

**ENTRY NO:** CM-2  
**Machine Name:** C14 Self-Extraction  
**Date:** 9/10/01 5:56:12 AM  
**Institution:** Ion Beam Applications (IBA)  
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## HISTORY

**Designed By:** Ion Beam Applications (IBA)  
**Construction Dates:** Jan 1998 - Dec 2000  
**First Beam Date:** December 2000

## CHARACTERISTIC BEAMS

ions	/ energy(MeV/N)	/current(pps)	/power(w)
proton	14	5 mA	70 kW

## transmission efficiency(source to extract beam)

typical: 75% - best: 80%

## transverse emittance

### emittance definition:

vertical: unknown $\pi$  mm mrad  
horizontal: unknown $\pi$  mm mrad  
longitudinal: unknown( $\Delta$ ) E/E)%xdeg RF

## USES

basic research: %	therapy: %
development: %	isotope production: 100%
other: %	maintenance: %
beam tuning: %	Total Time: h/year

## TECHNICAL DATA

a)magnet: type: compact  
Kb: 14MeV/A Kf: 14MeV/A  
average field (min/max): 1.1 (1.8/0.3) T  
number of magnet sectors: 4  
hill angular width: 45hill angular width  
spiral (max): 0 deg  
pole parameters  
diameter: 0.52 - 0.56 m  
injection radius: 0.02 m  
extraction radius: 0.48 m  
hill gap: 0.04 - 0.015m valley gap: 0.67m  
trim coils  
-number: 0x2  
-current(max): N/A A-turns  
harmonic coils  
-number: 2xNsectorsx2  
-current(max): 300 A-turns  
main coils  
number: 2x2  
total ampere-turns: 126000 A-turns  
current: 175 A  
stored energy: 0.03MJ  
weight - iron: 20t coils: 2t  
power  
main coils (total): 22 kW  
trim coils (total max): N/A kW  
refrigerator (cryogenic): N/A kW  
b)RF  
acceleration

frequency range: 67MHz  
harmonic modes: 4  
number of dees: 2  
number of cavities: 4  
dee angular width: 40degrees  
voltage  
at injection: 45kV(peak to ground, max)  
at extraction: 55kV(peak to ground, max)  
peak: 55kV(peak to ground, max)  
line power(max): 200kW  
stability  
phase: 0.1 deg  
voltage: 0.1%  
injection  
c)ion source: PIG  
external injection:  
components:  
source bias voltage: kV  
injection energy: MeV/N  
buncher:  
injection efficiency: N/A%  
d)injector:  
e)extraction  
Self-Extraction Principle  
efficiency  
typical: 75%  
best: 80%

## f)vacuum

pumps: 2 ODPs  
achieved vacuum: 5\*10-6Pa

## REFERENCES

1) W. Kleeven, M. Abs, J.C. Amelia, W. Beeckman, J.L. Bol, V. Danloy, Y. Jongen, G. Lannoye, S. Lucas, J. Ryckewaert, D. Vandeplassche, S. Zaremba, "Self-Extraction in a Compact High-Intensity H+ Cyclotron" EPAC2000, 2) W. Kleeven, S. Lucas, S. Zaremba, W. Beeckman, D. Vandeplassche, M. Abs, P. Verbruggen, Y. Jongen "The Self-Extracting Cyclotron" CYCLOTRONS 2001 3) W. Kleeven, W. Beeckman, S. Lucas, S. Zaremba, D. Vandeplassche, Y. Jongen "Magnetic Field Calculations and Shimming of the Self-Extracting Cyclotron" CYCLOTRONS 2001

## EXPERIMENTAL FACILITIES

IBA Isotope Productions Facility Fleurus, Belgium

## COMMENTS