

ENTRY NO. CM24 Date  
 Machine Name CS-15  
 Manufacturer The Cyclotron Corporation (a)  
 Address 950 Gilman Street, Berkeley, CA 94710 USA  
 Tel (510) 524-8844 Telex 910-366-7116  
 Fax (510) 527-9336 EMAIL  
 In Charge: n/a Reported by: F.A. Ramsey

**HISTORY AND STATUS**

DATES: Design 1965 First Machine OCT 1967  
 SALES: No. Sold/Operational 3 / 3 Currently Available n/a  
 COST: Accelerator Facility

**MAGNET**

POLE PARAMETERS:  
 Diameter .81 cm R<sub>extract</sub> .35 cm R<sub>inject</sub> cm  
 HILL PARAMETERS: Gap (min) .5 cm B<sub>max</sub> .20 T  
 (@ AT) Gap (max) cm B<sub>min</sub> T  
 VALLEY PARAMETERS: Gap (min) cm B<sub>max</sub> T  
 (@ AT) Gap (max) .10 cm B<sub>min</sub> .12 T  
 AVERAGE FIELD: < B ><sub>min</sub> T < B ><sub>max</sub> T  
 NUMBER OF SECTORS: compact/separated 3 /  
 sector angle deg. spiral (max) deg.  
 FIELD TRIMMING: Trim Coils none  
 Harmonic Coils One set - outer  
 Other  
 CURRENT: Main Coils 250 Amps Stability 0.01%  
 Trim Coils Amps Stability  
 Stored Energy (cryogenic) MJ  
 WEIGHT: Iron 22,000 kg TOTAL Conductor  
 ION ENERGY: Bending Limit E/A = q<sup>2</sup>/A<sup>2</sup> MeV/u  
 Focussing Limit E/A = q/A MeV/u

**ACCELERATION SYSTEM**

FUNDAMENTAL ACCELERATION:  
 Description: Two 120° dees  
 No. of Gaps/turn 4 dE/dn(max) MeV/q  
 Voltage(max) 0.025 MV Harmonic f<sub>rf</sub>/f<sub>ion</sub>  
 Freq 12.5 - 25 MHz Power in(max) 0.030 MW  
 Stability: Phase Voltage

**VACUUM SYSTEM**

OPERATING PRESSURE: 10<sup>-5</sup> torr  
 PUMPS: No. and type One oil diffusion pump

**ION SOURCE(S)**

Type	Intensity (mA)	ε <sub>n</sub> = βγε (π mm mrad)	Ion Species
(a) Penning		not available	H <sup>+</sup> /D <sup>+</sup>
(b) "		"	<sup>3</sup> He <sup>++</sup> / <sup>4</sup> He <sup>++</sup>

**INJECTION SYSTEM**

Radial Efficiency 10-12. %

**EXTRACTION SYSTEM**

Electrostatic deflector and septum Efficiency 70. %

**CHARACTERISTIC BEAMS**

Accelerated Ions	E/A (MeV/u)	Current (part. μA)	
		Internal	External
(a) H <sup>+</sup> /D <sup>+</sup>	15/8	200/300	60/100
(b) <sup>3</sup> He <sup>++</sup> / <sup>4</sup> He <sup>++</sup>	20/16	135/90	60/40

**EXTRACTED BEAM PROPERTIES:**

For μA of MeV/u ions  
 ΔE/E 1. % Δφ °rf  
 ε<sub>n</sub> = βγε x π mm mrad z π mm mrad

**REFERENCES/NOTES**

(a) CII Cyclotron Systems, 950 Gilman St., Berkeley, CA  
 (b)

ENTRY NO. CM25 Date  
 Machine Name CS-22  
 Manufacturer The Cyclotron Corporation (a)  
 Address 950 Gilman Street, Berkeley, CA 94710 USA  
 Tel (510) 524-8844 Telex 910-366-7116  
 Fax (510) 527-9336 EMAIL  
 In Charge: n/a Reported by: F.A. Ramsey

**HISTORY AND STATUS**

DATES: Design 1969 First Machine SEPT. 1970  
 SALES: No. Sold/Operational 4 / 3 Currently Available n/a  
 COST: Accelerator Facility

**MAGNET**

POLE PARAMETERS:  
 Diameter .96 cm R<sub>extract</sub> .42 cm R<sub>inject</sub> cm  
 HILL PARAMETERS: Gap (min) .5 cm B<sub>max</sub> .20 T  
 (@ AT) Gap (max) cm B<sub>min</sub> T  
 VALLEY PARAMETERS: Gap (min) cm B<sub>max</sub> T  
 (@ AT) Gap (max) .10 cm B<sub>min</sub> .12 T  
 AVERAGE FIELD: < B ><sub>min</sub> T < B ><sub>max</sub> T  
 NUMBER OF SECTORS: compact/separated 3 /  
 sector angle deg. spiral (max) deg.  
 FIELD TRIMMING: Trim Coils none  
 Harmonic Coils One set - outer  
 Other  
 CURRENT: Main Coils 250 Amps Stability 0.01%  
 Trim Coils Amps Stability  
 Stored Energy (cryogenic) MJ  
 WEIGHT: Iron 23,000 kg TOTAL Conductor  
 ION ENERGY: Bending Limit E/A = q<sup>2</sup>/A<sup>2</sup> MeV/u  
 Focussing Limit E/A = q/A MeV/u

**ACCELERATION SYSTEM**

FUNDAMENTAL ACCELERATION:  
 Description: Two 90° dees  
 No. of Gaps/turn 4 dE/dn(max) MeV/q  
 Voltage(max) 0.025 MV Harmonic f<sub>rf</sub>/f<sub>ion</sub>  
 Freq 13 - 25 MHz Power in(max) 0.060 MW  
 Stability: Phase Voltage

**VACUUM SYSTEM**

OPERATING PRESSURE: 10<sup>-5</sup> torr  
 PUMPS: No. and type One oil diffusion pump

**ION SOURCE(S)**

Type	Intensity (mA)	ε <sub>n</sub> = βγε (π mm mrad)	Ion Species
(a) Penning		not available	H <sup>+</sup> /D <sup>+</sup>
(b) "		"	<sup>3</sup> He <sup>++</sup> / <sup>4</sup> He <sup>++</sup>

**INJECTION SYSTEM**

Radial Efficiency 10-12. %

**EXTRACTION SYSTEM**

Electrostatic deflector and septum Efficiency 70. %

**CHARACTERISTIC BEAMS**

Accelerated Ions	E/A (MeV/u)	Current (part. μA)	
		Internal	External
(a) H <sup>+</sup> /D <sup>+</sup>	22/12	200/300	50/50
(b) <sup>3</sup> He <sup>++</sup> / <sup>4</sup> He <sup>++</sup>	32/24	135/90	50/50

**EXTRACTED BEAM PROPERTIES:**

For μA of MeV/u ions  
 ΔE/E 1. % Δφ °rf  
 ε<sub>n</sub> = βγε x π mm mrad z π mm mrad

**REFERENCES/NOTES**

(a) CII Cyclotron Systems, 950 Gilman St., Berkeley, CA  
 (b)