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INTRODUCTION

- Contribution of radiology to better diagnosis and treatments is evident. In parallel, efforts were oriented towards the improvement and control of equipment.
- The importance of quality assurance (QA) of diagnostic X-ray equipment is well recognized. Application of QA program is very important when optimization of image quality and reduction of patient exposure is desired.
- For the success of the program, it is essential to apply scientific and technical knowledge to define a clear protocol for the safety and measurements of the performance of X-ray units.

WHAT IS QUALITY ASSURANCE

- Quality Assurance (QA) of medical diagnostic x-ray equipment means systematic actions necessary to provide adequate confidence to the end-user(s) that a medical diagnostic x-ray equipment will perform satisfactory in compliance with safety standards specified by the Competent Authority.

QA PROGRAMME

The goal of QA Program is to ensure the accuracy of the diagnosis.

- The minimum radiation dose should be delivered to the patient to achieve the objective of the diagnostic or interventional procedures.
- QA programme begins with the performance evaluation of diagnostic x-ray equipment at the manufacturing stage and then acceptance testing after the installation of X-ray equipment at user's institution to ensure its conformity with the specifications.
- The QA tests should be carried out thereafter at regular intervals (periodicity-once in two years) and also after repairs of the equipment or when equipment malfunction is suspected

OBJECTIVE / AIM OF QUALITY ASSURANCE (QA)

- **Optimum image quality of radiological procedures with minimum possible dose to the patient(s).**

THE PURPOSE OF QUALITY ASSURANCE AND QUALITY CONTROL IS TO

1. MINIMIZE THE RADIATION DOSE TO THE PATIENT
2. INCREASING THE LIFE SPAN OF THE EQUIPMENT
3. PROVIDE MAXIMUM GOOD QUALITY IMAGES.

WHY QA IN DIAGNOSTIC RADIOLOGY

- To get calibrate all the exposure parameters, to check functional performance of X-ray equipment and radiation safety around the X-ray installation, QA checks are necessary for every diagnostic X-ray equipment.
- In other words, to obtain the optimum quality diagnostic information at the lowest radiation risk to the patient, QA of diagnostic X-ray equipment is necessary.

BENEFITS OF QA PROGRAM

- **Image Quality:**

  Production of diagnostic image of optimum quality.

- **Equipment:**

  Reduction in retakes, less wear and tear on equipment.

  Problems detected early are generally less costly to repair.

- **Patient Flow:**

  Reduction in repeats and human efforts

BENEFITS OF QA PROGRAM

- **Patient Dose:**

  Reduction in retakes and less wear and tear on equipment

  leads in less patient dose.

- **Cost Effect:**

  Less repetition, less wear and tear, less wastage of resources

  leads to less financial wastage, Hence cost effective.

QUALITY CONTROL

- The Quality Control (QC) is a central part of QA program, which deals with **Equipment Maintenance and Monitoring.**
- QA in diagnostic radiology is a mean of maintaining standards in imaging and working towards minimizing patient and staff doses.
- A number of physical parameters that affect the performance of X-ray imaging system are

QUALITY CONTROL

There are four stages to the checks and measurements applicable to X-ray imaging equipment:

I. Critical examinations

II. Acceptance

III. Commissioning

IV. Routine performance testing

THE SCOPE OF ACTIVITIES IN THE QUALITY ASSURANCE PROGRAM FOR GENERAL RADIOLOGY IMAGING SYSTEMS INCLUDES:

1. Responsibility
2. Evaluations
3. Purchase specifications
4. Standards for Image Quality
5. Monitoring and Maintenance
6. Training
7. Committee
8. Records
9. Manual
10. Review

1.RESPONSIBILITY

- It is recommended that at least one staff member at each facility is identified and responsible for ensuring quality checks are undertaken at specified times.
- The designated person(s) may include one or more of the following staff members: Chief Technologist /Assistant Chief Technologist / Quality Manager / QA Technologist / Section Senior Technologist / RSO

CONT...

- The designated quality manager should also review non-compliance issues and provide for corrective and preventative action in a timely manner and formulate quality improvement within the department.

- The designated quality manager is also responsible for the organization, dissemination and document control of all incoming quality guidelines, policies and directives from regulatory bodies, Local Health Service and State Departments of Health.

2.EVALUATIONS

- The performance of the facility should be evaluated. The comparison evaluation demonstrates the effectiveness of the Q.A. program.
- Equipment monitoring results are evaluated to assess the need for correction that may indicate that preventive maintenance is required.

3.PURCHASE SPECIFICATIONS

- When new equipment is purchased the facility determines the performance criteria for the equipment. These performance criteria are then reflected in the purchase specification.
- Before the final acceptance of the equipment it is ensured that the actual performance meets the purchase specifications.
- The purchase specification and the records of the acceptance testing should be retained through out the life of the equipment for comparison with monitoring results in order to assess continued acceptability of performance.

4.STANDARDS FOR IMAGE QUALITY

- Standards for image quality are established for the performance parameters of the x-ray system that are of interest of the facility.

- If the periodic equipment monitoring results show that the equipment does not meet the acceptance limits of the standards, then corrective actions are needed.

5.MONITORING AND MAINTENANCE

Equipment monitoring and the maintenance is the center of the QA program.

While working in stationary unit ,the first thing a technologist should do at the beginning of each shift is to visually inspect the x-ray machine.

1. X-ray control panel
2. Tube stand
3. X-ray tube
4. Collimator
5. Table Bucky movement.

CONT..

Inspections are necessary in order to keep using the system for long time. It includes:

1. While turning the machine on ,to check whether main supply of that room is **ON or OFF**.
2. To see if cables are in good conditions or not.
3. To see all indicator lights are working properly or not.
4. To check whether the x-ray table & Bucky tray are clean and in good working condition or not.
5. Watching the electronic locks for smoothness of motion.
6. Listening for unusual noise in the moving parts of the system.
7. To look for any current leakage

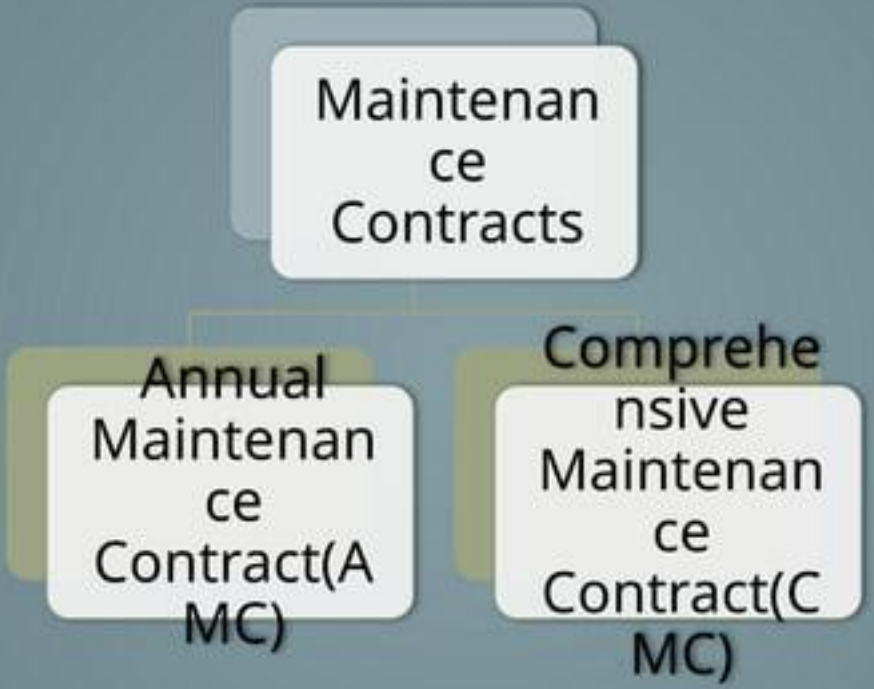

Maintenance
Preventive Maintenance
Corrective Maintenance

PREVENTIVE MAINTENANCE

- **Preventive maintenance** is **maintenance** that is regularly performed on a equipment to lessen the likelihood of its failure.
- **Preventive maintenance** is performed while the equipment is still working, so that it does not break down unexpectedly.
- There is always a danger of undesirable machine breakdown. Preventive maintenance can save a lot of time and money.

CORRECTIVE MAINTENANCE

Corrective maintenance is a **maintenance** task performed to identify, isolate, and rectify a fault so that the failed equipment can be restored to an operational condition within the tolerances or acceptable limits.


Maintenance Contracts
Annual Maintenance Contract(AMC)
Comprehensive Maintenance Contract(CMC)

ANNUAL MAINTENANCE CONTRACT (AMC)

- A manufacturer company provides the service through AMC by themselves or with the service providers.
- The contract is usually for the **period of 1 year** and can be extended up to **three years or five years.**
- Usually the service providers give only service support and would charge separately for every part under AMC.
- However, in some cases, few parts are replaced

COMPREHENSIVE MAINTENANCE CONTRACT (CMC)

- It includes prompt service from the company or service providers.
- The contract is usually for the **period of 1 year** and can be extended up to **three years or five years**.
- It includes repair and replacement of faulty parts. Having the contracts gives the benefits such as, those parts which are not part of contract being available at reduced costs.
- **CMC is costlier than AMC because it includes the**

6.TRAINING

- The QA program include the means to provide appropriate training for all personnel with QA responsibilities (especially those directly involved with QA program) to ensure a minimum level of competency to perform QC test correctly and consistently.

- **Medical physicist can provide seminars and training courses on How To Perform Quality Control Test.**

7.COMMITTEE

- For successful establishment and implementation of QA program is essential to ensure good cooperation among experts so called **Committee**.
- Committee is responsible for QA program and procedures, implementation of QA program, collection of data, analysis and evaluation of the results on the basis of which decision on measures to be undertaken to correct the deficiencies.
- The committee will decide appropriate corrective actions to be performed to remove deficiencies and reach the

8.RECORDS

1. All quality assurance test data should be recorded on standardized forms. It is suggested that each institution develop its own forms suitable to its own needs.
2. The use of standardized forms will assure that all of the required data will be obtained.
3. Forms should be filed as part of the room log.
4. The chart of data is a recommended procedure which will allow easy identifications of variation with time.

9.MANUAL

- An individual equipment manual should be maintained on each x-ray unit in a facility. This equipment manual must be kept at some convenient location where anyone using the facility can get ready access. The manual should contain;

1. Equipment Data Specifications
2. Technical specifications, including tube loading charts.
3. Equipment operating instructions.

5. An outline of the applicable quality assurance program.

6. A log of the quality assurance test results.

7. A record of service on the equipment including a description of system malfunctions and description of what service was carried out. **The service record should also include identification of the individual performing the service and the date.**

10.REVIEW

- It is essential to review QC results immediately and take action if they are out of tolerance.
- In some cases, it may be necessary to contact the service engineer. The urgency of remedial action by the service engineer should be determined by personal judgment.
- For example, a minor failure in x-ray to light-beam alignment could be fixed at the next service visit but anything that may affect patient dose or image quality

REVIEW

- Prior to contacting the service engineer, you may wish to carry out the following steps:

1. Repeat the test. If you are not confident in carrying out QC tests, consult an experienced colleague ;
2. Check that you have used correct and consistent settings e.g. kV, mAs, test object, focus to detector distance;
3. If artefacts are present, try to identify their location e.g. on the detector, the test object. Clean equipment and repeat the test;

QC IN CONVENTION RADIOGRAPHY

Q.C. FOR X-RAY GENERATORS

1. Accuracy Of Tube Voltage
2. Linearity Of mAs
3. Exposure Time Accuracy

ACCURACY OF TUBE VOLTAGE

- The maximum or peak electrical potential (kVp) across the x-ray tube affects the radiation intensity reaching the image receptor and the subjected contrast of the final image.
- This is to check the kVp selection on control panel if it is same as applied across the X-ray tube with the help of Digital kVp Meter.

GAMMEX 330 DIVOLTMETER

ACCURACY OF TUBE VOLTAGE

Procedure :

- Place the kVp Meter on the X-ray table and maintain the FFD at 40 inch or 100cm with the help of measuring tape.
- Collimate the beam up to the specified area of the ionization chamber.
- Keeping the **mAs constant**, exposure is given for different kVp values and readings are observed.

Acceptance Limit:

- Reading should be within the **acceptance limit of ±5%.** If reading is beyond this it should be rectified by service engineer.

LINEARITY OF MAS

REQUIREMENTS:

Densitometer

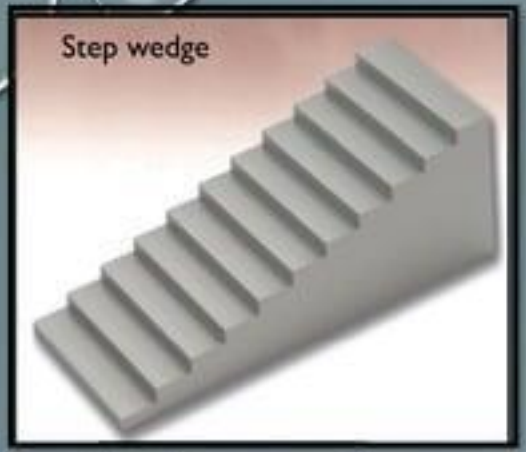
Step Wedge

Lead Separator

Processor

Graph Paper

Step wedge

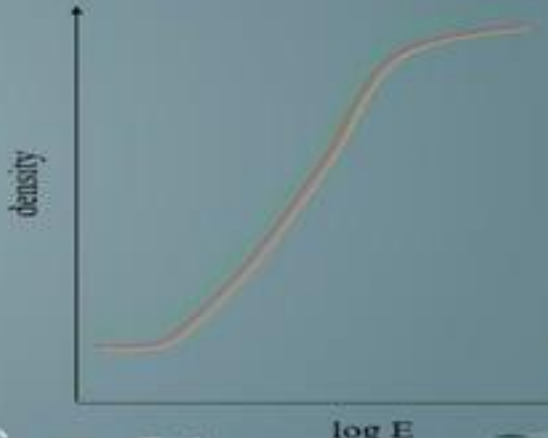


Densitometer

PROCEDURE:

Step wedge is placed on 10x 12 film. Half of the cassette is covered by lead separator.

- 3 exposures are given by keeping kVp & mAS constant & varying mA.
- Film is processed. Density is measured for 2 corners & mid point of each step.
- Mean value for each step is calculated.
- Graph is plotted b/w density & no. of steps.
- TOLERANCE: 3 graphs should overlap.



EXPOSURE TIME ACCURACY

- Exposure time is operator selectable on most radiographic console.
- The timer is used to control the duration of exposure. It initiates and terminates the exposure after prefixed period of time.
- With the help of Digital Timer we can check the timer accuracy.

PROCEDURE:

- Place the Digital timer on the X-ray table and reading must be on zero.
- Set FFD to 40 inch or 100cm with the help of measuring tape.
- Collimate the beam the specified area o the ionization Chamber.

Acceptance Limit:

- Reading should be within the **acceptance limit of ±10%.** If reading is beyond this it should be rectified by service engineer.

Q.C FOR DIAGNOSTIC X-RAY TUBE

1. Size Of The Focal Spot
2. Beam Perpendicularity
3. Congruence Of Optical And Radiation Field
4. Filtration

SIZE OF THE FOCAL SPOT

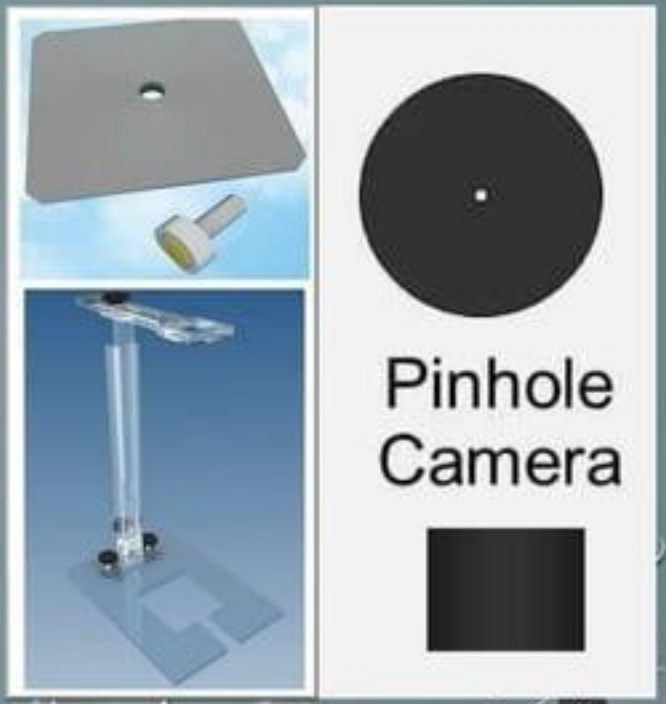
- Actual focal spot size is the area on the anode that is stuck by electrons, which is primarily determined by length of cathode filament and width of focusing cup.
- Effective focal spot size is the length and width of the focal spot which is projected downwards.
- Small anode angle is desirable for small field of view and Large anode angles necessary for large field of view.

TOOLS FOR MEASURING FOCAL SPOT SIZE ARE:

1. The pinhole camera
2. Slit camera
3. Star pattern
4. Resolution bar pattern

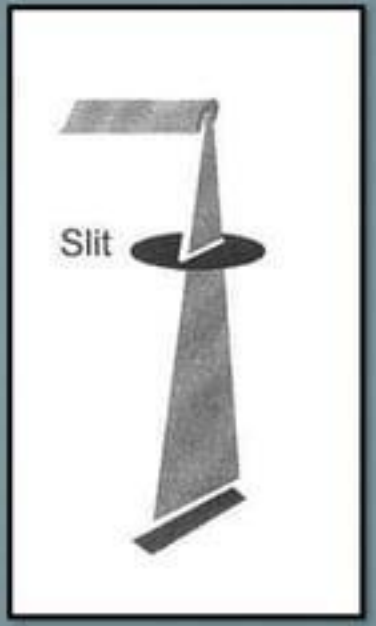
1.PINHOLE CAMERA

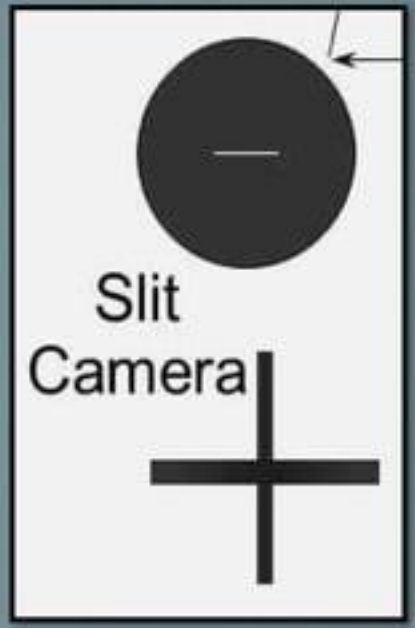
- The pinhole camera uses a very small circular aperture (10 to 30 /μm diameter) in a disk made of a thin, highly attenuating metal such as **lead, tungsten, or gold.**
- With the pinhole camera positioned on the central axis between the x-ray source and the detector, an image of the focal spot is recorded.



SLIT CAMERA

- Slit camera consist of a plate made up of a highly attenuating metal with a thin slit of **10m wide.**
- Take two exposures one on x-axis and second on y-axis and the recorded image is measured.

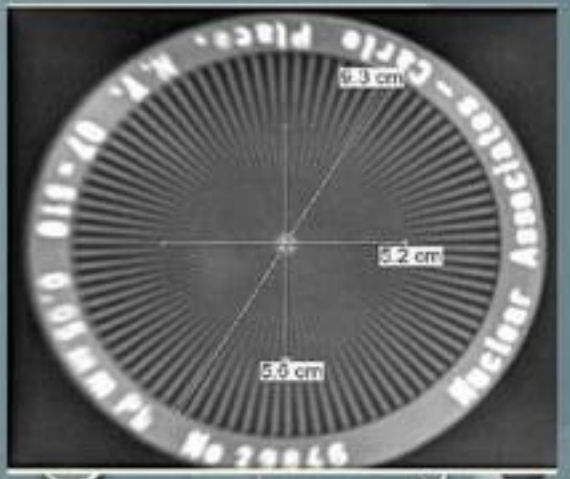

Slit


Slit
Camera

STAR TEST PATTERN

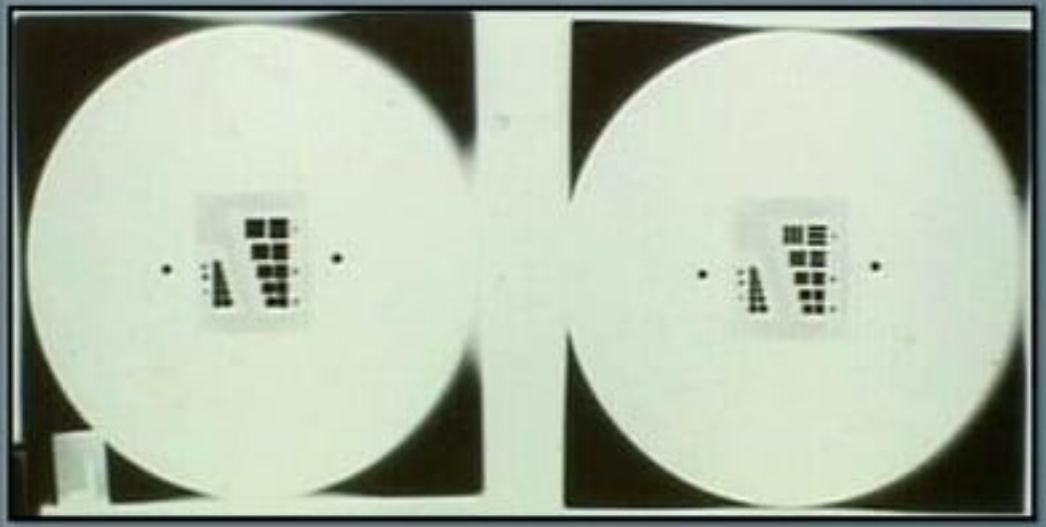
- The star pattern test tool contains a radial pattern of lead spokes of diminishing width and spacing on a thin plastic disk.
- Imaging the star pattern at a known magnification and measuring the distance between the outermost blur patterns (areas of unresolved spokes) on the image provides an estimate of the resolving power of the focal spot.
- A large focal spot has a greater blur diameter than a small focal spot. The effective focal spot size can be estimated from the blur pattern diameter.

- F=
- N is angle of star test pattern
- D is diameter from where contrast is minimum
- M is



USING BAR TEST PATTERN

- The recorded detail in a radiographic image is partially dependent on the size of the x-ray tube's focal spot.
- Both the focal spot should be checked in dual focus tubes As the size of the focal spot increase, it increases the unharness of image.
- Place the bar test pattern on image receptor and adjust the FFD at 18 inch by the help of measuring tape.
- Exposure is made with appropriate exposure factor and image is obtained.
- And the size of focal spot is revaluated by using table.



S.no.	LP/mm	Dimension Of Focal Spot
1	.84	4.3
2	1.00	3.4
3	1.19	3.1
4	1.41	2.6
5	1.68	2.2
6	2.00	1.8
7	2.39	1.5
8	2.83	1.3
9	3.36	1.1
10	4.00	0.9
11	4.70	0.8
12	5.00	0.7

BEAM PERPENDICULARITY

- X ray beam should be perpendicular to the image receptor, otherwise it would produce geometric distortion in image thus deteriorate image quality.

Procedure:

- Place the collimator test tool and beam alignment test tool on the center of the image receptor.
- Adjust the collimator so that the edge of collimated light beam must coincide with the out line of Collimator test tool and level should be checked with Sprit level.
- Expose the area with appropriate exposure.
- Shadow of two holes should concide with each other.
- If holes do not coincide but lie within the two concentric circles ,it is with in acceptance limit.

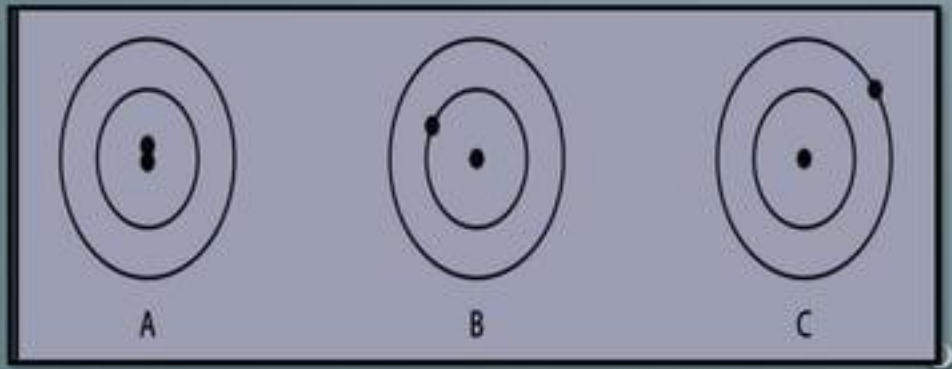
- EVALUATION: 2 points of Test tool are observed.

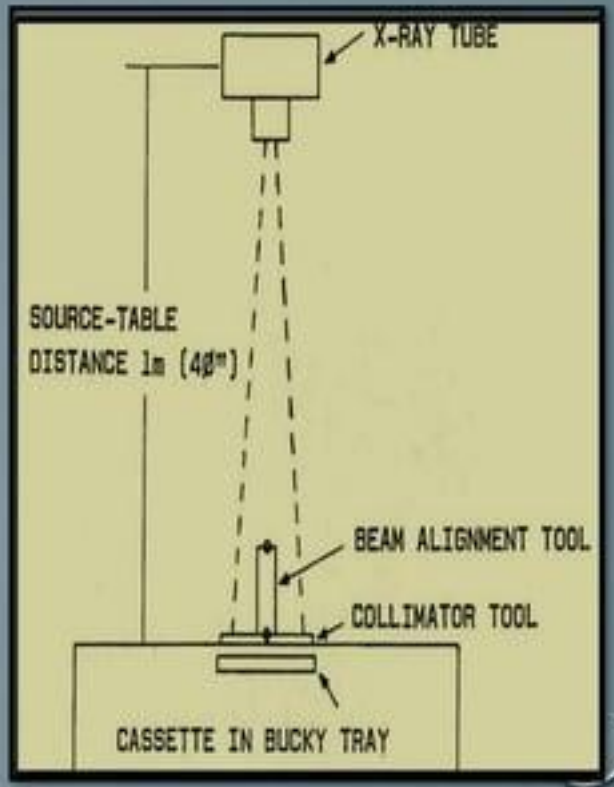
  If 2 points lie in the inner circle then shift=**0.5°**

  If 1 point lie in the outer circle then shift=**1.5°**

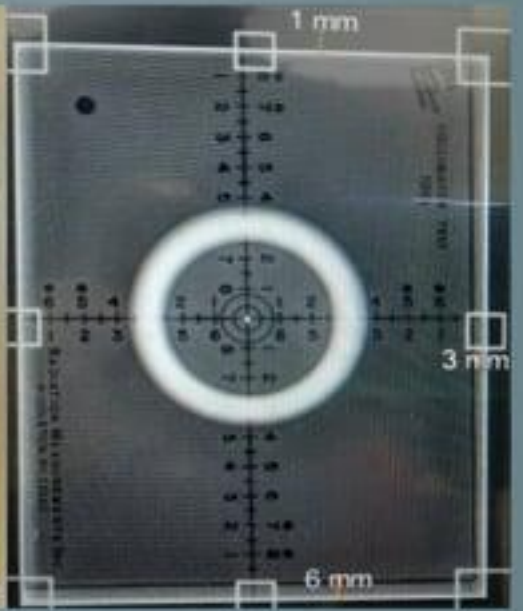
  If 1 point lie outside the outer circle, shift=**3°**

  TOLERANCE: Acceptance limit is **1.5°**.



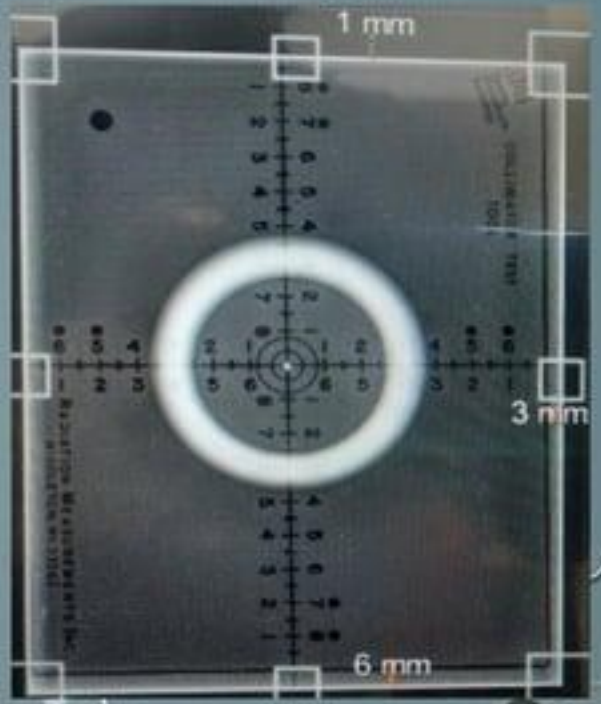


BEAM ALIGNMENT TEST TOOL



CONGRUENCE OF OPTICAL AND RADIATION FIELD

- This test is designed to check the centering and perpendicularity of the beam, as well as congruence or the alignment of the collimator light field and x-ray beam field.
- Acceptance Limit: **Beam /light field alignment should be within ± 2% of the SID**.



FILTRATION

- Perhaps the most important characteristic of a radiographic unit is X-ray beam filtrations.
- The general purpose of radiographic units have min. **total filtration of 2.5mm of Al**. It is normally not possible to measures filtration directly.
- Filtration should be checked annually or after a change in the x-ray tube or housing.

HALF VALUE LAYER (HVL)

- Half value layer testing is used to determine the quality of an x-ray beam.
- Basically , HVL tests are performed to determine if there is enough radiation produced by an individual system, to produce a quality diagnostic image, while not exposing a patient to more radiation than is necessary.
- HVL is defined as the absorber material thickness necessary to reduce the x-ray beam intensity to half of its incident intensity.

EVALUATION OF HVL AND TOTAL FILTRATION

- Total aluminum equivalent filtration of the x-ray tube is evaluated by determining the half value thickness of the beam.
- Transmission curve of the x-ray beam can be prepared by plotting a graph between the absorber thickness and corresponding percentage transmission.
- The absorber thickness for 50 % transmission will be the half value thickness of the x-ray beam.

MINIMUM FILTRATION FOR X-RAY TUBES

- For ensuring radiation quality of the x-ray beam, the total filtration in the x-ray source assembly
- Material Used :Aluminum filters of purity 99.99% or higher and density 2.70 g cm-3

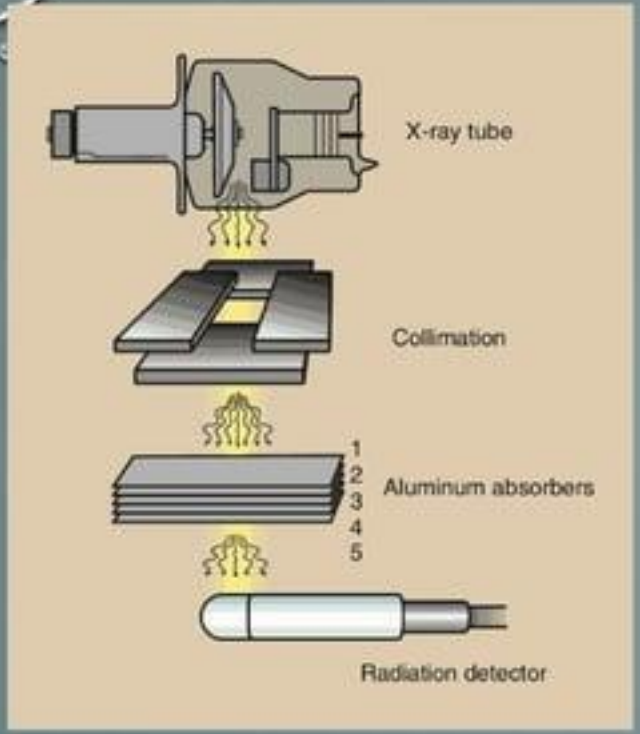
Tolerance : 1.5 mm Al for kV < 70

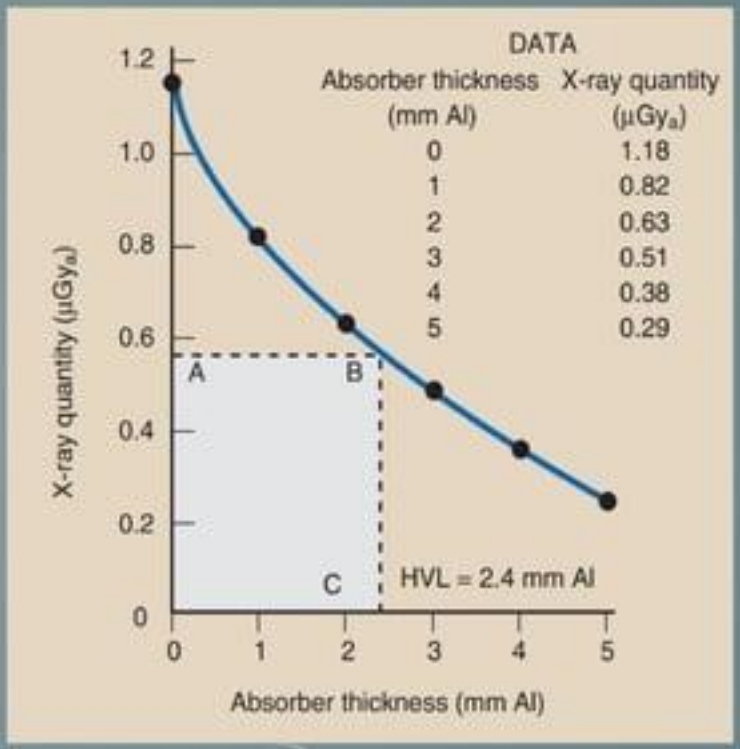
2.0 mm Al for 70 < kV < 100

2.5 mm Al for kV > 100

PROCEDURE:

- The ion chamber is to be placed at 100cm from the focus means or table top.
- The first exposure should be recorded with nothing in the path of x-ray beam.
- Now several small sheets of Aluminum ranging from 0.1mm up to 3.0mm are placed between the tube and radiation meter.


X-ray tube
Collimation
1
2
3
4
5
Aluminum absorbers
Radiation detector


DATA
Absorber thickness (mm Al)
X-ray quantity (μGy_a)
0 1.18
1 0.82
2 0.63
3 0.51
4 0.38
5 0.29
X-ray quantity (μGy_a)
1.2
1.0
0.8
0.6
0.4
0.2
0
A
B
C
HVL = 2.4 mm Al
0 1 2 3 4 5
Absorber thickness (mm Al)

- The thickness are then combined to determine the total aluminum needed to reduce the beam intensity to half its original measured intensity.
- It takes approx.. 2.5mm of Aluminum to reduce the intensity to one half of its original intensity at 75kV.
- If this can be done with less Aluminum then it is determined that the kVp is not sufficient and service is required.

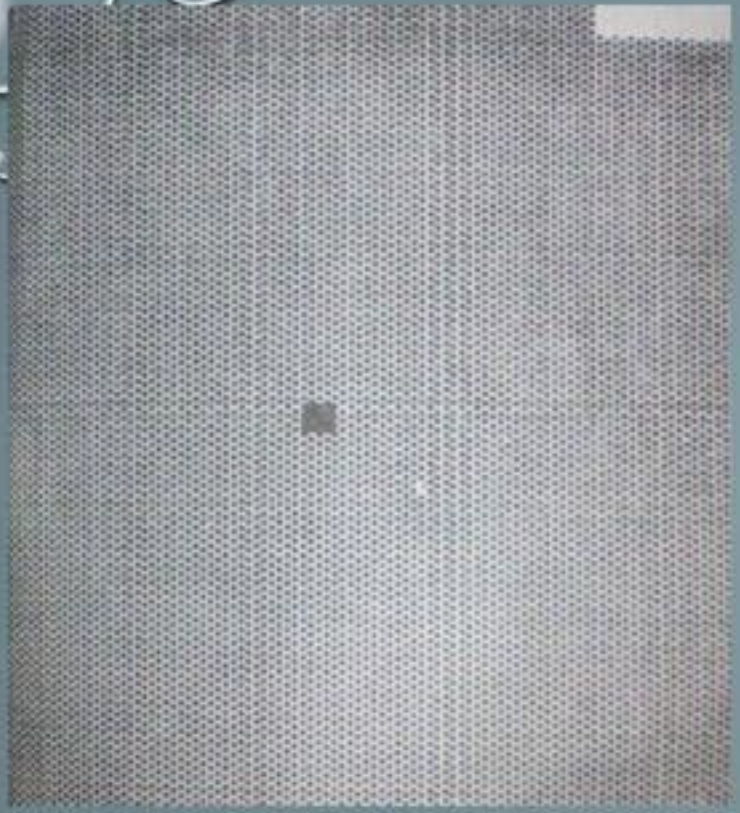
Q.C. FOR X-RAY FILMS AND CASSETTES:

1. Film Screen Contact
2. Cassettes
3. Intensifying Screens
4. Grid Alignment

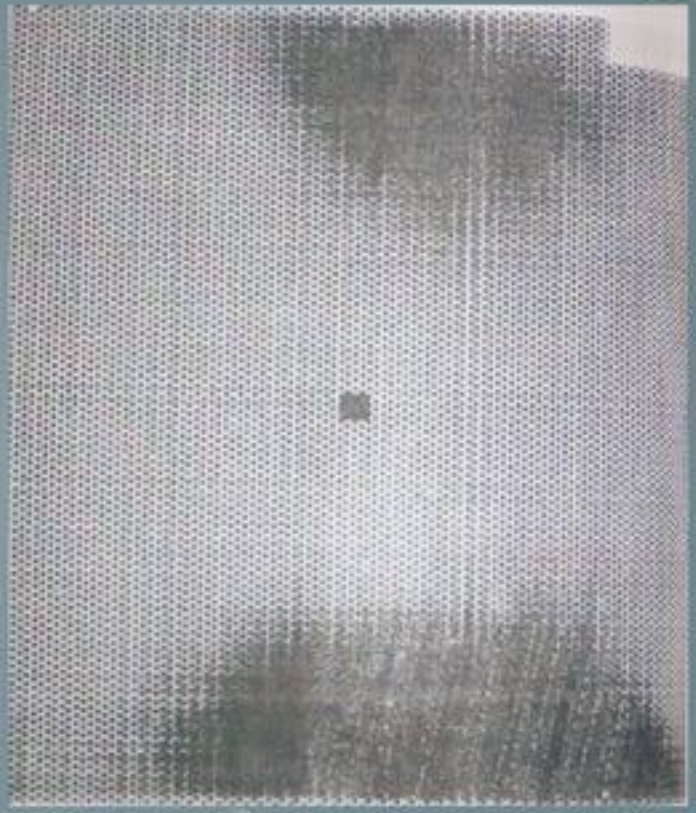
FILM SCREEN CONTACT

- Poor contact b/w the intensifying screen and the radiographic film reduces the contrast and produces the blurring Radiographic images if the film and cassette is not in proper contact.
- This can be checked with the help of wire mesh pattern test.


Wire Mesh



Undistorted Image



Distorted Image

CASSETTES

- Cassette should be physically inspected periodically for wearing of the latches and hinges, working of the cassette frame, and deterioration of the foam or felt compression material.
- Testing for light leakage should also be inspected.
- Cassette should be repaired or replaced if they do not pass such inspections.

RADIOGRAPHIC INTENSIFYING SCREENS

- Radiographic intensifying screens Dirty, cracks and torn out screens can cause radiographic artifacts so it require immediately replacement.

GRID ALIGNMENT

- The purpose of grid is to reduce the amount scatter radiation reaching the film. This greatly improves the quality of the image.
- Grid must be properly aligned with the beam otherwise it can lead to reduction of quality of image and is called **Grid cutoff.**

Procedure:

- Place the test tool on the table top so that the central hole on the center of the buckey table.
- Now expose the each hole one by one without moving the grid alignment test tool.
- The density on the central hole should be highest and gradually decreasing on the sides and holes on the either side should have equal densities.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QA IN DIGITAL RADIOGRAPHY

- Development in digital detector technologies have been taking place and new digital technologies are available for clinical practice.
- Several digital systems are currently available for the acquisition of a radiography.
- Digital radiography system have been replacing traditional analogue or screen-film systems.

CR SYSTEM

- CR technology uses an indirect conversion process using a two-stage technique.
- X-rays are captured at a storage-phosphor screen (SPS) (e.g.: BaFBr:Eu2+) and then a photodetector captures the light emitted from the SPS and converts the captured luminescence into a corresponding digital image.

DR SYSTEM

- DR detectors can use either a direct or an indirect process for converting X-rays into electric charges. These detectors use direct-readout by means of a TFT array.

DR SYSTEM

- **Direct-conversion** detectors have an X-ray photoconductor, such as amorphous selenium (a-Se), that converts directly at only one stage X-ray photons into electric charges.
- **Indirect-conversion** systems use a two-stage technique for conversion. They have a scintillator, such as cesium iodide (CsI) that converts X-rays into visible light at a first stage.
- That light is then converted an electric charge at second stage by means of an amorphous silicon photodiode array.

QUALITY CONTROL FOR CR SYSTEM

To ensure proper operation of the CR components, it is important to develop a continuous quality control program. This should include the following:

- Medical physicist's acceptance testing of any new CR component
- Routine quality control tests by the QC technologist.
- Periodic review of QC program by a qualified medical physicist.

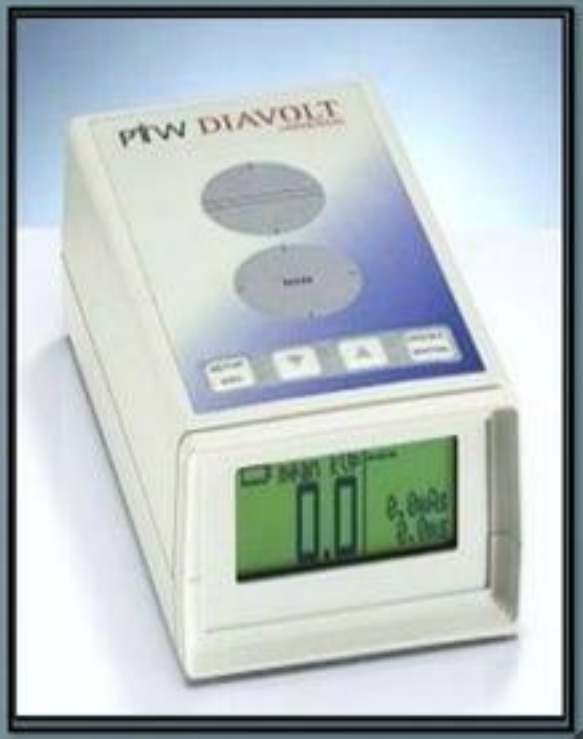
COMPONENTS OF CR SYSTEM

- General X-ray Equipment
- Image Recorder
- Image Reader
- Monitor / Display

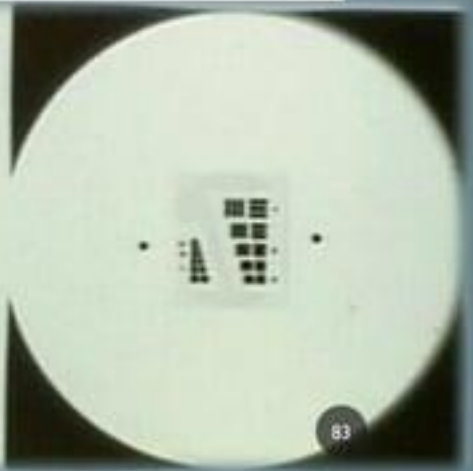
QC FOR GENERAL X-RAY EQUIPMENT

X-RAY GENERATOR	QC FOR DIAGNOSTIC X-RAY TUBE
1. Accuracy of tube voltage	1. Assessment of focal spot size
2. mA Linearity	2. Beam Perpendicularity
3. Exposure timer accuracy	3. Light Field/X-ray Field Congruency

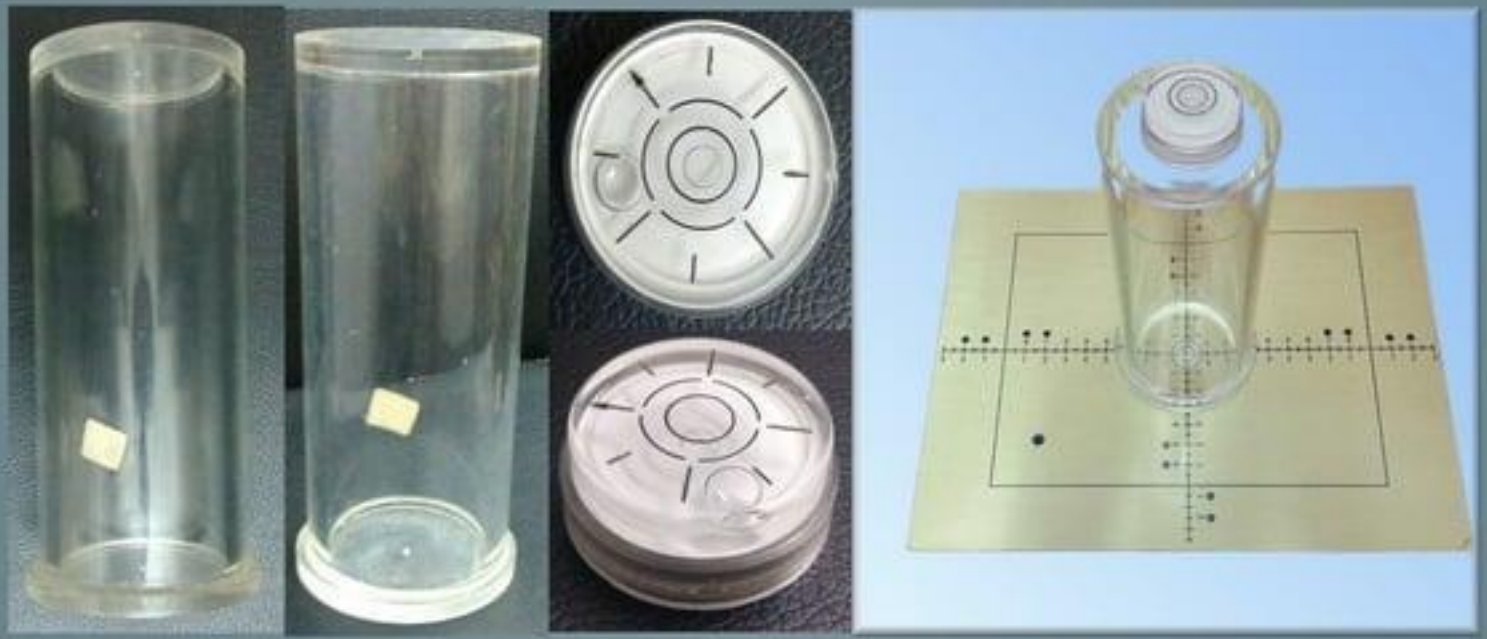
Universal Divolt Meter

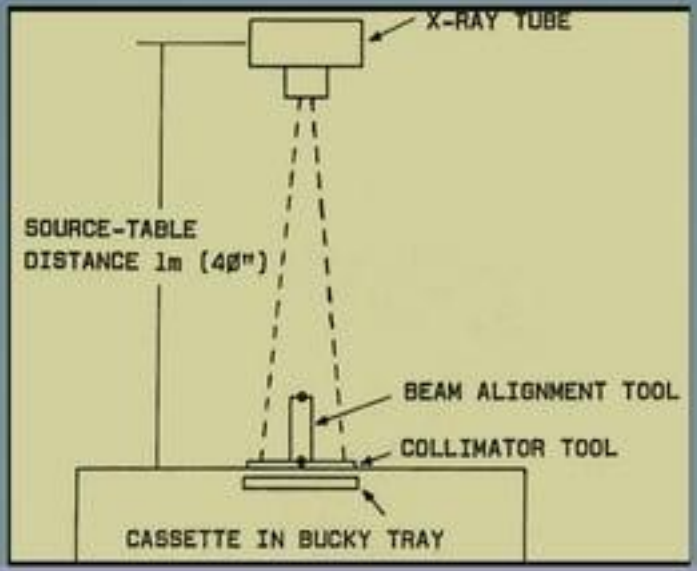


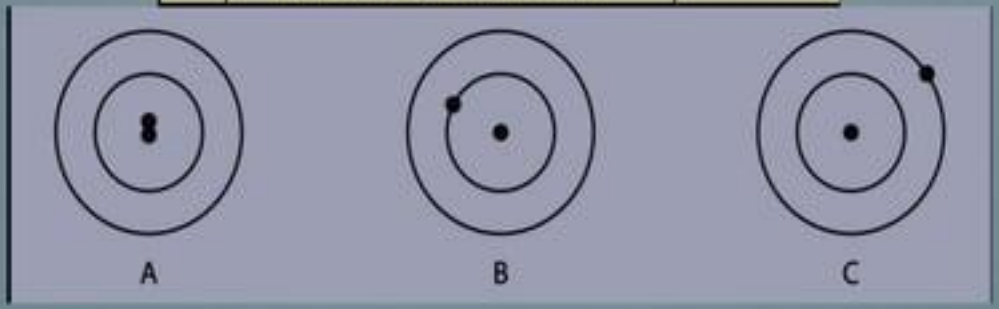
Tools for Assessment of focal spot size



for Beam Perpendicularity/Light Field and X-ray Field Congruency




X-RAY TUBE
SOURCE-TABLE
DISTANCE 1m (40")
BEAM ALIGNMENT TOOL
COLLIMATOR TOOL
CASSETTE IN BUCKY TRAY


A
B
C

LINEARITY OF MA LOADING STATIONS

- The tube current (mA) is equal to the number of electrons flowing from the cathode to the anode per unit time.
- The exposure of the beam for a given kVp and filtration is proportional to the tube current.
- This test is carried out to check the linearity of radiation output with respect to change in tube current (mA) stations by keeping timer station constant at a particular kV station.

FFD=100 cm Radiation field size= 20cm x 20 cm

- Keeping exposure time and kVp constant, radiation output is measured at different mA stations.
- Measurement for mA loading station is to be repeated for a number of times each to eliminate statistical errors.
- Radiation output readings of each mA loading station readings are averaged and the **coefficient of linearity (CoL)** is evaluated from average **mR/mAs** or **mGy/mAs** as follows:

Coefficient of linearity = **(X max -Xmin) / (Xmax + X min)**

Tolerance: Coefficient of Linearity < 0.1

CIT CR TEST PHANTOM FOR RADIOGRAPHIC SYSTEM

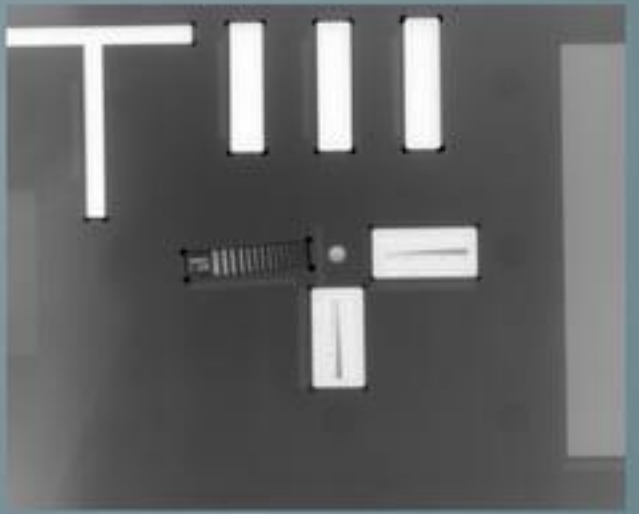


IMAGE RECORDER

- Computed radiographic cassette are used in digital radiographic systems. However these cassette instead of intensifying screen contains a special phosphor plate called **Imaging plate.**

- Though the phosphor material used in these films is **Eu: Barium Fluoro-halide,** the image is formed by a complex electron trap mechanism. The imaging plate of such cassette has a large dynamic range.

IMAGE READER

- The CR image reader is also known as Analog to Digital Converter (ADC).
- It converts the Continuous Analog Imag Imaging Plate into the Digital Image.

What Happens to the Plate in the Reac

- Cassette enters the reader.
- Image plate is removed from cassette
- Latent image is scanned by laser
- Image plate is erased with high intensit
- Image plate is returned to cassette and

QUALITY ASSURANCE TEST IN CR SYSTEM

Daily Tests

- Image Artifact Test
- Reader Reboot
- Image Reader Visual Check
- Inspection & Cleaning

Quarterly Tests

- Laser Jitter Test
- Imaging Plate Cleaning
- Retake Image analysis

Annual Test

- IP Dark Noise Test
- Uniformity Test

Daily Tests

IMAGE ARTIFACT TEST

- Clinical image acquired should be free from any artefact and subject to a quick check before being dispatched.
- Visually inspect the image for non-uniformity and artefacts.
- If artefacts are seen, it is important to determine whether they are due to the mirror, the detector or x-ray beam non-uniformity.
- To eliminate the possibility of display artefact, rotate or pan the image on monitor. If the artefact moves with the image it is due to the imaging system, if it stays in the same place, it is due to the display system (monitor).

IMAGE READER VISUAL INSPECTION AND CLEANING

- Inspect imaging system for dust/dirt on or near image reception area.
- For CR systems, the IP loading/unloading mechanism may be cleaned and lubricated if necessary.
- Daily wiping of the insertion slot reduces the chance of dust getting into the readout chamber.
- Canned air may be used to

INSPECTION & CLEANING

- System Inspection for Physical Defects, Physical Inspection of Display Devices.
- Daily secondary Erasing of Imaging Plates, Verification of System Interfaces & Network Transmission.
- CR image plates are sensitive to scattered and naturally occurring radiation sources and if left unused for long periods of time will store energy absorbed from these sources.
- It is recommended that all CR image plates be

Quarterly Tests

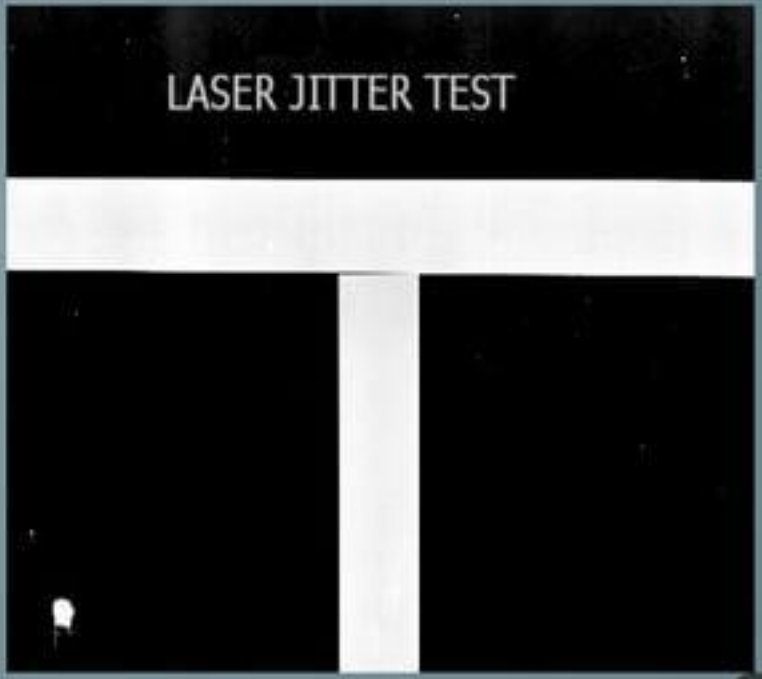
LASER JITTER TEST

This test will determine whether the mechanical motion of the image plate, laser, and optics are consistent in the transport system

Procedure:

- Erase your dedicated test IP
- Place a lead apron below the cassette .
- Place test IP on lead apron
- Place phantom on cassette
- Center, and open collimation about 1″ past edges of test IP and exposure is made.
- Print a hard-copy image on the laser printer.

LASER JITTER TEST



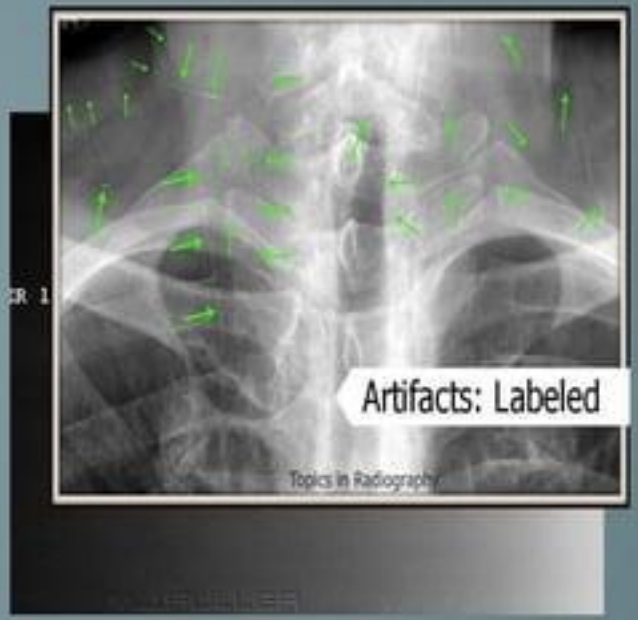
LASER JITTER TEST

Evaluation:

- Inspect the edges of the "T" in the SCALE for jagged edges.
- If the jagged edges appear at the QC station and the laser film, the reader should be serviced.
- However, if the jagged edges only appear on the hard copy, but not the QC station, there may be a problem with the laser

IMAGING PLATE CLEANING

- Frequency depends on patient volume, plate handling, and/or frequency artifacts found.
- Damage may be caused by improper handling ,such as contact with dirty/wet hand, lotions, sanitizers or non –approved cleaners.
- Imaging plates accumulates dust, dirt, scratches and cracks, and show wear from abrasions and other physical damage to surface.
- Dust and dirt build up on CR phosphor plates, leading to image artifacts.



QUALITY ASSURANCE AND QUALITY CONTROL IN CONVENTIONAL AND DIGITAL RADIOGRAPHY

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