

ENTRY NO. **CU27** Date **October, 10, 1995**  
 Name of Machine **Rossendorf PET Cyclotron "CYCLONE 18/9"**  
 Institution **Forschungszentrum Rossendorf, Institut für Bioorganische und Radiopharm. Chemie**  
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 In Charge: **St. Preusche, Dr. J. Steinbach** Reported by: **St. Preusche**

**HISTORY**  
**MILESTONE DATES:**  
 Design **IBA/Belgium** Model Tests  
 Construction **First Beam 1995**  
**DESIGN/CONSTRUCTION BY:**  
 in house **other**  
**COST:** Accelerator **Facility**  
**FUNDED BY:**

**STATUS**  
**STAFF:** Machine  
 Scientists **1** Engineers  
 Technicians **2** Students  
 Research (in house/external)  
 Scientists **/** Engineers **/**  
 Technicians **/** Students **/**  
**BUDGET:** Machine **Funded by**  
 Research **Funded by**  
**TIME DISTRIBUTION:**  
 Basic Research (in house/external) **60** % / **0** %  
 Applied Program (in house/external) **20** % / **0** %  
 Maintenance **10** % Development **10** %

**MAGNET**  
**POLE PARAMETERS:**  
 Diameter **108** cm  $R_{extract}$  **45,49** cm  $R_{inject}$  **cm**  
**HILL PARAMETERS:** Gap (min) **3** cm  $B_{max}$  **1.9** T  
 (@ **AT**) Gap (max) **3** cm  $B_{min}$  **1.6** T  
**VALLEY PARAMETERS:** Gap (min) **35** cm  $B_{max}$  **0.9** T  
 (@ **AT**) Gap (max) **35** cm  $B_{min}$  **0.3** T  
**AVERAGE FIELD:**  $\langle B \rangle_{min}$  **1.34** T  $\langle B \rangle_{max}$  **1.39** T  
**NUMBER OF SECTORS:** compact/separated **4 /**  
 sector angle **56** deg. spiral (max) **deg.**  
**FIELD TRIMMING:** Trim Coils  
 Harmonic Coils  
 Other **Movable Inserts**  
**CURRENT:** Main Coils **190** Amps Stability  
 Trim Coils **Amps** Stability  
 Stored Energy (cryogenic) **MJ**  
**WEIGHT:** Iron **Conductor**  
**ION ENERGY:** Bending Limit  $E/A =$  **18.6** q<sup>2</sup>/A<sup>2</sup> MeV/u  
 Focusing Limit  $E/A =$  **18.4** q/A MeV/u

**ACCELERATION SYSTEM**  
**FUNDAMENTAL ACCELERATION:**  
 Description: **RF Cavities in opposite valleys**  
 No. of Gaps/turn **4**  $dE/dn(max)$  **0.1** MeV/q  
 Voltage (max) **0.03** MV Harmonic  $f_r/f_{ion}$  **2 or 4**  
 Freq **41.8** MHz Power in(max) **0.01** MW  
 Stability: Phase **Voltage**  
**OTHER CAVITIES (Flattopping or otherwise):**  
 Description:  
 Region of Influence:  $R_{min}$  **cm**  $R_{max}$  **cm**  
 No. of Gaps/turn **dE/dn(max)** **MeV/q**  
 Voltage (max) **MV** Harmonic  $f_r/f_{ion}$   
 Freq **MHz** Power in(max) **MW**  
 Stability: Phase **Voltage**

**VACUUM SYSTEM**  
 OPERATING PRESSURE: **10<sup>-5</sup>** mbar with beam  
 PUMPS: (No. and type) **4x Edwards 160/700 diffstack**  
**1x Edwards 100/300 diffstack for beamline**

**ION SOURCE(S)**

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

**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>	18		
(b) D <sup>-</sup>	9,5		
(c)			
(d)			

  

Secondary Particles	E (MeV)	part/sec
(a)		
(b)		
(c)		

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

**FACILITIES FOR RESEARCH**  
 SHIELDED AREA: Fixed: **m<sup>2</sup>** Moveable **m<sup>2</sup>**  
 Target Stations: **No. Served At Same Time:**  
**MAGNETIC SPECTROMETERS:**  
**OTHER FACILITIES:**

**REFERENCES/NOTES**  
 (a)  
 (b)

**PLAN VIEW OF FACILITY, COMMENTS**  
 1. 8 exit ports for targets; 6 are used  
 2. External beam transport line  
 3. Dual beam at ports 3/7 and 4/8 possible

