

ENTRY NO. C2 Date October 1995
 Name of Machine TASCC (Tandem Accelerator Superconducting Cyclotron)
 Institution AECL
 Address Chalk River Laboratories, Chalk River, Ontario, Canada, K0J 1J0
 Tel (613) 584-3311 Telex 053-34555 Fax (613) 584-1800 E-MAIL TASCC@CRL.AECL.CA
 In Charge: J.C. Hardy Reported by: H. Schmeing

HISTORY

MILESTONE DATES:

Design 1973 Model Tests 1974-78
 Construction 1978-84 First Beam Sep. 1985
 DESIGN/CONSTRUCTION BY: Commissioned Oct. 1991
 in house X other
 COST: Accelerator Facility
 FUNDED BY: AECL

STATUS

STAFF: Machine

Scientists 10
 Technicians 14 Students Operators: 14
 Research (in house/external)
 Scientists 16 / 92 Engineers - / -
 Technicians 15 / - Students 5 / 24
 BUDGET: Machine Funded by AECL
 Research Funded by AECL

TIME DISTRIBUTION:

Basic Research (in house/external) 56 % / %
 Applied Program (in house/external) 14 % / %
 Maintenance 20 % Development 10 %
 Facility operates 8400 hour/year

MAGNET

POLE PARAMETERS:

Diameter 138.6 cm R_{extract} 65.2 cm R_{inject} 14.5-28 cm

HILL PARAMETERS: Gap (min) 3.7 cm B_{max} 6.0 T

@ AT Gap (max) cm B_{min} T

VALLEY PARAMETERS: Gap (min) cm B_{max} T

@ AT Gap (max) 6.4 cm B_{min} 4.3 T

AVERAGE FIELD: $\langle B \rangle_{\text{min}}$ 2.3 T $\langle B \rangle_{\text{max}}$ 5.1 T

NUMBER OF SECTORS: compact/separated 4 /

sector angle deg. spiral (max) 50 deg.

FIELD TRIMMING: Trim Coils 13 saturated rods in

Harmonic Coils each flutter pole

Other

CURRENT: Main Coils 2200 Amps Stability ± 20 mA

Trim Coils Amps Stability

Stored Energy (cryogenic) 22 MJ

WEIGHT: Iron 170 tonnes Conductor NbTi

ION ENERGY: Bending Limit E/A = 520 q^2/A^2 MeV/u

Focusing Limit E/A = 100 q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:

Description: 2 dee pairs on 2 resonators

No. of Gaps/turn 8 $dE/dn(\text{max})$ 0.8 MeV/q

Voltage (max) 0.1 MV Harmonic f_r/f_{ion} 2, 4, 6

Freq 31-62 MHz Power in(max) 0.1 MW

Stability: Phase $\pm 1-1^\circ$ Voltage 0.02%

OTHER CAVITIES (Flattopping or otherwise):

Description:

Region of Influence: R_{min} cm R_{max} cm

No. of Gaps/turn $dE/dn(\text{max})$ MeV/q

Voltage (max) MV Harmonic f_r/f_{ion}

Freq MHz Power in(max) MW

Stability: Phase Voltage

VACUUM SYSTEM

OPERATING PRESSURE: 310⁻⁷ torr

PUMPS: (No. and type) two cryopanel

1500 l/s. each

ION SOURCE(S)

Type	Intensity (mA)	@ $\epsilon_n = \beta\gamma\epsilon$ (π mm mrad)	Ion Species
(a)			
(b)			Beam injected from MP Tandem - 16 MV
(c)			
(d)			

INJECTION SYSTEM

Carbon stripper after radial injection Efficiency -- %

EXTRACTION SYSTEM

Electrostatic deflector, superconducting magnet channel Efficiency 30-100 %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current (part μ A)	Internal	External
(a) ^3He	50			7×10^{-3}
(b) ^6Li	50			4.7×10^{-3}
(c) ^{12}C	50			23×10^{-3}
(d) ^{127}I	19			1.5×10^{-3}

Secondary Particles	E (MeV)	X part/sec
(a) ^{197}Au	14	0.2×10^{-3}
(b) ^{238}U	3.3	0.2×10^{-3}
(c)		

EXTRACTED BEAM PROPERTIES:

For 0.1 μ A of 15 MeV/u ^{127}I ions
 $\Delta E/E$ 0.3 % $\Delta\phi$ 3 $^\circ$ *ff
 $\epsilon_n = \beta\gamma\epsilon$ $\times 0.7$ π mm mrad z 0.6 π mm mrad

FACILITIES FOR RESEARCH

SHIELDED AREA: Fixed: m² Moveable m²

Target Stations: 9 No. Served At Same Time: 1

MAGNETIC SPECTROMETERS: Q3D

OTHER FACILITIES: 8- π high spin spectrometer

ISOL on-line isotope separator

Atomic physics particle physics, scattering chambers,

AMS, SEE, Penning trap

REFERENCES/NOTES

(a) H. Schmeing, et al., Proc. 12th Int. Conf. on
 (b) Cyclotrons and Their Applications, Berlin, 1989

PLAN VIEW OF FACILITY, COMMENTS

