



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

MATERIALS MANAGEMENT DIVISION

Powai, Mumbai - 400076

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Revised Technical Specifications for Semi Preparative HPLC

Supply, Delivery, Installation and Commissioning of Modular Analytical cum Semi Preparative LC

The HPLC system shall include the following individual stackable self-contained modules.

The HPLC system must be controllable, monitored, capable of performing system maintenance using Microsoft Internet Explorer web browser. Modules should be connected via fibre optic noise resistant high-speed transmission technology to enhance the reliability & sensitivity of HPLC

1. Pump for Semi-Preparative & Analytical flow rates:

- The pump should support both analytical as well as preparative flow rates in a single unit
- Maximum operating pressure should be 40MPa or better
- Flow rate should be settable between 0.01mL/min to 50.00mL/min or better without any hardware changes
- Flow rate accuracy should be $\pm 1\%$ & precision $\leq 0.3\%$ RSD
- The gradient formation should be produced through high/low pressure mixing
- It should be supplied with reservoir tray, solvent bottles, fittings etc.
- It must have a leak sensor as safety feature
- Pump should be capable of mixing solvents in different proportions for entire flow rate

2. Column Organizer with Column Switching Valves

- Appropriate column organizer/holder with column clamp assembly shall be supplied along with this HPLC system

- Column holder should support mounting of analytical and preparative columns.
- Automatic column switching valve should be provided. This column switching should be completely automatic.
- Solvent recycle assembly with all essential valves & accessories should be provided. Suitable software for solvent recycle purpose should be included with this.
- It should be able to accommodate up to 4 Analytical columns of 4.6 X 300mm & 2 Preparative Columns of either 10/20/30/50 cm id with 300mm length. It should also be able to accommodate different flow line switching valves within this compartment.

3. Autosampler with Sample Cooler & Manual Injector with different sample loops

- Sample injection volume of Autosampler should be variable between 0.1 µl to 100µl
- Injection system should be variable injection volume type with zero sample loss during injection
- It should have a capacity up to 132 vials or better of (1ml or 2ml capacity) or 35 vials or better of (4ml or higher capacity).
- Flow line rinse capability both before and after sampling should be possible
- It should be capable of a carry-over no more than 0.005 %
- Injection volume accuracy within 1%
- The injection precision should be less than 0.4% of RSD value
- It should be supplied with additional sample loop of 2000ul
- It should be possible to increase autosampler capacity for high throughput analysis
- Supply of at least 100 sample vials of 1.5/2 ml capacity with caps and septa
- Autosampler should have provision of sample cooler for controlling temperature of the sample vials from 4°C to 40°C
- Rheodyne Manual Injector with different sample loop sizes of 20ul, 100ul, 500ul, 1ml & 2ml should be supplied along with HPLC system.

4. Fraction Collector

- It should be possible to use fraction collector over wide range of flow rates covering small & large scale preparative work. It should adapt to applications such as manual collection while viewing chromatogram as well as advanced continuous & automated preparative separation & collection performed in combination with autosampler
- It should be possible to perform fraction simulation using HPLC software
- Even if elution time changes due to fluctuations in room temperature or composition of mobile phase, it should be possible to accurately perform fractionation by catching the target component
- Appropriate racks with vials/tubes (for 4ml & 20ml) should be supplied
- Fraction Collector have below specifications

Drive System:

Arm movement X-Y system

Minimum number of fractions:	10 to 100 (depending in type of rack used)
Collection method:	Solenoid Valve or direct through nozzle
Maximum flow rate:	100 ml/min or better
Fraction Modes:	Basic mode & Time-Program mode

5. Photodiode Array (PDA) Detector

- The wavelength range should be 190 nm - 800 nm or better
- The photo-diode array detector should have 1024 elements
- The detector should have variable slit width for high resolution as well as high sensitivity
- A standard flow cell of 12 μ L/14 μ L volume & 10 mm cell path length should be available. It should have constant temperature control from 19°C to 50°C or equivalent
- Preparative flow cell with variable path length for preparative applications should be provided
- Wavelength accuracy should be $\leq \pm 1$ nm
- A deuterium lamp [D₂] and a Tungsten lamp [W] should be available as Light Source for UV and visible wavelengths respectively.
- The selection of light source should be flexible to select D₂, W or both lamps for analysis
- The Drift should be smaller than 0.9×10^{-3} AU/Hour or better
- The Noise Level should be smaller than 7×10^{-6} AU or better
- Linearity should be 2.0 AU or better (ASTM method)
- It should have a self-aligning mechanism for the light sources and cell.
- Light sources and cell should be accessible from the front for easy maintenance

6. Chromatographic Software

- Genuine Windows based software for control of LCMS as well as Preparative LC system should be supplied along with this system. It should be possible to perform all functions of Preparative LC as well as Single Quadrupole MS system with this software.
- It should cover full one-point digital instrument control, qualitative and quantitative processing, report creation and self-diagnosis
- The data should be convertible to other formats. Spread Sheet software and word-processing software can be readily employed to provide data in tables or graphs through industry standard protocols
- It should have sample rescue function in the event of interrupted analysis or when instrument error occurs

7. Service, Warranty and Training

1. Tendered price should include delivery, installation, commissioning and training (at least 4 users) at supplier's location
2. Comprehensive warranty for complete equipment for a period of 36 months should be provided. This shall include the following at no extra cost:
 - Travel and Labour expenses of Customer Engineer
 - Service Parts used for repairs
3. Vendor to provide service guarantee: should the system require service during the warranty period, vendor must guarantee turn-around-time within 24 hours
4. Vendor to provide a copy of Site-Preparation checklist
5. Vendor must demonstrate that it has a proven appropriate set-up and capability to provide after-sales service efficiently and effectively. The supplier should have in his facility a similar system to that proposed in this tender for training purpose
6. Automatic switching between two columns should be possible. Appropriate switching valves with required accessories should be supplied as standard with this system
7. One Analytical C-18 Column (5µm, 4.6 x 250) & one Semi-Prep C-18 Columns (5µm, 10 x 250) and 1 prep column (20 x 250) should be supplied along with HPLC system.
8. All required kits, tubings, joints, tool kit etc. essential for running & maintenance of the system shall be supplied along with the system.
9. Suitable configuration (at least i5 processor, 8GB RAM, 1 TB hard drive, 22 inch screen) branded Desktop PC (with Windows OS & MS Office) and suitable capacity of online UPS with at least 1 hour back-up should be supplied.