Customizable Control

BioFlo® 510 benchtop SIP fermentation system
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 user-defined 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.

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**Convenience, Flexibility, and Control**

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 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.

- Optional glycol heat exchanger enables rapid cool-down; closed-loop, eco-friendly design reduces need for single-pass cooling water through the system.
- Customizable 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.
- 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.
- ASME and CE certified: Designed and built to ASME and CE standards.
- 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.
- Built-in load cell measures vessel volume, enabling weight to be used to automate pump control for additions and harvesting.
- Customize PI values for all process parameters or select factory defaults.
- 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.

4 removable vessels baffles provided for enhancing mixing.

Resterilizable drain valve enables sterile transfer of vessel contents.

Resterilizable addition valve array: Each vessel can accommodate up to four addition ports for vessel additions (one addition port shown).
## BioFlo® 510 fermentor specifications*

<table>
<thead>
<tr>
<th>Vessel</th>
<th>Working volume</th>
<th>10.75 - 32.0 L</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Total volume</td>
<td>40 L</td>
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### 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
- Material of construction: 316L stainless steel

### Agitation
- Drive: Top drive, double-mechanical seal

### Speed
- 100 - 700 rpm

### Impellers
- (2) Rushton-type impellers

### 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

- **Upper side wall**
  - (7) 1.5 in NBS connect sanitary style (gas overlay/spare, vessel rupture device, and (4) addition valves/spares)

- **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

### 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 100 - 700 rpm

### 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
- Additional sight glass
- Validation packages

### Utility requirements and connections
- Process air/gases
  - O₂, N₂, CO₂: 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

### Input/output connections and communication ports
- 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)

### External devices
- Seven analog inputs and seven analog outputs for your external devices such as analyzers, sensors, external pumps, etc.

### Communications port
- For optional BioCommand® SCADA software

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* Specifications subject to change without notice

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Eppendorf is ISO 13485 and 9001 certified.

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