

## **SPECIFICATIONS FOR C-ARM IMAGE INTENSIFIER**

Microprocessor controlled C-arm machine with Flat Panel Detector should provide the excellent image quality at low radiation, ideally suited for general surgeries in many application fields and special application such as orthopedics and other procedures.

### **A) FLAT PANEL DETECTOR:**

- Receptor Type should be of Amorphous Silicon technology
- Conversion Screen should be of CsI
- FPD with 30 x 30 Cm or more size should be provided
- Image Matrix should be 1K x 1K or more
- Pixel pitch should be 150  $\mu\text{m}$  or less.
- ADC conversion should be 16 bit or more

### **B) Monitor on Trolley: -**

- 02 no. 17 inch or more medical grade or 01 No. 32 inch or more with split screen High Resolution Monitor mounted on mobile Trolley should be provided.

### **C) Monitor on C-carriage: -**

Touch screen 10 inch or more control console mounted on C-carriage for the operator. Type of monitor to be provided with intensifier system LED/OLED.

### **D) C-ARM MOVEMENTS: Fully counter balanced all movements**

1. Rotation: +180 Degrees or more.
2. Motorized Up/down: 400mm or more
3. Horizontal Travel: 200 mm or more
4. Arc Orbital Movement: At least +90 to -30 Degrees.
5. Wig Wag:  $\pm 12.5$  Degrees or more.
6. Source to Image distance should be 950 mm or more.
7. Depth of "C" should be 650mm or more.
8. Free space should be 750mm or more.
9. Steering handle with +/-90 degree movement for both side diagonal scan.

### **E) X-RAY GENERATOR:**

- High Frequency 40 KHz or more.
- Output power should be 2.5 KW or more.
- Fluoro & Rad. Kv 40 to 120 KV.
- Fluoroscopy mA range: 0.2 to 7 or more.
- Pulse Fluoroscopic mA(peak): - 1 to 15mA or more.

**F) X-RAY TUBE:**

- Monoblock tube head having dual focus Rotating anode X-Ray tube of focal spot 0.3mm small focus & large focus 0.6mm should be provided.
- Anode Heat Storage capacity should be 50 KHU or more.
- Lead collimator Shutters with preview-Radiation free should be provided.

**G) CONTROL: Control should have the following:**

Touch screen monitor mounted on C-arm carriage for Image & Exposure parameters control is provided with following functions and indications: -

**On GUI Screen**

- Fluoro and Radio mode selection.
- Image rotation & Flip
- Fluoroscopy timer (Five minute cumulative timer with buzzer that activates after the completion of 300 seconds of exposure to reinitiate the exposure reset switch is provided).
- Metal Compensated ABS (Automatic brightness stabilization) selection for hand free operation-also known as ADR
- KV and mAs increase and decrease switches.
- X-Ray ON indicator.
- Collimator open/close switches

**Others**

- Switches for up/down movement of "C" on both side of machine frame.
- Emergency OFF switches mounted on monitor.
- Machine ON/OFF Key switch.
- Fluoro ,Cine & spot switches on both side of panel.
- Laser Centering Device.
- Virtual DAP meter.
- Removable Grid should be provided.

**H) MEMORY SYSTEM should include the following: -**

**Image Acquisition:**

- Image processing software with real time image capturing, storage, and display in 1K X 1K or more.
- Digital Radiography (SPOT) exposure mode is available
- Pulse fluoroscopy upto 30 frame per second with real time recording.

**Image Processing:**

- Real time noise with reduction with Averaging up-to 16
- Recursive filter for image smoothing, DRC, Contrast, Brightness, Sharpness.
- Interactive Zoom and Pan

- Dynamic Zoom up to 400%
- Pre-programming for image setting for different operating Modes
- Image Inversion
- WW/WL level adjustments
- Dynamic Noise Filtration.
- Selectable dose level operation- 03 levels.
- Image Flipping and Image Rotation Clockwise or Anti-clockwise.
- Live to Reference View on Single Monitor or on second monitor.
- Cine Loop Play(Auto and Frame wise)
- Real time Image Flip(Horizontal/Vertical)

**Collimator:**

Parallel shutter Rectangular or square / Iris Collimator.

**Radiography Cassette:**

Size of Cassette holder provided (for radiographic mode) 10x12 inches or more

**DAP Module:**

- DAP dose integrated in software and total summary for Fluoro/Cine Saved.
- Real Time Patient dose monitoring display with overdose warning message

**MAG:**

- Real Time Three step Digital MAG.

**DICOM: System should be DICOM ready**

- Connectivity with DICOM workstation/PACS
- DICOM Send/Storage Commitment
- DICOM Print
- DICOM Worklist

**Storage:**

- The storage capacity of 50000 or more images.
- Fluoro saving as per user need
- LIH saving as per user need

**Annotation:**

- Rectangle, Ellipse, Line, Text, etc.

**Miscellaneous:**

- Thermal Printer should be there.
- Different format of image saving like JPG, BMP, TIF, png, AVI Loop in USB Pen drive
- Image Data Export to Dicom, CD
- Mosaic view/Image layout 2x2, 3x3, 4x4 or better.

- Wireless remote for software features like Image Flip/ Rotation etc.
- Foot switch and hand switch.

**Power requirement:**

- The unit should be operable on Single Phase 230 V  $\pm$  10% AC, 50 Hz
- External / Inbuilt electronic voltage stabilizer should be provided of 5 KVA or more.
- UPS with suitable rating for power backup (for 15 mins or more).

**Accessories:**

- 10 nos full body apron (extra light weight apron front and back lead free).
- 10 nos Thyroid shield.
- 10 nos of radioprotective goggle.
- 04 nos apron stand and hanger.
- Storage cover for C arm.

**OTHER REQUIREMENTS:**

- Company should be responsible for the maintenance of the equipment. There is no subletting of the work to third party is not permitted.
- The company should be ISO 13485 and ICMED certified company.
- The quoted model should be USFDA / BIS/ European CE Certified with Notified Body No.
- The unit should be approved by AERB with test approval from AERB. Company must take responsibility of quality assurance test and equipment should be registered with AERB on eLORA
- The company should have a Service center in State.
- The company should have supplied the item in Govt. sector.
- Major components like X Ray generator, detector and console software should be from same manufacturer of C-Arm System for seamless service availability, connectivity and consistent image quality. All these should be integrated.
- Data sheet and compliance sheet mentioning all details of quoted model with everything that are to supplied should be uploaded.
- Warranty required 5 year and 5 year CAMC after warranty.