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**What is the name of the act that specifies quality metrics for mammography in the United States and what is the overseeing governing body of this act?**

Mammography quality standards act (MQSA) as specified by the U.S. Food and Drug Administration (FDA). Basically, MQSA specifies that you must follow manufacturer recommendations for QC tests. However, the ACR has also received approval that it's QC manual can count as an alternative and satisfy MQSA requirements for QC as well.

More info/link to ACR mammography QC manual here: [https://www.acr.org/-/media/ACR/NOINDEX/QC-Manuals/Mammo\\_QCManual.pdf](https://www.acr.org/-/media/ACR/NOINDEX/QC-Manuals/Mammo_QCManual.pdf)

Also, good mammography QC article in RadioGraphics here: <https://pubs.rsna.org/doi/10.1148/rg.2015150036>

**According to the ACR, what is the purpose of routine Quality Control testing?**

To detect, identify, and correct equipment related problems prior to these problems causing a deleterious effect on clinical images. QC is about prevention and is designed to preserve the integrity of clinical images.

**According to the ACR, what is the definition of Quality Assurance?**

QA comprises all management practices, implemented and overseen by the lead mammography radiologist (each breast imaging group has a specified lead mammography radiologist to oversee quality of the program). Goals are to ensure that every imaging procedure is necessary and appropriate, the images are of diagnostic quality, reports contain necessary information and turnaround times are acceptable, lowest possible radiation exposures, cost and inconvenience to the patient are realized.

**What is repeat analysis?**

Repeat analysis is the number of examinations a mammography technologist needed to repeat due to poor positioning, patient motion, or other factors that resulted in a non-diagnostic examination. Repeat analysis is performed on an "as needed" basis per ACR though I have seen some sources say quarterly.

**How often is the mammography phantom test performed?**

Weekly

**What are the 3 components of a standard breast phantom that must be assessed?**

Fibers, speck groups and masses

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**How many of each of these (fibers, speck groups, and masses) must be visualized in order to pass the breast phantom test?**

You must be able to see at least 4/6 fibers, 3/5 speck groups, and 3/5 masses on the phantom test to pass

\*\*Update from what is in the episode: There are updated ACR phantoms that no longer follow the classic 4-3-3 rule, but follow a 2-3-2 rule. More info here:

<https://accreditation.support.acr.org/support/solutions/articles/11000065938-phantom-testing-mammography-revised-12-12-19->

“For the small ACR Mammography Phantom, in order to pass there must be no clinically significant artifacts and the 4 largest fibers, the 3 largest speck groups, and the 3 largest masses must be visualized.”

“For the ACR Digital Mammography Phantom, ACR phantom image reviewers will follow the same process outlined in the 2018 ACR Digital Mammography Quality Control Manual. Medical physicists and quality control technologists should follow the same procedures as part of their routine QC. In order to pass there must be no clinically significant artifacts and the 2 largest fibers, the 3 largest speck groups, and the 2 largest masses must be visualized.”

**What additional breast imaging quality control measure is checked on a weekly basis: view box/monitor check, compression, or dark room cleanliness?**

The answer is view box conditions (old film screen view box)/monitor check. This is a weekly check typically performed by a breast imaging technologist.

**How often is the breast compression QC check performed?**

Semi-annual basis

**How many pounds of compression are you required to apply during a mammogram?**

25-45 pounds of compression are required (per federal law)

**What is the mammography QC visual checklist and how often must this checklist be completed?**

The visual checklist is available in the ACR QC manual [https://www.acr.org/-/media/ACR/NOINDEX/QC-Manuals/Mammo\\_QCManual.pdf](https://www.acr.org/-/media/ACR/NOINDEX/QC-Manuals/Mammo_QCManual.pdf) and has items ensuring cleanliness of equipment, checks of indicators on equipment, cables, paddles, DBT assembly movement, monitor conditions, etc. This checklist must be completed monthly.

**What is the compression thickness indicator test and how often must this be assessed?**

Each month the compression thickness indicator must be checked to ensure the indicated compression thickness closely matches actual compression thickness of a phantom. This must be accurate to within +/- 5 mm of the actual compressed thickness.

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**How often is a medical physicist required to perform her equipment assessment?**

Once per year for breast imaging a medical physicist must perform a complete equipment check to certify a mammogram machine and site. Any time equipment is installed, or otherwise modified/moved/altere the physicist is also required to perform system checks.

**What are some screen film QC tests that, although largely obsolete, could show up on the ABR core exam?**

Processor check, dark room cleanliness, dark room fog, screen film contrast check.

**What is the difference between dark room cleanliness and dark room fog?**

Dark room cleanliness refers to literally removing dust and removing debris and other unnecessary materials from the dark room. Basically, dust and loose debris could be really problematic and cause imaging artifacts on the films so you had to maintain a clean environment with daily cleaning. Note that the dark room was to be cleaned daily and the intensifying screen was to be cleaned weekly.

Dark room fog refers to how much stray light is able to enter the dark room and inadvertently expose the mammography films. This was to be tested on a semi-annual basis.

**What are some components of the processor check and how frequently should this be performed?**

Processor check should be performed daily. Components include ensuring processor is cleaned and chemicals are replenished, rollers are in good condition and apply proper pressure to the film, temperature and humidity levels are ok, etc. Hopefully you won't need to get into that level of detail on the ABR Core exam as this is largely obsolete now. For those interest, more info here:

<https://pubs.rsna.org/doi/pdf/10.1148/radiographics.19.2.g99mr13503>

**How often is a screen film contrast test supposed to be performed for screen film mammography QC?**

Semi-annual basis.

**What is the flat field test and how often must this be performed?**

The flat field test is a weekly QC test in which a thick acrylic (of different thicknesses as specified by the manufacturer of the equipment) is placed over the entire detector, without compression, and an exposure is taken. Note this is different from the ACR/MQSA phantom with specks, flecks, and masses. This is kind of more like a blank phantom test to evaluated brightness and signal to noise nonuniformities, bad pixels, high frequency modulation, etc.

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**Bonus questions:**

**What is ghosting artifact and how do you prevent this?**

Ghosting artifact can occur in mammography and happens when a previously acquired image is superimposed on the current acquired image. To correct, the detector needs to be recalibrated to wipe the memory of the prior image and then a new image needs to be acquired.

**What are two common interventions a technologist can do to remove motion artifact from an image?**

1. Increase compression. 2. Remind patient to remain still during the image. Note that motion artifact is seen as a blurring of the image and motion artifact may be especially deleterious for evaluation of calcifications. Note that calcifications may be completely missed on an image (not shown) if motion artifact is present. Compression is key for evaluation of calcifications and other small structures, both to reduce motion blur. For example, if you are performing a stereotactic biopsy of calcifications and you know you are in the correct spot but are unable to see the calcifications on pre-biopsy scout imaging, try increasing the compression and you may suddenly be able to perceive the calcifications.

**What are electrical readout errors and how do you identify these?**

Electrical readout error aka vibration artifact results from electrical interference in the mammography system and are seen as vertical dark lines across an image, or sometimes alternating dark and bright lines through an image. If identified and recurrent, detector needs to be serviced.

**What is grid line artifact?**

Grid line artifact occurs when the bucky oscillation is too slow or stopped and you are able to see the lines from the anti-scatter grid on the image. The grid lines are often seen as repeating at a 45 degree angle over the image. If this artifact persists the mammography unit needs to be serviced.

Good mammography artifact article here: <https://pubs.rsna.org/doi/pdf/10.1148/rg.287085053>