

BioPro™ Lab & Pilot Series STEAM IN PLACE FERMENTORS 10L TO 300L W/V

Innovative Solutions and Support



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BioPro™ FERMENTORS

FOR BIOPROCESS SCALE UP AND PRODUCTION RUNS

EXPERIENCE & INNOVATION

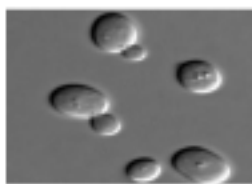
Utilizing its expertise in industrial bioprocesses and automated systems, DCI - BIOLAFITTE introduces its BioPro™ series, a new generation of Lab and Pilot scale Steam In Place fermentors designed for optimization studies, scale-up and production runs in standard or GLP / GMP environments.



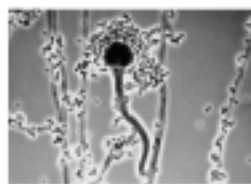
These systems represent the best pre-engineered culture devices and are suitable for many culture types including yeast, bacteria, fungi, in batch, fed-batch or continuous mode (with appropriate accessories) .



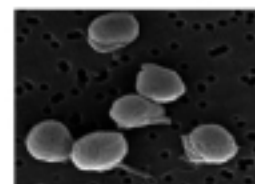
BACTERIAL CULTURE



YEAST CULTURE



MYCELIUM CULTURE



MICRO-ALGAE CULTURE

BENEFITS

- ❑ Ergonomic, modular and compact systems allowing easy installation and maintenance
- ❑ Fully customizable pre-engineered systems designed for R&D, scale-up and productions available through two different designs to meet all needs: **S Type** for general applications, **G Type** for GLP / GMP validated applications
- ❑ High oxygen and heat transfer performance via the use of the patented **HTPG4™** impeller in combination with RUSHTON turbines
- ❑ **NEPTUNE™** Control system with user friendly / intuitive interface and multiple options
- ❑ Micro PLC / PLC – PC based control technology and industrial components ensuring robustness and reliability for the system
- ❑ Software developed from non-proprietary platforms complying with GMP requirements (21CFR PART11 and GAMP 5 (*))
- ❑ Remote supervision and maintenance of multiple bioreactors via **ETHERNET™** network

QUALITY PROGRAM AND QUALIFICATION

- ❑ Full system testing and comprehensive FAT
- ❑ Rigorous quality program including 100% endoscopic control of process welds and comprehensive tests for problem-free start-up ; G type adds numeric records of welds and full material traceability
- ❑ Extended test program and documentation package (FS, HDS, SDS, FAT / SAT protocols) designed to support and ease qualification of G type systems

BioPro™ FERMENTORS

TECHNICAL SPECIFICATIONS

VESSEL, AGITATION & ACCESSORIES

VESSEL

- Jacketed vessel fitted with removable head plate
- Available sizes : 10, 20, 30, 60, 100, 150, 200, 300 w/v - working aspect ratio of 2:1
- Material (product-contact parts): stainless steel grade 1.4404 (316L)
- Finish (product-contact parts): Ra ≤ 30 for vessel and ≤ 60 for piping of the S type, Ra ≤ 20 for vessel (with electro-polishing) and piping of the G type
- Maximum operating pressure: 45 psig for vessel and jacket

AGITATION

- Bottom or top mounted agitation equipped with two HTPG4™ impellers and one RUSHTON turbine or three RUSHTON - tip speed : 5 m/s
- Agitation with mechanical for the S type or magnetic coupling for the G type

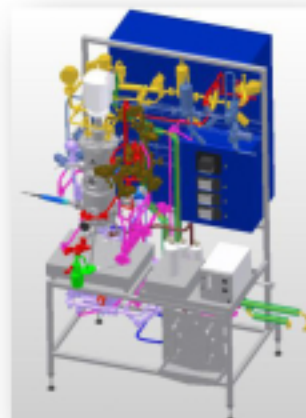
ACCESSORIES

- Round sight glass and illumination lamp
- Sanitary pressure relief valve and pressure gauge
- Inoculation tube and septum port with three injection needles (S type) or two resterilizable product lines (G type) for sterile additions
- 5 x DN25 Ports for standard probes and sensors
- Harvest diaphragm valve (steamed during vessel sterilization) and septum port for 'flame or alcohol' sampling via syringe (S type) or combined resterilizable harvest and sampling line with flush-mounted diaphragm valve (G Type)
- Up to four peristaltic pumps including one with adjustable speed for fed-batch or continuous culture
- 0.2 µm absolute filters on gas inlet and outlet
- Air supply to the sparger and the headspace

Code	Vessel Volume (Working/Total)	Selection
F01	10 L / 17 L	
F02	20 L / 30 L	
F03	30 L / 40 L	
F04	60 L / 100 L	
F05	100 L / 150 L	
F06	150 L / 200 L	
F07	200 L / 275 L	
F08	300 L / 400 L	
Code	Version	Selection
M	Semi-automatic	
A	Full automatic	
Code	Design	Selection
S	Standard (S type)	
G	GMP (G type)	
Code	Vessel, agitation and accessories options	Selection
00	Oval sight glass	
01	Vessel insulation	
02	Agitation with magnetic coupling ⁽¹⁾	
20	Resterilizable gas filters	
24	Additional resterilizable product addition line	Qty:
25	Resterilizable product transfer line	Qty:
26	CIP devices	
27	Independent resterilizable sampling valve	
28	Oxygen line with mass flow meter	
29	CO ₂ or NH ₃ line with rotameter and automatic valve for pH control	
30	Nitrogen line with rotameter	
31	Exhaust gas condenser	
32	Double filtration on gas exhaust line	
33	Resterilizable bottom valve for harvesting ⁽²⁾	

⁽¹⁾ Included in base configuration for G type equipment

Additional equipment (peristaltic pumps, reagent flasks, autoclavable or SIP vessels, scales, CIP units, ...) and customized design for specific applications and biological containment are also available on request.



TEMPERATURE CONTROL

- Cultivation temperature automatically controlled by injection of plant hot or cold water into jacket
- Steam sterilization of empty vessel and media

Code	Temperature control options	Selection
21	Jacket circulating pump	
22A	Cooling via chilled water circulation in jacket	
22B	Cooling via glycol water heat exchanger ⁽¹⁾	
23A	Heating via steam heat exchanger ⁽¹⁾	
23B	Heating via electrical heater ⁽¹⁾	

⁽¹⁾ To be combined with option 21



BioPro™ FERMENTORS

TECHNICAL SPECIFICATIONS

INSTRUMENTATION

- Automatic control of temperature, speed and pH
- Air flow-rate manually controlled via rotameter up to 2 VVM

Code	Instrumentation Options	Selection
40	Air mass flow controller in replacement of the rotameter	
41	Automatic control of the head space pressure	
42	pO ₂ measurement and control	
43	Foam level control	
44	Vessel low level switch	
45A	Vessel weight measurement (Load Cells)	
45B	Continuous level measurement	
46	Temperature measurement on drain lines	Qty:
47	Feed back control of valve position	Qty:
48	Feed back control of agitator speed	
49	Printer	
50	Control of nutrient flow rate	
51	Optical density measurement	
52	O ₂ , CO ₂ exhaust gas analyzer	



NEPTUNE CONTROL SYSTEM

HARDWARE CONFIGURATION

- Micro-PLC / PC based control with a wide choice of Human Machine Interfaces: laptop or desktop PC as standard or optional Industrial Touch Screen Panel
- Up to 32 configurable control loops for a wide range of process parameters including temperature, pH, Redox, speed control, pO₂, foam, gas flow rates, weight or level, OD, pO₂ / pCO₂ on gas exhaust
- Control types include : PID, digital on/off and others – cascade mode for advanced control strategies

SOFTWARE CONFIGURATION

"Advanced" Version

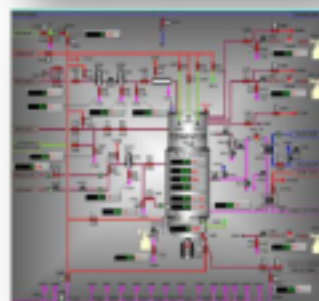
- Customized User Access module complying with 21CFR PART11 (*)
- Synoptic overview presenting all on-line measured values, actuator status, phase running, alarms
- Parameter Editing module allowing operator for adjusting set-points, PID settings...
- Audit Trail module (iFIX or In Touch versions) capturing all actions made with the software and providing a SQL database record of a batch with customised report generation
- Trend module allowing data display in the form of trend or historic graphs
- Profile module for controlling set-points via imported or plotted data

"Expert" Version

- Calculation module providing a means to make automatic calculations (RQ, OUR...) in real-time; calculated values can then be logged or implemented as a new process control variable.
- Strategy module enabling a stepwise, user-interactive and repeatable process definition; typically used for feed control, complex gassing addition, set-point ramps or event based actions.
- Additional features such as secure SCADA Server (networked system), remote supervision and maintenance on request

(*) With the SCADA iFIX or InTouch versions

Code	SCADA Configuration	Selection
60La	NEPTUNE LAB in "Advanced" version	
60Le	NEPTUNE LAB in "Expert" version	
60Fa	NEPTUNE SCADA iFIX in "Advanced" version	
60Fe	NEPTUNE SCADA iFIX in "Expert" version	
60Ta	NEPTUNE SCADA InTouch in "Advanced" version	
60Te	NEPTUNE SCADA InTouch in "Expert" version	



AVAILABLE SIZES AND DIMENSIONS (Without control cabinet)

Nominal working volume	Minimum Working volume	Total volume	Depth	Width	Height	Weight Empty
10 L	5 L	17	950 mm	950 mm	1950 mm	175 kg
20 L	8 L	30 L	950 mm	1000 mm	2200 mm	185 kg
30 L	12 L	40 L	950 mm	1050 mm	2300 mm	200 kg
60 L	24 L	90 L	1300 mm	1500 mm	2550 mm	350 kg
100 L	40 L	150 L	1350 mm	1550 mm	2750 mm	480 kg
150 L	60 L	200 L	1350 mm	1550 mm	3000 mm	520 Kg
200 L	80 L	275 L	1400 mm	1600 mm	3350 mm	550 kg
300 L	120 L	400 L	1450 mm	1750 mm	3900 mm	650 kg