

Medical LINAC

Brief Description

The Medical Linear Accelerator (LINAC) is a high energy X-Ray machine used for treatment of deep seated cancers by Radiation Therapy using high energy photons. The 6MV LINAC is an Integrated Oncology System with computerized controls. Main Sub-systems of the machine are:

- LINAC tube and computerized beam control system
- Computer controlled LINAC handling & collimation system
- Computer controlled Patient Support System
- Field optics and Range optics
- ASHA 3-D TPS, virtual simulator & 3-D treatment planning system

Agencies involved in development of this project are SAMEER-Mumbai and CSIO-Chandigarh under the sponsorship of DeitY (then DIT), New Delhi. CSIO developed gantry & patient support system with computerized movement controls and Field & Range optics in the project.



Specifications

Beam

- Beam Energy : 6 MV
- Dose Rate : 50 – 250 rads/min at iso-centre
- Field Size : 0x0 to 40x40 cm
- Field Flatness : $\pm 3\%$
- Leakage Radiation : $< 0.1\%$ except 0.5% on rear

Movement Range

- Gantry Rotation : 0° to $\pm 185^\circ$ (about horizontal axis)
- Jaws (X & Y) : 0x0 to 40x40 cm
- Collimator Rotation : $\pm 95^\circ$ (about vertical axis)
- PSA Vertical : 68 to 168cm from floor
- PSA Longitudinal : 120 cm
- PSA Lateral : ± 20 cm
- PSA Rotation : $\pm 95^\circ$ (about vertical axis)
- PSA Floor : Automatic (Up & Down)

Movement Control

- Controls : From Pendant & Control Panels
- Display : Electronic & GUI

Electrical Requirement

- Input Power Supply : 3-Phase, 50 Hz, 440 V±5%
- Maximum Load : 15 KVA

Salient Features/Uniqueness

- Indigenous Linac Tube (Developed by SAMEER)
- Computerised controls
- Virtual Simulator & 3D-TPS
- Comparable to contemporary LINACs
- Integrated Field and Range Optics

Applications

- For the treatment of cancers in Radiotherapy

Field Trials

- Acceptance test trials of the machine have been conducted by Atomic Energy Regulatory Board (AERB) and certificate has been granted for its clinical use.

User Agencies

- Mahatma Gandhi Institute of Medical Sciences, Wardha since April 2007
- Cancer Institute, WIA, Adyar Chennai since April 2008
- Four 6 MV Medical Linac's will be commissioned in four National Cancer Institute by the end of year 2013

Collaborating Agencies

- SAMEER, Mumbai (Nodal Lab)
- CSIO, Chandigarh