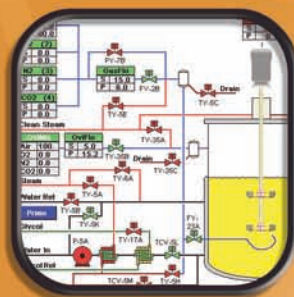
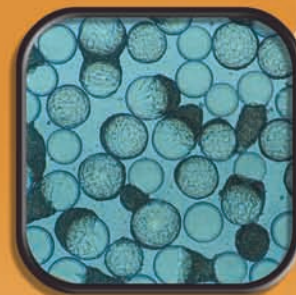




New Brunswick Scientific
Where Quality and Innovation Have Become Tradition

19.5L & 40L STERILIZABLE-IN-PLACE CELLIGEN® 510 BIOREACTOR

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



The CelliGen 510 Bioreactor – For the Ultimate in Convenience,

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

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

The new CelliGen 510 Bioreactor 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. Choose up to four Thermal Mass Flow controllers for process gasses or substitute a Rotameter. An additional TMFC can be added for gas overlay/air wash system.
- Capable of batch, fed-batch and continuous (perfusion) modes.
- Multiple impeller options provide flexibility to achieve high yields from virtually any mammalian, insect or plant cell line.
- 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.

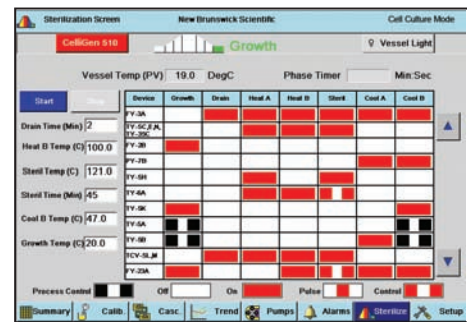
Advanced Controller Optimizes Results.

- 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 and 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.

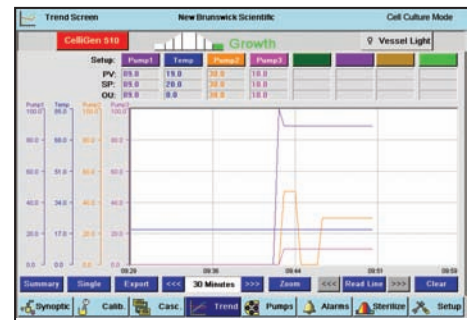
A Production-Scale System That Fits on the Bench!

- At just 45.5" wide x 34.0" deep (116 cm 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 CelliGen 510...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 and interval between sample measurements.

LoopName	PV	Setpoint	Out%	Control Mode	Units	Casc.
DO	1.9	0.0	0.0	Off	%DO	Source
ExtrRH	0.0	20.0	0.0	Off	%	GasFlo
Volume	0.00	0.00	0.0	Off	L	None
pH2	15.93	7.00	0.0	Off	pH	None
DO2	1.0	0.0	0.0	Off	%DO	None
Air (1)	0.0	0.0	0.0	Off	%	None
O2 (2)	0.0	0.0	0.0	Off	%	DO
GasFlo	-0.01	0.00	0.0	Off	SLPM	Source
HF foam (LX2)	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	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 & O₂) 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

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

Independent overlay gas/air wash system with separate TMFC enables addition of air, O₂, CO₂ or N₂ into vessel headspace

4 Removable Vessel Baffles Optional for enhanced mixing

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

Gauge Panel provides quick reference to basic process utilities

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

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. Measurement is displayed on the 15" monitor

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

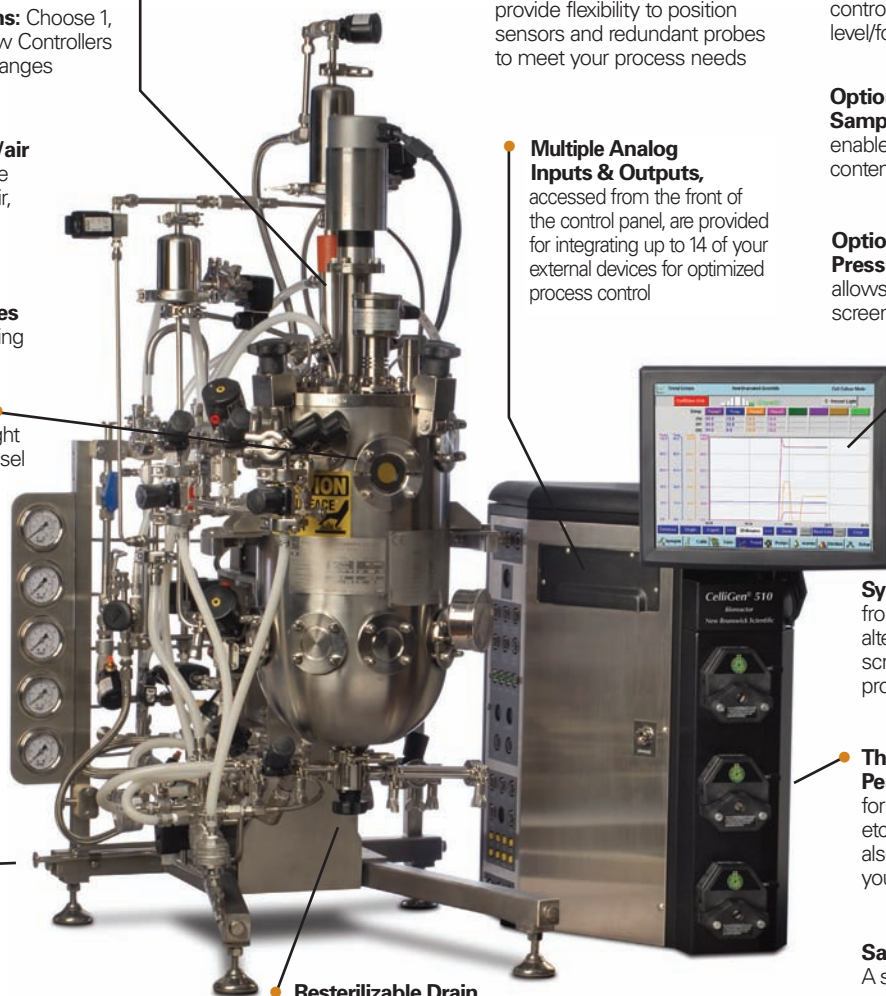
Adjustable-Angle, User-Friendly 15" Touchscreen Interface simplifies control and provides clear viewing of process parameters

Synoptic Screen (shown on the front cover), provides pictorial alternative to the summary screen for viewing and 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

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.





Specialized impellers maximize yields. **1. Spin Filter** with impeller for suspension or ADP cells in perfusion. **2. Patented 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 Blade Impeller** for the growth of insect cells and other cultures.



Packed-Bed Basket optimizes yields of secreted products. Basket is filled with FibraCel® disks and used with a patented low shear draft tube impeller.

CelliGen 510 — Specifications*

VESSEL	Total Volume	19.5 Liters	40.0 Liters
	Working Volume	5.5 - 15.6 Liters	10.75 - 32.0 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/Speed	> Top drive, double-mechanical seal standard. 25 - 200 RPM > Optional: Top magnetic drive. 25 - 130 RPM	
	Impeller Systems	Choice of pitched blade, marine blade, packed-bed basket, cell lift and spin filter	
	Baffles	Optional: (4) Removable, 316 L stainless-steel baffles	
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 built-in four-gas control (4 solenoid valves). Includes a stainless steel housing and 0.2 µ absolute filter element > Optional: Rotameter or 2nd, 3rd, or 4th TMFCs for individual gas control	
	Gas Overlay	Overlay with TMFC is provided with a stainless-steel housing and 0.2 µ absolute filter element	
	Exhaust Line	> Standard: Line designed for minimal backpressure. Includes heater and 0.2 µ absolute 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 > Decanter > Transfer lines > Sterile sampling kit > Addition vessels > Mobile skid > 1 or 7 port septum > Utility filter regulator kits > Mobile headplate lift > Validation packages > Addition valve connector kit > Scales for addition vessel			
UTILITY REQUIREMENTS & CONNECTIONS	Process Air/Gases O₂, N₂, CO₂	Direct sparge: 30 PSIG, 3 SLPM**	30 PSIG, 32 SLPM**
		Cell Lift Impeller systems: 30 PSIG, 15 SLPM	
		Overlay Options: 15 SLPM or 32 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	

NBS SALES OFFICES

USA HEADQUARTERS

800-631-5417
732-287-1200
Fax: 732-287-4222
bioinfo@nbsc.com
www.nbsc.com
PO Box 4005
44 Talmadge Rd.
Edison, NJ 08818-4005

UNITED KINGDOM

0800 581331
+44 (0) 1727 853855
Fax: +44 (0) 1727 835666
bioinfo@nbsuk.co.uk
17 Alban Park, Hatfield Rd
St. Albans, AL4 0JJ

THE NETHERLANDS

+ 31 (0)24 3717 600
Fax: + 31 (0)24 3717 640
sales@nbsbv.nl
Kerkenbos 1101, 6546 BC
Nijmegen
P.O. Box 6826, 6503 GH
Nijmegen

FRANCE

+ 33 (0)1 53 53 15 11
Fax: + 33 (0)1 53 53 15 57
sales@nbsar.fr
12 - 14, Rond Point des
Champs Elysées
75008 Paris

BELGIUM

+32 (0) 16 562 831
Fax: +32 (0) 16 572 753
sales@nbsnv-sa.be
Stationsstraat 180/4
B-3110 Rotselaar
België/Belgique

GERMANY

+49 (0)7022-932490
Fax: +49 (0)7022-32486
sales@nbsgmbh.de
In der Au 14
D-72622 Nürtingen

CHINA

+86-21-648 45955
Fax: +86-21-648 45933
nbschc@online.sh.cn
Suite A903
No. 250 Cao Xi Rd.
Shanghai 200235

* Specifications subject to change without notice.

** Flow rates shown are for use with a single TMFC with 4 solenoid valves. Other options available. Ask your rep for details.



New Brunswick Scientific Co., Inc.