



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

MATERIALS MANAGEMENT DIVISION

Powai, Mumbai - 400076

PR No. 1000029098

Rfx No. 6100001223

### Technical specification of HPLC

<b>1. Pump Module</b>	Maximum operating pressure	$\geq 40$ Mpa
A.	Operating flow rate range	0.01 to 0.5ml/min, 0.5 to 20ml/min (As may suitable binary pump for the entire range of flow rate or combination of binary & quaternary pump.)
B.	increment rate	$\leq 0.01$ ml/min or better
C.	Retention time reproducibility	$\leq 0.3\%$ RSD or better
D.	Number of solvents	Two
E.	Mixing Type	Binary gradient pump at minimum
F.	Flow accuracy	$\pm 1\%$ or better
G.	Flow precision	$\leq 0.3\%$ RSD or better
H.	Composition accuracy	$\pm 0.5\%$ or better
I.	Composition precision	0.02% or better

<b>2. Sampling Module</b>	Type	Manual
A.	Injection Loop size	Around 5 $\mu$ L, 20 $\mu$ L, 50 $\mu$ L and 200 $\mu$ L
B.	Injection repeatability	0.3% RSD or Better
C.	Temperature Range:	4°C to 40°C ( $\pm 2$ °C) or better

<b>3. Column Oven</b>	Operating temperature range:	$\leq 5$ °C to $\geq 90$ °C
	Temperature Accuracy	$\pm 0.8$ °C or better
	Temperature stability	$\pm 0.1$ °C or better
	Temperature ramp	up to 5°C/min or better



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4. Detector	RID	
A.	Refractive Index Range	1.0 to 1.75 RIU
B.	Measurement Range	
C.	<ul style="list-style-type: none"> <li>High</li> </ul>	50 to 10 <sup>-6</sup> RIU/1V
D.	<ul style="list-style-type: none"> <li>Standard</li> </ul>	500 to 10 <sup>-6</sup> RIU/1V
E.	<ul style="list-style-type: none"> <li>Low</li> </ul>	5000 to 10 <sup>-6</sup> RIU/1V
F.	Noise	3x 10 <sup>-9</sup> RIU or less
G.	Drift	2x10 <sup>-7</sup> RIU/h or less
H.	Temperature Setting Range	0 to ≥45 °C (1°C increments) or better
I.	Measurement System	Deflection type
J.	Light Source Type	Light Emitting Diode (LED)
K.	Flow Cell Volume	8-10 μl

5. PDA Detector		
A.	Wavelength range	190-800nm or better
B.	Noise level :	≤ ± 3 μAU
C.	Drift	≤ 0.5 μAU/h



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D.	Detector linearity	2.0AU or better
E.	Wavelength accuracy :	$\pm 0.5\text{nm}$ or better
F.	Light source & warranty:	Deuterium (D <sub>2</sub> ) and Tungsten (W) lamp & at least 2000hrs lifespan
G.	Data Acquisition Range	Around 0.5-200Hz or better
H.	Flow cell pressure limit:	$\geq 12\text{Mpa}$
I.	Optical resolution	4 nm or better
J.	Digital resolution	0.6nm or better
K.	No of elements in the array	1024 or better
L.	Path length	Around 10mm

<b>6. Column</b>	<p><b>GPC and HPLC columns</b></p> <p><b>GPC Column –</b></p> <ol style="list-style-type: none"> <li><b>1. Aqueous Column (semi preparative):</b> <ol style="list-style-type: none"> <li>i. Solvent: water</li> <li>ii. Molecular weight range: 100 g/mol to 100000 g/mol.</li> <li>iii. Column Diameter: around 7.8 mm</li> <li>iv. Column length around 300 mm</li> <li>v. Particle size: around 6 micron</li> <li>vi. Temperature: 10-80°C,</li> <li>vii. Polymer for analysis: anionic, cationic, and neutral )</li> </ol> </li> <li><b>2. Organic solvent Column (semi preparative):</b> <ol style="list-style-type: none"> <li>i. Solvent: Toluene</li> <li>ii. Molecular weight range: 100 g/mol to 100000 g/mol.</li> <li>iii. Column Diameter: around 7.8 mm</li> <li>iv. Column length: around 300 mm</li> <li>v. Particle size: around 5 micron</li> <li>vi. Temperature: 10-80°C,</li> </ol> </li> </ol>
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#### HPLC Column –

##### 1. C18 (Analytical):

- i. Silica particle size: around 5 micron (spherical)
- ii. Column Inner Diameter: around 4.6 mm
- iii. Column length around 250 mm
- iv. Pore size: around 130 Å
- v. Pressure range: around 6000 psi
- vi. pH range: 1-12
- vii. Temperature: Room Temp-60°C

##### 2. C18 (Semi preparative):

- i. Silica particle size: around 5 micron (spherical)
- ii. Column Inner Diameter: around 10 mm
- iii. Column length around 250 mm
- iv. Pore size: around 130 Å
- v. Pressure range: around 6000 psi
- vi. pH range: 1-12
- vii. Temperature: Room Temp-60°C

##### 3. C4 (Analytical):

- i. Silica particle size: around 3.5 micron (spherical)
- ii. Column Inner Diameter: around 4.6 mm
- iii. Column length around 250 mm
- iv. Pore size: around 300 Å
- v. Pressure range: around 6000 psi
- vi. pH range: 2-10
- vii. Temperature: Room Temp-60°C

#### 7. UV/VisD (Optional)

A.	Spectra bandwidth	8 nm or better
B.	Wavelength accuracy	±1 nm or better
C.	Light source	Deuterium Lamp



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D.	WL range	190-700 nm or better
E.	Multiple wavelength measurement	2 wavelengths
F.	Noise	$\pm 0.3 \times 10^{-5}$ ABU or better
G.	Drift	$1 \times 10^{-4}$ ABU/h (at 230 nm) or better
H.	Flow Cell	Around volume 15 $\mu$ L, $\geq 120$ bar (1740 psi) pressure
I.	Spectra Measurement range	190-700 nm or better
J.	Operating Temperature	4-40°C or better

**8. Warranty is 3 (Three) years from the date of installation and commissioning**