

## Technical Specifications for the Gas Chromatograph Mass Spectrometer

We would like to buy a gas chromatograph - mass spectrometer with the following specifications

### **GC Specifications**

The system should have a total of two Split/Splitless inlets (for a capillary column). System should be capable of supporting two inlets and two detector ports simultaneously.

System should have electronic pressure controls (EPC) for all the gases.

System should be supplied with the software, which is based on Microsoft Windows operating system for instrument control, data acquisition, data analysis, quantization, automation & customization with online and offline sessions provided.

System should have capability of locking / adjusting the retention time so that same Retention time can be reproduced from system to system and the method should be electronically transferred. NIST 2011 library along-with AMDIS and Deconvolution should be provided and also Retention Time Locked database for, VOC and Semi-VOC to be provided

System should be designed and manufactured under ISO9001 and should comply with most of international regulatory, safety and electromagnetic compatibility requirement

### **The instrument should meet the following requirements**

1	Provision to install two or more columns
2	Operating temp range of oven from near ambient to 450°C
3	Retention time repeatability should be <0.01%
4	The ramp rate of the oven should be a minimum of 60°C and a maximum of at least 100°C or better/min. The oven should be able to cool down in a maximum of 5 min or better
5	Possible to program 20 temp ramps (21 plateaus)
6	Flow sensor for control & storage of split ratio
7	Possible to use capillary columns of 50, 100, 250, 320 microns and Above
8	The pressure set points should be adjustable by increments of 0.001 psi up to 100 psi. Maximum temperature attainable should be 400°C or more
9	Inlets: Two split/split less Capillary inlets; both with EPC should be provided.
10	The system should have one ECD detector with the following specification or better: Minimum Detection Level: Min 4fg /Sec or better. Data Acquisition rate: up to 50 HZ. Detector should reach 400C temperature. Detector should have the facility to minimize the contamination and optimizes sensitivity.

11	The system should have one FID detector with the following specification or better: <ul style="list-style-type: none"> <li>• MDL: less than 2 pg N/s OR BETTER(SPECIFY THE COMPOUND)</li> <li>• Dynamic range: &gt; 10<sup>7</sup></li> <li>• Data acquisition rate: up to 500 Hz OR BETTER</li> </ul> All gases flow should be adjustable/controlled by software only.
12	NPD as optional detector with the following specifications should be quoted Minimum Detection Level: At least 0.1PG N /Sec or better. Data Acquisition rate: up to 200 HZ or better. Detector should reach 400C temperature. All gases flow should be adjustable/ controlled by software with no manual control.
13	2 (two) Six port Gas sampling valves along with the corresponding actuators should be installed in the system in such a way that each inlet is connected to one six port gas sampling valve for online gas sampling. each valve should be provided with 0.5 CC loop and two additional loops of 1CC each should also be supplied.
14	Pressure set point and Control precision to 0.001PSI
15	Instrument should meet the international safety standards.
16	The GC should be provided with necessary fittings to integrate FT-IR of any make in future with the help of hyphenation using the necessary optical/thermal interface of a third party. The presence of these accessories should not limit or restrict our usage and an independent GC

### MS Specifications

LAN based Quadruple MS system with an Inert source conforming to International safety standards, designed and manufactured under a quality system registered to ISO 9001 with appropriate computer & printer to support the system from original manufacturer. Should include turbo molecular pump with a minimum of 250 l/sec capacity with EI source

- Mass range: 2-1000 amu in 0.1 amu steps
- Scan speed: A minimum of 10,000 u/sec or better
- Mass stability should be at least 0.10 amu/48 hrs (specify stability and time)
- Ion source temp - up to a minimum of 350°C for better sensitivity for active compounds and it should be programmable.
- Transfer line temp - Should be in the range of 100-400°C
- Quadrupole temp: Quadrupole should be able to be heated up to 100-200°C to keep quadrupole clean for a longer period.
- Ionization energy: Should be in the range of 5-200eV
- Ionization current: Should be in the range of 1-300μ A

- EI source should be inert to active compounds and should be programmable with maximum temp of 350<sup>0</sup>C
  - EI scan sensitivity and is a must parameter to demonstrate at least: 500:1 S/N for 1 pg of a standard sample when scan in the complete range of the molecule at its parent ion.
  - EI SIM Instrument detection limit of 10 fg or better for any standard compound.
  - Mass Spectrometer must utilize a Quadrupole Mass filter.
  - Auto tuning facility should be built in for BFB, DFTPP.
  - Spectral libraries: NIST latest version should be supplied with the instrument.
  - Mass spectrometer control: Auto and manual tuning capabilities for user-definable ionization voltage, lens voltage, electron multiplier voltage etc.
  - **Data collection and analysis system:** A user friendly automatic data collection and analysis system compatible with Microsoft Windows OS and Microsoft Office suite applications. The software should support Single Ion Monitoring and scan mode.
- 

- Computer, monitor and printer of latest model of brand names and latest version of software should be supplied along with the instrument.
- Consumable spares for one year, optional GC detectors such as FID, ECD, TCD and NPD should be quoted.
- All the necessary high pure gases to operate the GC-MS with the cylinders with the corresponding regulators of high quality, gas purification panels and necessary UPS should be supplied with the system.
- **Other terms and conditions**
  - The system must be factory tested and a certificate should be provided.
  - The system should have a 10 year value guarantee.
  - A minimum of three years warranty should be provided. Any additional years of warranty may also be given.
  - The system should be installed by the company professionals at our site. A thorough technical training in analyzing and troubleshooting should be given by the technical professionals.
  - Syringes, mechanical accessories for the operation and maintenance of the instrument should be provided to meet our needs for at least 5 years.
  - A minimum of two general purpose capillary columns should be supplied with the system

- **A list of references in India, where similar systems have been installed, must be provided and this will be taken very seriously while making the decision. Your post sales service feedback will be certainly a deciding factor.**