

ENTRY NO. 56
 NAME OF MACHINE Research Centre Medical Cyclotron
 INSTITUTION King Faisal Specialist Hospital and Research Centre
 ADDRESS Riyadh 11211, Saudi Arabia
 TEL 464-7272 TELEX 201050 ROSPEC SJ
 IN CHARGE Dale K. Wells REPORTED BY Paul S. Plascjak

HISTORY AND STATUS

DESIGN, date Model tests
 ENG DESIGN, date TCC Model Cs-30
 CONSTRUCTION, date Factory Tests: March 1977
 FIRST BEAM, date (or goal) October 1981
 MAJOR ALTERATIONS None

COST, ACCELERATOR
 COST, FACILITY, total
 FUNDED BY Kingdom of Saudi Arabia

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS 1 ENGINEERS 1
 TECHNICIANS 7 CRAFTS 2
 GRAD STUDENTS involved during year 0
 OPERATED BY Research staff or X Operators
 OPERATION 84 hr/wk. On target 40 hr/wk
 TIME DISTR. in house 100 % Outside - %
 BUDGET, op & dev
 FUNDED BY Kingdom of Saudi Arabia

RESEARCH STAFF, not included above

USERS, in house 5 outside 0
 GRAD STUDENTS involved during year
 RESEARCH BUDGET, in house
 FUNDED BY Kingdom of Saudi Arabia

MAGNET

POLE FACE, diameter (compact) 96.5 cm, R extraction 42 cm
 R injection cm
 GAP, min 5 cm, Field 19.5 kG
 min 10 cm, Field 12 kG at 0.2×10^6
 AVERAGE FIELD at R ext 16 kG Ampere turns
 B max / < B >

NUMBER OF SECTORS { compact 3 } Spiral, max deg
 { separated 3 }

SECTOR ANGLE (SSC) deg
 TRIMMING COILS Harmonic coils
 3 inner - 3 outer

CONDUCTOR, material and type Copper, hollow
 STORED ENERGY (cryogenic) MJ-4
 POWER: main coils 60 max, kW; current stability 5×10^{-4}
 trimming coils max, kW; current stability
 WEIGHT: Fe 20 tons; coils 2 tons
 COOLING system D.I. Water
 ION ENERGY (bending limit) E/A = q²/a² MEV/amu
 (focusing limit) E/A = q/a MeV/amu

ACCELERATION SYSTEM

DEES, number 2 81 deg
 BEAM APERTURE 1.9 cm; DC Bias 1.5 kV
 TUNED by, coarse Shorting Bar fine Capacitor
 RF 14 to 26.5 MHz, stable ±
 Orb F to MHz
 HARMONICS, RF/Orb F, used First
 DEE-Gnd, max 30 kV, min gap 1 cm
 STABILITY, (pk-pk noise)/(pk RF volt)
 ENERGY GAIN, max 100 kV/turn
 RF PHASE, stable to ± deg
 RF POWER input, max 70 kW
 FREQUENCY MODULATION, rate /s
 modulator, type
 beam pulse, width

VACUUM SYSTEM

OPERATING PRESSURE 3×10^{-5} Torr or mbar
 PUMPS, No, Type, Size 1 Diffusion Pump
 10"

ION SOURCES

"Cold Cathode" (1)

INJECTION SYSTEM

EXTRACTION SYSTEM

Electrostatic and Magnetic Channel (2)

FACILITIES FOR RESEARCH

SHIELDED AREA, fixed 190 m²; movable None m²
 TARGET STATIONS 9 in 4
 STATIONS served at same time, max 1
 MAG SPECTROGRAPH, type 101.5°
 COMPUTER model PDP 11/70
 OTHER FACILITIES Isotope Production
 Isocentric Neutron Production

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (μA)	
	Goal	Achieved	Internal	External
P	26	26.5	200	60
d	15	14.8	300	100
He	38	38.1	135	60
α	30	29.6	90	50

SECONDARY (part/s)
 n 27 Rad/min @ 125 cm

BEAM PROPERTIES

MEASURED CONDITIONS
 PULSE WIDTH RF deg μA of MeV ions
 PHASE EXC. max RF deg μA of MeV ions
 EXTRACT eff 80 % 55 μA of 26.5 MeV ions P
 RESOL ΔE/E 0.5 % 0.2 μA of 14.8 MeV ions d
 EMITTANCE External { 22 axial } V 2 μA of 26.5 MeV P ions
 (7 mm. mrad) { 9 rad } H

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS 0 SOLID STATES PHYSICS 0
 BIOMEDICAL APPLICAT 0 ISOTOPE PRODUCTIONS 40%
 Neutron Production 40%
 R & D 20%

REFERENCES/NOTES

- IEEE Trans. Nucl. Sci. NS-14, 70-71 (1967)
- IEEE Trans. Nucl. Sci. NS-16, 500-503 (1969)

PLAN VIEW OF FACILITY, COMMENTS, ETC.

