



**INDIAN INSTITUTE OF TECHNOLOGY BOMBAY
MATERIALS MANAGEMENT DIVISION
Powai, Mumbai 400076.**

PR No. 1000026934 Rfx No. 6100001261

Detailed Technical Specifications GAS CHROMATOGRAPHY SYSTEM:

1. **The vendor should quote for the latest model available and should guarantee for the availability of necessary spares and service support for next 10 years from the date of installation of the instrument at site.**

2. The quoted reactor gas analyzer should be with following specification:

A. Reaction Gas Analyzer model and analysis requirement:

1. Single channel with universal and highly sensitive Barrier discharge Ionization Detector or equivalent for trace level analysis of highly dilute organic compounds and permanent gases.
2. Suitable GC configuration for analysis of gas stream from reactor outlet (1/8 inch connection)
3. **Complete analysis of permanent gases:** H₂, O₂, N₂, CH₄, CO & CO₂.
4. Analysis time: 20 minutes or better for complete analysis in a single injection.
5. Detection of permanent gases: 1 ppm to 1000 ppm
6. GC should provide repeatable and reproducible with RSD < 3% under widely varying lab conditions

B. Injector system for Gas sample:

1. Injector suitable for repetitive constant volume of gas sample injections
2. Helium Purged GSV (with 1ml loop) up to 175°C for Gas sample injection
3. Inert Split/Split less Injector with maximum temperature 450°C
4. Split Ratio 9999.9 :1 or better
5. Pressure range up to 1035 KPa
6. Stability of pressure up to ±0.1 psi

C. Columns:

1. Necessary columns for complete analysis of the mentioned application

D. Column Oven system:

1. Programmable column oven (32 ramps)
2. Maximum oven temperature 450°C
3. Oven temperature ramp up to 120°C/min.
4. Rapid oven cooling from 450°C to 50°C within 3.4 minutes or better
5. Settable time for each step: 9999.99 min

6. Temperature setpoint resolution: 0.1°C
7. Proper mounting of columns so that during cooling/any operation(shifting) columns should not get vibrated

E. Control system:

1. Gas flow/pressure in all the injectors, columns and detectors should be controlled by advance flow /pressure controllers (AFC/APC)
2. AFC flow range: 0 to 100ml/min with set-point resolution of 0.1 and flow rate ramps of up to 7.
3. APC should adjust the pressure resolution up to 0.1 KPa (0.001psi)
4. Carrier gas settings selectable for He, H₂, N₂ and Ar.

F. Valves:

1. Valve Diagram should be provided with the quotation.
2. All the Valve should be installed in external side oven box for easy accessibility of column Oven
3. Valcomake valves with purged housing should be provided.

G. Detectors:

1. BID (Barrier discharge Ionization Detector) for complete analysis of gas as mentioned above.
2. BID minimum detection limit: < 0.8 pg C/s (dodecane) He (carrier gas) and maximum temperature 350°C
3. Dynamic range: 1×10^5
4. Max acquisition rate: 2 ms (500 Hz)
5. Flow rate settings: Discharge gas (He): 0 to 100 mL/min

H. Data analysis and reporting:

1. Fully automated PC with original OS window10 or higher.
2. Intel i5 or better CPU with 8GB RAM or higher and data storage more than 1 TB
3. PC system with 19" LCD Monitor
4. Functional key board with alpha numeric display
5. Original licensed version GC software to be provided for compatibility and smooth operation with windows 10 OS.
6. The GC software should carryout simultaneous analysis and report generation
7. The report should have the chromatogram and the concentration of the individual components.
8. The raw data can be generated in both PDF and excel formats

I. Warranty:

1. 1 year from the date of installation with full service free of cost whenever it is required

J. Installation& commissioning

1. Supplier / Indian agent should install the instrument at IIT Mumbai and demonstrate and train the chemists/engineers at site for the operation, method development and routine maintenance of the instrument.
2. After Installation and Commissioning, Demo Should be given with both the Standards and real gas samples under both Online and Offline Analysis.