**ENTRY NO:** C-39
**Machine Name:** Gustaf Werner Cyclotron
**Date:** 8/17/01 5:58:17 AM
**Institution:** The Svedberg Laboratory
**Address** Box 533, S-75121 Uppsala, Sweden
**In Charge of Cyclotron:** Dag Reistad
**Telephone:** +46-184713890
**Fax:** +48-184713833
**Person Reporting:** Bengt Lundstrom
**Web:** www.tsl.uu.se
**E-mail:** lundstrom@tsl.uu.se

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**HISTORY**
**Designed By:** in house
**Construction Dates:** 1946-51, 1977-86
**First Beam Date:** 1951,1986
**CHARACTERISTIC BEAMS**

| **ions** | / **energy**(MeV/N)/**curre**nt(pps)/**powe**r(w) | | |
|---|---|---|---|
| p | 180 | 2*10^12 | 50 |
| p | 98 | 6*10^13 | 1000 |
| H2+ | 48 | | |
| 14N7+ | 45 | 8*10^9 | |
| 40Ar11+ | 14.5 | 2*10^12 | |
| 129Xe27+ | 8.33 | 7*10^8 | |

**transmision efficiency(source to extract beam)**
**typical:** (5)% - **best:** %
**tranverse emmitance**
**emmitance definition:** RMS
**vertical:** 9π mm mrad
**horizontal:** 9π mm mrad
**longitudinal:** (Δ) E/E)%xdeg RF

**USES**
**basic research:** 50% **therapy:** 20%
**development:** 5% **isotope production:** 5%
**other:** 10% **maintenance:** 5%
**beam tuning:** 5% **Total Time:** 4300h/year

**TECHNICAL DATA**
**a)magnet:** **type:** compact
**Kb:** 200MeV/A **Kf:** 100MeV/A
**average field (min/max):** 1.75/0.6 T
**number of magnet sectors:** 3
**hill angular width:** varieshill angular width
**spiral (max):** 55 deg deg
**pole parameters**
**diameter:** 2.8 m
**injection radius:** (0.038) m
**extraction radius:** 1.175 m
**hill gap:** 0.2m **valley gap:** 0.38m
**trim coils**
-number: 13x2
-current(max): ca 5000 A-turns
**harmonic coils**
-number: 2xNsectorsx2
-current(max): ca 8000 A-turns
**main coils**
**number:** 1x2
**total ampere-turns:** 814000 A-turns
**current:** 1000 A
**stored energy:** 9MJ
**weight -** iron: 600t coils: 50t
**power**
**main coils (total):** 275 kW
**trim coils (total max):** 70 kW
**refrigerator (cryogenic):** kW
**b)RF**
**acceleration**
**frequency range:** 12.3-25MHz
**harmonic modes:** 1,2,3,4
**number of dees:** 2
**number of cavities:**
**dee angular width:** 72-42degrees
**voltage**
at injection: kV(peak to ground, max)
at extraction: kV(peak to ground, max)
peak: 50kV(peak to ground, max)
**line power(max):** 280kW
**stability**
**phase:** +/- 0.5 deg
**voltage:** +/- 0.1%
**injection**
**c)ion source:** int PIG, ext ECR,pol
**external injection:** axial
**components:** spiral inflectors
**source bias voltage:** 20kV
**injection energy:** MeV/N
**buncher:** h=1 double gap
**injection efficiency:** 5-10%
**d)injector:**
**e)extraction**
isochr. mode: precessional extraction El. stat. defl. 65 kV, aperture 5 mm, septum 0.5 mm El. magn. channel 4.7 kA, 5 mm septum passive focussing channel Synchrocyclotron mode: regenerative extraction Same plus passive peeler, regenerator
**efficiency**
**typical:** 50%
**best:** 80%
**f)vacuum**
**pumps:** 2+1 diff. pumps, 2 Meissner traps
**achieved vacuum:** 10^-5Pa
**REFERENCES**
S. Holm, Proc. 13th Int. Conf, Vancouver 1992 p.106
**EXPERIMENTAL FACILITIES**
CELSIUS cooler ring Spectrometers HESM, LISA, PACMAN Neutron beam (MEDLEY, SCANDAL) Radiotehrapy area Radionuclide production
**COMMENTS**