

## **FERMENTER SPECIFICATION**

1. **Type** : In-situ sterilizable laboratory fermenter for microbial cultivation

2. **Capacity** : 2 - 3 litres Total volume, In-situ sterilizable glass vessel

3. **Agitation system** :

a. Agitator: 6 blade Rushton impeller, SS 316, two pieces, for radial mixing, height adjustable  
Drive system: direct drive from bottom by brushless DC motor with mechanical seal, 30-1500 RPM controlled speed

b. Aeration: Aeration tube with ring sparger through rotameter

c. Ventilation: Exhaust gas condenser; stainless steel, with connections for cooling water supply and return, including closing and adjustment valve for cooling water.

4. Temperature circuit: Electrical heating finger/jacket

5. **Measurement and system** :

a. Temperature control: Sterilizable Pt 100 temperature probe and temperature controller. Allows to measure and control vessel temperature within 4 to 130o C accuracy  $\pm 0.1$ o C.

b. Speed control: Measurement and control of agitation speed, accuracy 30 - 1500 RPM  $\pm 0.1$

c. pH control: In situ sterilizable pH-probe and pH controller activating both a base pump and an acid pump. Measurement and control of pH value between pH 2 - 12,  $\pm 0.05$  C.

d. pO<sub>2</sub>: In situ sterilizable DO (pO<sub>2</sub>)-probe with DO- controller, by configurable cascade control. For measurement and control of DO between 6 ppm and saturation,  $\pm (1\% + 6\text{ppm})$ .

e. Antifoam/Level: In situ sterilizable conductive level or foam probe with controller

6. **I/O package with additional Interfaces and controllers, freely configurable**

Communication through RS232 port. Additional ports for future use like adding gas analyzer. All inputs and outputs are available on sockets at the control cabinet housing and can be easily configured with suitable software allowing adding external equipment at any time without updating the software.

7. **Pump** module with 1 variable for media feed/antifoam and 2 fixed pumps for acid and base.

8. **One process control system for upto six fermenter units.**

Programming and management of user profiles, security enter passwords (various levels), Password management Trends, process data visualization with scaleable timeframe, 2 D and 3 D bar

charts Alarm and Warning Management: Set points, Alarms, Warnings and Acknowledgement, visual and acoustic notification.

Status line with chronological event list Record management

**9. Should have Gas mixing station : Optional**

10. Should have supplied such instrument to IIT Madras or any reputed institute/ company. Should have COS – Certificate of satisfactory performance

11. **Warranty** : 2 years

12. Should have international supply and service

13. Should have journal publication references

14. Should have servicing facility at Chennai

15. Two-bid system: separate technical and financial bids