

ENTRY NO. CM1 Date July 3, 1992
 Machine Name CYCLONE 3
 Manufacturer IBA
 Address Rue J. E. Lenoir 6, 1348 Louvain-la-Neuve,
 Tel 32 10 47 58 11 Telex Belgium
 Fax 32 10 47 58 10 EMAIL
 In Charge: Yves JONGEN Reported by: Stephane FASSIN.

HISTORY AND STATUS

DATES: Design 1989 First Machine 1990
 SALES: No. Sold/Operational 3 / 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
 (Ø AT) Gap (max) cm B_{min} T
 VALLEY PARAMETERS: Gap (min) 5 cm B_{max} 1.70 T
 (Ø 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 +/- 5 Amps Stability 10⁻⁴
 Stored Energy (cryogenic) MJ
 WEIGHT: Iron 5 Tons Conductor 0.5 Tons
 ION ENERGY: Bending Limit E/A = 7.6 q²/A² MeV/u
 Focussing Limit E/A = 7.6 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
 Stability: Phase +/- 10% Voltage 20 kV (dee)

VACUUM SYSTEM

OPERATING PRESSURE: 8 10⁻⁵ mbar
 PUMPS: No. and type 1 x 300 l/sec ODP

ION SOURCE(S)

Type	Intensity (mA)	Ø (mm mrad)	ε _n = βγε (π mm mrad)	Ion Species
(a) PIG cold cathode	1			deuteron
(b)				

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
 ΔE/E % Δφ °f
 ε_n = βγε x πmm mrad z πmm mrad

REFERENCES/NOTES

(a) EPAC 90, Y. Jongen et al., Nice 1990
 (b)

ENTRY NO. CM2 Date July 3, 1992
 Machine Name CYCLONE 10/5
 Manufacturer IBA
 Address Rue J. E. Lenoir 6, 1348 Louvain-la-Neuve,
 Tel 32 10 47 58 11 Telex Belgium
 Fax 32 10 47 58 10 EMAIL
 In Charge: Yves JONGEN Reported by: Stephane FASSIN.

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
 (Ø 112,000AT) Gap (max) cm B_{min} T
 VALLEY PARAMETERS: Gap (min) 80 cm B_{max} 0.4 T
 (Ø 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 q²/A² MeV/u
 Focussing Limit E/A = 11 q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:
 Description: 2 x 30° Dees on lambda/2 Helical/Vertical Stems
 No. of Gaps/turn 4 dE/dn(max) 0.104 MeV/q
 Voltage(max) 0.03 MV Harmonic f_{rf}/f_{ion} 2 p/4 d
 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)	Ø (mm mrad)	ε _n = βγε (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
 ΔE/E % Δφ °f
 ε_n = βγε x πmm mrad z πmm mrad

REFERENCES/NOTES

(a) EPAC 90, Y. Jongen et al., Nice 1990
 (b)