

# **CRCPD Stereotactic Worksheet Instructions**

For all testing, the needle support system should be in the zero position and out of the field of view. Refer to the 1999 American College of Radiology *Stereotactic Breast Biopsy Quality Control Manual* for additional clarification of the testing procedures (ACR manual).

## **Alignment Test**

Place screen/film or direct print paper behind the biopsy window and directly on the patient support. Tape metal markers or coins to indicate the window edges. Set the mAs at about 50 and kVp at 28 and make an exposure. If there is an overage in any direction, measure the difference and record in centimeters.

Note: This collimation test can be done more accurately with the use of a stereotactic collimator test tool. This test tool can be used with both the Lorad and Fischer stereotactic x-ray units. Refer to the manufacturer for instructions on use of this tool.

## **Technique Factors**

Technique factors should be set to the normal "scout" mode. The term "matrix setting" refers to the screen resolution. (Example: 512x512)

## **Patient Dose**

For measuring patient dose, the mammography probe (10x6m) should be centered in the biopsy window with the probe exposure entrance surface at 4.5 cm from the breast support. This can be accomplished by suspending the probe through the hole in the table, using the tripod to secure the probe on the side of the unit, or using foam or some other material to support the probe from underneath. If foam or other material is used, it should not cover any portion of the AEC detector.

To determine the dose, use the procedure outlined in the 1999 ACR manual. With permission from ACR, the dose table for Molybdenum/Molybdenum (mo/mo) from the 1999 ACR *Stereotactic Breast Biopsy Quality Control Manual* is included as part of these instructions. For additional target/filter combinations, please refer to the ACR manual. The dose should not exceed 3 mGray (300 millirads) for the standard compressed breast (4.2 cm).

## **HVL Measurement**

The probe should remain centered in the biopsy window. The 0.1 mm Al filters (99.9% pure) should be attached to the front of the beam limiting device. Tape can be used to secure the filters.

## kVp Accuracy

The detector area of the kV meter should be centered in the biopsy window. Depending on the meter, this could be accomplished by using the compression paddle to secure the meter in place or by securing the meter to the image receptor with tape.

## Phantom Image Test

If using a traditional mammography phantom, the phantom should be divided into four equal quadrants. Each quadrant will then be imaged individually. This will allow the entire phantom to be imaged with four exposures. The phantom can be held in place by the compression paddle.

If using a stereotactic "mini digital" phantom, the phantom should be centered in the biopsy window and held in place with the compression paddle.

### Minimum Acceptable Phantom Scores:

	Traditional Phantom		Stereotactic Phantom*	
	Film	Digital	Film	Digital
Fibers	4	5	2	3
Specks	3	4	2	3
Masses	3	3.5	2	2.5

\*This refers to the ACR "mini" digital stereotactic phantom. For other "mini" phantoms, please refer to the manufacturer's recommendations.

## Quality Control Program

QC Test	Frequency Recommended	Criteria
Needle Accuracy Test	Daily prior to use	+/- 1mm of actual needle tip location
Phantom Image	Weekly with use	See minimum acceptable phantom scoring recommendations
Visual Checklist	Monthly	All items pass
Hardcopy Output Quality Test	Monthly	Densities in all four locations should not differ by >.20
Compression	Semi-annually	25-45 lbs of pressure
Repeat Analysis	Semi-annually	< 20%
Processor QC*	Daily with use	+/- 0.15 mid density and density difference
Fixer Retention*	Quarterly	<5 micrograms per square centimeter
Darkroom Fog*	Semi-annually	<0.05 difference
Screen/Film contact	Semi-annually	<.30 difference for all cassettes

\*for screen/film systems only

## **Physicist Survey**

The survey should include all the tests listed on the inspection form and should be conducted at least annually.

## **Quality Assurance**

The medical outcomes audit should be performed at least annually. The audit should specifically address stereotactic mammography.

## **Personnel**

All personnel involved in stereotactic procedures should meet the ACR guidelines outlined in the 1999 Stereotactic Breast Biopsy Accreditation Program information.

The information contained herein is for guidance. The implementation and use of the information and recommendations are at the discretion of the user. The mention of commercial products, their sources, or their use in connection with material reported herein is not to be construed as either an actual or implied endorsement by CRCPD.

## GLANDULAR TISSUE DOSE TABLE

The table below is reprinted with permission of the American College of Radiology, Reston, Virginia. No other representation of this material is authorized without express, written permission from the American College of Radiology.

Glandular Tissue Dose (mrad) for 1 Roentgen ESE 4.2 cm compressed breast tissue (50% adipose, 50% composition)<sup>1</sup>

HVL	Mo/Mo X-ray Tube Voltage (kVp) <sup>23</sup>												
	23	24	25	26	27	28	29	30	31	32	33	34	35
0.23	118												
0.24	122	125											
0.25	126	129	132										
0.26	129	132	136	137									
0.27	134	137	140	142	143								
0.28	140	142	144	146	148	149							
0.29	145	147	149	150	152	153	154						
0.30	150	152	154	155	157	157	158	159					
0.31	154	156	158	160	161	162	163	165	166				
0.32	159	160	162	164	166	167	168	169	170	171			
0.33	164	165	167	168	170	171	172	173	175	176	177		
0.34		170	172	173	175	176	177	179	180	181	182	183	
0.35			176	178	179	180	182	183	184	184	185	186	187
0.36				182	184	185	186	187	188	189	189	190	191
0.37					188	189	190	191	192	193	194	195	196
0.38						193	194	195	196	197	198	199	201
0.39							199	200	201	202	203	204	205
0.40								204	205	206	207	208	209
0.41									208	209	210	212	213
0.42										214	214	215	216
0.43											218	219	220

<sup>1</sup> Values obtained from X. Wu, G.T. Barnes, and D.M. Tucker, "Spectral dependence of glandular tissue in screen film mammography," **Radiology** 179, 143-148 (1991)

<sup>2</sup> Values in this table are for a 4.2 cm compressed breast (50% adipose, 50% glandular composition). The values are approximately 7% higher than those used by ACR for a 4.5 cm compressed breast of the same composition.

<sup>3</sup> The ESE value obtained using the NEXT probe configuration is at approximately 4.8 cm above the patient support. Failure to apply an inverse square correction of the ESE reading to take it from 4.8 to 4.2 cm will result in a dose estimate which is 2% higher at an SID of 64 cm.