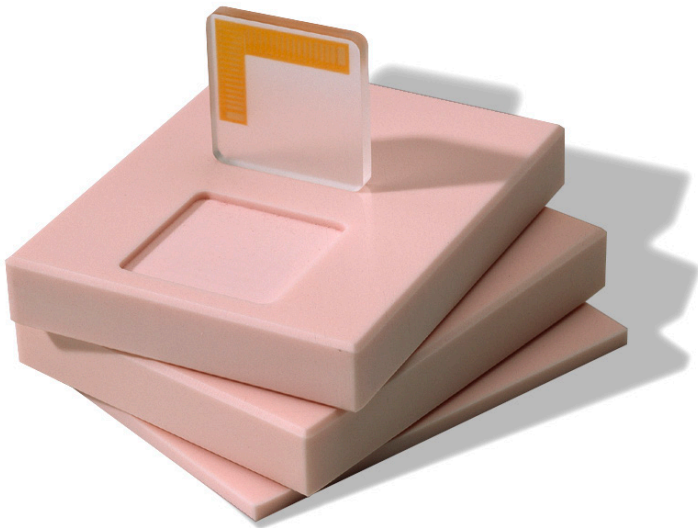


# *Single Exposure High Contrast Resolution Phantom*

Model 016A-BR12



## USER GUIDE

**CIRS**

900 Asbury Ave • Norfolk, Virginia 23513 • USA • Tel: 757-855-2765 • [WWW.CIRSINC.COM](http://WWW.CIRSINC.COM)



## **OBJECTIVE**

Focal spot performance may be evaluated by determining limiting resolution with a high contrast resolution pattern. The resolution pattern should provide a test of at least 16 line pair per millimeter (lp/mm), but a resolution pattern with 20 lp/mm is ideal. The test should be marked to identify the number of lp/mm in the image at appropriate points.

## **PHANTOM DESCRIPTION**

The Model 016A-BR12 incorporates two 17.5 micron thick gold-nickel bar patterns positioned at 90 degrees. This allows assessment of resolution perpendicular and parallel to anode-cathode axis in just one exposure. Each pattern has 17 segments from 5 lp/mm to 20 lp/mm, equivalent to 25 microns of lead at 20 keV.

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

The phantom body consists of BR12. The BR12<sup>2</sup> is a tissue simulating epoxy resin with a linear attenuation of 45% glandular and 55% adipose.

The phantom body features a cavity for the acrylic wafer. This design enables consistent, reproducible positioning of the bar pattern at 4.5 cm above the breast support plate and 1 cm from the chest wall, centered laterally (as recommended by the American College of Radiology).

## **SPECIFICATIONS**

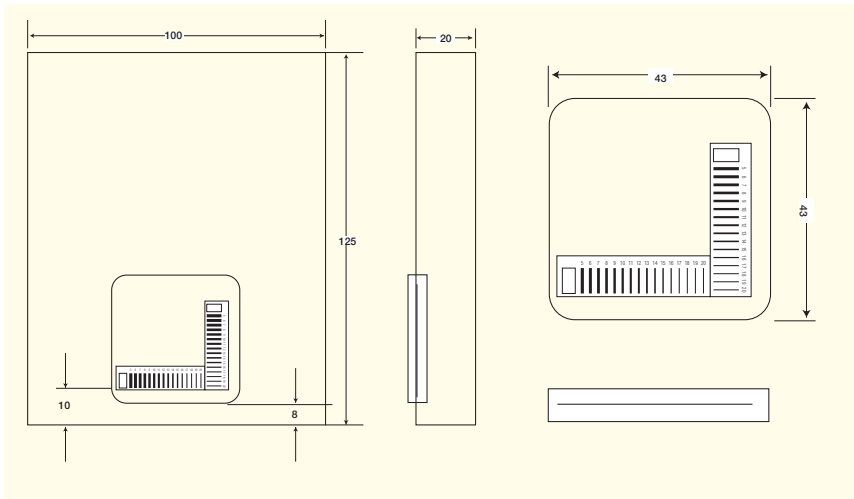
<b>SET DIMENSIONS:</b>	12.5 cm x 10 cm x 4.5 cm (4.9" x 3.9" x 1.7")
<b>PHANTOM WEIGHT:</b>	2 lbs. (0.7 kg)
<b>MATERIALS:</b>	Phantom: BR12 Target: Gold Nickel Construction (equivalent to 25 microns lead or 2.6 mm aluminum) Embedded in acrylic

<sup>1</sup> Hammerstein R., Miller D., White D., et al; Absorbed Dose in Mammography; RADIOLOGY;130:485-491, 1979.

<sup>2</sup>White, D.R., R.J. Martin, and R. Darlison, Epoxy resin based tissue substitutes, British Journal of Radiology, 5, 814-821, 1977.

## USE OF THE PHANTOM

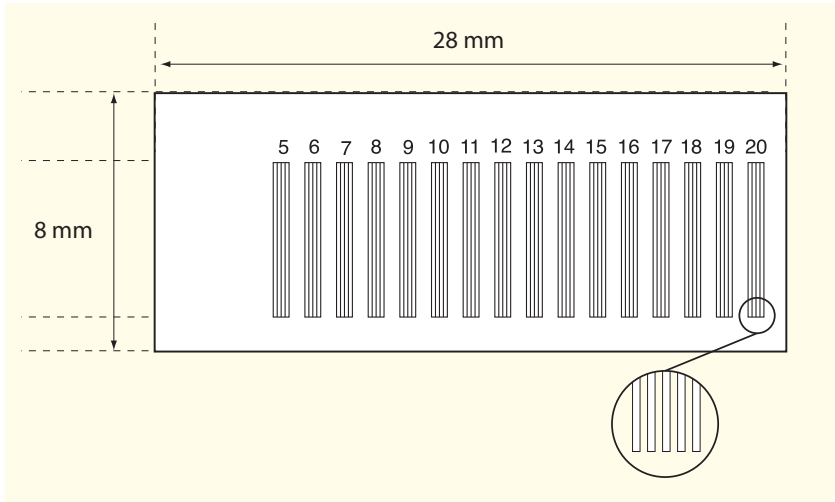
1. Place the pattern at the desired height above the breast support plate, either with no extraneous materials between the bar pattern and the breast support or with a homogenous phantom supporting the pattern. Position the pattern within 1 cm of the chest wall edge of the image receptor, centered laterally. It is important that the test pattern be positioned in a reproducible manner. A test stand or jig may be helpful.
2. Place the image receptor in the location where it would normally be used for mammography.
3. Select the kVp, mA, and focal spot used for imaging an average breast during normal radiography and an exposure time that will produce a background optical density from 1.2 to 1.6. This may be done either manually or in the AEC mode. For specifications regarding digital mammography, refer to the ACR–AAPM–SIIM Practice Guideline For Determinants Of Image Quality In Digital Mammography<sup>3</sup>.
4. Make an exposure and process for review.



Slab Layout with Acrylic Target

Acrylic Target (016AW)

<sup>3</sup>THE AMERICAN COLLEGE OF RADIOLOGY MAMMOGRAPHY QUALITY CONTROL MANUAL 1999 Revised Edition, Page Nos. 238-240.



20 Line Pair per Millimeter Bar Pattern (Model 019-500)

### ***DATA INTERPRETATION AND ANALYSIS***

1. Under masked conditions, view the high-contrast resolution pattern images using adequate magnification.
2. Note the highest frequency pattern whose lines are distinctly visible throughout at least half of the bar length and record the highest frequency visible for each test image.

### ***SUGGESTED PERFORMANCE CRITERIA AND CORRECTIVE ACTION***

In the contact mode, measurements made with the bars parallel to the anode-cathode axis should be at least 13 lp/mm; measurements with the bars perpendicular to the anode-cathode axis should be at least 11 lp/mm. In magnification mode, the limiting spatial resolution should be no lower than the above specification.

## ***CLEANING***

Cleaning may be accomplished by using mild soap and water solutions. Avoid contact with corrosive substances and with radiographic contrast media. Wash thoroughly if such contact occurs.

## ***HANDLING AND STORAGE***

Your phantom is manufactured from epoxy resin. Various other chemicals and fillers have been added to the resin using a proprietary tissue simulation technology. As with most other epoxy plastics, your phantoms may discolor over time. This process can be accelerated by direct exposure to sunlight or extreme temperatures. Discoloration does not affect tissue equivalent performance. Epoxy is quite durable, but can still be damaged if it is dropped on a hard surface so handle with care! Most phantoms can be easily repaired. If damaged, contact CIRS.

## ***TECHNICAL SUPPORT***

Contact CIRS customer service at (800) 617-1177.

## **WARRANTY**

All standard CIRS products and accessories are warranted by CIRS against defects in material and workmanship for a period as specified below. During the warranty period, the manufacturer will repair or, at its option, replace, at no charge, a product containing such defect provided it is returned, transportation prepaid, to the manufacturer. Products repaired in warranty will be returned transportation prepaid.

There are no warranties, expressed or implied, including without limitation any implied warranty of merchantability or fitness, which extend beyond the description on the face hereof. This expressed warranty excludes coverage of, and does not provide relief for, incidental or consequential damages of any kind or nature, including but not limited to loss of use, loss of sales or inconvenience. The exclusive remedy of the purchaser is limited to repair, recalibration, or replacement of the product at manufacturer's option.

This warranty does not apply if the product, as determined by the manufacturer, is defective because of normal wear, accident, misuse, or modification.

### **NON-WARRANTY SERVICE**

If repairs or replacement not covered by this warranty are required, a repair estimate will be submitted for approval before proceeding with said repair or replacement.

### **RETURNS**

If you are not satisfied with your purchase for any reason, please contact your local distributor prior to returning the product. Visit <https://www.cirsinc.com/distributors/> to find your local distributor. If you purchased your product direct through CIRS, call Customer Service at 800-617-1177, email [rma@cirsinc.com](mailto:rma@cirsinc.com), or fax an RMA request form to 757-857-0523. CIRS staff will attempt to remedy the issue via phone or email as soon as possible. If unable to correct the problem, a return material authorization (RMA) number will be issued. Non-standard or "customized" products may not be returned for refund or exchange unless such product is deemed by CIRS not to comply with documented order specifications. You must return the product to CIRS within 30 calendar days of the issuance of the RMA. All returns should be packed in the original cases and or packaging and must include any accessories, manuals and documentation that shipped with the product. The RMA number must be clearly indicated on the outside of each returned package. CIRS recommends that you use a carrier that offers shipment tracking for all returns and insure the full value of your package so that you are completely protected if the shipment is lost or damaged in transit. If you choose not to use a carrier that offers tracking or insure the product, you will be responsible for any loss or damage to the product during shipping. CIRS will not be responsible for lost or damaged return shipments. Return freight and insurance is to be pre-paid.

### **WITH RMA NUMBER, ITEMS MAY BE RETURNED TO:**

CIRS  
Receiving  
900 Asbury Ave,  
Norfolk, Virginia, 23513 USA

<b>PRODUCT</b>	<b>WARRANTY PERIOD</b>
Model 016A-BR12 - Single Exposure High Contrast Resolution Phantom	60 Months

**CIRS**  
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