

1. The High-performance Liquid Chromatography

It should have minimum specification as bellow.

A. System Capability

The System must be capable of to carry out applications analytical/semi-preparative/preparative analysis.

B. Pump

- Binary Pump (Suitable mechanism)
- Flow rate Setting range: 0.001 to 10 mL/min
- Flow rate accuracy-No more than $\pm 1\%$ or $\pm 2 \mu\text{L}/\text{min}$, Whichever is greater
- Gradient precision-0.1% RSD max
- Flow Rate precision -0.06% RSD
- Gradient accuracy-+/- 1%
- Pressure 40 MPa or Better
- Plunger capacity-10 μL or better
- Safety measures-Liquid-leakage sensor, high-pressure/low-pressure limits

C. Autosampler with sample cooler

- Sample injection volume should be variable between 0.1 μl to 100 μl
- Injection system should be variable injection volume type with zero sample loss during injection
- It should be capable of fast injection time of 10 sec/sample or better
- Capacity to process samples automatically,
Suitable number of positions for 1 or 2 ml vials, 96 wells microtitre plates and 384 wells microtitre plates
- Flow line rinse capability both before and after sampling should be possible
- Injection volume accuracy within 1%
- The injection precision should be equal to or less than 0.3% of RSD
- It should have a leak sensor, automatic rack and vial recognition as safety feature
- Supply of at least 100 sample vials of suitable capacity, complete with caps and septa should be included
- The autosampler should have inbuilt sample cooler.
- Operating temperature range should be from 4°C to 40°C

D. PDA Detector (Photo Diode Array Detector)

- Wavelength range: 200-800nm or better
- Lamp: Deuterium (D2) lamp or Tungsten lamp or Suitable source
- No.Of Diodes: 1024 or suitable
- Baseline noise: 4.5×10^{-6} AU
- Drift should be less than 0.4×10^{-3} AU/h
- Wavelength accuracy must be ± 1 nm
- Operating temperature range should be 4 to 35°C
- Detector should have Temperature Control Flow Cell and Flow Cells have temperature-control range 19°C above room temperature to 50°C or better

E. A suitable column heater/oven:

- It should be block heating type or suitable technology and capacity of cooling for uniform temperature distribution

- The temperature setting range should be 4 °C to 80 °C
- It should have a leak sensor

F. Software and Computer

- Genuine & compliant chromatographic software should be supplied with HPLC system
- It should cover full one-point digital instrument control, qualitative and quantitative processing, report creation and self-diagnosis
- Sample schedule wizard function should be standard with on-line help function
- The reporting format should be flexible and easy to use in any desired format
- The data should be convertible to other formats
- The software should allow automatic execution of system checks, auto-purge and baseline checks etc.
- Suitable Workstation/PC/Laptop with all requirements for the operation of HPLC should be included

G. COLUMN

- Column – C 18 column (250mmx4.6mmx5u)—1No.
- Column -C 8 column (250mmx4.6mmx5u)—1 No.

H. WARRANTY

- Warranty should be 2 years for HPLC system.
 - Assurance of easy to reach/access to the supplier/engineers/instrumentation team in emergency situations.
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1. Fluorescent 4 mode ELISA Plate Reader

Plate reader

Requirements

- Detection modes: UV-Vis absorbance
Fluorescence intensity
Luminescence
Time-resolved fluorescence (secondary mode)
- Read methods : End point, kinetic, spectral scanning and well area scanning
- Microplate types: 6- to 384-well plates
- Other labware supported: PCR plates, Petri and cell culture dishes
Take3 Micro-Volume Plates
- Temperature control: Incubation to 50 °C wit +/- 0.2 °C at 37 °C
- Shaking: Linear, orbital
- Software: Suitable

ABSORBANCE

- Light source Xenon flash
- Detector photodiode
- Wavelength selection monochromator
- Wavelength range 200 - 999 nm, 1 nm increments
- Monochromator bandwidth 2.4 nm

- Dynamic range 0 - 4.0 OD
- Resolution 0.0001 OD
- Pathlength correction yes
- Monochromator wavelength accuracy +2 nm
- Monochromator wavelength repeatability +0.2 nm
- OD accuracy <1% at 2.0 OD
<3% at 3.0 OD
- OD linearity <1% from 0 to 3.0 OD
- OD repeatability <0.5% at 2.0 OD
- Stray light 0.03% at 230 nm

FLUORESCENCE INTENSITY

- Light source Tungsten halogen
- Xenon flash (option)
- Detector PMT
- Wavelength selection Filters or Monochromator
- Wavelength range 300 - 700 nm (200 - 850 nm option)
- Dynamic range >6 decades
- Sensitivity Top and Bottom: Fluorescein 5 pM (1 fmol/well 96-well plate)
- Reading speed (kinetic) 96 wells: 31 seconds
- 384 wells: 80 seconds

LUMINESCENCE

- Wavelength range 300 - 700 nm
- Dynamic range >6 decades
- Sensitivity 10 amol ATP (flash) - Lum and Abs / Lum configurations
30 amol ATP (flash) - Multi-mode configurations

TIME-RESOLVED FLUORESCENCE

- Light source Xenon flash
- Detector PMT
- Wavelength selection Monochromator

ALPHA DETECTION

- Light source Tungsten halogen
- Detector PMT
- Wavelength selection Filters or Monochromator
- Sensitivity 300 amol of biotinylated-LCK-P peptide, 25 μ L/ well in 384-well plate
- Read speed 2 minute (96-well plate)

REAGENT DISPENSERS

- Supported detection modes All modes
- Number 2 syringe pumps
- Supported labware 6- to 384-well plates
- Dead volume 1.1 mL with back flush
- Dispense volume 5-1000 μ L in 1 μ L increments
- Dispense accuracy +1 μ L or 2%
- Dispense precision <2% at 50 - 200 μ L

PHYSICAL CHARACTERISTICS

- Connectivity 1 USB, 1 RS232 for external PC control
- Power 100-240 VAC, 50/60 Hz

2. High volume-capacity Centrifuge: Quantity-1

Specifications

- Capacity
 - >Max Capacity 4-liter capacity (4 x 1000 mL)
 - >Max. RCF 5590 x g
 - >Max. Speed 15,200rpm
 - >Refrigerated Yes
 - >Display Digital
 - >Noise Level < 61 / < 55* dB
- Electrical Requirements 230V 50/60Hz
- Controller Type Microprocessor
- Temperature Range -10° to +40°C
- Fixed angle rotors for the 15 ml/1.5 ml tubes

Additional features

- Intuitive controls with simplified operation for operating parameters and processing status
- Motorized lid latch/ automatic lock System
- Easy access to rotor chamber for quick cleaning, a healthier working environment
- Glove-friendly, one-handed open/close capability
- Good rotor management system maximizes acceleration, braking and residual load imbalance for each rotor and bucket option
- Optimizes safety and improves separations

3. **Real-Time PCR:** Quantity-1

Specifications

- No. of channels: 5
- Multiplexing: 5 Color
- Sample Capacity 96-Well PCR plate, 12x8 Strip, 96x0.2ml (Bottom Transparent)
- Dynamic Range: 1~1010 Copies
- Excitation Wavelength: 300-800nm
- Emission Wavelength: 500-800nm
- Detected Fluorescence: F1: FAM, SYBR
F2: HEX, TET, JOE, VIC
F3: ROX, TEXAS-RED
F4: CY5
F5: CY5.5
- Passive reference dye: Rox or other dye not required (optional)
- Block Temp. Range: 4~105°C (Minimum Increment 0.1°C) Soak Low Temperature, Conservation Function
- Heating / Cooling Rate: 4.0°C/s (max)
- Temp. Control Accuracy: $\leq \pm 0.1^\circ\text{C}$
- Temp. Fluctuation: $\leq \pm 0.1^\circ\text{C}$
- Temp. Uniformity: $\leq \pm 0.3^\circ\text{C}$
- Temp. Control Mode: Block / Tube Simulation Mode (Automatic Control Based On Sample Volume)
- Sample Volume Range: 5~100 μl
- Gradient Temp. Range: 1~36°C
- Hot-Lid Temp. Range: 30~110°C (Adjustable Default 105°C), Automatic Hot-Lid
- Fluorescence Detection Repeatability: Within 5%
- Scan Mode: Entire Plate or Designated Line
- Run Time: Max 20 Segments for each Program, Max 99 Cycles
- Operation Mode: Continuous

- Scan Period: 5.5 seconds
- Feature Function: Absolute Quantification; Automatic Data Analysis; Melt Curve; Genotyping; Gradient; Correction; Customized Parameters
- Operating System Microsoft: Windows 7/ Windows 8.1/ Windows 10,
- Software: Excel 2000/2002/2003/2007/2012
- Required PC Configurations: Memory 4GB RAM, Hard Disk: 500GB, CPU: Intel i3 & latest, Virtual Memory: $\geq 1000\text{MB}$
- Power Supply: 100 - 240V \sim 50/60Hz 600W
- Socket USB Adapter, Bluetooth Adapter

4. Automated DNA purification system

Specifications

- Sample Capacity: 1~16 or more
- Process volume: 50 to 1000 μl or more
- Sample Volume Range: 25 to 400 μl or more
- Elution Volume: 50 μl or more
- Consumables: Individual cartridge +96 Deep well plate + Special magnetic rod's tip
- Working principle: Magnetic beads method
- Magnetic Rod: 4200 gauss
- Purification accuracy: 100 copy sample positive rate $> 95\%$
- Stability: CV $<3\%$
- Magnetic beads recycling rate: $>95\%$
- Temperature Range: Room temperature to 120 $^{\circ}\text{C}$
- Lysis temperature: Room temperature to 120 $^{\circ}\text{C}$
- Elution temperature: Room temperature to 120 $^{\circ}\text{C}$
- Mixing: Mixing ways can be editable
- Operation interface: 4.3 inch
- Built-in protocol: 8 groups of preset protocols, 100 groups of protocols can be stored
- Protocol management: New, Edit, Delete, Save as Template, Create
- Expansion interface: Standard USB, Ethernet port and RS 232 available
- Lighting: Yes
- Sterilization: UV light
- Exhaust way: By Fan
- Data storage: Available, with built-in SD card
- Max. input power: 150W

6 & 7. Microbial lab fermenter/Plant cell reactor: Quantity: 2

Requirements:

- Fermenter vessel :-
 - > Borosilicate (pyrex) glass vessel
 - > Nominal capacity 5 litres (approx.)
 - > Working volume range 2 to 3 litres (approx.)
- Stainless steel support plates with ports & fittings for the following :-
 - > Air inlet to sparger
 - > Air exhaust (vent)
 - > Inoculation cum sampling

- > Cooling finger heat exchanger
- > Sensor port(s)
- > Addition port(s)
- > Thermowell
- > Spare port(s)
- Agitation (stirring) arrangement :-
 - > Bottom driven seal-less & totally leak-proof magnetic drive agitator
 - > Rugged industrial grade AC induction motor
 - > Variable frequency (ACVF) drive for motor speed variation, range 250-750 RPM
 - > Digital RPM meter for motor speed
- Aeration control system :-
 - > Oil-free mini air compressor
 - > Air flow rotameter with needle valve for manual flow control setting
 - > Autoclavable sterile air filter for inlet air, rating 0.2 micron
- Temperature measurement & control system :-
 - > Microprocessor-based digital on/off type temperature controller
 - > Control range : 5 °C above cold water temperature upto 35 °C
 - > For heating : Non-contact type infrared (IR) heater, as the heat source
 - > For cooling : Cold water circulation through cooling finger heat exchanger
- Cold water provision for temperature control :-
 - > Induced draft cooling tower in FRP with fan
 - > Cooling capacity upto 5 °C below room temperature
 - > Submersible water pump for recirculation
- Online sterilizable pH monitoring & control system :-
 - > Autoclavable gel filled glass body pH electrode
 - > Panel-mounted microprocessor-based digital on/off type pH indicator-controller
 - > 3-way selector switch for selecting between acid-based or alkali-based pH control strategy
 - > Panel-mounted programmable cyclic timer with programmable on & off timing
 - > Suitable for programming the addition volume of acid/alkali to fermenter
- Online sterilizable DO monitoring system (without control facility) :-
 - > Autoclavable glass body galvanic DO electrode with PG13.5 process connection
 - > Detachable cable for the above electrode, length 3 metres
 - > Panel-mounted microprocessor-based digital DO indicator
- Online sterilizable foam control system (antifoam addition based) :-
 - > Autoclavable foam sensor
 - > On/off type blind foam controller
 - > Panel-mounted variable speed peristaltic pump for antifoam dosing
- Control panel console
 - > Suitable for tabletop mounting adjacent to fermentor
- Mounting
 - > Suitable for mounting on laboratory benchtop or platform
- Suitable autoclave unit for the autoclaving
- Suitable Chiller unit should be included
- Model in general should be suitable for following applications
 - > College-level experiments, demonstration, practicals
 - > Research work on the following :-
 - > Microbial cultures (bacteria, yeasts, actinomycetes, fungi)

9. Refrigerated Incubator Shaker : Quantity:1

Standard Specification for

SHAKING SPECIFICATION

- Shaking Frequency : 25-400 RPM
- Shaking Deviation : ± 1 RPM
- Shaking Display : Colour LCD
- Shaking Change via: HMI (Touch Screen)
- Shaking Motion : Orbital
- Diameter of Orbital Motion : 26 mm (1 inch)
- Platform Dimension (W x D) : 420 x 420 mm
- Universal Platform to accommodate

Standard clamps of sizes from 10 ml upto 2 L

16 Nos. of 500 ml/9 Nos. of 1L/4 Nos. of 2L .

TEMPERATURE SPECIFICATION

- Temperature Range : 5°C to 80°C
- Temperature Accuracy : $\pm 0.1-0.5^\circ$ C in 5°C to 80°C
- Temperature Display : Colour LCD
- Temperature Change via : HMI (Touch Screen)

OTHER SPECIFICATIONS

- Internal Dimensions (W x D x H) Per Unit : (500 x 490 x 425) mm
- External Dimensions (W x D x H) Per Unit : (570 x 702 x 815) mm
- Multiple Step programming upto 4 parameters
- Audible & Visual alarm for Temperature deviation
- Thermostat cut-off for Temperature over shoot
- Non Volatile Memory with automatic Power failure restart
- Electrical Requirement : 230V,16 Amps, 50 Hz, 1 Φ
- Net Weight (Kg) Per Unit : 125
- Gross Weight (Kg) per Unit : 225

10. Speed Vac: Quantity:1

11. Soxhlate apparatus with Vacuum Pump: **Rota vapour and Soxhlet assembly**

Requirements

1. Capacity: 3 Lit

- Temp range: Room Temp to 180 °C
- Shape: Round
- Receiving flask: Round bottom, 1 lit capacity
- Vacuum: 2 mbar pump

2. Soxhlet Apparatus

- Sample weight : Upto 15 g
- Solvent jar capacity: 150 ml

1 Rotary Evaporator System

12.Deep Freezer -80 °C

- Capacity : 368 Ltrs
- Temperature range : -50 °C to -86 °C
- 2" Box Capacity : 240
- Vial Capacity (2 ml) : 24,000

- Display : Digital display.
- displays setpoints, system status and alarm messages
- Easy-to-use microprocessor control panel
- Operating Mode : Standard operation mode
- Security : Key lock with compatible pad lock
- Data Management
- Dry Contacts – Standard Optional PT100 Probe
- Improved temperature recovery after door openings
- Dust protection on condenser : Easy to remove washable air filter

13. Probe Sonicator

Probe Sonicator-With

- | | |
|--|-------------|
| 1. Probe 3 mm : | Quantity: 1 |
| 2. Extra Probe-2 mm : Process Capacity-0.5-5ml | Quantity: 1 |
| 3. Extra Probe-12 mm : Process Capacity-50-500ml | Quantity: 1 |

- Touch screen Display,
- Microprocessor Controlled
- Completely Programmable
- Data Memory-20 Groups,
- Variable power output control

14. Binocular Microscope with Camera: Research Microscope with Digital camera

Binocular Microscope

- with infinity corrected optical system
- built in transmitted Led illumination system
- coaxial & fine focusing knob on both side with torque adjustment for coarse
- focusing stopper
- quadruple revolving nosepiece with inward tilt
- anti-fungus plan achromatic, Objectives
- 4x, 0.10 WD, 27.8mm
- 10x-0.25 WD 8 mm
- 40x-0.65 WD 0.6mm
- 100x-1.25 WD 0.13mm
- Spring Oil
- mechanical XY Stage with travelling range- 76mmx30mm
- Single Specimen observation tube.
- wide field paired eyepiece of 10x
- abbe condenser

2. Digital camera for image recording

- MagCam DC-5 (with 0.5x TR adapter) 11.3.2

15. CO₂ Incubator

CO₂ Incubator, 167 liter 5.9 cu.ft.

Required features

- Fan-less, six-sided direct heating with seamless, deep drawn stainless steel chamber
- Unique IR sensor for CO₂ offers specific measurement and control of CO₂ levels
- Auto-calibration feature of sensor automatically ensuring CO₂ accuracy
- Sealed inner Glass door for conservation of inner chamber ambience
- Connections/ Communication ports: Ethernet 1x
- User & 1x Service; with BMS relays 0-5V & O₂ Nos. of 25mm access ports
- Stackable up to 2 units high
- Large volume humidification pan with dedicated independent heater
- HEPA filtration of gas supply inlets to minimize contamination risk
- 4 position shelving rack with 3 perforated shelves as standard supply; optionally upgradable to 8 shelves.
- Flatness tolerance of Shelves = 1mm and thickness of shelves = 1.5 mm
- High Temperature Disinfection [HTD]: 140°C 2-hour cycle
- Convenient and simple operation
- CO₂ sensor remains in the chamber during HTD • Ensures a clean and disinfected environment for cell culture

Additional features:

- Building Management System (BMS) Relay for integration into centralized building alarm system is standard on all models
- Advanced control maintains temperature accuracy and uniformity while minimizing costly gas consumption
- auto-calibration to ensure accurate CO₂ calibration measurements
- Access Port for adding instrumentation or probes
- High quality door gasket maintains a leak-free seal
- In-line filters for gas supply inlets ensure sterility
- Space-saving stackable (x2) design; requires optional stacking stand
- **Technical specifications:**
Capacity: 167 liter
Temperature Management: Range: 4°C above ambient to 50°C,
Control increment: ± 0.1 °C
Accuracy: ± 0.4 °C at 37°C
Uniformity: ± 0.3 °C at 37°C and ambient 22°C
Stability: ± 0.1°C at 37°C and ambient 22°C
High Temperature Disinfection: 140°C 2- hour cycle CO₂ gas management
Gas range: 0.1 - 20% with Control increment of 0.1%, Accuracy: + 0.3% at the specified
Relative Humidity (RH) at 37°C and ambient 22°C,
Stability: ± 0.1% at 37°C and ambient 22 on Uniformity: ± 0.1% at 37°C and ambient 22°C
Gas Recovery after door opening: Approx 5 min
Connections: Gas tubing Inner diameter of 6.5 mm and outer diameter of 10 mm, gas
service pressure required: 0.1 MPa (1 bar/ 14.4 PSI). Range: 0.05 to 0.2 MPa (0.5-1.5 bar/
7.2 -21.8 PSI)
Humidity: Reservoir: removable SS pan volume = 2.5 lts,
RH (37 °C) up to 95% Controller: Diagnostic interface to show system parameters and
functions
- Electrical: 220 - 240 volts, 50/60 Hz.
- Power: 500 W, Weight: Net. 81 to 105 kg. Depending on options w/o accessories.

16. Bioinformatics Software and processing unit:

Specification:

Software: Dassault Systemes' BIOVIA Discovery Studio Academic Teaching Suite

BIOVIA Discovery Studio Academic Teaching Suite - 30 Users. Perpetual Licence

Processing Unit:-----

17. Green House Facility:

Specification:

Greenhouse Tunnel with Fan and Pad system (45 ft X 35 ft)

18. UPS:

Specifications: 10 KVA- Quantity: 01

6 KVA- Quantity: 02