FLUKE®
Biomedical

Nuclear Associates 18-201 and 18-207

Mammography Screen-Film Contact Test Tool

User Manual

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Section 1
Introduction

1.1 Purpose

To assure that optimum screen-film contact is obtained in mammographic cassettes.

NOTE

Mammographic screen-film systems have much higher resolution than conventional systems. Consequently, good screen-film contact is extremely important. Copper meshes used for conventional screen-film cassettes are not adequate for mammographic screen-film systems. A 40 mesh (40 wires per inch) copper screen must be used to test the contact of mammographic cassettes.

ACR recommendations state that acrylic sheets (sufficient to provide 4 cm thickness) are required.

The plastic material in the 18-201 and 18-207 has the equivalent density of 4 cm thickness of acrylic.

1.2 Equipment Required

1. Mammographic Screen-Film Contact Test Tool (18-201 8 ½" x 10" 21 x 25 cm or 18-207 in white 11 ¼" x 13 ¼" 28.5 x 33.5 cm copper screen laminated in plastic)
2. Cassettes (with film) to be tested
3. Lead numbers
4. Densitometer

1.3 Frequency

This test should be carried out when new cassettes and screens are purchased or initially (at the start of the quality control program) and every six months. In addition, the test should be repeated whenever reduced image sharpness is suspected.

1.4 Procedures

1. Place the cassette to be tested on edge of the cassette holder, i.e., without any grid between the x-ray tube and the cassette.
2. Place the mesh on top of the cassette, and move the compression device as close as possible to the x-ray tube.

3. Place the lead numbers corresponding to the number of the cassette on top of the mesh in the image area.

4. Select a manual technique (at 28 kVp) that will produce a film density between 0.70 and 0.80 when measured over the mesh near the chest wall side of the film.

5. The density of the film must be read with a densitometer using an aperture of 2.0 mm in diameter or larger. The density is read directly over the image of the copper mesh.

6. Expose and process the film.

7. View the films at a distance of at least one meter on a mammographic viewbox. Areas of poor contact will appear as dark areas in the image of the mesh (See Figure 1-1).

1.5 Problems and Pitfalls

1. It is essential to view the mesh images from at least one meter (3 feet) since the darker areas in the image indicate poor contact. It is not necessary and extremely difficult to examine the images closely looking for areas of sharpness.
2. Small pieces of dust or dirt can significantly reduce screen-film contact for distances up to 1 cm or more away from the dust or dirt speck. If multiple areas of poor contact, about the size of a dime, are present, thoroughly clean the screens using a screen cleaner recommended by the screen manufacturer, allow them to dry, and retest the cassette.
3. Poor contact may also be caused by air entrapped between the intensifying screen and the film. This is especially noticeable if the cassettes are exposed within 5 or 10 minutes after they are loaded with film.

NOTE

If this problem is evident, then it will be necessary to wait at least 15 minutes after loading cassettes with film for clinical studies in order to obtain maximum contact. If less than optimum contact is still evident after waiting 15 minutes, then the cassette and screens should be replaced.

4. Poor contact can also result from damaged cassettes or screens, insufficient pressure from the screens on the film, and from deterioration of the screen surface or foam in the cassette. In these cases, the best solution is to replace the cassettes and screens providing less than optimum contact.

1.6 Acceptance Limits

Areas of poor contact greater than 1 cm in diameter should not be tolerated. Areas of poor contact on the chest wall side of the cassette should result in immediate replacement of the cassette and screens. Areas of poor contact near the edge opposite the chest wall side, or near the two perpendicular edges will probably not affect clinical images since areas of the breast are seldom, if ever, imaged in these areas. More than two or three small areas of poor contact, especially in the primary mammographic image areas of the cassette, should result in replacement of the cassette and screens. Cassettes with large areas of poor contact should be removed immediately from use (see Section 1.5 regarding entrapped air).

1.7 Corrective Action

As noted in Section 1.6, significant areas of poor contact should result in immediate replacement of the cassette and screens.

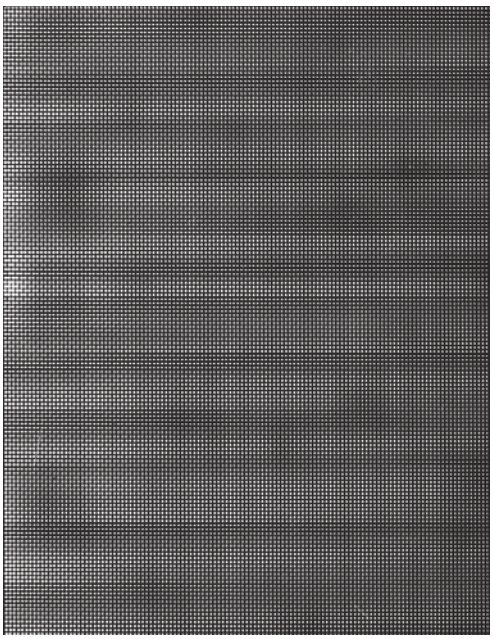

Figure 1-1. Mammographic Image of Mammographic Screen-Film Contact Test Tool Exhibiting Poor Screen-Film Contact

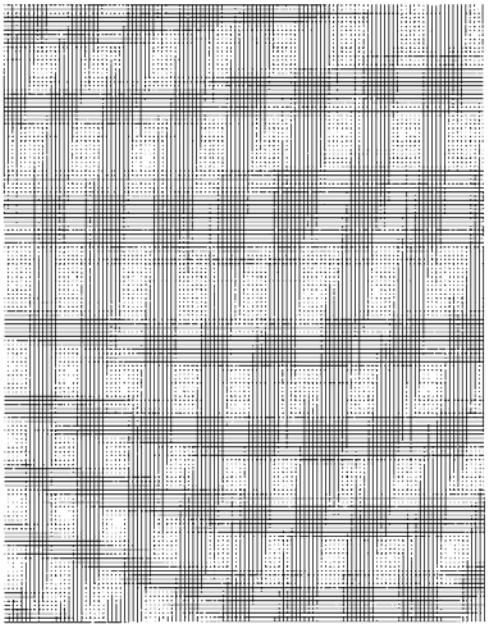

Figure 1-2. Mammographic Image of Mammographic Screen-Film Contact Test Tool Exhibiting Good Screen-Film Contact

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