

Appendix

Sr.No.	Parameter	Specification
1	System	Microprocessor based modular/ integrated GC system with auto Injection Port with Advance Flow Controller (AFC) and high sensitivity FID with APC/EPC (Digitally controlled) for operation on 220-240V for general chemical analysis The Gas Chromatograph should be dual channel & have capabilities for flexible upgradation in future.
2	Display	PC control or Manual Control with Display for the complete control of the system. Display or user interface should be able to control and set GC parameters, alter methods, monitor system including chromatograms. Operating conditions should be controllable from either the built-in keyboard or via an external computer based control system
3	Oven	Standard dimensions around 15-20L and should accommodate 2 standard (capillary+packed) columns.
4	Oven Temperature	Ambient Temperature $\pm 5^{\circ}\text{C}$ to 350°C / 450°C with accuracy $\pm 0.1^{\circ}\text{C}$ Should allow maximum time of 999 min for steps Resolution 1°C or better Maximum number of steps with more than 20 temperature stages Correction function in temperature programmed run to automatically adjust pressure to maintain flow Compensation for barometric pressure & ambient temperature should be available as standard and electronic pneumatic control or similar is required Typical cool down time from 450°C - 50°C in <5- 8 min or better Should support isothermal programming
5	Auto Injector	Programmable auto Injector with 6 or more vials and should be able to upgrade to additional tray of up to 100 samples vials in future. Split, split less injection unit Injection volume liquid from $1\mu\text{l}$ to $10\mu\text{l}$ by auto-sampler or better Temperature Program: up to 400°C with split ratio of 1:200 or better Less than <1-0.5% RSD area reproducibility Fully programmable dispense rate, draw rate, and injection rate Maximum flow Rate: 0 - 1250ml/min for H ₂ or He, 0 - 200ml/min for N ₂ . Should support high pressure, on column injection, Fast and default injection types Should be compatible with narrow, broad bore standard columns It should have necessary sensors to detect sample vial, whether sample is grasped and injected etc.

6	Detector	<p>Instrument should be supplied with standard FID detector with following specification or better.</p> <p>Instrument should provide auxiliary port to install another extra detector</p> <p>Flame Ionized Detector: High sensitivity FID Detector with temperature range up to 400°C or more with possible Steps of 1°C</p> <p>Minimum detection limit for FID of 1.5 pgC/s for Dodecane or better accuracy with dynamic range of 10⁷</p> <p>Automatic ignition and re-ignition of FID flame through manual switch and software</p> <p>Quartz coated nozzle for less contamination is preferred</p>
7	Other	<p>Arrangement to be done for future interface with Mass detector.</p> <p>Optionally quotations for</p> <ol style="list-style-type: none"> 1. TCD detector: Dynamic range of 10⁵ with sensitivity of 40,000 mV.mL/mg 2. Headspace injector with around 12 vials compatible with auto injector 3. Methaniser 4. Gas sampling ports and assembly
8	Output	Extra 2 or more auxiliary output required for optional detector system
9	Column	One Capillary Column (DB5/HP5 30 mt or equivalent from renowned brand) should be provided with the system
10	Flow Controller	Automatic flow controller (with digital setting is preferable)
11	Gas purification assembly	Standard installation (oxygen, moisture and catalytic traps)
12	Voltage Stabilizer	Standard (around 12.5 KVA) Servo Stabilizer or any equivalent standard stabilizer.
13	Cylinders and Regulators	N ₂ , H ₂ and Air Cylinders 47 Litters filled Grade 1 gases, with double stage pressure regulators including all required tubing and installation requirements should be included
14	Software	<p>A latest windows (windows10 preferably) compatible software to operate, control, monitor GC, pre, post analysis of chromatograms and overall instrument control.</p> <p>Electrical system, flow control systems and sensors should be fully supported by the operating software.</p> <p>Software should have Self-diagnosis functions to indicate errors, system status and monitor status before every injection.</p> <p>GLP, GMP, IQ, OQ and USP compatible</p> <p>Free updates should be supplied time to time as per policy.</p> <p>All software & database shall be quoted with appropriate part numbers & description only. No pirated copies of any software or database shall be accepted.</p>
15	Computer & Printer	Branded PC Core i5 Processor 8GB RAM, 1 TB HDD, 21" LCD and Laser Printer with latest original windows software loaded and should be compatible with current GC software
16	After Sales Service	<p>A Comprehensive warranty for a period of 2 years from date of installation should be offered on the entire system. The warranty should cover all necessary/essential spares/parts of the GC system except routine consumables</p> <p>All essential consumables should be quoted optionally for trouble free operation of GC system for a period of 2 years.</p> <p>AMC should be quoted in INR separately for a period of 2 years after completion of warranty.</p>

17	Accessories	Standard Accessories for GC installation including liquid syringe Set of fuses - 1 Set SS tubing for gases - 3 Nos Instruction manual - 1 No. SS nut & ferrule - 50 Nos. Set of Tools - 1 Set
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