

ENTRY NO. C2 Date  
 Name of Machine TASSC (Tandem Accelerator Superconducting Cyclotron)  
 Institution AECL Research  
 Address Chalk River Laboratories, Chalk River, Ontario, Canada K0J 1J0  
 Tel (613) 584-3311 Telex 053-34555 Fax (613) 584-4024 EMAIL  
 In Charge: J.C. Hardy Reported by: H. Schmeing

**HISTORY**

MILESTONE DATES:  
 Design 1973 Model Tests 1974-78  
 Construction 1978-84 First Beam Sept. 1985  
 DESIGN/CONSTRUCTION BY:  
 in house X other  
 COST: Accelerator Facility  
 FUNDED BY: AECL Research

**STATUS**

STAFF: Machine  
 Scientists and Engineers 11  
 Technicians 8 Students Operators 15  
 Research (in house/external)  
 Scientists 15 / Engineers /  
 Technicians 20 / Students /  
 BUDGET: Machine Funded by AECL Research  
 Research Funded by AECL Research  
 TIME DISTRIBUTION:  
 Basic Research (in house/external) 52 % / %  
 Applied Program (in house/external) % / %  
 Development 20 % Maintenance 28 %

**MAGNET**

POLE PARAMETERS:  
 Diameter 138.6 cm R<sub>extract</sub> 65 cm R<sub>inject</sub> 14.5 cm  
 HILL PARAMETERS: Gap (min) 3.7 cm B<sub>max</sub> 6.0 T  
 (AT) Gap (max) cm B<sub>min</sub> T  
 VALLEY PARAMETERS: Gap (min) cm B<sub>max</sub> T  
 (AT) Gap (max) 6.4 cm B<sub>min</sub> 4.3 T  
 AVERAGE FIELD: < B ><sub>min</sub> 2.4 T < B ><sub>max</sub> 5.0 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<sup>2</sup>/A<sup>2</sup> MeV/u  
 Focussing Limit E/A = 100 q/A MeV/u

**ACCELERATION SYSTEM**

FUNDAMENTAL ACCELERATION:  
 Description:  
 No. of Gaps/turn 8 dE/dn(max) 0.8 MeV/q  
 Voltage(max) 0.1 MV Harmonic f<sub>rf</sub>/f<sub>ion</sub> 2, 4, 6  
 Freq 31-62 MHz Power in(max) 0.1 MW  
 Stability: Phase +1-1° Voltage 0.02%  
 OTHER CAVITIES (Flattopping or otherwise):  
 Description:  
 Region of Influence: R<sub>min</sub> cm R<sub>max</sub> cm  
 No. of Gaps/turn dE/dn(max) MeV/q  
 Voltage(max) MV Harmonic f<sub>rf</sub>/f<sub>ion</sub>  
 Freq MHz Power in(max) MW  
 Stability: Phase Voltage

**VACUUM SYSTEM**

OPERATING PRESSURE:  
 PUMPS: No. and type two cryopanel  
 1500 l/s each

**ION SOURCE(S)**

Type	Intensity (mA)	ε <sub>n</sub> = βγc (πmm mrad)	Ion Species
(a)			
(b)			Beam injected from MP Tandem - 15 MV
(c)			
(d)			

**INJECTION SYSTEM**

Carbon stripper after radial injection Efficiency %

**EXTRACTION SYSTEM**

Electrostatic deflector, superconducting magnet channel Efficiency %

**CHARACTERISTIC BEAMS**

Accelerated Ions	E/A (MeV/u)	Current(part μA)	
		Internal	External
(a) 6Li	50		
(b) C12	50		23x10 <sup>-3</sup>
(c) I127	19		1.5x10 <sup>-3</sup>
(d) U238	3		1.3x10 <sup>-6</sup>

Secondary Particles	E (MeV)	part/sec
(a)		
(b)		
(c)		

**EXTRACTED BEAM PROPERTIES:**

For 0.1 μA of 15 MeV/u 127I ions  
 ΔE/E 0.3 % Δφ 3 °rf  
 ε<sub>n</sub> = βγc x 0.7 πmm mrad z 0.6 πmm mrad

**FACILITIES FOR RESEARCH**

SHIELDED AREA: Fixed m<sup>2</sup> Moveable m<sup>2</sup>  
 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, SEU

**REFERENCES/NOTES**

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

**PLAN VIEW OF FACILITY, COMMENTS**

