

**APPENDIX 3G**

**LOT 7 SPECIFICATION**

**STATIC X-RAY SYSTEMS AND ASSOCIATED OPTIONS AND RELATED SERVICES**

**1. Introduction**

1.1. This Lot is for the supply of static X-Ray systems for a range of clinical applications to provide radiographic images of the patient. Dependent upon the application the system will incorporate an X-Ray generator and tube, zero, one or more detectors, an operator workstation/control panel and a vertical stand (Bucky) and/or horizontal patient table and must include IT connectivity.

1.2. The core product lines within this Lot are as follows:

Line Number	
1	Digital Vertical Radiographic X-Ray System with detector
2	Digital Radiographic Table X-Ray System with detector
3	Universal Digital Radiographic X-Ray System with One Detector
4	Universal Digital Radiographic X-Ray System with Two Detectors
5	General Purpose Analogue Radiographic X-Ray System
6	Digital Vertical Radiographic X-Ray System – no detector
7	Digital Radiographic Table X-Ray System – no detector
8	Universal Digital Radiographic X-Ray System – no detector
9	Full body, stereo-radiographic static x-ray system capable of imaging a patient in a functional position

1.3. Product line(s) must be supplied with a minimum 7 year expected lifecycle under proper use and maintenance.

**2. Criteria applicable across all product lines**

2.1. Static X-Ray systems must incorporate a high frequency X-Ray generator and tube which as a minimum must have the following features:

- 2.1.1. The X-Ray generator must have a power of at least 50 kilowatts (kW).
- 2.1.2. The X-Ray tube and collimator must be suitable for either floor or ceiling mounting.
- 2.1.3. It must be possible for the user to adjust the peak Kilo-voltage (kVp), mA, and exposure time values.
- 2.1.4. The available voltage range must be at least 40 to 150kVp.
- 2.1.5. Programmable settings (anatomical programs) must be provided.
- 2.1.6. The minimum tube current must be no more than 30mA.
- 2.1.7. The X-Ray tube must have inherent filtration equivalent to at least 2.5 mm Al.
- 2.1.8. Leakage radiation must conform to national requirements.

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- 2.1.9. The X-Ray tube must provide at least two focal spots;
  - 2.1.9.1. Fine focus ( $\leq 0.6\text{mm}$ ); and
  - 2.1.9.2. Broad focus ( $\leq 1.2\text{mm}$ ).
- 2.1.10. The X-Ray tube must have a rotating anode.
- 2.1.11. The heat capacity of the X-Ray tube must be a minimum of 300k HU (Heat Units).
- 2.1.12. The maximum cooling rate of the X-Ray tube housing assembly must be at least 200 HU/Min.
- 2.1.13. It must be possible to add copper filtration to the X-Ray tube either manually or automatically.
- 2.1.14. The source image distance must be displayed on the tube head.
- 2.1.15. The X-Ray tube must be equipped with an adjustable collimator with coincident light field.
- 2.1.16. The generator must be capable of 3-point technique.

2.2. Static X-Ray systems must include an operator workstation from which it can be operated safely and effectively to create radiographic images of the patient. As a minimum the workstation must include the following features:

- 2.2.1. At least one high-resolution monitor minimum 15" screen (measured diagonally corner to corner) with brightness of at least  $200\text{cd/m}^2$  and resolution of at least 1 megapixel to allow image quality assessment and annotation.
- 2.2.2. A digital image suitable for preview must be displayed within 5 seconds of exposure.
- 2.2.3. A measure of exposure received by the detector must be displayed after an image is taken.
- 2.2.4. An alphanumeric keyboard for data entry and annotation must be supplied.
- 2.2.5. Post-processing of an image must be possible on the workstation and as a minimum include the following functions:
  - 2.2.5.1. Image processing (customised to match exam).
  - 2.2.5.2. Image annotation.
  - 2.2.5.3. Window and level.
  - 2.2.5.4. Image greyscale inversion.
  - 2.2.5.5. Image rotation and flip.
  - 2.2.5.6. Image reversal.
  - 2.2.5.7. Distance and angles.
  - 2.2.5.8. Zoom.

2.3. Static X-Ray systems must conform to DICOM 3.0 and meet the following requirements for IT connectivity in terms of SCU (Service Class User) and/or SCP (Service Class Provider).

- 2.3.1. Modality work list – SCU minimum.
- 2.3.2. Basic greyscale print management meta SOP class - SCU must be available.
- 2.3.3. Modality performed procedure – SCU minimum.

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- 2.3.4. Storage commitment – SCU minimum.
- 2.3.5. Verification - SCU/SCP minimum.
- 2.3.6. Greyscale standard display function - SCU/SCP must be available.
- 2.3.7. The proposed X-Ray System(s) must support the following IHE (Integrating the Healthcare Enterprise) profiles:
  - 2.3.7.1. Scheduled workflow (SWF).
  - 2.3.7.2. Patient information reconciliation (PIR).
  - 2.3.7.3. Basic image review (BIR).

**3. Line 1 – Digital Vertical Radiographic X-Ray System with detector**

3.1. Digital Vertical Radiographic X-Ray System for general digital studies performed with a vertical stand and used for routine chest and other upright studies. The system comprises of an X-Ray generator, tube, control console and vertical stand with digital detector.

3.2. The X-Ray generator/tube for a digital vertical radiographic X-Ray system must have the following features:

- 3.2.1. The X-Ray system must be able to import patient demographic and ordered study details from an IT X-Ray system.
- 3.2.2. The X-Ray system must be able to set X-Ray parameters based on the ordered study.
- 3.2.3. The X-Ray tube must be equipped with an adjustable collimator with coincident light field.
- 3.2.4. It must not be possible to initiate an exposure unless the digital detector is ready.
- 3.2.5. The minimum time between exposures must be no more than 20 seconds.
- 3.2.6. It must be possible to freely adjust the X-Ray collimator to arbitrary angles.

3.3. A vertical stand (Bucky) for a digital vertical radiographic X-Ray system must as a minimum have the following features:

- 3.3.1. The vertical stand must have a digital detector that measures at least 35cm x 40cm.
- 3.3.2. The vertical stand must be suitable for either floor or ceiling mounting.
- 3.3.3. It must be possible for the detector to be tilted by at least 90 degrees to enable horizontal and vertical images.
- 3.3.4. It must be possible to tilt and set the angle of the detector at any point within the range of tilt available.
- 3.3.5. It must be possible to lower the detector towards the floor and position the centre of the detection area at least 0.4 metres above the floor.
- 3.3.6. It must be possible to raise the detector with the maximum height of the centre of the detection area at least 1.5 metres above the floor.

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- 3.3.7. The movement of the X-Ray tube and detector must be linked either mechanically or electromechanically.
- 3.3.8. The source to image distance must be adjustable in a range of at least 1.0 metre to 1.8 metres.
- 3.3.9. The collimation must adjust automatically when the source to image distance is adjusted.
- 3.3.10. An automatic exposure control must be supplied with at least 3 detection fields.
- 3.3.11. A removable anti-scatter grid, matched to the detector must be provided.
- 3.3.12. The anti-scatter grid must not cause moiré interference patterns on the resulting image.
- 3.3.13. The image pixel size must be no more than 0.2mm.
- 3.3.14. The minimum Detective Quantum Efficiency (DQE) must be at least 60% at 0lp/mm and measured using RQA5 (Standardised Radiation) beam quality.
- 3.3.15. The detector must have an image digitisation resolution of at least 14bits.

**4. Line 2 – Digital Radiographic Table X-Ray System with detector**

4.1. A digital radiographic table X-Ray system is a table based radiographic X-Ray system equipped with a digital detector and used for general table based radiographic studies. The system comprises of an X-Ray generator, tube, control console and radiographic table with digital detector.

4.2. The X-Ray generator/tube for a digital radiographic table X-Ray system must have the following features:

- 4.2.1. The X-Ray system must be able to import patient demographic and ordered study details from an IT X-Ray system.
- 4.2.2. The X-Ray system must be able to set X-Ray parameters based on the ordered study.
- 4.2.3. The X-Ray tube must be equipped with an adjustable collimator with coincident light field.
- 4.2.4. It must not be possible to initiate an exposure unless the digital detector is ready.
- 4.2.5. The minimum time between exposures must be no more than 20 seconds.
- 4.2.6. It must be possible to freely adjust the X-Ray collimator to arbitrary angles

4.3. The radiographic table for a digital radiographic table X-Ray system must have the following features:

- 4.3.1. The X-Ray table must be a permanently mounted design.
- 4.3.2. The table stand must have a fixed or wireless digital detector that is at least 35cm x 40cm.

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- 4.3.3. If the detector is not square, then it must be possible to acquire images in both landscape and portrait formats.
- 4.3.4. An automatic exposure control must be supplied with at least 3 detection fields.
- 4.3.5. A removable anti-scatter grid, matched to the detector must be provided.
- 4.3.6. The anti-scatter grid must not cause moiré interference patterns on the resulting image.
- 4.3.7. The image pixel size must be no more than 0.2mm.
- 4.3.8. The minimum DQE must be at least 60% at 0lp/mm and measured using RQA5 beam quality.
- 4.3.9. The detector must have an image digitisation resolution of at least 14bits.
- 4.3.10. The table must be an elevating design with a floating table top.
- 4.3.11. All table motions must include electromagnetic or alternative locking mechanism.
- 4.3.12. The X-Ray absorption must be equivalent to no more than 1.2mm AL.
- 4.3.13. Table elevation must be manual or motorised.
- 4.3.14. The table controls must be via foot switches.
- 4.3.15. The foot switch design must prevent accidental activation.
- 4.3.16. The table length must be at least 2.0 metres.
- 4.3.17. The table width must be at least 0.7 metres.
- 4.3.18. The longitudinal motion of the table or detector must be at least 0.75m.
- 4.3.19. The lateral motion must be at least 0.2 metres.
- 4.3.20. The maximum patient weight must be at least 200 kg
- 4.3.21. It must be possible to centre the Bucky with the collimation indicators or detents.

**5. Line 3 – Universal Digital Radiographic X-Ray System with One Detector**

- 5.1. A universal digital radiographic X-Ray system with one detector is a general purpose digital radiographic X-Ray system equipped for all standard radiographic studies. The system comprises of an X-Ray generator, tube, control console, radiographic table, vertical detector stand (Bucky) and one digital detector that can be positioned either horizontally or vertically in order to allow an image to be taken of a patient whether they are erect, supine or seated.
- 5.2. The X-Ray generator/tube for a universal digital radiographic X-Ray system with one detector must also have the following features:
  - 5.2.1. The X-Ray system must be able to import patient demographic and ordered study details from an IT X-Ray system.
  - 5.2.2. The X-Ray system must be able to set X-Ray parameters based on the ordered study.

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- 5.2.3. The X-Ray tube must be equipped with an adjustable collimator with coincident light field.
- 5.2.4. It must not be possible to initiate an exposure unless the digital detector is ready.
- 5.2.5. The minimum time between exposures must be no more than 20 seconds.
- 5.2.6. It must be possible to freely adjust the X-Ray collimator to arbitrary angles

5.3. The radiographic table for a universal digital radiographic X-Ray System with one detector must as a minimum have the following features:

- 5.3.1. The X-Ray table must be a permanently mounted design.
- 5.3.2. The table stand must have a fixed or wireless digital detector that is at least 35cm x 40cm.
- 5.3.3. If the detector is not square, then it must be possible to acquire images in both landscape and portrait formats.
- 5.3.4. An automatic exposure control must be supplied with at least 3 detection fields.
- 5.3.5. A removable anti-scatter grid, matched to the detector must be provided.
- 5.3.6. The anti-scatter grid must not cause moiré interference patterns on the resulting image.
- 5.3.7. The pixel size must be no more than 0.2mm.
- 5.3.8. The minimum DQE must be at least 60% at 0lp/mm and measured using RQA5 beam quality.
- 5.3.9. The detector must have an image digitisation resolution of at least 14bits.
- 5.3.10. The table must be an elevating design with a floating table top.
- 5.3.11. All table motions must include electromagnetic or alternative locking mechanism.
- 5.3.12. The X-Ray absorption must be equivalent to no more than 1.2mm AL.
- 5.3.13. Table elevation must be manual or motorised.
- 5.3.14. The table controls must be via foot switches.
- 5.3.15. The foot switch design must prevent accidental activation.
- 5.3.16. The table length must be at least 2.0 metres.
- 5.3.17. The table width must be at least 0.7 metres.
- 5.3.18. The longitudinal motion of the table or detector must be at least 0.75m.
- 5.3.19. The lateral motion must be at least 0.2 metres.
- 5.3.20. The maximum patient weight must be at least 200 kg.
- 5.3.21. It must be possible to centre the Bucky with the collimation indicators or detents.

5.4. A vertical stand (Bucky) for a Universal Digital Radiographic X-Ray System with One Detector must as a minimum have the following features:

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- 5.4.1. The vertical stand must have a digital detector that measures at least 35cm x 40cm.
- 5.4.2. The vertical stand must be suitable for either floor or ceiling mounting.
- 5.4.3. It must be possible for the detector to be tilted by at least 90 degrees to enable horizontal and vertical images.
- 5.4.4. It must be possible to tilt and set the angle of the detector at any point within the range of tilt available.
- 5.4.5. It must be possible to lower the detector towards the floor and position the centre of the detection area at least 0.4 metres above the floor.
- 5.4.6. It must be possible to raise the detector with the maximum height of the centre of the detection area at least 1.5 metres above the floor.
- 5.4.7. The movement of the X-Ray tube and detector must be linked either mechanically or electromechanically.
- 5.4.8. The source to image distance must be adjustable in a range of at least 1.0 metre to 1.8 metres.
- 5.4.9. The collimation must adjust automatically when the source to image distance is adjusted.
- 5.4.10. An automatic exposure control must be supplied with at least 3 detection fields.
- 5.4.11. A removable anti-scatter grid, matched to the detector must be provided.
- 5.4.12. The anti-scatter grid must not cause moiré interference patterns on the resulting image.
- 5.4.13. The image pixel size must be no more than 0.2mm.
- 5.4.14. The minimum DQE must be at least 60% at 0lp/mm and measured using RQA5 beam quality.
- 5.4.15. The detector must have an image digitisation resolution of at least 14bits.

**6. Line 4 – Universal Digital Radiographic X-Ray System with Two Detectors**

- 6.1. Universal digital radiographic X-Ray system with two detectors, equipped for all standard radiographic studies. The system comprises of an X-Ray generator, tube, control console, radiographic table, vertical detector stand (Bucky) and two digital detectors.
- 6.2. The X-Ray generator/tube for a universal digital radiographic X-Ray system with two detectors must have the following features:
  - 6.2.1. The X-Ray system must be able to import patient demographic and ordered study details from an IT X-Ray system.
  - 6.2.2. The X-Ray system must be able to set X-Ray parameters based on the ordered study.
  - 6.2.3. The X-Ray tube must be equipped with an adjustable collimator with coincident light field.

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- 6.2.4. It must not be possible to initiate an exposure unless the digital detector is ready.
- 6.2.5. The minimum time between exposures must be no more than 20 seconds.
- 6.2.6. It must be possible to freely adjust the X-Ray collimator to arbitrary angles.

6.3. A radiographic table for a universal digital radiographic X-Ray system with two detectors must as a minimum have the following features:

- 6.3.1. The X-Ray table must be a permanently mounted design.
- 6.3.2. The table stand must have a fixed or wireless digital detector that is at least 35cm x 40cm.
- 6.3.3. If the detector is not square, then it must be possible to acquire images in both landscape and portrait formats.
- 6.3.4. An automatic exposure control must be supplied with at least 3 detection fields.
- 6.3.5. A removable anti-scatter grid matched to the detector must be provided.
- 6.3.6. The anti-scatter grid must not cause moiré interference patterns on the resulting image.
- 6.3.7. The pixel size must be no more than 0.2mm.
- 6.3.8. The minimum DQE must be at least 60% at 0lp/mm and measured using RQA5 beam quality.
- 6.3.9. The detector must have an image digitisation resolution of at least 14bits.
- 6.3.10. The table must be an elevating design with a floating table top.
- 6.3.11. All table motions must include electromagnetic or alternative locking mechanism.
- 6.3.12. The X-Ray absorption must be equivalent to no more than 1.2mm AL.
- 6.3.13. Table elevation must be manual or motorised.
- 6.3.14. The table controls must be via foot switches.
- 6.3.15. The foot switch design must prevent accidental activation.
- 6.3.16. The table length must be at least 2.0 metres.
- 6.3.17. The table width must be at least 0.7 metres.
- 6.3.18. The longitudinal motion of the table or detector must be at least 0.75m.
- 6.3.19. The lateral motion must be at least 0.2 metres.
- 6.3.20. The maximum patient weight must be at least 200kg.
- 6.3.21. It must be possible to centre the Bucky with the collimation indicators or detents.

6.4. A vertical stand (Bucky) for a universal digital radiographic X-Ray system with two detectors must as a minimum have the following features:

- 6.4.1. The vertical stand must have a digital detector that measures at least 35cm x 40cm.

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- 6.4.2. The vertical stand must be suitable for either floor or ceiling mounting.
- 6.4.3. It must be possible for the detector to be tilted by at least 90 degrees to enable horizontal and vertical images.
- 6.4.4. It must be possible to tilt and set the angle of the detector at any point within the range of tilt available.
- 6.4.5. It must be possible to perform cross trolley studies with the upright detector.
- 6.4.6. It must be possible to lower the detector towards the floor and position the centre of the detection area at least 0.4 metres above the floor.
- 6.4.7. It must be possible to raise the detector with the maximum height of the centre of the detection area at least 1.5 metres above the floor.
- 6.4.8. The movement of the X-Ray tube and detector must be linked either mechanically or electromechanically.
- 6.4.9. The source to image distance must be adjustable in a range of at least 1.0 metre to 1.8 metres.
- 6.4.10. The collimation must adjust automatically when the source to image distance is adjusted.
- 6.4.11. An automatic exposure control must be supplied with at least 3 detection fields.
- 6.4.12. A removable anti-scatter grid, matched to the detector must be provided.
- 6.4.13. The anti-scatter grid must not cause moiré interference patterns on the resulting image.
- 6.4.14. The image pixel size must be no more than 0.2mm.
- 6.4.15. The minimum DQE must be at least 60% at 0lp/mm and measured using RQA5 beam quality.
- 6.4.16. The detector must have an image digitisation resolution of at least 14bits.

**7. Line 5 – Digital Vertical Radiographic X-Ray System – no detector**

- 7.1. A digital vertical radiographic X-Ray system for general digital studies performed with a vertical stand and used for routine chest and other upright studies. The system comprises of an X-Ray generator, tube, control console and vertical stand.
- 7.2. The X-Ray generator/tube for a digital vertical radiographic X-Ray system must have the following features:
  - 7.2.1. The X-Ray system must be able to import patient demographic and ordered study details from an IT X-Ray system.
  - 7.2.2. The X-Ray system must be able to set X-Ray parameters based on the ordered study.
  - 7.2.3. The X-Ray tube must be equipped with an adjustable collimator with coincident light field.

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- 7.2.4. It must not be possible to initiate an exposure unless the digital detector is ready.
- 7.2.5. The minimum time between exposures must be no more than 20 seconds.
- 7.2.6. It must be possible to freely adjust the X-Ray collimator to arbitrary angles.

7.3. A vertical stand (Bucky) for a digital vertical radiographic X-Ray system must have the following features:

- 7.3.1. The vertical stand must be able to hold a digital detector that measures at least 35cm x 40cm.
- 7.3.2. The vertical stand must be suitable for either floor or ceiling mounting.
- 7.3.3. It must be possible for the detector to be tilted by at least 90 degrees to enable horizontal and vertical images.
- 7.3.4. It must be possible to tilt and set the angle of the detector at any point within the range of tilt available.
- 7.3.5. It must be possible to lower the detector towards the floor and position the centre of the detection area to at least 0.4 metres above the floor.
- 7.3.6. It must be possible to raise the detector with the maximum height of the centre of the detection area at least 1.5 metres above the floor.
- 7.3.7. The movement of the X-Ray tube and a detector must be linked either mechanically or electromechanically.
- 7.3.8. The source to image distance must be adjustable in a range of at least 1.0 metre to 1.8 metres.
- 7.3.9. The collimation must adjust automatically when the source to image distance is adjusted.
- 7.3.10. An automatic exposure control must be supplied with at least 3 detection fields.
- 7.3.11. A removable anti-scatter grid, matched to the detector must be provided.
- 7.3.12. The anti-scatter grid must not cause moiré interference patterns on the resulting image.

**8. Line 6 – Digital Radiographic Table X-Ray System – no detector**

8.1. A digital radiographic table X-Ray system is a table based radiographic X-Ray system used for general table based radiographic studies. The system comprises of an X-Ray generator, tube, control console and radiographic table.

8.2. The X-Ray generator/tube for a digital radiographic table X-Ray system must also have the following features:

- 8.2.1. The X-Ray system must be able to import patient demographic and ordered study details from an IT X-Ray system.

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- 8.2.2. The X-Ray system must be able to set X-Ray parameters based on the ordered study.
- 8.2.3. The X-Ray tube must be equipped with an adjustable collimator with coincident light field.
- 8.2.4. It must not be possible to initiate an exposure unless the digital detector is ready.
- 8.2.5. The minimum time between exposures must be no more than 20 seconds.
- 8.2.6. It must be possible to freely adjust the X-Ray collimator to arbitrary angles.

8.3. A radiographic table for a digital radiographic table X-Ray system must have the following features:

- 8.3.1. The X-Ray table must be a permanently mounted design.
- 8.3.2. The table stand must be able to hold an integrated digital detector that is at least 35cm x 40cm.
- 8.3.3. An automatic exposure control must be supplied with at least 3 detection fields.
- 8.3.4. A removable anti-scatter grid, matched to the detector must be provided.
- 8.3.5. The anti-scatter grid must not cause moiré interference patterns on the resulting image.
- 8.3.6. The table must be an elevating design with a floating table top.
- 8.3.7. All table motions must include electromagnetic or alternative locking mechanism.
- 8.3.8. The X-Ray absorption must be equivalent to no more than 1.2mm AL.
- 8.3.9. Table elevation must be manual or motorised.
- 8.3.10. The table controls must be via foot switches.
- 8.3.11. The foot switch design must prevent accidental activation.
- 8.3.12. The table length must be at least 2.0 metres.
- 8.3.13. The table width must be at least 0.7 metres.
- 8.3.14. The longitudinal motion of the table or detector must be at least 0.75m.
- 8.3.15. The lateral motion must be at least 0.2 metres.
- 8.3.16. The maximum patient weight must be at least 200kg.
- 8.3.17. It must be possible to centre the Bucky with the collimation indicators or detents.

**9. Line 7 – Universal Digital Radiographic X-Ray System with no detectors**

9.1. Universal digital radiographic X-Ray system - a general purpose digital radiographic X-Ray system equipped for all standard radiographic studies. The system comprises of an X-Ray generator, tube, control console, radiographic table, vertical detector stand (Bucky).

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9.2. The X-Ray generator/tube for a universal digital radiographic X-Ray system must also have the following features:

- 9.2.1. The X-Ray system must be able to import patient demographic and ordered study details from an IT X-Ray system.
- 9.2.2. The X-Ray system must be able to set X-Ray parameters based on the ordered study.
- 9.2.3. The X-Ray tube must be equipped with an adjustable collimator with coincident light field.
- 9.2.4. It must not be possible to initiate an exposure unless the digital detector is ready.
- 9.2.5. The minimum time between exposures must be no more than 20 seconds.
- 9.2.6. It must be possible to freely adjust the X-Ray collimator to arbitrary angles.

9.3. A radiographic table for a universal digital radiographic X-Ray must as a minimum have the following features:

- 9.3.1. The X-Ray table must be a permanently mounted design.
- 9.3.2. The table stand must be able to hold an integrated digital detector that is at least 35cm x 40cm.
- 9.3.3. An automatic exposure control must be supplied with at least 3 detection fields.
- 9.3.4. A removable anti-scatter grid, matched to the detector must be provided.
- 9.3.5. The anti-scatter grid must not cause moiré interference patterns on the resulting image.
- 9.3.6. The table must be an elevating design with a floating table top.
- 9.3.7. All table motions must include electromagnetic or alternative locking mechanism.
- 9.3.8. The X-Ray absorption must be equivalent to no more than 1.2mm AL.
- 9.3.9. Table elevation must be manual or motorised.
- 9.3.10. The table controls must be via foot switches.
- 9.3.11. The foot switch design must prevent accidental activation.
- 9.3.12. The table length must be at least 2.0 metres.
- 9.3.13. The table width must be at least 0.7 metres
- 9.3.14. The longitudinal motion of the table or detector must be at least 0.75m.
- 9.3.15. The lateral motion must be at least 0.2 metres.
- 9.3.16. The maximum patient weight must be at least 200 kg.
- 9.3.17. It must be possible to centre the Bucky with the collimation indicators or detents.

9.4. A vertical stand (Bucky) for a universal digital radiographic X-Ray system must as a minimum have the following features:

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- 9.4.1. The vertical stand must be able to hold a digital detector that measures at least 35cm x 40cm.
- 9.4.2. The vertical stand must be suitable for either floor or ceiling mounting.
- 9.4.3. It must be possible for the detector to be tilted by at least 90 degrees to enable horizontal and vertical images.
- 9.4.4. It must be possible to tilt and set the angle of the detector at any point within the range of tilt available.
- 9.4.5. It must be possible to lower the detector towards the floor and position the centre of the detection area at least 0.4 metres above the floor.
- 9.4.6. It must be possible to raise the detector with the maximum height of the centre of the detection area at least 1.5 metres above the floor.
- 9.4.7. The movement of the X-Ray tube and detector must be linked either mechanically or electromechanically.
- 9.4.8. The source to image distance must be adjustable in a range of at least 1.0 metre to 1.8 metres.
- 9.4.9. The collimation must adjust automatically when the source to image distance is adjusted.
- 9.4.10. An automatic exposure control must be supplied with at least 3 detection fields.
- 9.4.11. A removable anti-scatter grid, matched to the detector must be provided.
- 9.4.12. The anti-scatter grid must not cause moiré interference patterns on the resulting image.

**10.Line 8 – General Purpose Analogue Radiographic X-Ray System**

10.1. A general purpose radiographic system is equipped for standard cassette sizes (film screen, computed radiography cassettes etc.). The system will be used for all general radiographic studies and comprises of X-Ray generator, tube, control console, vertical stand and radiographic table.

10.2. The X-Ray generator/tube for a general purpose analogue radiographic X-Ray system must also have the following features:

- 10.2.1. Setup parameters must be displayed on the collimator housing.
- 10.2.2. It must be possible to angle the X-Ray tube for cross table and oblique studies.
- 10.2.3. It must be possible to position the X-Ray tube for off table studies (e.g. patient on a stretcher).

10.3. A vertical stand (Bucky) for a general purpose analogue radiographic X-Ray system must have the following features:

- 10.3.1. The vertical stand must accept standard sized cassettes (as per **BS EN ISO 4090:2004** – *Photography. Medical radiograph cassettes /*

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*screens / films and hard-copy imaging films. Dimensions and specifications) up to 35cm x 43cm.*

- 10.3.2. It must be possible to acquire images in both landscape and portrait formats.
  - 10.3.3. The vertical stand must be either floor or ceiling mounted.
  - 10.3.4. The stand must lower to the floor.
  - 10.3.5. The maximum height of the centre of the detection area from the floor must be at least 1.5 metres.
  - 10.3.6. The source to image distance must be adjustable in the range 1.0 metre to 1.8 metres.
  - 10.3.7. An automatic exposure control must be supplied with at least 3 detection fields.
  - 10.3.8. A removable anti-scatter grid, matched to the detector must be provided.
- 10.4. A radiography table for a general purpose analogue radiographic X-Ray system must have the following features:
- 10.4.1. The X-Ray table must be a permanently mounted design.
  - 10.4.2. The Bucky tray must accept standard sized cassettes (as per **BS EN ISO 4090:2004**) up to 35cm x 43cm.
  - 10.4.3. It must be possible to acquire images in both landscape and portrait formats.
  - 10.4.4. The table must be an elevating design with a floating table top.
  - 10.4.5. All table motions must include electromagnetic or alternative locking mechanism.
  - 10.4.6. The X-Ray absorption must be equivalent to no more than 1.2mm AL.
  - 10.4.7. Table elevation must be manual or motorised.
  - 10.4.8. The table must lower to at least 0.6 metres above the floor.
  - 10.4.9. The table controls must be via foot switches.
  - 10.4.10. The foot switch design must prevent accidental activation.
  - 10.4.11. The table length must be at least 2.0 metres.
  - 10.4.12. The table width must be at least 0.7 metres.
  - 10.4.13. The longitudinal motion of the table or detector must be at least 0.75m.
  - 10.4.14. The lateral motion must be at least 20cm.
  - 10.4.15. The maximum patient weight must be at least 200kg.
  - 10.4.16. It must be possible to centre the Bucky with the collimation indicators or detents.
  - 10.4.17. An automatic exposure control must be supplied with at least 3 detection fields.

**11. Line 9 – Full body, stereo-radiographic static x-ray system capable of imaging a patient in a functional position.**

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- 11.1. A full body, stereo-radiographic static x-ray system capable of imaging a patient in a functional position must have the following features:
  - 11.1.1. 2D imaging acquisition.
  - 11.1.2. Images are obtained by vertical scanning.
  - 11.1.3. Patient is in a standing, seated or bending position.
  - 11.1.4. Two simultaneous frontal and lateral acquisitions (single plane acquisitions should be possible).
  - 11.1.5. Acquisition zone may cover the full body or a specific region (spine, lower limbs, etc.) up to 44.8 cm wide and 175 cm high.
  
- 11.2. Detectors must have the following features:
  - 11.2.1. At least 2 linear detectors must be included.
  - 11.2.2. Number of pixels and line must be 1764/line and Pixel size: 254  $\mu\text{m}$ .
  - 11.2.3. Pixel depth must be 16 bits ( $> 65\,000$  grey levels).
  - 11.2.4. The detector typical dynamic Range must be  $> 90\text{dB}$ .
  
- 11.3. Tubes must have the following features:
  - 11.3.1. At least two X-ray tubes, maximum power 42 kW must be provided.
  - 11.3.2. The focal spot must be (0.6 x 1.3).
  - 11.3.3. Copper (0.1 mm or 0.5mm) filtration.
  
- 11.4. Acquisition software must have the following features:
  - 11.4.1. Patient information management compatible with DICOM 3.0 standard (Modality Worklist SCU).
  - 11.4.2. Selection of area of interest (height and width) and acquisition mode (biplanar, frontal or lateral).
  - 11.4.3. Selection of morphotype and anatomical region.
  - 11.4.4. Adjustment of kV, mA and acquisition speed (auto/manual).
  - 11.4.5. Display of radiation exposure dose.
  - 11.4.6. Image display and processing tools (windowing, zoom, annotations).
  - 11.4.7. Contrast enhancement.
  - 11.4.8. Image print SCU.
  - 11.4.9. Archive on DICOM 3.0 PACS (Image Storage SCU).
  - 11.4.10. Automatic generation and sending of reports on the dose accumulated during the examination.

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