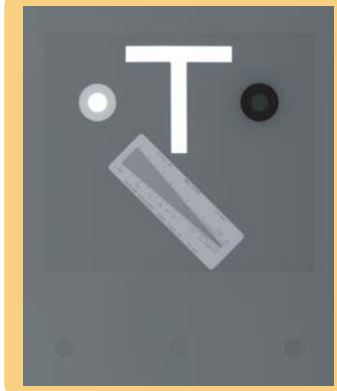
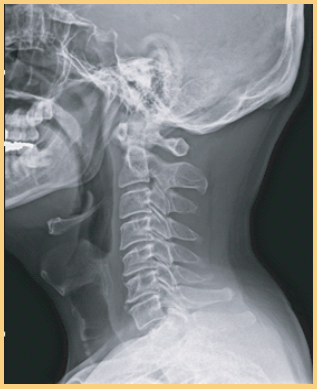
FUJIFILM

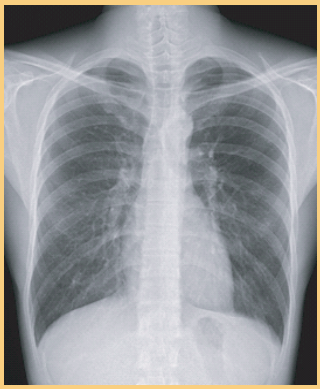


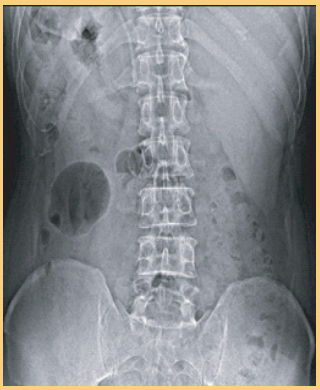
FCR / FDR

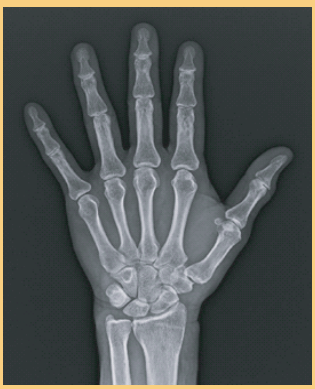
1 Shot Phantom

Quality Control Manual









Introduction

FUJIFILM offers a wide selection of digital detectors. In conjunction with this manual, the FUJIFILM 1 Shot Phantom provides an effective Quality Control (QC) program for monitoring the performance of all FUJIFILM CR and DR general radiographic digital image acquisition systems. The workflow of cassette based CR and DR differ so there are some procedural steps in this manual that indicate “Cassette based CR only”. If you are not evaluating a cassette based CR system, ignore that step and continue.

The FUJIFILM 1 Shot Phantom provides a system wide quality analysis by incorporating all Monthly QC tests in a single exposure. In addition to a practical analysis of the digital detector, the test tool provides an image that can be used system wide to help evaluate monitor workstation and laser printer performance.

It is acceptable to evaluate the phantom image on the QC workstation however if your facility uses hardcopy printed images to make the final diagnosis, the image must also be evaluated using a printed image. We also recommend that you should follow the manufacturer’s instructions for quality control on all printers and monitors used for final diagnosis.

Consistency in the performance of Quality Control testing is a must. We recommend that one individual is designated as the Quality Control Leader. Other individuals should be trained to perform testing in the leader’s absence. When a failure has been detected, repeat the test to confirm that the failure has not been caused by a procedural mistake. It is important to establish the baseline 1 Shot Phantom image when you are confident that your exposure unit, digital detector, workstation and image printing systems are in proper calibration.

Do not write in this book; photocopy the pertinent forms for your record keeping.

This program was developed for use with FUJIFILM CR and DR General Radiographic Digital Imaging Systems. It is not intended for Mammography Imaging Systems.

The information contained herein can change without notice owing to product and/or technical improvements. Please make sure before using the product that the information you are referring to is up-to-date.

We assume no responsibility for any consequence resulting from any wrong or improper use or operation, etc. of the product.

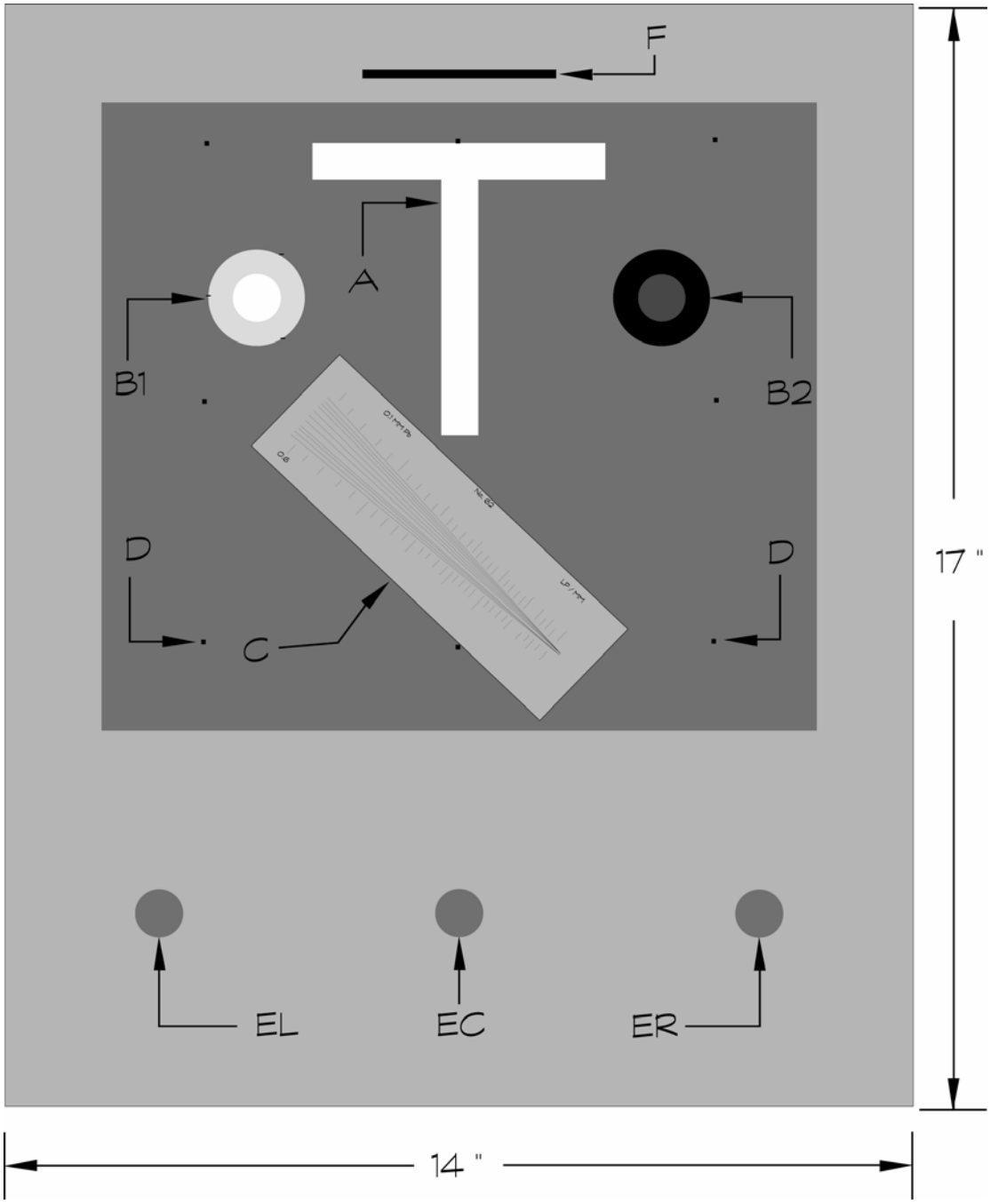
NOTE: All FUJIFILM General Radiographic Digital Imaging Systems are calibrated to an S# of 200 when the detector is exposed to an 80kVp beam at a distance of 72” resulting in an exposure of 1mR at the IP surface. FUJIFILM does not recommend the use of added filtration in the beam beyond that used in the unit’s normal operation.

Table of Contents

1 Shot Phantom Tests and Frequency

Name of Test/Equipment	Frequency/Purpose
1. ***Relative Sensitivity Calibration Test*** • Exposure Room • Digital Detector • Image Printer and densitometer*	***Monthly*** *Confirms the consistency and calibration of the x-ray exposure unit and the digital detector*
2. ***Contrast Evaluation*** • Exposure Room • Digital Detector • Viewing Device	***Monthly*** *Confirms the consistency of the x-ray exposure unit, image processing, workstation display and hardcopy printer*.*
3. ***Sharpness and Jitter Test*** • Digital Detector • Viewing Device	***Monthly*** *Confirms the x-ray tube performance, digital detector system, monitor display and hardcopy printer*.*
4. ***Image Uniformity, Noise & Artifact Test*** • Exposure Room • Digital Detector • Viewing Device	***Monthly*** *Confirms the uniformity of the x-ray beam, uniformity of the digital detector, monitor degradation, and printer artifact*.*
5. ***Accuracy of Measurement Tools/Scale Test*** • Workstations • Image Printer*	***Semi-annual*** *Confirms accuracy of workstation measurement tools and image printer* scale*
6. ***System Linearity Test*** • Exposure Room • Digital Detector • Image Printer and Densitometer*	***Semi-annual*** *Confirms EDR function and system linearity*
7. ***Residual Image Test*** • *Digital Detector System*	***Semi-annual*** *Confirms proper performance of the erasure system*

* Only required if the Primary Diagnosis is made using printed images.



A: Laser Jitter (Test Object 1.6mm Pb)

B1: Contrast Patch (Outer Circle 0.15mm Pb, Inner Circle, 0.5mm Pb)

B2: Contrast Patch (Outer Circular hole 0.0mm cu, Inner Circle 0.7mm.cu)

C: Sharpness Test Tool

D: 10 cm points for Workstation & Printer (8 total) Scale Accuracy. (Size 0.5 mm Diameter & Depth)

EL (left), EC (center), ER (right): Measuring Points for Shading Correction & Sensitivity (19mm Diameter, 3.0mm Lucite removed)

F: Cassette Positioning Locator Anode End (does not appear on image)

Phantom Exposure and Image Processing Procedure

For cassette based CR and DR detector systems only

Phantom image set up**:** Designate a 14x17" IP/cassette as the QC cassette for your QC testing. Perform a *Secondary Erasure* cycle on your control IP/cassette before performing tests on any CR readers.

Using the QC workstation, create a new study and select the *CONTRAST* menu from the *TEST* menu page. Move the x-ray tube away from the table and raise it to the maximum height and turn on the collimator light. Place a lead apron on the floor and place the cassette on the apron with the top orientation strip at the anode end of the beam and position the phantom directly on top of the QC cassette matching the orientation strip. Collimate the beam to 1 inch outside the frame of the cassette/detector..

For fixed (built-in) CR and DR detector systems only

Phantom image set up**:** Using the QC workstation, create a new study and select the *CONTRAST* menu from the *TEST* menu page. Position the phantom on the table top or supported by a table (or other device) against the front of the upright stand. Using the distance detent set up for clinical use; position the phantom with the orientation stripe at the anode end of the beam. Collimate the beam size to 14x17". It is acceptable to leave the grid in place for the phantom image exposure but once that decision has been made, all further tests will be performed with the same condition.

Exposure and processing for all CR and DR systems:

Set the generator for 80 kVp and select a time setting of 0.10 second. Start with a small mA station (100 mA or less). Expose and process the image. If needed, first adjust (up or down) the mA station, then the time setting (if needed) to establish an exposure with an "S" number close to 200 (typically 150-250). Remember that as exposure is decreased "S" number increases and as exposure is increased "S" number decreases. It may take several exposures to establish each baseline.

When finalizing the time setting for your *Baseline Exposure,* select an exposure time that permits you to make an exposure one half and twice as long as the *Baseline Exposure* time. This will be necessary for the *Semi-annual System Linearity* test. If your generator only offers kVp and mAs then select a mAs setting for your *Baseline Exposure* that allows you to set mAs values one half and double the baseline setting.

Establish Baseline Exposure Conditions for each CR Image Plate Reader and DR Detector. Once you have established the exposure conditions for each of your detector systems, lock your baseline image on the QA workstation. Every time you produce a new monthly 1 Shot Phantom image you will compare the new image against the Baseline Image. If your facility uses printed images for Final Diagnosis, print the baseline image and use it as the *Baseline Comparison*. Occasionally you may need to re-establish the baseline after servicing or major component replacement to the x-ray or detector systems. Copy the chart on the next page to record Baseline Exposure Conditions for your systems using the FUJIFILM 1 Shot Phantom QC Program.

NOTE: DR systems will immediately process the image after exposure. For cassette based CR, establish a practical delay before processing the image based on the distance between the exposure room and Image Plate Reader (e.g. 2 minutes) and always process test images with the same delay.

Exposure Room Baseline Exposure Factors

Exposure Room________ Distance________Detector_________________________
kVp_______________ mA______________ Time or mAs__________________________
Baseline “S” Number_______________ Phantom Serial #___________________________
CR Reader______________________________ Grid on/out__________________________
System Linearity Exp. Factors ½_____________________ 2X________________________
Date_______________________ Technologist Name_______________________________

Exposure Room________ Distance________Detector_________________________
kVp_______________ mA______________ Time or mAs__________________________
Baseline “S” Number_______________ Phantom Serial #___________________________
CR Reader______________________________ Grid on/out__________________________
System Linearity Exp. Factors ½_____________________ 2X________________________
Date_______________________ Technologist Name_______________________________

Exposure Room________ Distance________Detector_________________________
kVp_______________ mA______________ Time or mAs__________________________
Baseline “S” Number_______________ Phantom Serial #___________________________
CR Reader______________________________ Grid on/out__________________________
System Linearity Exp. Factors ½_____________________ 2X________________________
Date_______________________ Technologist Name_______________________________

Exposure Room________ Distance________Detector_________________________
kVp_______________ mA______________ Time or mAs__________________________
Baseline “S” Number_______________ Phantom Serial #___________________________
CR Reader______________________________ Grid on/out__________________________
System Linearity Exp. Factors ½_____________________ 2X________________________
Date_______________________ Technologist Name_______________________________

Exposure Room________ Distance________Detector_________________________
kVp_______________ mA______________ Time or mAs__________________________
Baseline “S” Number_______________ Phantom Serial #___________________________
CR Reader______________________________ Grid on/out__________________________
System Linearity Exp. Factors ½_____________________ 2X________________________
Date_______________________ Technologist Name_______________________________

FUJIFILM 1 Shot Phantom

Monthly Tests

Test 1- Relative Sensitivity Calibration

Objective:

Compare the "S" number to the standard. This test will evaluate the exposure system as well as the digital detector system when the detector is exposed to the pre-established exposure conditions. ***The image produced from this single exposure will be used for all the phantom evaluation monthly tests.***

Frequency:

Monthly

Equipment Needed:

- 1 Shot Phantom
- Lead Apron (for cassette based detectors removed from the bucky)
- Densitometer (Only required for sites reading hardcopy)
- Monthly Report Form

Procedure:

NOTE: This test should be performed using the baseline exposure conditions established in the *"Phantom Exposure and Image Processing Procedure"* section of the manual. Remember, the "S" number is an indication of the amount of exposure reaching the detector, so the exposure conditions, distance and settings must be identical each month.

1. Expose and process the detector as described in the "*Phantom Exposure and Image Processing Procedure"*

2. Evaluate and record the "S" number produced on the Monthly Report Form.

3. If your facility makes its Primary Diagnosis via hardcopy, print and measure the optical density produced within the center measurement circle, (EC on the FCR 1 Shot Phantom diagram) and record the results on the Monthly Report Form.

Precautions:

It is only required to evaluate a hardcopy image when your facility uses printed images for the purpose of Primary Diagnosis. When printing hardcopy images, always be sure that the laser printer is freshly calibrated and in control and that the image processing parameters are unchanged from the baseline.

Some printers such as the FUJIFILM Thermal Dry Imager FM-DP2636 and FM-DP 3543, require a special optical filter to be installed in X-Rite model 301, 301RS and 331 densitometers. Filter kits are available from FUJIFILM Medical Systems. Contact your FUJIFILM Account Manager for information. This added filter does not affect density measurements on other film types. Check with your printer manufacturer if a compensation filter is needed.

Performance and Corrective Action:

"S" Number Evaluation:

"S" variation should be no greater than +/- 20% of the established standard. If your results exceed this level, the following steps should be taken to further investigate.

Repeat the test confirming that you are using the exposure settings recorded on the Baseline Exposure Factors Chart. Failure of this test may indicate a problem in your x-ray generator or detector system. Contact your service provider if assistance is required.

Hardcopy Evaluation:

See Precautions. Compare results against the previously established baseline optical density of the phantom image. Variation should not be greater than $\pm$ 0.15 optical density (OD). If a greater difference exists, recalibrate the printer and reprint the image. If the "S" number is in the normal range and printer density is still outside the limits, printer service may be needed.

Test 2- Contrast Evaluation

Objective:

Visually confirm that the contrast of the digital image is normal when compared to an established standard. This procedure can be performed on printed images, the QA workstation and clinical review workstations.

Frequency:

Monthly, as part of the Phantom Image evaluation.

Equipment Needed:

- Baseline 1 Shot Phantom image
- Current 1 Shot Phantom image
- Monthly Report Form

Procedure:

1. Use the image produced in the *"Relative Sensitivity Calibration"* test and proceed to Step 3, or produce a new image for this evaluation

2. Expose and process the detector as described in the *"Phantom Exposure, Identification and Image Processing Procedure"*.

3. Visually compare the contrast patches against the established baseline.

Precautions:

When comparing hardcopy images always be sure that the laser printer is freshly calibrated and in control. When comparing softcopy images, monitor brightness and contrast controls should be checked for display consistency and viewing room lighting set to its minimum level.

As monitor brightness degrades, a loss of visibility of the contrast difference within each patch group may occur. It is up to each facility to determine the application and useful life of viewing monitors.

NOTE: At an 80kVp non-grid exposure, it is not uncommon for a slight scatter (density) pattern to occur in the phantom image around the perimeter of the darkest density patch.

Performance and Corrective Action:

The contrast patches should demonstrate two distinct densities each and be similar in relationship to the baseline image. Typically, a simple pass/fail observation is sufficient; however, measurements on a printed film can be recorded and tracked as a density difference.

Test 3- Sharpness and Jitter

Objective:

Confirm that the spatial resolution of the digital system is consistent over time and that the optics and image processing system are functioning normally.

Frequency:

Monthly, as part of the Phantom Image evaluation.

Equipment Needed:

- 1 Shot Phantom image
- magnifier
- Monthly Report Form

Procedure:

1. Use the image produced in the *"Relative Sensitivity Calibration"* test and proceed to Step 3, or produce a new image for this evaluation.

2. Expose and process your standard phantom image as described in the *"Phantom Exposure and Image Processing Procedure"*. Inspect the resolution test tool located in the center of the phantom, scoring the result as the smallest pair of black and white lines seen under magnification.

3. Inspect the edges of the T object using magnification

Precautions:

Be sure to always expose the FUJIFILM 1 Shot Phantom using the small focal spot and at the proper distance.

FUJIFILM DR systems have a fixed acquisition and output matrix. FUJIFILM CR based systems can acquire and output either Standard or High Resolution modes. If the result of your most recent phantom image differs significantly from the baseline image, check the system resolution settings.

NOTE: The copper filter within the 1 Shot Phantom produces a significant amount of scatter radiation and degrades the visibility of detail in the line pair test tool. This evaluation is a comparative study from month to month and is not meant to demonstrate maximum system resolution.

NOTE: When reviewing the resolution test tool at a workstation monitor, a wavy artifact (*moiré pattern)* may occur. This is a normal event caused by interference between the frequency of the test tool and display device. If your workstation has a magnification tool, changing magnification levels will help to reduce or eliminate this interference.

NOTE: It is normal for the "T" object to demonstrate some level of "jagged edges" when viewed using high magnification, however, they should not be visible to the unaided eye. Compare the most recent image against the baseline image to establish any change using 2X magnification.

Performance and Corrective Action:

Compare the results of your latest exposure to the standard "baseline" image. Record the results of your evaluation on the Monthly Report Form.

The resolution target can be viewed on hardcopy (printed film) or on the workstation monitor. If your facility uses film for the Final Diagnosis you must use a printed image for this evaluation. Use a magnifier lens to help evaluate resolution on a printed film. For softcopy evaluation, images can be viewed on the QC workstation or forwarded on to a diagnostic workstation. When scoring the image, use the magnification tool available on that workstation.

Action Limits:

Sharpness:

If the sharpness of the image (line pair measurement) decreases by more than one half line pair from the Baseline, repeat the image confirming all settings are correct. If the finding is unacceptable contact your service provider to investigate.

Jitter:

The T object should not display any jagged edges when compared to the Baseline Image when viewed under 2X magnification conditions. If changes exist, Jitter from the optics or transport from CR Image Reader or an Image Printer is the most likely cause. Contact your service provider for further assistance.

Test 4- Image Uniformity, Noise and Artifact

Objective:

Review the phantom image for the presence of density variations, elevated noise or artifact. This evaluation can be used to inspect images from the X-ray System, Detector System and hardcopy printer.

Frequency:

Monthly, as part of the Phantom Image evaluation.

Procedure:

1. Use the image produced in the *"Relative Sensitivity Calibration"* or produce a new image for this evaluation.
2. Visually examine the image. Look for artifacts or abnormal densities which could obscure clinical details.

Inspect for:

Increased Graininess:

Increased image grain is typically related to under-exposure. Check the Contrast Menu was used and the exposure factors, collimation, distance and "S" number are as expected.

Density Bands:

Density bands can occur at several points of the imaging chain; the x-ray beam, detector system and display system. Density bands are distinct light and dark stripes on the image and may also require a service adjustment. Short exposures can "freeze" grid motion and demonstrate grid lines and increased mottle not seen when the grid is in motion.

When investigating density bands and artifacts it may be helpful to produce a "*Flat Field* Image". This is done by removing all objects possible (including the phantom and grid) between the tube focus and surface of the detector. Make a low exposure (60 kVp at 2 to 3 mAs) collimated to the detector size. The Image should appear as a medium gray with minimal irregularities. Always be careful to use low exposures when directly imaging the detector. Overexposure can permanently damage the detector.

Imaging Plate/ CR Reader Artifact- (CR Only):

When evaluating most CR systems, inspect for a gradual density change from left to right across the 10 or 14 inch dimension. This density change can be corrected by a FUJIFILM service engineer by performing a Shading Correction.

Dust, stains and scratches on the IP will produce white artifacts on the image. IPs should be dusted with a soft, dry, lint free cloth on a monthly basis. Particles that cannot be removed in this manner should be removed by gently cleaning the IP with an approved solution.

Image Reader artifacts can be caused by dust or dirt particles on the Light Guide. This will typically be demonstrated as a soft edged white line running end to end in the image area of the film parallel to the 14" or 10" dimension. Call service to clean the Light Guide.

Viewing Devices- Printer and or Monitor:

Artifacts that are present on the hardcopy but not visible on the QA workstation are usually caused by the printer, and may require service on that device. These artifacts may be caused by laser optics, dirty print heads, rollers, chemical stains; or improper film storage, loading or handling.

Artifacts that are present on one monitor but not visible on other monitors or hardcopy devices can usually be isolated easily. We recommend that you contact your monitor and printer manufacturers to learn any additional QC or user information.

Performance and Corrective Action:

The phantom is designed with large featureless areas which will typically show artifacts before they are seen on clinical images. AEC detectors, grids and other objects in the beam will all create a cumulative effect. In addition and over time, some degree of “image burn in” may occur on the detector itself. This is a natural effect of aging or can also occur as damage when gross overexposure is applied to the detector.

Inspect the image for signs of increased graininess, density bands or other artifacts. If you are unsure about the significance of an artifact, discontinue the use of the system until you determine, together with your physician, that the artifact does not mimic or obscure clinical information. Contact your service provider as needed.

FUJIFILM 1 Shot Phantom

Semi-annual Tests

Test 5- Accuracy of Measurement Tools

Objective:

Evaluate workstation measurement tool and laser printer measurement scale accuracy.

Frequency:

Semi-annual

Equipment Needed:

- Diagnostic Workstation measurement tools (if available)
- Monthly 1 Shot Phantom image (printed image required for hardcopy primary diagnosis only)
- Pencil and paper (required for hardcopy primary diagnosis only)
- Semi-annual Report Form

Procedure:

Workstation:

If your diagnostic review workstation offers the feature of a measurement tool, activate the measurement function. Look closely within the object area of the phantom. There are a series of eight tiny holes drilled at 10-cm intervals in the upper 2/3 of the phantom (labeled D on the 1 Shot Phantom Diagram). Carefully place the cursor over the measurement hole and activate measurement function. Check the tool accuracy at 10 and 20-cm points on the horizontal and vertical axis.

Printed image:

Printed images may be presented in reduced or enlarged size. If your laser printer produces a measurement scale printed along the outside of the image, place a piece of paper in the center of the scale and mark the paper at 10-cm intervals using a fine point pencil. Compare the distance between the phantom points on the printed CR 1 Shot phantom image and the paper scale produced from that image.

Performance and Corrective Action:

Measurement tools on the workstation or printed on the film should be accurate to within +/- 5%. For example, a 10-cm measurement (with the phantom directly on the detector surface) should yield a measured result of 9.5 to 10.5cm or 19-cm to 21-cm over a 20-cm distance.

NOTE: Some magnification will occur if you are placing the phantom on the table top or upright bucky front compared to placing the phantom directly on the detector surface. In these cases, expect the measurements to be slightly larger than the example above. In this case, it is acceptable to use the first time measurement as your baseline for setting your Action Limits. .

NOTE: The scale from the digital detector may not be presented or may be out of the above recommended tolerances on some brands of printers or network print server systems. Scale errors caused by other manufacturer's devices are beyond our control. Check with your printer or network print server manufacturer for additional information.

Test 6- System Linearity

Objective:

This test requires three exposures. The objective of the test is to confirm that the system will properly re-scale under- and over-exposure and produce images of consistent appearance when the phantom is exposed to 50% reduced exposure, the Baseline Exposure, and 200% increased exposure. In addition, this test will also confirm that the exposure indicator (S number) will accurately report the increased and decreased exposure levels.

NOTE: Immediately following the third exposure, plan to produce the image for Test 7, the Residual Image test.

Frequency:

Semi-annual.

Equipment Needed:

- 1 Shot CR Phantom
- Densitometer (for hardcopy diagnosis only)
- Stop Watch
- Semi-annual Report Form

Procedure:

1. Cassette based CR only- Erase the QA designated IP using the secondary erasure mode of your CR image reader.

2. Create a study and select the Contrast Menu. Refer to the Exposure Room Baseline Exposure Factors Chart for the baseline exposure set-up to be used for the three exposures.

3. Set the exposure factors for Exposure 1, the low dose (50% of the Baseline mAs) exposure. Expose and process using the Contrast menu.

4. Using the Semi-annual Report Form, record the S number from this exposure.

5. If your facility uses hardcopy for Final Diagnosis you must measure and record the OD of the center patch (EC) on the Report Form.

6. Repeat steps 3 thru 5 for Exposure 2 (the normal Baseline exposure) and Exposure 3 (double the exposure of the normal Baseline mAs).

7. For FDR only, immediately following step 6, start the timer to begin the measurement of a 2 minute elapsed time and proceed to Test 7.

Precautions:

Most experts agree that the exposure timer circuit of the generator is more stable than mA station or kVp selection. **Do not** perform this test by changing mA stations or kVp. If your x-ray generator does not offer separate mA and time selections, it is acceptable to change exposure using the mAs setting. The relationship of the three exposures must be precise: Exposure 1 must be ½ and Exposure 3 must be double the time (or mAs) of Exposure 2.

If errors are detected, it is important to qualify the accuracy and repeatability of the x-ray exposure unit.

Performance and Corrective Action:

Using the "S" number and optical density of *Image 2* as a baseline, compare the images produced at one half and double the exposure.

"S" Number Evaluation:

As exposure increases "S" number decreases. The "S" number of Image 1 should be double (±20%) that of Image 2.

The "S" number of Image 3 should be one half (±20%) that of Image 2.

Density Evaluation:

This step is only required if the facility uses hardcopy for Final Diagnosis:

Measure the optical density of the center circle (EC) located in the lower third of Image 2: Compare the optical density of the same location of Image 1 and Image 3. The optical density of Images 1 and 3 should be within ± 15% of Image 2.

Example:
"S" number of Image 2 = 186

Target "S" number for Image 1 is 372 (2X the Image 2 "S" number).
±20% = 74.4 for an acceptance range of 297.6 to 446.4

Target "S" number for Image 3 is 93 (½ the Image 2 "S" number).
±20% = 18.6 for an acceptance range of 74.4 to 111.6

Optical density of Image 2 = 1.45

Target optical density for Image 1 and 3 should be the same.
±15% = 0.22 for a range of 1.23 to 1.67.

If your test results fall outside the specifications above, repeat the test confirming the exposure factors and set-up. If the results of the retest are still out of tolerance, contact your service provider for assistance.

Test 7- Residual Image

Objective:

Confirm that the digital system is capable of fully erasing a previous exposure.

Frequency:

Semi-annual

Equipment Needed:

- 1 Shot Phantom
- Coin
- Semi-annual Report Form

Procedure:

1. Two minutes following the completion of the “System Linearity Test” final exposure (2X normal exposure), rotate the phantom 180 degrees so that the Positioning Stripe is at the cathode end of the image and place a coin on the phantom surface in the center of the sharpness test tool.
2. Reset the X-ray exposure to the standard technique used for the “Sensitivity Test”.
3. Expose and process the phantom image using the “Contrast Menu”.

Performance and Corrective Action:

The image from the rotated phantom exposure should look normal in every way, except it will be upside down and contain the coin when compared to the standard baseline image. There should be no evidence of a second set of Contrast Patches or a second T object beyond the coin at the opposite end of the image.

If residual image exists, confirm that the test conditions and X-ray technique are correct and perform a re-test. If evidence of residual image exists following the re-test, contact your service provider.

FUJIFILMFILM 1 Shot Phantom

Report Forms

1 Shot Phantom Monthly Report Form

Date _____ Operator _____

1. RELATIVE SENSITIVITY TEST

Action Limit-
S# +/- 20% of baseline Density +/- 0.15 OD baseline
Baseline S# _____ Monthly Test S#_____ Acceptable?_____
Baseline density*_____ Monthly density _____ Acceptable?_____

Notes/ Corrective Action _____
_____

2. CONTRAST EVALUATION

Action Limit-
Contrast patch density or contrast is visibility different when compared to baseline image.

QC Workstation Acceptable?_____
Other Workstation (optional) Acceptable?_____
Printed Image* Acceptable?_____

Notes/Corrective Action_____
_____

3. SHARPNESS AND JITTER TEST

Action Limit-
Sharpness- Linepair (lp/mm) measurement must be no less than ½ lp lower than the Baseline image measurement.
Jitter- No Jitter (jagged edges) visable around T object using 2x magnification.

Sharpness Baseline _____lp/mm measured _____lp/mm Acceptable?_____
Jitter on monitor Image yes/no _____ Acceptable?_____
Jitter on printed Image* yes/no _____ Acceptable?_____

Notes/Corrective Action _____
_____

4. IMAGE UNIFORMITY, NOISE AND ARTIFACT

Action Limit-
Noise and or artifact do not obscure clinical data.

Noise		**Artifact**	
QA workstation	Acceptable? ____	QA Workstation	Acceptable?____
Other workstation	Acceptable? ____	Other Workstation	Acceptable?____
Image Printer *	Acceptable? ____	Image Printer	Acceptable?____

Notes/Corrective Action _____
_____

*Only required if printed images are used for Hardcopy Diagnosis

1 Shot Phantom Semi-Annual Report Form

Date _____ Operator _____

5. ACCURACY OF MEASUREMENT TOOLS

Action Limits: No more than +/- 5% error (9.5- 10.5 cm on 10 cm measurement. 19-21 cm on a 20 cm.measurement).

Diagnostic Workstation Accurracy Acceptable?_____
Image Printer* Scale Accuracy Acceptable?_____

Notes/ Corrective Action_____
_____

6. EXPOSURE LINEARITY TEST

Action Limits: S# of image 1 should be double (+/- 20%) that of image 2. S# of image 3 should be one half (+/- 20%) that of image 2. Optical density* of center measurement circle (EC) of images 1 and 3 should be within +/- 15% of image 2 (see example in test instruction section).

Image 1 S# _____ Acceptable?_____
Image 2 S# _____ Acceptable? _____
Image 3 S# _____ Acceptable?_____

Image 1 OD* _____ Acceptable?_____
Image 2 OD* _____ Acceptable?_____
Image 3 OD* _____ Acceptable?_____

Notes/ Corrective Action_____
_____
_____

7. PRIMARY ERASURE TEST

Action Limit: No evidence of previous image.

Evidence of previous image (Yes/No) _____ Acceptable?_____

Notes/ Corrective Action
_____
_____
_____

*Only required if printed images are used for Hardcopy Diagnosis