

## Technical Specifications for GC-MS-MS

### GC-MS-MS-Specifications

System should be IEC and ISO Certified and be capable of supporting analysis of volatile organic compounds, metabolite identification, should have inlet equipped with Automatic pneumatic controls for all the gases and should have Chromatography Data system which is based on Microsoft Windows operating system for instrument control, data acquisition, chromatographic deconvolution and library (qualitative and quantitative data)

Gas Chromatography	Specification
Column Oven	<ul style="list-style-type: none"> <li>• Column oven should have provision to install two or more columns</li> <li>• Operating temp range of column oven from near ambient to 450°C</li> <li>• Column oven temperature ramp rate of oven should be 110°C or better</li> <li>• Column oven should have possibility to program 15 temp ramps (16 plateaus) or better</li> <li>• Oven cool down (22 °C ambient) 450 to 50 °C in 5.0 min</li> <li>• Oven power must turn-off automatically when the lid/door is opened</li> </ul>
Inlets	<ul style="list-style-type: none"> <li>• GC should be configurable with capillary split/Splitless injector.</li> <li>• Split/Split injector with maximum temperature of 400°C</li> <li>• Inlets should have Advanced electronic flow control modules with pressure set points adjustable in increments of 0.001 psi and pressure range up to 100 psi.</li> <li>• Inlets System should have Gas saver mode to reduce gas consumption without compromising performance and Inlet sealing system is built in standard for quick, easy, injector liner change for quick maintenance of liner</li> <li>• Inlets Split ratio up to 6000:1 and suitable for all capillary column from 50um to 530um.</li> </ul>
Autosampler	Autoliquid sampler with 15 vial or better capacity
<b>Tandem Mass Spectrometer (Triple Quadrupole)</b>	<b>The following are specifications for a Mass Spectrometer which is to be interfaced in the Gas Chromatography</b>
Specification	<ul style="list-style-type: none"> <li>• One dual stage turbo molecular vacuum pump for creating high vacuum with ion gauge controller and suitable Rotary-vane fore line pump supporting the turbo molecular pump</li> <li>• Non-coated inert EI source with dual filament heatable up to 350°C.</li> <li>• Quadrupole should be made up of inert non-metallic material with preferably hyperbolic shape and heatable up to 200°C</li> <li>• Mass range (m/z) up to 1,000amu</li> <li>• Mass axis stability should be 0.10 amu/24 hours.</li> <li>• Scan rate (electronic) of 20000 u/s or better.</li> <li>• Mass resolution, 0.7 to 2.5 daltons</li> <li>• Hexapole collision cell with Nitrogen/Argon as collision gas.</li> <li>• Minimum MRM dwell time must be at least 0.5msec</li> <li>• MRM speed up to 800 transitions/sec</li> <li>• Collision Energy must be selectable up to 60eV</li> <li>• Should have independently heated GC/MS interface</li> <li>• EI MRM IDL 4 fg or less octafluoronaphthalene (OFN) Statistically derived at 99 % confidence level from 8 sequential for 10 fg/μL OFN injection for MS/MS transition of m/z 272 &amp; 222 using 30m column</li> <li>• EI MRM S/N: 14,000, 1 μL of 100 fg/μL of OFN S/N for the transition of m/z 272 &amp; 222 using 30m x 0.25mm ID x 0.25um column</li> <li>• PCI S/N Sensitivity: 2,500:1 RMS S/N for 5 pg/μL benzophenone (BZP) for the MS/MS transition of m/z 183 &amp; 105 using methane as reagent gas and 30m x 0.25mm ID x 0.25um column.</li> </ul>

	<ul style="list-style-type: none"> <li>• NCI SIM Sensitivity: &gt; 2,000:1 RMS S/N for 100 fg/μL OFN for m/z 272 using methane as reagent gas and 30m x 0.25mm ID x 0.25um column</li> </ul>
Software Features	<ul style="list-style-type: none"> <li>• Suitable PC with preloaded software tools should be quoted</li> <li>• Suitable data acquisition software to acquire the data that has optimization tools like determination of precursor and product ions from Scan/SIM data and Optimization of collision energy (CE)</li> <li>• Identification of compound spectra with standard libraries and includes chromatographic deconvolution with retention index using application specific database</li> <li>• Should have Suitable Quantitation tools for Scan, SIM and MRM datasets.</li> </ul>
Library and Database	<ul style="list-style-type: none"> <li>• The system should be supplied with fully compatible Fiehn Metabolomic GC/MS Library Contains 1000+ compounds with GC/MS retention time indexed and spectral matching for primary metabolites and NIST library. Suitable Column and method setup kit accessories to be quoted to setup the method.</li> </ul>
Accessories & other Items	<p>One quantity of each item to be supplied along with the instrument</p> <ul style="list-style-type: none"> <li>• Syringe, 10 uL</li> <li>• Ferrule, 0.5mm Graphite 0.32 col 10/PK</li> <li>• Ferrule, 0.4mm VG cond .25 col lng 10/PK</li> <li>• Septa Non-Stick BTO Inlet 11mm 100 pk</li> <li>• Column nut, universal 2/PK</li> <li>• Column Nut for MS interface</li> <li>• Liner, UI, splitless, single taper, GW, 5/pk</li> <li>• Liner O-Ring, Non-Stick 10PK</li> <li>• Filament, high temperature EI for GCMS</li> <li>• CI Filament- 2PK</li> <li>• Fiehn GC/MS Metabolomics standards kit</li> <li>• DB-5MS 30m, 0.25mm, 0.25um, 10m DRGRD</li> <li>• 2 mL Wide Opening Screw Top Glass Vials 100/PK</li> <li>• Screw Caps for 2 mL Vials 1Pk</li> </ul>
	<ul style="list-style-type: none"> <li>• Required installation kit to be provided.</li> <li>• Required accessories should be quoted along with the system such as Helium &amp; Nitrogen Gas purifier panel and tubing and methane gas cylinder with regulator.</li> <li>• Suitable 10 KVA online UPS with 30 minutes back up facility.</li> </ul>
Training	<ul style="list-style-type: none"> <li>• Must be provided at the Customer site as well as Manufacturer's/Dealer's facility in India</li> </ul>
Warranty	<ul style="list-style-type: none"> <li>• Three years Comprehensive Warranty from date of installation of equipment</li> <li>• Rates should be quoted for Annual Maintenance Contract (AMC) for 4<sup>th</sup> and 5<sup>th</sup> year.</li> </ul>