recharged with fluid after aspiration. It is made from durable synthetic materials and can be easily cleaned with mild soap and water.

Weight: 5 lbs (2.3 kg)

18-212 Diagnostic Breast Phantom



MAMMO TOWELETTES



Unreadable mammograms are frustrating...for both the technician and the patient. *You'll get a clean, clear, readable image every time, when your patients use our Mammo Towelettes before a procedure.* Pre-moistened with an antiseptic, they are the ideal wipe to use when removing powders, oils and other residues which could cause artifacts in the mammogram. Your patients' skin will dry in seconds, leaving them with a fresh feeling.

Weight: 4.5 lbs (2 kg)

18-276 Mammo Towelettes, Box of 500

MAMMO DEODORANT WIPES*



Your patients will appreciate your care and concern when you offer them one of our pleasantly scented Mammo Deodorant Wipes. They're the perfect way to freshen up *after* a mammogram, leaving the patient feeling clean and comfortable.

Weight: 4.5 lbs (2.1 kg)

18-277 Mammo Deodorant Wipes, Box of 500

*Contains aluminum chlorohydrate.

