

# Notice Inviting Tender

**High Vacuum Chamber, Pumping system and Control for  
high temperature additive manufacturing**

**Tender No: SID/IAP/GMR/2019-20/01**



INDIAN INSTITUTE OF  
**SCIENCE**

**Department of Instrumentation and Applied  
Physics  
Indian Institute of Science  
Bangalore – 560012**

**July 2019**

# Table of Contents

1	Section 1	Scope of the tender
1	Section 1 -	Bid Schedule
2	Section 2 -	Eligibility Criteria
3	Section 3 -	Terms And Conditions
4	Section 4 -	Technical Specifications

## SECTION 1 – BID SCHEDULE

1	<b>Tender No</b>	<b>IAP/GMR/2019-20/01</b>
2	<b>Tender Date</b>	
3	<b>Item Description</b>	Supply and Installation of <b>Vacuum Chamber and Pumping system for high temperature additive manufacturing</b>
4	<b>Tender Type</b>	Two Bid System a) Technical Bid (Part-A) b) Commercial Bid (Part-B)
5	<b>Place of Submission and tender opening</b>	The Chairman Department of Instrumentation and Applied Physics Indian Institute of Science, Bangalore – 560012, India
6	<b>Last Date &amp; Time for submission of tender</b>	<b>26 July 2019, 17:00 hrs</b>
7	<b>For further clarifications</b>	The Chairman Department of Instrumentation and Applied Physics Indian Institute of Science, Bangalore – 560012, India <b>Attn: Dr.K.H.Thulasiraman</b>

## SECTION 2 – ELIGIBILITY CRITERIA

### Prequalification criteria:

Bidders who are qualifying/meeting following Technical and Financial capabilities are eligible to participate in the bid for High Vacuum Chamber, Pumping system and Control for high temperature additive manufacturing. Bidder shall furnish all the details with documentary proof and submit the same along with quotation. Bids of the parties which are not meeting the following criteria will not be considered for evaluation and will be rejected without seeking any further clarifications. Bidder shall furnish the details of their resources in factory like manpower, machinery, quality system etc., for department to assess their capability.

Sl. No.	Criteria/ Requirement	Reply and Eligibility from vendor
<p><b>Technical Qualification Requirements:</b> The bidder should meet the following technical qualifying requirements and shall submit relevant certificates/data to establish his credentials along with the technical bid.</p>		
1	<p>The Bidder should be an organization with previous experience of more than 20 years in having executed contracts for high vacuum system engineering, manufacture, supply, testing for following applications</p> <ol style="list-style-type: none"> <li>1) High temperature material processing environments such as casting, melting and chemical vapour process.</li> <li>2) High vacuum chamber for highly ionizing radiation environments.</li> <li>3) High vacuum pumping system design with above mentioned process with turbo molecular pump as a high vacuum pump.</li> <li>4) High vacuum systems with high wall thickness (beyond 30 mm without structural ribbing.</li> <li>5) High vacuum system more than 1500X1500X1500 mm dimension or 3.375 m<sup>3</sup> volume rectangular or squire type chamber.</li> <li>6) High vacuum system with material high temperature and high degassing processing time beyond 50-80 hours or higher.</li> <li>7) High vacuum system designed based FEM analysis</li> </ol>	Enclose list of works executed with details
2	The Bidder shall have dedicated qualified design team for high vacuum chamber design and manufacturing team.	
3	The Bidder shall have dedicated qualified welding team	
4	The Bidder shall have dedicated system control and	

	automation team with Siemens profibus and profinet control experience.	
5	Since this is a developmental project, the bidder is expected to have a recognised R&D centre	Provide a document to the effect

1. The Bidder should be Indian firm, based in Bangalore
2. The Bidder should have qualified technical service personnel with documented and adequate experience in an Indian Office
3. If the Bidder is a local distributor/dealer/Agent, it is mandatory to attach authorization certificate along with the bid from the original equipment manufacturer.
4. The bidder should sign and submit the declaration for Acceptance of Terms and Conditions as per -Annexure x
5. The Bidder must not have been blacklisted/banned/suspended or have a record of any service related dispute with any organization in India or elsewhere. A declaration to this effect has to be given as per Annexure

## SECTION 3 – TERMS AND CONDITIONS

### A) Submission of Tender:

1. All documentations in the tender should be in English.
2. Tender should be submitted in two envelopes (two bid system).
  - a. **Technical Bid (Part-A) –**  
Technical bid consisting of all technical details, check list for conformance to specifications, format in which the price bid is quoted without the actual prices (suppliers who include any indication of prices in the technical bid will be automatically disqualified).
  - b. **Commercial Bid (Part-B) –**  
Commercial bid indicating item wise price for the items mentioned in the technical bid , as per the format of quotation in section 6 provided in tender and other commercial terms and conditions
3. The technical bid and price bid should each be placed in a sealed cover, superscripting on both the envelopes the tender no. and the due date and Both these sealed covers are to be placed in a bigger cover which should also be sealed and duly superscripted with the Tender No & Due Date.
4. The SEALED COVER superscripting tender number / due date & should reach The Chairman, Department of Instrumentation and Applied Physics, Indian Institute of Science, Bangalore – 560012, India on or before due date mentioned in the tender notice. In case due date happens to be holiday the tender will be accepted and opened on the next working day.

**If the quotation cover is not sealed, it will be rejected.**

5. All communications are to be addressed to- The Chairman, Department of Instrumentation and Applied Physics, Indian Institute of Science, Bangalore – 560012, India.
6. GST/other taxes, levies etc., are to be indicated separately. The BIDDER should mention GST Registration and PAN in the tender document (Indian Bidders only).
7. If price is quoted in Technical Bid as provided in tender document the bid is liable to be rejected.
8. The Institute reserves the right to accept or reject any bid and to annul the bidding process and reject all bids at any time prior to the award of contract, without thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders.
9. Incomplete bids will be summarily rejected.

### B) Cancellation of Tender:

Notwithstanding anything specified in this tender document, IISc Bangalore, in its sole discretion, unconditionally and without having to assign any reason, reserves the right:

- a. To accept OR reject lowest tender or any other tender or all the tenders.
- b. To accept any tender in full or in part.
- c. To reject the tender offer not confirming to the tender terms.

**C) Validity of the Offer:**

The offer shall be valid 90 Days from the date of opening of the commercial bid.

**D) Evaluation of Offer:**

1. The technical bid (Part A) will be opened first and evaluated.
2. Bidders meeting the required criteria as stated in Section 2 of this document shall only be considered for Commercial Bid (Part B) opening. Further, agencies not furnishing the documentary evidence as required will not be considered.
3. Pre-qualification of the bidders shall not imply final acceptance of the Commercial Bid. The agency may be rejected at any point during technical evaluation or during commercial evaluation. The decision in regard to acceptance and / or rejection of any offer in part or full shall be the sole discretion of IISc Bangalore, and decision in this regard shall be binding on the bidders.
4. The award of contract will be subject to acceptance of the terms and conditions stated in this tender.
5. Any offer which deviates from the vital conditions (as illustrated below) of the tender is liable to be rejected:
  - a. Non-submission of complete offers.
  - b. Receipt of bids after due date and time and or by email / fax (unless specified otherwise).
  - c. Receipt of bids in open conditions.
6. In case any BIDDER is silent on any clauses mentioned in these tender documents, IISc Bangalore shall construe that the BIDDER had accepted the clauses of the tender and no further claim will be entertained.
7. No revision in the terms and conditions quoted in the offer will be entertained after the last date and time fixed for receipt of tenders.

**E) Pre-requisites:**

The bidder will provide the prerequisite installation requirement of the equipment along with the technical bid.

**F) Mode of Shipment:**

In case of foreign bidders, the consignment must be airlifted, insured and transported to the installation site by the bidder. Necessary custom clearance will be done by IISc, Bangalore, at Bangalore International Airport.

**G) Customs clearance:**

The IISc, Bangalore will furnish the necessary papers for the import of items into India, necessary custom duty exemption certificate and other supporting documents to facilitate the import of the items will be provided.

**H) Warranty:**

The complete system is to be under warranty period of 3 years including free supply of spare parts and labour from the date of functional installation. If the instrument is found to be defective, it has to be replaced or rectified at the cost of the bidder within 30 days from the date of receipt of written communications from IISc, Bangalore. If there is any delay in replacement or rectification, the warranty period should be correspondingly extended.

**I) Annual Maintenance Contract:**

An annual maintenance contract cost will be negotiated on completion of warranty period. The bidder shall provide an annual maintenance cost.

**J) Purchase Order:**

1. The order will be placed on the bidder whose bid is accepted by IISc based on the terms & conditions mentioned in the tender document.
2. The quantity of the items in tender is only indicative. IISc, Bangalore reserves the right to increase /decrease the quantity of the items depending on the requirement.
3. If the quality of the product and service provided is not found satisfactory, IISc, Bangalore reserves the right to cancel or amend the contract.

**K) Delivery and Installation:**

The bidder shall provide the lead time to delivery, installation and made functional at IISc, Bangalore from the date of receipt of purchase order. The system should be delivered, installed and made functional within 120 days from the date of receipt of purchase order. The supply of the items will be considered as effected only on satisfactory installation and inspection of the system and inspection of all the items and features/capabilities tested by the IISc, Bangalore. After successful installation and inspection, the date of taking over of entire system by the IISc, Bangalore shall be taken as the start of the warranty period. No partial shipment is allowed.

**L) Statutory Variation:**

Any statutory increase in the taxes and duties subsequent to bidder's offer, if it takes place within the original contractual delivery date, will be borne by IISc, Bangalore subject to the claim being supported by documentary evidence. However, if any decrease takes place the advantage will have to be passed on to IISc, Bangalore.

**M) Disputes and Jurisdiction:**

Any legal disputes arising out of any breach of contract pertaining to this tender shall be settled in a court of competent jurisdiction located within



the city of Bangalore, India. The purchase shall be governed by the laws of India

**N) General:**

1. All amendments, time extension, clarifications etc., within the period of submission of the tender will be communicated electronically. No extension in the bid due date/time shall be considered on account of delay in receipt of any document(s) by mail.
2. The bidder may furnish any additional information, which is necessary to establish capabilities to successfully complete the envisaged work. It is however, advised not to furnish superfluous information.
3. The bidder may visit the installation site before submission of tender, with prior intimation.
4. All imported equipment should be quoted in the currency of the country of origin, and all locally sourced items should be quoted in Indian Rupees.
5. Any information furnished by the bidder found to be incorrect, either immediately or at a later date, would render the bidder liable to be debarred from tendering/taking up of work in IISc, Bangalore.

## Section – 4 – Technical Specifications

### A) Technical Specifications of Laser Powder Blown Additive Manufacturing System:

SI No	Parameter	Specifications	Comments
1	Equipment Class	High vacuum system with pumping system	
2	Country of manufacture		Indicate
3	Customer Base	Should have supplied Vacuum chambers with automated pumping system to reputed industry/universities (at least 15 systems in last 5 years)	List all supplied institutes/research labs/Industries. Please attach the copies of purchase orders and customer details for verification purpose
4	Vacuum chamber specifications	Drawings are attached in the Annexure I	
	Volume		
	Vacuum chamber wall fabrication materials and supplier name		
	Flange details		
	Water cooling line		
	Water cooling line welding standards		
	Taping holes inside the vacuum chamber walls		
	Internal surface finish		
	Heat shield inside the chamber walls		
	X-ray radiation shields at pumping ports		
	Water cooling line hoses into the chamber		
	Electrical feed through		
5	Pumping system circuit		
6	Ultimate vacuum	$10^{-6}$ mbar with titanium powder in the bed	
7	Leak rate	$10^{-9}$ Torr Lit/min	Indicate moisture, oxygen, nitrogen levels during process Less than 30 ppm O/N, less than 10 ppm moisture, (indicate actual values)  Must be demonstrated in acceptance tests with titanium powder build
	View port standards		
	View port shutter life cycle		

	X-ray leakage from view port		
	X-ray leakage from vacuum chamber walls		
8	Targeted time for reaching the specified ultimate vacuum		
	Welding specification		
	Control system specifications		
	Vibration levels in the vacuum system		
	OEM certificates for all the imported pumps and gauges		
	X-leakage certification with third party		
	Rittal manufactured Electrical cabinets		
	Relays in the control system		
	Door locking sensors		
	Feedthrough X-ray leakage		
	Numatics		
	Water line pressure indicators		
	Water flow sensors		
	Internal wall surface finish		Indicate size distribution, shape factors and flowability
	Outer wall surface finish		
	Vacuum seals and O-ring seals		
	Water channel welding standards		
	Door locking mechanism		
	Door hinges type		
	Vacuum chamber lifting hooks		
	Weld cracking of the joints		
16	Safety Certification	Bidder shall provide the details	
17	Supply Lead Time	The system should be preferably delivered, installed and made functional within 60 days from the date of receipt of purchase order.	Indicate lead time of supply
18	Service and Maintenance	Require the presence of trained and experienced service engineer	Indicate terms and conditions of response in warranty period
24	Infrastructure Requirements	Provide Machine footprint for operation Power requirements Air conditioning	

		Cooling, Chiller units, gas and compressed air Special installation tooling Any other infrastructure requirement	
25	Acceptance	Benchmark part Repair/build	Indicate all acceptance standards
26	Training	On site training covering all aspects of equipment operation within 2 week of installation and acceptance	
27	Spares and Consumables	Recommended spares and consumables for one year normal operation	
28	Annual maintenance contract in post warranty operation		Terms and condition
<b>29</b>	<b>Desirable Options</b>		
<b>29.1</b>		Deposition aligned with gravity	
29.2		Induction heating of build during process	Indicate area/volume of zone being heated and achieved temperature and temperature measurement methods
29.3		Control system out put details	Describe software features
29.4		All safety equipment and protective gear	

### **Check list for the bid**

1. Bidder details with complete address, email, telephone etc.
2. Declaration regarding experience in vacuum system fabrication
3. Declaration regarding clean track record
4. Declaration regarding the registered R&D centre
5. Declaration of acceptance to tender conditions
6. Commercial bid (in a separate sealed envelope)
7. Technical bid (in a separate sealed envelope with all the terms and conditions, component details)