ENTRY NO. CM1 Date October 9, 1995
Machine Name CYCLONE 3
Manufacturer ION BEAM APPLICATIONS (IBA)
Address Rue Jean Lenoir 6 - 1348 Louvain-la-Neuve, BELG
Tel 32-10-47.58.11 Telex
Fax 32-10-47.58.10 E-MAIL
In Charge: Yves JONGEN Reported by: Françoise VAMECQ

HISTORY AND STATUS
DATES: Design 1989 First Machine 1990
SALES: No. Sold/Operational 4 / 2 Currently Available Y
COST: Accelerator - Facility -

MAGNET
POLE PARAMETERS:
Diameter 50 cm $R_{extract}$ 20.5 cm R_{inject} 2 cm
HILL PARAMETERS: Gap (min) 3.4 cm B_{max} 1.95 T
(@ AT) Gap (max) cm B_{min} T
VALLEY PARAMETERS: Gap (min) 5 cm B_{max} 1.70 T
(@ AT) Gap (max) cm B_{min} T
AVERAGE FIELD: $<B>_{min}$ 1.85 T $<B>_{max}$ T
NUMBER OF SECTORS: compact/separated 4 /
sector angle 40° deg. spiral (max) - deg.
FIELD TRIMMING: Trim Coils -
Harmonic Coils -
Other -
CURRENT: Main Coils 225 Amps Stability 10^{-4}
Trim Coils - Amps Stability -
Stored Energy (cryogenic) MJ
WEIGHT: Iron 5 Tons Conductor 0.5 Tons
ION ENERGY: Bending Limit E/A = 15.2 q^2/A^2 MeV/u
Focusing Limit E/A = 15.2 q/A MeV/u

ACCELERATION SYSTEM
FUNDAMENTAL ACCELERATION:
Description: 2 x 90° Dees
No. of Gaps/turn 4 dE/dn(max) 0.08 MeV/q
Voltage (max) 0.02 MV Harmonic f_{rf}/f_{ion} 2
Freq 30 MHz Power in(max) 10 kW MW
Stability: Phase +/- 10 % Voltage 10^{-3}

VACUUM SYSTEM
OPERATING PRESSURE: $8\ 10^{-5}$ mbar
PUMPS: (No. and type) 1 x 300 l/sec ODP

ION SOURCE(S)

	Type	Intensity (mA)	@ $\varepsilon_n = \beta\gamma\varepsilon$ (π mm mrad)	Ion Species
(a)	PIG cold	1		deuteron
(b)	cathode			

INJECTION SYSTEM
- Efficiency %

EXTRACTION SYSTEM
Deflector Efficiency 70 %

CHARACTERISTIC BEAMS

	Accelerated Ions	E/A (MeV/u)	Current (part. μA) Internal	External
(a)	deuteron	1.90	100	70
(b)				

EXTRACTED BEAM PROPERTIES:
For μA of MeV/u ions
$\Delta E/E$ % $\Delta\phi$ °rf
$\varepsilon_n = \beta\gamma\varepsilon$ x π mm mrad z π mm mrad

REFERENCES/NOTES
(a) EPAC 1990, Y. Jongen et al., Nice 1990
(b)

ENTRY NO. CM2 Date October 9, 1995
Machine Name CYCLONE 10/5
Manufacturer ION BEAM APPLICATIONS (IBA)
Address Rue Jean Lenoir 6 - 1348 Louvain-la-Neuve, BELG
Tel 32-10-47.58.11 Telex
Fax 32-10-47.58.10 E-MAIL
In Charge: Yves JONGEN Reported by: Françoise VAMECQ

HISTORY AND STATUS
DATES: Design 1988 First Machine 1989
SALES: No. Sold/Operational 2 / 2 Currently Available Y
COST: Accelerator - Facility -

MAGNET
POLE PARAMETERS:
Diameter 76 cm $R_{extract}$ ~35 cm R_{inject} 2 cm
HILL PARAMETERS: Gap (min) 3 cm B_{max} 1.9 T
(@ 112.000 AT) Gap (max) cm B_{min} T
VALLEY PARAMETERS: Gap (min) 80 cm B_{max} 0.4 T
(@ - AT) Gap (max) cm B_{min} T
AVERAGE FIELD: $<B>_{min}$ 1.3 T $<B>_{max}$ 1.3 T
NUMBER OF SECTORS: compact/separated 4 /
sector angle 50 deg. spiral (max) 0 deg.
FIELD TRIMMING: Trim Coils None
Harmonic Coils None
Other
CURRENT: Main Coils 200 Amps Stability $5\ 10^{-5}$
Trim Coils N/A Amps Stability N/A
Stored Energy (cryogenic) N/A MJ
WEIGHT: Iron 12 Tons Conductor 1,250 Tons
ION ENERGY: Bending Limit E/A = 11 q^2/A^2 MeV/u
Focusing Limit E/A = 11 q/A MeV/u

ACCELERATION SYSTEM
FUNDAMENTAL ACCELERATION:
Description: 2 x 30° Dees on lambda/2 Vertical Stems
No. of Gaps/turn 4 dE/dn(max) 0.104 MeV/q
Voltage (max) 0.03 MV Harmonic f_{rf}/f_{ion} 2p /4d
Freq 40 MHz Power in(max) 0.010 MW
Stability: Phase Voltage $2\ 10^{-3}$

VACUUM SYSTEM
OPERATING PRESSURE: $3\ 10^{-6}$
PUMPS: (No. and type) 2 x 2000 l/sec ODP

ION SOURCE(S)

	Type	Intensity (mA)	@ $\varepsilon_n = \beta\gamma\varepsilon$ (π mm mrad)	Ion Species
(a)	PIG	1 DC		H^-
(b)	PIG	1 DC		d^-

INJECTION SYSTEM
2 Internal Sources Efficiency 10 %

EXTRACTION SYSTEM
Stripping Efficiency 100 %

CHARACTERISTIC BEAMS

	Accelerated Ions	E/A (MeV/u)	Current (part. μA) Internal	External
(a)	H^-	10	100	100
(b)	d^-	2.5	50	50

EXTRACTED BEAM PROPERTIES:
For μA of MeV/u ions
$\Delta E/E$ % $\Delta\phi$ °rf
$\varepsilon_n = \beta\gamma\varepsilon$ x π mm mrad z π mm mrad

REFERENCES/NOTES
(a) EPAC 1990, Y. Jongen et al., Nice 1990
(b)