**ENTRY NO:** C49
**Date:** 12 Feb 2005 21:24:35
**Machine Name:** K1200
**Institution:** Michigan State University
**Address:** Nscl/ Cyclotron Laboratory, E. Lansing, Mi 48824
**Telephone:** 517-355-9671
**Fax:** 517-353-5967
**Web Address:** www.nscl.msu.edu
**Person in Charge of Cyclotron:** C. K. Gelbke
**Person Reporting Information:** P. S. Miller
**E-mail Address:** miller@nscl.msu.edu

**History**
**Designed by:** Michigan State University 1976-86
**Construction Dates:** 80-87
**First Beam Date:** 6/88; Coupled Cyc. 10/2000
**Characteristic Beams**

| ions | / energy(MeV/N) | /current(pps) | /power(w) |
|---|---|---|---|
| 16O8+ | 150 | 133E10 | 510 |
| 18O8+ | 120 | 102E10 | 350 |
| 40Ar18+ | 140 | 42E10 | 370 |
| 48Ca20+ | 140 | 9.8E10 | 105 |
| 78Kr34+ | 140 | 13.8E10 | 240 |
| 86Kr34+ | 140 | 18.4E10 | 350 |
| 124Xe48+ | 140 | 0.88E10 | 15 |
| 124Sn45+ | 120 | 1.8E10 | 43 |
| 209Bi63+ | 80 | 0.15E10 | 4 |

**Transmission Efficiency (source to extracted beam)**
**Typical (%):** 7
**Best (%):** 10 (coupled cyc. system)
**Emittance**
**Emittance Definition:** 50%
**Vertical (pi mm mrad):** 3-8
**Horizontal (pi mm mrad):** 2-5
**Longitudinal (dE/E[%] x RF[deg.]):** 0.07 (%) x 30 deg.
**USES**
**Basic Research (%):**
**Development (%):**
**Therapy (%):**
**Isotope Production (%):**
**Other Application (%):**
**Maintenance (%):**
**Beam Tuning (%):**
**Total Time (h/year):**

**TECHNICAL DATA**
**(a)Magnet**
**Type:** compact
**Kb (MeV):** 1200
**Kf (MeV):** 400
**Average Field (min./max. T):** 3.0 - 5.3
**Number of Sectors:** 3
**Hill Angular Width (deg.):** 60
**Spiral (deg.):** 176
**Pole Diameter (m):** 2.197
**Injection Radius (m):** 0.32
**Extraction Radius (m):** 1.03
**Hill Gap (m):** 0.076
**Valley Gap (m):** 0.914
**Trim Coils** (square coil, axis horizontal)
**Number:** (21x3 sectors)
**Maximum Current (A-turns):** 400x20/2
**Harmonic Coils** (use trim coils)
**Number:** 3 (trim coil #1,5,21)
**Maximum Current (A-turns):** 400x20/2
**Main Coils**
**Number:** 2x2
**Total Ampere Turns:** 7E6
**Maximum Current (A):** 900
**Stored Energy (MJ):** 60
**Total Iron Weight (tons):** 240
**Total Coil Weight (tons):** 20
**Power**
**Main Coils (total KW):** 0
**Trim Coils (total, maximum, KW):** 100
**Refrigerator (cryogenic, KW):** 1300

**(b)RF**
**Acceleration**
**Frequency Range (MHz):** 9-27
**Harmonic Modes:** 1
**Number of Dees:** 3
**Number of Cavities:** 3
**Dee Angular Width (deg.):**60
**Voltage**
**At Injection (peak to ground, KV):** 150
**At Extraction (peak to ground, KV):** 169
**Peak (peak to ground, KV):** 169
**Line Power (max, KW):** 920
**Phase Stability (deg.):** 1
**Voltage Stability (%):** 0.01

**(c)Injection**
**Ion Source:** ECR
**Source Bias Voltage (kV):** 30 kV max
**External Injection:** radial
**Buncher Type:** none
**Injection Energy (MeV/n):** approx. Efinal/11
**Component:** K500 cyc., internal stripper foil
**Injection Efficiency (%):** 60
**Injector:** K500 Cyclotron

**(d)Extraction**
**Elements, Characteristic:** electrostatic deflectors (2), 6mm gap, 130 kV/cm; movable passive magnetic dipole and 2 compensators, movable focusing bars (8) and compensators (5), precessional
**Typical Efficiency (%):** 70
**Best Efficiency (%):** 90

**(e)Vacuum**
**Pumps:** 2 cryopanels, 7K, Cu+charcoal, 2500 l/s/panel, 3 TMP's
**Achieved Vacuum (Pa):** 9.3e-5

**REFERENCES**
MSU Reports MSUCP 29 (June 80) and MSUCP35 (June 81) MSUCP-939 (July 94) "The K500 x K1200" Proc. 11th Int. Conf. on Cyclotrons (1986)157

**EXPERIMENTAL FACILITIES**
Magnetic spectrometer S800, Segmented Germanium Array, 92 Inch Chamber, Neutron Wall, Sweeper magnet, Gas stopping target, Low energy beam ion transport, Ion trap, Reaction Products Mass Separator, 4 pi array

**COMMENTS**