

Entry: **C40**
Machine Name: **Kazakhstan Isochronous Cyclotron**
Address: **480082, Kazakhstan, Almaty, INP**
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HISTORY

Design by: **INP, Almaty**
Construction time: **1970-1971**
First beam: **September, 1971**

CHARACTERISTIC BEAMS

ions / energy (MeV/n) / current (pps) / power (W) :

P	6-30	18,7·10 ¹³	180-900
d	12-25	18,7·10 ¹³	360-750
He-3	19-62	4,7·10 ¹³	285-930
He-4	25-50	6,25·10 ¹³	500-1000

transmission efficiency (total)
- typical: **2** % - best: **3** %
transverse emittance (rms)
- vertical: **16** π mmmrad
- horizontal: **16** π mmmrad
longitudinal emittance (rms) **0,6** ΔE/E deg RF

USES

basic research: **40** % therapy: **0** %
development: **5** % isotope production: **40** %
other applications: **5** % maintenance: **8** %
beam tuning: **2** %
total time: **2000** h/year

TECHNICAL DATA

a) magnet
type: **compact**
Kb: **50** MeV/A Kf: **30** MeV/A
average field (min-max): **1,56** T
number of magnet sectors: **3**
- angle: **60** deg
- spiral (max): **25** deg
pole parameters
- diameter: **1,56** m
- injection radius: **0,02** m
- extraction radius: **0,665** m
hill gap: **0,21** m valley gap: **0,35** m
field trimming
- trim coils
- number: **9**
- current (max): **700** A
- harmonic coils
- number: **6**
- current (max): **5** A
- others
- number:
- current (max): A
main coils:
- number: **1**
- Ampere-turns: **240000** A.T.
- current: **1200** A
stored energy: **0,48** MJ
weight : - iron: **205** t - coils: **8,1** t
power
- main coils (total): **275** kW
- trim coils (total max): **50** kW
- refrigerator (cryogenic): kW

b) RF

- acceleration
- frequency range: **8,5-19,0** MHz
- harmonic modes: **1,3**
- number of dees: **2**
- angular aperture: **180** deg
- voltage: average (min-max): **30-100** kV
- variation with radius:
- power in (max): **300** kW
- stability: - phase: **2** deg - voltage: **1** %

- other cavities
- purpose:
- frequency range: MHz
- region of influence: m
- voltage (max): kV
- power in (max): kW
- stability: - phase: deg - voltage: %

c) Injection

- internal source:
- external (radial/axial):
- elements:
- source voltage: kV
- injection energy: MeV/n
- buncher:
- injection efficiency: %

d) ion sources/injector

Internal, not flavent, hooded

e) extraction

- elements, characteristics:
radially focusing, dc deflector, magnetic channel

- efficiency
- typical: **30** % - best: **60** %

f) vacuum

- pumps: **diffusion pumps**
- achieved vacuum: **5·10⁻⁴** Pa

REFERENCES

A.A. Arzumanov, L.M. Nemenov. Nucl. Instr. Methods. 166 (1973) 201

EXPERIMENTAL FACILITIES

PLAN VIEW OF FACILITY

COMMENTS

The Cyclotron was initially designed "In classical mode" 50-th by Efremov Institute in Leningrad.