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**Preparative HPLC Technical Specifications:**

**Supply, Delivery, Installation and Commissioning of Modular Analytical cum Preparative LC with Mass Directed Automated Purification:**

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 Preparative & Analytical flow rates:**

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

## **2. Column Storage Compartment:**

2.1 Column storage compartment should be included with this system

2.2 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. Liquid Handler System for Sample Introduction as well as Fraction Collection :**

This unit should be an integrated sample injector as well as fraction collector with below mentioned specifications

### **3.1 Specifications for Injection Functions:**

3.1.1 Needle drive system should be arm movement in X-Y-Z directions

3.1.2 Injection method should be loop injection method

3.1.3 It should have options for injection amount setting range such as 1 to 2000ul. It should be possible to inject samples from Analytical Scale (10ul volume) to Preparative Scale (4ml volume). For this suitable syringe kit with appropriate loop etc. should be supplied as default

3.1.4 It should have provision to inject samples from 1.5-2 ml & 4-6ml vials

3.1.5 Injection reproducibility should be  $\leq 2\%$  RSD

3.1.6 A set of 100 vials with caps each for 1.5-2ml & 4-6ml should be provided

3.1.7 It must be able to perform continuous analyses according to the conditions specified for each sample, including sandwich injection etc.

3.1.8 Needle rinse capability both before and after sampling should be possible

3.1.9 Purging of syringe & rinsing of needle interior as well as exterior should be possible

### **3.2 Specifications for Fraction Collection Functions:**

3.2.1 Preparative valve drive of fraction collector should have arm movement of X-Y-Z

3.2.2 Preparative method should be on valve based preparation

3.2.3 It should be able to handle flow rate of at least 50ml/min

3.2.4 It should have capacity up to 540 tubes of 10mm or 12 mm OD and 252 vials/tubes of 4ml or 6 mL capacity

3.2.5 It should have fractionation methods such as time-based, peak-based, manual etc.

3.2.6 Liquid handler should have sample rescue function in the event of interrupted analysis or when instrument error occurs

3.2.7 It should have provision to connect at least 4 different detectors

- 3.2.8 Suitable sample trays & racks for this fractions collector should be provided.
- 3.2.9 The delay time from the detector to the fractionation head should be calculated automatically every time the flow rate is changed
- 3.2.10 Suitable glass test tubes should be provided

#### **4 Photodiode Array (PDA) Detector**

- 4.1 The wavelength range should be 190 nm - 800 nm or better
- 4.2 The photo-diode array detector should have 1024 elements
- 4.3 The detector should have variable slit width for high resolution as well as high sensitivity
- 4.4 A standard flow cell of 12  $\mu\text{L}$ /14  $\mu\text{L}$  volume & 10 mm cell path length should be available. It should maintain a constant temperature between 19 to 50 C
- 4.5 Preparative flow cell with variable path length for preparative applications should be provided
- 4.6 Wavelength accuracy should be  $\leq \pm 1$  nm
- 4.7 A deuterium lamp [D2] and a Tungsten lamp [W] should be available as Light Source for UV and visible wavelengths respectively.
- 4.8 The selection of light source should be flexible to select D2, W or both lamps for analysis
- 4.9 The Drift should be smaller than  $1 \times 10^{-3}$  AU/Hour or better
- 4.10 The Noise Level should be smaller than  $8 \times 10^{-6}$  AU or better
- 4.11 Linearity should be 2.0 AU or better (ASTM method)
- 4.12 It should have a self-aligning mechanism for the light sources and cell.
- 4.13 Light sources and cell should be accessible from the front for easy maintenance

#### **5 Single Quadrupole Mass Spectrometer Detector:**

Single Quadrupole Mass Spectrometer is intended for mass directed auto purification purpose. This LCMS should have below specifications

- 5.1 Mass range should be 10 to 2000 m/z
- 5.2 Scanning speed should be 10,000 u/sec or better
- 5.3 Polarity switching time should be 30ms or better
- 5.4 ESI source should be supplied along with LCMS system with a suitable flow rate
- 5.5 Should have sensitivity in 10pg levels on column with a sensitivity of 100:1 or better
- 5.6 Mass accuracy: Should be  $\pm 0.1$  Da or better
- 5.7 Suitable software should be supplied along with this LCMS system which should be able to control Preparative LC also
- 5.8 Autotuning facility for LCMS should be available

- 5.9 Nitrogen gas consumption for LCMS should be less than 30L/min or better. Suitable imported make nitrogen gas generator with built-in compressor shall be supplied with LCMS system
- 5.10 All tuning as well as calibration solutions shall be supplied with LCMS system
- 5.11 Cleaning & maintenance of ionization assembly/desolvationline should be simple & be able to carry out without breaking the vacuum
- 5.12 Roughing pump & turbo pump should be an integral part of the LCMS system
- 5.13 Suitable analytical make-up pump for LCMS should be supplied as standard
- 5.14 Suitable flow control / divert valve for LCMS should be provided
- 5.15 Suitable start-up kit for LCMS should be supplied as standard

## **6 Chromatographic Software**

- 6.1 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.
- 6.2 It should cover full one-point digital instrument control, qualitative and quantitative processing, report creation and self-diagnosis
- 6.3 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
- 6.4 It should have sample rescue function in the event of interrupted analysis or when instrument error occurs

## **7 Service, Warranty and Training**

- 7.1 Tendered price should include delivery, installation, commissioning and training (at least 4 users) at supplier's location
- 7.2 Comprehensive warranty for complete equipment for a period of 36 months should be provided. This shall include the following at no extra cost:
  - 7.2.1 Travel and Labour expenses of Customer Engineer
  - 7.2.2 Service Parts used for repairs
- 7.3 Vendor to provide service guarantee: should the system require service during the warranty period, vendor must guarantee turn-around-time within 24 hours
- 7.4 Vendor to provide a copy of Site-Preparation checklist

- 7.5 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
- 7.6 Automatic flow line switching from Analytical to Preparative scale & vice versa should be possible. Also automatic switching between two columns should be possible. Appropriate switching valves with required accessories should be supplied as standard with this system
- 7.7 One Analytical C-18 Column (5 $\mu$ m, 4.6x250) & one Silica Column (5 $\mu$ m, 4.6x250) should be supplied along with Preparative LC system.
- 7.8 All required kits, tubings, joints, tool kit etc. essential for running & maintenance of the system shall be supplied along with the system
- 7.9 The vendor must be reputed one having experience of at least 10 Years for supply of HPLC & Preparative LC systems. Vendor must have service as well as application engineers based within Mumbai city