## eppendorf



## 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



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		BF 51		-11	G G	rowth	9 Vessel Ligh	it.
			PV: 89.0 SP: 89.0 DU: 89.0	19.0 20.0	Pump2 30.0 30.0 30.0	Pump1 10.0 10.0 10.0		
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Trend graphs make it simple to track and export data on up to eight process variables over a six day span

BI	510	- 1		Growth			
LoopName	PV	Setpoint	Out%	Control Mode	Units	Case.	
Agit	0	25	0.0	om	RPM	None	
Temp	39.7	20.0	0.0	Off	DegC	None	٢
pH	6.71	7.00	0.0	om	pH	None	L
DO	2.0	0.0	0.0	on	%00	None	
AirFlo (1)	-0.1	5.0	25.0	Mix	SLPM	None	
O2F10 (2)	-6.0	0.0	0.0	Mix	SLPM	None	
N2Flo (3)	-5.0	0.0	0.0	Mix	SLPM	None	
CO2Fin (4)	-3.7	0.0	0.0	Mix	SLPM	None	
OviMir	0.0	0.0	0.0	Off	*	None	

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

BF 51			Growth		Vessel Light
Cascade From	DO	_			
То	Enoble	Start Sulpoint	@ DO Start Out?	End Sulpoint	@ 00 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 and O<sub>2</sub>) 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 Optional exhaust gas condenser reduces evaporation of vessel contents

Resterilizable sample valve

Three built-in, assignable,

Safety features: A sanitary rupture

disk in the vessel and an ASME

safety release valve on the drain

peristaltic pumps

jacket are standard

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

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

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; closedloop, 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)



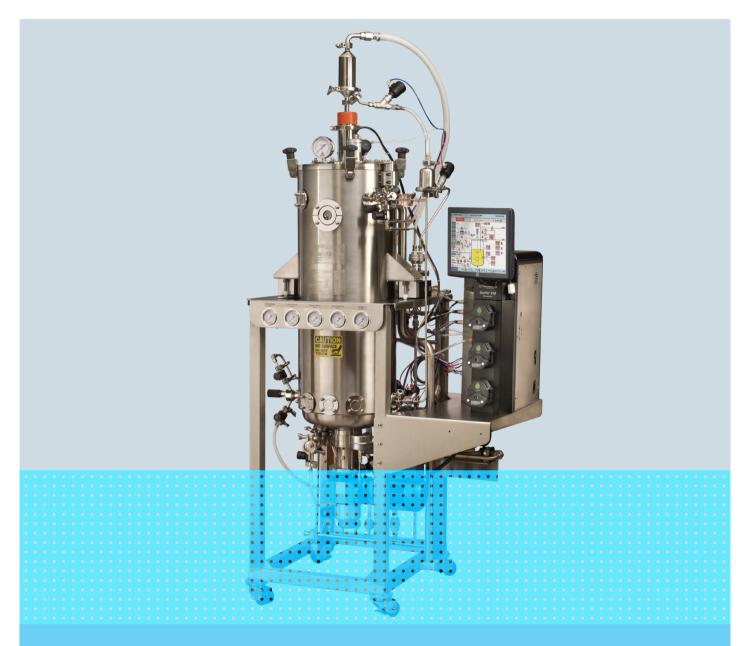
Optional impellers: Pitched blade impeller (left) for high aeration and low shear in insect and other cell cultures; marine blade impeller (right) for the growth of insect cells and other cultures



#### BioFlo® 510 fermentor specifications\*

	Working volume	10.75 - 32.0 L							
	Total volume	40 L							
	Construction	> Aspect ratio: 2:1		> Code ratings: ASM	E/CE				
		> Material of construction: 316L	stainless steel		) PSIG (5.5 BAR), Full vacuum				
		> Vessel access: Headplate		> Finish: 15 CLA (0.3 [standard]	38 micrometer) Ra electropolished interior				
	Agitation	Drive: Top drive, double-mechan	ical seal						
	Speed	100 - 700 rpm							
	Impellers	(2) Rushton-type impellers							
	Baffles	Standard: (4) Removable, 316L s		· · · · · ·					
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]							
	11			· · · · · · · · · · · · · · · · · · ·					
	Upper side wall	> (1) 3 in NBS connect sanitary		·	vice, and (4) addition valves/spares]				
	Lower side wall	combinations thereof]			/spare, sparger/spare, and (3) DO/pH/redox or				
	Bottom	(1) 1.5 in NBS connect sanitary s							
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 touchscr	een interface/display						
Pumps	Standard, options,	Standard: Three built-in, assignable, peristaltic pumps. Control modes: Off, Prime, Base, Acid, Foam, Level 2 Wet, Level 2 Dry							
	and control	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 co Optional: 2nd TMFC for individu		flow rates up to 2 VV	M and built in four-gas control (4 solenoid valves)				
	Gas inlet	Sparger/overlay filter housing wi	ith 0.2 μ absolute disp	osal filter. Overlay va	lve optional				
	Exhaust line	Standard: Line designed for mini	imal backpressure. In	cludes heater and 1.2	$\boldsymbol{\mu}$ nominal exhaust filter and housing, with manua				
		backpressure regulator							
		Optional: Automatic backpressur							
	Temperature control	> All systems come with automat							
	line	> 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							
		> 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							
		=	·		Crange				
	Load call	> Optional: Glycol/chiller heat ex	changer designed to		*C range				
Soncor	Load cell	> Optional: Glycol/chiller heat ex Provided for measuring vessel vo	changer designed to	remove 100 watts/L					
	Options	> Optional: Glycol/chiller heat ex Provided for measuring vessel vo > pH/DO sensor kits	changer designed to						
Dimensions (W	Options ' x D x H)	> Optional: Glycol/chiller heat ex Provided for measuring vessel vo > pH/DO sensor kits 116 x 86 x 151 cm (45.5 x 34.0 s	changer designed to blume x 59.5 in)	remove 100 watts/L  > Redundant pH/DO	sensor kits > Redox sensor kit				
Dimensions (W	Options ' x D x H)	> Optional: Glycol/chiller heat ex Provided for measuring vessel vo > pH/DO sensor kits 116 x 86 x 151 cm (45.5 x 34.0 s > Spray balls > Foar	cchanger designed to blume x 59.5 in) n/level kits	> Redundant pH/DO > Turbidity sensor/tr.	sensor kits > Redox sensor kit ansmitter > Utility prefilter/regulator kit				
Dimensions (W	Options ' x D x H)	> Optional: Glycol/chiller heat ex Provided for measuring vessel vo > pH/DO sensor kits 116 x 86 x 151 cm (45.5 x 34.0 s > Spray balls > Foar > Transfer lines > Ster	changer designed to olume x 59.5 in) m/level kits ile sampling kit	> Redundant pH/DO > Turbidity sensor/tr. > Addition vessels	sensor kits > Redox sensor kit  ansmitter > Utility prefilter/regulator kit  > Marine and pitched-blade impellers				
Dimensions (W	Options ' x D x H)	> Optional: Glycol/chiller heat ex Provided for measuring vessel vo > pH/DO sensor kits 116 x 86 x 151 cm (45.5 x 34.0 s > Spray balls > Foar > Transfer lines > Ster > 1 or 7 port septum > Addi	cchanger designed to blume x 59.5 in) n/level kits	> Redundant pH/DO > Turbidity sensor/tr. > Addition vessels > Scales for addition	sensor kits > Redox sensor kit  ansmitter > Utility prefilter/regulator kit > Marine and pitched-blade impellers				
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## eppendorf



# 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 initial delivery, as well as easy customization at any time, should your process require a different setup. 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 userdefined passwords and auto log-out

### 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



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 impellers optional

Adjustable-angle, userfriendly 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

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



Resterilizable 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, ecofriendly design eliminates need for single-pass cooling water in growth mode



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

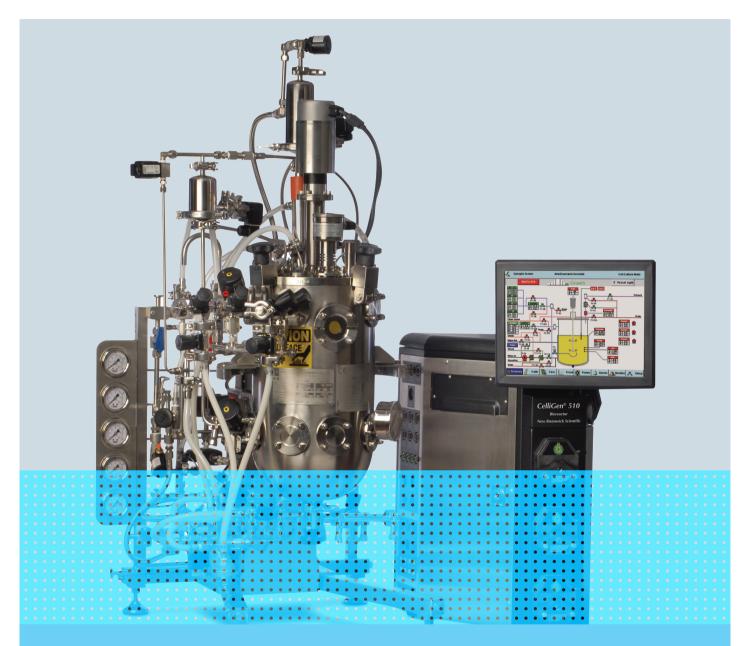


#### BioFlo® 610 fermentor specifications\*

Vessel	144 11	50 L		100				
	Working volume	16 - 50 L			100 L			
	Total volume	65 L		125				
	Construction	> Aspect ratio: 3:1			de Ratings: ASME/CE			
		> Material of construction: 316	6L stainless stee			(3.45 BAR), Full vacuum		
		> Vessel access: Headplate			nish: 20 CLA (0.5 micro ndard]	ometer) Ra mechanically polished interior		
	Agitation	Drive: Bottom drive, double-m	nechanical seal					
	Speed	50 - 700 rpm		50 -	500 rpm			
	Impellers	(3) Rushton-type impellers sta	ındard. Low-shea	ar marine and p	ine and pitched blade optional			
	Baffles	(4) Removable, 316L stainless	steel					
Ports	Headplate	> (3) Pg 13.5 [Level 1 sensor/s	spare, Level 2 sei	nsor/spare, sep	tum/spare]			
		> (4) 1.5 in NBS connect sanita > (1) 2 in vessel light	ary style [pressu	ire gauge, exha	e gauge, exhaust, and (2) spray balls/septums/spares]			
	Upper side wall	> (7) 1.5 in NBS connect sanita valves/spares]	ary style [pressu	re transducer/s	transducer/spare, gas overlay/spare, vessel rupture device, and (4) addition			
		> (1) 3 in NBS connect sanitar	y style [vessel si	ght glass]				
	Lower side wall	> (7) 1.5 in NBS connect sanitary style [RTD, sample/spare, spare, sparger, and (3) DO/pH/redox or combinations thereo						
	Bottom	(1) 1 in NBS connect sanitary	style [radial diap	alve]				
Controller	Control station					bles for trend graphing. Includes an s for all utilities and communication signal		
	Touchscreen interface/display	38 cm (15 in) Industrial touchs						
Pumps	Standard, options,		Base, Acid, Foam, Level 2 Wet, Level 2 Dry,					
	and control	Volume Add, Volume Harvest						
		Optional: External variable-spe	eed pumps can b	oe added with t	lded with totalizer and functionality of standard pumps			
	Speed	Pumps 1, 2 and 3: 100 rpm Fix	xed-speed duty o	cycle				
iping skid	Construction	> Material of construction: 316	6L stainless stee	l > Ga	skets/O-Rings: Class (\	VI) EPDM and silicon		
	Aeration	Standard: 1 thermal mass flow		3	5			
		Optional: 1 TMFC with 2-gas of						
	Gas inlet	Sparger/overlay filter housing						
	Exhaust line	Line designed for minimal bac Automatic backpressure contro		ides heater and	1.2 μ nominal exhaust	t filter and housing		
	Temperature control	> All systems come with auton		old and steriliza	ation program			
	line	> Operating temperature contr	rol range 10 °C a	above water sup	pply 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	l volume					
Sensor	Options	> pH / DO sensor kits		> Re	> 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 opti	ons	> Spray balls > Fo	oam/level kits	> Tu	rbidity sensor/transmit	tter > Addition valve connector kit		
•			terile sampling k		ldition vessels	> Marine and pitched-blade impellers		
			tility filter/regula		ales for addition vesse			
			ottle holder		w pressure seal alarm	> Additional sight glass		
leilie.	Process air		ottie fiolder		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		
Jtility requirements	Process air	30 PSIG (2.1 bar), 75 SLPM			SIG (2.1 bar), 150 SLP			
equirements nd	Oxygen	30 PSIG (2.1 bar), 32 SLPM	-( /E/ E 6! 5: 2		SIG (2.1 bar), 64 SLPN	и 		
onnections	Instrument air	80-100 PSIG (5.5-6.9 bar), 2 so						
omiccions.	Process steam	35 PSIG (2.4 bar), 10 lb/hr (4.5			35 PSIG (2.4 bar), 20 lb/hr (9 kg/hr)			
	Utility steam	35 PSIG (2.4 bar), 50 lb/hr (22			35 PSIG (2.4 bar), 100 lb/hr (45 kg/hr)			
	Facility water	30 PSIG (2.1 bar), 3 GPM (11.3	37 L/min)	30 F	SIG (2.1 bar), 4 GPM (	15.16 bar)		
	Water return	Less than 15 (1.0 bar) PSIG ba	ack pressure					
	Clean condensate	Gravity drain						
	Biowaste	Gravity drain						
	Glycol/chiller	30 PSIG (2.1 bar), 4 GPM (15.1	16 bar)	30 F	SIG (2.1 bar), 8 GPM (	30.32 bar)		
	Electric	208-230V AC, single phase, 50			(			
nonderfie ICO 1210				Input/output	External devices	Seven analog inputs and seven analog		
pendorf is ISO 1348:	5 and 9001 certified. ^ Specifica	tions subject to change without notice.		connections	External devices	outputs for your external devices such		
				and	n 2 HCDt	analyzers, sensors, external pumps, etc		
				ports	n 2 USB ports	Import firmware/software upgrades and export trend data. Connect optional 8-port serial box for accessories		
, ,					Communications	For optional BioCommand® SCADA		
our local dis	tributor: www.eppe				port	software		
	D 11	22339 Hamburg · German						

www.eppendorf.com/bioflo610

## eppendorf



# System Flexibility

CelliGen 510 benchtop SIP bioreactor system

### Convenience, Flexibility, and Control

The CelliGen 510 bioreactor systems 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; choose up to four thermal mass flow controllers for process gasses; an additional TMFC can be added for gas overlay/air wash system
- > Capable of batch, fed-batch and perfusion modes
- > Multiple 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 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

- > 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 CelliGen 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

<u> </u>	rend S	creen		Newt	Brunswick !	scienane	Cell Culti	are Mode
	Cel	liGen:	510	-1	G G	rowth	♀ Vessel Lig	pht
			PV: 89.0 SP: 89.0 DU: 89.0	19.0 20.0	20.0 30.0 30.0 30.0	Pump3 10.0 10.0 10.0		
Named 100007	Tone 86.6		Pung0 100.0	10.0	130.0	λ		
10.0	60.0 -		00.0					
0.0	\$1.0 -	60.0 -	60.0					
40.0 -	34.0 -		40.0			$-\Pi$		
20.0	17.0 -		20.0		+			
. ]	0.0		00 00 20		09.36	09.44	09.61	09

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

Celli	Sen 510	-1	I ■ Gro		∀essel Light		
LoopName	PV	Setpoint	Out%	Control Mode	Units	Case.	
DO	1.9	0.0	0.0	on	%D0	Source	
ExhistHtr	0.0	25.0	0.0	on	*	GasFto	
Votune	0.00	0.00	0.0	оп	L	None -	
pH2	15.93	7.00	0.0	orr	рН	None	
002	1.0	0.0	0.0	Off	%D0	None	
Air (1)	0.0	0.0	0.0	Off	%	None	
02 (2)	0.0	0.0	0.0	Off	%	00	
GasFlo	-0.01	0.00	0.0	Off	SLPM	Source	
HiFoim (Lx12)	0.0	0.0	0.0	Off	%	None	
						-	

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

CelliGen S			Growth		Vessel Light
Cascade From	DO				
То	Enable	Start Setpoint	@00 Stat Out	EndSetpoint	@ DO End Datk
Agit	YES	50	0.0	200	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 O<sub>2</sub>) 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 style connection ports

provide flexibility to position sensors and redundant sensors to meet your process needs

Independent overlay gas/air wash system with separate TMFC enables addition of air,  $O_2$ ,  $CO_2$  or  $N_2$  into vessel headspace

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, 3, or 4 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



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



Resterilizable drain valve enables

sterile transfer of vessel contents

#### Specialized impellers maximize yields:

1. Spin filter with impeller for suspension or ADP cells in perfusion; 2. Cell-lift impeller for low shear and high oxygenation in microcarrier and suspension cultures; 3. Pitched blade impeller for high aeration and low shear in insect and other cell cultures;

**4. Marine impeller** for the growth of insect cells and other cultures



Packed-bed impeller optimizes yields of secreted products; basket is filled with Fibra-Cel® disks and used with a patented low shear draft tube impeller



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



#### CelliGen 510 bioreactor specifications\*

Vessel	Working volume	10.75 - 32.0 L							
	Total volume	40 L							
	Construction	<ul><li>Aspect ratio: 2:1</li><li>Material of construction: 3</li><li>Vessel access: Headplate</li></ul>	16L stainless steel	·	40 PSIG (5.5 BAR), F	Full vacuum electropolished interior			
	Agitation/speed	Top drive, double-mechanica Optional: Top magnetic drive		-pm					
	Impeller systems	Choice of pitched blade, mai	ine, packed-bed/basket, c	ell-lift and spin filter					
	Baffles	Optional: (4) Removable, 316		·					
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 air wash/spare, gas overlay/spare, vessel rupture device, and (4) addition valves/spare. > (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 sanita	ary style [radial diaphragn	n drain valve]					
Controller	Control station	Controls one vessel with 32 of industrial touchscreen monit				l graphing. Includes an ies and communication signals			
	Touchscreen interface/display	38 cm (15 in) Industrial touc							
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							
1 3	Aeration	Standard: 1 thermal mass flow controller (TMFC) with built in four-gas control (4 solenoid valves). Includes a stainless steel							
		housing and 0.2 μ absolute f Optional: 3rd or 4th TMFCs	ilter element	J					
	Gas overlay	Overlay with TMFC is provid	ed with a stainless-steel h	ousing and 0.2 μ abso	lute filter element				
	Exhaust line	Standard: Line designed for backpressure regulator Optional: Automatic backpre	•	cludes heater and 0.2	μ absolute exhaust f	ilter and housing, with manual			
	Temperature control			 m					
	line	<ul> <li>All systems come with automatic sterilization program</li> <li>Operating temperature control range 10 °C above water supply temperature to 80 °C</li> </ul>							
		<ul><li>&gt; Line designed to achieve 1</li><li>&gt; Optional: Glycol/chiller hea</li></ul>	· ·		°C range				
	Load cell	Provided for measuring vess	el volume						
Sensor	Options	> pH/DO sensor kits		> Redundant pH/D	O sensor kits	> Redox sensor kit			
Dimensions (W	/ x D x H)	116 x 86 x 151 cm (45.5 x 34	1.0 x 59.5 in)						
Additional opti	ons	> Spray balls >	Foam/level kits	> Turbidity sensor/	transmitter > Decar	nter			
		> Transfer lines >	Sterile sampling kit	> Addition vessels	> Mobil	e table			
		> 1 or 7 port septum >	Utility prefilter/regulator kit	> Scales for addition	n vessel				
		> Validation packages >	Addition valve connector kit						
Utility	Process air/gases	Direct sparge: 30 PSIG (2.1 l							
requirements	$O_2$ , $N_2$ , $CO_2$	Cell-lift impeller systems: 30 F	PSIG (2.1 bar), 15 SLPM						
and		Overlay options: 32 SLPM							
connections	Instrument air	80-100 PSIG (5.5 - 6.9 bar),							
	Process steam	35 PSIG (2.4 bar), 10 lb/hr (4	l.5 kg/hr)						
	Utility steam	35 PSIG (2.4 bar), 35 lb/hr (1	5.9 kg/hr)						
	Facility water	30 PSIG (2.1 bar), 1 GPM (3.	79 L/min)						
	Water return	Less than 15 PSIG (1.0 bar)	oack 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	5 and 9001 certified. * Specifica	ations subject to change without notice.							
* Flow rates shown are	e for use with a single TMFC with presentative for details.	4 solenoid valves. Other options available	Input/output connections and communications	External devices	your external devi	ts and seven analog outputs fo ces such as analyzers, sensors, c. (Reduce by 1 input and			
			ports	2 LICD t-		ditional TMFC added)			

2 USB ports

Import firmware/software upgrades and export

Communications port For optional BioCommand®/SCADA software

trend data. Connect an optional 8-port serial box for accessories requiring a serial connections

www.eppendorf.com/celligen510

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