

ENTRY NO. CM3 Date July 3, 1992
 Machine Name CYCLONE 18/9
 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 01/04/90 First Machine 03/92
 SALES: No. Sold/Operational 5 / 2 Currently Available Y
 COST: Accelerator Facility

MAGNET

POLE PARAMETERS:
 Diameter 108 cm R_{extract} 48 cm R_{inject} 3 cm
 HILL PARAMETERS: Gap (min) 3 cm B_{max} 2.1 T
 (@ .112.000. AT) Gap (max) 3 cm B_{min} 2.1 T
 VALLEY PARAMETERS: Gap (min) 67 cm B_{max} 0.6 T
 (@ - AT) Gap (max) 67 cm B_{min} 0.6 T
 AVERAGE FIELD: < B >_{min} 1.35 T < B >_{max} 1.35 T
 NUMBER OF SECTORS: compact/separated 4 /
 sector angle 57° deg. spiral (max) - deg.
 FIELD TRIMMING: Trim Coils None
 Harmonic Coils None
 Other iron edges (movable for deuterons)
 CURRENT: Main Coils 200 A Amps Stability 10^-4
 Trim Coils N/A Amps Stability N/A
 Stored Energy (cryogenic) N/A MJ
 WEIGHT: Iron 20 Tons Conductor copper 2 Tons
 ION ENERGY: Bending Limit E/A = 20 q^2/A^2 MeV/u
 Focussing Limit E/A = 20 q/A MeV/u

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:
 Description: 2 x 30° Dees on lambda/4 straight stems
 No. of Gaps/turn 4 dE/dn(max) 0.104 MeV/q
 Voltage(max) 0.032 MV Harmonic f_{rf}/f_{ion} 2 p/4 d
 Freq 42 MHz Power in(max) 0.010 MW
 Stability: Phase Dees connected Voltage 8.10^-3

VACUUM SYSTEM

OPERATING PRESSURE: 0.10^-6
 PUMPS: No. and type 4 x 700 l/sec ODP

ION SOURCE(S)

Type	Intensity (mA)	θ (π 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

Carbon Stripper Efficiency 100 %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current(part. μA)	
		Internal	External
(a) H ⁻	18	100	100
(b) d ⁻	4.5	35	35

EXTRACTED BEAM PROPERTIES:

For 500 μA of 30 MeV/u ions
 ΔE/E 1 % Δφ °rf
 ε_n = βγϵ x 10 πmm mrad z 5 πmm mrad

REFERENCES/NOTES

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

ENTRY NO. CM4 Date July 3, 1992
 Machine Name CYCLONE 30
 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 1985 First Machine 1986
 SALES: No. Sold/Operational 14 / 10 Currently Available Y
 COST: Accelerator Facility

MAGNET

POLE PARAMETERS:
 Diameter 160 cm R_{extract} 50-75 cm R_{inject} 3 cm
 HILL PARAMETERS: Gap (min) 3 cm B_{max} 1.7 T
 (@ .60.000. AT) Gap (max) 3 cm B_{min} 1.7 T
 VALLEY PARAMETERS: Gap (min) 100 cm B_{max} 0.12 T
 (@ - AT) Gap (max) 100 cm B_{min} 0.12 T
 AVERAGE FIELD: < B >_{min} 1.0 T < B >_{max} 1.3 T
 NUMBER OF SECTORS: compact/separated 4 /
 sector angle 54-58 deg. spiral (max) 0 deg.
 FIELD TRIMMING: Trim Coils None
 Harmonic Coils None
 Other
 CURRENT: Main Coils 110 A Amps Stability 5 x 10^-5
 Trim Coils N/A Amps Stability N/A
 Stored Energy (cryogenic) N/A MJ
 WEIGHT: Iron 45 Tons Conductor 4 Tons
 ION ENERGY: Bending Limit E/A = 30 q^2/A^2 MeV/u
 Focussing Limit E/A = 30 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) 0.17 MeV/q
 Voltage(max) 0.055 MV Harmonic f_{rf}/f_{ion} 4
 Freq 66 MHz Power in(max) 0.025 MW
 Stability: Phase Voltage 10^-3

VACUUM SYSTEM

OPERATING PRESSURE: 2.5 10^-7
 PUMPS: No. and type 3 x 2,000 l/sec ODP + 2 x 1,500 l/sec (N₂) cryo's

ION SOURCE(S)

Type	Intensity (mA)	θ (π mm mrad)	ε _n = βγϵ (π mm mrad)	Ion Species
(a) Multicusp	3			H ⁻ d ⁻
(b)				

INJECTION SYSTEM

Axial Efficiency 35 %

EXTRACTION SYSTEM

Stripping Efficiency 100 %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current(part. μA)	
		Internal	External
(a) Protons (H ⁺)	30	500	500
(b)			

EXTRACTED BEAM PROPERTIES:

For 500 μA of 30 MeV/u Protons ions
 ΔE/E 1 % Δφ °rf
 ε_n = βγϵ x 10 πmm mrad z 5 πmm mrad

REFERENCES/NOTES

(a) ACC 92, Y. Jongen et al, St Petersburg 1992
 (b) EPAC 1990, Y. Jongen et al, Nice 1990