

GMP Sanitary Bioreactor Configuration



Vessel

Capacity	5L-10,000L, customizable
Working Volume	30%-75%
Vessel Material	SUS316L/SUS304; smooth surface, no dead zones, easy to clean
Surface Finish	Electropolished, $Ra \leq 0.2 \mu m$
Air inlet	<p>Deep aeration design with the air inlet introduced from the upper sidewall of the vessel. The internal air sparger is detachable. The bioreactor is equipped with a gas distributor, which ensures uniform gas distribution throughout the vessel with no dead zones. This design enables efficient oxygen transfer, is easy to clean, and fully meet the requirements of high aerobic fermentation processes.</p> <p>Equipped with non-return device to prevent back-suction of broth and contamination of inlet filter.</p>
Discharge	The bioreactor is equipped with a bottom drain outlet featuring a sanitary, dead-zone-free design. It is easy to clean, supports repeated sterilization, and allows complete discharge of the culture broth from the vessel.
Sampling	A flush-mounted, dead-zone-free sterile sampling valve assembly is adopted, enabling multiple in-situ sterile sampling without compromising process sterility.

Agitation System

Agitation Type	The bioreactor is equipped with 3-stage, 6-blade impellers, with adjustable installation height. A mechanical defoaming impeller is also provided to effectively control foam formation during operation. The impeller type and configuration can be customized.
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Control System

Hardware Configuration	Siemens PLC + 15-inch LCD touch screen
Control Software	Dedicated fermentation control software (independent intellectual property)
	Real-time and historical curves; supports 24-hour continuous monitoring and control
	Integrated fermentation process analysis software
Automatic Sterilization	<p>Sterilization Mode: In-vessel steam sterilization; sterilization timing; over-temperature and over-pressure alarms</p> <p>Post-Sterilization Control: Automatic pressure holding and temperature control after sterilization to ensure sterility</p> <p>Filter Sterilization: Independent filter sterilization; set sterilization temperature and time; automatic drying after sterilization</p> <p>Sterilization Validation: Equipped with cold spot detection</p>
CIP	Equipped with 360° rotary spray ball
Temperature Control	<p>Display Accuracy: 0.3% FS±0.1°C</p> <p>Control Accuracy: ±0.2°C</p> <p>Sensor: WIKA Germany</p> <p>Control Function : Dual-direction heating and cooling control; equipped with constant-temperature water tank</p> <p>Data Management: Data logging, production curves, report analysis, remote data transmission</p>
pH	<p>Display Accuracy: 0.01 pH; measurement range: 0-12 pH</p> <p>Sensor: METTLER (Germany) / HAMILTON</p> <p>Control Function: Dual-direction acid and alkali addition; digital calibration</p> <p>Data Management: Data logging, production curves, report analysis, remote data transmission</p>
DO	<p>Display Accuracy: 0.1%; range: 0-200%</p> <p>Sensor: METTLER (Germany) / HAMILTON</p>

	<p>Control Function: Cascade control; linked control with agitation speed and aeration</p> <p>Data Management: Data logging, production curves, report analysis, remote data transmission</p>
Agitation Speed	<p>Speed Range: 0-60 rpm, customizable</p> <p>Data Management: Data logging, production curves, report analysis, remote data transmission</p>
Gas Flow	<p>Control Function: Mass flow controller for automatic inlet gas control (maximum aeration up to 2.0 vvm; continuously adjustable according to process requirements)</p> <p>Flow Meter: Vögtlin (Switzerland)/YOKOGAWA (Japan)</p>
Pressure	<p>Display Accuracy: 0.01 bar; range: 0-3 bar</p> <p>Sensor: BD (Germany)</p> <p>Control Function: Digital setpoint control for vessel pressure regulation</p> <p>Data Management: Data logging, production curves, report analysis, remote data transmission</p>
Feeding	<p>Control Mode: Automatic control</p> <p>Programmed Feeding: Time-based programmed feeding with adjustable variable speed</p> <p>Batch Feeding: Set feed rate, single batch volume, and feeding cycle</p> <p>Programmed Flow Feeding: Pre-set batch volume; multi-batch variable flow feeding based on time profile</p>
Weighing	<p>Display Accuracy: 0.01 kg</p> <p>Sensor: METTLER-TOLEDO (Switzerland)</p> <p>Data Management: Data logging, production curves, report analysis, remote data transmission</p>
Peristaltic Pumps	<p>Quantity: Four units: acid addition, alkali addition, antifoam, and feeding</p>