

ENTRY NO. CM7 Date September 1995
Machine Name TR13
Manufacturer Ebco Technologies
Address 7851 Alderbridge Way, Richmond, B.C.
Tel (604) 278-5578 Telex Canada V6X 2A4
Fax (604) 278-7230 E-MAIL
In Charge: Reported by: B. Milton

HISTORY AND STATUS
DATES: Design 1991 First Machine 1994
SALES: No. Sold/Operational 2 / 2 Currently Available Yes
COST: Accelerator Facility

MAGNET
POLE PARAMETERS:
Diameter cm R_{extract} 45 cm R_{inject} 2.5 cm
HILL PARAMETERS: Gap (min) 3.2 cm B_{max} 1.9 T
(@ $\times 10^5$ AT) Gap (max) 4 cm B_{min} T
VALLEY PARAMETERS: Gap (min) 10 cm B_{max} .55 T
(@ $\times 10^5$ AT) Gap (max) 20 cm B_{min} T
AVERAGE FIELD: $\langle B \rangle_{\text{min}}$ 1.20 T $\langle B \rangle_{\text{max}}$ 1.22 T
NUMBER OF SECTORS: compact/separated 4 /
sector angle 40-45 deg. spiral (max) none deg.
FIELD TRIMMING: Trim Coils none
Harmonic Coils none
Other
CURRENT: Main Coils 475 Amps Stability 0.02%
Trim Coils none Amps Stability
Stored Energy (cryogenic) MJ
WEIGHT: Iron Conductor
ION ENERGY: Bending Limit E/A = 18 $\text{q}^2/\text{A}^2 \text{ MeV/u}$
Focusing Limit E/A = 18 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_r/f_{ion} 4
Freq 73 MHz Power in(max) .015 MW
Stability: Phase 1 Voltage 10^{-4}

VACUUM SYSTEM
OPERATING PRESSURE: 1×10^{-6} Torr
PUMPS: (No. and type) 1 cryo pump

ION SOURCE(S)
Type Intensity @ $\epsilon_n = \beta\gamma\epsilon$ Ion Species
(mA) (mm mrad)
(a) Cusp 1 0.7 H^-
(b)

INJECTION SYSTEM
Axial - Spiral Efficiency 12 %

EXTRACTION SYSTEM
Stripping Efficiency 100 %

CHARACTERISTIC BEAMS
Current (part. μA)
Accelerated Ions E/A (MeV/u) Internal External
(a) H^- 13 100 H^- 100 p
(b) 0 15 150 H^- 150 p
EXTRACTED BEAM PROPERTIES:
For 100 μA of 13 MeV/u H^+ ions
 $\Delta E/E$ 1 % $\Delta\phi$ 30 °rf
 $\epsilon_n = \beta\gamma\epsilon$ x 2 $\pi \text{ mm mrad}$ z 2 $\pi \text{ mm mrad}$

REFERENCES/NOTES
(a)
(b)

ENTRY NO. CM8 Date September 1995
Machine Name TR30 + TR30/15
Manufacturer Ebco Technologies
Address 7851 Alderbridge Way, Richmond, B.C. Canada V6X
Tel (604) 278-5578 Telex
Fax (604) 278-7230 E-MAIL
In Charge: Reported by: B. Milton

HISTORY AND STATUS
DATES: Design 1988-89 First Machine July 1, 1990
SALES: No. Sold/Operational 2 / 2 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} 1.9 T
(@ 9×10^5 AT) Gap (max) 5.2 cm B_{min} 1.3 T
VALLEY PARAMETERS: Gap (min) 18 cm B_{max} 1.1 T
(@ 9×10^5 AT) Gap (max) 18 cm B_{min} 0.4 T
AVERAGE FIELD: $\langle B \rangle_{\text{min}}$ 1.2 T $\langle B \rangle_{\text{max}}$ 1.24 T
NUMBER OF SECTORS: compact/separated 4 /
sector angle 32-45 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 tonne
ION ENERGY: Bending Limit E/A = 30 $\text{q}^2/\text{A}^2 \text{ MeV/u}$
Focusing 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_r/f_{ion} 4
Freq 73, 14 MHz Power in(max) 0.035-4 MW
Stability: Phase 1° Voltage 10^{-4}

VACUUM SYSTEM
OPERATING PRESSURE: 3×10^{-7} Torr
PUMPS: (No. and type) 2 cryo pumps

ION SOURCE(S)
Type Intensity @ $\epsilon_n = \beta\gamma\epsilon$ Ion Species
(mA) (mm mrad)
(a) Cusp 7 0.7 H^- , D^-
(b)

INJECTION SYSTEM
Axial - spiral Efficiency 12 %

EXTRACTION SYSTEM
Stripping Efficiency 100 %

CHARACTERISTIC BEAMS
Current (part. μA)
Accelerated Ions E/A (MeV/u) Internal External
(a) H^- 30 450 H^- 450 p
(b) 0 15 150 H^- 150 p
EXTRACTED BEAM PROPERTIES:
For 400 μA of 30 MeV/u H^+ ions
 $\Delta E/E$ 1 % $\Delta\phi$ 30 °rf
 $\epsilon_n = \beta\gamma\epsilon$ x 2 $\pi \text{ mm mrad}$ z 2 $\pi \text{ mm mrad}$

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