eppendorf

Customizable Control

BioFlo® 510 benchtop SIP fermentation system

Convenience, Flexibility, and Control

The Eppendorf BioFlo® 510 fermentation system is designed for rapid delivery and easy field customization, should your requirements change. Compact, versatile, and exceptionally capable. Quality at a very competitive price.

Modular design provides system flexibility
> Easily add or remove system components at any time, pre- or post-delivery to accommodate changes in your process requirements
> Numerous ports in the vessel headplate and sidewall provide flexibility to position sensors, spray balls, addition valves, pressure transducer and more
> Multiple gas flow options, up to two thermal mass flow controllers can be employed
> Capable of batch, fed-batch and continuous modes
> Three impeller options
> Optional SCADA software, validation packages, sprayballs for vessel clean-in-place, redundant pH/DO sensors

Advanced controller optimizes results
> Simultaneously regulate up to 32 process loops through the sophisticated RPC (Reactor Process Controller) or Allen-Bradley® CompactLogix™ PLC (Programmable Logic Controller)

> Front-accessed, analog inputs and outputs allow you to integrate up to 14 sensors, analyzers, flow controllers or other external devices
> Security, built into the control system, offers two user groups unique userdefined passwords and auto log-out
> Touchscreen control screens are exceptionally easy to navigate, to simplify setup, calibration, sterilization and monitoring
> Store up to ten batch recipes; program and monitor sterilization cycles,gas flow, PI values, and more
> This same RPC controller is used on our other benchtop fermentors, facilitating scale-up and scale-down

Production-scale system that fits on the bench
> At just 116 cm wide x 86 cm deep (45.5 x 34.0 in), the compact BioFlo® 510 can fit on a lab bench. Or, move and operate it on our sturdy, optional, stainless-steel mobile table
> Sterile vessel connections, flush with the vessel's interior, virtually eliminate deadlegs, minimizing contamination risk and simplifying cleaning
> Fully validatable, following V-Model guides for URS, FRS, DDS, IQ, OQ and trace matrix
> CE-certified and manufactured to meet cGMP guidelines

Enter and view sterilization parameters and valve sequences from the sterilization screen
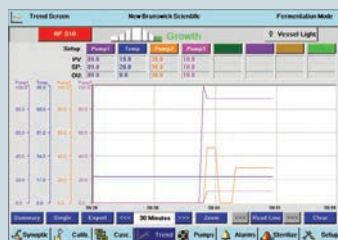
Trend graphs make it simple to track and export data on up to eight process variables over a six day span

Simultaneously view up to 10 setpoints, current values, cascade loops and more on the Summary screen

Cascade one or more variables (in this case agitation and O_2) to achieve sophisticated process control, based on the value of any other one or more variables

Advanced system includes benchtop control station with touchscreen interface, stainless steel vessel, and piping skid

Customize PI values for all process parameters or select factory defaults

Multiple PG 13.5 and sanitary connection ports provide flexibility to position sensors and redundant sensors to meet your process needs
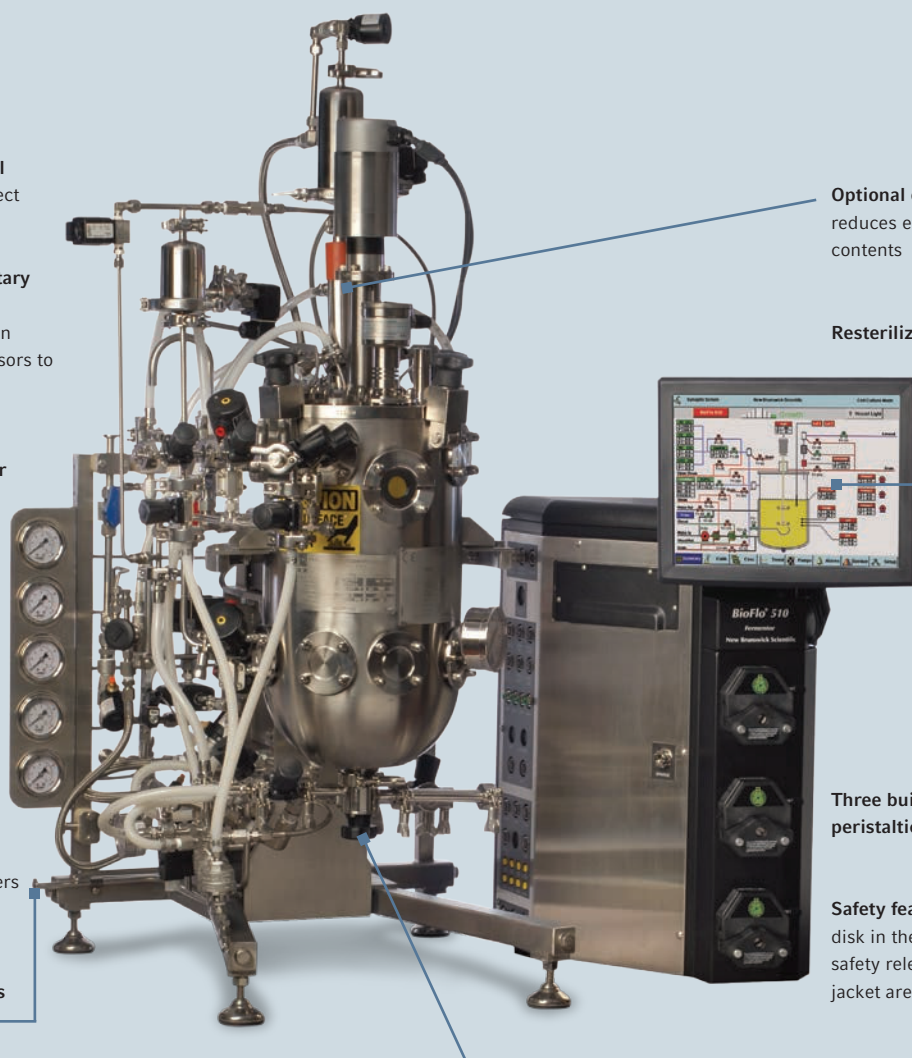
Double mechanical seal with rushton-type impeller

Multiple gas flow options: Choose 1 or 2 thermal mass flow controllers (TMFC) in a variety of flow ranges

Sanitary or quick connects allow utilities to be connected in minutes

ASME and CE certified: Designed and built to ASME and CE standards

Optional exhaust gas condenser reduces evaporation of vessel contents

Resterilizable sample valve

Adjustable-angle, user-friendly 15 in (38 cm) touchscreen interface simplifies control and provides clear viewing of process parameters

Three built-in, assignable, peristaltic pumps

Safety features: A sanitary rupture disk in the vessel and an ASME safety release valve on the drain jacket are standard

4 removable vessels baffles provided for enhancing mixing

Resterilizable drain valve enables sterile transfer of vessel contents

Built-in load cell measures vessel volume, enabling weight to be used to automate pump control for additions and harvesting

Optional glycol heat exchanger enables rapid cool-down; closed-loop, eco-friendly design reduces need for single-pass cooling water through the system

Resterilizable addition valve array: Each vessel can accommodate up to four addition ports for vessel additions (one addition port shown)

Optional impellers: Pitched blade impeller (left) for high aeration and low shear in insect and other cell cultures; **marine blade impeller** (right) for the growth of insect cells and other cultures

BioFlo® 510 fermentor specifications*

Vessel	Working volume	10.75 - 32.0 L	
	Total volume	40 L	
	Construction	> Aspect ratio: 2:1 > Material of construction: 316L stainless steel > Vessel access: Headplate	> Code ratings: ASME/CE > Vessel pressure: 40 PSIG (5.5 BAR), Full vacuum > Finish: 15 CLA (0.38 micrometer) Ra electropolished interior [standard]
	Agitation	Drive: Top drive, double-mechanical seal	
	Speed	100 - 700 rpm	
	Impellers	(2) Rushton-type impellers	
	Baffles	Standard: (4) Removable, 316L stainless steel. Optional baffle plug kit	
Ports	Headplate	> (4) PG 13.5 [light, Level 1 sensor/spare, Level 2 sensor/spare, septum/spare] > (4) 1.5 in NBS connect sanitary style [pressure transducer/spare, exhaust, and (2) spray balls/septums/spares]	
	Upper side wall	> (7) 1.5 in NBS connect sanitary style [gas overlay/spare, vessel rupture device, and (4) addition valves/spares] > (1) 3 in NBS connect sanitary style [vessel sight glass]	
	Lower side wall	> (7) 1.5 in NBS connect sanitary style [RTD, sample/spare, pressure gauge/spare, sparger/spare, and (3) DO/pH/redox or combinations thereof]	
	Bottom	(1) 1.5 in NBS connect sanitary style [radial diaphragm drain valve]	
Controller	Control station	Controls one vessel with 32 control loops. Stores 10 recipes and eight process variables for trend graphing. Includes an industrial touchscreen monitor/user interface, three built-in pumps, and connections for all utilities and communication signals	
	Touchscreen interface/display	38 cm (15 in) Industrial touchscreen interface/display	
Pumps	Standard, options, and control	Standard: Three built-in, assignable, peristaltic pumps. Control modes: Off, Prime, Base, Acid, Foam, Level 2 Wet, Level 2 Dry, Volume Add, Volume Harvest Optional: Two external variable-speed pumps can be added	
	Speed	Pumps 1, 2 and 3: 100 rpm Fixed-speed duty cycle, ability to view total pump flow rates	
Piping skid	Construction	> Material of construction: 316L stainless steel	> Gaskets/O-Rings: Class (VI) EPDM and silicon
	Aeration	Standard: 1 thermal mass flow controller (TMFC) with flow rates up to 2 VVM and built in four-gas control (4 solenoid valves) Optional: 2nd TMFC for individual gas control	
	Gas inlet	Sparger/overlay filter housing with 0.2 µ absolute disposal filter. Overlay valve optional	
	Exhaust line	Standard: Line designed for minimal backpressure. Includes heater and 1.2 µ nominal exhaust filter and housing, with manual backpressure regulator Optional: Automatic backpressure control	
	Temperature control line	> All systems come with automatic sterilization program > Operating temperature control range 10 °C above water supply temperature to 80 °C > Line designed to achieve 1 °C/minute temperature rises, in the 30 °C - 50 °C range > Optional: Glycol/chiller heat exchanger designed to remove 100 watts/L	
	Load cell	Provided for measuring vessel volume	
Sensor	Options	> pH/DO sensor kits	> Redundant pH/DO sensor kits > Redox sensor kit
Dimensions (W x D x H)		116 x 86 x 151 cm (45.5 x 34.0 x 59.5 in)	
Additional options		> Spray balls > Foam/level kits > Transfer lines > Sterile sampling kit > 1 or 7 port septum > Mobile headplate lift > Validation packages > Additional sight glass	> Turbidity sensor/transmitter > Utility prefilter/regulator kit > Addition vessels > Marine and pitched-blade impellers > Scales for addition vessel > Vessel passivation
Utility requirements and connections	Process air/gases O_2, N_2, CO_2	30 PSIG (2.1 bar), 64 SLPM	
	Instrument air	80-100 PSIG (5.5 - 6.9 bar), 2 scfm (56.5 SLPM)	
	Process steam	35 PSIG (2.4 bar), 10 lb/hr (4.5 kg/hr)	
	Utility steam	35 PSIG (2.4 bar), 35 lb/hr (15.9 kg/hr)	
	Facility water	30 PSIG (2.1 bar), 2 GPM (7.57 L/min)	
	Water return	Less than 15 PSIG (1.0 bar) back pressure	
	Clean condensate	Gravity drain	
	Biowaste	Gravity drain	
	Glycol/chiller	30 PSIG (2.1 bar), 2 GPM (7.57 L/min)	
	Electric	208-230 V AC, single phase, 50/60 Hz, 15 A	

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

Input/output connections and communication ports	External devices (RPC only)	Seven analog inputs and seven analog outputs for your external devices such as analyzers, sensors, external pumps, etc. (Reduce by 1 input and output for each additional TMFC added)
	2 USB ports	Import firmware/software upgrades and export trend data. Connect an optional 8-port serial box for accessories requiring serial connections
	Communications port	For optional BioCommand® SCADA software
Regulatory compliance	c(ETL)us CE ASME	CAN/CSA-C22.2 No. 61010-1 UL Standard UL-61010-1