

 <p>IIT PALAKKAD</p>	<p>भारतीय प्रौद्योगिकी संस्थान पालक्काड Indian Institute of Technology Palakkad अहलिआ एकीकृत कैम्पस, कोज़िहपारा Ahalia Integrated Campus, Kozhipara पालक्काड- 678557 Palakkad – 678 557</p>	<p>दूरभाषसंख्या/ Phone no: 04923 – 226300/590/586 ईमेल/ Email : purchase@iitpkd.ac.in</p>
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Ref No: IITPKD/CHY/DJ/126/ 2017

Date: 01.03.2018

Due Date of the tender: 15.03.2018 @ 3 PM

TENDER FOR INVITING QUOTATIONS

Dear Sir,

On Behalf of Indian Institute of Technology Palakkad quotations are invited for “**Online Gas Chromatograph**” confirming to the specification in the Annexure.

1. **Preparation of Bids:** - The tenders should be submitted **under two-bid system** (i.e.) Technical bid and Financial bid. The technical bid should consist of all technical details along with commercial terms and conditions. No prices should be included in technical bid. Financial Bid should indicate item – wise prices for the items mentioned in the technical bid. The technical and the financial bids should be put in separate cover and sealed. Both sealed covers should be put into a bigger cover.
2. The Quotations duly sealed and superscribed on the envelope **with the reference No. and due date, should be addressed to the undersigned so as to reach him on or before the due date stipulated above. Fax and Email quotation are not acceptable.**
3. The price should be quoted per unit and packing and delivery charges should be indicated separately. The offer/bids should be exclusive of Taxes and Duties, which will be paid by the purchaser as applicable. However the percentage and of taxes and duties as on date should be clearly indicated.
4. The Quotations should be valid for **sixty days** from the due date and the period of delivery required should also be clearly indicated.
5. **Local Firms:** Quotations should be for free delivery to this Institute. If Quotations for Ex-Godown delivery charges should be indicated separately.
6. Outside Palakkad: Quotations should be for **F.O.R. at IIT Palakkad**. If F.O.R. consignor station, freight charges by passenger train / lorry transport must be indicated. If Ex-Godown, packing, forwarding and freight charges must be indicated.
7. Goods shall not be supplied without an official supply order.
8. **Custom Duty:** Custom Duty which will be paid at a concessional rate against duty exemption certificate. **The price indicated should be CIF/CIP Kochi**

9. **Concessional GST@ 5% will be paid extra against Government Notification No.47/2017, dated 14.11.2017**
10. **Payment:** Every attempt will be made to make payment within 30 days from the date of receipt of bill / acceptance of goods, whichever is later. No advance payment will be made. The Tenderer have to furnish the bank details along with tender like Account No, Account Name, IFSC Code, Bank address etc.
11. **Submission of Bids:** Quotation should be sent to the following address “**The Registrar, Indian Institute of Technology Palakkad, Ahalia Integrated Campus, Kozhipara, Palakkad -678 557, Kerala**”, Phone No: 04923 226 586/590, Email: purchase@iitpkd.ac.in.
12. **Delivery Period:** The quotation should indicate clearly when delivery and installation to be made.
13. **Delay in Supply or Liquidate damages:** If the supplier fails to deliver the stores within the time specified in the purchase order, the purchaser will recover from the supplier as liquidated damages a sum of **one- half of one percent (0.5%) of the P.O value of the undelivered stores for each calendar week of delay. The total liquidated damages shall not exceed five percent (5%) of the P.O price of the unit or units so delayed. Stores will be deemed to have been delivered only when all their component parts are also delivered. If certain components are not delivered in time, the stores will be considered as delayed until such time as the missing parts are delivered.**
14. **Late offer:** The quotation received after due date will not be considered. Please ensure that your offer is sent well in advance to reach the Institute by the due date.
15. **Loading and unloading charges will be borne by the supplier.**
16. **Warranty:** Warranty Clause should be indicated clearly.
17. **Acceptance and Rejection:** IIT Palakkad has the right to accept the whole or any parts of the Tender or portion of the quantity offered or reject it in full without assigning any reason.

Yours faithfully,



Registrar, IIT Palakkad

Encl: Specifications



S.No	Items	Specifications
1	Equipment	Online Gas Chromatograph
2	Targeted application	Continuous and simultaneous online separation of gaseous and liquid products emerging from a reactor in shortest time possible.
3	Compounds to be analyzed	<ul style="list-style-type: none"> • The sample to be analyzed will be a mixture of CO₂, CO, C₁-C₆, C₆₊ hydrocarbons, H₂O, H₂, Ar. • H₂ and Ar/N₂ will be in large quantities and hence need not be quantified but must be separated. • A well resolved separation of CO, CO₂, C₁ to C₆ hydrocarbons must be achieved. • Olefins and isomers in C₁ – C₆ range range must be well separated. The concentration of these compounds as low as 0.1% should be quantifiable. • The entire analysis period must be completed in 10 – 15 min. • Clear separation of CO from Ar/N₂ must be achieved. • Significant amount of CO and traces of H₂O must be prevented from entering into sensitive detector (TCD) and column components (e.g. CO must be avoided from entering Molecular Sieve based columns). • Hydrocarbons above above C₆ may also form in trace quantities. It is preferred that these compounds are also eluted possibly as a single peak under the same conditions. • All the analysis must be carried out inside a single GC having a programmable oven. • The configuration must be designed so as to avoid frequent maintenance of the columns.
4	Design of configuration	<ul style="list-style-type: none"> • Two channel Parallel GC for analyses allowing the separation of the above mentioned compounds typically in three sections. Each channel can optimize a particular part of the separation. • TCD with helium carrier gas to be used for permanent gases analysis like H₂ (10-40%), CO (0.1 – 10%), CO₂ (0.1 – 10%), CH₄ (0.1 – 10%) and C₂-C₅ hydrocarbons (0.1 – 10%) with backflush detector for C₆₊ compounds. • Argon or nitrogen will be the balance and this should be separated from other analytes of interest. • For the permanent gas channel, moisture and heavier compounds should be to backflushed using suitable valve configuration and channel must be configured with isolation valve to bypass CO₂ to TCD detector. • For the hydrocarbon channel, sample introduction should be with capillary S/SL inlet using suitable online sampling and liquid injection should be provided. Heavier hydrocarbons C₆₊ to be backflushed to FID and lower hydrocarbons with isomeric separation must be achieved

		<p>using suitable column.</p> <ul style="list-style-type: none"> • As part of the instrument 2 gas sampling valves for hydrocarbon and permanent gas analysis is to be provided. Permanent gas analysis must have the backflush facility to vent the heavier compound • All valves to be temperature controlled and should automated in function. • Suitable flow control should be quoted for the carrier gas control for each channel. • The full configuration must be presented in a flow diagram with clear description about the functionality of each of the components (valves, columns and detectors) with respect to the above mentioned analysis. • The chromatograms along with the condition of separation of all the proposed columns must be attached as proof. • The design of the equipment is such that all the control units are integrated into a single unit so that relocation is easier.
5	Hardware and components	<p>The hardware components of the GC should meet the following standards</p> <p>Column Oven</p> <ul style="list-style-type: none"> • Provision to install two or more columns • Operating temp range of oven from near ambient to 450°C • Oven temperature ramp rate of oven should be 120°C or better • Possible to program 15 temp ramps (16 plateaus) or better <p>Inlet:</p> <ul style="list-style-type: none"> • Should have capillary Split/Splitless injector as given below • Advanced electronic flow control modules with Pressure set points adjustable in increments of 0.001 psi upto 99 psi • Maximum Temperature range: upto 400°C Efficient gas saver mode built-in to reduce gas consumption during standby without affecting performance. • Capillary inlet can be connected to suitable gas sampling valve and backflush to detector valves. <p>Flame Ionization detector</p> <ul style="list-style-type: none"> • Maximum operating temperature should be 450 °C. • Minimum Detectable limit <1.4pg/ C/s for tridecane or any equivalent compound • Linear dynamic range >10⁷ • Data rate upto 450Hz and Detector gas flow control through Automatic Pneumatic control system.

		<p>Thermal Conductivity Detector</p> <ul style="list-style-type: none"> • Maximum operating temperature should be 400 °C. • Minimum detectable Level should be 400pg/mL for tridecane any equivalent compound • Linear dynamic range >10⁵ • Detector gas flow control through Automatic Pneumatic control. • The quote must include all the necessary accessories required to operate the equipment to its fullest potential. • Installation kit including syringes, swage connections, soap bubbler, column cutters, SS tube cutter, spanners, scre driver must be provided. <p>Accessories</p> <ul style="list-style-type: none"> • High purity gases required for the operation of GC will be arranged by us locally. However, the bid must include the gas purification panel for the gases and the required number of SS double stage gas regulators to operate GC.
6	Computer and software	<p>Software</p> <ul style="list-style-type: none"> • Suitable software for instrument control for all mentioned modules to be quoted • Parameters for all instrument modules associated with the instrument. Users can create new or load existing methods for a launched instrument, make modifications as needed and save the acquisition method with the same name or under a new one <p>Desktop</p> <ul style="list-style-type: none"> • Data Analysis should extensive review capabilities for GC data facilitating the use of the same integration, calculation, calibration and reporting across the all data file. The quote must also include 1 unit of desktop 6th generation Intel core TM i5-7500T processor (6MB Smart Cache, Intel HD Graphics 530 or Higher) RAM – 8GB DDR4. HDD – 500GB 7200 RPM SATA Motherboard – OEM Logo should be embedded, No sticker allowed. Operating System – Original Windows 7 or above 64 bit that is completely compatible with the equipment software. Monitor – 24 inch full HD IPS LED 1600X900 resolution with anti glare coating. Optical mouse wired. Standard keypad – wired. Ports – USB 2.0 ports (two numbers), USB 3.0 (one number), 1 DVD drive for seamless interface with the equipment and data download
7	Warranty	Five years of warranty from the date of installation. The warranty period should cover the replacement of faulty parts free of cost.
8	Eligibility	<ul style="list-style-type: none"> • The vendor must have supplied gas chromatographs to atleast 5 Centrally Funded Technical Institutes (only IITs/IISERs/NITs/IISc) in the last 3 years. • The contact details of the end users in such Institutes must

		be attached.
9	Service support	<ul style="list-style-type: none"> • The vendor must have a dedicated set of service engineers who can attend to the calls within 48 hours. • The engineers must be stationed in the states of Kerala, Karnataka or Tamil Nadu. • The contact details of the service engineers dedicated for GC must be mentioned.
10	Inspection & Acceptance criteria	<ul style="list-style-type: none"> • All the items as per the PO must be supplied. • Installation must be completed satisfactorily. • Training on hardware operation, software and simple troubleshooting techniques must be provided. • A run time for the complete separation of the above products not exceeding 15 min should be demonstrated.
11	Training	<ul style="list-style-type: none"> • The quote must include training of our personnel for 40 man hours by your factory trained staff.
12	Delivery	10 weeks from the date of PO. Any delays must be promptly communicate dto the Purchase Department of IIT Palakkad.