INTER-UNIVERSITY ACCELERATOR CENTRE

(An Autonomous Centre of UGC)

Aruna Asaf Ali Marg, New Delhi-110 067

NOTICE INVITING e-TENDER

TENDER NO: IUAC/NIT/58/SK/2019-20 *Dated: 14/02/2020*

Instructions for Online Bid Submission:

Inter-University Accelerator Centre (IUAC), invites online bids through e-Procurement Portal under two bid system, viz., Technical and Financial bids, from eligible and experienced vendors for the "FABRICATION, COPPER (Cu) PLATING, ASSEMBLING, TESTING & SUPPLY OF TWO (2) NOs. OF HIGH ENERGY BEAM TRANSPORT (HEBT) SPIRAL BUNCHERS AS PER DRAWINGS & SPECIFICATIONS".

Tender Documents may be downloaded from Central Public Procurement Portal **http://eprocure.gov.in/eprocure/app** and **www.iuac.res.in.**

Aspiring bidders who have not enrolled/registered in e-Procurement Portal should enrol/ register before participating through the website **http://eprocure.gov.in/eprocure/app.**

Only bids received through e-procurement portal will be considered for the opening. Bids not covering the full scope of work/supply of the products/goods will be rejected and only complete bids will be considered.

Bids shall be submitted online only at CPPP website: **http://eprocure.gov.in/eprocure/app.** Tenderers/Contractors/Bidders are advised to follow the instructions provided in the e-procurement portal. Bid documents may be scanned with 100 dpi with a black and white option which helps in reducing the size of the scanned document.

IUAC reserves the right to accept/reject any/all tenders in part/full without assigning any reasons thereof.

The bidder has to select the payment option as **"offline"** to pay the **Tender Fee** and **Earnest Money Deposit (EMD)** as applicable. The Tender Fee and EMD shall be in the form of **Demand Draft** issued in favour of "**Inter-University Accelerator Centre, New Delhi**" and it should be deposited at IUAC before the bid opening. Bidders registered

with MSME/NSIC are exempted from payments of EMD & tender fee. Copy of valid registration certificate should be uploaded in the portal.

Bidders are requested to note that they should necessarily submit their financial bids of all items in the format provided and no other format is acceptable. the price bid has been given as a standard BOQ format with the tender document, the same is to be downloaded and to be filled and submit it online without modifying the format. If the BOQ file is found to be modified by the bidder, the bid will be rejected.

For any clarification/amendment/corrigenda etc. to NIT before the last date of submission of tender will only be available on website https://eprocure.gov.in and Bidders are requested to keep visiting this website for all updates and in case of any correspondence for clarifications needed, they may contact Administrative Officer (S&P) e-mail: joseph@iuac.res.in

E-TENDER DOCUMENT

Name of Work/Supply	FABRICATION, Cu PLATING, ASSEMBLING, TESTING & SUPPLY OF TWO Nos. OF HEBT SPIRAL BUNCHER AS PER DRAWINGS & SPECIFICATIONS
Tender No.	IUAC/NIT/58/SK/2019-20
Tender Value/Estimate only	Rs. 1,00,00,000/- (One Crore)
Earnest Money Deposit	Rs. 2,00,000 only (Two Lacs)
Tender fee	Rs. 500 only (Five hunered)
Bid Submission End Date and time	12/03/2020 at 3.00 P.M.
Technical Bid Opening Date (PART-A)	13/03/2020 at 3.30 P.M.
Price Bid Opening Date(PART-B)	To be intimated later.
Contact Persons	M. B. Joseph, Administrative Officer (S&P) e-mail: joseph@iuac.res.in Phone: 011-24126018 & 24126022
Place of opening the tender	Council Room/Committee room, IUAC

GENERAL CONDITIONS OF TENDER:

1. **Submission of Tender**: Tenders should be uploaded on CPP Portal in two parts, i.e., Technical Bid (Part - A) and Price Bid / BOQ (Part - B).

2. **Technical Bid (Part-A):**

In this bid, the bidder should upload the following documents :

a) Tender Acceptance Letter (format attached with NIT) on bidder's Letter Head duly signed & stamped as a token of acceptance of the NIT conditions, terms and conditions.

b) Documents showing the company profile, organizational setup and credentials.

c) List of fabrication facilities, inspection facilities, vacuum leak testing & ultimate vacuum achieving facilities available with the vendor. A team of IUAC personnel may visit the bidder's sites for technical confirmation.

d) Copies of work orders and Client's satisfactory certificates of similar type of works successfully completed, in the last five years, with reputed organizations, Govt. dept., Public sector & Autonomous bodies for minimum qualification. Either one work of value more than Rs 40,00,000 (Forty lacs) or two works of value more than Rs 25,00,000/- (Twenty Five lacs) each or three works of value more than Rs. 20,00,000/- (Twenty lacs) each. Further, the bidder should have a minimum annual turnover of at least Rs. three Crores for each of the last three financial years ending March 31, 2019.

No deviation in respect of NIT is accepted.

3. **Price Bid/BOQ (Part-B) :**

a) In this bid, the bidder is required to quote his unconditional rates in the standard .XLS BOQ format provided and no other format is acceptable. The rates/price should be all inclusive like packing, forwarding, etc. up to IUAC basis, except Goods & Services Tax (GST).

b) IUAC is exempted from the GST, and necessary exemption certificate will be provided by IUAC.

c) **Earnest Money Deposit**: An earnest money of Rs.2,00,000/- (Two Lacs) has to be deposited at IUAC before the tender opening date and time. The EMD shall be only in the form of Bank Draft in favour of **Inter-University Accelerator Centre**, payable at **New Delhi**. No Cheque/Cash shall be accepted as EMD. The refund of EMD to all other bidders except the lowest bidder shall be made within 15 days from the date of opening of price bid. The refund of EMD of the successful bidder shall be made after completion of delivery and acceptance of items by IUAC.

4. **Exemption from EMD:** Units registered with NSIC are exempted from payment of EMD, subjected to:

    a) The units being registered with MSME or NSIC for the items tendered.

    b) Self-attested copy of valid MSME or NSIC registration certificate is enclosed.

    c) Photocopy of application for registration at MSME or NSIC or for renewal of NSIC will not be acceptable. Such offers will be treated as offers received without EMD.

5. **Delivery Period:** The time shall be the essence of this work. Entire work is to be completed in two phases.

    a) Phase-I: The vendor is required to complete the fabrication of all components, inclusive of copper plating, except Copper Spiral & Copper Stem, within a period of 150 calendar days (One hundred fifty days) from the date of issue of the Purchase order. On receiving the satisfactory inspection reports and pictures of fabricated components, IUAC personnel will inspect all the components at the vendor's site at different fabrication stages i.e once before copper plating and once after copper plating. Vacuum leak testing of vacuum chambers to be performed before and after copper plating. The vendor will be required to assemble the Spiral (AL) & Stem (AL) in the Chamber in front of IUAC personnel. IUAC personnel will check the frequency etc. at vendor's site.

    b) Phase-II: Final fabrication drawings of Spiral (Cu) & Stem (Cu) will be given to the vendor after the completion of Phase-I. After receiving the drawings, the vendor will be required to complete the remaining work within a further period of 30 calendar days (thirty days). IUAC personnel may again visit the vendor's site for a final inspection. Vendor shall deliver all the components to IUAC, New Delhi within 15 calendar days (fifteen days) of final inspection.

    Any delay in completing the work for reasons attributable to the Supplier is liable for liquidated damages as per clause-8 of NIT. Under the force-majeure conditions or delay due to reasons beyond the control of the Supplier, IUAC may grant a suitable time extension for which the Supplier has to request along with the justification/ reasons well in advance to the Director, IUAC for approval without any prejudice to price escalation. No time extension request

shall be considered after the expiry of the completion period/contract. The decision of the Director, IUAC, will be final and binding on the bidder/Supplier.

6. **Pre-dispatch Inspection**: All the items will be subjected to pre-dispatch inspection and shall be rejected if any defects found before dispatch.
7. **Warranty Period**: The items supplied must be covered under minimum one-year Warranty/Guarantee, commencing from the date of the satisfactory acceptance of the equipment at IUAC, against the defect of any manufacturing, workmanship and poor quality of the component. The vendor will be required to replace/repair the defected components free of cost.
8. **Liquidate damages:** In case of supply is delayed beyond the specified completion period for reason attributable to the bidder, deduction on account of liquidated damages @ 1% of the order value per week will be deducted subject to a maximum of 10% of the total work.
9. **Scope of Work**: Supply of items as per technical specifications given in Annexure-A.
10. **Material Certificate**: Test certificate for the material used has to be submitted before the start of fabrication and during on-site delivery of the components. In addition, the test shall be conducted by IUAC on samples from completed components.
11. **The validity of Tender:** Tender shall be valid for our acceptance without any change in rates and NIT conditions for a period of **90 (ninety)** days from the date of opening of Price bid. No escalation of the cost will be acceptable in any condition after the opening of Price bid.
12. **Escalation:** No escalation or deviation shall be allowed until the execution of order/contract.
13. **Deviations**: No deviation from the stipulated commercial terms and conditions will be allowed. Tenders should be unconditional.
14. **Correspondence:** All the correspondence in respect of tender/contractual obligation shall be made to A.O.(S&P), Inter-University Accelerator Centre, Aruna Asaf Ali Marg, New Delhi-110067, India
15. **Terms of Payment**: 70% of the payment shall be made after the delivery of all the goods at IUAC. 20% of the total payment shall be made after successful technical inspection and acceptance of all the components at IUAC. The payment process will be initiated on submission of the bills by the bidder and

after due certification by the concerned IUAC personnel. Balance 10% shall be paid either after one year of the warranty period or on submission of bank guarantee of equal amount for one year.

16. **Tender Rejection:** The bids will be rejected if
    a) Bids not covering the full scope of work/supply of the products/goods will be rejected and only complete bids will be considered.
    b) BOQ / Price Bid file is found to be modified by the bidder, the bid will be rejected.
    c) Bids not complying with any of the provisions stated in this tender document.
    d) The Terms and conditions are not accepted and by the bidders.
17. **IUAC reserves the right** to reject any or all the tenders in full or in part without assigning any reasons whatsoever, and the decision of the IUAC in this regard will be binding on all the bidders. Tenders not complying with any of the provisions stated in this tender document are liable to be rejected. **Director, IUAC reserves the right to accept or reject any tender without assigning any reason and does not bind himself to accept the lowest tender.**
18. **Any dispute arising out of this contract will be subjected to the jurisdiction of New Delhi/Delhi.**

ANNEXURE-A

Scope of Work: FABRICATION, Cu PLATING, ASSEMBLING, TESTING & SUPPLY OF TWO Nos. OF HEBT SPIRAL BUNCHERS AS PER DRAWINGS & SPECIFICATIONS AND TERMS & CONDITIONS :

1 **EXCEPT FOR FOUR NOS. OF END PLATES (DRAWING NO.–IUAC/485BUN/03), IUAC WILL NOT SUPPLY ANY OTHER MATERIAL**. The raw material for these four nos of end plates is OFHC copper of size = 1000mm x 1000mm x 30mm. Any rejection will be borne by the vendor.

2 The vendor will be required to submit the material test certificates of all the materials used, from the manufacturer or recognized Laboratory before the start of fabrication.

For work phases, please see Point # 4 at page no.4 (Delivery Period)

3 Following Drawings are attached with the NIT for initial reference :

	Drawing No.	Description
a.	IUAC/HEBT/BUN/01	Assembly Drawing
b.	IUAC/ HEBT/BUN /02	Vacuum Chamber
c.	IUAC/ HEBT/BUN /03	End Plate
d.	IUAC/ HEBT/BUN /04	Spiral (Cu)
e.	IUAC/ HEBT/BUN /05	Spiral (AL)
f.	IUAC/ HEBT/BUN /06	Spiral Post (Cu)
g.	IUAC/ HEBT/BUN /07	Spiral Post (AL)
h.	IUAC/ HEBT/BUN /08	Drift Tube
i.	IUAC/ HEBT/BUN /09	Side Drift Tube
j.	IUAC/HEBT/BUN /10	Cooling Plate

4 Quantity of each item and other specifications are given in the drawings.

5 Complete set of detailed drawings, except standard components, will be supplied along with the Purchase order.

6 The chamber material is forged low carbon steel AISI -1020 or SA-105 of equivalent grade material.

7 **Electroplating of the Chamber:** Copper plating of the external and internal surface of the tank as per the specification :

a. Electroplating is a crucial part of the successful fabrication of the Buncher project. The success of this project heavily depends on the quality of copper plating. Suppliers are advised to be careful regarding the plating infrastructure and procedures. Prior experience in plating resonator components will be very useful for the successful completion of the project.

b. The entire tank has to be de-greased, free of dirt and machining lubricant before electro-plating.

c. After electro-plating, the tank shall be finally buffed/ mirror polished and cleaned with acetone and rinsed with methanol or ethylene alcohol. Always pack the plated components with plastic sheets to avoid dust, moisture and dirt.

d. Ultrasonic cleaning with Alcohol (LR) should be done after the polishing prior to final assembly of the tank and spiral.

e. The thickness of copper deposition on inner surfaces of the chamber should be 100 microns (tolerance of ±10 microns) and it should be uniform all over inside. The thickness of copper deposition on outer surfaces of the chamber should be a minimum of 50 microns. Thickness uniformity is not crucial for the outside surface of the chamber, where RF is not flowing.

f. The surface roughness inside the chamber and port bores should be better than Ra value of 1.0 microns

g. The plating should not peel-off while polishing, or buffing or otherwise.

h. Also, the plating should withstand with RF powering up to 10 kW or heating up to 80º C of uniform heating.

i. The supplier should have all the instruments to inspect the copper plating thickness and surface roughness.

8 The vendor will be required to supply the entire copper blank off flanges, good quality S.S.304 nuts, socket head cap screws, I-bolts & washers and one complete set of Viton O-rings of the required quantity and sizes.

9 Aluminium Spiral & Stem are required for frequency testing only. Copper Spiral & Copper Stem will be fabricated after testing of frequency etc. with the Aluminium Spiral & Stem inside the Chamber. Final drawings of Copper Spiral & Copper Stem will be given to the vendor after frequency testing at the vendor's site.

10 The inside surfaces of the chamber should have a mirror finish i.e. surface roughness of N4-N5 grade or of Ra-0.2-0.4µm before the copper plating.

11 No dent or scratch will be tolerated on the inside surface of the chamber, O ring grooves and the surfaces which seal the rubber O'rings.

12 Overall length, internal diameter and circularity of the chamber has to be maintained within and accuracy of $\pm$ 1.0 mm.

13 Vacuum Testing:- The vacuum chambers will be subjected to vacuum leak testing with helium in front of IUAC personnel once at the vendor's site and once at IUAC site after delivery. The leak rate should be better than $1x10^{-9}$ mbar lt/sec. Ultimate vacuum of the chambers should be better than $1x10^{-8}$ mbar.

14 Spiral base (Cu) has to be brazed with spiral blank off (Cu). Vacuum brazing is preferred. The vendor should keep sufficient machining allowance to nullify the distortions with machining after brazing.

15 High-pressure testing, as well as the helium leak vacuum testing, is required for the Spiral (Cu) water circuits after brazing.

16 Spiral (Cu) should be vacuum leak checked once after brazing and once after the final machining.

17 The vendor is required to assemble all the components inside the tank and test for vacuum as well as for dimensional accuracy.

18 Packing and forwarding the components after the completion to IUAC. The Spiral (Cu) should be packed separately. All the items should be packed without any damage or scratch on the surface. Packing shall be strong enough and shock resistant to withstand any damage to the chamber either by air or road.

19 The vendor is free to ask and clear any doubt from authorized IUAC personnel.

20 Minor changes in design by IUAC should be allowed without any extra cost.

Quality Control (Inspection and Testing)

The vendor should have an independent quality control division and its report shall be forwarded to concerned IUAC personnel. A detailed quality assurance program (QAP) shall be chalked out and shall be communicated to IUAC in writing.

The work shall be inspected at various stages of manufacturing to fulfil the requirement and specification as per the drawings. These reports shall be easily accessible to IUAC personnel. Authorized IUAC personnel will also be allowed for witnessing the quality control program for critical process and operations. The total quality control documents shall be submitted to IUAC along with other necessary documents.

1. **Quality control for materials**.

All the materials procured for the chamber/tank and other components shall conform to the material specifications. The laboratory certificates and tests reports shall be provided to IUAC as and when required.

2. **Quality control for dimensional accuracy, surface finish and electroplating**

Dimensional accuracy of the chamber/ tank and other components shall be checked and report shall be generated and submitted to IUAC. The assembled chamber/tank, end blank offs, Stems, Spiral etc shall be tested for assembly dimensional accuracy. Please contact IUAC personnel for further details on tank assembly inspection.

Copper plating thickness shall be measured at various places and report shall be submitted to IUAC. The surface finish of the components shall be checked with calibrated instruments as specified in the drawings.

3. **Quality test for leak-proof joints and brazing**

All the assembled parts, as well as the individual parts, shall be done leak testing using helium mass spectrometer. The brazed joints shall be pressure tested as well as helium mass spectrometer checked. The helium leak testing set up shall be calibrated with a standard leak to have a detection capability better than 1x 10^{-10} Torr-Lit/sec on site.

MATERIALS

All the materials used for the chamber/ tank and other components shall be fresh and procured from reputed suppliers/ manufactures. The materials to be used for the fabrication, as well as machined components, shall be protected against any damages/scratches/ dents or weathering.

1. Chamber/Tank material

   Forged low carbon steel confirming AISI 1020 / SA 105 or equivalent steel is chosen for the tanks. To ensure a defect-free tank, the supplier shall do radiography/ultrasound test to detect porosity. This material would give a thermal conductivity of 50w/m-k at room temperature for additional information please contact concerned IUAC personnel.

2. Stem (Cu) & Spiral (Cu) material and blank off material: Electrolytic-Tough-Pitch copper (ETP) C11000 grade material

3. Fasteners & Elastomers:

   Fasteners for the use in this work shall be made of stainless steel material grade 304.

   Fluorocarbon (Viton) elastomers with exceptional resistance to radiation, temperature and low gas permeability shall be used with black colour.
   For additional information please contact concerned IUAC personnel.

Cleaning, Handling, Storage and Shipment

The Buncher is an accelerating structure, therefore the RF surface will see the high electric field, so surface cleanliness and smoothness is very important. The avoidable oils and acids from the machine as well as human skin shall be avoided. Disposable gloves and lint-free papers shall be used, and the handlers shall be sensitized to these requirements. Additives containing sulfur, silicon and halogens shall be avoided. Cutting fluids shall be removed after the machining operation immediately. Avoid cutting oil accumulated for a long duration of machining operation.

Transport and temporary storage during the machining and plating of the Buncher components should be done such a way that no damage or contamination on the surfaces. Buncher components shall be packed with cling foil and PUF packing. Buncher components should not be left lying out in open where they may be exposed to dust and inadvertent handling of personnel.
Before the shipment, the vendor shall make sure that all the items in the scope of the supply are fully included in the packing boxes. Packing cases must be robust enough to take care of the impact during handling and transportation. Suitable stiffener and cushion should be provided to movement and vibration during transportation.

After final tank assembly before shipment to IUAC, inert gas with positive pressure and shall be shipped with silica desiccant packets to avoid moisture exposure on the RF surface.