

ENTRY NO. CM11 Date  
 Machine Name BC2010N  
 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 1992-1994 First Machine 1995  
 SALES: No. Sold/Operational 1 / 1 Currently Available yes  
 COST: Accelerator Facility

MAGNET  
 POLE PARAMETERS:  
 Diameter 101 cm R<sub>extract</sub> 42 cm R<sub>inject</sub> cm  
 HILL PARAMETERS: Gap (min) 6 cm B<sub>max</sub> T  
 (@ 1.2x10<sup>5</sup> AT) Gap (max) 6 cm B<sub>min</sub> T  
 VALLEY PARAMETERS: Gap (min) 14 cm B<sub>max</sub> T  
 (@ 1.2x10<sup>5</sup> AT) Gap (max) 14 cm B<sub>min</sub> T  
 AVERAGE FIELD: <B><sub>min</sub> 1.51 T <B><sub>max</sub> 1.51 T  
 NUMBER OF SECTORS: compact/separated 4 /  
 sector angle 45 deg. spiral (max) none deg.  
 FIELD TRIMMING: Trim Coils 3  
 Harmonic Coils 2  
 Other  
 CURRENT: Main Coils 350 Amps Stability ± 2x10<sup>-5</sup>  
 Trim Coils 30 Amps Stability ± 1x10<sup>-4</sup>  
 Stored Energy (cryogenic) MJ  
 WEIGHT: Iron 26 ton Conductor 1 ton  
 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 dee with lambda/4 stems  
 No. of Gaps/turn 4 dE/dn(max) 0.16 MeV/q  
 Voltage (max) 0.04 MV Harmonic f<sub>r</sub>/f<sub>ion</sub> 2 / 4  
 Freq 46 MHz Power in(max) 0.02 MW  
 Stability: Phase 1 Voltage 1x10<sup>-3</sup>

VACUUM SYSTEM  
 OPERATING PRESSURE: 1x10<sup>-6</sup> Torr  
 PUMPS: (No. and type) 2 diffusion pumps

ION SOURCE(S)  

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

INJECTION SYSTEM  
 Efficiency %

EXTRACTION SYSTEM  
 Stripping Efficiency 100 %

CHARACTERISTIC BEAMS  

Accelerated Ions	E/A (MeV/u)	Current (part. $\mu$ A)	
		Internal	External
(a) H <sup>-</sup>	20	100	100
(b) D <sup>-</sup>	10	50	50

EXTRACTED BEAM PROPERTIES:  
 For 50  $\mu$ A of 20 MeV/u H<sup>+</sup> ions  
 $\Delta E/E$  1 %  $\Delta\phi$  °rf  
 $\epsilon_n = \beta\gamma\epsilon$  x 30  $\pi$  mm mrad z 10  $\pi$  mm mrad

REFERENCES/NOTES  
 (a)  
 (b)

ENTRY NO. CM12 Date  
 Machine Name BC2211  
 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 1988-1989 First Machine 1989  
 SALES: No. Sold/Operational 1 / 1 Currently Available yes  
 COST: Accelerator Facility

MAGNET  
 POLE PARAMETERS:  
 Diameter 101 cm R<sub>extract</sub> 42 cm R<sub>inject</sub> cm  
 HILL PARAMETERS: Gap (min) 7 cm B<sub>max</sub> T  
 (@ 1.3x10<sup>5</sup> AT) Gap (max) 7 cm B<sub>min</sub> T  
 VALLEY PARAMETERS: Gap (min) 13 cm B<sub>max</sub> T  
 (@ 1.3x10<sup>5</sup> AT) Gap (max) 13 cm B<sub>min</sub> T  
 AVERAGE FIELD: <B><sub>min</sub> 1.60 T <B><sub>max</sub> 1.60 T  
 NUMBER OF SECTORS: compact/separated 4 /  
 sector angle 45 deg. spiral (max) none deg.  
 FIELD TRIMMING: Trim Coils 3  
 Harmonic Coils 2  
 Other  
 CURRENT: Main Coils 400 Amps Stability ± 2x10<sup>-5</sup>  
 Trim Coils 50 Amps Stability ± 1x10<sup>-4</sup>  
 Stored Energy (cryogenic) MJ  
 WEIGHT: Iron 30 ton Conductor 1 ton  
 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 dee with lambda/4 stems  
 No. of Gaps/turn 4 dE/dn(max) 0.16 MeV/q  
 Voltage (max) 0.04 MV Harmonic f<sub>r</sub>/f<sub>ion</sub> 2 / 4  
 Freq 48 MHz Power in(max) 0.02 MW  
 Stability: Phase 1 Voltage 1x10<sup>-3</sup>

VACUUM SYSTEM  
 OPERATING PRESSURE: 1x10<sup>-6</sup> Torr  
 PUMPS: (No. and type) 1 diffusion pump

ION SOURCE(S)  

Type	Intensity (mA)	@	$\epsilon_n = \beta\gamma\epsilon$ ( $\pi$ 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 80 %

CHARACTERISTIC BEAMS  

Accelerated Ions	E/A (MeV/u)	Current (part. $\mu$ A)	
		Internal	External
(a) H <sup>+</sup>	22	150	70
(b) D <sup>+</sup>	11	150	70

EXTRACTED BEAM PROPERTIES:  
 For 50  $\mu$ A of 22 MeV/u H<sup>+</sup> ions  
 $\Delta E/E$  1 %  $\Delta\phi$  °rf  
 $\epsilon_n = \beta\gamma\epsilon$  x 30  $\pi$  mm mrad z 10  $\pi$  mm mrad

REFERENCES/NOTES  
 (a)  
 (b)