

ENTRY NO. 94

NAME OF MACHINE . . . . . NEN Cyclotron 3 . . . . . DATE . 30 April 19984 . . . . .
INSTITUTION . . . . . E. I. DuPont . . . . .
ADDRESS . . . . . 331 Treble Cove Road, N. Billerica, MA (USA) . . . . .
TEL (617) 667-9531 . . . . . TELEX 947126-NENMTC . . . . .
IN CHARGE R. Garniewicz . . . . . REPORTED BY . . . . . F. Buck . . . . .

Designed and

HISTORY AND STATUS Built by the Cyclotron Corp.

DESIGN, date . . . . . Model tests . . . . .
ENG DESIGN, date . . . . .
CONSTRUCTION, date . . . . . May 78 . . . . .
FIRST BEAM, date (or goal) . . . . . August 78 . . . . .
MAJOR ALTERATIONS . . . . . None . . . . .

COST, ACCELERATOR . . . . .
COST, FACILITY, total . . . . .
FUNDED BY . . . . . E. I. DuPont . . . . .

ACCELERATOR STAFF, OPERATION AND DEVELOPMENT

SCIENTISTS . . . . . ENGINEERS . . . . .
TECHNICIANS . . . . . CRAFTS . . . . .
GRAD STUDENTS involved during year . . . . .
OPERATED BY . . . . . Research staff or . . . . . X . . . . . Operators
OPERATION . . . . . 100 . . . . . hr/wk. On target . . . . . hr/wk
TIME DISTR. in house . . . . . 100 . . . . . %, outside . . . . . %
BUDGET, op & dev . . . . .
FUNDED BY . . . . . E. I. DuPont . . . . .

RESEARCH STAFF, not included above . . . . . None
USERS, in house . . . . . outside . . . . .
GRAD STUDENTS involved during year . . . . .
RESEARCH BUDGET, in house . . . . .
FUNDED BY . . . . .

MAGNET

POLE FACE, diameter (compact) 96.52 . . . . . cm, R-extraction 41.9 . . . . . cm
R injection . . . . . cm
GAP, min 5.08 . . . . . cm, Field 22.5 . . . . . kG
max 10.16 . . . . . cm, Field 14.4 . . . . . kG } at . 26x10^6 . . . . .
AVERAGE FIELD at R ext . . . . . 17.5 . . . . . kG } Ampere turns
B max / < B > . . . . . 1.28 . . . . .

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

SECTOR ANGLE (SSC) . . . . . deg
TRIMMING COILS . . Inner and outer harmonic coils, one . . . . .
. . . . . per sector . . . . .
CONDUCTOR, material and type . Hollow copper . . . . .
STORED ENERGY (cryogenic) . . . . . MJ
POWER: main coils . 51 . . . . . max kW: current stability . . . . .
trimming coils . 1.2 . . . . . max kW: current stability . . . . .
WEIGHT: Fe . 22.5 . . . . . tons: coils . 2 . . . . . tons
COOLING system . . Deionized water . . . . .
ION ENERGY (Bending limit) E/A = . . . . . q^2/A^2 MeV/amu
(Focusing limit) E/A = . 26 . . . . . q/A MeV/amu

ACCELERATION SYSTEM

DEES, number . . . . . 2 . . . . . angle . . . . . 81 . . . . . deg
BEAM APERTURE . . 1.9 . . . . . cm; DC Bias . . 2.5 . . . . . kV
TUNED by, coarse . . shorting bar . fine . . capacitor . . . . .
RF . . . . . 26.9 . . . . . to . . . . . MHz, stable ± . . . . .
Orb F . . . . . 26.9 . . . . . to . . . . . MHz
HARMONICS, RF/Orb F, used . 1st . . . . .
DEE-Gnd, max . . . . . 34 . . . . . kV, min gap . . . . . 1 . . . . . cm
STABILITY, (pk-pk noise)/(pk RF volt) . . . . .
ENERGY GAIN, max . . . . . kV/turn
RF PHASE, stable to ± . . . . . deg
RF POWER input, max. . . . . 55 . . . . . kW
FREQUENCY MODULATION, rate . . . . . None . . . . . /s
modulator, type . . . . .
beam pulse, width . . . . .

VACUUM SYSTEM

OPERATING PRESSURE . . . . . 10-20 Micro . . . . . Torr or mbar
PUMPS, No, Type, Size . . . . . 1-10" oil diffusion . . . . .

ION SOURCES

. . . . . Fig. cold cathode, radial . . . . .

INJECTION SYSTEM

EXTRACTION SYSTEM

FACILITIES FOR RESEARCH

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

CHARACTERISTIC BEAMS

Table with columns: PARTICLE, ENERGY (MeV) Goal, Achieved, CURRENT (pA) Internal, External. Row 1: p, 26, 26, 200.

BEAM PROPERTIES

Table with columns: MEASURED, CONDITIONS. Rows include Pulse Width, Phase Exc, Extract eff, Resol ΔE/E, Emittance.

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.