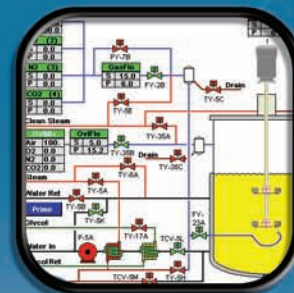




**New Brunswick Scientific**  
Where Quality and Innovation Have Become Tradition

## 19.5L & 40L STERILIZABLE-IN-PLACE BIOFLO® 510 FERMENTOR

*Benchtop / Mobile Intermediate-Size  
Systems for R&D through Production*



# The BioFlo 510 Fermentor — For the Ultimate in Convenience,

What features are important to you in selecting an SIP fermentor:

- A customizable system with quick delivery
- Flexibility to meet changing process needs
- Competitive cost
- Convenient operation

The new BioFlo 510 Fermentor offers all these advantages, and more!

## A 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 probes, spray balls, addition valves, pressure transducer and more, wherever needed.
- Multiple gas flow options let you optimize control, based on your process needs. Up to 4 Thermal Mass Flow Controllers can be employed, or choose a Rotameter.
- Capable of batch, fed-batch and continuous (perfusion) modes.
- Three impeller options provide flexibility to achieve high yields from yeast, bacterial or plant cell lines.
- Optional SCADA software, validation packages, sprayballs for vessel clean-in-place, redundant pH/DO probes, resterilizable sample and addition valves, and more, are available to customize the system for your lab or production-floor requirements.

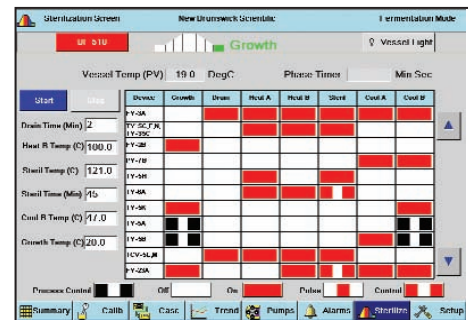
## Advanced Controller Optimizes Results.

- Simultaneously regulate up to 32 process loops using our 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, for optimized system control.
- 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.
- Trend eight process parameters simultaneously. Store up to ten batch recipes. Program & monitor sterilization cycles, gas flow, PI values, and more.
- This same controller is used in our benchtop BioFlo 310 & 415 fermentors & CelliGen 310 & 510 bioreactors, facilitating scale-up and scale-down.

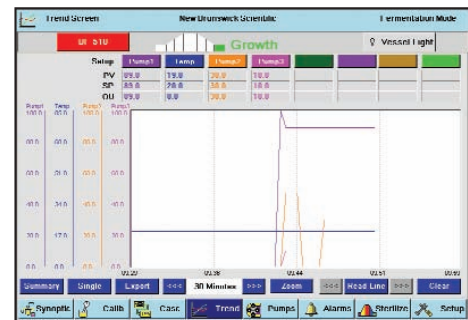
## A Production-Scale System That Fits on the Bench!

- At just 45.5" wide x 34.0" deep (116 x 86 cm), the compact 510 can fit on a lab bench. Or, move and operate it on our sturdy, optional, stainless-steel mobile skid.
- A built-in load cell precisely measures vessel contents, enabling integrated control of pumps for automatic addition of fresh media, pH, DO, or foam control agents, or harvesting. Measurements are displayed on the RPC interface for easy tracking.
- Sterile vessel connections, flush with the vessel's interior, virtually eliminate deadlegs, minimizing contamination risk and simplifying cleaning.

The BioFlo 510 Fermentor... designed for rapid delivery and easy field customization, should your requirements change. Compact, versatile, and exceptionally capable. NBS quality at a very competitive price.



Enter and view sterilization parameters and valve sequences from the sterilization screen. Across the bottom are quick links to screens for **synoptic view, calibration, cascades, trends, pumps, alarms and setup.**



Trend graphs make it simple to track & export data on up to eight process variables over a six day span. Customize the view by selecting the parameters, colors & interval between sample measurements.

LoopName	PV	Setpoint	Out%	Control Mode	Units	Casc.
Agit	0	25	0.0	OFF	RPM	None
Temp	39.7	20.0	0.0	OFF	DegC	None
pH	6.73	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
O2Flw (2)	-5.0	0.0	0.0	Mix	SLPM	None
N2Flw (3)	-5.0	0.0	0.0	Mix	SLPM	None
CO2Flw (4)	-3.7	0.0	0.0	Mix	SLPM	None
CvMix	0.0	0.0	0.0	OFF	%	None

Simultaneously view up to 10 setpoints, current values, cascade loops and more on the Summary screen. All 32 parameters can be readily viewed simply by scrolling up or down.

To	Enable	Start Setpoint	@ DO Start Out%	End Setpoint	@ DO End Out%
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 & O<sub>2</sub>) to achieve sophisticated process control, based on the value of any other one or more variables. Cascades run in parallel, not just serial sequence, for optimized control.



**Advanced System Includes Benchtop Control Station with Touchscreen Interface, 19.5 or 40L Vessel, and Piping Skid**

**Double Mechanical Seal with Rushton Style Impeller** are standard. For other impeller options, see below

**Multiple Gas Flow Options.** Choose 1, 2, 3, or 4 Thermal Mass Flow Controllers (TMFC) in a variety of flow ranges

**4 Removable Vessels Baffles.** provided for enhancing mixing

**Illuminated Sight Glass.** Window and momentary light provide clear viewing of vessel contents

**ASME & CE Certified.** Designed and built to ASME and CE standards

**Gauge Panel** provides quick reference to basic process utilities

**Sanitary or Quick Connects** allow utilities to be connected in minutes

**Resterilizable Drain Valve** enables sterile transfer of vessel contents

**Optional Exhaust Gas Condenser** reduces evaporation of vessel contents

**Customize PI Values for All Process Parameters** or select factory defaults

**Multiple PG 13.5 & Sanitary Style NBS Connection Ports** provide flexibility to position sensors and redundant probes to meet your process needs

**Multiple Analog Inputs & Outputs,** accessed from the front of the control panel, are provided for integrating up to 14 of your external devices for optimized process control

**Multiple Probe Options.** pH, DO, Redox, 2nd pH, and 2nd DO

**Two Conductivity Probes,** assignable to pumps, alarm or control loops, are provided for level/foam

**Optional Resterilizable Sample Valve** enables sampling vessel contents

**Optional Automatic Vessel Pressure Controller** allows control via the touchscreen interface

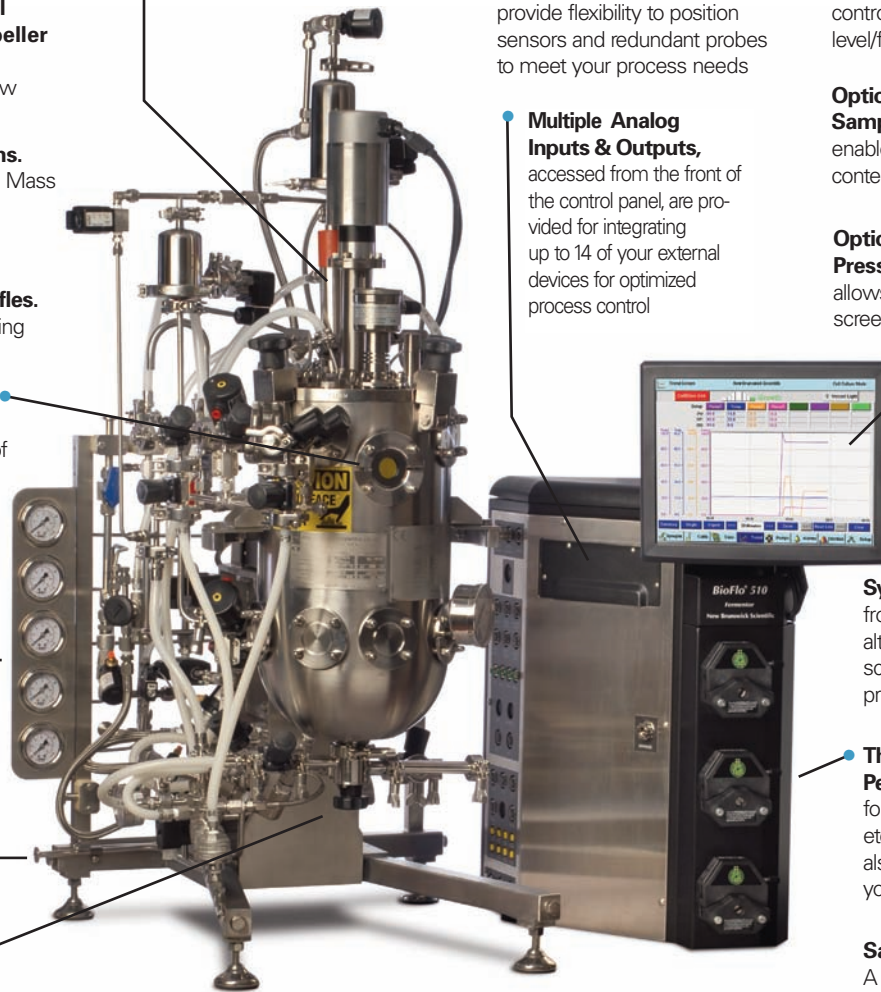
**Adjustable-Angle, User-Friendly 15" Touchscreen Interface** simplifies control and provides clear viewing of process parameters

**Synoptic Screen** (shown on the front cover), provides pictorial alternative to the summary screen for viewing & editing process values

**Three Built-in, Assignable, Peristaltic Pumps** are provided for addition, harvest, foam, level, etc. Controls and connections are also provided for easy addition of your external pumps

**Safety Features**

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



**Built-in Load Cell** measures vessel volume, enabling weight to be used to automate pump control for additions and harvesting. Measurement is displayed on the 15" monitor.

**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	Total Volume	19.5 Liters	40.0 Liters
	Working Volume	5.5 - 15.6 Liters	
Construction	> Aspect Ratio: 2:1 > Code Ratings: ASME/CE > Vessel Access: Headplate > Material of construction: 316L SS > Vessel Pressure 40 PSIG, Full Vacuum > Finish: 15 Ra electropolished interior [standard]		
Agitation	Drive: Top drive, Double-mechanical seal		
Speed	100 - 800 RPM		100 - 700 RPM
Impellers	(2) Rushton-Style impellers		
Baffles	Standard: (4) Removable, 316 L stainless-steel. Optional: Baffle plug kit		
PORTS	Headplate	> (4) PG 13.5 [light, Level 1 probe/spare, Level 2 probe/spare, septum/spare] > (4) 1½" NBS connect sanitary style [pressure transducer/spare, exhaust, and (2) spray balls/septums/spares]	
	Upper Side Wall	> (7) 1½" NBS connect sanitary style [gas air wash/spare, gas overlay/spare, vessel rupture device, and (4) addition valves/spares] > (1) 3" NBS connect sanitary style [vessel sight glass]	
	Lower Side Wall	> (7) 1½" NBS connect sanitary style [RTD, sample/spare, pressure gauge/spare, sparger/spare, and (3) DO/pH/Redox or combinations thereof]	
	Bottom	> (1) 1½" 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	15" 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: External variable-speed pumps can be added	
	Speed	Pumps 1 – 3: 100 RPM Fixed-speed duty cycle – ability to view total pump flow rates	
PIPING SKID	Construction	> Material of construction: 316L SS > 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: Rotameter or 2nd, 3rd, or 4th TMFCs 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° - 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 probe kits > Redundant pH / DO probe kits > Redox probe kit	
DIMENSIONS	W x D x H	> 45.5" x 34.0" x 59.5" > 116 cm x 86 cm x 151 cm	
ADDITIONAL OPTIONS	> Spray balls > Foam/level kits > Turbidity sensor/transmitter > Mobile headplate lift > Transfer lines > Sterile sampling kit > Addition vessels > Utility filter regulator kits > 1 or 7 port septum > Marine and pitched-blade impellers > Mobile skid > Validation packages > Addition valve connector kit > Scales for addition vessel		
UTILITY REQUIREMENTS & CONNECTIONS	Process Air/Gases O <sub>2</sub> , N <sub>2</sub> , CO <sub>2</sub>	30 PSIG, 32 SLPM	30 PSIG, 64 SLPM
	Instrument Air	80-100 PSIG, 2 scfm (56.5 SLPM)	
	Process Steam	35 PSIG, 10 lb/hr	
	Utility Steam	35 PSIG, 30 lb/hr	35 PSIG, 35 lb/hr
	Facility Water	30 PSIG, 1 GPM	
	Water Return	Less than 15 PSIG back pressure	
	Clean Condensate	Gravity Drain	
	Biowaste	Gravity Drain	
	Glycol/Chiller	30 PSIG 1 GPM	30 PSIG 2 GPM
Electric	208-230V, single phase, 50/60 Hz, 20 A		
INPUT / OUTPUT CONNECTIONS & COMM PORTS (Built into the back panel of Master Control Station)	External Devices	Seven analog inputs & seven analog outputs for your external devices such as analyzers, sensors, external pumps, etc. (Reduce by 1 input & output for each additional TMFC added)	
	2 USB Ports	Import firmware/software upgrades and export trend data. Connect optional 8-port serial box for scales, etc.	
	Communications Port	For optional BioCommand/SCADA software	
REGULATORY COMPLIANCE	 CAN/CSA-C22.2 Nos. 1010.1 & 1010.2.010 UL Standard UL-61010A-1 & 61010A-2-010		

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\* Specifications subject to change without notice.



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