

BIOFLO[®] 5000

Mobile Pilot Plant Fermentor



- For Process Development and Small-Scale Production
- 40, 80 or 120 L Capacities
- Automatic In-Place Sterilization
- Space Efficient
- Equipped with Resterilizable Valves for Addition, Sample and Harvest
- Thermal Mass Flow Meter or Controller



NEW BRUNSWICK SCIENTIFIC

Where Quality and Innovation Have Become Tradition

BIOFLO[®] 5000 PILOT PLANT FERMENTER

New Brunswick Scientific offers the most compact and complete pilot plant fermentor in the industry. Designed for culturing both aerobic and anaerobic organisms, the versatile BioFlo 5000 fermentor is capable of process development and small-scale production of bacterial, insect, yeast, plant, fungal and algal cells. This sterilizable-in-place system is available in 40, 80 and 120 liter (total volume) capacities, yet occupies just 7.3 square feet (0.70 m²) of floor space. It comes equipped with all accessories needed for out-of-the-box start up, as well as for convenient and contamination-free operation. Automated data logging, process control and optimization are made possible with an optional software package. With its outstanding array of standard features, this proven system provides an exceptional value.

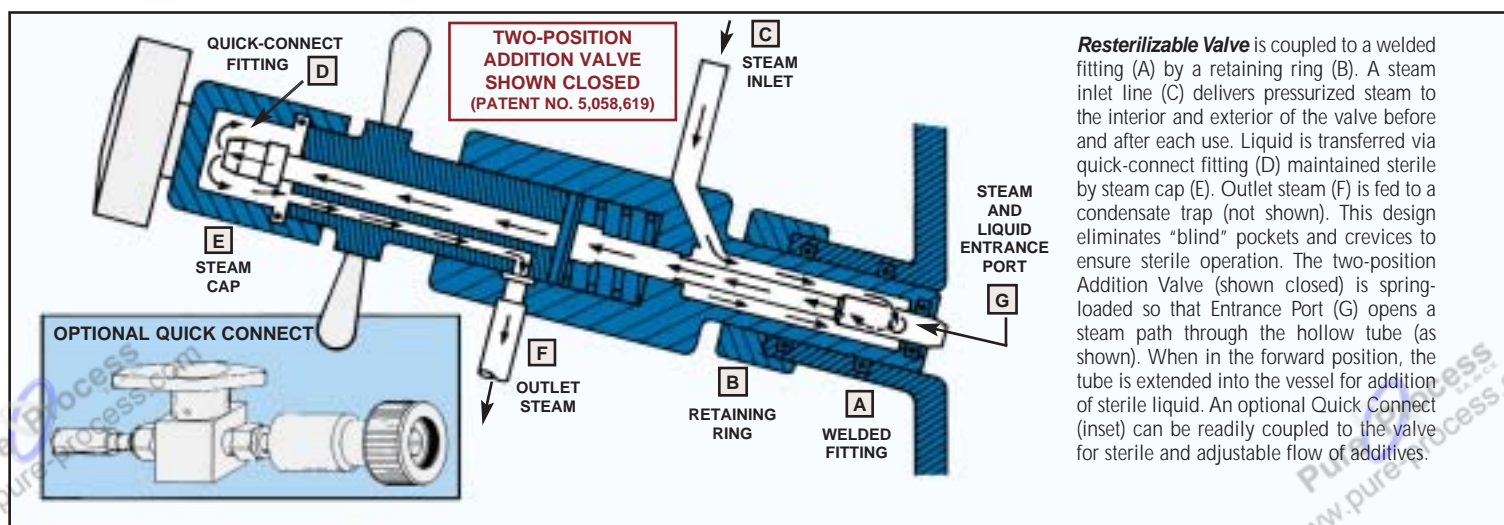
UNIQUE ADVANTAGES

- Guaranteed high oxygen transfer rates (OTR) of 350 mM O₂/L/Hr or higher enable high-density microbial culture*. Up to 1,500 mM O₂/L/Hr attainable via O₂ supplementation utilizing an optional NBS 2-gas mixer
- Capable of rapid temperature shifts in growth phase, to allow for heat induction (1°C/minute in range of 23°C to 45°C*)
- Capable of remote control, data logging and process programming using optional AFS-BioCommand[®] software
- Smallest footprint of any pilot plant fermentor
- Most complete, fully accessorized, pilot plant fermentor
- Set-up and start-up assistance provided, with optional validation and training packages available. Process development and scale-up assistance can also be provided
- Most comprehensive warranty in the industry. One year on parts and labor
- Only NBS has an in-house ASME-accredited vessel shop, microbiology and cell culture labs, software and instrumentation development group, and integrated cGMP bioprocess area to provide added customer support

* Optional on 120 L systems

STANDARD FEATURES INCLUDED

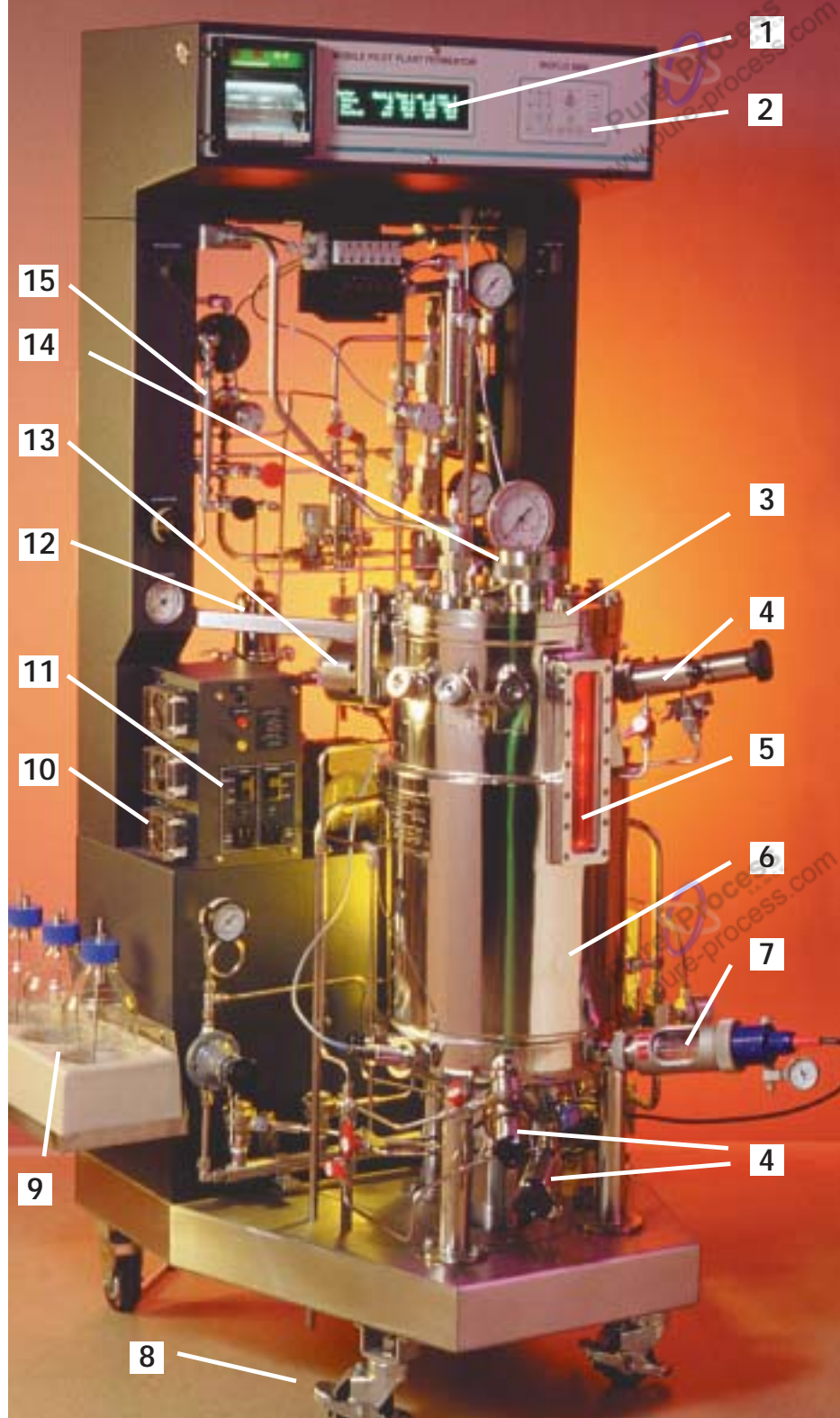
- 1 **Easy-To-Read, 8" (20.3 cm) Vacuum Fluorescent Display** is clearly visible under all light conditions. Simultaneously displays current value, setpoint and control mode for (4) parameters
- 2 **Membrane Keypad** facilitates activation of setpoint entry, calibration and sterilization cycles. Watertight and easily cleanable
- 3 **Swing-Away Headplate** provides easy access to vessel interior
- 4 **Resterilizable Addition/Inoculation, Harvest and Sampling Valves** for aseptic operation are readily removable and cleanable. Straight-through flow path attains complete sterilization of the valve and transfer lines. (See diagram.) All valves utilize quick connect fittings. Sample valve provides variable flow
- 5 **Large Window** allows viewing the culture above and below maximum working level
- 6 **Sterilizable-In-Place Vessel**, ASME coded, available in 40, 80 and 120 L capacities. Type 316L jacketed stainless steel provides rapid sterilization and precise temperature; Internal finish of 15 - 20 Ra facilitates cleaning and prevents residue build-up
- 7 **DO, pH, Foam, Level, Temperature RTD Sensors** Choice of Ingold or Broadley-James pH and DO Probes. In-Line Amplifiers for pH and DO sensors, compatible with polarographic and galvanic DO probes. (pH probe and pressurizable housing shown)
- 8 **Mobile System with Lockable Casters** facilitates preparation, clean-up, maintenance and servicing
- 9 **Addition Bottles and Support Stand** for acid, base and antifoam provided for added convenience
- 10 **Three Peristaltic Pumps** provided for acid, base and antifoam addition
- 11 **Two Switched Outlets** for optional remote pumps to control nutrient and level
- 12 **In-line Sterilizable Air and Exhaust Filters** designed for 100% removal of viable organisms
- 13 **Lamp** illuminates vessel contents



MENTOR

WITH EVERY BIOFLO 5000

- 14** Extra-Large Powder/Fill Port with septum
- 15** Exhaust Line with heat exchanger and view glass. Heaters keep moisture-laden gases above the dew-point and prevent condensation and clogging of the exhaust filter
Features 16 - 28 are not visible in the photo
- 16** Choice of Thermal Mass Flow Controller or Thermal Mass Flow Meter
- 17** Automatic In-Place Steam Sterilization of vessel, process piping, valves and filters
- 18** Safety override permits manual operation of the pneumatic control valves in the sterilization/cooling system to protect personnel and culture
- 19** Automatic Cool Down from sterilization temperature to growth temperature
- 20** Steam Traps, multiple traps guarantee the sterilization temperature is maintained in all process lines
- 21** Powerful Bottom-Drive Motor, 1.5 hp; allows easy access to headplate ports and vessel interior
- 22** Double Mechanical Agitator Seal, carbon-tungsten carbide, mounted in a pressurized steam/steam-condensate environment, maintains constant pressure and protects contents of both the vessel and the environment from contamination
- 23** Rupture Disk Safety Device, side mounted, of 316L stainless steel, prevents over-pressurization of vessel; includes discharge tube to convey liquid to bottom of reactor
- 24** Three Additional Ports, 19 & 25 mm Ingold-type, allow for insertion of extra sensors
- 25** High-Level Foam Control for the exhaust line shuts off air and reduces agitation while signaling alarm
- 26** Rear Connection for All Utilities. Open frame piping facilitates cleaning, maintenance and servicing
- 27** Pre-Filter Regulator Kits for air, water and steam for removal of particulates or impurities
- 28** Serial Port for data logging and computer control



HEADPLATE PENETRATIONS

- Foam Probe Port *
- Level Probe Port *
- Diaphragm-Type Pressure Gauge
- High Foam-Sensing Probe * in Exhaust Gas Line or in Optional Exhaust Gas Condenser
- Combination Filling and Inoculation Port

BOTTOM PENETRATIONS

- Bottom Agitator Double Mechanical Seal Housing
- Resterilizable Bottom Drain Valve with Quick Connect

SIDE WALL PENETRATIONS

- Ring Sparger and Gas Overlay
- Three Septum Addition Ports
- Resterilizable Addition/Inoculation Port with Quick Connect
- Rupture Disc
- Five Ingold-Type Probe Ports for pH*, DO* and other sensors
- Resterilizable Sample Port with Quick Connect
- Jacket Pressure-Relief Valve

* Sensors supplied

BioFlo 5000 Fermentor Specifications *

	Total Capacity	40 Liters	80 Liters	120 Liters
VESSEL	Working Volume	10 - 30 Liters	20 - 60 Liters	25 - 100 Liters
	Aspect Ratio (H:D)	2:1	2:1	3:1
	Geometry	Cylindrical with dished bottom		
	Pressure Rating	Vessel is ASME-coded, rated for 40 psig (2.8 kg/cm ²) Jacket rated for 50 psig (3.5 kg/cm ²) / 149° C		
	Viewing Window	Rectangular, sidewall mounted above and below the maximum working level. 40 L: 8.5" x 1.25" (21.6 x 3.2 cm); 80 & 120 L: 11.25" x 2.5" (29.2 x 6.4 cm)		
	Baffles	(4) 316 L stainless steel removable baffles		
	Dimensions Inches cm	11.625" ID x 23.25" H 29.53 x 59.06 cm	15.625" ID x 28.625" H 39.69 x 72.72 cm	
MATERIALS & FINISH	Vessel	316 L stainless steel, orbitally welded and electropolished		
	Process Piping	All piping fabricated of 316 L stainless steel including valves and fittings		
	Gaskets/O-Rings	Gaskets of Silicone; O-Rings of EPDM		
IMPELLERS	Diameter	4.87" (12.38 cm)	6.44" (16.35 cm)	
	Type	(2) Six-bladed 316 L stainless steel, Rushton blade, standard Marine blade and pitched blade optional		
PENETRATIONS	Headplate	(1) Powder/Liquid Fill Port with Septum; (1) Pressure Gauge; (1) Exhaust/High Foam; (1) Level; (1) Foam		
	Upper Side Wall	(3) 19 mm septum ports; (1) 25 mm port and resterilizable valve; (1) 19 mm spare port, plugged		
	Lower Side Wall	(1) 19 mm port and resterilizable septum valve; 25 mm ports, plugged: (4) in 40 L vessels and (5) in 80 & 120 L vessels		
	Bottom	Bottom drive; Steam-sterilizable ball drain valve		
AGITATION	Drive	1.5 HP, AC motor, bottom-entry drive		
	Sensor	Magnetic speed pick-up sensor		
	Range	80 - 800 rpm ± 2 rpm	55 - 550 rpm ± 2 rpm	
	Control	PID regulation of speed via microprocessor feedback circuit		
	Bearing Housing	Double mechanical seal		
TEMPERATURE	Sensor	Platinum RTD in thermowell		
	Control	Microprocessor-based via PID control of tempered water, employing a pulse-width modulation of steam and cooling control valve		
	Range	5°C above coolant supply temperature to 85°C, ± 0.2°C. (See also sterilization, below)		
	Shift	1°C/minute in growth phase in a range from 23° C to 45°C ^①		
AIR FLOW	Inlet Filter	Sterilizable-in-place absolute 0.2 µ filter with 316 L stainless steel housing		
	Outlet Filter	Depth filter		
	Control	Choice of Thermal Mass Controller or Thermal Mass Flow Meter		
	Range	0 - 60 SLPM	0-90 SLPM	
PRESSURE	Manual back pressure control standard. Automatic back pressure control optional			
STERILIZATION	Automatic sterilization and cool down Selectable temperature from 105°C - 130°C with duration of 1 - 120 minutes			
COMMUNICATIONS PORT	RS 422 BioCommand port for automatic data logging and control			
WEIGHT	Net	630 lbs. (286 Kg)	670 lbs. (304 Kg)	880 lbs. (400 Kg)
	Gross	680 lbs. (309 Kg)	700 lbs. (318 Kg)	920 lbs. (418 Kg)
DIMENSIONS, OVERALL	Inches	34" Wide x 32" Deep x 70" High		
	cm	86.4 Wide x 81.3 Deep x 178 High		
ELECTRICAL	Recorder Output	0 - 1 V AC for logging pH, DO, temperature and agitation on optional recorder		
	Connections	Receptacle for optional nutrient pump, 120 V AC (2 Amps) or 220/230 V AC (1 Amp) Receptacle for optional harvest pump, 120 V AC (2 Amps) or 220/230 V AC (1 Amp)		
	Power	200 V / 208 V 50/60 Hz or 230 V 60 Hz AC, 1 Phase, 20 Amps Meets UL, CSA, VDE and British Standards		
UTILITIES	Requires appropriate utilities for steam, air, water, exhaust, water return and drain			

OPTIONAL ACCESSORIES

- Gas Overlay
- Exhaust Condenser, water-cooled installed in headplate to minimize evaporation of culture medium
- Resterilizable Quick Connect for inoculation/ addition, sampling and harvest valves
- Adaptable to Recirculation of Tempered Water with optional chiller to conserve water
- Aerosol Containment System to prevent aerosol formation when sampling
- Steam Generator for utility and clean steam
- 2-Gas Controller for oxygen supplementation and gas mixing
- Low-Shear Impellers, marine blade or pitched blade for insect cell culture
- Auxiliary Pump, assignable peristaltic pump
- Validation Documentation, IQ & OQ packages
- cGMP Validation, hardware upgrades
- Chart Recorder, 4 channel for data logging

* Specifications subject to change without notice.

① In the 120 L system, this is an optional feature.



New Brunswick Scientific Co., Inc.