

ENTRY NO. CM9 Date  
 Machine Name BC3015  
 Manufacturer The Japan Steel Works, Ltd.  
 Address 1-2, Yurakucho 1-chome, Chiyoda-ku, Tokyo, Japan  
 Tel (03) 3501-8111 Telex J24256 (JSW)  
 Fax (03) 3504-0727 EMAIL  
 In Charge: Reported by: Y. Toda

HISTORY AND STATUS  
 DATES: Design 1983-1985 First Machine 1985  
 SALES: No. Sold/Operational 1 / 1. Currently Available Yes  
 COST: Accelerator Facility

MAGNET  
 POLE PARAMETERS:  
 Diameter 129. cm R<sub>extract</sub> 52. cm R<sub>inject</sub> cm  
 HILL PARAMETERS: Gap (min) 10.7 cm B<sub>max</sub> T  
 (@ 2.6x10<sup>9</sup> AT) Gap (max) 10.7 cm B<sub>min</sub> T  
 VALLEY PARAMETERS: Gap (min) 19.9. cm B<sub>max</sub> T  
 (@ 2.6x10<sup>9</sup> AT) Gap (max) 19.9. cm B<sub>min</sub> T  
 AVERAGE FIELD: < B ><sub>min</sub> 1.54. T < B ><sub>max</sub> 1.54. T  
 NUMBER OF SECTORS: compact/separated 4. /  
 sector angle 45. deg. spiral (max) 49. deg.  
 FIELD TRIMMING: Trim Coils 6.  
 Harmonic Coils 4.  
 Other  
 CURRENT: Main Coils 450. Amps Stability 2.2x10<sup>-9</sup>.  
 Trim Coils 50. Amps Stability 1.1x10<sup>-4</sup>.  
 Stored Energy (cryogenic) MJ  
 WEIGHT: Iron 50. ton Conductor 2. ton  
 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: 2 sets of piezo shape dec with lambda/4 steps  
 No. of Gaps/turn 4. dE/dn(max) 0.16. MeV/q  
 Voltage(max) 0.04. MV Harmonic f<sub>rf</sub>/f<sub>ion</sub> 2.4.  
 Freq 47. MHz Power in(max) 0.025. MW  
 Stability: Phase 1. Voltage 1x10<sup>-2</sup>.

VACUUM SYSTEM  
 OPERATING PRESSURE: 1x10<sup>-9</sup>. Torr.  
 PUMPS: No. and type 2. diffusion pump.

ION SOURCE(S)  
 Type Intensity @ ε<sub>n</sub> = βγε Ion Species  
 (mA) (π mm mrad)  
 (a) Hot Cathode PIG 1. H<sup>+</sup>. D<sup>+</sup>.  
 (b)

INJECTION SYSTEM  
 Efficiency %

EXTRACTION SYSTEM  
 Electrostatic deflector. Efficiency 70. %

CHARACTERISTIC BEAMS  
 Current(part. μA)  
 Accelerated Ions E/A (MeV/u)<sup>†</sup> Internal External  
 (a) H<sup>+</sup> 30 150 70  
 (b) D<sup>+</sup> 15 150 70

EXTRACTED BEAM PROPERTIES:  
 For 50. μA of 30. MeV/u H<sup>+</sup>. ions  
 ΔE/E 1. % Δφ  
 ε<sub>n</sub> = βγε x 30. πmm mrad z 10. πmm mrad

REFERENCES/NOTES  
 (a)  
 (b)

ENTRY NO. CM10 Date June 19, 1992  
 Machine Name HM-18 CYCLOTRON  
 Manufacturer Sumitomo Heavy Industries, Ltd.  
 Address 10-11, Kiba 5-chome, Koto-ku, Tokyo 135, Japan  
 Tel (03) 3820-6588 Telex  
 Fax (03) 3820-6452 EMAIL  
 In Charge: Reported by: Y. Sekii

HISTORY AND STATUS  
 DATES: Design 1989 First Machine 1991  
 SALES: No. Sold/Operational 2 / 1. Currently Available Yes  
 COST: Accelerator Facility

MAGNET  
 POLE PARAMETERS:  
 Diameter 104. cm R<sub>extract</sub> 43.46. cm R<sub>inject</sub> cm  
 HILL PARAMETERS: Gap (min) 3.6. cm B<sub>max</sub> 2.1. T  
 (@ 9.7x10<sup>9</sup> AT) Gap (max) cm B<sub>min</sub> T  
 VALLEY PARAMETERS: Gap (min) 15.4. cm B<sub>max</sub> 7.2. T  
 (@ 9.7x10<sup>9</sup> AT) Gap (max) cm B<sub>min</sub> T  
 AVERAGE FIELD: < B ><sub>min</sub> 1.91. T < B ><sub>max</sub> 1.56. T  
 NUMBER OF SECTORS: compact/separated 4. /  
 sector angle 50. deg. spiral (max) no. deg.  
 FIELD TRIMMING: Trim Coils 4 pairs.  
 Harmonic Coils  
 Other  
 CURRENT: Main Coils 180. Amps Stability 0.01. %  
 Trim Coils 30, 30, 60, 80. Amps Stability 0.1. %  
 Stored Energy (cryogenic) MJ  
 WEIGHT: Iron 26. tons Conductor 0.7 tons  
 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: 2 dees (2.4 cavities).  
 No. of Gaps/turn 4. dE/dn(max) 0.12. MeV/q  
 Voltage(max) 0.035. MV Harmonic f<sub>rf</sub>/f<sub>ion</sub> 2(H<sup>+</sup>), 4(D<sup>+</sup>).  
 Freq 45. MHz Power in(max) 0.015. MW  
 Stability: Phase ±0.5°. Voltage 1x10<sup>-2</sup>.

VACUUM SYSTEM  
 OPERATING PRESSURE: 7 x 10<sup>-9</sup>. Torr.  
 PUMPS: No. and type 2. oil-diffusion pumps.

ION SOURCE(S)  
 Type Intensity @ ε<sub>n</sub> = βγε Ion Species  
 (mA) (π mm mrad)  
 (a) PIG(internal) H<sup>+</sup>. D<sup>+</sup>.  
 (b)

INJECTION SYSTEM  
 No. Efficiency %

EXTRACTION SYSTEM  
 Stripping. Efficiency 100. %

CHARACTERISTIC BEAMS  
 Current(part. μA)  
 Accelerated Ions E/A (MeV/u) Internal External  
 (a) H<sup>+</sup> 18 150 70  
 (b) D<sup>+</sup> 10 150 50

EXTRACTED BEAM PROPERTIES:  
 For μA of MeV/u ions  
 ΔE/E % Δφ  
 ε<sub>n</sub> = βγε x πmm mrad z πmm mrad

REFERENCES/NOTES  
 (a)  
 (b)