

ENTRY NO. CM5 Date
 Machine Name TR30
 Manufacturer EBCO Technologies
 Address 4004 Westbrook Mall, Vancouver Canada V6T2A3
 Tel (604) 224-7090 Telex
 Fax (604) 228-1715 EMAIL
 In Charge: Reported by: B. Milton

HISTORY AND STATUS
 DATES: Design 1988-89 First Machine July 1, 1990
 SALES: No. Sold/Operational 2 / 1. Currently Available Yes
 COST: Accelerator Facility

MAGNET
 POLE PARAMETERS:
 Diameter 76 cm R_{extract} 47-66 cm R_{inject} 2.5 cm
 HILL PARAMETERS: Gap (min) 3.5 cm B_{max} 1.3 T
 (@ 2 x 10² AT) Gap (max) 5.2 cm B_{min} 1.3 T
 VALLEY PARAMETERS: Gap (min) 1.8 cm B_{max} 1.1 T
 (@ 2 x 10² AT) Gap (max) 1.8 cm B_{min} 0.4 T
 AVERAGE FIELD: < B >_{min} 1.2 T < B >_{max} 1.24 T
 NUMBER OF SECTORS: compact/separated 4 /
 sector angle 32.7/45 deg. spiral (max) none deg.
 FIELD TRIMMING: Trim Coils none
 Harmonic Coils none
 Other
 CURRENT: Main Coils 500 Amps Stability 0.01%
 Trim Coils Amps Stability
 Stored Energy (cryogenic) MJ
 WEIGHT: Iron 45 tonnes Conductor 1.5 tonnes
 ION ENERGY: Bending Limit E/A = 30 q²/A² MeV/u
 Focussing Limit E/A = 30 q/A MeV/u

ACCELERATION SYSTEM
 FUNDAMENTAL ACCELERATION:
 Description: 2 pie shape dees with lambda/4 stems
 No. of Gaps/turn 4 dE/dn(max) 0.200 MeV/q
 Voltage(max) 0.050 MV Harmonic f_{rf}/f_{ion} 4
 Freq 73.14 MHz Power in(max) 0.035 MW
 Stability: Phase 1 Voltage 10

VACUUM SYSTEM
 OPERATING PRESSURE: 3 x 10e-7 Torr
 PUMPS: No. and type 2 cryo pumps

ION SOURCE(S)
 Type Intensity @ ε_n = βγϵ Ion Species
 (mA) (π mm mrad)
 (a) Cusp 7 0.7 H⁺
 (b)

INJECTION SYSTEM
 Axial - spiral Efficiency 12 %

EXTRACTION SYSTEM
 Stripping Efficiency 100 %

CHARACTERISTIC BEAMS
 Accelerated Ions E/A (MeV/u) Current(part. μA)
 Internal External
 (a) H⁺ 30 450 H⁺ 450 p
 (b)

EXTRACTED BEAM PROPERTIES:
 For 400 μA of 30 MeV/u H⁺ ions
 ΔE/E 1 % Δφ 30 °rf
 ε_n = βγϵ x 2 πmm mrad z 2 πmm mrad

REFERENCES/NOTES
 (a) 12th International Cyclotron Conf. B. Milton et al
 (b) PAC 1991 B. Milton et al

ENTRY NO. CM6 Date
 Machine Name BC168
 Manufacturer The Japan Steel Works, LTD.
 Address 1-2, Yurakuchō 1-chōme, Chiyoda-ku, Tokyo Japan
 Tel (03) 3501-6111 Telex J24298 (JSW)
 Fax (03) 3504-0727 EMAIL
 In Charge: Reported by: Y. Toda

HISTORY AND STATUS
 DATES: Design 1981-1982 First Machine 1982
 SALES: No. Sold/Operational 4 / 4. Currently Available Yes
 COST: Accelerator Facility

MAGNET
 POLE PARAMETERS:
 Diameter 81 cm R_{extract} 38 cm R_{inject} cm
 HILL PARAMETERS: Gap (min) 7 cm B_{max} T
 (@ 1.2 x 10² AT) Gap (max) 7 cm B_{min} T
 VALLEY PARAMETERS: Gap (min) 1.3 cm B_{max} T
 (@ 1.2 x 10² AT) Gap (max) 1.3 cm B_{min} T
 AVERAGE FIELD: < B >_{min} 1.54 T < B >_{max} 1.54 T
 NUMBER OF SECTORS: compact/separated 4 /
 sector angle 45 deg. spiral (max) 0.009 deg.
 FIELD TRIMMING: Trim Coils 2
 Harmonic Coils 2
 Other
 CURRENT: Main Coils 310 Amps Stability 1.2 x 10⁻²%
 Trim Coils 50 Amps Stability 1.1 x 10⁻²%
 Stored Energy (cryogenic) MJ
 WEIGHT: Iron 20 tonnes Conductor 1.1 tonnes
 ION ENERGY: Bending Limit E/A = q²/A² MeV/u
 Focussing Limit E/A = q/A MeV/u

ACCELERATION SYSTEM
 FUNDAMENTAL ACCELERATION:
 Description: 2 sets of pie/A shape dee with lambda/A stems
 No. of Gaps/turn 4 dE/dn(max) 0.15 MeV/q
 Voltage(max) 0.04 MV Harmonic f_{rf}/f_{ion} 2.4
 Freq 47 MHz Power in(max) 0.02 MW
 Stability: Phase 1 Voltage 1 x 10⁻²

VACUUM SYSTEM
 OPERATING PRESSURE: 1 x 10⁻⁷ Torr
 PUMPS: No. and type 1 diffusion pump

ION SOURCE(S)
 Type Intensity @ ε_n = βγϵ Ion Species
 (mA) (π mm mrad)
 (a) Hot Cathode PIG 1 H⁺
 (b)

INJECTION SYSTEM
 Efficiency %

EXTRACTION SYSTEM
 Electrostatic deflector Efficiency 80 %

CHARACTERISTIC BEAMS
 Accelerated Ions E/A (MeV/u) Current(part. μA)
 Internal External
 (a) H⁺ 16 150 70
 (b) D⁺ 8 150 70

EXTRACTED BEAM PROPERTIES:
 For 50 μA of 16 MeV/u H⁺ ions
 ΔE/E 1 % Δφ 30 °rf
 ε_n = βγϵ x 30 πmm mrad z 10 πmm mrad

REFERENCES/NOTES
 (a)
 (b)