



राष्ट्रीय विज्ञान शिक्षा एवं अनुसंधान संस्थान, भुवनेश्वर
(परमाणु उर्जा विभाग, भारत सरकार का एक स्वयं शासित संस्थान)
NATIONAL INSTITUTE OF SCIENCE EDUCATION AND RESEARCH, BHUBANESWAR
(AN AUTONOMOUS INSTITUTE UNDER DEPT. OF ATOMIC ENERGY, GOVT. OF INDIA)

No. NC-000903-30 MeV medical Cyclotron facility at NISER-25-26

Date: 06.04.2026

EXPRESSION OF INTEREST (EOI)

On behalf of the Director, NISER “Expression of Interest” is invited from reputed and interested firms/manufactures/companies globally for Supply and installation of “**30 MeV Cyclotron, with all accessories for research applications and the production of [18F] - radio pharmaceuticals**” at NISER, Jatni, Khurda, Odisha, India. Bidders for the EoI should have experience as per annexure.

This equipment and associated accessories are exempted for procurement through global tender vide DoE, GoI OM No. F.4/1/2023-PPD dated 28.06.2024 (Sl. No. 339).

1. Firms/manufactures/companies, who are interested in participating may visit CPP Portal as well as NISER website (<https://www.niser.ac.in/content/tender>) for details.

2. Schedule-1

Name of the work	Invitation of Expression of Interest (EoI) from reputed and interested firms/manufactures/companies for supply, installation and commissioning of “ 30 MeV Cyclotron, with all accessories for research applications and the production of [18F] radio pharmaceuticals ” at NISER, Jatni, Khurda, Odisha.
Address	FIC (Stores & Purchase), National Institute of Science Education and Research Bhubaneswar, P.O. Jatni, Khurda 752050, Odisha, India
Place of submission of EoI	Online CPP Portal only.
Location	Centre for Medical and Radiation Physics, NISER Campus, Jatni
Reference Number	NC-000903-30 MeV medical Cyclotron facility at NISER-25-26
Last date for submission of EOI	27.04.2026, 11.00A.M
Date & time of opening of EoI	28.04.2026, 11.00A.M
Date and time of making Presentation (only for the qualified parties based on the EoI)	To be announced later to successful parties

Contact Persons for Clarifications from NISER	<p>Technical Prof. Bedangadas Mohanty School of Physical Sciences and Centre for Medical and Radiation Physics, NISER, Jatni Email ID: bedanga@niser.ac.in</p> <p>Dr. Varchaswi K S Kashyap School of Physical Sciences and Centre for Medical and Radiation Physics, NISER, Jatni Email ID: vkashyap@niser.ac.in</p>
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3. (A) Scope of Work:

NISER BHUBANESWAR invites Expression of Interest (EoI) from reputed and interested firms/manufacturers/companies for “Supply, installation and commissioning of **30 MeV Cyclotron, with all accessories for research applications and the production of [18F] radio pharmaceuticals fulfilling all Regulatory requirements (including Operational and Radiation Safety)**”

Bidders should have experience in supply, installation, commissioning, troubleshooting, and providing post-sale support and maintenance of **cyclotrons, beamlines and production of PET/SPECT/theranostic radioisotopes, radiopharmaceuticals and research applications.**

The Cyclotron system offered should meet the above-mentioned requirements. **The maintenance support and spare parts for the proposed model of the cyclotron should not be discontinued for the next 20 years from the date of installation,** and it should be easy to operate in a fail-safe manner with low maintenance cost and consumables cost per run.

The EoI scope shall include supply, installation, site acceptance testing, commissioning, maintenance, and post-sale warranty and troubleshooting, and maintenance-contract support post-warranty. In addition, the firm/manufacturer/company that is bidding should provide proof of sufficient expertise and experience in the installation and maintenance of equivalent machines elsewhere. Certificates of satisfaction of installation and post-sale support from Indian purchasers of similar or lower energy systems would be an added qualification. Apart from supply and installation, the scope shall include Application Training as and when required.

The EoI received shall be evaluated based on predetermined criteria, and only those qualifying for the same shall be considered for the next stage of the bid. After preliminary scrutiny of the bidders' documents, the firms/manufactures/companies shortlisted will be called to present their EoI before the Technical Evaluation Committee for final shortlisting. Based on the discussion, a tender will be floated amongst the shortlisted bidders only. In general, the entire work shall consist of the following three stages:

Stage-I (EOI by Vendors): - EOI from vendors/bidders/agencies meeting minimum eligibility criteria. A Technical Evaluation Committee appointed by the Competent Authority of NISER, Bhubaneswar, shall shortlist the agencies based on minimum eligibility criteria and terms and conditions specified in the EOI. The interested agencies may visit the actual site to get the

necessary details.

Stage-2 Evaluation, shortlisting of vendors & issue of tender documents (2-part bidding system): - Shortlisted firms/manufactures/companies shall be called for making a presentation at NISER, Bhubaneswar, on the date and time intimated by NISER. Tender documents complete in all respects shall be issued to only shortlisted agencies after payment of requisite fees for submitting technical and financial bids. Short-listed firms/manufactures/companies will be called for technical clarifications, if any, one week after the issue of tender documents.

Stage-3 (Evaluation of tenders): - Bids are to be submitted along with Earnest Money Deposit (EMD) and all the required documents and proofs, as per the requirements indicated in the tender documents – Technical-Bids will be opened first, and the financial-bids of only technically qualified bidders will be opened at a later date.

Before submitting documents, the interested firms/manufactures/companies may visit the site and suggest any additional requirements at the site to fit the equipment(s) they have bid for.

The firms/manufacturers/companies should offer a one-point solution to all the requirements. NISER reserves the right to accept or reject the tender without assigning any reason.

A Technical Evaluation Committee will comprehensively evaluate firms/ manufactures/ companies based on their credentials, quality assurance systems, financial background, dealer/distributor network, past performance, after-sale service, and published references to the use of their equipment, preferably in reputed peer-reviewed technical/scientific journals.

Along with "Expression of Interest", please furnish the following information with self-attested proof/ Registration copies

1. Registered address with phone, Fax, Email, Web, etc.
2. Local address of representatives for foreign vendors with phone, Fax, Email, Web, etc. (If available)
3. Years of Existence in this field
4. Company / Organization status Individual / Proprietary / Partnership / Ltd (or) Private Ltd Etc. With Name and Address of Proprietor, Partners, Board of Directors, etc.
5. Associates: (a) Indian (b) Foreign
6. List of major customers with full address and their Contact Persons for the last ten years.
7. Details of other contracts, if any, are now in hand
8. Establishment / GST Registration Number / PAN Number or equivalent document from the country of origin
9. Nature of Business
10. Detailed catalog / Brochure of Products as hard and soft copies shall be submitted along with the EoI document.

Note: Any wrong or misleading information will lead to disqualification.

Part solutions received from the bidders will not be entertained. NISER reserves the right to cancel the EoI without assigning any reason.

General Instructions

1. Firms/manufactures/companies are advised to study this EoI document along with its annexures carefully before submitting their proposals in response to the EoI Notice. Submission of a proposal in response to this notice shall be deemed to have been done after careful study and examination of this document to understand its terms, conditions, and implications fully.
2. Bids received via email, fax, and Late Bids will not be considered. Bids should be submitted only through the online CPP portal.
3. The response to this EoI should be complete in all respects. Failure to furnish all or correct/adequate information required by the EoI documents or submission of a proposal not substantially responsive to the EoI document in every respect will be at the Bidder's risk and may result in rejection of its Proposal.
4. The Technical Evaluation Committee may visit sites where the equipment(s) have been installed if deemed necessary.

PRE-QUALIFICATION CRITERIA

1. The firm/manufacturer/company that has submitted a bid has to be either a reputed Original Equipment Manufacturer (OEM) or its authorized direct distributor/dealer of the proposed equipment. Necessary documentation to this effect must be a part of the Proposal.
2. The Bidder should be able to deliver the total solution, complete in all respects, and the Proposal must reflect the competence and capability of the Bidder in meeting this requirement.
3. In the last ten years, the Bidder should have supplied and installed similar equipment in India or internationally. Documentary evidence to this effect must be enclosed with the offer giving precise details of the installation and contact details of the purchaser.
4. In case a firm/manufacturer/company that has submitted a bid is not doing business within India, it shall furnish the certificate to the effect that the Bidder is or will be represented by an agent in India, equipped and able to carry out the supply, installation, maintenance, repair obligations, etc. during the warranty and post-warranty period.

For clarifications: bedanga@niser.ac.in vkashyap@niser.ac.in

(B) Evaluation by Technical Evaluation Committee based on presentation and details

1. Past experience – Weightage (45%)

Sub-criteria	Percentage obtained after evaluation by committee
1. Number of years as a vendor of cyclotron systems	
2. Number of 15-30 MeV cyclotron systems installed in the last 10 years globally	
3. Experience in installation and commissioning of cyclotron beamlines for radioisotope production and research	
4. Experience in installation and commissioning of hotcells, synthesizers for production of various radiochemicals and	

radiopharmaceuticals	
5. Number of installations having AMC and CMC services from the vendor	

2. General profile of qualification – Weightage (40%)

Sub-criteria	Percentage obtained after evaluation by committee
1. Compliance with specifications and user requirements as per annexure	
2. Range of cyclotron, beamlines, targets, delivery system to hotcells available and their seamless integration	
3. Integration capability of cyclotron control system with the medical cyclotron facility management and safety system	
4. Different isotope production options available with the vendor cyclotron systems	

3. Overall Financial strength – Weightage (15%)

Sub-criteria	Percentage obtained after evaluation by committee
1. IT returns/compliance since last three years	
2. Annual turnover/profitability etc. since last three years	

Bidder must secure at least **65 (sixty-five) percent in aggregate.**

The interested parties may visit the site at their own cost to understand the project. The application form along with the accompanying documents should be submitted in CPP portal.

INSTRUCTIONS TO FIRMS/MANUFACTURES/COMPANIES - TERMS & CONDITIONS:

Interested firms/manufactures/companies should note the following:

1. This EoI invitation document is not a Tender or Request for Proposal in any form and would not be binding on NISER in any manner whatsoever.
2. The firms/manufacturers/companies will have to make a presentation before a duly constituted Technical Evaluation Committee. Based on the presentation, the Technical Evaluation Committee will decide on issuing tender documents to successful presenters.
3. NISER reserves the right to cancel the EoI invitation as a whole or in part without assigning any reason whatsoever.
4. The firms/manufacturers/companies are encouraged to conduct their own independent survey, assessment, analysis on any working day with prior approval from the competent authority of NISER and check the reliability, accuracy, feasibility and completeness before submission of their interest/ proposal.

5. NISER reserves the right to update, amend and supplement the information given in this document at its sole discretion before the last date and time of submission of the interest/proposal.
6. The firms/manufacturers/companies should submit the EoI with supporting documents about their experience, qualification, annual turnover etc.
7. Director, NISER, reserves the right to call a limited or all parties to make a presentation, based on their experience and technical submission made in the EoI. Mere fulfilment of EoI criteria does not entail the parties to be called for making a presentation.
8. In support of the credentials submitted by the parties, NISER reserves the right to solicit information from the organizations, issuing such credential certificates.
9. In case of any dispute arising due to the EoI, the High Court of Odisha, alone has the Jurisdiction to resolve the dispute.

SD/-

SD/-

INDENTING OFFICER

FIC (STORES & PURCHASE)

General Information			
Sl. No.	Basic Information	Please fill details	Page No. with name of the documents attached in support of information required
1.	Name of the Company		
2.	Full address of company along with Telephone no./Mobile No. Fax no. E-mail address:		
3.	Local address of company for communication, if any		
4.	Are you a manufacturer or dealer/reseller		
5.	If dealer please attach certificate from your principal company clearly showing validity of the certificate		
6.	If foreign supplier: Please give details of your Indian authorized partner if any		
7.	Annual turnover in last 3 financial years in Rs. Crores or foreign currency. Please attach balance sheet		
8.	GST Registration no. or equivalent no./document in the country of origin		
9.	Income Tax Registration no. or equivalent no./document in the country of origin		
10.	Complete Bank details		
11.	Service center details & principal vendor support centre		
12.	Delivery period: Please mention time of delivery, installation and commissioning		
13.	Mode of Delivery Ex-works/CIP/CIF for foreign currency only		
14.	Duration of comprehensive warranty offered (years)		
15.	AMC terms post warranty		

ANNEXURE

Comprehensive specifications for 15-30 MeV cyclotron with three beamlines

1. General Cyclotron Specifications:

- Cyclotron type: Fixed-field, isochronous, negative-ion or equivalent high-efficiency extraction design.
- Particle type: Protons (mandatory). Optional: Deuterons (8–15 MeV)
- Energy range: 15–30 MeV, continuously variable or selectable in defined steps.
- Beam current: $\geq 400 \mu\text{A}$ extracted proton beam across full energy range, with design margin for upgrade to $\geq 500\text{--}1000 \mu\text{A}$ (optional).
- Beam stability: Energy stability $\pm 0.3 \text{ MeV}$. Current stability $\pm 2\%$.
- Extraction efficiency: $\geq 90\%$ (stripping extraction preferred).

2. Beam-Line Configuration (Three Beam-Lines Total)

Beam-Line 1 — High-Power Production Line

- Rated for $\geq 400 \mu\text{A}$ continuous proton beam.
- Dedicated to liquid or solid target station #1.
- Independent beam steering and focusing.
- Energy degrader for isotope specific tuning.
- Full beam diagnostics: Faraday cup, profile monitor, current transformer, collimators.
- Fast beam shutter and safety interlocks.

Beam-Line 2 — High-Power Production Line

- Rated for $\geq 400 \mu\text{A}$ continuous proton beam.
- Dedicated to liquid or solid target station #2.
- Independent beam steering and focusing.
- Energy degrader for isotope-specific tuning.
- Full beam diagnostics: Faraday cup, profile monitor, current transformer, collimators.
- Fast beam shutter and safety interlocks.

Beam-Line 3 — Low-Power Research Line

- Rated for 1–50 μA (configurable).
- For research, detector testing, activation studies, and low-dose R&D.
- Adjustable beam spot and profile.
- Optional: experimental end-station with sample holder, vacuum chamber, or irradiation box.

3. Control System

PLC/SCADA-based control with:

- Recipe-driven operation for each isotope.
- Real-time monitoring of beam parameters.
- Automatic logging for GMP compliance.
- Remote operation from control room.
- Multi-level User access control.
- Full alarm and interlock logic documentation.
- Storage of cyclotron run data for 30 days
- The cyclotron control system should have provision to monitor the hot-cell to

ensure that radioactivity is not transferred to hot-cell unless hot-cell door is closed and its ventilation system is working.

4. Beam Transport & Diagnostics

- Quadrupole magnets for focusing.
- Steering magnets for precise alignment.
- Beam profile monitors (wire scanner or harp).
- Faraday cups for absolute current measurement.
- Collimators and adjustable beam spot shaping.
- Fast beam shutter with <10 ms response time.
- Scanning magnet if necessary for solid target irradiation

5. Target Stations (Two Independent Stations) for each of above high-power beamlines. General Requirements

Two fully independent target stations, each capable of:

- Liquid targets (e.g., for producing fluorine-18, copper-64, gallium-68).
- Solid targets (e.g., for producing copper-64, zirconium-89, germanium-68).
- Independent control of beam current and energy.
- Quick-change target assemblies with remote handling.
- Redundant cooling (water + helium).
- Temperature, pressure, and flow monitoring with interlocks.

Liquid Target Capability

- High-pressure, high-current liquid targets rated for 100 μ A or higher.
- Suitable for:
 - ^{18}F via $^{18}\text{O}(p, n)^{18}\text{F}$ reaction.
 - ^{68}Ga via $^{68}\text{Zn}(p, n)^{68}\text{Ga}$ using ^{68}Zn -salt solution in liquid targets
 - ^{64}Cu via $^{64}\text{Ni}(p, n)^{64}\text{Cu}$ using ^{64}Ni -salt solution in liquid target
- Transfer of the irradiated liquid target to hot-cells through appropriate fail-safe delivery mechanism, to the designated hot-cell.

Solid Target Capability

- High-power solid target stations with:
 - Water and/or helium cooling.
 - High-Z backing plates.
 - Remote dissolution or transfer to hot-cells through appropriate fail-safe delivery mechanism, to the designated hot-cell.
- Suitable for:
 - ^{64}Cu via $^{64}\text{Ni}(p, n)^{64}\text{Cu}$.
 - ^{89}Zr via $^{89}\text{Y}(p, n)^{89}\text{Zr}$.
 - ^{68}Ge via $^{69}\text{Ga}(p, 2n)^{68}\text{Ge}$.
 - ^{124}I via $^{124}\text{Te}(p, n)^{124}\text{I}$.

6. Isotope Production Capability

The cyclotron must support routine production of the above-mentioned radioisotopes, viz., fluorine-18, germanium-68, copper-64, zirconium-89, gallium-68, scandium-44 and iodine-124 etc.

The system must allow future expansion for additional PET/SPECT isotopes.

7. Radiosynthesis module for the automated nucleophilic synthesis of [18F] FDG from the cyclotron produced fluorine-18.
 - The synthesis module should use disposable cassettes that are designed to handle up to 20 Ci (740 GBq) with $\geq 60\%$ yield (un-decay corrected) of [18F] FDG
 - The synthesis protocol used should be cGMP compliant and produce pharmaceutical-grade [18F] FDG, suitable for PET-studies in patients.
 - [18F] FDG synthesis time (including purification) should be completed in 30 – 40 minutes
 - The automated synthesis software and control systems should manage the radiosynthesis process, monitor the production, and provide batch records and documentation
 - The synthesis module should have a comprehensive one-year warranty followed by AMC
 - The consumables and reagents for the synthesis of the required [18F]-radiopharmaceuticals should have a reasonable shelf-life and be available from the vendor or the vendor's agents.

8. Hot-cells for housing two of the above-mentioned radiosynthesis modules:
 - The hot-cells should have 100 mm lead or equivalent tungsten shielding on all sides and be of suitable inner dimensions for the synthesizer,
 - Air inlet: DN40 with HEPA filter, (Class A (ISO 5) during synthesis), including manual ball valve
 - Air outlet: DN40, including Charcoal and HEPA filter and manual ball valve and vent to connect to waste-gas compression system
 - Inside hot-cell chamber should have net negative pressure with reference to the room
 - Hot-cell should have built-in radiation monitors that are interlocked with the doors to prevent accidental opening when radiation level is high inside, except with override control.
 - Doors should have air-tight pneumatic seals to ensure that there is no chance of radioactivity leakage from inside and ingress of air from outside.
 - Internal stainless-steel box of chamber using SS316L
 - Door should have lead-glass window 250 mm x 250 mm x 100 mm lead equivalent (with 10 degrees incline for better view inside)
 - Provisions for basic gas connections (He, N and compressed air)
 - Waste Bottle Shielding 50 mm lead
 - Low voltage PLC control panel for all controls
 - Power connection in accordance with Indian requirements
 - Digital gauge for measuring the internal pressure
 - LED internal light fixtures
 - Exterior smooth SS 304 Mirror finish
 - Steel structure built to support all components
 - The hot-cell should have a comprehensive one-year warranty followed by AMC

9. Semi-automatic Dispenser for aseptic dispensing of sterile radiopharmaceuticals
 - Accurate, (within +/- 5% of desired volume) dispensing of [18F] FDG and other radiopharmaceuticals through sterilizing 0.22 micron filter into pre-sterilized open vials followed by capping and crimping.
 - There should be provision to manually place the vials in the dispensing area

using the ball-tong unit provided in the hot-cell

- After dispensing, capping and crimping, the radioactivity in the vial should be measured and the vial dropped into a lead/tungsten container that can be accessed below the dispensing hot-cell
- The dispensing should be software controlled with a print out of label that can be placed on the shielded radioactivity container in which the vials will be shipped in to PET-imaging centres
- Inline filter integrity test (bubble-point test) to ensure that the entire dispensing operations are aseptically done and sterility of the product is not compromised
- The required accessories and tubing to connect the dispenser to the [18F]-RPs synthesis modules should be provided.
- The dispenser should have a comprehensive one-year warranty followed by AMC
- The sterile vials, consumables etc., for the aseptic dispensing of the [18F]-radiopharmaceuticals should have a reasonable shelf-life and be available from the vendor or the vendor's agents

10. Hot-cell for above-described semi-automatic Dispenser for [18F] FDG solution

- Hot cell should have 100 mm lead or equivalent tungsten shielding on all 6-sides
- Internal stainless-steel box of chamber using SS316L
- Chamber dimensions to fit the semi-automatic dispenser
- Acrylic door with special seals to maintain airtight integrity
- Lead Glass window 250 mm x 250 mm x 100 mm lead equivalent (with 10 degrees incline for better view inside)
- Air inlet: DN40 with HEPA filter, to maintain Class A (ISO 5) including manual ball valve
- The dispensing area in the hot-cell should be in sterile laminar flow
- Air outlet: DN40, including Charcoal filter and manual ball valve
- Digital gauge for measuring the internal pressure
- LED internal light fixtures
- Provisions for basic gas connections (He, N and compressed air)
- Low voltage PLC control panel for all controls
- Power connection in accordance with Indian requirements
- Exterior smooth finish easy to decontaminate
- Front door interlock with radiation detector
- Dose calibrator shielding for 2 Units CRC-77tHR and CRC-55t PET
- Laptop Stand
- Product transfer tubing from [18F]-radiosynthesis hot cell i.e. with Inlet & Outlet
- Two ball-tong unit for handling presterilized vials, caps, crimps etc., inside the hot-cell
- The hot-cell should have a comprehensive one-year warranty followed by AMC

11. Radioactive Waste Gas System for collecting the ambient air from the [18F]-RPs synthesis hot-cell and compressing and storing it in steel tanks for discharge into the stack after decay.

Technical Specification:

- User friendly, easy maintenance and oil free compressor by diaphragm vacuum pump & compressor system
- PLC controlled, easy to operate Waste gas system ON-Off from hot cell area
- Storage tanks capacity 2 x 500 litre tanks + 100-litre buffer tank
- HMI with screen display for operation of all the Tanks
- Safety features on tanks to guard maximum system pressure of 20 bar
- Automatic switch to next tank when first tank is full
- Tank selection can be Automatic or manual mode.
- Remote diagnostic features available with software (optional)
- Normally, the radioactive compressed air gets released after 10 half life or 24 hours depending on setting by operator. This release will be done by an authorized person from the Medical Cyclotron Facility to cyclotron stack exhaust.
- Common Electrical Power supply and control Panel and interconnecting ducting and cabling to be supplied with the unit
- The waste gas compression system should have a comprehensive one-year warranty followed by AMC

12. Quality Control Equipment for [18F] FDG and other [18F]-radiopharmaceuticals

- Gas Chromatography system with Flame Ionization Detector (FID) for identifying ppm levels of residual solvents in the [18F]-radiopharmaceuticals
- Gamma Spectrometer for identifying the radionuclides in the product by their gamma emissions
- Radioactivity scanner to identify radioactivity distribution in thin layer chromatography (TLC) strips
- Endotoxin testing – cartridge based rapid test system
- Dose calibrator for 511 keV gamma
- Shielded L-bench with lead-glass window for aliquoting radioactivity for the QC Steps in the QC room
- Digital weighing balance with 0.1 mg sensitivity and can weigh up to 100 g
- Digital pH meter with micro-bulb electrode for measuring pH of radioactive product
- Small laminar-flow cabinet for sterility testing of [18F]-radiopharmaceutical products
- Two microbiological-Incubators - small for incubating culture-media at 37 deg C and 25 deg C.

13. Safety Systems

- Radiation safety:
 - Area radiation monitors.
 - Access control with interlocks.
- Beam shutdown on:
 - Loss of vacuum
 - Cooling failure
 - Power failure
 - Shielding door open
 - High radiation alarm
- Mechanical safety:
 - Emergency scram buttons at vault and control room.

- Fail-safe design for all critical systems.

14. Infrastructure Requirements

- From Vendor – Shielding calculations for vault designed to meet the local regulatory dose limits. From Buyer - Cyclotron vault shielding.
- Cooling system:
 - From vendor – for Primary-Cooling of cyclotron - high-capacity chilled water system of required temperature for cooling of cyclotron, RF, and targets. The unit supplied should be suitable for the climatic conditions at NISER.
 - From Buyer – for Secondary-Cooling – chilled water with sufficient flowrate and temperature for cooling the Primary-Cooling system.
- From Buyer - Power requirements:
 - Stable 3-phase supply of the required rating with UPS backup for controls.
- From Buyer – Ventilation - as per the equipment’s requirements specified by the vendor:
 - HVAC with negative pressure in vault.
 - Exhaust handling for airborne radioactivity (if applicable).

15. Documentation & cGMP Compliance (as per Drugs & Cosmetic Rules, Government of India)

Vendor must supply:

- The delivery of the cyclotron and all its accessories to site will be responsibility of the vendor.
- The vendor or the vendor’s authorized agent should visit the site and ensure that the site is ready in all aspects, as mentioned in Sl. No. 14 above.
- Vendor should advise on the appropriate rigging system to move the cyclotron into the bunker, and auxiliary equipment to their specified locations.
- DQ / IQ / OQ / PQ documentation.
- FAT / SAT protocols and reports.
- Shielding calculations and dose maps.
- Operating manuals and maintenance manuals.
- Targetry manuals and dissolution procedures, wherever applicable.
- SCADA/PLC validation documentation.
- Training for operators and maintenance staff.

16. Reliability, Service & Support

- Minimum one year warranty + one-year extended warranty (Optional).
- Post warranty the vendor should provide AMC with full support for at least 15 years.
- $\geq 95\%$ uptime target for routine production.
- Remote diagnostics capability.
- Preventive maintenance schedule.
- The vendor should provide an undertaking that the spare parts will be available for ≥ 15 years.
- The vendor must state the working life of the cyclotron and its accessories.
- Local or regional service support.
- For the period of warranty, the vendor should appoint a qualified cyclotron-

engineer to support NISER staff and troubleshoot operational problems that may occur so that routine production and research work is not affected. The onsite support must be provided within 24 hrs if some malfunction occurs.

17. The vendor must quote the following accessories/spares/consumables separately. NISER may chose some, all or none of them:

- High-quality delivery lines for seamless/trouble-free transfer of radioactivity from liquid target port to specified hot cell.
- Solid target dissolution system and high-quality delivery line for seamless/trouble-free transfer of radioactivity from target port to specified hot cell.
- Solid target transfer system line for seamless/trouble-free transfer from solid target port to specified hot cell

18. Optional Enhancements

- Additional research beam-line end-station.
- Deuteron capability.
- Automated target changer.
- High-power third production beam-line upgrade.
- Integrated gas target system for Xe-based radioiodine production.

Note: Any items which are essential for the system (but not in the above list of specifications) should be mentioned and quoted separately.