eppendorf

Scale-Up Seamlessly

BioFlo® Pro pilot to production SIP fermentation systems

Design, Delivery and Dependability

The BioFlo® Pro fermentors provide a unique solution to the need for flexibility in pilot through production-scale bioprocessing. The advanced, modular fermentation systems feature off-the-shelf components to enable rapid delivery and dependability.

These systems come with an industry-standard Allen Bradley® Programmable-Logic Controller (PLC) for reliable operation. BioFlo Pro fermentors incorporate robust devices to minimize maintenance and downtime. Eppendorf also offers training and a wide range of services to minimize start-up time and to provide ongoing support.

Smart design

> Open piping frame eases filter and valve access during operation and routine maintenance
> Flush-mounted vessel connections limit contamination risk
> Easy customization to suit a wide variety of specifications and budgets
> Small footprint
> Field-upgrade capability
> Fully validatable, following V-Model guides for URS, FRS, DDS, IQ, OQ and trace matrix[1]

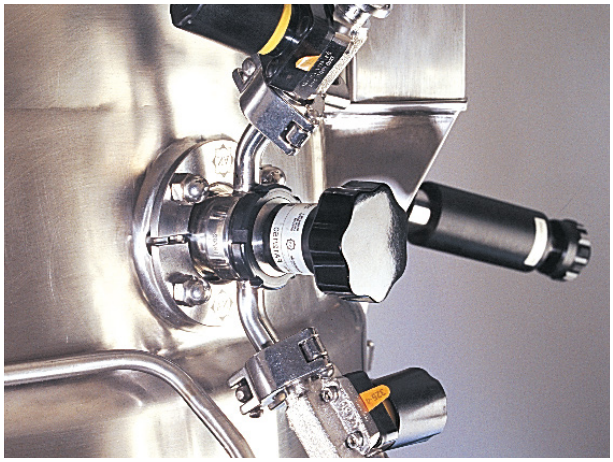
Premium performance

> CE-certified and manufactured to cGMP and GaMP guidelines[2]
> 3 : 1 vessel ratio optimized for fermentation; pressure vessels designed and built to ASME standards
> NEMA 4, IP66 rated control cabinet with user-friendly touchscreen interface
> Industry-standard Allen Bradley® PLC system for optimized process control and easy integration with any production environment
> Optional transmitters measure and display pH/DO/redox and/or weight
> Optional dual transmitters offer redundant pH/DO sensors

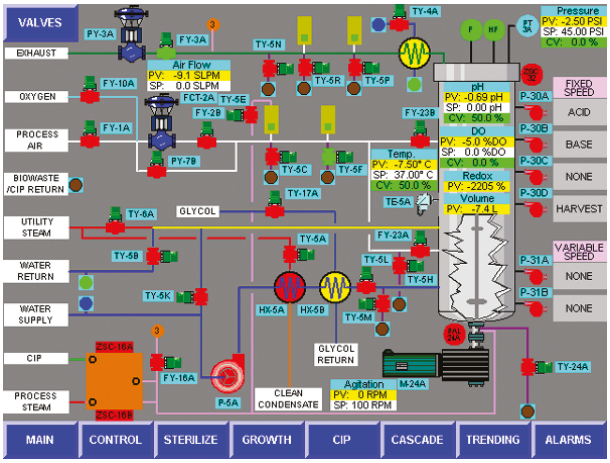
[1]User Requirement Specification, Functional Requirement Specification, Detailed Design Specification, Installation Qualification, Operational Qualification
[2]cGMP: Current Good Manufacturing Practice; GaMP: Good Automated Manufacturing Practice

Headplate ports accommodate septum, sprayballs, level sensors, level and pressure transmitters, vessel light and more; spring-assisted manway on 120 - 400 L models; motorized headlift on 1200 L vessel

Resterilizable SIP, CIP and addition valves enable sterile transfer of liquids into the vessel for pH and foam control, or nutrient addition



Flush mount, sanitary NA-Connect® quick connections in hard-to-clean locations eliminate dead legs; 25 mm safety ports on lower side wall enable use of redundant sensors or retractable housings



Allen Bradley PLC system lets you easily integrate data from auxiliary systems, such as CIP skids, for total system control

Efficient scale-up

> Validation packages with detailed documentation shorten start-up timelines
> Preventive maintenance and spare parts kits simplify system upkeep
> Worldwide network of factory-trained service engineers provide after-sales support

Nothing comes close

The BioFlo Pro offers a unique solution for pilot- and production-scale processing, combining dependable operation, system flexibility, increased throughput and quick delivery, all at an affordable price.

BioFlo® Pro vessel specifications*

Vessel	120 L	240 L	400 L	1200 L
Working volume	45 - 120 L	68 - 240 L	103 - 400 L	375 - 1200 L
Total volume	150 L	300 L	500 L	1500 L
Air flow rate (SLPM)	4 - 180	7 - 360	12 - 600	36 - 1800
Construction	Aspect ratio: 3 : 1; Code ratings: ASME/CE; Material: 316L stainless steel; Vessel access: spring-assisted manway, motorized headlift for 1200 L systems; Finish: 20 CLA (0.5 micrometer) Ra internal/external (optional electropolished interior)			
Agitation				
Range	50 - 500 rpm	45 - 450 rpm	40 - 400 rpm	25 - 250 rpm
AC motor size	1.12 kW (1.5 hp)	2.24 kW (3 hp)	3.73 kW (5 hp)	14.91 kW (20 hp)
Drive	Bottom drive, double-mechanical seal			
Impellers	3 Rushton-type			
Baffles	(4) 316L stainless-steel *[removable]*			
Ports				
Headplate tri-clamps	(3) 1.5 in *[DP transmitter, rupture disk, pressure transmitter]* (4) 2 in *[sprayballs, exhaust condenser, level sensors, septum]* (1) 3 in *[exhaust condenser]*	(3) 1.5 in *[DP transmitter, rupture disk, pressure transmitter]* (1) 2 in *[vessel light]* (3) 3 in *[sprayballs, exhaust condenser, level sensors, septum]*		(3) 1.5 in *[rupture disk, pressure transmitter]* (2) 2 in *[vessel light]* (3) 4 in *[sprayballs, exhaust condenser, level sensors, septum]* (1) 3 in *[spare]*
Upper side wall	(1) 0.75 in NA-Connect *[gas overlay]* (5) 0.5 in Tapered Tri-clamps *[SIP/CIP addition valves]* (1) 1.5 in Tapered Tri-clamp *[pressure gauge]* (1) 4 in Tapered Tri-clamp *[viewing port]*			(1) 1.5 in NA-Connect *[gas overlay]* (1) 1.5 in Pressure gauge (3) 0.5 in Tapered Tri-clamps *[addition]* (2) 1 in Tapered Tri-clamp *[addition]* (1) 3 in Tapered Tri-clamp *[upper DP transmitter]* (1) 6 in Tapered Tri-clamp *[viewing port]*
Lower side wall	(2) 0.75 in NA-Connects *[RTD, thermowell]* (4) 25 mm Ingold® ports at 15 ° angle *[pH, DO, Redox, spare pH, spare DO]* (2) 1.5 in NA-Connect *[sample valve, sparge]*			Same as 120 - 400 L, plus: (1) 3 in NA-Connect *[sparge]* (1) 2 in NA-Connect *[sight glass]*
Bottom	(1) 1.5 in Drain valve (1) Drain flange (1) 1.5 in NA-Connect *[lower DP transmitter]*			(1) 2 in Drain valve (1) Drain flange (1) 3 in NA-Connect *[lower DP transmitter]*

BioFlo® Pro system specifications*

Controller	
System	Standard Allen Bradley® PLC, design based on GaMP guidelines
Display	Large color industrial touchscreen interface
cGMP validation	Validation documents available to support cGMP validation of cell culture and microbial systems. FRS, DDS, Trace Matrix, IQ and OQ
Sensor options	pH/DO kit; redundant pH/DO sensor kit; SIP retractable sensor housing; redox sensor and transmitter; foam, level, high foam, high high foam
Regulatory compliance	c ETL us CE ASME CAN/CSA-C22.2 No. 61010-1 UL Standard UL-61010-1

Eppendorf is ISO 13485 and 9001 certified. * Specifications subject to change without notice.

Piping skid	
Construction	Material: 316L stainless steel; Gaskets/O-rings: EPDM Class VI and Silicon
Air line	Equipped with TMFC, SIP inlet filter, sparger, single gas air control. Options include: Dual inlet air filters (in series), two gas air control, oxygen supplementation, dual inlet air filters with integrity-test ports, overlay valve
Exhaust line	Designed for minimal backpressure, unregulated. Standard heated exhaust filter and manual backpressure regulator. Options include: automatic backpressure control, dual exhaust filters (in parallel), exhaust condenser, dual exhaust filters with integrity-test ports
Temperature	User-definable PLC-based automated sterilization program; temperature increases of 1 °C per minute; Glycol heat exchanger optional
System dimensions W x D x H	
120 L	1.6 x 1.24 x 2.44 m (6 ft 5 in x 4 ft 1 in x 8 ft)
240 - 400 L	2.06 x 1.42 x 3.12 m (6 ft 9 in x 4 ft 8 in x 10 ft 3 in)
1200 L	2.16 x 2.06 x 4.65 m (7 ft 1 in x 6 ft 9 in x 15 ft 3 in)

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