

How to Choose the Right Bioreactor

Choosing the right bioreactor is crucial for ensuring the success of fermentation processes. The type of bioreactor, its material, capacity, and control systems all vary based on different application needs. Below are key factors to consider when selecting a bioreactor:

1. Select Based on Application

Laboratory Research: Suitable for small-scale experiments and process development. Typically made of glass, with a capacity between 0.5-10L, allowing easy observation and process adjustments.

Pilot Scale: Used for process optimization and small-scale production. Capacity typically ranges from 10-200L, with options for glass or stainless steel.

Industrial Production: Designed for large-scale continuous production, with capacities ranging from 200L to several thousand liters. These are usually stainless steel and equipped with automated control systems.

Single-Use Bioreactors: Ideal for high-demand processes such as vaccine production or cell culture, reducing cross-contamination and improving flexibility.

2. Choose the Right Material

Glass Bioreactors: Transparent and ideal for laboratory research, allowing easy monitoring of the fermentation process.

Stainless Steel Bioreactors: Suitable for pilot and industrial production. Corrosion-resistant, easy to clean and sterilize.

3. Control Systems and Automation Needs

Automated Control: Including parameters such as pH, DO (dissolved oxygen), temperature, and agitation speed to ensure a stable fermentation environment.

Gas Management Systems: Does the system require multi-stage ventilation or gas mixing control?

Online Sensors: Sensors like OD and CO₂ monitoring can improve data accuracy and process control.

4. Other Selection Considerations

Agitation Type: Top-drive, bottom-drive, or magnetic stirring—choose based on the process requirements.

Sterilization Method: In-situ sterilization (SIP) or high-temperature, high-pressure sterilization.

Process Compatibility: Does it meet GMP/FDA standards? Is it suitable for specific microorganisms (aerobic or anaerobic)?

5. Budget and Customization Needs

If your process has specific requirements, such as extreme pH values or custom stirring designs, a customized bioreactor may be the best option to meet production needs while managing costs.

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