MODEL L-820
EXTRA LARGE BAR PHANTOM

January 2010

MODEL L-820
EXTRA LARGE BAR PHANTOM

January 2010

Ludlum Medical Physics
501 Oak Street • P.O. Box 810
Sweetwater, Texas 79556
325-235-5494 • Fax: 325-235-4672
www.medphys.ludlums.com

Table of Contents

Overview

The Model L-820 is ideal for daily/weekly QA checks of scintillation camera performance. The bar pattern phantom measures intrinsic and collimator spatial resolution (ability to see small objects), and spatial linearity (ability to correctly position image data), confirming the gamma camera's overall ability to identify and properly display small anatomic objects.

Each of the sets of parallel lines is precisely machined onto a plastic sheet. The lines are filled (cast) with Cerrobend ® high-density metal alloy. This causes the gamma radiation to be attenuated, thereby providing the QA image.

Specifications

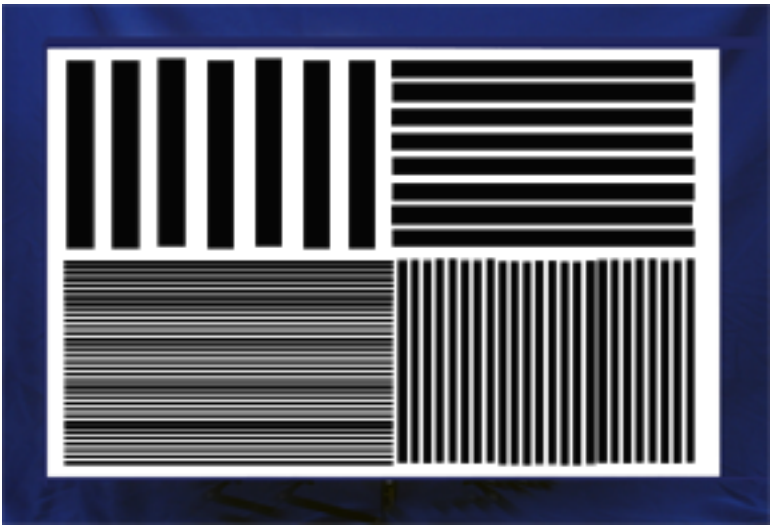
Available in standard or large

Size: 40.6 x 40.6 cm (16 x 16 in.) or

45.7 x 45.7 cm (18 x 18 in.)

Bar Widths: 0.10 (one-tenth) inch, 0.25 (one-fourth) inch, 0.1875 (three-sixteenths inch), 0.375 inch (three-eighths)

Weight: 5.4 kg (12 lb) or 6.8 kg (15 lb)



General Procedure (Intrinsic Resolution)

Select and adjust the window position to the appropriate width of the radionuclide being utilized for the QA procedure. A typical starting point is an FWHM value of 1.5.

√ **Note:** The count rate should not exceed 10,000 cps.

With the collimator removed, place the bar phantom against the face of the gamma camera. Raise the detector to its maximum height (generally 1.5 meters [60 inches] from the floor). Place the radioactive source (point source or vial) on the floor under the camera and center it to the detector.

Select the activity of the QA source being used. Make sure that the entire field is covered by the activity. Always use appropriate shielding. Collect an image with at least one million counts (two million counts for LFV cameras). Process the data collected and image as appropriate. If the image is acceptable, save and file it as the standard against which to measure future tests.

General Procedure (System Resolution)

Choose the desired collimator and attach to the gamma camera. Invert the detector. Place the bar phantom pattern on top of the collimator. Place a flood phantom or similar flood source on top of the bar phantom.

√ **Note:** Flood sources should not exceed 10,000 cps.

Again, collect an image with at least one million counts (two million counts for LFV cameras). Process the data collected and image as appropriate. If the image is acceptable, save and file it as the standard against which to measure future tests.

Place a 10 centimeters thickness of plastic (Lucite) attenuator between the bar phantom and the collimator. Collect another image with at least one million counts and evaluate as previously.

Results

The resulting linearity and intrinsic resolution information is dependent on a variety of factors, which must be taken into consideration when evaluating the results provided by the bar phantom. They include isotope energy, window width, collimation, activity density, count rate, distance from the collimator, and data processing/documentation. All of the latter should be standardized as much as possible for each test. Lack of standardization will make it difficult to determine true capabilities of the system.

Inspect the films following each test in order to determine the smallest bar spacing that can be visualized. Examine images further for distortion near the edges of the images. Note that the intrinsic resolution will always be better than the system resolution due to the addition of the collimator. The addition of the plastic attenuator will also reduce the visibility of the bar patterns.

While the viewing of images is subjective, comparing the results to previous images will provide important information about the trends in the resolution that is visible, thereby allowing the ability to correct problems (initiate service) before the system is used for clinical examinations.