

## Technical Specification for Gas Chromatography – Mass Spectrometer

Sl. No	Component	Specification
1	<b>General</b>	<p>System should be designed and manufactured under ISO-9001. The chromatography data system should be based on Microsoft Windows operating system for instrument control, data acquisition and data analysis.</p> <ol style="list-style-type: none"> <li>1. Must be able to configurable at least 3 inlet, 4 detectors.</li> <li>2. Retention time repeatability should be &lt; 0.0008 min and Peak area repeatability &lt; 1 % RSD.</li> <li>3. Integrated leak check function allows you to easily check for leaks and extensive self-diagnosis function with safety features.</li> <li>4. Should perform automated baseline check and user defined system suitability test in a sequence for standard detectors.</li> </ol>
2	<b>Column Oven</b>	<ol style="list-style-type: none"> <li>1. Minimum two suitable capillary columns.</li> <li>2. Temp. Range: Ambient + 4 to 450°C.</li> <li>3. Ramp rate: maximum 100°C/min or more.</li> <li>4. Cooling rate: 450°C to 50°C within 4 min or better with optional cooling ramps.</li> <li>5. Built-in oven light that facilitates column installation should be available.</li> <li>6. Should have oven power safety (power off when door is open)</li> </ol>
3	<b>Split/Splitless injector port – 1 No</b>	<ol style="list-style-type: none"> <li>1. Split/split less capillary inlet.</li> <li>2. Maximum temperature: 450°C</li> <li>3. Split ratio: 7000:1 or more.</li> <li>4. Pressure setting range 0 – 150 psi with control of 0.001 psi for whole range.</li> <li>5. Carrier gas Flow Control should have Constant flow, constant pressure.</li> <li>6. Pressure program ramps: Minimum 5 steps.</li> </ol>
4	<b>Detector - FID</b>	<ol style="list-style-type: none"> <li>1. Minimum detection level should be around 1.2 pgC/s for dodecane or equivalent compound.</li> <li>2. Temperature range of up to 450°C.</li> <li>3. Able to automatically control up to 3 channels of gas, i.e. H<sub>2</sub>, make-up and Zero grade Air.</li> <li>4. Must have an acquisition time of 2 ms (500Hz) or better.</li> <li>5. Must provide fast flame out detection and efficient automatic re-ignition.</li> <li>6. Dynamic range should be up to 10<sup>7</sup></li> </ol>
5	<b>Auto Injector</b>	<ol style="list-style-type: none"> <li>1. Automated liquid sampler with 150 Vials capacity.</li> <li>2. Should able to inject sample volume 1 to 80% of</li> </ol>

		syringe capacity or better
6	<b>Single Quadruple Mass Spectrometer</b>	<ol style="list-style-type: none"> <li>1. Ionization modes: EI &amp; System should have dual filament design with automatic switching.</li> <li>2. Ion Source temperature: upto 350°C.</li> <li>3. Electron energy range upto 200eV or better.</li> <li>4. Mass Range: 1.5 to 1000 amu or better.</li> <li>5. Mass analyzer: Quadruple should be of solid metal, with pre- rods for matrix elimination or equivalent.</li> <li>6. Vacuum pump: Dual inlet/stage Turbomolecular pump (&gt;250 L/s) Ionization.</li> <li>7. Mass axis stability: <math>\pm 0.1</math> amu over 48 hours.</li> <li>8. Mass resolution: Unit mass.</li> <li>9. Detector: Sealed long-life electron multiplier tube.</li> <li>10. Scan rate: 20,000 amu/s or better and should retain sensitivity for all higher scan rate acquisition.</li> <li>11. EI Scan sensitivity: 2000:1 for 1pg of OFN for the mass m/z 272 using 30 m column</li> </ol>
7	<b>Software</b>	<ol style="list-style-type: none"> <li>1. Suitable software for performing data analyses, calibration, blank correction, data import, export, handling and reporting.</li> <li>2. Must be able to review quantitative peak identification in a single environment that includes quantitation tables, calibration curves, raw spectra, background subtracted spectra, ratios plots etc.</li> <li>3. Must have built-in reporting functionality to generate industry-standard reports with the ability to customize report templates as necessary.</li> <li>4. Automatically create SIM from acquired Scan data and optimizing tool for SIM group creation with dwell time for better repeatability and peak profile.</li> <li>5. Instrument acquisition, acquired data analysis and reporting should have be built based on the Retention indices through automated features.</li> </ol>
8	<b>Database and software</b>	NIST 2020 library with license, Library data base in CD ROM should be provided
9	<b>Capillary Columns</b>	<ol style="list-style-type: none"> <li>1. The following capillary columns must be provided along with the system.</li> <li>2. HP5-ms/DB5-ms or equivalent</li> <li>3. Zebron 5-HT or equivalent</li> <li>4. Heliflex® ATT-35ms (or equivalent)</li> <li>5. Heliflex® ATT-5ms or equivalent</li> </ol>
10	<b>Computer</b>	The PC should meet the minimum requirements such as desktop with thei-5 processor, 8 GB RAM, 1 TB, Windows 10 or better, and 28 inches or more LED monitor.

11	<b>Accessories required</b>	<ol style="list-style-type: none"> <li>1. Gas cylinders for Carrier gas and detector gas should be provided.</li> <li>2. Two stage Cylinder Regulator with Brass Chrome plated body with S.S. Diaphragm for Carrier gas and Collision gas, should be included.</li> <li>3. Suitable Gas Purification &amp; Control Panel with pressure Regulator for Carrier gas and Collision gas should be provided</li> </ol>
12	<b>Warranty</b>	Minimum 3 years warranty with 2 years free service
13	<b>Vendor eligibility criteria</b>	<ol style="list-style-type: none"> <li>1. A list of at least 3 Institutions/R&amp;D units/Industries where similar instruments have been supplied in India, including contact details (name of the person-in-charge, email, and phone number), should be provided.</li> <li>2. The quoted model's three performance certificates in reputed institutions in India should be enclosed duly signed and stamped by the concerned scientist.</li> </ol>