MODEL L-647
RD/FL TEST TOOL

February 2017

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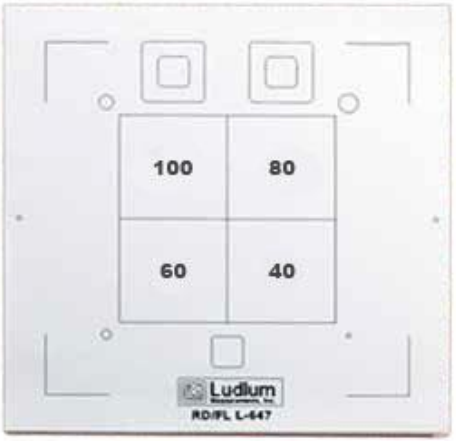
Overview

The RD/FL Test Tool was designed to give the diagnostic medical physicist, radiologic technologist, and/or service engineer an easy method for a quick evaluation of the image quality and performance of the departmental diagnostic radiographic and fluoroscopic imaging systems.

The tool provides an easy-to-use method for a quick overview of the constancy of the imaging system. For a standard R/F system, no more than 5 to 10 minutes should be required to complete the suggested protocol.

It is generally recommended that the test tool be utilized on all of the departmental radiographic and fluoroscopic equipment on at least a monthly basis.



At the center of the test tool is a square-shaped area divided into four quadrants numbered 40, 60, 80, and 100. The number on each quadrant represents the lines of wire mesh per inch in that segment. Visibility of a given quadrant will provide a cursory evaluation of high contrast resolution of the system. While this is in part a subjective evaluation, consistency of the resolution seen from test to test is more important.

Surrounding the mesh are four low-contrast "targets" of different diameters: 2 mm, 4 mm, 6 mm, and 8 mm. At the lower edge of the tool is a small "contrast" square, providing a low-contrast difference between the background and the square itself. At the upper edge of the tool are two monitor adjustment squares, one providing a low-contrast difference and the other providing a higher-contrast difference between the insert and the surrounding square. The copper attenuator in the test tool allows the plate to simulate the attenuation of a small adult. At each corner of the test tool, a 90-degree angle has been scribed onto the surface of the plate as an easy method for aligning the light field to the tool.

General Procedure

As previously noted, it is preferred that system evaluation be performed at least monthly. More frequent evaluations are suggested to prevent any unexpected imaging problems before actual clinical procedures are performed with the equipment. For more sensitive procedures like C-arm studies in the OR, consideration should be given to utilizing the test tool before each use of the instrument.

Radiographic Systems

1. When utilizing the Automatic Exposure Control mode, the techniques typical for a small abdomen usually work best to properly image the test tool (e.g., 70 kVp, center cell). Manual techniques may also be used.

2. After processing the film, measure and record the optical density of the background just outside the "density difference" square. In addition, measure the density difference square itself. Next, subtract this value from the background optical density. Record all the measure densities as well as the technique utilized right on the film.

3. Visually inspect the image on a standard view box and determine the smallest mesh pattern that is clearly visible. Record this value on the film.

4. Determine which of the four low-contrast targets is most clearly visualized. Circle this target on the film.

5. Place the film in the appropriate QA file.

Fluoroscopic Systems

1. Place the test tool on the table.

2. Position the image intensifier approximately 30.5 centimeters (12 inches) above the table. Use the same image intensifier for every evaluation.

3. During fluoroscopy – utilizing radiation safety methods (lead gloves, apron) – center the test tool under the image intensifier. For proper visualization of the various targets, 70 kVp is recommended for the Fluoro kV. Both monitor adjustment squares should be visible at this kV setting.

4. Evaluate the fluoroscopic image and determine the smallest mesh pattern that is clearly visible. Document this result.

5. Determine and record the smallest low-contrast target that is visible on the monitor. Document this result also.

6. Make a spot film image of the test tool. Process the film, then visually inspect the image on a standard view box and determine the smallest mesh pattern and low-contrast target that is clearly visible. Record this value on the film. In addition, make note of the kV and mA utilized to create the film. If the image is acceptable, use it as the standard to measure future films against.

Results

The results of the evaluation may be plotted on a graph rather than just recorded on the film or log sheet. Graphed results will make it easier to detect any trends that could adversely affect the performance of the system.

A properly functioning fluoroscopy system should be able to resolve at least the 40-mesh at the center of the image in the smallest mode. From image to image, the smallest mesh visible should not decrease by more than one step. The number of targets visible should also not decrease by more than one.

Report changes in resolution or contrast greater than one step, and schedule corrective action (service).

The mA for radiographic systems and the kVp and mA for fluoro systems should remain constant to within 10%. Increasing or decreasing trends should not be observed. However, it is possible to observe trends that do not move consistently in the same direction, but instead move either upward or downward over a longer period of time. In either case, note any inconsistencies and schedule corrective action.