



**INDIAN INSTITUTE OF TECHNOLOGY BOMBAY**  
**MATERIALS MANAGEMENT DIVISION**

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**Specification for Ion Chromatography (IC) System with accessories**

| Sr. No | Item Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Detailed Technical Specification                                                                                                                                                                             | Technical Compliance<br>(Yes / No) | Additional Information<br>( if any ) |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|--------------------------------------|
| 1.     | <b><u>Ion Chromatography (IC) System with accessories</u></b><br><br><b>General technical specifications for Ion Chromatography (IC) System:</b><br>Complete turnkey system including Ion Chromatography (IC) unit, autosampler, columns, suppressors, detector, software, workstation, UPS, consumables, spares, installation, training, and validation. The IC system must provide high-precision analysis of anions (Fluoride, Acetate, formate, Chloride, chlorite, bromate, nitrite, bromide, nitrate, benzoate, phosphate, sulfate, arsenate, oxalate other anions in environmental samples in a single column), cations ( $\text{Na}^+$ , $\text{K}^+$ , $\text{Li}^+$ , $\text{NH}_4^+$ , $\text{Ca}^{2+}$ , $\text{Mg}^{2+}$ and other cations in environmental samples in a single column), PFAS, and organic acids from complex environmental matrices including wastewater, groundwater, sludge, and soil. |                                                                                                                                                                                                              |                                    |                                      |
| 1.1    | Measurements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | The Ion Chromatography (IC) system must provide high-precision analysis of anions, cations, PFAS, and organic acids from complex environmental matrices including wastewater, groundwater, sludge, and soil. |                                    |                                      |
| 1.2    | Analytical Pump                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Serial dual piston pump with inert check valves                                                                                                                                                              |                                    |                                      |
|        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Flow range: 0.001–20 mL/min or better                                                                                                                                                                        |                                    |                                      |
|        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Flow accuracy: $\pm 0.1\%$ or better                                                                                                                                                                         |                                    |                                      |

|     |                                   |                                                                                                                      |  |  |
|-----|-----------------------------------|----------------------------------------------------------------------------------------------------------------------|--|--|
|     |                                   | Resolution of flow rate: 0.001mL                                                                                     |  |  |
|     |                                   | Pulsation: $\leq 1\%$                                                                                                |  |  |
|     |                                   | Pressure range: 0–35 MPa                                                                                             |  |  |
| 1.3 | INJECTOR                          | 6-port injector valve with software control                                                                          |  |  |
|     |                                   | Integrated degasser and column oven                                                                                  |  |  |
|     |                                   | Injection loops: 20 $\mu\text{L}$ , 100 $\mu\text{L}$ , 200 $\mu\text{L}$ , 1000 $\mu\text{L}$                       |  |  |
| 1.4 | Columns                           | Anion columns: 1 analytical + 1 guard                                                                                |  |  |
|     |                                   | Cation columns: 1 analytical + 1 guard                                                                               |  |  |
|     |                                   | Preconcentration column for cations should be provided without any additional cost                                   |  |  |
| 1.5 | Suppressor System                 | Packed bed or membrane type                                                                                          |  |  |
|     |                                   | 100% solvent compatibility                                                                                           |  |  |
|     |                                   | External chemical regeneration with flow control                                                                     |  |  |
|     |                                   | Backpressure stability $\geq 350$ psi                                                                                |  |  |
|     |                                   | Minimum 10 years unconditional warranty                                                                              |  |  |
| 1.6 | Conductivity Detector             | Microprocessor-based with thermostated flow cell                                                                     |  |  |
|     |                                   | Temperature accuracy $\leq 0.001$ °C                                                                                 |  |  |
|     |                                   | Resolution 1 nS/cm                                                                                                   |  |  |
|     |                                   | Range 0–15000 $\mu\text{S}/\text{cm}$ or more                                                                        |  |  |
|     |                                   | Electronic noise $\leq 0.1$ nS/cm                                                                                    |  |  |
| 1.7 | Column Housing with build in oven | Column housing should be able to identify the columns and set the optimal operating conditions for column operations |  |  |
|     |                                   | Temperature range should be 0- 80°C (ambient temperature +5...+40 °C)                                                |  |  |
|     |                                   | Stability $< 0.05$ °C                                                                                                |  |  |
| 1.8 | Autosampler                       | Minimum 36 positions (56 preferred)                                                                                  |  |  |

|      |                         |                                                                                                                                                                                    |  |  |
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|      |                         | Metal-free flow path (PEEK)                                                                                                                                                        |  |  |
|      |                         | Minimum 400 sample vials of 10 mL to be supplied along with an autosampler without any additional cost                                                                             |  |  |
| 1.9  | Accessories             | All necessary tubing and glassware to run the instrument should be provided                                                                                                        |  |  |
|      |                         | Extra set of tubing should be provided                                                                                                                                             |  |  |
| 1.10 | Future Upgradation      | The Instrument must be upgradable with an Electrochemical detector and UV Visible diode array (1024 diodes) detector for future applications                                       |  |  |
|      |                         | The quoted instrument must be compatible with ICP MS for hyphenation of both techniques                                                                                            |  |  |
|      |                         | The quoted instrument must be upgradeable to ternary gradient applications                                                                                                         |  |  |
| 1.11 | Software & Hardware     | Fully licensed software (GLP/FDA compliant) without any additional cost                                                                                                            |  |  |
| 1.12 | Installation & Training | Installation by OEM-trained engineers                                                                                                                                              |  |  |
|      |                         | One-week training after installation                                                                                                                                               |  |  |
|      |                         | Annual training (minimum 2 visits per year for 3 years)                                                                                                                            |  |  |
| 1.13 | Power requirements      | 240 50 Hz                                                                                                                                                                          |  |  |
| 1.14 | Power backup            | 2 KVA UPS or higher should be supplied (Online UPS with 30 min) should be provided with the instrument                                                                             |  |  |
| 1.15 | Warranty                | 3 years Warranty, 2 years Maintenance without any additional cost (3+2= 5 years)                                                                                                   |  |  |
| 1.16 | Computer                | Desktop with i7 Processor, 8GB RAM, 1 TB HDD, WIN 10/11, 21" LED, UPS, Mouse and Keyboard needed for the smooth operation of the main instrument should be provided by the vendor. |  |  |
| 1.17 | Ethernet connection     | Ethernet and USB connection.                                                                                                                                                       |  |  |
| 1.18 | Other Requirements      | UV/VIS detector that permits a secure and reliable quantification of substances active in                                                                                          |  |  |

|      |                       |                                                                                                                                                                                                                                     |  |  |
|------|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|      |                       | the ultraviolet or visible range. Detection takes place via a Diode Array or similar                                                                                                                                                |  |  |
|      |                       | Column for Transition Metals                                                                                                                                                                                                        |  |  |
|      |                       | Column for organic matters                                                                                                                                                                                                          |  |  |
|      |                       | Gradient compatibility for mixed eluents                                                                                                                                                                                            |  |  |
| 1.19 | Terms and Conditions: | Transportation, packing & forwarding charges must be incurred by the supplier.                                                                                                                                                      |  |  |
|      |                       | System performance should be demonstrated with necessary standards and calibration kits which will be provided by the vendor as part of standard delivery.                                                                          |  |  |
|      |                       | Basic training for a period of one week during installation with real sample analysis & commissioning of the equipment to technical personnel to be provided at our site.                                                           |  |  |
|      |                       | On-site training of staff and students (at least twice in a year for 7 days each) during the first 3 years.                                                                                                                         |  |  |
|      |                       | Good technical support should be provided after the installation of the instrument and the service engineer should be able to attend unlimited breakdown calls and should visit the installation site within 24 hours without fail. |  |  |
|      |                       | Service support should be available for 6 days a week.                                                                                                                                                                              |  |  |
|      |                       | Training on troubleshooting the issues associated with instrumentation or application should be provided free of cost whenever required by the user.                                                                                |  |  |
|      |                       | Manufacturer should provide the service support details in Mumbai and India. Details of the service engineers and application specialists should be provided along with their experience on these kinds of systems.                 |  |  |
|      |                       | Kindly note that PBG to be submitted for 5 years as maintenance for additional 2 years is required.                                                                                                                                 |  |  |