

Customizable Control

BioFlo® 510 benchtop SIP fermentation system

Convenience, Flexibility, and Control

The 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

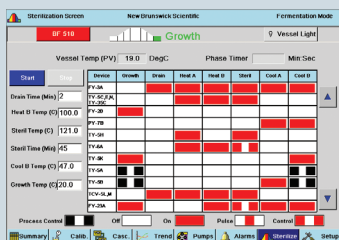
Advanced controller optimizes results

- > Simultaneously regulate up to 32 process loops through the sophisticated RPC (Reactor Process Controller)
- > Front-accessed, analog inputs and outputs allow you to integrate up to 14 sensors, analyzers, flow controllers or other external devices

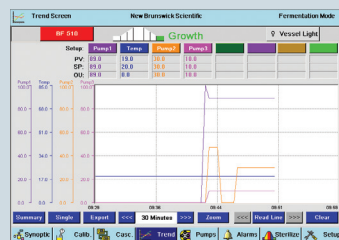
- > Security, built into the control system, offers two user groups unique userdefined passwords and auto log-out
- > Touchscreen control screens are exceptionally easy to navigate, to simplify setup, calibration, sterilization and monitoring
- > Store up to ten batch recipes; program and monitor sterilization cycles, gas flow, PI values, and more

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

| Name | PV | Setpoint | Ctrl | Control Mode | Units | Caps |
|------------|------|----------|------|--------------|-------|------|
| Agit | 0 | 25 | 0.0 | Off | RPM | None |
| Temp | 39.7 | 20.0 | 0.0 | Off | DegC | None |
| pH | 6.71 | 7.00 | 0.0 | Off | pH | None |
| DO | 2.0 | 0.0 | 0.0 | Off | %DO | None |
| AirFlw (1) | -0.1 | 5.0 | 25.0 | Mix | SLPM | None |
| O2 In (1) | -0.0 | 0.0 | 0.0 | Mix | SLPM | None |
| N2 In (1) | -0.0 | 0.0 | 0.0 | Mix | SLPM | None |
| C12 In (1) | -0.0 | 0.0 | 0.0 | Off | % | None |
| CO2 In (1) | 0.0 | 0.0 | 0.0 | Off | % | None |

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

| Cascade From | Enable | Start Setpoint | @ 100 Start Out | End Setpoint | @ 100 End Out |
|--------------|--------|----------------|-----------------|--------------|---------------|
| DO | YES | 250 | 0.0 | 800 | 70.0 |
| Agit | YES | 250 | 0.0 | 800 | 70.0 |
| O2 (2) | YES | 0.0 | 70.0 | 100.0 | 100.0 |
| None | NO | | | | |
| None | NO | | | | |
| None | NO | | | | |

Cascade one or more variables (in this case agitation and O₂) 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

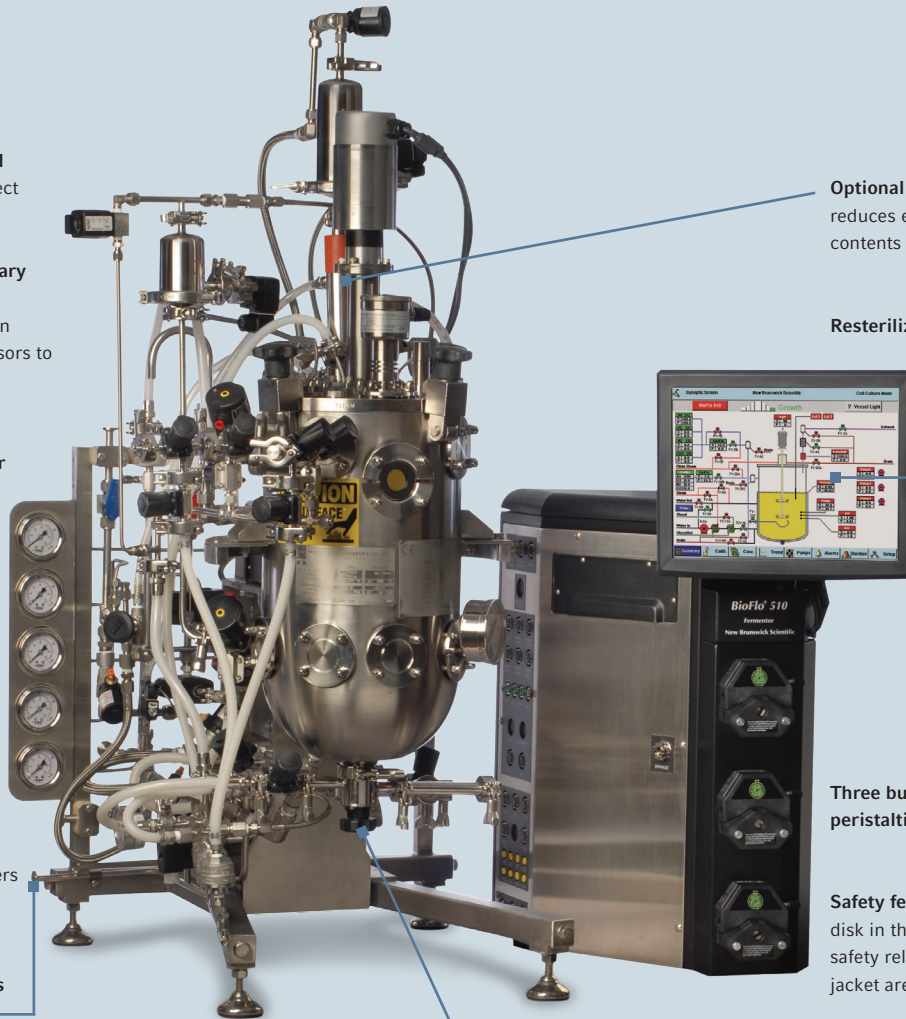
Double mechanical seal with rushton-type impeller

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

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



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



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 | > Turbidity sensor/transmitter | > Utility prefilter/regulator kit |
| | > Transfer lines | > Sterile sampling kit | > Addition vessels | > Marine and pitched-blade impellers |
| | > 1 or 7 port septum | > Additional sight glass | > Scales for addition vessel | |
| | > Validation packages | | > 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 | 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 |

Your local distributor: www.eppendorf.com/contact
 Eppendorf SE · Barkhausenweg 1 · 22339 Hamburg Germany
eppendorf@eppendorf.com

www.eppendorf.com/bioflo510