

## Technical Specification

### GC-MS/MS System (Triple Quadrupole Gas Chromatograph Mass Spectrometer (GCMS/MS)

A Computer Controlled bench top GCMS Triple Quadrupole Mass Spectrometer is required for Food and Drug analysis having following minimum specifications

<b>1. Mode of GCMSMS</b>	System should have full scan/SRM/MRM, product ion scan modes
<b>2. Ion Source</b>	It should have a EI and CI source with source lenses, RF lens and dual filaments in all ionization modes, programmable up to 350°C
<b>3. Software Features</b>	It should have automated SRM/MRM development. It should have automated acquisition window adjustment based on retention time and compound based acquisition method setup.
<b>4. Quadrupole Assembly</b>	The quadrupole should have heated, off-axis ion guide for noise reduction and solid, homogenous, non-coated quadrupole rods or heated gold quartz.
<b>5. Detector</b>	The detection system should be with off-axis dynode, discrete dynode electron multiplier and electrometer, linear range of $>10^{-7}$ (0-68uA)
<b>6. Mass Analyzer</b>	The mass range should be from 10-1000u or better MS should have scan speed up to 6,000 u/sec or better and up to 300 SRM/s transition. System must be offered a single stage dual inlet turbomolecular pump System should have an adjustable electron energy from 10eV to 150eV or more with emission current up to 350uA and improved regulation at low current. Transfer line temperature should be up to 350°C
<b>7. Gas Chromatograph</b>	MSMS system should be supplied with latest fully electronic pneumatic controlled gas chromatograph with below specification
<b>7a. SSL Injector</b>	Split/ Splitless modules should be available with temperature up to 400°C with 970 Kpa or better digitally controlled carrier gas with gas saver and septum purge.
<b>7aPTV Injector</b>	Temperature Range: air forced cooling to ambient +5 °C up to 450 °C Temperature programming of up to 3 ramps at up to 870 °C/min. Split Ratio: up to 7500:1 Pressure Range: 0-1000 kPa (0-145 PSI) Total Flow Setting: – Control of split flow in 1 mL/min from 0 to 1250 mL/min – Purge flow from 0 to 50 mL/min
<b>7b. Auto sampler &amp; Headspace Sampler</b>	Auto sampler should be capable having both liquid and headspace injection facility .Head space sampler should have at least five) vial incubation oven capacity or more
<b>7c. Oven Temperature</b>	The operating temperature range should be 5°C above ambient to 450°C
<b>7d. Oven ramp/ plateau cool down</b>	It should have number of ramps/ plateau: 9 or more and maximum heating rate should be 120°C/min or better
<b>7e. GC Analytical Performance</b>	The GC should have a retention time repeatability off <0.0008 min or better and the peak area repeatability should be <0.5% RSD or better
<b>7f. FID Detector</b>	Flame Ionization Detector module: high performance in terms of sensitivity and dynamic range featuring acquisition rate as high as 300 Hz; MDL < 1.5 pg C/s or better; linear dynamic range = $>10^7$ ( $\pm 10\%$ ); capillary column compatible with 1/8" and 1/16" packed column; Flameout detection and automatic reignition; Max T = 450 °C;
<b>8. Data System:</b>	System should be offered with suitable PC and Printer. Data system should have software for controlling and acquiring all the MS and conventional detectors. It should have separate dedicated software for reporting for environmental and food safety domain as per international protocols. The latest version of the 2014 NIST software should be included.

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<b>9. Installation Specification</b>	EI SRM: 1ul of 100fg/ul octafluoronaphthalene (OFN) should produce the following minimum S/N ratio for the transition from m/z 272 to m/z 222, 8000:1 using helium as carrier gas.
<b>10. Instrument detection limit</b>	<b>0.5fg</b> or less OFN derived at the 99% confidence level from area precision of eight sequential injections of 1 ul, 10fg/ul OFN, acquired.
<b>11. Columns</b>	DB1-2Nos, DB5-5Nos or equivalent - 30 mtr X 0.25 $\mu$ id along with other required columns for our application like DB-Wax 30mtr x 0.25 , 025 Microns DB-23 30mtr x 0.25 , 025 Microns & DB-HP 88 100mtr x 0.25 , 0.2 Microns
<b>12. Spares</b>	1. Filament Cartridge – 04 nos 2. Injection Port Septa – 200 nos 3. 2 ml vials and caps(Screw type) for auto sampler – 200 nos 4. Graphite Ferrules for Capillary columns of 0.25 and 0.32 mm id – 25 each 5. Glass Liners for Split and Split less injections – 05 each. 6. Auto sampler Syringe -5 nos 7. 1 Vial of tuning Solution

**Accessories :**

1. He, Ar, H<sub>2</sub>, N<sub>2</sub>, Zero Air Gas Cylinders with SS regulators with Gas purification Panel. ( 2Nos each) - **BOC gases or equivalent**,
2. Gas Manifolds, Mixer- **BOC gases or equivalent**
3. Grinder, Vortex Mixer - (**Indigenous**),
4. Tissue Homogeniser –Low volume and High Volume, (**Indigenous**),
5. Vacuum Concentrator - Low volume and High Volume , (**Indigenous**),
6. **Centrifuge** Refrigerate cooling with 10000RPM along with 2, 15 and 50 ml rotor head - **Imported**
7. Centrifuge tubes (1000 each- PTFE material). - (**Indigenous**),
8. Top pan Balance (1500gm, 0.01gm **Mettler, Sartorius, Precisa Make or Equivalent** ),
9. Analytical Balance ( 35/120g or better , 0.01mg/0.1mg). - 2 NO's ( **Imported**)
10. Micropipettes with 1000 tips each (1ml, 5ml , 100microlitre, 200 microlitre)- 2 each,- **Imported**
11. **1.5 ton Air conditioner** five star rated with stabilizer should be provided.-2 Nos - (**LG, Samsung, Hitachi or equivalent** )
12. On line UPS for full system ( Minimum 20 KVA ) with **60 Minutes** of Back up (**Uniline, Jackson or equivalent** )

**Other Terms & Conditions:**

1. Manufacturer of Equipment & Accessories should be ISO 9001 / ISO 13485 certified.
2. Equipment and Accessories should be US FDA / European CE certified by Notified Body.
3. **Guarantee:** Three years on equipment, accessories and all peripherals / sub systems from the date of installation, which Includes 4 visits and unlimited breakdown calls by service/application support engineer during the Guarantee period.
4. Basic training for a period of not less than **two weeks** after installation of the equipment to technical personnel includes Operational & Trouble shooting training as and when required.
5. Manufacturer should provide an Training Instructor for initial 6 month (minimum) to train on duty staff and after 6 month as per demand of user department as an when required.
6. Installation will be done by supplier free of cost including all parts like wires, tubes, joints & attachments, small fixtures etc.
7. **Firm should mention all the pre-installation requirements in technical bid.**
8. Technical Compliance statement should be submitted in Technical Bid Documents, along with every above mentioned point should be submitted with relevant literature, specification sheets and brochures. Any deviation from specifications should be clearly mentioned in compliance statement.
9. **Comprehensive Maintenance Service: The CMC may be awarded for five years (on yearly basis) after Guarantee period of three years. CMC should be quoted in BOQ inclusive of Excise Duty & exclusive of VAT/CST etc.) plus service tax (as applicable) .**
10. Manufacturer should provide SOP , I.Q & O.Q etc. as per System requirements.
11. **QuEChERS for fruits and vegetable , pulses and food grains , milk and butter etc. should be provided 10 Boxes ( Contains Minimum 50 No's) along with Instruments .**
12. **Imported Quality (NIST Certified) Standard Mixtures of below mentioned Pesticides should be provided (1000 PPM Concentration) for Method Developments.**

Sr.No.	Pesticide (Smallest Pack / Kit)
1	Aldrin
2	Dieldrin
3	Chloradane(cis & trans)
4	Chorothalonil
5	DDT
6	OPDDD
7	PPDDD
8	OPDDE
9	PPDDE
10	OPDDT
11	PPDDT

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12	Dicofol
13	Endosulphan
14	Endosulphan alfa
15	Endosulphan bita
16	Endosulphan sulphate
17	Endrin
18	HCH (A&B)
19	Heptachlor
20	Lindane
21	4-bromo-2chlorophenol
22	Acephate
23	Chlorfenvinphos
24	Chlorpyriphos
25	Chlorpyriphos Methyl
26	Diazinon
27	Dichlorvos
28	Dimethoate (including Omethoate)
29	Ethoin
30	Etrimphos
31	Fenitrothion
32	Iprobenphos
33	Malathion
34	Methamindaphos
35	Monocrotophos
36	omethoate(refer to Dimethoate)
37	Oxydemeton-methyl
38	Parathion ethyl
39	Parathion-methyl
40	Phorate
41	Phosalone
42	Phosphamidon
43	Profenophos
44	Quinalphos
45	Triazophas
46	Cyfluthrin
47	Cypermethrin
48	Deltamethrin
49	Ethofenprox
50	Fenvalerate & Esfenvalerate (sum of RR & SS isomers)
51	Fenvalerate & Esfenvalerate (sum of RS & SR isomers)
52	Lambda-cyhalothrin
53	Permethrin
54	Atrazine
55	Simazine
56	Metaxyl
57	Carbaryl
58	Carbofuran
59	Carbosulfan
60	Endoxacarb
61	Methomyl
62	Thiodicarb(see methomyl)
63	Fenarimol
64	Bitertanol
65	Fulsilazole
66	Hexaconazole
67	Myclobutanil
68	Penconazole
69	Proplconazole
70	Tebuconazole
71	Triadimefon
72	Triadimenol
73	Difenconazole
74	Captafol
75	Captan
76	Iprodione
77	Carbendazim(including bebomyl)

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78	Thiophenate-methyl
79	Acetamipride
80	Clothianidin
81	Imidacloprid
82	Thiacloprid
83	Thiamethoxam
84	Dimethomorph
85	Buprofezin
86	Spinosad (sum of sponosyn A+D)

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**Executive Director (EPM)**  
**Rajasthan Medical Services Corporation Ltd,**  
**Jaipur**