

ENTRY NO. CM13 Date  
 Machine Name BC3015  
 Manufacturer The Japan Steel Works, LTD.  
 Address 4 Chatsu-machi Muroran, Hokkaido, Japan  
 Tel (0143) 22-9211 Telex 0987601  
 Fax (0143) 23-8161 E-MAIL  
 In Charge: Y. Toda 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  $R_{extract}$  52 cm  $R_{inject}$  cm  
 HILL PARAMETERS: Gap (min) 10.7 cm  $B_{max}$  T  
 (@ 2.8x10<sup>5</sup> AT) Gap (max) 10.7 cm  $B_{min}$  T  
 VALLEY PARAMETERS: Gap (min) 19.9 cm  $B_{max}$  T  
 (@ 2.8x10<sup>5</sup> AT) Gap (max) 19.9 cm  $B_{min}$  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) 40 deg.  
 FIELD TRIMMING: Trim Coils 6  
 Harmonic Coils 4  
 Other  
 CURRENT: Main Coils 450 Amps Stability  $\pm 2 \times 10^{-5}$   
 Trim Coils 50 Amps Stability  $\pm 1 \times 10^{-4}$   
 Stored Energy (cryogenic) MJ  
 WEIGHT: Iron 60 tons Conductor 2 tons  
 ION ENERGY: Bending Limit E/A = q<sup>2</sup>/A<sup>2</sup> MeV/u  
 Focusing Limit E/A = q/A MeV/u

ACCELERATION SYSTEM  
 FUNDAMENTAL ACCELERATION:  
 Description: 2 sets of pie/4 shape dees with lambda/4 stems  
 No. of Gaps/turn 4 dE/dn(max) 0.16 MeV/q  
 Voltage (max) 0.04 MV Harmonic  $f_r/f_{ion}$  2/4  
 Freq 47 MHz Power in(max) 0.025 MW  
 Stability: Phase 1 Voltage  $1 \times 10^{-3}$

VACUUM SYSTEM  
 OPERATING PRESSURE:  $1 \times 10^{-6}$  Torr  
 PUMPS: (No. and type) 2 diffusion pump

ION SOURCE(S)  

Type	Intensity (mA)	@	$\epsilon_n = \beta\gamma\epsilon$ (mm mrad)	Ion Species
(a) Hot Cathode PIG	1			H <sup>+</sup>
(b) Hot Cathode PIG	1			D <sup>+</sup>

INJECTION SYSTEM  
 Efficiency %

EXTRACTION SYSTEM  
 Electrostatic deflector Efficiency 70 %

CHARACTERISTIC BEAMS  

Accelerated Ions	E/A (MeV/u)	Current (part. $\mu$ A)	
		Internal	External
(a) H <sup>+</sup>	30	150	70
(b) D <sup>+</sup>	15	150	70

EXTRACTED BEAM PROPERTIES:  
 For 50  $\mu$ A of 30 MeV/u H<sup>+</sup> ions  
 $\Delta E/E$  %  $\Delta\phi$  °rf  
 $\epsilon_n = \beta\gamma\epsilon$  x 30  $\pi$  mm mrad z 10  $\pi$  mm mrad

REFERENCES/NOTES  
 (a)  
 (b)

ENTRY NO. CM14 Date October 5, 1995  
 Machine Name BW-18 CYCLOTRON  
 Manufacturer Sumitomo Heavy Industries, Ltd.  
 Address 5-9-11, Kitashinagawa, Shinagawa-ku, Tokyo 141, Japan  
 Tel (03) 5488-8322 Telex  
 Fax (03) 5488-8321 E-MAIL  
 In Charge: Reported by: T. Tachikawa

HISTORY AND STATUS  
 DATES: Design 1989 First Machine 1991  
 SALES: No. Sold/Operational 6/6 Currently Available Yes  
 COST: Accelerator Facility

MAGNET  
 POLE PARAMETERS:  
 Diameter 104 cm  $R_{extract}$  43.46 cm  $R_{inject}$  cm  
 HILL PARAMETERS: Gap (min) cm  $B_{max}$  2.1 T  
 (@ 97,000 AT) Gap (max) 3.6 cm  $B_{min}$  0.72 T  
 VALLEY PARAMETERS: Gap (min) cm  $B_{max}$  T  
 (@ 97,000 AT) Gap (max) 15.4 cm  $B_{min}$  T  
 AVERAGE FIELD: <B><sub>min</sub> 1.51 T <B><sub>max</sub> 1.56 T  
 NUMBER OF SECTORS: compact/separated 4 /  
 sector angle 50 deg. spiral (max) 90 deg.  
 FIELD TRIMMING: Trim Coils 4 pairs  
 Harmonic Coils  
 Other  
 CURRENT: Main Coils 180 Amps Stability  $\pm 1 \times 10^{-4}$   
 Trim Coils 30-80 Amps Stability  $\pm 1 \times 10^{-3}$   
 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  
 Focusing Limit E/A = q/A MeV/u

ACCELERATION SYSTEM  
 FUNDAMENTAL ACCELERATION:  
 Description: 45°-2 dees with  $\lambda/4$  cavities  
 No. of Gaps/turn 4 dE/dn(max) 0.12 MeV/q  
 Voltage (max) 0.035 MV Harmonic  $f_r/f_{ion}$  2(H<sup>+</sup>), 4(D<sup>+</sup>)  
 Freq 45 MHz Power in(max) 0.015 MW  
 Stability: Phase  $\pm 0.5$  deg Voltage  $\pm 1 \times 10^{-3}$

VACUUM SYSTEM  
 OPERATING PRESSURE:  $7 \times 10^{-6}$  Torr  
 PUMPS: (No. and type) DP x 2

ION SOURCE(S)  

Type	Intensity (mA)	@	$\epsilon_n = \beta\gamma\epsilon$ (mm mrad)	Ion Species
(a) PIG				H <sup>+</sup> , D <sup>+</sup>
(b)				

INJECTION SYSTEM  
 Efficiency %

EXTRACTION SYSTEM  
 Stripping (carbon foil) Efficiency 100 %

CHARACTERISTIC BEAMS  

Accelerated Ions	E/A (MeV/u)	Current (part. $\mu$ A)	
		Internal	External
(a) H <sup>+</sup>	18	70	70
(b) D <sup>+</sup>	10	50	50

EXTRACTED BEAM PROPERTIES:  
 For  $\mu$ A of MeV/u ions  
 $\Delta E/E$  %  $\Delta\phi$  °rf  
 $\epsilon_n = \beta\gamma\epsilon$  x  $\pi$  mm mrad z  $\pi$  mm mrad

REFERENCES/NOTES  
 (a)  
 (b)