

ENTRY NO:CU28

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Machine Name: Clinical Cyclotron

Institution: University of Washington Medical Center

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Person in Charge of Cyclotron: R. Risler

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History

Designed by: Scanditronix AB, Uppsala, Sweden

Construction Dates: 1981/82

First Beam Date: Factory: June 1982, Facility: June 1983

Characteristic Beams

28 to 50.5 MeV p, 80 uA extracted at 50.5 MeV

15 to 24 MeV d, rarely

28 to 50 MeV 4He^{++} , 60 uA extracted at 28 MeV

Transmission Efficiency (source to extracted beam)

Typical (%):

Best (%):

Emittance

Emittance Definition: 50%

Vertical (pi mm mrad): protons 14

Horizontal (pi mm mrad): protons 12

Longitudinal (dE/E[%] x RF[deg.]):

USES

Basic Research (%): 1

Development (%): 5

Therapy (%): 80

Isotope Production (%): 2

Other Application (%): 1

Maintenance (%): 6

Beam Tuning (%): 5

Total Time (h/year): 1500

TECHNICAL DATA

(a)Magnet

Type: Compact

Kb (MeV): 51

Kf (MeV):

Average Field (min./max. T): 1.75

Number of Sectors: 3

Hill Angular Width (deg.):

Spiral (deg.): 55

Pole Diameter (m): 1.55

Injection Radius (m):

Extraction Radius (m): 0.57

Hill Gap (m): 0.115

Valley Gap (m): 0.205

Trim Coils

Number: 10 pairs

Maximum Current (A-turns):

Harmonic Coils

Number: 4 sets of 3 pairs

Maximum Current (A-turns):

Main Coils

Number: 1 pair

Total Ampere Turns: 288000

Maximum Current (A): 900

Stored Energy (MJ):

Total Iron Weight (tons): 90

Total Coil Weight (tons):

Power

Main Coils (total KW): 120

Trim Coils (total, maximum, KW): 3

Refrigerator (cryogenic, KW):

(b)RF

Acceleration

Frequency Range (MHz): 19.5 to 26.0

Harmonic Modes: 1,2

Number of Dees: 2

Number of Cavities:

Dee Angular Width (deg.): 90

Voltage

At Injection (peak to ground, KV):

At Extraction (peak to ground, KV):

Peak (peak to ground, KV): 40

Line Power (max, KW): 60

Phase Stability (deg.): 0.1

Voltage Stability (%): 0.1

(c)Injection

Ion Source: dual chimney internal PIG

Source Bias Voltage (kV):

External Injection:

Buncher Type:

Injection Energy (MeV/n):

Component:

Injection Efficiency (%):

Injector:

(d)Extraction

Elements, Characteristic: Electrostatic deflector, 47 kV max., electromagnetic channel, two passive focusing channels

Typical Efficiency (%): 85 (protons)

Best Efficiency (%): 90

(e)Vacuum

Pumps: Two oil diffusion pumps, 2 x 4300 l/s

Achieved Vacuum (Pa): 3. 10E-04

REFERENCES R. Risler et al. these proceedings

EXPERIMENTAL FACILITIES

COMMENTS

