

ENTRY NO. 104

NAME OF MACHINE **Medi-Physics Cyclotron**  
 INSTITUTION **Medi-Physics Inc.**  
 ADDRESS **900 Durham Ave., South Plainfield, New Jersey 07080-U.S.A.**  
 TEL **201-757-0500** TELE X  
 IN CHARGE **W. S. Buela** REPORTED BY **E. A. Kowalski**

HISTORY AND STATUS (CS-22)

DESIGN, date . . . . . Model tests **72**  
 ENG DESIGN, date . . . . .  
 CONSTRUCTION, date . . . . .  
 FIRST BEAM, date (or goal) **Feb. 1973**  
 MAJOR ALTERATIONS . . . . .

COST, ACCELERATOR . . . . .  
 COST, FACILITY, total . . . . .  
 FUNDED BY . . . . .

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS . . . . . ENGINEERS **1**  
 TECHNICIANS **5** . . . . . CRAFTS  
 GRAD STUDENTS involved during year . . . . .  
 OPERATED BY . . . . . Research staff or **xx** Operators  
 OPERATION **168** . . . . . hr/wk, On target **125** . . . . . hr/wk  
 TIME DISTR. in house **100** . . . . . %, outside . . . . . %  
 BUDGET, op & dev . . . . .

FUNDED BY **Medi-Physics, Inc.**  
 RESEARCH STAFF, not included above  
 USERS, in house . . . . . outside . . . . .  
 GRAD STUDENTS involved during year . . . . .  
 RESEARCH BUDGET, in house . . . . .  
 FUNDED BY . . . . .

MAGNET  
 POLE FACE, diameter (compact) **96.5** cm, R-extraction **43** cm  
 R injection . . . . . cm  
 GAP, min **5** cm, Field **21** . . . . . kG  
 max **10** cm, Field **13.5** kG at **1.5x10<sup>5</sup>**  
 AVERAGE FIELD at R ext **16.5** kG . . . . . Ampere turns  
 B max / < B > **1.22** . . . . .

NUMBER OF SECTORS { compact **3** . . . . . } Spiral, max . . . . . deg  
 { separated . . . . . }  
 SECTOR ANGLE (SSC) . . . . . deg  
 TRIMMING COILS **Harmonic Corr. 1pr/sec.** . . . . .

CONDUCTOR, material and type **Cu Strap** . . . . .  
 STORED ENERGY (cryogenic) . . . . . MJ  
 POWER: main coils **40** . . . . . max kW: current stability **3x10<sup>-5</sup>**  
 trimming coils **5** . . . . . max kW: current stability . . . . .  
 WEIGHT: Fe . . . . . tons: coils . . . . . tons  
 COOLING system **D.I. Water** . . . . .  
 ION ENERGY (Bending limit) E/A = . . . . . q<sup>2</sup>/A<sup>2</sup> MeV/amu  
 (Focusing limit) E/A = . . . . . q/A MeV/amu

ACCELERATION SYSTEM

DEES, number **2** . . . . . angle **90** . . . . . deg  
 BEAM APERTURE **2** . . . . . cm; DC Bias **1.5** . . . . . kV  
 TUNED by, coarse **Inductor** . . . . . fine **Panel** . . . . .  
 RF **12** . . . . . to **25** . . . . . MHz, stable ± **4/10<sup>5</sup>**  
 Orb F **12** . . . . . to **25** . . . . . MHz  
 HARMONICS, RF/Orb F, used **1st** . . . . .  
 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 **10<sup>-5</sup>** . . . . . Torr or mbar  
 PUMPS, No, Type, Size **10" Oil Diffusion** . . . . .

ION SOURCES

**Radial Pig** . . . . .

INJECTION SYSTEM

EXTRACTION SYSTEM  
**Electrostatic Channel & Magnetic Channel**  
 FACILITIES FOR RESEARCH

SHIELDED AREA, fixed . . . . . m<sup>2</sup>, movable . . . . . m<sup>2</sup>  
 TARGET STATIONS . . . . . in . . . . . rooms  
 STATIONS served at same time, max . . . . .  
 MAG SPECTROGRAPH, type . . . . .  
 COMPUTER model . . . . .  
 OTHER FACILITIES . . . . .

CHARACTERISTIC BEAMS

PARTICLE	ENERGY (MeV)		CURRENT (µA)	
	Goal	Achieved	Internal	External
P	22	22.4	200	60
D	12	12.4	200	100
He <sup>3++</sup>	32	32.4	100	50
He <sup>4++</sup>	24	24.8	100	50
SECONDARY			(part/s)	

BEAM PROPERTIES

MEASURED		CONDITIONS	
PULSE WIDTH	RF deg	µA of	MeV ions
PHASE EXC, max	RF deg	µA of	MeV ions
EXTRACT eff	%	µA of	MeV ions
RESOL ΔE/E	%	µA of	MeV ions
EMITTANCE			
(π mrad)	axial	µA of	MeV
	rad		

OPERATING PROGRAMS, time distribution

BASIC NUCLEAR PHYSICS . . . . . SOLID STATES PHYSICS . . . . .  
 BIOMEDICAL APPLICAT . . . . . ISOTOPE PRODUCTIONS **100%** . . . . .

REFERENCES/NOTES

- 1)
- 2)

PLAN VIEW OF FACILITY, COMMENTS, ETC.