

## **DATA SHEET**

### **Tender Application No.**

Tender Notification No. & Date :

Name of the Equipment :

Name of the bidding firms and Address/  
Telephone/fax, Contact Person :

Whether any business transactions have  
been entered into with the Anna University :

Details of the Last Transaction :

Details of EMD and date :

Note : Separate tender application should be used for each item

## **TENDER SCHEDULE “A”**

### **INSTRUCTIONS TO TENDERS**

1. Tenders in duplicate each complete with all schedule duly filled in with the earnest money deposit in the form of Bank Guarantee in favour of Director, Centre for Biotechnology, Anna University, Chennai – 25 as indicated in the specification sheet should be enclosed in a sealed cover addressed in the undersigned and delivered so as to reach this office before 5.00 p.m. on 24.07.2009. No other forms of payment will be accepted.
2. Separate tender schedule should be purchased for each item. The tenders should quote the price(s) along with the numbered data sheet duly filled in each item.
3. The tenders should adhere to the general conditions enclosed. Tenders found defective in any manner will summarily be rejected.
4. The tenders will be opened by the undersigned or any authorized officer at the office of the undersigned in the presence of such tenderers as may desire to be present at 2.30 p.m. on 27.07.2009.
5. The Director, Centre for Biotechnology reserves the right to reject any tender in full or part without assigning any reasons therefore.

The cover should be sealed and super scribed as follows

CBT/Tender001/2009 and name of the equipment

Tender for the supply of equipment to The Director, Centre for Biotechnology, Anna University, Chennai due on 24.07.2009.

## **TENDER SCHEDULE “B”**

### **IMPORTANT INSTRUCTIONS TO TENDERERS**

1. E.M.D. : The successful tenderer should furnish Bank Guarantee to the tune of 10% of the total value of the stores/equipments before release of the purchase order towards E.M.D.
2. (i) E.M.D. in the form of Bank Guarantee furnished by the successful tenderer will be returned only on completion of all the transactions in the respective purchase.  
(ii) This University is fully exempted from the payment of excise duty. Necessary certificate will be issued to the firm so as to avail nil duty.  
(iii) This University is not in a position to furnish form ‘C’ or ‘D’ but can furnish Educational Concession Certificate. Hence the rate of Sales Tax/C.S.T./VAT as applicable against the issue of the above certificate should be indicated.  
(iv) The packing and forwarding charges where applicable, should be quoted separately.  
(v) As per Anna University Rules, Insurance charges will not be borne by this University.  
(vi) The validity of the quotation should be not less than six months.
3. The Tenderers should adhere to the general conditions mentioned in tender schedule ‘B’. Tenders found defective will summarily be rejected.  
Separate tender should be furnished for each item in DUPLICATE. The cover should be sealed and superscribed.
4. Completed tenders in duplicate for each item should be sent to the DIRECTOR CENTRE BIOTECHNOLOGY, ANNA UNIVERSITY, CHENNAI 600 025 so as to reach him before 5.00 p.m. on 24.07.2009.
5. The tenders will be opened in the office of the undersigned in the presence of such tenderers who may desire to be present at 2.30 pm on 27.07.2009.
6. The University reserves the right to cancel in full or part the purchase of any item without assigning any reason therefore even after calling for tenders.

# TENDER SCHEDULE "C"

## GENERAL CONDITIONS

1. a) The tenderers are expected to furnish their tenders for the equipment whose specifications are given in the detailed specifications. The tenderer may offer alternatively their standard equipment wherever possible which will approximately meet with the specifications contained in the detailed specifications.

b) The graduation of equipment to be offered should be in the metric system.

### **2. Drawing and Special Specifications:**

Detailed drawings of the equipment wherever necessary and complete descriptions of the parts should be furnished to enable the complete verification of the equipments to be supplied. Pamphlets on detailed instructions for operation and maintenance of the equipments should be supplied along with each equipment. List of spare parts usually required should also be submitted.

**3. Packing :** The tenders shall include and provide for securely protecting and packing the equipment of materials to be supplied, so as to avoid damage in transit. The tenderer shall be responsible for all loss or damage caused or occasioned by any defect in packing or in handling during transit, when the materials of equipment are delivered at the Centre for Biotechnology, Anna University, Chennai 600 025.

### **4. Replacing of defective work or materials:**

(a) If during the assembly or use of the equipment any unsound or imperfect work or inferior quality material is noted, any officer authorized by the University shall decide and notify the tenderer of the same and tenderer on receiving the details of such defects or deficiency shall, at his own expenses, proceed to alter or supply fresh materials of the standard laid down in the specification.

(b) Rejected goods or materials shall be removed at the expenses of the tenderer within seven days after the issue of notice as such rejection. If not, the University may cause the equipment or materials to be removed and charge the tenderer with all expenses incurred in such removal.

**5. Guarantee:** The tenderer shall guarantee the quality of the equipment supplied and satisfactory operation for a period of not less than one year.

- 6. Test Certificate:** “Maker’s Test Certificate” in duplicate should be supplied wherever possible. Standard Test Certificate should also be furnished from approved standard laboratory wherever applicable.
- 7. Price and Period of Delivery:** All tenders must indicate the delivery cost for delivery at the Centre for Biotechnology, Anna University, Chennai 25. Taxes payable (Central and State). The period of validity should be furnished in the tenders and it should not be less than 6 months. Prices should be firm and free from adjustments due to variation in cost of raw materials and labor. Wherever accessories are involved, such items must be indicated separately and rates for them should be shown separately. Since the University is exempted from paying Customs Duty on equipment procured under OGL LICENCE, CIF., Duty free, and Duty paid prices should be quoted separately as that exemption from payment of import and customs duty for Educational Institutions may be availed of from Government of India.
- 8. Time of Delivery:** Delivery Period will be reckoned from the date of receipt of the order by the tenderer. Therefore the time required for supply by the tenderer from the date of receipt of the order should be clearly indicated in the tender schedule for each item.

A reasonable extension of time shall be granted on application for reasons beyond the control of the tenderer.

The University reserves the right to cancel in part or in full in the order, if the due date of delivery is not kept up.

- 9. Terms of Payment:** (i) Invoice(s) in duplicate is/are to be sent/furnished by the supplier at the time of delivery of goods/materials. The duplicate will be returned by the Director, Centre for Biotechnology, concerned or the Officer authorized by him with the quantities or numbers received duly noted thereon. The supplier should send his bill(s) after the supply complete set of items in the tender to the Director concerned indicating the amount due correctly calculated according to the prices agreed upon. After examination of the claim subject to any deduction by the Director (may be authorized to make under the tender) the tenderer shall be entitled to the payment of the bill(s) within a reasonable period of time after the satisfactory operation of the equipment.

- (ii) University Payment terms: 90% of the cost will be paid within a reasonable period after the delivery of the item and 10% within one month after the receipt of the certificate from the user centre about the good performance of the equipment. Payment on other terms will not be made under any circumstances.
- 10. Deduction from the tender price:** All costs towards damages or expenses which the Centre for Biotechnology might have paid for which the tenderer is liable may be deducted by the Director, Centre for Biotechnology from any money due or becoming due to the tenderer under the tenders.
- 11.** The final payment for goods or materials under the contract shall be made only on production of a certificate by the suppliers obtained from the Income Tax authorities that all the Income Tax payable by him upto the end of the financial year has been duly paid.
- 12.** Any notice to the contractor shall be deemed to be sufficiently served, if given or left in writing at his usual or last known place of abode or business.
- 13.** The contractor shall produce an Income Tax Certificate in the prescribed form the Income Tax Officer of the Circle/Ward/District where he is assessed or assessable to Income Tax.
- 14.** Tender may be sent for each any every item separately indicating the serial number of the item in the Tender documents.
- 15. IN THE CASE OF IMPORT:** The supplier/local agent is required to watch the shipment and advise The Director, Centre for Biotechnology, ANNA UNIVERSITY by Fax No.044-2235 0299 about the shipment on the same day for speedy clearance of cargo. If this University is forced to pay the demurrage in the absence of the receipt of information of shipment, the local agent will be held responsible for the demurrage; and the demurrage paid will be deducted from the agency commission. If the demurrage exceeds the agency commission the local agent will be liable to compensate the same.
- 16. Technical Bid and Commercial Bid should be enclosed in two separate covers.**
- 17. Commercial bid will be opened only if the Technical Bid satisfies the Requisite Tender specifications.**
- 18. Declaration should be submitted either by the supplier or by the manufacturer for meeting the specifications as in the format for each equipment.**

**Bioreactor – 3 Nos (Approx Cost: Rs 42 lakhs inclusive of customs duty, tax & levies)**

Type : Insitu sterilizable bioreactor for microbial cultivation

Capacity : Between 2 to 10 litres any operating capacity

Material of construction : Glass or SS 316L

**AGITATION SYSTEM:**

Agitator : 2 six blade turbine agitator with baffle

Drive system : Suitable drive system to run the agitator from 50 – 1000 rpm

Seal : Mechanical seal or Magnetic seal

With suitable Agitation Indication and control system.

**AERATION SYSTEM:**

Suitable sparger for aeration rate of 2 VVM . Aeration system should have rotameter, check valve, pressure control valve, inlet filter and exhaust filter

**TEMPERATURE SYSTEM:**

Complete heating and cooling circuit for sterilisation and cultivation with PT 100 probe.

Suitable Temperature Indication and control.

**pH SYSTEM:**

Insitu sterilizable pH probe of Mettler Toledo or equal probe with connecting cable.

Suitable pH Indication and control system with peristaltic pumps for acid and alkali with connecting system to the reactor

**DISSOLVED OXYGEN SYSTEM:**

Insitu sterilizable DO probe of Mettler Toledo or equal probe with connecting cable.

Suitable DO Indication and control to activate the cascade control of agitator or aeration valve.

**FEED SYSTEM:**

Variable speed peristaltic pump for feeding with suitable connecting tubes and accessories

**DATA LOGGING SYSTEM (Price should be quoted separately for this):**

Suitable software for data logging in the PC

Required computer (Either laptop or branded PC with TFT monitor) and accessories for data acquisition should be provided. Specification and brand name of the computer should be specified.

Necessary spares should be included for the system

**OPTIONAL SPARES: (Cost of these have to be mentioned separately)**

pH probe

Dissolved oxygen probe

Mechanical seal

The CIF price to chennai airport have to be quoted. Tender document should clearly specify the payment mode, warranty terms (2 year or more warranty preferable). Validity of the tender should be 6 months from the date of opening. Manufacturer should have supplied the equipment globally for past 5 years.

Declaration to be attached with the tender for Bioreactor:

S.No	Tender Specification	Quoted equipment specification
1	Type : Insitu sterilizable bioreactor for microbial cultivation Capacity: Between 2 to 10 litres Material of construction: Glass or SS 316L	
2	AGITATION SYSTEM: Agitator: 2 six blade turbine agitator with baffle Drive system : Suitable drive system to run the agitator from 50 – 750 rpm Seal : Mechanical seal or Magnetic seal With suitable Agitation Indication and control system.	
3	AERATION SYSTEM: Suitable sparger for aeration rate of 2 VVM . Aeration system should have rotameter, check valve, pressure control valve, inlet filter and exhaust filter	
4	TEMPERATURE SYSTEM: Complete heating and cooling circuit for sterilisation and cultivation with PT 100 probe. Suitable Temperature Indication and control.	
5	pH SYSTEM: Insitu sterilizable pH probe of Mettler Toledo or equal probe with connecting cable. Suitable pH Indication and control system with peristaltic pumps for acid and alkali with connecting system to the reactor	
6.	DISSOLVED OXYGEN SYSTEM: Insitu sterilizable DO probe of Mettler Toledo or equal probe with connecting cable. Suitable DO Indication and control to activate the cascade control of agitator or aeration valve.	
7.	FEED SYSTEM: Variable speed peristaltic pump for feeding with suitable connecting tubes and accessories	
8.	Global supply : min 5 years	

## **COLOUR MEASUREMENT SYSTEM FOR FOOD PRODUCTS – 1No.**

**Type:** A colour measurement system for measuring colour of liquids (transparent and opaque), solid, paste, powder, whole foods both in reflectance and transmittance with accessories, data processing system and UPS.

It should measure reflected and transmitted colour (L, a, b); spectral reflectance, spectral transmittance and transmission haze (whiteness index, yellowness index, brightness opacity and haze).

### **Instrumentation**

**Spectrometry:** Dual beam spectrometer with two polychromators, each with 256 elements diode array and high resolution concave grating.

Spectral range: 360 nm to 780 nm

Geometry: Diffuse/8° reflectance, diffuse/ 0° regular transmission, diffuse/8° total transmission

Wave length resolution: < 2nm

Photometric range: 0 to 150%

Photometric resolution: 0.003%

Band width: 10 nm equivalent triangular

Sphere: 15.2 cm (6") diameter with high performance spectraflect coating

Light source: Pulsed xenon lamp, filtered to approximate to D65

Automatic UV control: 400nm cut off filter for UV control and UV exclusion

Automatic specular included/excluded

Viewing apertures:

Large area view (LAV) 25mm (1") illuminated

Small area view (SAV) 9.5mm (3/8") illuminated

Automatic lens switching for LAV/SAV

Measurement time: < 5 seconds

Calibration and quality control:

Calibration standards

Calibrated diagnostic green tile

Quality control soft ware compatible with the instrument and data processing system

Transmittance compartment: compartment open on 3 sides, large capable of holding up to 50 mm cells

Reflectance shelf: Large, capable of accommodating 50 mm cells

**Accessories**

Transmission cell, Transmission cell holder and others needed for handling solid and liquid samples

**Data acquisition and processing system**

(Price should be quoted separately for this):

The system should have a dedicated data acquisition processor suitable for the above system with proper monitor.

Suitable software for data logging in the processor

Required computer (Either laptop or branded PC with TFT monitor) and accessories for data acquisition should be provided. Specification and brand name of the computer should be specified.

Necessary spares should be included for the system

**Optional Spares:** (Cost of these have to be mentioned separately)

Sample handling devices for various types of samples

**UPS 1KVA**

The CIF price to Chennai airport has to be quoted. Tender document should clearly specify the payment mode, warranty terms (2 year or more warranty preferable). Validity of the tender should be 6 months from the date of opening.

## **Confocal microscope**

**(Approx Cost: Rs 90 lakhs inclusive of customs duty, tax & levies)**

### **Desirable Specifications**

**(As the equipment is higher end equipment the desirable specifications were given. The technical committee will decide based on the technical and commercial bid, the equipment to be purchased. Preference will be given for the equipment with latest technology & upgradable features)**

#### **1. Inverted microscope (Fully Motorized)**

- a. Bright field, Fluorescence with accessories for confocal scan head attachment
- b. Motorized beam path selection for visual and confocal imaging
- c. Motorized Z focus drive with encoder with minimum stable resolution of 30nm or better
- d. Online display screen on microscope body for the motorised functions
- e. 6 position or higher motorized FL filter wheel, 6 position motorized nosepiece
- f. Rectangular Mechanical Scanning stage for the movement of specimen
- g. 12v/100w halogen illumination for transmitted light
- h. High resolution plan apochromat objectives 4x, 10x, 20x, 40x, 60x/63xoil and 100x oil immersion.
- i. 100 Watt Mercury Lamp or optional 120w/130w metal halide or mercury lamp with 2000 hours of lamp life for fluorescence observation with automatic shutter having DC (direct current) to provide constant and non-fluctuating light
- j. Increase individual component speeds while reducing communication time with PC and hub to enable real time live cell imaging

#### **2. Confocal scan head and detection system**

- a. High transmission efficiency optics for confocal
- b. Scan head with dual imaging capability with conventional fluorescence imaging (filter/prism based) and real time Confocal imaging
- c. Scan head should have minimum 4PMT in standard detectors and preferably with 4 channel simultaneous image acquisition
- d. Computer controlled continuously variable single pinhole system, which should cover more area for higher brightness and without affecting sectioning performance

- e. High speed fiber-optic communication data transfer system which should be able to transfer up to 4 giga bytes per second or more to avoid any data lose
- f. System should possess efficient dichroic mirror with low angle incidence or acoustic optical beam splitter (AOBS) for better transmission efficiency
- g. Maximum scan resolution of up to 4Kx4K with a scan field of 18mm or higher
- h. Scan zoom of 1-40X or more continuous variable. Multi step scanning zoom preferred

### **3. Lasers: Visible laser module with laser lines of**

- a. Multiline Ar laser with 457/477/488/514nm
- b. HeNe Laser 543nm
- c. He-Ne Laser 633nm
- d. All the visible laser lines should be controlled through AOTF for laser attenuation and switching in synchronisation with scanner
- e. Laser power should be controlled by the absolute value and they have to be modulated through power control for each wavelength along with return mask and also ROI exposure control

### **4. Computer Workstation(To be supplied from principal company)**

- a. Intel Core 2 Duo E6600 2.4GHz. or better with at least 4 MB SLC, 1066 MHz FSB, RAM 4 GB DDR2-667 (upgradable to 8 GB)
- b. Hard Disc: 2X250 GB SATA II, 1 TB Back-up HDD, DVD super multi SATA R/RW/DL
- c. Graphics: ATi Fire GL V5200 256 MB DH DVI or higher
- d. 6 USB, Fire wire 1394, Gigabit Ethernet, Windows XP Professional
- e. 19" LCD TFT wide aspect true color monitor 2 no. for connection to workstation to enable 2560 x 1600 pixel resolution

### **5. Confocal Software**

- a. Basic image acquisition, Complete microscope control, Scan head control and Laser control software
- b. Saving of all instrument parameters along with the image for repeatable/reproducible imaging
- c. Frame/line/lambda capturing, Z-Stack, Time series imaging capabilities

- d. ROI bleach for FRAP experiments
- e. FRET Imaging
- f. Co-localization analysis and volume rendering
- g. Real time ratio-display
- h. 2 D and 3D image deconvolution
- i. Diverse measurement and statistical processing
- j. Offline image analysis software – to be installed in off line computer

**Optional items or accessories:**

**Inverted Microscope**

- a. The microscope should be capable of conducting long time live cell imaging applications without focus drift through hardware based continuous focus correction System. (Optional)
- b. Onstage CO2 incubator for live cell imaging, which can hold petriplate & multiwall plate etc.(optional)
- c. DIC attachment motorized for 10x to 100x objectives with analyzer and polarizer attachment, sliders and modules for the respective objectives
- d. A suitable anti-vibration table to be provided along with the system
- e. Optional high resolution cooled monochrome camera having 1.45 million net effective pixel resolution with cooling of 10 degree below ambient.

**Confocal Microscope**

- a. High speed two independent galvano scanner with the speed of 25-30 frames per second at 512x512 resolution preferably with simultaneous hybrid mode for photo activation studies
- b. Transmitted light detector to be provided for capturing bright field and DIC images

## **DYNAMIC LIGHT SCATTERING SYSTEM (DLS)**

**(Approx Cost: Rs 15 lakhs inclusive of customs duty, tax & levies)**

### **TECHNICAL DATA**

**Laser-** Wavelength: 660 nm,

**Particle size** Measurement range: Minimum: 1nm, Maximum: 6  $\mu\text{m}$

**Cuvette holder** Temperature stabilised to ensure measurement precision Range from 4°C – 90°C

**Scattering angle** Variation: Range 30° to 150°. Stepwidth: 0.1° steps

**Sample holders which could house the** Cuvettes with following specifications:-

Quartz, 1.5 x 1.5 mm inner dimensions, 7 $\mu\text{l}$  sample volume,

Circular, 5mm diameter, sample volume 50 $\mu\text{l}$

Flow through cuvette, sample volume 100 $\mu\text{l}$

Sample vials 11.5mm diameter, sample volume 300 $\mu\text{l}$

Plastic cuvetts (disposable), sample volume 40 $\mu\text{l}$

### **Hardware and Software DLS Software**

Should run on all Linux, Windows, Mac systems and should have the following capabilities

Display of ACF and radius distribution

Display histograms and radius distribution (2D and 3D)

Should be able to calculate, Radius values of all fractions, Molecular weights, Polydispersity

Autopilot for automated long time measurement series, including time, temperature and angle setting

**Preferable: the system should have provision for connection to an external DLS probe which can be attached to e.g. a microscope to perform DLS measurements in droplets, in capillaries or in microfluidic devices.**

Declaration to be attached with the tender for DLS :

S.No	Tender Specification	Quoted equipment specification
1	<b>Laser</b> - Wavelength: 660 nm,	
2	<b>Particle size</b> Measurement range: Minimum: 1nm, Maximum: 6 µm	
3	<b>Cuvette holder</b> Temperature stabilised to ensure measurement precision Range from 4°C – 90°C	
4	<b>Scattering angle</b> Variation: Range 30° to 150°. Stepwidth: 0.1° steps	
5	<b>Sample holders which could house the</b> Cuvettes with following specifications:-  Quartz, 1.5 x 1.5 mm inner dimensions, 7µl sample volume, Circular, 5mm diameter, sample volume 50µl Flow through cuvette, sample volume 100µl Sample vials 11.5mm diameter, sample volume 300µl Plastic cuvetts (disposable), sample volume 40µl	
6	<b>Hardware and Software DLS Software</b> Should run on all Linux, Windows, Mac systems and should have the following capabilities: Display of ACF and radius distribution Display histograms and radius distribution (2D and 3D) Should be able to calculate, Radius values of all fractions, Molecular weights, Polydispersity Autopilot for automated long time measurement series, including time, temperature and angle setting	
7	<b>Preferable: the system should have provision for connection to an external DLS probe which can be attached to e.g. a microscope to perform DLS measurements in droplets, in capillaries or in microfluidic devices.</b>	



## **FOOD TEXTURE ANALYSER - 1 NO.**

**Type:** The texture analyser should measure texture, rheological properties/ stress-strain behaviour of food products; tenderness, firmness, consistency and fracturability of cereal and pulse products, fruits and vegetables, dairy products, poultry and sea food products. It should also measure extensibility of dough and gluten and acoustic emissions of crisp products.

The instrument should measure rheology of solid, semi-solid, viscous liquid, powder and granulate materials and texture/strength of food packaging material.

### **Instrumentation**

Load range: Minimum 50 kg load frame capacity and 50 g load cell.  
Connecting leads and probe adapter.

Load Accuracy and resolution:

Load repeatability:

Position range:

Position accuracy:

Setting resolution:

Test Speed range: Maximum speed of 40mm/s and  
Minimum speed of 0.01mm/s.

Test modes: Single, Hold, Cycle, Bloom, Static Load

Operating temperature:

Power supply:

### **Fixtures**

- 1) Fixture for spreadability / softness of cheese spread, butter, honey etc.
- 2) Probe for softness of full-fat and low-fat cream cheese
- 3) Fixture for measuring the consistencies of full-fat and low fat yoghurt and for consistencies of tomato ketchup
- 4) Fixture to assess firmness (in bulk) of fresh or processed fruits / vegetables and also for firmness of diced tomatoes, hardness of cereal bars
- 5) Fixture for measuring tensile strength of pizza, chappathi, roti, etc.
- 6) Fixture to assess fruit/vegetable flexibility and to measure hardness and resistance of biscuits /cookies.
- 7) Fixture for extensibility of dough and measure of gluten quality. The sample requirement should not be more than 5 g
- 8) Probe for measurement of firmness and springiness of cakes.
- 9) Acoustic detector

### **Data acquisition and processing system**

(Price should be quoted separately for this):

The system should have a dedicated data acquisition processor suitable for the above system with proper monitor.

Suitable software for data logging in the processor- 32 bit.

The Software should provide complete database of family of probes and attachments and include comprehensive library of application reports, help guide covering a wide range of products. Software should give flexibility in data manipulation and data analysis using a wide range of mathematical and statistical formulae.

The software must facilitate control of the instrument and its various probes and fixtures used for the different measurements.

Required computer (Either laptop or branded PC with TFT monitor) and accessories for data acquisition should be provided. Specification and brand name of the computer should be specified.

Necessary spares should be included for the system

**Optional Spares:** (Cost of these have to be mentioned separately)

Sample handling devices for various types of samples

The CIF price to Chennai airport has to be quoted. Tender document should clearly specify the payment mode, warranty terms (2 year or more warranty preferable). Validity of the tender should be 6 months from the date of opening.

**Gas Analyser : approximate cost 9 lakhs**

Fermentation exhaust Gas analysis application

**CO<sub>2</sub> Analyser:**

Range : 0-5% (Optional extended range 0- 25%)

Type: Infra red

Accuracy : 5% of reading

Repeatability : 1 % of full scale

Response time: less than 1 minute

**O<sub>2</sub> Analyser:**

Range : 0-25% (Optional extended range)

Accuracy : 1% of full scale

Repeatability : 1 % of full scale

Response time: less than 1 minute

**Other specifications:**

Built-in Sample Pump for regulated delivery of sample gasses

Built-In Flow Meter for precise control of the sample gas flow rate

Simultaneous Export of Data to a PC and export to any spreadsheet programs

Sample processing unit for moisture removal

Sample flow rate 0.5 to 1 litre/min

In built calibration with zero and calibration gases should be available

Unit should be stand alone unit with inlet and exhaust gas connections.

Same sample should be analysed in both the analysers either parallel or serial continuously.

**HIGH PRESSURE BINARY GRADIENT HPLC SYSTEM WITH UV-VIS DETECTOR AND EVAPORATIVE LIGHT SCATTERING  
- 1 NO.**

**Type:** The HPLC system should include the following individual stackable self-contained HPLC modules. The system must be controllable, using Microsoft Internet Explorer web browser. Modules must be connected by fibre optic noise resistant high-speed transmission technology to enhance the reliability and sensitivity of the system.

**Solvent Delivery System for Micro, Semi-Micro, Analytical, Semi-Prep flow rates**

Pumps: two - High-Pressure, Binary Gradient pump

Flow rate resolution: 3 nl /min

Flow rate: set between 0.0001 to 10 ml/min from micro to semi-preparative flow rates

Flow rate accuracy:  $\pm 1\%$  or  $\pm 0.5$  ul/min of set value whichever is larger

Flow rate precision: less than  $\pm 0.1\%$  RSD

Pressure setting range: 1 - 40 MPa

**Other features of the solvent delivery system**

Have active check valves that allow stable delivery of even non-polar organic solvents

Be capable of standalone operation

Be suitable for upgrading to a high pressure (up to ternary) gradient operation if required

Have a leak sensor as safety feature

Have functions for maintenance and validation which are accessible by a dedicated operation button

Have variable volume type gradient mixture

### **Manual injector with 20 µL loop**

### **UV – Vis Detector**

Light Source: D2 Lamp  
Wavelength range: 190 -700 nm  
Bandwidth : 8 nm  
Wavelength accuracy: 1nm max  
Wavelength precision: 0.1nm max  
Noise:  $0.5 \times 10^{-5}$  AU  
Drift:  $1 \times 10^{-4}$  AU / h  
Linearity : 2.5 AU (ASTM standard)  
Dual wavelength detection  
Temperature controlled flow cell with optical length 10mm, Capacity 12µL

### **Evaporative Light Scattering Detector**

Light Source: LED 480nm  
Detector: Photo Multiplier tube digital signal processing/  
PMT  
Temperature range:  
\*\* Evaporator – Ambient to 120° C with 1 °C increment  
\*\* Nebulizer – Below ambient to 90° C  
Mobile Phase flow rate: 20 µL to 500µL/min  
Nebulizer Gas: Nitrogen  
Gas flow: 0.9 L to 3.25 L/min  
Analog Output: 0 to 1 VDC

### **Column Oven**

Temperature setting range: 4 to 80°C sept  
Temperature control precision: +/- 0.1°C  
Temperature control range: (Ambient temp. - 15)°C to up to  
temp + 60°C

Safety Features : Temperature limit device using maximum temperature setting, Thermal Fuse, Solvent leak sensor

Time Program : Temperature setting changes Over ON/OFF  
320 steps, 0.1- 999.9 min

Ambient Temperature range: 4 to 35°C

## **System Controller**

It should function as a communication bus module with data buffering capability

It should acquire up to 24 hours for one analysis, at 500ms sampling rate

It must be controllable from a web-based interface via a network. It allows the system to be controlled, monitored and maintained via Internet Explorer Web browser

It must be compatible with wireless networking

It must come with Expert function in that if pressure falls below specified value, the expert function will automatically purge the mobile phase

## **Data acquisition and processing system**

(Price should be quoted separately for this):

The system should have a dedicated data acquisition processor suitable for the above system with proper monitor.

Suitable software for data logging in the processor: 32 bit Win XP based software, provide digital instrument control, qualitative and quantitative processing, report creation and self-diagnosis

The software should allow automatic execution of system checks, auto-purge and baseline checks; an audio-visual multi-media CD-ROM for Maintenance and Troubleshooting must be provided.

System suitability, System security as well as System check functions must be provided which comply with Good Laboratory Practice (GLP) and Regulatory Conformity

Required computer (Either laptop or branded PC with TFT monitor) and accessories for data acquisition should be provided. Specification and brand name of the computer should be specified.

Necessary spares should be included for the system

**Optional Spares:** (Cost of these have to be mentioned separately)

The CIF price to Chennai airport has to be quoted. Tender document should clearly specify the payment mode, warranty terms (2 year or more warranty preferable). Validity of the tender should be 6 months from the date of opening.

## **SPRAY DRIER – 1 NO.**

**Type:** Table type Bench Top system suitable for Aqueous / Aqueous + solvents / Solvent feeds including. Stainless steel construction and design assembly to dry liquid foods to affine powder for products such as beverages, plant, vegetable and fruit extracts., heat sensitive materials, dairy and egg products.

### **Evaporation Rate:**

1000ml of water evaporation/hour

### **Drying Temperature:**

Ambient to 250<sup>0</sup> C; Accuracy  $\pm 1^0$  C in steps of 0.1<sup>0</sup> C through Microprocessor

### **Air Heater Capacity:**

1.6 kW

### **Aspirator:**

Blower Capacity 85 Nm<sup>3</sup> /hour; 0 to 250mm of water column vacuum with variable frequency drive; in steps of 1% of capacity; Microprocessor controlled

### **Aspirator Blower's Motor:**

0.25 HP x 2700 rpm 3 phase FLP – Motor with Single Phase 230V AC input & Three Phase 230V AC Output.

**Feed Pump Capacity:**

1000ml/ hour with 2 mm ID tube 1250 ml/ hour with 3 mm ID tube with variable speed control in steps of 1% of pump capacity controlled through Microprocessor

Compressed Air for Pressure Spray-Non Lubricated - 100 lit/min @ 8 kg/cm<sup>2</sup>

**Spray System:**

Co- current – 0.7mm, two fluid spray nozzle

**Air Autojet Deblocking System for Spray Nozzle:**

Fitted on Co- current nozzle with variable stroke interval through Microprocessor

**Hot Air Flow:**

Co-Current

**Fresh Air Filter:**

Pre-filter – 5 microns, Hepa Filter – 0.3 microns

**Other components:**

Product Receivers with covers, Collection bottle, Scrubber, Threaded Couplers, connecting tubing to be provided.

**Built in Control system:**

Digital controller with display of inlet and outlet temperature

Pump speed controller

Air Pressure Regulator Cum Filter for Spray Atomization

Control panel with LCD graphic display and audio visual indicators and 2-way communication between machine and data processing system

**Material of Construction:**

Main Body (Stand), Air Heater Body, Air Distributor- Stainless steel 316,

Spray Nozzle: SS 316 with 2 'O' Rings – 0.7mm

Drying Chamber - Borosilicate glass; annealed- stress relieved,

Cyclons - Borosilicate glass; annealed- stress relieved, Spark tested.

Tube for Peristaltic Pump - Silicon Tubing

All Sealing gaskets & 'O' Rings - Teflon / Silicon

**Accessories**

SS 316 countercurrent nozzle

Spray Congealing Nozzle

N<sub>2</sub> Inert Closed loop system with solvent recovery

Hot melt spray system

**Data acquisition and processing system**

(Price should be quoted separately for this):

The system should have a dedicated data acquisition processor suitable for the above system with proper monitor.

Suitable software for data logging in the processor

Required computer (Either laptop or branded PC with TFT monitor) and accessories for data acquisition should be provided. Specification and brand name of the computer should be specified.

Necessary spares should be included for the system

**Optional Spares:** (Cost of these have to be mentioned separately)

The CIF price to Chennai airport has to be quoted. Tender document should clearly specify the payment mode, warranty terms (2 year or more warranty preferable). Validity of the tender should be 6 months from the date of opening.