

Minutes of the Pre-Bid Meeting held on 10.11.2017 at Conference Hall, Administrative block, CUTN in connection with pre-bid queries raised by prospective bidder against our Tender Enquiry No 15/2017-18 for supply and installation of laboratory Equipment for department of Chemistry

The following members of the Committee were present:

1. Prof. S. Nagarajan, Head, Department of Chemistry - Chairperson
2. Dr. T. Mohan Das, Associate Professor, Department of Chemistry - Member
3. Dr. V. Rajendiran Assistant Professor, Department of Chemistry - Member
4. Dr. Vittal Babu Gudimetla, Assistant Professor, Department of Chemistry - Member
5. Dr. M. Shiva Prasad, Assistant Professor, Department of Chemistry - Member
6. Assistant Registrar (Finance) - Finance Nominee
7. Officer In-charge (Purchase) - Purchase Nominee
8. Dr. S.G. Ramkumar, Assistant Professor, Department of Chemistry - Member & Convener

The representatives of following prospective bidders attended the Pre-Bid Conference

1. Mr. V.Manoharan, Infinite Scientific Co, Salem
2. Mr. M. Uma Sankar, M/s BUCHI INDIA Pvt. Ltd.
3. Mr. Amit Jain, KNF pumps
4. Mr. S.Sathyanarayana, Incarp Instruments Pvt. Ltd.
5. Mr. Vedhamuthu, Laser Spectra Services Pvt. Ltd.,
6. Mr.P.Suresh, Tech Science
7. Mr.Selvakumar, Biological Scientific Instruments

The attendance sheet is enclosed herewith.

Opening Remarks:

- (i) Prof. S. Nagarajan, HOD chemistry at the beginning welcomed the participating members and after introduction, he briefed all participants about the tender.
- (ii) It was explained that purpose of Pre-Bid conference is to explain the various important provisions of the bidding documents to the prospective bidders and to clarify the queries that the bidders may have in the subject, bidding documents.

The clarifications sought by the bidders were suitably amended and the amended tender specification is enclosed. Further the bidders were informed to ensure that all *mandatory documents / certificates / Undertakings are enclosed with the bids, as specified in the tender document.*

The bidders were informed that the minutes of the pre-bid conference and amendment of the bidding forms shall be published on the website of central university of ramil Nadu. The bidders were also informed that they should also regularly visit the CUTN website for any amendments issued.

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R.S.B.

T. Mohan Das

V. Rajendiran

V.P.

Vittal Babu

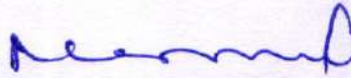
M. Shiva Prasad

In case of any further information/clarification, they were asked to contact over phone, to the Purchase Section at 04366-277359 (or) send email on purchase@cutr.ac.in; Individual visits are not entertained.

The queries related to the technical aspects raised by the suppliers were considered and appropriately incorporated. The revised technical specification is enclosed, which shall be replaced as the amended tender specification.

The meeting ended with a vote of thanks to the representatives of the prospective bidders.

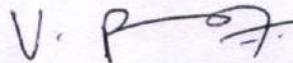
Prof. S. Nagarajan, Head,
Department of Chemistry -
Chairperson



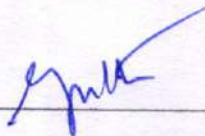
Dr. T. Mohan Das,
Associate Professor,
Department of Chemistry - Member



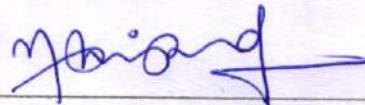
Dr. V. Rajendiran
Assistant Professor, Department of
Chemistry - Member



Dr. Vittal Babu Gudimetla,
Assistant Professor,
Department of Chemistry - Member



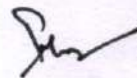
Dr. M. Shiva Prasad,
Assistant Professor,
Department of Chemistry - Member



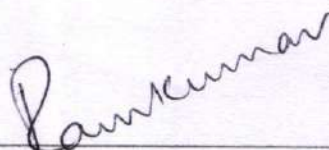
Assistant Registrar (Finance) -
Finance Nominee



Officer In-charge (Purchase) -
Purchase Nominee



Dr. S.G. Ramkumar,
Assistant Professor,
Department of Chemistry
Member & Convener



TECHNICAL SPECIFICATION

Sl. No.	Equipment Description
1	<p><u>Rotary Evaporator with Vacuum Controller, Diaphragm Vacuum Pump and Chiller – 6 Nos.</u></p> <p>Rotation speed 20-280 rpm Condenser Vertical Cooling Surface Area 1400cm² or better Rotation speed setting Digital Display Temperature Digital Display of set and actual temperature</p> <p>Motor lift Yes Height adjustment speed 30mm/s Angle Adjustment specify if available Stroke distance 150 mm or better Water bath capacity 3 L or better (Should be able to accommodate a round bottom flask of 2 L volume capacity) Should be made of corrosion resistant material.</p> <p>Max flask Capacity specify Protection Class specify Heating power 1300 W or better Controlled Temp. range heating bath 20 to 150 or better Temperature accuracy ±2 or better Overheat cut-off protection required Bath temp. setting Digital Temperature Sensor Yes Heating bath temp. control Electronic/digital Diameter heating bath Suitable to use 2 L round bottom flask and above, please specify.</p> <p>Maximum Volume heating bath 5.0 L 1L receiving and 1L evaporating flasks include B-29 to B-24 (Anti foam adaptor) include Combi clip or fixing the flask 29 joint Integrated Vacuum controller Yes, automatic. Auto distillation sensor Yes Supply voltage 220 to 240 V 50 Hz Vacuum Valve vacuum Controller with Wolff bottle for trap</p> <p>Operating modes Display set and actual Pressure ON/OFF Regulation of Pump</p> <p><u>Vacuum Pump</u> diaphragm pump made from chemically resistant materials with High suction capacity of 1.8</p>

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Suresh

V.P.

Srinivas

Sl. No.	Equipment Description
	<p>m³/h or better, for fastest evacuation suction capacity for up to 2 rotary evaporators at the same time. The Valve Control system should achieve an ultimate vacuum of at least 7 mbar or better.</p> <p>ON/OFF Regulation Supply Voltage 230 V± 20 V, 50 Hz</p> <p><u>Recirculating Chiller</u> Good quality noise free chiller Temperature settable for -10 °C to + RT or better Temperature control =/- 0.2 Display (Digital) Note All items should be manufactured by a single manufacturer.</p>
2	<p><u>Magnetic Stirrer with Hot Plate – 12 Nos.</u></p> <p>Approximate dimension of plate: 18 cm x 18 cm Digital Display for temperature and RPM Temperature range: RT to 300 °C and above Temperature control with external probe: 6" or better Heating capacity of hot plate: 11 kg or better Stirring volume: 5 L and above Top element: Ceramic or better (specify) Stirring speed: 100 to 1200 rpm Instrument Dimension: 32 x 24 x 12 cm (W x H x D) or equivalent (please specify) Power: 240 VAC, 50 Hz, 4.7 amps SS Support Rod Boss Head Clamp Clamping Rod</p>
3	<p><u>Weighing Balance: (4 digits) – 6 Nos.</u></p> <p>Readability: 0.0001g Repeatability: 0.0002g or better Linearity: 0.0002g or better Stable time: 8 sec or better Pan diameter: 80mm or better Display: LCD with elegant visibility of numbers or better display Adjustable feet: Full range tare Multiple weighing units. Stainless steel pan/better. 3 door removable draft shield glass chamber min 24cm height or better from pan to top.</p>
4	<p><u>Electrochemical Workstation – 1 No.</u></p> <p>The equipment should be capable of A. Performing voltammetric and potentiometric measurements.</p>

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Sl. No.	Equipment Description
	<p>B. Will be having Frequency Response Analyzer and Bipot module.</p> <p>C. Will be coupled with rotating ring disc electrode for reaction kinetic studies and electrochemical reaction mechanism studies.</p> <p>D. Performing advanced electroanalytical measurements.</p> <p>Electrochemical Workstation</p> <p>Specifications:</p> <ol style="list-style-type: none"> 1. Compliance and applied voltage: ± 30 V or better at ± 2 A 2. Maximum Output Current: ± 2 A or better at ± 30 V 3. Output Voltage Range: ± 10 V 4. Current Ranges smallest current range: ± 10 nA to current range 1A in nine ranges 5. Resolution of applied potential: 160 μV 6. Resolution of measured potential: 1mV or better 7. Accuracy of applied current: ± 0.2 % of the current range or better 8. Potentiostat Rise/fall Time: 500 ns or better 9. Gain bandwidth range of amplifier: 1 MHz 10. Bandwidth of electrometer: > 4 MHz 11. Interface: USB interface for connection with PC 12. Input bias current: 10 pA or better 13. Frequency Range of FRA Module: 10 μHz to 7 MHz or better range 14. Input Impedance of electrometer: $> 1T \Omega // 25$ pF or better 15. Input ac amplitude: 0.5 mV to 300 mV rms or better <p>True analog scan generator</p> <p>To study the processes which exhibit very fast transient behavior, should apply a true analog sweep to the sample to eliminate capacitive currents and facilitate recording of only Faradic Currents Specifications: Scan Range: ± 4 Volts (relative to initial potential) or better; Scan Rate Range: 20 mV/Sec to 220kV/Sec, Max no of Scans 30,000 or more Analogue Output: Scan Signal.</p> <p>Filter and integrator module:</p> <p>It should allow users to do coulometric and chrono-coulometric experiments. The analog integrator to offer the possibility to measure charge instead of current. It should be possible to use it in cyclic voltammetry as well as in potential step experiments. The integrator should be effective in reducing signal noise by averaging it out.</p> <p>Ultra Fast Cyclicvoltammerty Measurement: The necessary module is required for ultrafast cyclic voltammery measurements.</p> <p>Electrochemistry Cell: It should consist of the following: 50 mL Glass cell 1no, 2mm diameter Pt disc working electrode 1no, Pt wire Counter electrode 1 mm dia 40 mm length 1 no, Ag/AgCl reference electrode (Aqueous) & Ag/AgCl reference electrode (Non-Aqueous) 1 no each Suitable Lid for the cell and purge tube with valve.</p> <p>Electrodes:</p>

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Sl. No.	Equipment Description
	<p>Glassy carbon (2 mm), platinum electrode</p> <p>Calomel electrode, silver/silver chloride electrode (Please quote separately) You may add any other electrodes available as optional items.</p> <p>Optional printed electrodes: Cell for screen printed-electrodes - Conical well; Screen Printed Electrodes for special applications-Optically Transparent screen-printed electrode pack of 75; Screen Printed Electrodes coated with nano materials Graphene modified screen-printed electrode pack of 50;</p> <p>Switchable BIPOT/ARRAY module: Module for conversion of the system into a two channel potentiostat with two working electrodes sharing the same AE & RE. Specifications: Potential Offset Range: ± 10 V, Maximum Current 50 mA, Current Range: 10 mA, 1 mA, 100 μA, 10 μA, 1 μA, 100 nA & 10 nA. Modes: Bipotentiostat, Scanning Bipotentiostat High current Booster. 20A/20V High current Booster required for the Bi Potentiostat with necessary cell cables</p> <p>Electrochemical Software: Software should have facility to record additional signal viz EQCM, bi-potentiostat etc. Import/export ASCII. Ready-to-use Vis & Generic interface for .Net applications should be included. It should have facility to display up to 4 plots simultaneously. Comparison with previous experiments should be possible while experiments are in progress. The software should support following basic electrochemical measurements: Cyclic Voltammetry with scan rates from 10 μV/Sec to 200V/Sec, Sampled DC Voltammetry. Tafel Plots, Differential Pulse Voltammetry, Square Wave Voltammetry. Electrochemical methods like Chrono-Amperometry, Chrono-Coulometry & Chrono-Potentiometry.</p> <p>Computer & Printer: A suitable branded Computer for system control & data acquisition should be offered with the system. It should have following minimum specs: i7 processor or better, 8 GB SD RAM, 1 TB HDD, 52 x CDD read/write combo drive or DVD driver, 2 or more USB Ports, 29" TFT Colour Monitor or better, 101 Keys Keyboard, Optical mouse, Laser colour Printer or equivalent with minimum 1 hour back up UPS.</p>
5	<p><u>Fluorescence Spectrometer – 1 No.</u></p> <p>The spectrometer should be capable of Time Resolved Fluorescence</p> <p>Specification for Time resolved fluorescence spectrometer</p> <ul style="list-style-type: none"> • Fluorescence spectrometer with Time Correlated Single Photon Counting (TCSPC) detection technique. • The system should come with Sample Compartment, Emission Polarizer, Emission Monochromator, Detector, Data Acquisition System, and Software for data analysis and Excitation Sources. • The system should compatible of measuring fluorescence lifetime down to 60

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Sl. No.	Equipment Description
	<p>picoseconds or less with lasers as excitation sources and fluorescence lifetime down to 100 picoseconds or less with LEDs (Light emitting diodes) as excitation sources for both liquid and solid samples.</p> <p>1. System description: The system should be Time correlated Single Photon Counting based, Compact, and Modular.</p> <p>2. Light source:</p> <ul style="list-style-type: none"> • It should be interchangeable Pulsed LED (or Nano LED) and Laser diodes with synchronization features. • Standard optical pulse durations should be < 200 ps for laser-diodes, < 1.5 ns for LEDs with High repetition rate. <p>Provide quote for LED and LASER Diodes separately. For four wavelengths viz, 290, 340, 455, 625 Quote the light source separately both (LED and LASER diodes)</p> <p>3. Monochromator:</p> <ul style="list-style-type: none"> • Emission monochromator of 100 mm or better focal length and stray light rejection $>1 \times 10^{-5}$ should be provided. • Motorized adjustable slits (1 nm to 32 nm or better) should be available in the emission side. Specify details <p>5. Fluorescence Lifetimes range: from < 100 ps to 100 ms.</p> <p>6. Sample Chamber:</p> <ul style="list-style-type: none"> • Sample compartment should be cryostat compatible. <ul style="list-style-type: none"> A) either pettier cooling provision (-10 to 80 °C) – provide details such as rate at which desired temperature can be obtained, stability of temperature, read out of temperature, etc., B) External circulation arrangement – provide details such as liquid and solid sample holder design features. • Position adjustable Front face sample holder for solid samples. <p>8. Anisotropy Measurements: Motorized Polarizer's for the above said wavelengths.</p> <p>9. Computer: Dedicated computer with latest specifications should be provided.</p> <p>10. Data Acquisition and analysis software:</p> <p>Windows based Software for spectrometer control, performance monitoring, fluorescence lifetime data acquisition, anisotropy with G-Factor correction, temperature control and data analysis particularly 1 to 4 exponential decay, global, non-exponential, micelle kinetics, life time distribution, FRET calculator.</p>

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Sl. No.	Equipment Description																																																				
	<p>11. The Instrument Electronics It should have the Timing jitter < 25 ps or better and less susceptible to PC originated noise with 4K histogram (greater dynamic range) or better.</p> <p>12. Cryostat : Suitable Liquid Nitrogen cryostat with connecting accessories.</p> <p>13. Standards: Suitable standards (please specify)</p>																																																				
6	<p>Glove Box – 1 No.</p> <table border="0"> <tr> <td data-bbox="295 680 343 714">1</td> <td data-bbox="383 680 710 714">Number of chambers</td> <td data-bbox="782 680 1013 714">Single chamber</td> </tr> <tr> <td data-bbox="295 748 343 782">2</td> <td data-bbox="383 748 502 782">Design</td> <td data-bbox="782 748 1005 782">Modular design</td> </tr> <tr> <td data-bbox="295 782 343 816">3</td> <td data-bbox="383 782 606 850">Main chamber dimensions</td> <td data-bbox="782 782 1460 861">1200-1250 (W) X 900-950 (H) X 750-800 mm (D)</td> </tr> <tr> <td data-bbox="295 895 343 929">3</td> <td data-bbox="383 895 598 929">Shell material</td> <td data-bbox="782 895 1348 952">SS Steel or better with bolted side panel</td> </tr> <tr> <td data-bbox="295 963 343 997">4</td> <td data-bbox="383 963 598 997">Interior Finish</td> <td data-bbox="782 963 1452 1043">Brushed, Anti corrosive coating and scratch resistant.</td> </tr> <tr> <td data-bbox="295 1043 343 1077">5</td> <td data-bbox="383 1043 606 1077">Exterior Finish</td> <td data-bbox="782 1043 997 1077">Powder coated</td> </tr> <tr> <td data-bbox="295 1111 343 1145">6</td> <td data-bbox="383 1111 646 1145">Chamber window</td> <td data-bbox="782 1111 1452 1236">Chemical and scratch resistance polycarbonate or similar/ better material with inclined panel of 9-10 mm thick ness.</td> </tr> <tr> <td data-bbox="295 1224 343 1258">7</td> <td data-bbox="383 1224 470 1258">Stand</td> <td data-bbox="782 1224 1316 1281">Powder coated, leveling fee & castors.</td> </tr> <tr> <td data-bbox="295 1258 343 1292">8</td> <td data-bbox="383 1258 734 1292">Electrical feed/ Flanges</td> <td data-bbox="782 1258 1444 1338">2 DN KF40 Flanges, with one electrical feed through</td> </tr> <tr> <td data-bbox="295 1338 343 1372">9</td> <td data-bbox="383 1338 622 1372">Electrical outlet</td> <td data-bbox="782 1338 1101 1383">Six position power strip</td> </tr> <tr> <td data-bbox="295 1406 343 1440">10</td> <td data-bbox="383 1406 726 1440">Electrical feed through</td> <td data-bbox="782 1406 949 1440">One number</td> </tr> <tr> <td data-bbox="295 1474 343 1508">11</td> <td data-bbox="383 1474 646 1508">Gas feed through</td> <td data-bbox="782 1474 877 1508">3 blank</td> </tr> <tr> <td data-bbox="295 1508 343 1542">12</td> <td data-bbox="383 1508 502 1542">Shelves</td> <td data-bbox="782 1508 1444 1632">At least 3, height must be adjustable and made of SS 304 (non-corrosive in chemical like sulfur environment)</td> </tr> <tr> <td data-bbox="295 1666 343 1700">13</td> <td data-bbox="383 1666 550 1700">Glove ports</td> <td data-bbox="782 1666 1444 1780">2 x Teflon or polyoxymethylene glove ports, 200 mm diameter or better, should be O-ring sealed, chemical resistant</td> </tr> <tr> <td data-bbox="295 1780 343 1814">14</td> <td data-bbox="383 1780 478 1814">Gloves</td> <td data-bbox="782 1780 1364 1825">Thick butyl rubber of 0.3-0.4 mm thickness</td> </tr> <tr> <td data-bbox="295 1848 343 1882">15</td> <td data-bbox="383 1848 502 1882">Lighting</td> <td data-bbox="782 1848 1444 1961">Internally mounted with one spare light pre-fixed inside with separate switch and one fluorescent lamp.</td> </tr> <tr> <td data-bbox="295 1961 343 1995">16</td> <td data-bbox="383 1961 734 1995">Gas Purification system</td> <td data-bbox="782 1961 1444 2041">Full system installed with glove box with necessary gas.</td> </tr> </table>		1	Number of chambers	Single chamber	2	Design	Modular design	3	Main chamber dimensions	1200-1250 (W) X 900-950 (H) X 750-800 mm (D)	3	Shell material	SS Steel or better with bolted side panel	4	Interior Finish	Brushed, Anti corrosive coating and scratch resistant.	5	Exterior Finish	Powder coated	6	Chamber window	Chemical and scratch resistance polycarbonate or similar/ better material with inclined panel of 9-10 mm thick ness.	7	Stand	Powder coated, leveling fee & castors.	8	Electrical feed/ Flanges	2 DN KF40 Flanges, with one electrical feed through	9	Electrical outlet	Six position power strip	10	Electrical feed through	One number	11	Gas feed through	3 blank	12	Shelves	At least 3, height must be adjustable and made of SS 304 (non-corrosive in chemical like sulfur environment)	13	Glove ports	2 x Teflon or polyoxymethylene glove ports, 200 mm diameter or better, should be O-ring sealed, chemical resistant	14	Gloves	Thick butyl rubber of 0.3-0.4 mm thickness	15	Lighting	Internally mounted with one spare light pre-fixed inside with separate switch and one fluorescent lamp.	16	Gas Purification system	Full system installed with glove box with necessary gas.
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Sl. No.	Equipment Description	
17	Dust Filter	One 0.3 micron or better dust filter of class H13, 1 gas inlet and outlet filter.
18	Solvent Filter	one inline solvent filter cartridge for extra solvent vapor removal
19	Sensor	<ol style="list-style-type: none"> I. Solid state oxygen sensor with digital display (0 to 100%). II. Moisture and humidity sensor with digital display (0 to 100%) III. PLC controlled via system control panel
20	Box Pressure	Automatic box pressure from -15 mbar to +15 mbar. Provision for positive pressure regulation without vacuum pump with non-oil based pressure relief system.
21	Pressure Adjustment	Water proof easy foot pedal for instant pressure control.
22	Antechamber	<p>2 Numbers (made of MS or SS with brushed interior finish, each with separate doors operated manually having spindle locks, doors aluminum, anodized).</p> <ol style="list-style-type: none"> I. Cylindrical shape, 250-400 mm ID, 350-600 mm Length (big enough to transport a weighing micro-balance) II. Cylindrical shape, 150 mm (ID), 350-400 mm Length, hinged doors with sliding tray. III. Gas lines with dual control valves must be given for purging purposes.
23	Vacuum system	<ol style="list-style-type: none"> I. Vacuum pump: High speed rotary vacuum pump with dual stage, oil mist filter, oil recirculation, auto gas ballast control II. Pumping capacity: minimum 200 liters / m III. Vacuum level: Rough vacuum IV. Vacuum gauge: Digital gauge V. Option for automatic turning the vacuum pump off when the antechamber is not in use.
24	Working gas	<ol style="list-style-type: none"> I. Argon and Nitrogen (regular full size cylinder) II. Ar & N₂ gas regulator indicating pressure of both cylinder pressure and line outlet III. Connecting piping: 304 stainless steel

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Sl. No.	Equipment Description	
	<p>25 Controller</p> <p>26 Monitoring</p> <p>27 Optional Freezer</p>	<p>IV. Main chamber (box) pressure control: Foot switch / pedals (separate for increasing and decreasing pressure)</p> <p>PLC control color panel for operation of all glove box. Automatic box pressure control with foot switch (+15 mbar,-15 mbar)</p> <p>Remote monitoring facilities of all the values/parameters. Alerts about upcoming maintenance and service terms. Should be upgradable.</p> <p>In built provision for freezer/refrigerated rack</p> <p>NOTE: A layout diagram with properly marked dimensions should be supplied while quoting the item. Any picture or photograph of the previously manufactured / supplied system is more helpful.</p>
7	Guoy's Balance – 1 No.	
	<p>1 Digital Balance</p> <p>2 Electromagnet</p> <p>3 Constant Current Power Supply</p> <p>4 Gaussmeter</p> <p>5 Travelling Microscope</p>	<p>Capacity : upto max. 100 gm Readability : 0.0001gms or better Repeatability : (+/-) 0.1mg Linearity : (+/-) 0.2mg or better Complete with weigh below hook feature Sample should be in the form of a long rod (Aluminum or better options) and Glass Tube</p> <p>Pole Pieces : 75mm tapered to 25mm Mag. Field : approx. 20KG at 6 mm air gap /10 KG at 1 cm air gap Energizing Coils : Two of approx. 13W each Power : 0-90Vdc, 3A, for coils in series 0-45Vdc, 6A, for coils in parallel (Protection against the overload/short-circuit)</p> <p>Current Range : Smoothly adjustable from 0-3A per coil, i.e. 6A Load Regulation: 0.1% for load variation from 0 to max. Line Regulation: 0.1% for ±10% mains variation Display: 3½ digit, 7 segment LED DPM Power: 220V ±10%, 50Hz</p> <p>Resolution: 1 gauss at 0 to 2 kilogauss range or better Range : 0 to 2 KG and 0 to 20 KG Accuracy : ±0.5% or better Temperature: Upto 50°C Display : 3½ digit, 7 segment LED DPM with auto polarity and overflow indication Power: 220V ±10%, 50Hz Transducer: Hall Probe – InAs Special Feature Indicate the direction of the magnetic field Magnification : 30X Micrometer travel : 25mm</p>

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S. Pullaiah

V.P.

Y. Srinivas

Sl. No.	Equipment Description
	<p style="text-align: right;">Least Count : 0.01mm</p> <p>6 Specimen holder with mount Required</p> <p>7 Gauss probe holder with mount Material : Anodized Aluminum alloy</p>
8	<p>Triple Detector Gel Permeation Chromatography System – 1 No.</p> <p>Instrument: GPC system with pump, thermo stated ovens, columns for analysis of protein and polymers, degasser, auto sampler, solvent and sample delivery system with RI, Light scattering, Viscometer Detectors with software.</p> <p>Software:</p> <p>a) Windows based chromatography license version GPC software for multi detector system and report generation in terms of with result output: Mn, Mw, Mz, Mp, PDI, Rh, Rg, Branching Number, Branching Frequency, Number of Arms, Weight Fraction, Concentration, MH-a, MH-k, dn/dc, dA/dc. A2, copolymer ratio.</p> <p>b) The software should be able to monitor and acquire both Differential Pressure Transducer and signals for all detectors.</p> <p>Refractive index range 1.00 to 1.75 RIU Measurement range 7.0×10^{-9} to 5.0×10^{-4} RIU or better (specify the measurement range)</p> <p>Linear dynamic range < 100psi</p> <p>Temperature control: Internal oven 30 to 55°C, + 0.5 °C, settable 1 °C increments Flow cell Fused quartz LED source</p> <p>Specify the wavelength and sensitivity</p> <p>Light scattering detector:</p> <p>RALS, 90°; LALS, 7° or better, high efficiency optics with temperature controlled laser diode, Cell - Ultra low volume 15 to 20 µL (specify the cell volume: lower the better)</p> <p>Viscometer Detector Specifications:</p> <p>Transducers - Digital Inert Transducer technology Measuring volume – min 15µL</p> <p>Pump Specifications: The system should be capable of delivering precise volumes of mobile phase</p>

Ramkumar *D. Moe* *Y. J. K.* *V. P.* *Y. J. K.* *Neeraj*

Sl. No.	Equipment Description
	<p>Flow rate range - 0.00 to 10 mL/min • Flow Precision: 0.1% RSD or better. • Flow accuracy: + 1% or better</p> <p>Maximum Pressure: 6000 psi or better • Pulsation - Less than 1% (with viscometer)</p> <p>1. Styra gel HR 5E Effective molecular weight (2000-4000000), along with guard column or equivalent column 2. HSP gel AQ 3.0 4UM Molecular weight (1000-60000), 3. Glycol standard kit (100-22000) 4. Styrene Standards 2ml Kit (400-2000000) Column Heater Module: Temperature range ambient to 80 °C or better; Temperature stability ± 0.15 °C; Temperature accuracy ± 0.5 °C or better; Column capacity Should be able to house up to four HPLC or GPC columns Auto sampler: (Optional)</p> <p>• Injection volume: 20 -200 ul • Sampling vials capacity: At least 80 or above • Temperature 30°C or higher • Reproducibility: Better than 0.5 % • Carryover: Less than 0.1%.</p> <p>All necessary accessories and spares should be included for running the instrument.</p>

Ramkumar

Prasanna

Spill
V P

Harish
Ramesh