

**Nano Research facility**  
**Indian Institute of Technology Delhi**

**Minutes of the Meeting: NIQ for the purchase of HPLC from RP02395**

**Purchase committee met on May 20, 2011 and decided to have following specifications for the purchase of HPLC.**

**HPLC SPECIFICATIONS**

**Solvent delivery system: (Low Pressure Quaternary Gradient Pump) :**

1. No. of solvents: 4
2. Flow range: 0.001 to 10.0 ml/min or better with 0.001 ml/ min increments
3. Flow Precision: < 0.07 % RSD
4. Flow accuracy:  $\pm 1\%$
5. Pressure operating range: upto 600 bar (60 Mpa) to work as Normal HPLC as well as Fast HPLC as well.
6. Online degasser : 4 Channel

**Diode Array detector :**

Wavelength range: 190 – 640 nm

Detector type: 1024-element (or specify) diode array

Light source: Deuterium and tungsten lamp

Short-term noise:  $\leq \pm 0.6 \mu\text{AU}$

Drift:  $< 5 \times 10^{-4} \text{ AU/h}$  at 254 nm

Data Rate : 80 Hz

Linearity: > 2 AU upper limit

Diode width: < 1 nm

Should have Radio Frequency Identification (RFID) tag

Instrument must have dual lamp design (tungsten and deuterium) for optimum sensitivity

Must have electronic records of maintenance and errors

Leak detection and safe leak handling design must be incorporated in the module housing.

**Fluorescence Detector :**

- 1) Detection type : Multisignal fluorescence detector with rapid online scanning capabilities and spectral data analysis
- 2) Performance : Single wavelength operation:
  - a) Raman (H<sub>2</sub>O) > 500 (noise reference measured at signal) Ex 350 nm, Em 397 nm, dark value 450 nm, standard flow cell.
  - b) Raman (H<sub>2</sub>O) > 3000 (noise reference measured at dark value) Ex 350 nm, Em 397 nm, dark value 450 nm, standard flow cell
- 3) Dual wavelength operation: Raman (H<sub>2</sub>O) > 300 Ex 350 nm, Em 397 nm and Ex 350 nm, Em 450 nm, standard flow cell
- 4) Light Source : Xenon flash lamp, normal mode (20 W), economy mode (5 W), lifetime 4000 hours
- 5) Pulse Frequency : 296 Hz for signal mode, 74 Hz for economy mode
- 6) Excitation Monochromator : Concave holographic grating, F/1.6, blaze 300 nm, range 200 – 1200 nm and zero-order, bandwidth 20 nm
- 7) Emission Monochromator : Concave holographic grating, F/1.6, blaze 400 nm, range 280 – 1200 nm and zero-order, bandwidth 20 nm
- 8) Time Programming : Up to 4 signals, response time, PMT gain, baseline behavior (append, free, zero), spectral parameters

- 9) Spectral Acquisition : Excitation or emission spectra, scan speed 28 ms per data point, e.g. 0.6 s per spectrum 200 – 400 nm, 10 nm step
- 10) Step Size : 1-20 nm
- 11) Wavelength Repeatability :  $\pm 0.2$  nm
- 12) Wavelength Accuracy :  $\pm 3$  nm
- 13) Data Rate : 74 Hz
- 14) Flow Cells : Standard: 8  $\mu$ L volume, 20 bar (2 MPa) pressure maximum, quartz Optional: fluorescence cuvette for offline spectroscopic measurements with 1 mL syringe, 8  $\mu$ L volume, quartz
- 15) Should have Radio Frequency Identification (RFID) tag

### **Refractive Index Detector.**

Should Includes 8  $\mu$ l flow cell and LAN interface and twisted pair cable

Detection type: Deflection method

Short-term noise:  $\pm 2.5 \times 10^{-9}$  RIU\*

Drift:  $200 \times 10^{-9}$  RIU/h\*

Refractive index range: 1.00–1.75, calibrated

Temperature control: Ambient +5 °C to 55 °C

pH range: 2.3–9.5

### **Auto sampler :**

- 1) Pressure range : 600 bar
- 2) Injection volume: 0.1 – 100  $\mu$ L can be extended upto 1500  $\mu$ L.
- 3) Precision: <0.25% RSD, 5-100  $\mu$ L, < 1% RSD, 0.1 – 5  $\mu$ L
- 4) Carry over: Typically < 0.1% without automated needle wash, typically < 0.05% with automated needle wash (external needle cleaning)
- 5) Minimum sample volume: 1  $\mu$ l can be sampled from 5  $\mu$ l in 100  $\mu$ l micro vial or 10  $\mu$ l in 300  $\mu$ l micro vial.
- 6) Sample viscosity range: 0.2–5
- 7) Injections per vial: 1–99

### **Column heater / cooler :**

1. 10 deg below ambient to 80 deg C.
2. Column capacity : 2 columns of 30 cm length
3. Temperature stability : +/-0.15 deg C
4. Temperature accuracy : +/- 0.8 deg C

### **Chromatographic Data Software:**

- a. Licensed software with Single point control of all HPLC modules including solvent delivery system, detectors, column compartment, etc.,
- b. Should have system suitability feature (licensed), report publisher, customizable report generator.
- c. 3-D and peak purity feature should be available in the software option.
- d. Compatible with import and export of data & has flexible report publisher to make report in desired format
- e. GLP/GMP as well as 21 CFR part 11 Compliant software

**Analytical columns:** General purpose six columns (give details) or more

**Computer and Printer:** Intel Pentium Core 2 Duo, at least 1 GB RAM, 1 MB cache, 160 GB hard disk drive, DVD-CD R/W combo drive, Microsoft Windows XP Professional. TFT color monitor, mouse, keyboard, etc.

### **Black and white Laser Jet Printer**

### **Online UPS of 3.5 KVa**

- All the above unit should have leak detection capability.
- The HPLC should be upgradable to MS or MS/MS system

**Terms and conditions:**

1. Specify terms and conditions and price at CIF New Delhi.
2. Submit commercial and technical bid separately
2. Warranty should clearly be mentioned; 3 years warranty is desirable.
3. The Institute reserves the right to accept or reject any or all quotations without assigning any reason thereof.
4. The quotation should reach to following address by **June 25, 2011**

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