
	सामग्री प्रबंधन अनुभाग भारतीय प्रौद्योगिकी संस्थान, रूडकी रूडकी-247667, हरिद्वार, उत्तराखण्ड, भारत Phone-(O) 01332-28-4293, 4693 E-mail: mmiitr@iitr.ac.in	Material Management Section Indian Institute of Technology Roorkee-247667(Haridwar) (Uttarakhand) (India) Phone-(O) 01332-28-4293, 4693 E-mail: mmiitr@iitr.ac.in	
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निविदा प्रलेख / Tender Document

No. 1600001213/MM-6/IITR/2020-21/2D-PIV SYSTEM/CHEMICAL/84

Date of Uploading of Tender -<https://eprocure.gov.in/eprocure/app>

1-Sep-2020

Bids under two bid systems (Technical and Commercial) are invited Online at CPP Portal (<https://eprocure.gov.in/eprocure/app>) from the reputed manufacturer/authorized supplier/dealer for the following items. **Manual bids will not be accepted.**

वस्तु की तकनीकी विषिष्टताये/ Technical Specifications of item:

Sr. No	Name of item / Specifications	QTY	UOM
1	2D-PIV SYSTEM	1	No.
(For Detailed Technical Specification Plz refer Annexure-V)			
नोट-1: कृपया वस्तु का मूल्य एवं कर अलग-अलग दर्शाए।			
Note-1: Please quote the Rate & Taxes of the item separately.			
Note-2: E-way bill is to be issued by the Venders/Transporter			
Note-3: The HSN / SAC Code of the item must be mentioned.			
For Reasonability of Rates, The firm must enclose the last two supply orders for the same item with Financial Bid (Annexure-III) only.			
Critical Date Sheet			
1	Published Date	1-Sep-2020	(17:00)
2	Bid Document Download / Sale Start Date	1-Sep-2020	(17:30)
3	Seek Clarification Start Date	1-Sep-2020	(18:00)
4	Seek Clarification End Date	8-Sep-2020	(16:00)
5	Pre Bid Meeting Date	9-Sep-2020	(17:00)
6	Bid Submission Start Date	11-Sep-2020	(10:00)
7	Bid Submission End Date	21-Sep-2020	(17:00)
8	Bid Opening Date	22-Sep-2020	(12:00)

Chapter-1 : Instruction to bidders

- A. The Tender should be enclosed with proper certifications like Agency Certification, Authorization certificate and/or Proprietary Certificate, as the case may be, in support of your offer.
- B. बोली का जमा किया जाना/ **Submission of Bids:**
 - The bids should be submitted online in two parts –**
 - 1 (i) The Technical Bid (Annexure-I, II & V) with EMD and Tender Acceptance Letter**
 - (ii) The Financial Bid (Annexure-III) & Price Bid in .XLS Format**
 - Rates in .xls format will only be considered for Financial evaluation.**
 - 2 The bids should be on official pad preferably with GST Number of the firm
 - 3 The quotations should bear full details and where possible may be duly supported with catalogues, pamphlets, literature, samples of the item/items as the case may be for comparing the quality and rates of the item(s).

- 4 The transportation cost, insurance charge etc., if any, percentage/ rate of GST or all other taxes and duties should be clearly mentioned.
- 5 The bids / rates / tenders should remain valid for a minimum period of 90 days from the date of financial opening.
- 6 **Since this purchase being for research purpose, I.I.T., Roorkee is registered in DSIR, New Delhi, it is therefore exempted from the payment of GST up to the limit of exemption as per Govt. Rules. The bidder should quote accordingly.**
- 7 The rates shall not be subject to escalation of any nature.
- 8 The rates quoted should be applicable to educational institutions and any cost advantage received in lieu thereof should be passed on the Institution.
- 9 While quoting / sending rates, the firm shall give an undertaking as per Annexure-II.
- 10 Pre-bid meeting will be through webex as per schedule mentioned in critical date sheet. Webex invitation link would be sent to those vendors who express willingness for the pre-bid meeting.

C. विधि निक्षेप/ Earnest Money Deposit (EMD):

The Technical Bid should accompany an EMD of value Rs. 7,50,000/-(Rupees Seven Lac Fifty Thousand only) which should be deposited online into below mentioned account.

Details of IIT Roorkee Bank Account:

Account Name: NON MHRD GOVERNMENT FUND IIT ROORKEE

Account No.: 00000032685865515

Bank Name: STATE BANK OF INDIA

Branch Address: IIT ROORKEE, ROORKEE

IFSC Code: SBIN0001069

MICR: 247002094

The Bidder will have to fill EMD details & provide the tender reference number in the narration/remarks while doing the payment as per quoted items and share the receipt of the same in pdf on CPP Portal (<https://eprocure.gov.in/eprocure/app>). The qualification in Technical bid will be subject to the submission of EMD in above mentioned account within schedule date and time as mentioned in the NIT. IITR shall not be responsible for any delay in submission of EMD.

In case the EMD is not received in above mentioned account within the aforesaid period i.e. before bid opening date & time as mentioned in NIT, the bid will be out rightly rejected.

Exemption on submission of EMD will be given against valid MSME/NSIC certificate under valid category.

The earnest money shall be refunded to all the unsuccessful firms, without any interest after finalization of the contract.

EMD shall be refunded to the successful firms on receipt of PBG/Security Deposit. No interest is payable on the EMD to either the successful firms or the unsuccessful firms.

D. निष्पादन बैंक प्रत्याभूति/ Performance Bank Guarantee (PBG):

In case the total order value of items becomes Rs.25.00 Lakhs or above, 10% of the order value in the form of Bank Guarantee or FDR pledged in favor of "The Registrar, IIT Roorkee" is required at the time of installation of the equipment which should remain valid at least during the warranty period plus sixty days. No interest shall be claimed by the bidder on the PBG submitted.

E. बोलियो का खोला जाना/ Opening of Bids:

- 1 The Technical Bids will be opened online at CPPP Portal (<https://eprocure.gov.in/eprocure/app>)-**Plz refer Critical Date Sheet**
- 2 The Financial bids of only the Technically Qualified bidders will be opened. The date and time for opening the Financial Bid will be communicated to the respective firm later by the system (CPP Portal (<https://eprocure.gov.in/eprocure/app>))
- 3 Representatives of the firms(s) may be present at the time of openings, if they so desire.

Chapter-2 : Conditions of Contract

- F.** ठेका देना / Award of Contract:
The final selection of the bidder for the award of the contract will be made on the basis of the lowest commercial bid amongst the Technically Qualified Bidders.
- G.** पूर्व-आपूर्ति निरीक्षण / Pre-supply Inspection:
Authorized representative of the Institute shall make the final inspection before supply of the item at site of the firm, if required.
- H.** वस्तु की आपूर्ति / Supply of Item:
The whole supply as per order shall have to be completed within the time mentioned in the order failing which the I.I.T. Roorkee shall have the right to accept or reject any quantity of items ordered. The firm will have to arrange for supply of the material in good condition.
- I.** भुगतान की शर्तें / **Payment Terms:**
- A.** **Payment in INR for supply of goods:**
Where installation is not required: 100% payment will be made after satisfactory delivery of material duly certified by the HOD/P.I. **OR**
Where Installation is required :100% payment will be made after satisfactory delivery and installation of the material duly certified by the HOD/P.I. **OR**
80% payment will be made on receipt and acceptance of goods and balance 20% on successful installation and commissioning duly certified by the HOD/P.I. **OR**
100% Advance will be paid against submission of 110% Bank Guarantee of the Total Order value. Bank Guarantee should be in favor of "The Registrar, IIT Roorkee" which should be valid till the date of Installation/Delivery period + 30 days
- B** **Payment in INR for AMC/Service:**
Quarterly/Halfyearly after satisfactory completion of work/service duly certified by the H.O.D./P.I.
- J.** **दंड/Penalty:**
A penalty of 0.5% of the total order value per week shall be levied for the delay subject to a maximum of 5% of the total order value.
In case of the non-supply of the item after the acceptance of the work/supply order, EMD will be forfeited by the Institute.
- K.** **अप्रत्याशित घटना/Force Majeure:**
For the purpose of and within the scope of contract by way of indication and not of limitation, the term "Force Majeure" shall mean acts of nature, strikes, Lockouts, or other industrial disturbances, act of public/enemy, wars, blockades, insurrection, riots, epidemics, landslides, earthquakes, storms lightening, flood, washouts, civil disturbances, explosion and any other similar even not within the control of either party on which by exercise of due care and diligence neither party is able to prevent or overcome.
- L.** **मध्यस्थता / Arbitration:**
In the event of any difference or dispute arising out this work, all effort shall be made by both the parties to settle the same amicably. Failing an amicable settlement, the dispute shall be finally settled through arbitration conducted under the Arbitration and Conciliation Act 1996, by arbitrators appointed in accordance with the said Act. The arbitration shall give reasoned and speaking award. All disputes are subject to Roorkee jurisdiction only.
- M.** **बोली अस्वीकृती के लिए मानदंड / Criteria for bid rejection:**
- 1 If technical bid found without the required undertaking (Annexure-II).
 - 2 If it found at a later date that any information given in the bids is Incorrect/false then the bid is liable to be disqualified/rejected.
 - 3 Canvassing in any form will result to disqualification.
 - 4 If "extra, as actual" etc. are mentioned against any of the price components in the bid the bid will be rejected.
 - 5 If the firm quotes 'NIL' charges / consideration, the bid shall be treated as unresponsive and will not be considered.
 - 6 If financial bid is found along with technical bid in pdf on CPP Portal, then the bid shall be rejected outrightly.
 - 7 If any bidder submitting two/multiple bids for the same item of a tender, both/all the bids of that bidder will be outrightly rejected.

Chapter-3 : Schedules of requirements

- N.** **टिप्पणी / Note:**
- 1 If the supplier/firm is manufacturer/authorized dealer/sole distributor/of the item, the certificate to this effect should be attached.

- 2 Please note that the firms must submit the compliance Statement in an organized and structured manner in respect of all the specifications as per Annexure-VII with the supporting catalogue/leaflet of the firm. Annexure-I, II & V have to be submitted with Technical Bid and Annexure-III with financial bid.
- 3 It may also be noted that the tender bids received after the stipulated date & time or found incomplete and the tender bids containing false/incorrect information shall be summarily rejected. The Institute shall not entertain any communication in this regard, whatsoever.
- 4 The firm is required to give its Bank Account details with IFSC for the purpose of making e-payment.
- 5 The Indian Institute of Technology (IIT) Roorkee reserves the right to reject any quotation wholly or partly without assigning any reason.
- 6 The quantity shown in the tender can be increased or decreased to any extent depending upon the actual requirement.
- 7 The decision of the institute in all matters relating to eligibility, acceptance, rejection of the bid will be final and binding on the applicants.
- 8 IIT Roorkee discourages High Sea Sale purchase. All tenders with High Sea Sale will be rejected.
- 9 The firms should clearly mention (in the financial bid) the Harmonized System of Classification (HS code) defined by the Central Custom and Excise Board (Govt. of India)- for the item(s) involving import.
- 10 **If the bid opening date happens to be a holiday, then the bid will be opened at 3.30PM of the next working day followed by the holiday.**
- 11 If an agent submits bid on behalf of the Principal/OEM, the same agent can not submit a bid on behalf of another Principal/OEM in the same tender for the same item/product.
- 12 Indian Agent should submit the certificate from the Foreign Principal that they are the Authorized & Registered Indian Agent.
- 13 The quantity shown against the item is approximate and may vary as per demand of the Institute at the time of placing order. Also, the final requirement of each line item will be decided by the Institute at the time of placing the PO.
- 14 **Any corrigendum/addendum/errata in respect of the Tender Notice/ Enquiry letter shall be made available CPP Portal (<https://eprocure.gov.in/eprocure/app>). Hence prospective bidders are advised to visit the CPP Portal (<https://eprocure.gov.in/eprocure/app>) regularly.**
- 15 Bidders shall be responsible for the correctness of the information provided in the enquiry letter/tender document. If it is found at a later date that any information given in the bid is Incorrect/false then the bid is liable to be disqualified/rejected.
- 16 Before submission of bids, bidders should read the complete enquiry letter/tender document carefully and ensure that the bidders fulfill the eligibility criteria.
- 17 In case the item/product is under rate contract with DGS&D or GeM, then Bidder should certify that the rate quoted is not over and above (higher side) the rates under RC with the DGS&D or GeM.
- 18 **In Item Wise BoQ .xls sheet, In column M, leave blank for the item/service not provided/quoted by you. If quoted 0 then it will be considered that the item/service will be provided free of cost.**
- Or**
- 19 **In Item Rate BoQ .xls sheet, If quoted 0 for the items/services in column M then it will be considered that the items/services will be provided free of cost.**
- 19 **The Institute reserves the right to rectify any discrepancy of this advertisement, if found later on. In case of any inadvertent mistake in the process which may be detected at any stage even after the issue of purchase order, the Institute reserves the right to modify/withdraw/cancel any communication made to the bidder.**

Chapter-4 : Specifications and allied Technical details

Plz. See Annexure- I, II, V

Chapter-5 : Price Schedule (to be utilized by the bidders for quoting their prices online in .XLS format at CPPP Portal (<https://eprocure.gov.in/eprocure/app>))

Plz. See Annexure- III & Price Bid in .XLS Format

Chapter-6 : Contract Form

Purchase Order is used as Contract Form

Chapter-7 : Other Standard Forms, if any to be utilized by the purchaser and bidders

Tender Acceptance Letter

*उप कुलसचिव (सामग्री प्रबंधन) / सहायक कुलसचिव (सामग्री प्रबंधन)

Deputy Registrar (MM)/ Assistant Registrar (MM)

***Document Digitally Signed on <https://eprocure.gov.in/eprocure/app>**

For any Clarification regarding technical specifications of item Please Contact:

Prof. Vimal Kumar

Chemical

Mo: 7579024676

Chemical Engineering

Engineering

Email: vimal.kumar@ch.iitr.ac.in

IIT Roorkee

IIT Roorkee

तकनीकी बोली

विस्तृत विवरण अनुपालन रिपोर्ट के साथ प्रस्तुत किया जाना है (अपने आधिकारिक लेटर हेड पर विक्रेता/फर्म द्वारा प्रस्तुत करने के लिए)

Detailed specification cum compliance report to be submitted with the Technical Bid
(to be submitted by the vendor/firm on its official letter head)

(For Detailed Technical Specification Plz refer Annexure-VII)

Sr.No	Name & Required Specifications of Item(s)	Qty	UOM	Offered specifications of item(s) by the firm
1	2D-PIV SYSTEM	1	No.	
	Firm's Profile :			
1	Manufacturer/Authorized Agent/Distributor/Dealer/Supplier(valid certificate must be attached)			
2	E-mail I.D. & Telephone/Mobile No. Detail of Bank A/C			
Note:	1. "offered specifications", should be filled up properly in the format provided as per Annexure-I.			
	2. Volume & Weight of the item should also be mentioned.			
	3. The HSN / SAC Code of the item must be mentioned.			

Signature: _____

Name : _____

Designation : _____

Seal of the Organisation

उपबंध / UNDERTAKING

Ref. No. No. 1600001213/MM-6/IITR/2020-21/2D-PIV SYSTEM/CHEMICAL/84
Dated:- 1-Sep-20

That all the terms/conditions mentioned in the enquiry letter/tender against which the rates are being given are acceptable to the firm.

It is certified that the rate quoted is not over and above (higher side) the rates under RC with the DGS&D or GeM.

It is certified that the firm has never been black-listed from any Government Department. (State/Central Govt./ Autonomous/ PSU)

Signature_____

Name_____

Financial Bid

(to be submitted by the vendor/firm on its official letter head)

Ref. No. No. 1600001213/MM-6/IITR/2020-21/2D-PIV SYSTEM/CHEMICAL/84
 Date: 1-Sep-20

Rates :

Sr. No	Name of item / Specifications	Qty	UOM	Rate	Amount (INR) Or In Other Currency
To be filled in .XLS sheet (attached)					
Total					
Grand Total Rs.					

1) Price of the items should be clearly mentioned if supplied Free of Cost.

Terms & Conditions:

- 1 Prices (if quoted in Rs.): FOR Deptt. of Chemistry
IIT Roorkee
- 2 **Payment:** **Should be clearly mentioned, As per clause-I of enquiry letter.**
- 3 Validity:
- 4 Delivery period:
- 5 Other charges:
- 6 **Warranty:**
- 7 Rejection: Equipment if found not as per the required specification would be rejected.
- 8 Penalty Clause: As per clause-J of enquiry letter.
In case of the non-supply of the item after the acceptance of the work/supply order, EMD will be forfeited by the Institute.
- 9 PBG: 10% of the order value in the form of Bank Guarantee or FDR pledged in favor of "The Registrar, IIT Roorkee" is required at the time of installation of the equipment which should remain valid at least during the warranty period plus sixty days. No interest shall be claimed by the bidder on the PBG submitted.

It is certified that the rate quoted is not over and above (higher side) the rates under RC with the DGS&D or GeM.

Signature _____
 Name _____
 Designation _____
 Seal Of the Firm/Organization _____

Details of Institute :

IEC CODE	0100000011	
AD CODE	0001069-2770325	S.B.I., IIT ROORKEE
	0303974-2770324	P.N.B. IIT ROORKEE

Instructions for Online Bid Submission

Instructions to the Bidders to submit the bids online through the Central Public Procurement Portal for e Procurement at <https://eprocure.gov.in/eprocure/app>.

- 1 Possession of valid Digital Signature Certificate (DSC) and enrollment/registration of the contractors/bidders on the e-Procurement/e-tender portal are prerequisite for tendering.
- 2 Bidder should register for the enrollment in the e-Procurement site using the "Online Bidder Enrollment" option available on the home page. Portal enrollment is generally free of charge. During enrollment/registration, the bidders should provide only valid and true information including valid email id. All the correspondence shall be made directly with the contractors/bidders through email id as registered.
- 3 Bidder need to login to the site through their user ID/ password chosen during enrollment/registration.
- 4 Then the Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by SIFY/nCode/eMudra etc. recognized by Controller of Certifying Authorities (CCA) India on eToken/SmartCard, should be registered.
- 5 The registered DSC only should be used by the bidder in the transactions and should ensure safety of the same.
- 6 Contractor/Bidder may go through the tenders published on the site and download the tender documents/ schedules for the tenders.
- 7 After downloading/getting the tender document/schedules, the Bidder should go through them carefully and then submit the documents as required, otherwise bid will be rejected.
- 8 Any clarifications may be sought online through the tender site, through the contact details or during pre-bid meeting if any. Bidder should take into account the corrigendum if any published before submitting the bids online.
- 9 Bidder may log in to the site through the secured login by the user id/ password chosen during enrolment/registration and then by submitting the password of the e-Token/Smartcard to access DSC.
- 10 Bidder may select the tender in which he/she is interested in by using the search option and then move it to the 'my tenders' folder.
- 11 From my tender folder, he may select the tender to view all the details uploaded there.
- 12 It shall be deemed that the bidder has read and understood all the terms and conditions before submitting the offer. Bidder should go through the tender schedules carefully and upload the documents as asked; otherwise, the incomplete bid shall stand rejected.
- 13 Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document/ schedule and ordinarily it shall be in PDF/xls/rar/jpg/dwf formats. If there is more than one document, all may be clubbed together and provided in the requested format. Bidders Bid documents may be scanned with 100 dpi with black and white option. It is advisable that each document to be uploaded through online for the tenders should be less than 2 MB. If any document is more than 2MB, it can be reduced through zip/rar and the same if permitted may be uploaded. The file size being less than 1 MB the transaction uploading time will be very fast.
- 14 The Bidders can update well in advance, the documents such as certificates, annual report details etc., under "My Space option" and these can be selected as per tender requirements and then send along with bid documents during bid submission. This will facilitate the bid submission process faster by reducing upload time of bids.
- 15 Bidder should submit the Tender Fee/ EMD as specified in the tender. Scanned copy of the same should be uploaded as part of the offer.
- 16 While submitting the bids online, the bidder shall read the terms and conditions and may accept the same to proceed further to submit the bid packets.
- 17 The bidder has to select the payment option as offline to pay the Tender FEE/ EMD as applicable and enter details of the same.
- 18 The details of the DD/any other accepted instrument, physically delivered, should tally with the details available in the scanned copy and the data entered during bid submission time, otherwise submitted bid shall not be acceptable or liable for rejection. (If applicable)
- 19 The bidder has to digitally sign and upload the required bid documents one by one as indicated. Every act of using DSC for downloading the bids and uploading their offers shall be deemed to be a confirmation that they have read, understood and agreed with all clauses of the bid document including General conditions of contract without any exception.
- 20 The bidder has to upload the relevant files required as indicated in the cover content. In case of any irrelevant files, the bid may be rejected.

- 21 If the price bid format is provided in a spread sheet file like BoQ_XXXX.xls, the rates offered should be entered in the allotted space only and uploaded after filling the relevant columns. The Priced-bid/BOQ template shall not be modified / replaced by the bidder; else the bid submitted is liable to be rejected for the tender.
- 22 The bidders are advised to submit the bids through online e-tendering system to the Tender Inviting Authority (TIA) well before the bid submission due date and time (as per Server System Clock). The TIA shall not be held responsible for any delay or the difficulties faced during the submission of bids online by the bidders.
- 23 After the bid submission (i.e. after Clicking "Freeze Bid Submission" in the portal), the acknowledgement number indicated by the system should be printed by the bidder and kept as a record of evidence for online submission of bid for the particular tender and also be used as entry pass to participate in the bid opening.
- 24 The time settings fixed in the server side and displayed at the top of the tender site, shall remain valid for all actions of requesting, bid submission, bid opening etc., in the e- Tender system. The bidders should follow such time during bid submission.
- 25 All the data being entered by the bidders would be encrypted using Public Key Infrastructure (PKI) encryption techniques to ensure the secrecy of the data. The data entered is not retrievable by unauthorized persons during the bid submission and until the time of bid opening by any person.
- 26 Any bid document that is uploaded to the server is subjected to symmetric encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/bid openers' public keys. Overall, the uploaded tender documents become readable only after the tender opening by the authorized bid openers.
- 27 The confidentiality of the bids is maintained with the use of Secured Socket Layer (SSL) 128 bit encryption technology. Data storage encryption of sensitive fields is done.
- 28 The bidder should logout of the tendering system using the normal logout option available at the top right hand corner and not by selecting the (X) exit option in the browser.
- 29 For any queries regarding e-Tendering process, the bidders may contact at address as provided in the tender document. Parallely for any further queries, the bidders are advised to contact over phone: **0120-4001005** or send an e-mail to – cphp-nic@nic.in.

Prequalification

- 1 An undertaking by the firm that it has never been black-listed must be attached along with the Bid, failing which the Bid shall be rejected. (As per Annexure-II)
- 2 True copy of Permanent Account Number.
- 3 Details of GST along with a copy of certificate to be attached.
- 4 Submission of samples if required, for all items indicated in the NIT. The make of items proposed to be supplied should be indicated and submitted along with the techno commercial unpriced bid without indicating the pricing components.
- 5 Willingness to execute all orders which are placed to meet emergency requirement on priority basis. The Bidder shall note that standards for workmanship, material and equipment, and references to brand names designated by the Purchaser in the tender document are intended to be descriptive only and not restrictive. The Bidder may substitute alternative standards, brand names and/or catalogue numbers in his bid, provided that it demonstrates to the Purchaser's satisfaction that the substitutions ensure substantial equivalence to those designated in the Technical Specifications.

Tender Acceptance Letter
(To be given on Company Letter Head)

Date:

Sub: Acceptance of Terms & Conditions of Tender.

Tender No. 1600001213/MM-6/IITR/2020-21/2D-PIV SYSTEM/CHEMICAL/84

Tender description:

Dear Sir,

- 1 I/We have downloaded/ obtained the tender document(s) for the above mentioned 'Tender No.' from the web site(s) namely:

as per your advertisement, given in the above mentioned website(s).
- 2 I/We hereby certify that I/We have read the entire terms and conditions of the tender documents from Page No. _____ to _____ (including all documents like section(s), schedules(s) etc.), which form part of the contract agreement and I/we shall abide hereby by the terms/conditions/ clauses contained therein.
- 3 The corrigendum(s) issued from time to time by your department/ organisation too have also been taken into consideration, while submitting this acceptance letter.
- 4 I/We hereby unconditionally accept the tender conditions of above mentioned tender document(s)/ corrigendum(s) in its totality/entirety.
- 5 In case any provisions of this tender are found violated, then your department/organisation shall without prejudice to any other right or remedy be at liberty to reject this tender/bid including the forfeiture of the full said earnest money deposit absolutely.

Yours Faithfully,

(Signature of the Bidder, with Official Seal)

TECHNICAL SPECIFICATIONS
Particle Image Velocimetry (PIV) System

S. No.	Item	Quantity
1.	Supply, installation and commissioning of <u>Particle image velocimetry (PIV) measurement system</u> with plug and play (PnP) technology compatible with auto-detection of hardware. Please see Part – A (prospective use) and Part-B (detailed technical specifications) for detailed information.	1

PIV system must meet the following minimum specifications (mentioned in Parts A & B).

Bidders please note the following instructive points:

1. You are advised to provide point-by-point compliance statement for each item/sub-item/component in both parts A and B.
2. Your compliance statement must be supported by the authenticated documents.
3. Deviation in any component (or sub-component) must clearly be mentioned and supported by the documents.
4. Vendors are requested to submit minimum 3 Customer Satisfaction Letters from INDIA for Micro-PIV System for Technical Qualification.
5. Vendors are required to submit copies of Purchase Orders and Publications on Micro-PIV and Interferometric Sizing highlighting reference of their systems being used.
This is to ensure that Prototypes are not being promised to deliver.
6. Your compliance without support documents will be considered as 'NO'.
7. Full (100%) compliance of Part – A is compulsory for the consideration of part – B.
8. We reserve all the rights to select the components and their quantities, by keeping in mind the permissible budget.
9. All applicable taxes on the total cost of equipment should be mentioned separately.

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Gow

[Signature]
17/08/2020

[Signature]
17/08/2020

Part – A: Prospective use of PIV system

The PIV measurement system must be capable to fulfil the following general requirements:

Proposed		Expected Maximum (for Reference)
1. Purpose	Academic research and educational/teaching aids	
2. Microfluidics Applications:	Droplet generation and coalescence, Spray injection, interface dynamics, mixing intensities, etc.	
3. Measurements:	Flow, thermal and pressure fields	
4. Type of measurements:	Time resolved, Micro, Two Dimensional Two Components (2D2C)	
5. Analysis zone	$1 \times 1 \mu\text{m}^2$ (minimum area), $2 \times 2 \text{mm}^2$ (maximum area)	
6. Spatial resolution	$1 - 100 \mu\text{m}$	
7. Time resolution	$\leq 2 \mu\text{s}$	
8. Fluid	Complex fluids (liquids, gas, liquid-liquid, liquid-gas)	
9. Velocity	$1 \mu\text{m/s} - 15 \text{mm/s}$	
10. Operating Temperature	$5 - 50 \text{ }^\circ\text{C}$	
11. Relative humidity	$0 - 80 \%$	
12. Are you manufacturer as well as supplier of the system?		
13. Would you be providing direct support service after the purchase and installation of system?		
14. Have you read the instructive points 1 to 9 mentioned at Page 1 of this document?		

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Part - B: Detailed technical specifications

S. No.	Component(s) & Specification(s)	Tentative quantity	Compliance Statement (Yes/No/Remarks)
1.	Dual cavity ND: YAG laser a) Wavelength: 532 nm each head b) Repetition rate: 100 Hz (or more) frequency per cavity c) 2 × 50 mJ (or better) energy per pulse at 1(a & b) d) Pulse width: ≤ 10 ns at 1064 nm e) Flash lamp life: 50 Million shots or better f) Energy stability ≤ 2% at 1(a) g) Capable of emitting stable circular beams with uniform intensity level (top-hat beam profile) h) Suitable internal cooling facility, if any, for the above mentioned configuration	1	---
2.	Research Grade Inverted Microscope: High end with high contract optics for μ-PIV measurements a) Make: Nikon / Olympus / Zeiss b) Fluorescence Microscope with 2X relay lens and 10X objective lens c) Additional objective lenses for 4X and 20X total magnification d) Extendable to high optical magnification, i.e., up to 60X e) Transverse/focus mode: manual f) Light source: both laser and halogen/LED (user selectable) g) Compatible with laser wavelength and energy h) Camera port and accessories: as per camera mount i) Necessary filters and attenuators j) Appropriate adapters and cables for connecting microscope to laser and camera, including liquid light guide assembly and coupling accessories k) Lens cleaning kit	1	---

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3.	Long Distance Microscope	1	---
	a) Working distance of $(50 \pm 5 \text{ mm})$ to $(120 \pm 5 \text{ mm})$		
	b) Two close focus objectives for the above working distances with FOV of ~ 2 to $\sim 4 \text{ mm}$		
4.	Scientific Class High Speed Monochrome Camera:	1	---
	a) Sensor Type: CMOS		
	b) 4MP (or more) full resolution		
	c) 800 fps (or more) at full resolution		
	d) 36 GB (or more) high speed RAM		
	e) $10 \mu\text{m}$ (or better) pixel pitch and 12 bit (or better) pixel depth		
	f) Frame straddle time for PIV: $2 \mu\text{s}$ (or better)		
	g) Trigger signal: TTL		
	h) High quantum, low noise and global shutter		
	i) Camera filter: $532 \pm 5 \text{ nm}$		
	j) ISO 6400 (or more) sensitivity		
	k) Inclusive of camera lens ($50 \text{ mm}/f1.8$), including suitable mounting sets		
	l) Additional camera lens ($100 \text{ mm}/f2.8$), including suitable mounting sets		
	m) Camera Filter for PLIF (for Temperature and Concentration measurements), compatible with the lenses		
	n) Recording must be supported for full utilization of camera memory		
	o) Camera to be seamlessly integrated and controlled with data acquisition and control systems with compatible software supplied with system		
	p) Tripod with adjustable height and 3 way swivelling head		
	q) Lens cleaning kit		
	r) Good quality camera storage case		





5.	<p>Scientific Class High Resolution Monochrome Camera:</p> <p>a) Sensor Type: CCD</p> <p>b) 6MP (or more) full resolution</p> <p>c) 20 fps (or 10 image pair or more) at full resolution</p> <p>d) 5 μm (or better) pixel pitch and 12 bit (or better) pixel depth</p> <p>e) Frame straddle time for PIV: 200 ns (or better)</p> <p>f) Trigger signal: TTL</p> <p>g) High quantum, low noise and global shutter</p> <p>h) High performance frame grabber</p> <p>i) Camera filter: 532 \pm 5 nm</p> <p>j) Inclusive of camera lens (50 mm/f1.8), including suitable mounting sets</p> <p>k) Additional camera lens (100 mm/f2.8), including suitable mounting sets</p> <p>l) Camera Filter for PLIF (for Temperature and Concentration measurements), compatible with the lenses</p> <p>m) Recording must be supported for full utilization of RAM of Computer with 64 bit Operating System</p> <p>n) Camera to be seamlessly integrated and controlled with data acquisition and control systems with compatible software supplied with system</p> <p>o) Tripod with adjustable height and 3 way swivelling head</p> <p>p) Lens cleaning kit</p> <p>q) Good quality camera storage case</p>	1	---
6.	<p>Divergent Light Sheet Optics</p> <p>a) Light Sheet Optics with continuously adjustable focal length between 300 to 4000 mm</p> <p>b) 2 sets of cylindrical lenses of -15 and -25 mm focal length (equivalent divergence angle of 25 and 14 degrees respectively)</p> <p>c) Optics/lenses used should be compatible to the Laser Wavelength and Energy</p>	1	---
7.	<p>Parallel Light Sheet Optics</p> <p>a) Collimated Light Sheet Optics to generate up to 100 mm (or better) high parallel light sheet</p> <p>b) It should be possible to vary the height of the light sheet</p> <p>c) Optics/lenses used should be compatible to the Laser Wavelength and Energy</p>	1	---

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8.	2D Shadowgraphy unit	1	---
	a) Shadowgraphy unit (approx. 7 inch diameter) for connecting to the Laser.		
9.	High resolution Synchronization Device	1	---
	a) Computer controlled (as well as front panel /LED indicator controlled) with digital display		
	b) Programmable timing synchronization unit including trigger cables for cameras and laser resolution		
	c) Delay time: 0 – 5000 s		
	d) Pulse width: 10 ns – 1000 s		
	e) Time resolution: 0.5 ns (or better)		
	f) 8 (or more) independent output channels and 2 (or more) input channels		
	g) Communication ports: USB/RS-232		
	h) Standalone software to operate the synchronizer independently for non-PIV measurements		
	i) Good quality synchronizer storage case		
10.	Data Acquisition, Storage and Graphics Processing Unit:	1	---
	a) Intel Xeon Quad Core Processor		
	b) 32 M (or more) cache with 2.1 GHz (or more)		
	c) RAM: 32 GB DDR4 (or higher)		
	d) Storage: 512 GB SDD (or higher) + 2 TB HDD (or higher)		
	e) Graphics card with 16 GB DDR5 dedicated (or higher) for GPU support		
	f) 22 inches (or larger) LED monitor		
	g) Wireless keyboard and wireless mouse		
11.	Seeding particles:	1	---
	Spherical particles: (hollow glass/ceramic/polyamide):		
	(a) 10 μm (mean diameter), 1 kg, Hollow Glass		
	(b) 14 μm (mean diameter), 150 g, Silver coated Hollow Glass		
	Fluorescent particles (green absorption and red emission):		
	(a) 1 μm (mean diameter), 10 ml		
	(b) 3 μm (mean diameter), 10 ml		
	(c) 10 μm (mean diameter), 10 ml		
	Rhodamine Dyes for PLIF:		
	(a) Rhodamine B, 1 gm		
	(b) Rhodamine 6G, 1 gm		





12.	Interferometric Sizing Hardware	1	---
	a) Hardware including all mechanical and optical components for Simultaneous Planar measurement of Velocity and Size based on Interferometric technique and Fringe Pattern identification.		
	b) Should have Robust optical arrangement for elimination of influence of vibration and other external disturbances.		
	c) Camera Filter: 532 ± 5 nm		
	d) Camera Lens: 100 mm/f2.8		
	e) 60 degree Camera Mounting Plate		
	f) Camera Slit 1 mm		
	g) Other essential item like Dovetail Clamp, Base, Brackets etc.		
13.	Software Packages	1	---
	a) All software packages and necessary drivers for Laser, Camera, Synchronization, Calibration, and visualization, etc. for the high performance and ease of operation and post-processing		
	b) PIV image capture and control software (Image types: B/W, Grey, 8-16 bit and RGB; File formats: BMP/JPG/TIFF/AVI; Camera control: Free, Trigger, External, PIV; Support multiple camera; Image store: Long time capture, store to RAM or HD, all controlled by software)		
	c) Data processing software (Capabilities of 2D PIV visualizations; PLIF image capture, analysis and display; In-situ image calibration, background removal, corrections for variations in light intensity, advanced image arithmetic for customized image processing; Support of concentration, pressure and temperature measurements; Shape and Size analysis and processing of scalar, vector and tensor fields and relevant derived fields; Module for characterizing Spray Angle, Patterning, droplet diameter based on interferometric technique and Fringe Pattern identification; Should work for Spherical/Non-Spherical, Inhomogeneous droplets or having varying Refractive Index droplets with no additional corrections needed, High resolution with multi-pass multi-grid windows deformation algorithm; Support of mask function and multi-average function; Uncertainty analysis; Online particle image acquisition and velocity analysis functions; Batch processing from single directory or multi-directory auto process; Advanced vector filter and multi zoom combination functions; Export various image and video file formats; Export data files and links to Matlab and Tecplot for further visualization and processing; Support upgrade to Stereo PIV from 2D PIV)		
	d) Tecplot software supported on 64-bit both Windows and Linux OS		

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14.	Micro PIV Calibration Kit	1	---
	a) Complete calibration kit for micro-PIV measurements		
	b) Inclusive of and all required connections and assemblies, etc.		
15.	Supplementary accessories:	1	---
	a) Laser protective goggles and all other safety accessories		
	b) Vibration free workbench/Breadboard of appropriate size		
	c) Appropriate mountings for vertical and inclined microfluidic geometries		
16.	Compulsory Warranty and Services	1	---
	a) 1 years (xxxxx) on-site comprehensive warranty (application support services including of replacement of faulty or damaged parts) on all the components supplied by the vendor from the date of commissioning and training.		
	b) On-site training and hands-on sessions (minimum one per year)		
17.	Documentations:	1	---
	The following documentation (in English) must be supplied along with the system: (a) Operational manuals (b) Software user manuals (c) Maintenance and troubleshooting (d) Installation and commissioning manuals (e) Handling of accessories (f) Training (g) Safety manuals (h) any other relevant technical literature/user support documents, and (i) Online access (if available) to all the above documentations.		
18.	Terms and Conditions:	1	---
	a) All mounts, cables, guides, adaptors, light guides, assembly and other mandatory accessories must be included		
	b) All the supplied hardware components, attachments and software must be capable of yielding high performance of overall system		
	c) All components must be compatible with laser wavelength and energy		
	d) All the power supply related accessories must be as per Indian standard		
	e) System should be easily upgradable for stereo and volumetric PIV		
	f) Complete installation and on-site training of all components, start-up, synchronization and performance verification of equipment		
	g) All the required standalone software must be supplied.		
	h) All the supplied firmware/software and their upgrades to enhance performance, manageability and security must be available online to download free of cost during the warranty period.		
	i) All the components/spare parts supplied by the vendor must be available for a minimum of 5 years after the warranty period		

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Optional item(s)		
1.	Additional Warranty and Services on-site comprehensive warranty (application support services including of replacement of faulty or damaged parts) on all the components supplied by the vendor from the date of commissioning and training.	1
	a) Extended Warranty for 2 nd Year	
	b) Extended Warranty for 3 rd Year	
	c) On-site training and hands-on sessions (minimum one per year)	
2.	Scientific Class High Speed Monochrome Camera:	1
	a) Sensor Type: CMOS	
	b) 4MP (or more) full resolution	
	c) 1100 fps (or more) at full resolution	
	d) 72 GB (or more) high speed RAM	
	e) 10 μm (or better) pixel pitch and 12 bit (or better) pixel depth	
	f) Frame straddle time for PIV: 2 μs (or better)	
	g) Trigger signal: TTL	
	h) High quantum, low noise and global shutter	
	i) Camera filter: 532 \pm 5 nm	
	j) ISO 6400 (or more) sensitivity	
	k) Inclusive of camera lens (50 mm/f1.8), including suitable mounting sets	
	l) Additional camera lens (100 mm/f2.8), including suitable mounting sets	
	m) Camera Filter for PLIF (for Temperature and Concentration measurements), compatible with the lenses	
	n) Recording must be supported for full utilization of camera memory	
	o) Camera to be seamlessly integrated and controlled with data acquisition and control systems with compatible software supplied with system	
	p) Tripod with adjustable height and 3 way swivelling head	
	q) Lens cleaning kit	
	r) Good quality camera storage case	

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3.	<p>Scientific Class High Resolution Monochrome Camera:</p> <p>a) Sensor Type: CCD</p> <p>b) 9MP (or more) full resolution</p> <p>c) 14 fps (or 7 image pair or more) at full resolution</p> <p>d) 5 μm (or better) pixel pitch and 12 bit (or better) pixel depth</p> <p>e) Frame straddle time for PIV: 200 ns (or better)</p> <p>f) Trigger signal: TTL</p> <p>g) High quantum, low noise and global shutter</p> <p>h) High performance frame grabber</p> <p>i) Camera filter: 532 ± 5 nm</p> <p>j) Inclusive of camera lens (50 mm/f1.8), including suitable mounting sets</p> <p>k) Additional camera lens (100 mm/f2.8), including suitable mounting sets</p> <p>l) Camera Filter for PLIF (for Temperature and Concentration measurements), compatible with the lenses</p> <p>m) Recording must be supported for full utilization of RAM of Computer with 64 bit Operating System</p> <p>n) Camera to be seamlessly integrated and controlled with data acquisition and control systems with compatible software supplied with system</p> <p>o) Tripod with adjustable height and 3 way swivelling head</p> <p>p) Lens cleaning kit</p> <p>q) Good quality camera storage case</p>	1	---
4.	<p>Data Acquisition, Storage and Graphics Processing Unit:</p> <p>a) Intel Xeon Processor</p> <p>b) 4 (or higher) cores, 32 M (or more) cache with 2.2 GHz (or more)</p> <p>c) RAM: 128 GB DDR4 (or higher)</p> <p>d) Storage: 512 GB SDD (or higher) + 4 TB HDD (or higher)</p> <p>e) Graphics card with 16 GB DDR5 dedicated (or higher) for GPU support</p> <p>f) 24 inches (or larger) LED monitor</p> <p>g) Wireless keyboard and wireless mouse</p>	1	---



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