

DEPARTMENT OF CHEMICAL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY DELHI
HAUZ KHAS, NEW DELHI – 110016

Ref No: IITD/ChemEng/RP02880

Dated: 06/01/2015

NOTICE INVITING QUOTATION

Sub: Purchase of Gas Chromatography from IRD Project

Sealed quotations in separate envelopes of technical and commercial bid kept in a one sealed outer envelope are invited for purchase of '**Gas Chromatograph**' as per specifications given below. Your sealed quotation should reach latest by 5.30 PM on 27/01/2015 to **Head, Department of Chemical Engg., Indian Institute of Technology Delhi (IIT Delhi), Hauz Khas, New Delhi - 110016**. Your quotation should be superscribed '**Gas Chromatography**' dated 06/01/2015.

Specifications for Gas Chromatograph

- Gas Chromatography operating with programmable pneumatic control and should have Thermal Conductivity Detector (TCD) and Flame Ionization Detector (FID) detector and integral liquid/gas auto-sampler.
- Oven temperature range: - 99 °C to \leq 500 °C, Ramp rate: 0.1 to 45 °C/min with increment of 0.1 °C.
- Temperature programmer with 3 ramp, 5 plateaus in the time range of 0 to 999 min
- Instrument should have at least 12 programmable pneumatic control zones. 2 carriers with 2 zones each, 2 detectors with 2 zones each and 4 auxiliary channels.
- Control setting in ml/min, psig/min or kPa/min or cm/sec such as 0-100 ml/min, 0-200 cm/sec and 0-100 psi/min.
- Cool down time with different rates such as 250 °C to 50 °C in < 5 min, 200 °C to 50 °C in < 4 min, 50 °C to 0 °C in \leq 3 min and 50 °C to - 30 °C.
- Molecular Sieve, Poropak column should be provided and appropriate columns for analyzing H₂, N₂, O₂, CO, CO₂, and both lower and higher hydrocarbons, ketones, aldehyde, esters and acids alcohols

Auto sampler:

- Variable speed of injections.
- \geq 100 sample positions with vial size of 2 ml crimp-top and screw-top caps.

- Syringe size of min 0.5 μl to 50 μl with
- Viscosity setting between 0-15.
- Reproducibility of $< 0.5\%$ RSD for packed columns and 1% C_9 in C_7 , $\leq 1\ \mu\text{l}$ injected.

Injectors:

- Temperature range: 50 $^{\circ}\text{C}$ to $< 500\ ^{\circ}\text{C}$ with increment of $\leq 1\ ^{\circ}\text{C}$.
- Provide suitable fitting and column adapter.
- Should have programmed flow or pressure control.
- Types of injector: packed column injector, programmable split/splitless capillary injector and on-column capillary injector.

Thermal Conductivity Detector (TCD)

- Capable to operating with capillary column, software controlled flow for reference gas.
- Necessary safety protection to burnout filament.
- Temperature range: 50 $^{\circ}\text{C}$ to $< 500\ ^{\circ}\text{C}$ with increment of $\leq 1\ ^{\circ}\text{C}$.
- Minimum measurable/detectable quantity is $< 1\ \text{ppm}$ linear alkyl hydrocarbon (C_9H_{20})
- Constant current with various selectable settings.
- Single filtration timing is $\leq 50\ \text{msec}$ to 800 msec.
- Makeup gas in the required places.
- Linearity $> 10^5$
- High stable/ideal for long time operation.

Flame Ionization Detector (FID)

- Programmable pneumatic pressure/flow control for both hydrogen and oxygen/air.
- Proper design for air flow to prevent contamination of detector.
- Temperature range: 50 $^{\circ}\text{C}$ to $< 500\ ^{\circ}\text{C}$ with increment of $\leq 1\ ^{\circ}\text{C}$.
- Single filtration timing is same as TCD.
- Linearity $> 10^6$
- Input range 1-20.
- Minimum measurable/detectable quantity is $< 3 \times 10^{-12}\ \text{g C/sec}$ linear alkyl hydrocarbon (C_9H_{20}).

- All necessary accessories such as tubing, fittings, valves and power cables should be provided.
- Necessary software should be provided to carryout experiment and for analysis.
- All possible safety precautions should be incorporated in gas chromatography instrument.

Terms & Conditions:

1. The quotations must have validity of at least three months.
2. Quotation must include insurance and air-freight charges, delivery period of the items addresses to Indian Institute of Technology, Delhi, India (both FOB and CIF, New Delhi).
3. The products will be used for educational purposes. Any applicable academic institution discounts should be offered and stated.
4. Detailed brochures should accompany the offer.
5. If the bidder is an authorized dealer then the authorized Indian dealership certificate from the principles should be enclosed.
6. Warranty details must be given (At least 1 Year).
7. Payment will be through irrevocable letter of Credit.
8. In case the items are proprietary products of the company, a proprietary item certificate stating the same must be provided.
9. Installation and Training should be provided free of cost.
10. Compatible computer, printer, online UPS and related accessories may be provided.
11. Institute reserves the right to accept or reject any or all the quotations without assigning reasons thereof.

PFC has been held on 06/01/2015 and the above technical specifications have been finalized.

Chairman, PFC