



**INDIAN INSTITUTE OF TECHNOLOGY BOMBAY  
MATERIALS MANAGEMENT DIVISION  
Powai, Mumbai 400076.**

Ref. No. 21-22/67 (PR: 1000022923)

RFx. No.610000955

**Specifications for Gas Chromatograph**

Sr. No.	Specification	
Automatic, computer-controlled Gas Chromatograph Analyser required for analysis of gaseous mixture containing permanent gases H <sub>2</sub> , CO, CO <sub>2</sub> , O <sub>2</sub> and N <sub>2</sub> .		
1.	GC	Large Graphical LCD based display to view Realtime Chromatogram and their Parameters such as temperature sensors and carrier gas supply pressure.
1.1		An automatic computer controlled dual channel gas chromatographic system , capillary/ packed columns, column switching valves, oven, flow control systems detectors, gas sampling devices with appropriate valves & fittings, and powerful and versatile software capable of analyzing gases/liquid.is required. <b>The Valves and Columns must be factory fitted only.</b>
1.2		Should be capable of mounting 3 injectors and 4 Detectors.
1.3		Should be equipped with Intelligent self-diagnostic functions for detailed diagnosis of the septum, glass insert usage status, temperature sensor error, gas supply pressure, status of each gas ignition function etc.
1.4		Should be manufactured as per ISO 9001 and in full compliance with international regulatory, safety, and electromagnetic compatibility requirements
2	Column Oven	
2.1	Capacity	Minimum 15L or above
2.2	Temperature Range	Ambient + 10°C to 400°C
2.3	Temperature Program ramps	Minimum 20 or more
2.4	Max temperature program rate	Minimum 60°C/min or more
2.5	Cooling time	300 °C to 50 °C within 6 min (at 25 °C ambient temperature) or faster
2.6	Maximum run time	At least 9999 min or more
3	Automatic Gas Sampling Valves	Factory fitted 6 or 10 port gas sampling valves (Valco makeonly) – 2nos. or more in combination. Include a copy of theplumbing diagram

4	Thermal Conductivity Detector (TCD)																											
4.1	Max Operating temperature	400°C or more																										
4.2	Sensitivity	200 pg tri-decane/mL or <10 microvolt per ppm or >40000 mV x mL/mg (Decane)																										
4.3	Dynamic range	10 <sup>5</sup> or better																										
5	Sample Injection	Suitable sample injection port to introduce sample through gas tight syringe.																										
6	Automatic Gas Flow / Pressure Controller	Automatically compensates for variations in atmospheric pressure and temperature																										
6.1	Pressure range	0 to 140 psi																										
6.2	Pressure program ramps	Minimum 7 or more																										
7	Software	64-/32-bit Windows 10 compatible workstation software with minimum 4 Channel to be quoted of same make - Multi channel real time chromatographic data acquisition and post-run analysis should be possible. - Software should be with high-speed data acquisition and bulk analysis compatibility - Full qualitative & quantitative processing functions, multi-function compatibility, GLP/GMP functions, Audit Trail, Validation Assistant, Column Performance function, System Suitability, QA/QC functions - All in-one file configuration for easy data, transfer, customized report generator, networking capability, data management etc.																										
8	Columns	Suitable columns as per below analysis requirement to be provided.																										
		<table border="1"> <thead> <tr> <th rowspan="2">Name of Compound</th> <th colspan="2">Concentration Range</th> </tr> <tr> <th>Low Conc.</th> <th>High Conc.</th> </tr> </thead> <tbody> <tr> <td>H<sub>2</sub></td> <td>0.01%</td> <td>30%</td> </tr> <tr> <td>O<sub>2</sub></td> <td>0.01%</td> <td>50%</td> </tr> <tr> <td>N<sub>2</sub></td> <td>0.01%</td> <td>90%</td> </tr> <tr> <td>CO</td> <td>0.01%</td> <td>20%</td> </tr> <tr> <td>CO<sub>2</sub></td> <td>0.01%</td> <td>30%</td> </tr> <tr> <td>Sample status</td> <td colspan="2">Gas</td> </tr> <tr> <td>H<sub>2</sub>O existence</td> <td colspan="2">Yes</td> </tr> </tbody> </table>	Name of Compound	Concentration Range		Low Conc.	High Conc.	H <sub>2</sub>	0.01%	30%	O <sub>2</sub>	0.01%	50%	N <sub>2</sub>	0.01%	90%	CO	0.01%	20%	CO <sub>2</sub>	0.01%	30%	Sample status	Gas		H <sub>2</sub> O existence	Yes	
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9	Other items	Suitable sample loop, gas supply pipes & filter kit should be included.																										
10	Warranty	12 months from date of installation.																										
11	Installation & training	Installation of the instrument to be done at IIT Bombay campus, at free of cost. Operational training to be provided to respective group of research fellows. The scope of supply consists installation, commissioning,																										

		training of system at IIT Mumbai laboratory. System to be supplied with test chromatograms, method set up parameters, plumbing diagram, and schematics from factory.
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