



# Compact Mobility

BioFlo® 610 mobile SIP fermentation systems

# Compact and Comprehensive

The Eppendorf BioFlo® 610 fermentation systems – an exceptionally compact and versatile, industrial Mobile Pilot Plant Fermentor with choice of 50 and 100 L sterilizable-in-place vessels for R&D through small-scale production.

This modular system is offered with a comprehensive set of standard off-the-shelf options for rapid initial delivery, as well as easy customization at any time, should your process needs change. The entire system is built-on a mobile skid that fits through virtually any doorway, making it easy to move and share between labs in research, pilot plant and cGMP environments.

## Modular design provides flexibility

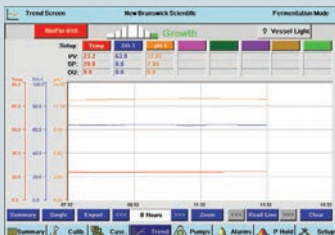
- > Easily add or remove system components at any time, pre- or post-delivery to accommodate changes in your process requirements
- > Numerous ports in the vessel headplate and sidewall provide flexibility to position sensors, addition valves, pressure transducer and more
- > Multiple gas flow options; choose one or two thermal mass flow controllers, in a variety of flow ranges.
- > A wide variety of options are offered, including SCADA software, spray balls 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)
- > Create, save, rename, delete and load up to 10 batch recipes to standardize your process and reduce operator variability
- > Trend up to eight process parameters simultaneously on one screen and export process value data for analysis in Excel® via the USB port
- > Built-in security features provide two user groups unique user-defined passwords and auto log-out
- > Process scale-up and scale-down are made easier because the same RPC controller is used across our line of bench- and intermediate-scale fermentor systems

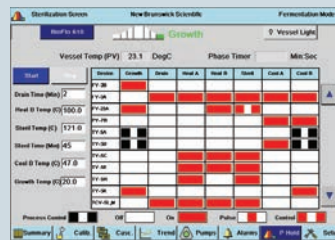
## The BioFlo® 610's intuitive touchscreen interface makes advanced operations user friendly



Trend graphs make it simple to track and export data on up to eight process variables over a six day span

Variable	PV	Setpoint	Unit	Control Mode	Units	Ctrl
Agit	0	100	0.0	OFF	RPM	DO-1
Temp	34.1	30.0	0.0	OFF	Diag	None
GasFlw	-0.2	0.0	0.0	OFF	SLPM	DO-1
pH-1	11.17	7.00	0.0	OFF	pH	None
DO-1	05.4	0.0	0.0	OFF	%DO	None
pH-2	10.50	7.00	0.0	OFF	pH	None
DO-2	0.6	0.0	0.0	OFF	%DO	None
Pressure	13372.0	0.0	0.0	OFF	PSI	DO-1
Temperature	-1.10	0.00	0.0	OFF	L	None
Control	0.0	0.0	0.0	OFF	%	GasFlw

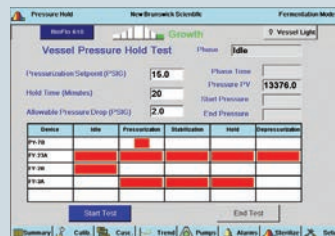
Simultaneously view up to 10 setpoints, current values, cascade loops and more on the Summary Screen



Enter and view sterilization parameters and valve sequences from the Sterilization Screen



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



Reduce the time and effort needed to verify vessel integrity through the Pressure Hold Test Screen

Integrated system includes control station with touchscreen interface, 50 L or 100 L working volume, and mobile piping skid

Mobile design/compact skid

Optional exhaust gas condenser reduces evaporation of vessel contents

Built-in load cells provide a direct measure of vessel contents, enabling integrated control of pumps for harvesting or automatic addition

Multiple sensor options for pH, DO, redox, 2nd pH, and 2nd DO are offered

Two foam/level conductivity sensors

Multiple PG 13.5 headplate ports and sanitary connection ports provide the flexibility to position sensors and redundant sensors wherever needed



Bottom drive with double mechanical seal and rushton style impeller are standard; low-shear pitched blade and marine blade impellers optional

Adjustable-angle, user-friendly 15 in (38 cm) touchscreen interface

Three built-in, assignable peristaltic pumps

Customizable PI values or factory defaults can be selected for most process parameters

Multiple analog inputs and outputs

Automatic vessel pressure controller

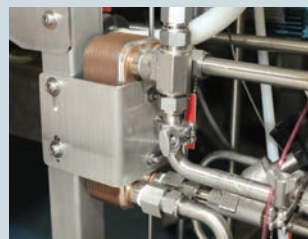
Sanitary fittings allow utilities to be connected in minutes

Resterilizable sample valve

Resterilizable drain valve enables sterile transfer of vessel contents



Restorable addition valve array facilitates making sterile additions; each vessel can accommodate up to four addition ports; one addition port shown



Optional glycol heat exchanger enables rapid cool-down; closed-loop, eco-friendly design eliminates need for single-pass cooling water in growth mode



Swing-away headplate makes it easy to access the vessel interior for cleaning

Safety features include a sanitary rupture disk in the vessel and an ASME safety release valve on the drain jacket

**BioFlo® 610 fermentor specifications\***

Vessel		50 L	100 L
Working volume		16 - 50 L	31 - 100 L
Total volume		65 L	125 L
Construction		> Aspect ratio: 3:1 > Material of construction: 316L stainless steel > Vessel access: Headplate	> Code Ratings: ASME/CE > Vessel Pressure: 50 PSIG (3.45 BAR), Full vacuum > Finish: 20 CLA (0.5 micrometer) Ra mechanically polished interior [standard]
Agitation		Drive: Bottom drive, double-mechanical seal	
Speed		50 - 700 rpm	50 - 500 rpm
Impellers		(3) Rushton-type impellers standard. Low-shear marine and pitched blade optional	
Baffles		(4) Removable, 316L stainless steel	
Ports	Headplate	> (3) PG 13.5 [Level 1 sensor/spare, Level 2 sensor/spare, septum/spare] > (4) 1.5 in NBS connect sanitary style [pressure gauge, exhaust, and (2) spray balls/septums/spares] > (1) 2 in vessel light	
	Upper side wall	> (7) 1.5 in NBS connect sanitary style [pressure transducer/spare, 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, spare, sparger, and (3) DO/pH/redox or combinations thereof]	
	Bottom	(1) 1 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: External variable-speed pumps can be added with totalizer and functionality of standard pumps	
	Speed	Pumps 1, 2 and 3: 100 rpm Fixed-speed duty cycle	
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 single-gas control Optional: 1 TMFC with 2-gas control, 2 TMFCs (2-gas control)	
	Gas inlet	Sparger/overlay filter housing with 0.2 µ absolute disposal filter. Overlay valve optional	
	Exhaust line	Line designed for minimal backpressure. Includes heater and 1.2 µ nominal exhaust filter and housing Automatic backpressure control	
	Temperature control line	> All systems come with automatic pressure hold and sterilization program > Operating temperature control range 10 °C above water supply temperature to 90 °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)		122 x 86 x 239 cm (42 x 31.5 x 94 in)	
Additional options	> Spray balls	> Foam/level kits	> Turbidity sensor/transmitter > Addition valve connector kit
	> Transfer lines	> Sterile sampling kit	> Addition vessels > Marine and pitched-blade impellers
	> 1 or 7 port septum	> Utility filter/regulator kit	> Scales for addition vessel > Vessel passivation
	> Validation packages	> Bottle holder	> Low pressure seal alarm > Additional sight glass
Utility requirements and connections	Process air	30 PSIG (2.1 bar), 75 SLPM	30 PSIG (2.1 bar), 150 SLPM
	Oxygen	30 PSIG (2.1 bar), 32 SLPM	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)	35 PSIG (2.4 bar), 20 lb/hr (9 kg/hr)
	Utility steam	35 PSIG (2.4 bar), 50 lb/hr (22.5 kg/hr)	35 PSIG (2.4 bar), 100 lb/hr (45 kg/hr)
	Facility water	30 PSIG (2.1 bar), 3 GPM (11.37 L/min)	30 PSIG (2.1 bar), 4 GPM (15.16 bar)
	Water return	Less than 15 (1.0 bar) PSIG back pressure	
	Clean condensate	Gravity drain	
	Biowaste	Gravity drain	
Glycol/chiller	30 PSIG (2.1 bar), 4 GPM (15.16 bar)	30 PSIG (2.1 bar), 8 GPM (30.32 bar)	
Electric	208-230V AC, single phase, 50/60 Hz, 15 A		

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

<b>Input/output connections and communication ports</b>	External devices	Seven analog inputs and seven analog outputs for your external devices such as analyzers, sensors, external pumps, etc.
	2 USB ports	Import firmware/software upgrades and export trend data. Connect optional 8-port serial box for accessories
	Communications port	For optional BioCommand® SCADA software
<b>Regulatory compliance</b>		CAN/CSA-C22.2 No. 61010-1 UL Standard UL-61010-1

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