

ENTRY NO. C35 Date 18 September, 1995
 Name of Machine JAERI-AVF Cyclotron
 Institution Takasaki Radiation Chemistry Research Establishment, Japan Atomic Energy Research Institute
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 In Charge: K. Arakawa Reported by: K. Arakawa

HISTORY

MILESTONE DATES:

Design Model Tests
 Construction 1988-1991 First Beam March, 1991

DESIGN/CONSTRUCTION BY:

in house other

COST: Accelerator Facility

FUNDED BY: The Science and Technology Agency (STA)

STATUS

STAFF: Machine

Scientists 4 Engineers 5

Technicians 8 Students

Research (in house/external)

Scientists 40 / 80 Engineers /

Technicians / Students / 20

BUDGET: Machine 170MYEN Funded by STA

Research 200MYEN Funded by STA

TIME DISTRIBUTION:

Basic Research (in house/external) 10 % / 5 %

Applied Program (in house/external) 35 % / 25 %

Maintenance 15 % Development 10 %

MAGNET

POLE PARAMETERS:

Diameter 216 cm R_{extract} 92.3 cm R_{inject} cm

HILL PARAMETERS: Gap (min) 16.6 cm B_{max} 2.10 T

(@ AT) Gap (max) cm B_{min} T

VALLEY PARAMETERS: Gap (min) 40.5 cm B_{max} 1.21 T

(@ AT) Gap (max) cm B_{min} T

AVERAGE FIELD: $\langle B \rangle_{\text{min}}$ 1.66 T $\langle B \rangle_{\text{max}}$ 1.69 T

NUMBER OF SECTORS: compact/separated 4 /

sector angle deg. spiral (max) 53 deg.

FIELD TRIMMING: Trim Coils 12 pairs

Harmonic Coils 8 pairs

Other

CURRENT: Main Coils 900 Amps Stability $\pm 1 \times 10^{-5}$

Trim Coils Amps Stability $\pm 2 \times 10^{-4}$

Stored Energy (cryogenic) MJ

WEIGHT: Iron 220 tons Conductor 9 tons

ION ENERGY: Bending Limit $E/A = 110 \text{ q}^2/A^2 \text{ MeV/u}$

Focusing Limit $E/A = 95 \text{ q/A MeV/u}$

ACCELERATION SYSTEM

FUNDAMENTAL ACCELERATION:

Description:

No. of Gaps/turn 4 $dE/dn(\text{max})$ 0.16 MeV/q

Voltage (max) 0.06 MV Harmonic $f_{\text{rf}}/f_{\text{ion}}$ 1, 2, 3

Freq 10.6-22.0 MHz Power in(max) 0.05 MW

Stability: Phase $\pm 0.5 \text{ deg}$ Voltage $\pm 1 \times 10^{-3}$

OTHER CAVITIES (Flattopping or otherwise):

Description:

Region of Influence: R_{min} cm R_{max} cm

No. of Gaps/turn $dE/dn(\text{max})$ MeV/q

Voltage (max) MV Harmonic $f_{\text{rf}}/f_{\text{ion}}$

Freq MHz Power in(max) MW

Stability: Phase Voltage

VACUUM SYSTEM

OPERATING PRESSURE: $2 \times 10^{-5} \text{ Pa}$

PUMPS: (No. and type) Turbo molecular pump (2000 L/s, 1 set)

Cryogenic pump (4000 L/s for N_2 , 4 set)

ION SOURCE(S)

	Type	Intensity (mA)	@ $\epsilon_n = \beta\gamma\epsilon$ ($\pi \text{ mm mrad}$)	Ion Species
(a)	CUSP	1.3	300	H^+
(b)	CUSP	1.0		D^+
(c)	ECR	0.16	100	$^{40}Ar^{8+}$
(d)	ECR	0.002		$^{129}Xe^{23+}$

INJECTION SYSTEM

Axial injection, Spiral inflector Efficiency 20 %

EXTRACTION SYSTEM

Deflector, Magnetic channel Efficiency 80 %

CHARACTERISTIC BEAMS

Accelerated Ions	E/A (MeV/u)	Current (part μA)	Internal	External
(a) proton	90			10
(b) deuteron	17.5			40
(c) $^{40}He^{8+}$	25			10
(d) $^{40}Ar^{8+}$	4.4			3.0

Secondary Particles	E (MeV)	part/sec
(a) neutron Li (p,n)		
(b) neutron Be (d,n)		
(c)		

EXTRACTED BEAM PROPERTIES:

For 5 μA of 4.4 MeV/u $^{40}Ar^{8+}$ ions

$\Delta E/E$ % $\Delta\phi$ °rf

$\epsilon_n = \beta\gamma\epsilon$ x 14.0 $\pi \text{ mm mrad}$ z 9.9 $\pi \text{ mm mrad}$

FACILITIES FOR RESEARCH

SHIELDED AREA: Fixed 4000 m^2 Moveable 0 m^2

Target Stations 18 No. Served At Same Time 1

MAGNETIC SPECTROMETERS:

OTHER FACILITIES:

On-line isotope separator

Beam chopping system, Beam scanner

Fast neutron production

REFERENCES/NOTES

(a)

(b)

PLAN VIEW OF FACILITY, COMMENTS

