



**DEPARTMENT OF BIOTECHNOLOGY**  
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Dr. D. KARUNAGARAN

Professor and Head

Date: 18.01.2017

Ref: BT/SMIT/2016/032/SPL

Dt. 18.01.17

Due Dt.07.02.17

1. Quotations are invited in duplicate for the various items shown below/overleaf/ enclosed list.
2. The quotations duly sealed and super scribed on the envelope with the reference No. and due date, should be addressed to the undersigned so as to reach him on or before the due date stipulated above.
3. The quotations should be valid for sixty days from the due date and the period of delivery required should also be clearly indicated.
4. If the item is under DGS & D Rate Contract, Rate Contract Number and the price must be mentioned. It may also please be indicated whether the supply can be made direct to us at the rate contract price. If so, please send copy of the R.C. (Please note that we are not Direct Demanding Officers).
5. Relevant literature pertaining to the items quoted with full specifications (and drawing, if any) should be sent along with the Quotations, wherever applicable. Samples if called for should be submitted free of charges and collected back at the supplier's expenses.
6. **Local Firms:** Quotations should be for free delivery to this Institute. If quotations are for Ex-Godown, delivery charges should be indicated separately.
7. **Firms outside Chennai:** Quotations should be for F.O.R Chennai. If F.O.R. Consigner stationer freight charges by passenger train/lorry transport must be indicated. If Ex-Godown, Packing, forwarding and freight charges must be indicated.
8. The rates of Sales/General Taxes and the percentage of such other taxes legally leviable and intended to be claimed should be distinctly shown along with the price quoted. Where this is not done, no claim for Sales/General Taxes will be admitted at any stage and on any ground whatsoever. **The taxes leviable should take into consideration that we are entitled to have concessional sales tax applicable to non-government educational institutions run with no profit motive for which a Concession. Sales tax certificates will be issued at the time of final settlement of the bill.**
9. Goods should be supplied carriage paid and insured.
10. Goods shall not be supplied without an official supply order.
11. **Payment:** Every attempt will be made to make payment within 30 days from the date of receipt of bill/acceptance of goods, whichever is later.

# Specifications for Fermentor

## Reactor Assembly

### Culture Vessel

- 3L total volume
- Working volume - max 2.5L, min 1.8L)
- Borosilicate glass vessel dished bottom
- Mounting stand with safety ring
- HXD = 250x150mm

### Head plate

- 16 Port head plate
- Diameter 200mm
- Thickness 7mm
- Material – SS316L
- 6-head plate fixing screws
- Micro polished

### Mixing Assembly

- Stirrer assembly with shaft
- Contamination free with lip seals and V-rings
- 2-Height adjustable Ruston Impeller with 6 blades each
- 2 smooth bearings
- 3 Baffles
- 2 additional marine impeller
- Material – SS316L

Sampling – 6mm Diameter sample pipe

Addition – media double inlet for acid and base, inoculum port with septum

Aeration – L-type air sparger with micro pores, air outlet condenser with 0.2 $\mu$  filter

Heat Exchanger – thermopocket for Pt sensor, heating finger, cold-water circulation U-tube

Nipple M3/8xpsp holder for pH sensor

Blind stoppers and head plate fixing screws

All material contact with culture – SS316L

## Airlift

### Culture Vessel

- 3L total volume
- HXD = 400x100mm
- Cylindrical Borosilicate glass vessel
- Mounting stand with base plate

- SS Safety jacket

#### Head plate

- Dimensions of top plate (DxT) : 130x12mm
- 10mm Port-1
- 18mm Port-8
- Dimensions of bottom plate (DxT): 130x12mm
- 25mm Port – 3
- 10mm Port – 3
- SS316L Material
- 12-head plate fixing screws
- Micro polished

Sampling – 6mm Diameter sample pipe and drain pipe with valve

Addition – Inoculum port with septum, acid and base ports

Aeration and mixing – Ring type air sparger with draft tube, air outlet condenser with glass wool cartridge and manual valve

Heat Exchanger – U-tube for cold water circulation, Heating finger

Holder – pH and dissolved oxygen sensor

Blind stoppers(4Nos.) and fixing screws(6Nos.)

### **Bubble column**

#### Culture Vessel

- 3L total volume
- HXD = 400x100mm
- Cylindrical Borosilicate glass vessel
- Mounting stand with base plate
- SS Safety jacket

#### Head plate

- Dimensions of top plate (DxT) : 130x12mm
- 10mm Port-1
- 18mm Port-8
- Dimensions of bottom plate (DxT): 130x12mm
- 25mm Port – 3
- 10mm Port – 3
- SS316L Material
- 12-head plate fixing screws
- Micro polished

Sampling – 6mm Diameter sample pipe and drain pipe with valve

Addition – Inoculum port with septum, acid and base ports

Aeration and mixing – Ring type air sparger without draft tube, air outlet condenser with glass wool cartridge and manual valve

Heat Exchanger – U-tube for cold water circulation, Heating finger

Holder – pH and dissolved oxygen sensor

Blind stoppers (4Nos.) and fixing screws (6Nos.)

### **Bio controller**

Agitation – Speed Range 100-800rpm, Rpm display, Accuracy 1rpm, Stirrer Motor PMDC

Temperature – PID control, Accuracy +/- 0.01 °C, Uniformity +/- 0.01 °C, Digital Display, Ambient temperature range - +5 °C to 60 °C, Simultaneous SV & PV display, feather touch keypad

pH Control – pH range 2-14, Accuracy +/- 0.01, Uniformity +/- 0.1, PID control, Auto calibration, BNC connector, Large LCD display, Two set point position, feather touch keypad

DO Control - Range: 0.0-100.0%, 0.00-8.24mg/L, Resolution : 0.1%, 0.01mg/L, temperature

Compensation : 0.0-50.0°C, Pressure Compensation : 600-2000mBar, Temperature Range: -10.0-

110.0°C, Resolution: 0.1°C, Accuracy: ±0.3°C, Temperature Sensor: 22K, Temperature Compensation:

Automatic Water proof and anti-gas, High protection against electromagnetic interference, Large

LCD, Automatically compensates salinity/barometric after manual input for increased accuracy,

Control modes: on / off limited control (LIT), Separately adjustable high and low set – point hysteresis (dead bands)

### **Biosensors**

RPM – Tacho Feedback Method

Thermal sensor (P+100) Length – 210mm

Gel filled autoclavable pH sensor -2 Nos

Length – 225mm Dia – 12mm

SS Polarographic DO sensor-2Nos

Length-225mm, Dia -12mm, Foam sensor

### **Actuators**

Three peristaltic pumps non spring loaded

Rotameter with Inbuilt Gas mixing Station

Range: 0.5 lit/min to 5lit/min for air flow

Range 0.1lit/min to 1lit/min O<sub>2</sub>

Cooling Valve

Air pump

### **Other accessories**

Autoclavable Silicon tubing - 2mm dia for acid & base addition – 3m, 5mm dia for sampling & addition – 1m, 6mm dia for hot & cold water circulation – 2m.

Addition bottle - 3 Nos for acid, base & foam, 250ml capacity, threaded cap with two pipe

Autoclavable & re-usable air filter of 0.2 micron size -5 No

### **Chiller cum circulator**

Temperature Range: 0 – 60°C  
Bath Volume: 5L  
Pressure: 1 bar  
Pump Capacity: 10 – 12 LPM

### **Variable speed pump**

Non spring loaded -2Nos  
5 points fixed flow rate. No digital display.

### **Power supply**

Voltage: 230 vac /50khz  
Power Consumption: 1KW  
Single / Three Phase

### **Data Acquisition System with software**

ON/OFF line data acquisition from fermentor  
Facility for storing all the data like temp, pH, DO, RPM and directly visualizing in computer on-line with trend graph of all parameter like temp, pH, DO, RPM Vs time.  
History facility to review all old data.  
Own display unit (LCD)

### **Starter Kit-3Set**

Set of O-rings for all ports including head plate (both reactor), Lip seals, Viton-v-rings, Align key-2, Spanner, Septum-100Nos, Additional autoclavable & reusable air filter of 0.2 micron size filters –5no., Assorted tubings - one extra set, Pinch clamps-10., Tag-Pack, Glass wool box – 1 no.

### **Accessories included**

Suitable Power Backup system with 2KVA one Hour back up, Suitable Laptop to load the fermentor software.

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