

# 2010

CATALOG

Shakers,  
CO<sub>2</sub> Incubators,  
Freezers, Fermentors,  
Bioreactors and more



A CULTURE OF INNOVATION



**New Brunswick**  
an eppendorf company

# Expanding the Cell Culture Universe



## Galaxy CO<sub>2</sub> Incubators

Take your cell culture to the next level, with these advanced new CO<sub>2</sub> Incubators from New Brunswick. Now featuring:

- **Active Humidification Option** for microplate and low volume cell culture.
- **Cooling Option** for better performance and wider temperature range.
- **Redesigned Sealed Inner Glass Door** for improved recovery, uniformity, and reduced CO<sub>2</sub> consumption (170 liter models only).
- **Perforated Shelving** for faster humidification recovery and improved uniformity.
- **Standard RS-232 Port** for communication and external data logging.

Additionally we offer three ranges of O<sub>2</sub> control for specialized high and low oxygen applications; a high-temperature disinfection option for the utmost in contamination control; and the largest amount of usable chamber volume of any incubators in the market.

Learn more at [www.nbsc.com](http://www.nbsc.com)  
or see pages 38 – 43.

a culture of innovation



**New Brunswick**  
an eppendorf company

# A Quick Peek at What's New in 2010:

Welcome to New Brunswick Scientific's 2010 catalog, featuring a wealth of new products and a new format to make learning about our equipment faster and easier than ever before.

In addition to the widest range of biological shakers, the most sophisticated CO<sub>2</sub> incubators, and the most energy-efficient ULT freezers on the market, this year we're proud to introduce several new products for fermentation and cell culture:

#### **CelliGen™ BLU Single-Use, Benchtop Bioreactor:**

Offering all the cost- and time-saving benefits of a single-use system, with the advanced control, proven technology, and true scalability that only a stirred-tank design can provide. See pages 50 - 51.

#### **BioFlo®/CelliGen 115 Benchtop Fermentor/Bioreactor:**

This versatile, entry-level system takes the complexity out of equipment selection, set-up and operation. Its integrated control station enables operation as both a fermentor and bioreactor; and is capable of controlling up to three independent vessels simultaneously. See pages 55 - 61.

#### **BioFlo 610 Mobile Pilot-Plant Fermentor:**

Do you need a production unit, but lack the space or budget? This exceptionally capable fermentor is the system for you. See pages 75 - 76.

#### **BioCommand® SCADA Software:**

Three distinct software packages provide the tools needed for research, optimization and, if needed, the security and audit trails to meet your regulatory requirements. See page 85.

We are also pleased to announce that New Brunswick Scientific has attained the most current ISO certification, ISO 9001:2008. This latest version of the world's most widely used standard for quality management systems demonstrates our commitment to meet global best practices for quality and customer satisfaction.

From all of us at New Brunswick's offices worldwide, thank you for your continued loyalty. We appreciate the opportunity to serve you.

## A CULTURE OF INNOVATION



# Think Outside the Bag



## Introducing CelliGen™ BLU — Single-Use, Stirred-Tank Bioreactor

**This benchtop bioreactor combines all the convenience of single-use technology with the trusted performance, advanced process management and true scalability of a stirred-tank design.**

Offered with 5 liter and 14 liter single-use vessels, pre-sterilized and ready for use, out of the box.

Move over bags. The next big wave in single-use cell culture technology is here!



a culture of innovation

Learn more at [www.nbsc.com/BLU](http://www.nbsc.com/BLU)  
or see pages 50 – 51.



**New Brunswick**  
an eppendorf company

<b>Welcome to New Brunswick Scientific</b>	
New Product Highlights	3
<b>Biological Shakers &amp; Accessories</b>	
Shaker Feature Comparison	6 - 7
Shaker & Platform Capacity Chart	8
Accessories: Platforms, Clamps & Test Tube Racks	9 - 10
<b>Innova® Incubator Shakers</b>	
Innova 44 & 44R Stackable Shakers	11 - 12
Innova 43 & 43R Console Shakers	12 - 13
Innova 42 & 42R On/Under Bench or Stackable Shakers	13 - 14
Innova 40 & 40R Benchtop Shakers	14 - 15
<b>Innova® Water Bath Shaker</b>	
Innova 3100, High-Temperature Shaker	16 - 17
<b>Innova® Open Air Shakers</b>	
Innova 2000, 2100 & 2300 Series Benchtop Shakers	18 - 21
Innova 5000 Multi-Tier Shaker	21 - 22
Innova 5050/5051 Racking Systems	22
<b>I Series Incubator Shakers</b>	
I26 & I26R Stackable Shakers	23
<b>Excella® Incubator Shakers</b>	
E24 & E24R Benchtop Shakers	24
E25 & E25R Console Shakers	25
<b>Excella® Open Air Shakers</b>	
E10 Benchtop Shakers	25 - 26
E5 Benchtop Shakers	26 - 27
E1 & E2 Benchtop Shakers	27 - 28
<b>C-Line Water Bath Shaker</b>	
C76 High-Temperature Shaker	28 - 29
<b>Freezers, Ultra-Low Temperature (-86°C)</b>	
Five Considerations In Selecting a Freezer	30
About NBS Freezers	31
<b>Eco-Friendly Green Freezers</b>	
Innova U725-G & Premium U570-G Upright	31
<b>Innova® -86°C Freezers with Space-Saving Vacuum Insulation Panel Technology</b>	
Innova U101 Upright	32 - 33
Innova U360 Upright	33
Innova U535 & U725 Upright	34
Innova C585 & C760 Chest	34
<b>Premium -86°C Freezers with Traditional Urethane Foam Insulation</b>	
Premium U410 & U570 Upright	35
Premium C340 & C660 Chest	35
Accessories, All Freezer Models	35 - 37
<b>CO<sub>2</sub> Incubators - Direct Heat</b>	
About Galaxy® CO <sub>2</sub> Incubators	38
<b>Full-Sized CO<sub>2</sub> Incubators</b>	
Galaxy CO-170R & CO-170S	39
<b>Personal-Sized CO<sub>2</sub> Incubators</b>	
Galaxy CO-48R & CO-48S	40
<b>Micro-Sized CO<sub>2</sub> Incubator</b>	
Galaxy CO-14S	41
Incubator Options & Accessories	42 - 43

<b>General Laboratory Equipment</b>	
<b>Data Logging Software</b>	
BioCommand® SFI for Shakers, Freezers, Incubators	44
<b>Tissue/Microbial Culture Roller Drums</b>	
TC-7 & TC-8 Roller Drums	44
<b>Automated Media Preparation</b>	
<b>Media Sterilizer</b>	
MM9 MediaMatic®	45
<b>Plate Pouring System/Dish Filler</b>	
MP-1000 PourMatic®	46
<b>Bioprocess Equipment</b>	
Fermentor/Bioreactor Selector Chart	47
FibraCel® Disk Solid-Support Growth Matrix	48
<b>Single-Use Cell Culture Systems</b>	
FibraStage, 500 mL	49
CelliGen® BLU, Stirred-Tank Bioreactor, 5.0 & 14.0 L	50 - 51
Impellers, Which is Best for Your Cell Line	52 - 53
RPC Reactor Process Controller	54
<b>Autoclavable Benchtop Fermentors &amp; Bioreactors</b>	
BioFlo® 115/CelliGen® Fermentor/Bioreactor, 1.3 - 14.0 L	55 - 60
BioFlo® 110 Replacement Parts	61
BioFlo® 310 Fermentor, 2.5 - 14.0 L	62 - 65
CelliGen® 310 Bioreactor, 2.5 - 14.0 L	66 - 70
<b>SIP Fermentors and Bioreactors</b>	
BioFlo® 415 Fermentor, 7.0 - 19.5 L	71 - 72
BioFlo®/CelliGen® 510 Culture Systems, 19.5 & 40.0 L	73 - 74
BioFlo® 610 Mobile Pilot Plant Fermentor, 65 - 125 L	75 - 76
BioFlo® Pro Fermentor & CelliGen® Pro Bioreactor, 75 - 3000 L	77 - 79
<b>Accessories and Services for Fermentors/Bioreactors</b>	
Pumps, Connectors, Tubing & More	80 - 81
NucleoCounter® Mammalian Cell Counter	82
NucleoCounter® YC-100 Yeast Cell Counter	82
Recirculating Mobile Chiller	83
General Purpose Controller	83
Interface Kit for RS-232 Device	84
EX-2000 Off-Gas Oxygen/Carbon Dioxide Monitor	84
BioCommand® Bioprocessing Software	85
Contract Laboratory Services & Training	86
Probes	87 - 92
<b>Centrifugation Equipment</b>	
CEPA High-Speed Centrifuges	93 - 94
<b>Additional Information</b>	
Ordering Information	95
Warranty Information	96
NBS Equipment Service Plans	97 - 98
Index by Catalog Number	99 - 103

## SHAKER FEATURE COMPARISON

## Selecting the Right Model Shaker

New Brunswick Scientific is the leading supplier of biological shakers, with over two dozen models offered to suit a wide variety of applications and budgets.












**Advanced Innova® & I26 Shakers** feature the NBS heavy-duty, Triple-Eccentric Drive, providing uniform motion and superb reliability. These models handle heavier workloads than competitive lines and feature a broader temperature range and provide better control. For labs short on space, we offer several space-saving stackable models. Many Innova incubator shakers also provide advanced capabilities such as gassing, humidity monitoring and the ability to automate multiple setpoint changes on a timed basis.

**Economical Excella® Shakers** feature microprocessor controls and heavy-duty counterbalanced drives for accurate control and dependable operation.

**For High-Temperature Water Bath Applications**, Innova 3100 and C76 shakers are offered.

**Interchangeable Universal Platforms** (sold separately) accommodate a mix of different glassware sizes on a single platform, providing maximum versatility. Clamps, test tube racks, Sticky Pads and other accessories are sold separately. If using a single flask size only, our **Dedicated Platforms** include clamps pre-installed, and maximize platform capacity (see page 8-9).


**NEW for most models, BioCommand® SFI** enables automated data logging for most incubated shakers (see page 44).

	Platform Size	Max 250 mL Flasks (Universal Platform)	Largest Flask Size	Orbit Diameter	Temperature Range °C (a = ambient)	RPM Range	Type of Shaker	Refrigeration	Multi-Step Programming	Photosynthetic Lights	Gassing Manifold	UV Germicidal Lamp	Humidity Monitor	Page	
<b>Innova 2000</b>	13 x 11 in 33 x 27.9 cm	6	500mL	0.75 in 1.9 cm		25 to 500	Benchtop Open Air							18	
<b>Innova 2050</b>	16 x 12 in 40.6 x 30.5 cm	10	500mL	0.75 in 1.9 cm		25 to 500	Benchtop Open Air							18	
<b>Innova 2100</b>	18 x 18 in 45.7 x 45.7 cm	18	6L	0.75 in 1.9 cm		25 to 500	Benchtop Open Air							18	
<b>Innova 2150</b>	24 x 18 in 61 x 45.7 cm	24	6L	0.75 in 1.9 cm		25 to 500	Benchtop Open Air							18	
<b>Innova 2300</b>	30 x 18 in 76.2 x 45.7 cm	30	6L	1.0, 2.0 in 2.5, 5.1 cm		25 to 500	Benchtop Open Air							18	
<b>Innova 2350</b>	36 x 24 in 91.4 x 61 cm	50	6L	1.0, 2.0 in 2.5, 5.1 cm		25 to 500	Benchtop Open Air							18	
<b>Innova 3100</b>	12 x 16.5 in 30.5 x 41.9 cm	8	2L	0.5 in 1.3 cm	a+5 to 100	25 to 400	Water Bath							16	
<b>Innova 40</b>	18 x 18 in 45.7 x 45.7 cm	18	3L	0.75, 1.0 in 1.9, 2.5 cm	a+5 to 80	25 to 500	Benchtop Incubated	●						15	
<b>Innova 40R</b>	18 x 18 in 45.7 x 45.7 cm	18	3L	0.75, 1.0 in 1.9, 2.5 cm	a-15 to 80	25 to 500	Benchtop Incubated	●	●					15	
<b>Innova 42</b>	18 x 18 in 45.7 x 45.7 cm	18	6L	0.75, 1.0 in 1.9, 2.5 cm	a+5 to 80	25 to 400	On/Under Bench Floor Stackable Incubated	●		○				13	
<b>Innova 42R</b>	18 x 18 in 45.7 x 45.7 cm	18	6L	0.75, 1.0 in 1.9, 2.5 cm	a-20 to 80	25 to 400	On/Under Bench Floor Stackable Incubated	●	●	○	○	○		13	

Photos shown are not to scale.

● = Standard ○ = Optional

Technical specifications are subject to change without notice.

	Platform Size	Max 250 ml Flasks (Universal Platform)	Largest Flask Size	Orbit Diameter	Temperature Range °C (a = ambient)	RPM Range	Type of Shaker	Refrigeration	Multi-Step Programming	Photosynthetic Lights	Gassing Manifold	UV Germicidal Lamp	Humidity Monitor	Page	
<b>Innova 43</b>	30 x 18 in 76.2 x 45.7 cm	30	6L	1.0, 2.0 in 2.5, 5.1 cm	a+5 to 80	25 to 500	Console Incubated	●	○	○				12	
<b>Innova 43R</b>	30 x 18 in 76.2 x 45.7 cm	30	6L	1.0, 2.0 in 2.5, 5.1 cm	a-20 to 80	25 to 500	Console Incubated	●	●	○	○	○	○	12	
<b>Innova 44</b>	30 x 18 in 76.2 x 45.7 cm	30	5L	1.0, 2.0 in 2.5, 5.1 cm	a+5 to 80	25 to 400	Floor Stackable Incubated	●		○		○		11	
<b>Innova 44R</b>	30 x 18 in 76.2 x 45.7 cm	30	5L	1.0, 2.0 in 2.5, 5.1 cm	a-20 to 80	25 to 400	Floor Stackable Incubated	●	●	○	○	○	○	11	
<b>I26</b>	30 x 18 in 76.2 x 45.7 cm	30	2.8L	1.0 in 2.5 cm	a+5 to 60	25 to 400	Floor Stackable Incubated							23	
<b>I26R</b>	30 x 18 in 76.2 x 45.7 cm	30	2.8L	1.0 in 2.5 cm	a-15 to 60	25 to 400	Floor Stackable Incubated	●						23	
<b>Innova 5000</b>	6 Platforms: 32.5 x 26.8 in 82.6 x 68.1 cm	252	6L	2.0 in 5.1 cm		25 to 350	Three Tiers Large Scale Incubated							21	
<b>Excella E24</b>	18 x 18 in 45.7 x 45.7 cm	18	2L	0.75 in 1.9 cm	a+7 to 60	50 to 400	Benchtop Incubated							24	
<b>Excella E24R</b>	18 x 18 in 45.7 x 45.7 cm	18	2L	0.75 in 1.9 cm	a-15 to 60	50 to 400	Benchtop Incubated	●						24	
<b>Excella E25</b>	30 x 18 in 76.2 x 45.7 cm	30	6L	1.0 in 2.5 cm	a+7 to 60	50 to 400	Console Incubated							25	
<b>Excella E25R</b>	30 x 18 in 76.2 x 45.7 cm	30	6L	1.0 in 2.5 cm	a-15 to 60	50 to 400	Console Incubated	●						25	
<b>Excella E1</b>	13 x 11 in 33 x 27.9 cm	6	500mL	0.75 in 1.9 cm		50 to 400	Benchtop Open Air (Analog)							27	
<b>Excella E2</b>	13 x 11 in 33 x 27.9 cm	6	500mL	0.75 in 1.9 cm		50 to 400	Benchtop Open Air							27	
<b>Excella E5</b>	18 x 18 in 45.7 x 45.7 cm	18	6L	0.75 in 1.9 cm		50 to 400	Benchtop Open Air							26	
<b>Excella E10</b>	30 x 18 in 76.2 x 45.7 cm	30	6L	1.0 in 2.5 cm		50 to 400	Benchtop Open Air							26	
<b>C76</b>	12 x 16.5 in 30.5 x 41.9 cm	8	2L	0.5 in 1.3 cm	a+7 to 80	50 to 300	Water Bath							28	

● = Standard ○ = Optional

## SHAKER &amp; PLATFORM CAPACITY CHART

## Universal &amp; Dedicated Platforms

Each NBS shaker accepts a wide variety of interchangeable platforms.

**Universal Platforms (U)** have multiple holes enabling you to mount an assortment of flask clamps or other accessories on a single platform. The capacities shown below represent the maximum number of flasks in a given size that will fit on the platform in a balanced pattern. Universal Platform, clamps & accessories are sold separately.

For platform catalog numbers, see the corresponding shaker page. Clamps and test tube (TT) racks are shown on page 10.

**Dedicated Platforms (D)** – When just one size flask will be used on the shaker, (i.e., 250 mL flasks), Dedicated Platforms (D) come with flask clamps already mounted. Dedicated Platforms generally will hold a greater number of flasks than the Universal Platform, but do not offer the versatility.

Shaker Model, Platform Dimensions & Maximum Capacity																				
Innova Models	2000		2050		2100 40/40R 42/42R		2150		43/43R 2300		2350		3100		44/44R		5000 (Per platform - Max. 6 per shaker)			
Excella Models	E1/E2				E5/E24/ E24R				E10/E25/ E25R											
I26 & C76 Models													C76						I26	
Platform (in & cm)	13" x 11" 33 x 28 cm		16" x 12" 41 x 31 cm		18" x 18" 46 x 46 cm		24" x 18" 61 x 46 cm		30" x 18" 76 x 46 cm		36" x 24" 91 x 61 cm		12" x 16.5" 31 x 42 cm		30" x 18" 76 x 46 cm		32.5" x 26.7" 83 x 68 cm		30" x 18" 76 x 46 cm	
Ded Plat. (D) Univ Plat. (U)	D	U	D	U	D	U	D	U	D	U	D	U	D	U	D	U	D	U	D	U
10 mL	60	60	86	86	–	109	–	–	–	183	–	–	–	59	–	187	300	264	–	187
25 mL	32	20	48	32	–	64	–	–	–	92	–	–	–	35	–	93	248	143	–	93
50 mL	20	15	35	32	64	45	80	63	108	92	–	–	31	18	–	91	161	143	–	93
125 mL	12	11	20	16	34	21	48	35	60	39	96	75	22	18	60	39	99	72	60	39
250 mL	8	6	12	10	25	18	35	24	40	30	70	50	13	8	40	30	64	42	40	30
500 mL	6	4	8	8	16	14	20	20	24	18	40	30	8	6	24	24	42	33	24	24
1 L	–	–	6	–	9	8	12	12	15	12	24	24	6	4	15	14	23	17	15	12
2 L	–	–	3	–	5	5	8	6	12	8	15	15	2	2	12	8	14 <sup>§</sup>	12 <sup>§</sup>	12	8
2.8 L	–	–	–	–	4	4	5	5	6	6	12	12	–	–	6 <sup>Δ</sup>	6 <sup>Δ</sup>	9 <sup>§</sup>	8 <sup>§</sup>	6	6
4 L	–	–	–	–	4*	4*	4	5	6	6	12	10	–	–	6 <sup>Δ</sup>	6 <sup>Δ</sup>	9	8	–	–
5 L	–	–	–	–	4	4*	–	4	–	6 <sup>Δ</sup>	–	10	–	–	–	6 <sup>Δ^</sup>	–	6 <sup>ΔΔ</sup>	–	–
6 L	–	–	–	–	2*	2*	4	3	4 <sup>Δ</sup>	4 <sup>Δ</sup>	6	8	–	–	–	–	8 <sup>ΔΔ</sup>	6 <sup>ΔΔ</sup>	–	–
Large TT Rack	–	–	–	–	–	4	–	6	–	7	–	12	–	–	–	7	–	10	–	7
Medium TT Rack	–	–	–	3	–	5	–	7	–	9	–	13	–	3	–	9	–	10	–	9
Small TT Rack	–	3	–	4	–	5	–	8	–	9	–	18	–	4	–	9	–	16	–	9
Microplate Rack (stack)	–	3	–	6	–	8	–	12	–	16	–	27	–	6	–	16	–	24	–	16
Microplate Rack (1 layer)	–	–	–	–	–	2	–	3	–	4	–	8	–	–	–	4	–	6	–	4

(\*) Innova 42/42R, Innova 2100 and Excella E5 only. (Δ) Maximum flask size when using Photosynthetic Light Bank is 4 Liters.

(^) Using Sticky Tape - less capacity with clamps. (§) Only half of bottom tier can be used. (ΔΔ) For use on top tier only.

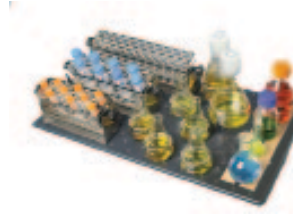
## ACCESSORIES: CLAMPS &amp; TEST TUBE RACKS

## Shaker Platforms & Clamps

Shakers are sold separately from platforms and accessories to provide the flexibility to select the platform(s) best suited to your application.

### Universal Platforms

Universal Platforms accommodate a mix of different size glassware on a single platform. Flask clamps, test tube and microplate racks sold separately.



Universal Platform shown with clamps, test tube racks and Sticky Tape

### Sticky Tape/ Sticky Pad

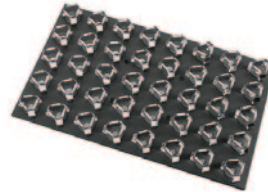
Sticky Tape and Sticky Pad can be used instead of clamps for low-speed applications.



Sticky Pad

### Dedicated Platforms

If using a single flask size only, our Dedicated Platforms include clamps already installed, and maximize platform capacity.



Dedicated Platform

### Utility Trays

Utility Trays provide a non-slip surface for low-speed applications.



Utility Tray

### Utility Carriers

Utility Carriers secure vessels between adjustable, cushioned rods.

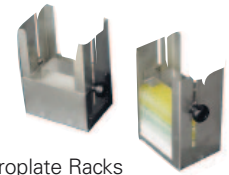


Utility Carrier

## ACCESSORIES: CLAMPS &amp; TEST TUBE RACKS

Flask Clamps<sup>††</sup>

Flask clamps are of a single piece stainless-steel construction (not spot welded or riveted) for added strength and safety. Clamps 2L and above come with an extra girdle for added security when agitating flasks at high speeds. Includes mounting screws.



Microplate Racks

Catalog No.	Description
ACE-10S	10 mL Erlenmeyer Clamp
M1190-9004	25 mL Erlenmeyer Clamp
M1190-9000	50 mL Erlenmeyer Clamp with spring retainer
M1190-9001	125 mL Erlenmeyer Clamp with spring retainer
M1190-9002	250 mL Erlenmeyer Clamp with spring retainer
M1190-9003	500 mL Erlenmeyer Clamp with spring retainer
ACE-1000S	1 L Erlenmeyer Clamp with spring retainer
ACE-2000S	2 L Erlenmeyer Clamp with spring retainer
M1190-9005***	2 L Lauber Clamp with spring retainer
ACFE-2800S	2.8 L Fernbach Clamp with spring retainer
ACE-3000S	3 L Erlenmeyer Clamp with spring retainer
ACE-4000S	4 L Erlenmeyer Clamp with spring retainer
ACE-5000S	5 L Erlenmeyer Clamp with spring retainer
ACE-6000S	6 L Erlenmeyer Clamp with spring retainer
ACSB-500S	500 mL Media Bottle Clamp with spring retainer
ACSB-1000S	1 L Media Bottle Clamp with spring retainer
TTR-210	Angled Tube Rack Holder for user-supplied test tube racks
TTR-215	Spacer Bar for TTR-210
M1289-0700	Microplate rack, stack 3 deep well or 9 standard plates, see photo above
TTR-221	Microplate rack, for single layer of 5 plates
M1250-9600 <sup>ⓐ</sup>	Sticky Tape, 16.4" x 1.5" (500 x 3.8 cm)
M1250-9700**	Sticky Pad, 8" x 8" (20 x 20 cm)
M1250-9504 <sup>3</sup>	Sticky Pad Adapter Kit
S2116-3051P	Spare Flat Phillips Head Screws, 10–24 x 5/16, Pack of 25, for aluminum & phenolic platforms
S2116-3101P	Spare Flat Phillips Head Screws, 10–24 x 5/8, Pack of 25, for model 2350 (plywood) platform only

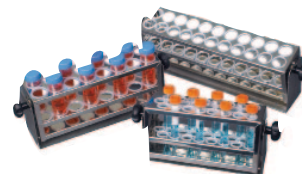
(††) Flask clamps are stainless steel, come complete with required screws, and are fitted with coiled wire springs for added stability at elevated speeds.

(ⓐ) Replaces the need for clamps when shaking at speeds up to 250 rpm. Not for use with water bath shakers, or at speeds above 250 rpm. (\*\*) Sticky Pad should be used on an anodized aluminum substrate. Select from M1250-9504, M1250-9903, M1250-9904 or M1282-9913. (\*\*\*) Fits 2L Thomson flask with our universal platform.

(3) Two anodized aluminum sheets each 6" x 18" (15.2 x 45.7 cm). Used with Sticky Pad on aluminum Universal Platforms.

## Test Tube Racks

Test Tube Racks have an adjustable angle and tube height support. Made from stainless-steel with inserts to help retain tubes and prevent them from spinning in the rack. Finger-tight knobs let you quickly adjust angle, or release the rack from the base plate, for easy transport to the bench.



Large Racks			Medium Racks			Small Racks		
Part number	Diameter	Tubes/Rack	Part number	Diameter	Tubes/Rack	Part number	Diameter	Tubes/Rack
M1289-0100	8 - 11 mm	80	M1289-0010	8 - 11 mm	60	M1289-0001	8 - 11 mm	48
M1289-0200	12 - 15 mm	60	M1289-0020	12 - 15 mm	44	M1289-0002	12 - 15 mm	34
M1289-0300	15 - 18 mm	42	M1289-0030	15 - 18 mm	31	M1289-0003	15 - 18 mm	24
M1289-0400	18 - 21 mm	30	M1289-0040	18 - 21 mm	23	M1289-0004	18 - 21 mm	18
M1289-0500	22 - 26 mm	22	M1289-0050	22 - 26 mm	16	M1289-0005	22 - 26 mm	13
M1289-0600	26 - 30 mm	20	M1289-0060	26 - 30 mm	16	M1289-0006	26 - 30 mm	12

INNOVA® INCUBATOR SHAKERS

### Innova® 44 Stackable Incubator Shakers & 44R with Added Refrigeration – Programmable

Space-saving Innova 44 incubator shakers stack up to three high and have front door that glides up to further minimize space requirements.

**Programmable controller:** provides “set it and forget it” convenience. Automatically changes temperature, speed, optional photosynthetic and UV germicidal lights at timed intervals.

**Slide-out platform †:** 30” x 18” (76 x 46 cm). (Platform sold separately.)

**Temperature range\*\*:** Innova 44: 5°C above ambient to 80°C; Innova 44R: 20°C below ambient to 80°C (minimum 4°C).

**Speed (rpm) ∅:** 25 - 400 with 1” (2.5 cm) orbit; 25 - 300 with 2” (5.1 cm) orbit or when stacking two units; 25 - 250 when stacking three units.

**Overall dimensions:** 53” W x 34.4” D x 26” H (135 x 87.3 x 66 cm). Height: add 26” (66 cm) for each added unit; door open adds 21” (53 cm).

**Net weight:** Innova 44: 523 lbs. (238 kg); Innova 44R: 566 lbs. (257 kg).



Three shakers shown  
Slide-out platform provides easy access to all flasks

Model	Catalog No. 1” (2.5 cm) Orbit	Catalog No. 2” (5.1 cm) Orbit	Electrical Service
<b>44 Incubated</b>	M1282-0000	M1282-0010	120V, 60Hz
	M1282-0001	M1282-0011	100V, 60Hz
	M1282-0002	M1282-0012	230V, 50Hz
	M1282-0003	M1282-0013	100V, 50Hz
<b>44R Incubated/ Refrigerated</b>	M1282-0004	M1282-0014	120V, 60Hz
	M1282-0005	M1282-0015	100V, 60Hz
	M1282-0006 ‡	M1282-0016	230V, 50Hz
	M1282-0007 ‡	M1282-0017	100V, 50Hz

(†) Shaker does not include platform which must be ordered separately. (\*\*) Maximum temp. is 60°C when using optional RH humidity probe and 55°C above ambient without RH probe. (∅) Less with baffled flasks. (‡) Refrigerated 50 Hz units temperature range: ambient -17°C to 80°C.

### Innova® 44/44R Interchangeable Platforms, Slide-Out

30” x 18” (76 x 46 cm) Aluminum unless otherwise stated below. (Not interchangeable with other 30” x 18” platforms)

Catalog No.	Description	Clamps 1 Shaker	Clamps 2 Shakers	Clamps 3 Shakers
M1282-9904 *	Universal Platform, (can be used with Sticky Pad/Tape)	—	—	—
M1282-9915 * †	Universal Platform, 3/8” Aluminum Plate	—	—	—
M1282-9905	125 mL Erlenmeyer Flask Dedicated Platform	60	120	180
M1282-9906	250 mL Erlenmeyer Flask Dedicated Platform	40	80	120
M1282-9907	500 mL Erlenmeyer Flask Dedicated Platform	24	48	72
M1282-9908	1 L Erlenmeyer Flask Dedicated Platform	15	30	45
M1282-9925 †	1 L Dedicated Platform, 3/8” Aluminum Plate	15	30	45
M1282-9909	2 L Erlenmeyer Flask Dedicated Platform	12	24	36
M1282-9926 †	2 L Dedicated Platform, 3/8” Aluminum Plate	12	24	36
M1282-9910	2.8 L Fernbach Flask Dedicated Platform	6	12	18
M1282-9927 †	2.8 L Dedicated Platform, 3/8” Aluminum Plate	6	12	18
M1282-9911	4 L Erlenmeyer Flask Dedicated Platform	6	12	18
M1282-9928 †	4 L Dedicated Platform, 3/8” Aluminum Plate	6	12	18
M1282-9913 ^	Sticky Pad Platform	—	—	—

(\*) Flask clamps, test tubes and Sticky Tape for Universal Platforms must be ordered separately. See pages 8 & 10. (^) Sticky Pad sold separately. See page 10.  
(†) Recommended for use with a full load of flasks, 1 liter or larger, containing more than 20% volume and/or baffles.

## INNOVA® INCUBATOR SHAKERS

### Innova® 44/44R Optional Accessories

(Not interchangeable with Innova 4400 Series Accessories)

Catalog No.	Description
	<b>Base: Raises shaker height for easier access to chamber &amp; controls.</b>
M1282-0600	Short Base to raise shakers by 4" (10.2 cm). For use with up to three stacked units
M1282-0800	Medium Base to raise shakers by 12" (30.5 cm). For use with up to two stacked units
M1282-0700	Tall Base to raise shakers by 16" (40.6 cm). For use with a single unit
	<b>Stacking Kit: Bolts shakers together for stability when stacking two or more units. One needed for two shakers. Two needed for three shakers.</b>
M1282-0500	Stacking Kit to join two Innova 44/44R Shakers
M1282-0501	Stacking Kit to join Innova 44/44R with Innova 4400. (44 shakers must be installed below 4400).
	<b>Other Options:</b>
M1282-9922	Photosynthetic Light Bank for Model 44R only, factory installed
M1282-0291	12-Port Gassing Manifold for direct gassing into flasks, factory installed
M1282-5011	Humidity Monitor, factory installed
M1282-9921	UV Germicidal Lamp for Model 44R only, factory installed
M1282-8038	Remote Alarm, factory installed
M1282-6000	Spare Parts Kit (refer to page 95 for details)

### Innova® 43 Console Incubator Shakers & 43R with Added Refrigeration – Programmable

Large-capacity Innova 43 Incubator Shakers accommodate numerous culture flasks up to 6 liters.<sup>‡</sup> Easy-open lid and foot pedal release provide hands-free operation.

**Programmable controller:** provides "set it and forget it" convenience. Automatically changes temperature, speed, optional photosynthetic and UV germicidal lights at timed intervals.

**Temperature range<sup>^</sup>:** Model 43: 5°C above ambient to 80°C; Model 43R: from 20°C below ambient to 80°C (minimum setpoint 4°C).

**Speed<sup>o</sup>:** 25 - 500 in models with 1" orbit; 25 - 300 rpm with 2" orbit.

**Platform<sup>†</sup>:** 30" x 18" (76 x 46 cm). (Platform sold separately.)

**Overall dimensions:** 45.5" W x 32" D x 40.6" H (115.6 x 81.3 x 103.1 cm). With door open, height is 63 1/2" (161 cm).

**Net weight:** Innova 43 - 420 lbs. (191 kg); Innova 43R - 475 lbs. (204 kg).



Model	Catalog No. 1" (2.5 cm) Orbit	Catalog No. 2" (5.1 cm) Orbit	Electrical Service
<b>43 Incubated</b>	M1320-0000	M1320-0010	120V, 60Hz
	M1320-0001	M1320-0011	100V, 60Hz
	M1320-0002	M1320-0012	230V, 50Hz
	M1320-0003	M1320-0013	100V, 50Hz
<b>43R Incubated/ Refrigerated</b>	M1320-0004	M1320-0014	120V, 60Hz
	M1320-0005	M1320-0015	100V, 60Hz
	M1320-0006 <sup>^</sup>	M1320-0016	230V, 50Hz
	M1320-0007 <sup>^</sup>	M1320-0017	100V, 50Hz

(†) Shaker does not include 30" x 18" platforms which must be ordered separately. See next page. (‡) With Photosynthetic lights, maximum flask size is 4 liters.

(o) Baffled flasks will significantly reduce maximum speed. (^) Temperature range is Ambient -17°C to 80°C for refrigerated 50 Hz units.

## Innova® 43 & 43R Interchangeable Platforms

30" x 18" (76 x 46 cm) Aluminum

Catalog No.	Description	Clamps
M1250-9920*	Universal Platform	—
M1243-2500	Microplate Platform. Holds 105 standard or 21 deep well plates	—
AG-00	Utility Tray with non-skid surface	—
M1191-9908	50 mL Erlenmeyer Flask Dedicated Platform	108
M1191-9909	125 mL Erlenmeyer Flask Dedicated Platform	60
M1191-9910	250 mL Erlenmeyer Flask Dedicated Platform	40
M1191-9911	500 mL Erlenmeyer Flask Dedicated Platform	24
AG-1	1 L Erlenmeyer Flask Dedicated Platform	15
AG-2	2 L Erlenmeyer Flask Dedicated Platform	12
AG-28	2.8 L Fernbach Flask Dedicated Platform	6
AG-4	4 L Erlenmeyer Flask Dedicated Platform	6
AG-6 <sup>1</sup>	6 L Erlenmeyer Flask Dedicated Platform	4
M1250-9904 <sup>2</sup>	Platform for Sticky Pad	—

(\*) Flask clamps and test tube racks for Universal Platform must be ordered separately. See pages 8 & 10. (1) AG-6 Platform cannot be used with photosynthetic light bank.  
(2) Sticky Pad ordered separately. See page 10.

## Innova® 43 & 43R Accessories

Catalog No.	Description
M1320-0500	12-Port Gas Manifold for direct gassing into flasks, factory installed
M1320-0300	Photosynthetic Light Bank for Model 43R only, factory installed
M1320-0400	UV Germicidal Lamp for Model 43R only, factory installed
M1320-0600	Humidity Monitor, factory installed
M1320-8029	Remote Alarm, factory installed
M1320-0700	Utility Basket for incubating/refrigerating stationary glassware
M1282-6000	Spare Parts Kit includes drive belt and fuses
M1320-6000	Spare Parts Kit includes drive belt, fuses, chamber bulbs and hinge assemblies

## Innova® 42 Stackable, On-or-Under-Bench Incubator Shakers & 42R with Added Refrigeration – Programmable

Our most versatile incubator shakers, programmable 42 & 42R provide exceptional convenience. Use on or under the bench, or double stacked for space savings. Optional culture drawer and humidity probe are available for both the 42 and 42R. Optional photosynthetic and UV germicidal lights are available for the 42R only.

**Programmable controller:** provides “set it and forget it” convenience. Automatically changes temperature, speed, optional photosynthetic and UV germicidal lights at timed intervals.

**Temperature range:** Innova 42: 5°C above ambient to 80°C; Innova 42R: 20°C below ambient to 80°C (minimum 4°C).

**Speed** <sup>⚡</sup>: 25 - 400 rpm.

**Platform** <sup>†</sup>: 18" x 18" (46 x 46 cm) accommodates flasks up to 4 liters. (Platform sold separately.)

**Overall dimensions:** 25" W x 29.7" D x 32.2" H (62 x 75.4 x 82 cm).

**Height stacked** <sup>§</sup>: 64.5" (164 cm). Depth with door open: 51.5" (130.8 cm).

**Net weight:** Innova 42: 217 lbs. (98.5 kg); Innova 42R: 267 lbs. (121 kg).

(†) Shaker does not include 18" x 18" platforms which must be ordered separately. (§) Stacking kit required when stacking 2 units. See accessories on next page.  
(⚡) Baffled flasks will reduce maximum speed. When stacked, maximum speed is 400 rpm with 250/500 mL flasks; maximum 300 rpm or lower with larger flasks.



Shown stacked two units high  
Stationary shelf and internal power receptacle are standard

## INNOVA® INCUBATOR SHAKERS

Model	Catalog No. 3/4" (1.9 cm) Orbit	Catalog No. 1" (2.5 cm) Orbit	Electrical Service
<b>42 Incubated</b>	M1335-0000	M1335-0010	120V, 60 Hz
	M1335-0002	M1335-0012	230V, 50 Hz
	M1335-0001	M1335-0011	100V, 60 Hz
	M1335-0003	M1335-0013	100V, 50 Hz
<b>42R Incubated/ Refrigerated</b>	M1335-0004	M1335-0014	120V, 60 Hz
	M1335-0006	M1335-0016	230V, 50 Hz
	M1335-0005	M1335-0015	100V, 60 Hz
	M1335-0007	M1335-0017	100V, 50 Hz

(†) Shaker does not include 18" x 18" platforms which must be ordered separately.

## Innova® 40 &amp; 40R / 42 &amp; 42R / 4000 &amp; 4080 / 4200 &amp; 4230 Interchangeable Platforms

18" x 18" (46 x 46 cm) Phenolic Resin unless otherwise stated

Catalog No.	Description	Clamps
M1250-9902*	Universal Platform, Aluminum	—
M1250-9906	Drip Pan for Universal Platform M1250-9902	—
M1194-9909	Utility Carrier holds glassware between rubber-cushioned cross bars	—
M1194-9923	Rod Kit for Utility Carrier (one additional rod)	—
M1194-9910	Utility Tray with non-skid surface	—
M1194-9903	50 mL Erlenmeyer Flask Dedicated Platform, Phenolic Resin	64
M1194-9904	125 mL Erlenmeyer Flask Dedicated Platform, Phenolic Resin	34
M1194-9905	250 mL Erlenmeyer Flask Dedicated Platform, Phenolic Resin	25
M1194-9906	500 mL Erlenmeyer Flask Dedicated Platform	16
M1194-9907	1 L Erlenmeyer Flask Dedicated Platform	9
M1194-9908	2 L Erlenmeyer Flask Dedicated Platform	5
M1233-9932	2.8 L Fernback Flask Dedicated Platform	4
M1233-9930 <sup>†</sup>	4 L Erlenmeyer Flask Dedicated Platform	4
M1250-9903 <sup>1</sup>	Sticky Pad Platform	—
M1192-9901 <sup>2</sup>	Quick-Change Platform Kit	—

(\*) Flask clamps for Universal Platform must be ordered separately. See page 8 & 10. (†) Available for models 42/42R and 4200/4230 only.

(1) Sticky Pad sold separately, see page 10. (2) Maximum speed 400 rpm.

## Innova® 42 &amp; 42R Optional Accessories

Catalog No.	Description
M1335-0300	Photosynthetic Light Bank for Model 42R only, factory installed
M1335-0500	Humidity Monitor, factory installed
M1335-0400	UV Germicidal Light for Model 42R only, factory installed
M1335-0501	Culture Drawer, prevents plates from drying
M1335-0800	Stacking Kit, required when stacking 42/42R units (See also M1335-0810 below)
M1335-0810	Stacking Kit, to stack Innova 42/42R units on Innova 4200/4230 shakers
M1335-0600	12-Port Gassing Manifold for direct gassing into flasks, factory installed
M1335-0080	Additional Shelf & Brackets
M1320-8029	Remote Alarm, factory installed
M1335-6000 <sup>††</sup>	Spare Parts Kit, all voltages

(††) Refer to page 95 for details of Spare Parts Kits.

## Innova® 40 Benchtop Incubator Shakers & 40R with Added Refrigeration – Programmable

Innova 40 incubator shakers provide very broad temperature capabilities for culturing a wide variety of organisms in flasks up to 3 liters. Refrigeration module is built into the Innova 40R, or can be easily added to Model 40, at any time.

**Temperature range:** Innova 40: 5°C above ambient to 80°C. Innova 40R: 15°C below ambient to 80°C (minimum 4°C).

**Speed** <sup>Ⓛ</sup>: 25 - 500 with choice of 3/4" or 1" orbit (1.9 or 2.5 cm). Programming capability automatically changes temperature and speed at timed intervals.

**Platform** <sup>†</sup>: 18" x 18" (46 x 46 cm), sold separately.

**Overall dimensions:** 22" W x 30" D x 24" H (55.88 x 76.2 x 61 cm). With lid open, height is 40" (102 cm).

**Net weight:** Innova 40: 133 lbs. (60.3 kg); Innova 40R: 175 lbs. (79.4 kg).



Model	Catalog No. 3/4" (1.9 cm) Orbit	Catalog No. 1" (2.5 cm) Orbit	Electrical Service
<b>40 Incubated</b>	M1299-0080	M1299-0090	120V, 60Hz
	M1299-0081	M1299-0091	100V, 60Hz
	M1299-0082	M1299-0092	230V, 50Hz
	M1299-0083	M1299-0093	100V, 50Hz
<b>40R Incubated/ Refrigerated</b>	M1299-0084	M1299-0094	120V, 60Hz
	M1299-0085	M1299-0095	100V, 60Hz
	M1299-0086	M1299-0096	230V, 50Hz
	M1299-0087	M1299-0097	100V, 50Hz

(†) Shaker does not include 18" x 18" platforms which must be ordered separately. (Ⓛ) Baffled flasks will significantly reduce maximum speed.

### Innova® 40 & 40R Interchangeable Platforms – see page 14

### Innova® 40 & 40R / 4000 & 4080 Options

Catalog No.	Description
M1299-0061	Refrigeration Module to upgrade Innova 40 to Innova 40R
M1320-8029	Remote Alarm, factory installed only
M1299-6000 <sup>††</sup>	Spare Parts Kit - Innova 40 & 40R, (120V, 50/60 Hz)
M1192-6002 <sup>††</sup>	Spare Parts Kit - Innova 4000 & 4080, (120V, 50/60 Hz)

(††) Refer to page 95 for details of Spare Parts Kits.

## INNOVA® INCUBATOR SHAKERS / WATER BATH SHAKERS

### Innova® 3100 High-Temperature Water Bath Shakers

Large-capacity orbital shakers with microprocessor control of speed and temperature. One-piece stainless steel bath. Adjustable water-level control automatically replenishes evaporated water. Has drain, water-in and overflow lines.

**Speed:** 25 - 400 rpm (less for baffled flasks).

**Orbit:** 1/2" (1.3 cm).

**Temperature range<sup>§</sup>:** 5°C above ambient to 100°C.

**Platform<sup>†</sup>:** 12" x 16.5" (30.5 x 42 cm), sold separately.

**Overall dimensions:** 17" W x 27.5" D x 14.5" H (43 x 70 x 37 cm).

**Net weight:** 115 lbs. (63 kg).



For flasks and gel trays

Model	Catalog No. 1/2" (1.3 cm) Orbit	Electrical Service
<b>3100 Water Bath</b>	M1231-0000	120V, 50/60Hz
	M1231-0001	100V, 50/60Hz
	M1231-0002	220/230V, 50/60Hz
	M1231-0003	240V, 50/60Hz

(†) Shaker does not include 12" x 16.5" platforms which must be ordered separately. See below. (§) Elevated temperatures attained with aid of a gable cover using bath liquid with a high boiling point to minimize evaporation. For lower temperatures an optional cooling assembly is available. See next page.

### Innova® 3100 Interchangeable Platforms

12" x 16.5" (30.5 x 42 cm) Stainless Steel

Catalog No.	Description	Clamps
M1231-9930*	Universal Platform	—
M1231-9933	50 mL Erlenmeyer Flask Dedicated Platform	31
M1231-9934	125 mL Erlenmeyer Flask Dedicated Platform	22
M1231-9935	250 mL Erlenmeyer Flask Dedicated Platform	13
M1231-9936	500 mL Erlenmeyer Flask Dedicated Platform	8
M1231-9937	1 L Erlenmeyer Flask Dedicated Platform	6
M1231-9938	2 L Erlenmeyer Flask Dedicated Platform	2
M1231-9939	Sub-Platform for mounting half-size platforms containing flasks and test-tube racks. Sub-platform holds 2 half-size flask platforms or 4 racks.	—

(\*) Flask clamps for Universal Platform must be ordered separately. For platform capacities and clamp information see pages 8 & 10.

INNOVA® WATER BATH SHAKERS



Half-Size Platforms with accessory clamps

Innova 3100 Half-Size Platforms (Half Platforms require Sub-Platform listed on previous page)

Catalog No.	Description	Half Platforms Per Bath	Clamps Per Platform
AG7-50	50 mL Erlenmeyer Flask Half Platform	2	13
AG7-125	125 mL Erlenmeyer Flask Half Platform	2	8
AG7-250	250 mL Erlenmeyer Flask Half Platform	2	5

Innova 3100 Test Tube Racks

Catalog No.	Description	Racks Per Bath	Tubes Per Rack
AG7-TT13	Rack for 13 mm Tubes	4	60
AG7-TT16	Rack for 16 mm Tubes	4	36
AG7-TT20	Rack for 20 mm Tubes	4	29
AG7-TT25	Rack for 25 mm Tubes	4	18



Stainless Steel Gable Cover



Cooling Assembly

Innova 3100 Accessories

Catalog No.	Description
M1231-2010	Gable Cover, Plexiglas, minimizes heat loss and heat-up time. Not recommended for temperatures above 60°C.
M1231-2000	Gable Cover, Stainless Steel, for high-temperature applications up to 100°C. Reduces heat-up time. Minimizes evaporation.
M1231-9920	Cooling Assembly, for below ambient temperature applications. Must be factory installed.
M1195-1020	Space-Saving Dolly, (Under lab bench operation) 18" W x 28.25" long (46 x 72 cm). Overall height, of shaker on dolly: 20"(51 cm)
M1231-0730	Spare Set of Arms
M1020-1220	Portable Cart, 22 1/2"W x 32.25"L, (57 x 87 cm). Overall height, shaker on cart: 42.5" (108 cm)
M1231-6000 <sup>††</sup>	Spare Parts Kit

(††) Refer to page 95 for details of Spare Parts Kit.




## INNOVA® OPEN AIR SHAKERS

### Innova® 2000, 2100 & 2300 Series Benchtop Open Air Shakers

Low-profile shakers with Triple-Eccentric Drive for uniform motion and microprocessor controls for accurate regulation of shaking speed, 25 – 500 rpm (less with baffled flasks). Includes audible and visual alarms, timer (0 – 99.9 hrs) with continuous operation or automatic shut-off at the end of the study. Models 2000, 2100 and 2300 provide for small, intermediate and large-capacity shaking, respectively. Models 2050, 2150 and 2350 come with additional stabilizing feet and/or counterweight to balance larger loads on oversized platforms. Platforms sold separately, see pages 19 - 21.

Model No.	Platform Size		Capacity/ Flask size <sup>†</sup>	Orbit		Overall Dimensions		Net Weight	
	Inches	cm		Inches	cm	Inches (W x D x H)	cm (W x D x H)	lbs.	kg.
Innova 2000	13 x 11	33 x 28	6 x 500 mL	3/4"	1.9	14 x 14.5 x 5.75	35.5 x 37 x 14.6	33	18.6
Innova 2050	16 x 12	40.6 x 30.5	3 x 2 L	3/4"	1.9	17 x 14.5 x 5.75	43 x 37 x 14.6	35	19.1
Innova 2100	18 x 18	45.7 x 45.7	5 x 2 L	3/4"	1.9	19 x 21.9 x 6.4	48 x 55.5 x 16.3	75	54.4
Innova 2150	24 x 18	61 x 45.7	8 x 2 L	3/4"	1.9	24 x 23.3 x 6.4	60.1 x 59.1 x 16.3	80	57
Innova 2300	30 x 18	76.2 x 45.7	4 x 6 L	1" or 2"	2.5 or 5.1	30 x 22.3 x 6.4	76.2 x 56.6 x 16.3	105	66
Innova 2350	36 x 24	91.4 x 61	6 x 6 L	1" or 2"	2.5 or 5.1	36 x 24 x 6.4	91.4 x 61 x 16.3	115	68

(†) Indicates number of largest flask size with dedicated platform. Universal platform capacity may be less. Flask clamps for Universal Platform must be ordered separately. See pages 8 & 10.

Model	Catalog No.	Electrical Service	
<b>2000</b>	M1190-0000	120V, 50/60Hz	
	M1190-0001	100V, 50/60Hz	
	M1190-0002	220/230V, 50/60Hz	
	M1190-0003	240V, 50/60Hz	
<b>2050</b>	M1190-0010	120V, 50/60Hz	
	M1190-0011	100V, 50/60Hz	
	M1190-0012	220/230V, 50/60Hz	
	M1190-0013	240V, 50/60Hz	
<b>2100</b>	M1194-0000	120V, 50/60Hz	
	M1194-0001	100V, 50/60Hz	
	M1194-0002	220/230V, 50/60Hz	
	M1194-0003	240V, 50/60Hz	
<b>2150</b>	M1194-0010	120V, 50/60Hz	
	M1194-0011	100V, 50/60Hz	
	M1194-0012	220/230V, 50/60Hz	
	M1194-0013	240V, 50/60Hz	
<b>2300 1" Orbit (2.5 cm)</b>	M1191-0000	120V, 50/60Hz	 For multi-shaker racking system, see page 22
	M1191-0001	100V, 50/60Hz	
	M1191-0002	220/230V, 50/60Hz	
	M1191-0003	240V, 50/60Hz	
<b>2300 2" Orbit (5.1 cm)</b>	M1191-0020	120V, 50/60Hz	
	M1191-0021	100V, 50/60Hz	
	M1191-0022	220/230V, 50/60Hz	
	M1191-0023	240V, 50/60Hz	
<b>2350 1" Orbit (2.5 cm)</b>	M1191-0010	120V, 50/60Hz	
	M1191-0011	100V, 50/60Hz	
	M1191-0012	220/230V, 50/60Hz	
	M1191-0013	240V, 50/60Hz	
<b>2350 2" Orbit (5.1 cm)</b>	M1191-0030	120V, 50/60Hz	
	M1191-0031	100V, 50/60Hz	
	M1191-0032	220/230V, 50/60Hz	
	M1191-0033	240V, 50/60Hz	

### Innova® 2000 Interchangeable Platforms & Accessories

13" x 11" (33 x 28 cm) Stainless Steel

Catalog No.	Description	Clamps
M1001-0240*	Universal Platform	—
AG2-UT	Utility Carrier holds a variety of glassware between rubber-cushioned cross bars	—
AG2-00	Utility Tray with non-skid rubber surface	—
M1001-9920	Rod Kit for Utility Carrier (one additional rod)	—
AG2-10	10 mL Erlenmeyer Flask Dedicated Platform	60
M1190-9919	25 mL Erlenmeyer Flask Dedicated Platform	32
M1190-9915	50 mL Erlenmeyer Flask Dedicated Platform	20
M1190-9916	125 mL Erlenmeyer Flask Dedicated Platform	12
M1190-9917	250 mL Erlenmeyer Flask Dedicated Platform	8
M1190-9918	500 mL Erlenmeyer Flask Dedicated Platform	6
M1250-9903	Sticky Pad Platform	—
M1190-9910 <sup>§</sup>	Capacity Upgrade Kit, converts Model 2000 to a Model 2050	—
M1190-9909	Temperature & Speed Monitoring Kit for recording on an external chart recorder	—
M1190-6100 <sup>††</sup>	Spare Parts Kit, Innova 2000/2050 (120V, 50/60Hz)	—

### Innova® 2050 Interchangeable Platforms

16" x 12" (40.6 x 30.5 cm) Stainless Steel

Catalog No.	Description	Clamps
M1190-9900*	Universal Platform	—
M1190-9907	Utility Carrier holds a variety of glassware between rubber-cushioned cross bars	—
M1190-9920	Rod Kit for Utility Carrier (one additional rod)	—
M1190-9908	Utility Tray with non-skid rubber surface	—
M1190-9901	10 mL Erlenmeyer Flask Dedicated Platform	86
M1190-9902	25 mL Erlenmeyer Flask Dedicated Platform	48
M1190-9903	50 mL Erlenmeyer Flask Dedicated Platform	35
M1190-9904	125 mL Erlenmeyer Flask Dedicated Platform	20
M1190-9905	250 mL Erlenmeyer Flask Dedicated Platform	12
M1190-9906	500 mL Erlenmeyer Flask Dedicated Platform	8
M1190-9911	1 L Erlenmeyer Flask Dedicated Platform	6
M1190-6100 <sup>††</sup>	Spare Parts Kit, Innova 2000/2050 (120V, 50/60Hz)	—

### Innova® 2100 Interchangeable Platforms and Accessories

18" x 18" (45.7 x 45.7 cm) Phenolic Resin – Unless otherwise stated

Catalog No.	Description	Clamps
M1250-9902*	Universal Platform, Aluminum	—
M1250-9906	Drip Pan to catch accidental spills for use with Universal Platform M1250-9902	—
M1194-9909	Utility Carrier holds a variety of glassware between rubber-cushioned cross bars	—
M1194-9923	Rod Kit for Utility Carrier (one additional rod)	—
M1194-9910	Utility Tray with non-skid rubber surface	—
M1194-9903	50 mL Erlenmeyer Flask Dedicated Platform	64
M1194-9904	125 mL Erlenmeyer Flask Dedicated Platform	34
M1194-9905	250 mL Erlenmeyer Flask Dedicated Platform	25
M1194-9906	500 mL Erlenmeyer Flask Dedicated Platform	16
M1194-9907	1 L Erlenmeyer Flask Dedicated Platform	9

(\*)Flask clamps for Universal Platform must be ordered separately. See pages 8 & 10. (\*\*) Sticky Pad sold separately, see page 10.

(§) Includes counterweight and hardware to balance larger workloads.

(††) Refer to page 95 for details of Spare Parts Kits.

continued on next page

## INNOVA® OPEN AIR SHAKERS

### Innova® 2100 Interchangeable Platforms and Accessories (continued)

18" x 18" (45.7 x 45.7 cm) Phenolic Resin – Unless otherwise stated

Catalog No.	Description	Clamps
M1194-9908	2 L Erlenmeyer Flask Dedicated Platform	5
M1233-9932	2.8 L Fernbach Flask Dedicated Platform	4
M1250-9903**	Sticky Pad Platform	—
M1194-9926 <sup>§</sup>	Capacity Upgrade Kit to convert a Model 2100 to a Model 2150	—
M1192-9901 <sup>⊖</sup>	Quick-Change Platform Kit, Innova 2100/4000/4230	—
M1194-9924	Temperature & Speed Monitoring Kit for recording on an external chart recorder. For Models 2100, 2150, 2300 & 2350	—
M1194-6001 <sup>††</sup>	Spare Parts Kit, Innova 2100/2150 (120V, 50/60Hz)	—

### Innova® 2150 Interchangeable Platforms & Accessories

24" x 18" (61 x 45.7 cm) Phenolic Resin

Catalog No.	Description	Clamps
M1194-9912*	Universal Platform	—
M1194-9921	Utility Carrier holds a variety of glassware between rubber-cushioned cross bars	—
M1194-9925	Rod Kit for Utility Carrier (one additional rod)	—
M1194-9922	Utility Tray with non-skid rubber surface for low-speed applications	—
M1194-9915	50 mL Erlenmeyer Flask Dedicated Platform	80
M1194-9916	125 mL Erlenmeyer Flask Dedicated Platform	48
M1194-9917	250 mL Erlenmeyer Flask Dedicated Platform	35
M1194-9918	500 mL Erlenmeyer Flask Dedicated Platform	20
M1194-9919	1 L Erlenmeyer Flask Dedicated Platform	12
M1194-9920	2 L Erlenmeyer Flask Dedicated Platform	8
M1194-9924	Temperature and Speed Monitoring Kit for recording on an external chart recorder. For Models 2100, 2150, 2300 & 2350 Shakers	—
M1194-9927 <sup>⊖</sup>	Quick-Change Platform Kit	—
M1194-6001 <sup>††</sup>	Spare Parts Kit, Innova 2100/2150 (120V, 50/60Hz)	—

### Innova® 2300 Interchangeable Platforms & Accessories

30" x 18" (76.2 x 45.7 cm) Aluminum

Catalog No.	Description	Clamps
M1250-9920*	Universal Platform	—
M1250-9921	Drip Pan to catch accidental spills for use with Universal Platform, M1250-9920	—
AG-00	Utility Tray with non-skid rubber surface for low-speed applications	—
M1191-9908	50 mL Erlenmeyer Flask Dedicated Platform	108
M1191-9909	125 mL Erlenmeyer Flask Dedicated Platform	60
M1191-9910	250 mL Erlenmeyer Flask Dedicated Platform	40
M1191-9911	500 mL Erlenmeyer Flask Dedicated Platform	24
AG-1	1 L Erlenmeyer Flask Dedicated Platform	15
AG-2	2 L Erlenmeyer Flask Dedicated Platform	12
AG-4	4 L Erlenmeyer Flask Dedicated Platform	6
AG-6	6 L Erlenmeyer Flask Dedicated Platform	4
AG-28	2.8 L Fernbach Flask Dedicated Platform	6
M1250-9904**	Sticky Pad Platform	—
M1191-9905 <sup>§</sup>	Capacity Upgrade Kit to convert a Model 2300 to a Model 2350	—

(\*)Flask clamps for Universal Platform must be ordered separately. See pages 8 & 10. (\*\*) Sticky Pad sold separately, see page 10.

(§) Includes counterweight and hardware to balance larger workloads.

(⊖) Enables platforms to be snapped in place without tools; platforms must be ordered separately; maximum speed is 400 rpm.

(††) Refer to page 95 for details of Spare Parts Kits.

continued on next page

### Innova® 2300 Interchangeable Platforms & Accessories (continued)

30" x 18" (76.2 x 45.7 cm) Aluminum

Catalog No.	Description	Clamps
M1191-9904 <sup>o</sup>	Quick-Change Platform Kit, Innova 2300	—
M1194-9924	Temperature and Speed Monitoring Kit for recording on an external chart recorder. For Models 2100, 2150, 2300 & 2350 Shakers	—
M1191-6102 <sup>††</sup>	Spare Parts Kit, Innova 2300/2350, (120V, 50/60Hz)	—
M1243-2500	Microplate platform holds 105 standard or 21 deep well plates	—

### Innova® 2350 Interchangeable Platforms & Accessories

36" x 24" (91.4 x 60.9 cm) Marine Plywood unless otherwise stated

Catalog No.	Description	Clamps
PTL-386*	Universal Platform	—
PTL-393*	Universal Platform, aluminum	—
AG-21-00	Utility Tray with non-skid rubber surface	—
M1191-9912	125 mL Erlenmeyer Flask Dedicated Platform	96
M1191-9913	250 mL Erlenmeyer Flask Dedicated Platform	70
M1191-9914	500 mL Erlenmeyer Flask Dedicated Platform	40
M1194-9924	Temperature and Speed Monitoring Kit for recording on external recorder. For Models, 2100, 2150, 2300 & 2350	—
M1191-6102 <sup>††</sup>	Spare Parts Kit, Innova 2300/2350, (120V, 50/60Hz)	—

(\*) Flask clamps for Universal Platform must be ordered separately. For platform capacities and clamp information see pages 8 & 10.

(o) Enables platforms to be snapped in place without tools; platforms must be ordered separately. Maximum speed with 1" (2.5 cm) orbit shaker is 400 rpm.

(††) Refer to page 95 for details of Spare Parts Kits.

## Innova® 5000 Multi-Tier Shaker — An Industrial Workhorse

Culture hundreds of samples on this industrial workhorse.

**Speed:** 25 to 350 rpm (less for baffled flasks).

**Orbit:** 2" (5.08 cm). Counterbalanced shaker provides uniform agitation to all samples without being bolted to the floor. Cantilevered design provides unobstructed access to all glassware.

**Six removable platforms<sup>†</sup>:** 32.5 x 26.75" (82.5 x 68 cm) accommodate flasks 10 mL to 6 L. (Platforms sold separately.) Digital display indicates speed, setpoint, running time and alarm conditions.

**Overall dimensions:** 62" W x 38" D x 53" H (157.5 x 96.5 x 135 cm).

**Net weight (with platforms):** 1,554 lbs. (706 kg).



Simultaneously agitate hundreds of samples on up to six accessory platforms

Model	Catalog No. 2" (5.1 cm) Orbit	Electrical Service
<b>Innova 5000</b>	M1196-0000	120V, 50/60Hz
	M1196-0001	100V, 50/60Hz
	M1196-0002	220V, 50/60H
	M1196-0003	240V, 50/60Hz

(†) Shaker does not include 32.5 x 26.75" Platforms which must be ordered separately. See next page.

## INNOVA® OPEN AIR SHAKERS

### Innova® 5000 Interchangeable Platforms & Accessories

32.5" x 26.75" (82.5 x 68 cm) Phenolic Resin. Capacity: 6 Platforms per Shaker

Flask Catalog No.	Description	No. of Flasks Per Platform	No. of Flasks Per Machine
M1196-9447**	Universal Platform	—	—
M1196-9900	125 mL Erlenmeyer Flask Dedicated Platform	99	594
M1196-9901	250 mL Erlenmeyer Flask Dedicated Platform	64	384
M1196-9902	500 mL Erlenmeyer Flask Dedicated Platform	42	252
M1196-9903	1 L Erlenmeyer Flask Dedicated Platform	23	138
M1196-9904 <sup>Δ</sup>	2 L Erlenmeyer Flask Dedicated Platform	14	70
M1196-9905 <sup>Δ</sup>	2.8 L Fernbach Flask Dedicated Platform	9	54
M1196-9906 <sup>‡</sup>	4 L Erlenmeyer Flask Dedicated Platform	8	16
M1196-9907 <sup>‡</sup>	6 L Erlenmeyer Flask Dedicated Platform	8	16
M1196-6000 <sup>††</sup>	Spare Parts Kit (120V, 50/60Hz)		

(\*\*) Flask clamps for Universal Platform must be ordered separately. For platform capacities and clamp information see pages 8 & 10. (Δ) Can only use front half of platform on bottom tier. (‡) For use on top tier only. Maximum, 16 flasks on 2 top trays. (††) Please refer to page 95 for details of Spare Parts Kits.

### Innova® 5050/5051 Racking Systems for Innova 2300 Shakers

Model 5050 consists of a sturdy, stainless-steel rack to hold up to four Innova 2300 Shakers. Innova 5051 rack extension can be added to support an additional four shakers, bringing the total number to eight.

Each unit includes an electrical strip for powering the shakers. Shakers must be ordered separately. See pages 18, 20 and 21 for Innova 2300 shaker and platform ordering information.

**Maximum speed:** 400 rpm for 1" (2.54 cm) orbit, and 300 rpm for 2" (5.08 cm) orbit shakers. See chart below for rack capacities.

**Overall dimensions 5050 or 5051:** 39" W x 27" D x 72" H (99.1 x 68.6 x 182.9 cm).



Innova 5050 & 5051 Extension Racks shown  
Shakers sold separately

Model	Catalog No.	Description	Electrical Service
<b>Innova 5050 &amp; 5051</b>	M1232-0100	5050 Rack System	100V/120V, 50/60Hz
	M1232-0101	5050 Rack System	230V/240V, 50/60Hz
	M1232-0110*	5051 Rack Extension	100V/120V, 50/60Hz
	M1232-0111*	5051 Rack Extension	230V/240V, 50/60Hz

Flask Size	Max. Shakers per Rack	Max. Flasks with Innova 2300	Max. Flasks with Innova 5050 Rack	Max. Flasks with Innova 5051 Extension
50 mL	4	108	432	864
125 mL	4	60	240	480
250 mL	4	40	160	320
500 mL	4	24	96	192
1 L	3	15	45	90
2 L **	3	12	36	72

(\*) Must be used with Model 5050 Rack System. (\*\*) Larger flasks can be used by removing one or more adjustable-height shelves.

I SERIES INCUBATOR SHAKERS

I26 Stackable Incubator Shakers & I26R with Added Refrigeration

Stackable, incubated I26 and Incubated/Refrigerated Model I26R Shakers feature NBS' triple-eccentric drive for uniform motion and dependable operation. Based on the design concepts of the Innova® shakers, the I26 & I26R offer excellent performance at a value price.

**Platform†:** 30" x 18" (76.2 x 45.7 cm) slides out for easy access to all flasks. (Platform sold separately).

**Speed♾:** 25 - 400 with a 1" orbit (2.5 cm).

**Temperature range:** I26: 5°C above ambient to 60°C; I26R: 15°C below ambient to 60°C (minimum 4°C).

**Overall dimensions\*:** 50" W x 30" D x 25.25" H (127 x 76.2 x 64.1 cm). Add 25.25" (64 cm) for each additional unit. With door open, add 19.5" (49.5 cm) to depth.

**Net weight:** I26: 370 lbs. (168 kg); I26R: 400 lbs. (182 kg).



Stacks up to 3 shakers. 2 shakers shown on a medium base

Model	Catalog No. 1" (2.5 cm) Orbit	Electrical Service
<b>I26 Incubated</b>	M1324-0000	120V, 60Hz
	M1324-0001	100V, 60Hz
	M1324-0002	230V, 50Hz
	M1324-0003	100V, 50Hz
<b>I26R Incubated/ Refrigerated</b>	M1324-0004	120V, 60Hz
	M1324-0005	100V, 60Hz
	M1324-0006	230V, 50Hz
	M1324-0007	100V, 50Hz

(†) Shaker does not include platform which must be ordered separately. See below. (♾) Less with baffled flasks. (\*) When using 1 unit on the floor, height is 27" (68.58 cm) including shaker feet. When using shaker on a base or stacked, no feet are required and each shaker will be 25.25" high (64.14 cm).

I26 & I26R Interchangeable Platforms, Slide-Out

30" x 18" (76.2 x 46 cm) Aluminum (Platforms are not interchangeable with other 30" x 18" platforms)

Catalog No.	Application/Size of Glassware	Clamps 1 Shaker	Clamps 2 Shakers	Clamps 3 Shakers
M1324-9904*	Universal Platform	—	—	—
M1324-9905	125 mL Erlenmeyer Flask Dedicated Platform	60	120	180
M1324-9906	250 mL Erlenmeyer Flask Dedicated Platform	40	80	120
M1324-9907	500 mL Erlenmeyer Flask Dedicated Platform	24	48	72
M1324-9908	1 L Erlenmeyer Flask Dedicated Platform	15	30	45
M1324-9909	2 L Erlenmeyer Flask Dedicated Platform	12	24	36
M1324-9910	2.8 L Fernbach Flask Dedicated Platform	6	12	18
M1324-9911	Sticky Pad Platform	—	—	—

(\*) Flask clamps and test tubes for Universal Platforms must be ordered separately. See pages 8 & 10.

I26 & I26R Optional Accessories

Accessories are not interchangeable with any other shaker

Catalog No.	Description
	Base: Raises shaker height for easier access to chamber & controls.
M1324-0600	Short Base to raise shakers by 4" (10.2 cm). For use with up to three stacked units
M1324-0800	Medium Base to raise shakers by 13" (33 cm.) For use with up to two stacked units
M1324-0700	Tall Base to raise shakers by 17" (43.2 cm). For use with a single unit
	Stacking Kit: Bolts shakers together for stability when stacking two or more units. One needed for two shakers; Two needed for three shakers.
M1324-0500	Stacking Kit to join two I26/I26R Shakers

## EXCELLA® SHAKERS

## Excella® Shakers — Excellent Performance &amp; Value

These next-generation shakers from New Brunswick Scientific are offered in eight models to suit a wide variety of culturing applications. Excella shakers combine sleek looks, microprocessor controls and heavy-duty counterbalanced drives to provide years of continuous, quiet operation. Digital displays are user friendly and easily seen throughout the lab.

Excella shakers are available with a large selection of accessories to accommodate a wide range of flasks, test tubes and general labware. Like most NBS shakers, Excella platforms, clamps and accessories are interchangeable with earlier NBS models.

## Excella® E24 Benchtop Incubator Shakers &amp; E24R with Added Refrigeration

Microprocessor-controlled incubator shakers with clear lid allows easy viewing of all flasks.

**Temperature:** Model E24: 7°C above ambient to 60°C; Model E24R: 15°C below ambient to 60°C (minimum 4°C).

**Speed:** 50 - 400 rpm, (less for baffled flasks).

**Orbit:** 3/4" (1.9 cm).

**Platform†:** 18" x 18" (46 x 46 cm), for test tubes and flasks up to 2.8 liters. (Platform sold separately.)

**Overall dimensions:** 22" W x 30" D x 24" H (56 x 76.2 x 61 cm).

**Net weight:** E24: 145 lbs. (66 kg); E24R: 180 lbs. (82 kg).



Model	Catalog No. 3/4" (1.9 cm) Orbit	Electrical Service
<b>E24 Incubated</b>	M1352-0000	120V, 60Hz
	M1352-0001	100V, 60Hz
	M1352-0002	230V, 50Hz
	M1352-0003	100V, 50Hz
<b>E24R Incubated/ Refrigerated</b>	M1352-0004	120V, 60Hz
	M1352-0005	100V, 60Hz
	M1352-0006	230V, 50Hz
	M1352-0007	100V, 50Hz

(†) Shaker does not include 18" x 18" platforms which must be ordered separately. See below.

## Excella® E24 &amp; E24R Interchangeable Platforms

18" x 18" (46 x 46 cm) Phenolic Resin unless otherwise stated

Catalog No.	Description	Clamps
M1250-9902*	Universal Platform, Aluminum	—
M1250-9906	Drip Pan for Universal Platform M1250-9902	—
M1194-9909	Utility Carrier holds glassware between rubber-cushioned cross bars	—
M1194-9923	Rod Kit for Utility Carrier (one additional rod)	—
M1194-9910	Utility Tray with non-skid surface	—
M1194-9903	50 mL Erlenmeyer Flask Dedicated Platform	64
M1194-9904	125 mL Erlenmeyer Flask Dedicated Platform	34
M1194-9905	250 mL Erlenmeyer Flask Dedicated Platform	25
M1194-9906	500 mL Erlenmeyer Flask Dedicated Platform	16
M1194-9907	1 L Erlenmeyer Flask Dedicated Platform	9
M1194-9908	2 L Erlenmeyer Flask Dedicated Platform	5
M1233-9932	2.8 L Fernbach Flask Dedicated Platform	4
M1192-9901	Quick-Change Platform Kit	—
M1250-9903 <sup>1</sup>	Sticky Pad Platform	—
M1352-6000	Spare Parts Kit, E24 & E24R	—

(\*) Flask clamps for Universal Platform must be ordered separately. See pages 8 & 10. (1) Sticky Pad sold separately, see page 10.

## EXCELLA® INCUBATOR SHAKERS

## Excella® E25 Console Incubator Shakers &amp; E25R with Added Refrigeration

Large-capacity, floor model incubator shakers.

**Temperature:** Model E25: 7°C above ambient to 60°C; E25R: 15°C below ambient to 60°C (minimum setpoint of 4°C).

**Speed:** 50 - 400 rpm (less for baffled flasks).

**Orbit:** 1" (2.5 cm).

**Platform†:** 30" x 18" (76 x 46 cm) accommodates a variety of flask capacities up to 6 liters. (Platform sold separately.)

**Overall dimensions:** 50" x 30.5" x 41.7" (127 x 77 x 85 cm). With lid open: 65" H (165 cm).

**Net weight:** Model E25: 377 lbs. (171.2 kg); Model E25R: 417 lbs. (189.3 kg).



Model	Catalog No. 1" (2.5 cm) Orbit	Electrical Service
<b>E25 Incubated</b>	M1353-0000	120V, 60Hz
	M1353-0001	100V, 60Hz
	M1353-0002	230V, 50Hz
	M1353-0003	100V, 50Hz
<b>E25R Incubated/ Refrigerated</b>	M1353-0004	120V, 60Hz
	M1353-0005	100V, 60Hz
	M1353-0006	230V, 50Hz
	M1353-0007	100V, 50Hz

(†) Shaker does not include 30" x 18" platforms which must be ordered separately. See below.

## Excella E25, E25R and E10 Interchangeable Platforms

30" x 18" (76 x 46 cm) Aluminum

Catalog No.	Description	Clamps
M1250-9920**	Universal Platform	—
M1250-9921‡	Drip Pan to catch accidental spills, for Universal Platform M1250-9920	—
AG-00	Utility Tray with non-skid rubber surface	—
M1191-9908	50 mL Erlenmeyer Flask Dedicated Platform	108
M1191-9909	125 mL Erlenmeyer Flask Dedicated Platform	60
M1191-9910	250 mL Erlenmeyer Flask Dedicated Platform	40
M1191-9911	500 mL Erlenmeyer Flask Dedicated Platform	24
AG-1	1 L Erlenmeyer Flask Dedicated Platform	15
AG-2	2 L Erlenmeyer Flask Dedicated Platform	12
AG-28	2.8 L Fernbach Flask Dedicated Platform	6
AG-4	4 L Erlenmeyer Flask Dedicated Platform	6
AG-6	6 L Erlenmeyer Flask Dedicated Platform	4
M1250-9904^	Platform for Sticky Pad	—
M1243-2500	Microplate platform holds 105 standard or 21 deep well plates	—

(\*\*) Flask clamps for Universal Platforms must be ordered separately. See pages 8 & 10. (^) Sticky Pad sold separately, see page 10. (‡) For use with E10 Shakers only.

## EXCELLA® OPEN AIR SHAKERS

## Excella® E10 Large-Capacity Benchtop Open Air Shakers

Large-capacity, microprocessor-controlled shakers with digital display.

**Speed:** 50 - 400 rpm (less for baffled flasks).

**Orbit:** 1" (2.5 cm).

**Platform†:** 30" x 18" (76 x 46 cm) accommodates flasks up to 6 liters.

**Overall dimensions:** 30" x 27" x 8.5" (76 x 68.3 x 21.6 cm).

**Net weight:** 100 lbs. (45.4 kg).



Model	Catalog No. 1" (2.5 cm) Orbit	Electrical Service
<b>E10 Open Air</b>	M1351-0000 M1351-0001	120/100V, 50/60Hz 230V, 50/60Hz

(†) Shaker does not include 30" x 18" platforms which must be ordered separately. See previous page.

## Excella® E5 Mid-Sized Benchtop Open Air Shakers

Microprocessor-controlled benchtop platform shakers for agitating test tubes and flasks up to 2 L.

**Speed:** 50 - 400 rpm (less for baffled flasks), with electronic speed control.

**Orbit:** 3/4" (1.9 cm).

**Platform†:** 18" x 18" (45.7 x 45.7 cm), sold separately.

**Overall dimensions:** 20.5" W x 17.90" D x 8.5" H (52 x 45.5 x 21.6 cm).

**Net weight:** 100 lbs. (45.4 kg).



Model	Catalog No. 3/4" (1.9 cm) Orbit	Electrical Service
<b>E5 Open Air</b>	M1355-0000 M1355-0001	120/100V, 50/60Hz 230V, 50/60Hz

(†) Shaker does not include 18" x 18" platforms which must be ordered separately. See next page.

### Excella E5 Interchangeable Platforms

18" x 18" (46 x 46 cm) Phenolic Resin unless otherwise stated

Catalog No.	Description	Clamps
M1250-9902 <sup>†</sup>	Universal Platform, Aluminum	—
M1250-9906	Drip Pan to catch accidental spills for use with Universal Platform M1250-9902	—
M1194-9909	Utility Carrier holds a variety of glassware between rubber-cushioned cross bars	—
M1194-9923	Rod Kit for Utility Carrier (one additional rod)	—
M1194-9910	Utility Tray with non-skid rubber surface	—
M1194-9903	50 mL Erlenmeyer Flask Dedicated Platform	64
M1194-9904	125 mL Erlenmeyer Flask Dedicated Platform	34
M1194-9905	250 mL Erlenmeyer Flask Dedicated Platform	25
M1194-9906	500 mL Erlenmeyer Flask Dedicated Platform	16
M1194-9907	1 L Erlenmeyer Flask Dedicated Platform	9
M1194-9908	2 L Erlenmeyer Flask Dedicated Platform	5
M1250-9903**	Sticky Pad Platform	—

(†) Flask clamps for Universal Platform must be ordered separately. See pages 8 & 10. (\*\*) Sticky Pad sold separately, see page 10.

### Excella E2 Microprocessor Controlled & E1 Analog-Controlled Compact Open Air Shakers

**E2:** Benchtop shakers for agitating test tubes and flasks up to 500 mL.

**E1:** Same as E2, but with analog control.

**Speed:** 50 - 400 rpm (less for baffled flasks), with electronic speed control.

**Orbit:** 3/4" (1.9 cm).

**Platform<sup>†</sup>:** 13" x 11" (33 x 28 cm), sold separately.

**Overall dimensions:** 15.75" W x 17.9" D x 8.5" H (40 x 45.5 x 21.6 cm).

**Net weight:** 35 lbs. (15.9 kg).



E2 with LED display, left / Analog-controlled E1, right

Model	Catalog No. 3/4" (1.9 cm) Orbit	Electrical Service
<b>E2 Open Air</b>	M1350-0000 M1350-0001	120/100V, 50/60Hz 230V, 50/60Hz
<b>E1 Open Air</b>	M1354-0000 M1354-0001	120V, 50/60Hz 230V, 50/60Hz

(†) Shakers do not include 13"x 11" platforms which must be ordered separately. See next page.

## EXCELLA® OPEN AIR SHAKERS &amp; C-LINE SHAKERS

## Excella E2 &amp; E1 Interchangeable Platforms

13" x 11" (33 x 28 cm) Stainless Steel

Catalog No.	Description	Clamps
M1001-0240**	Universal Platform	—
AG2-UT	Utility Carrier holds a variety of glassware between rubber-cushioned cross bars	—
AG2-00	Utility Tray with non-skid rubber surface	—
M1001-9920	Rod Kit for Utility Carrier (one additional rod)	—
AG2-10	10 mL Erlenmeyer Flask Dedicated Platform	60
M1190-9919	25 mL Erlenmeyer Flask Dedicated Platform	32
M1190-9915	50 mL Erlenmeyer Flask Dedicated Platform	20
M1190-9916	125 mL Erlenmeyer Flask Dedicated Platform	12
M1190-9917	250 mL Erlenmeyer Flask Dedicated Platform	8
M1190-9918	500 mL Erlenmeyer Flask Dedicated Platform	6

(\*\*) Flask clamps for Universal Platform must be ordered separately. See pages 8 &amp; 10.

## C76 High-Temperature Water Bath Shakers

Microprocessor-controlled orbital shaker for high-temperature applications.

**Temperature:** 7°C above ambient\*\* to 80° C.**Speed:** 50 - 300 rpm (less for baffled flasks).**Orbit:** 1/2" (1.3 cm), dynamically balanced. Features feedback control of temperature and agitation rate, with self-diagnostic status lights for speed, temperature and elapsed time. One-piece seamless bath with rounded corners.**Platform†:** 12" x 16.5" (30.5 x 42 cm) holds flasks to 2 L. (Platform sold separately.)**Overall dimensions:** 21.4" x 26.9" x 18.5" (54 x 68 x 47 cm).**Net weight:** 115 lbs. (52 kg).

Shown with accessory Plexiglas Gable Cover

Model	Catalog No. 1/2" (1.3 cm) Orbit	Electrical Service
<b>C76 Water Bath</b>	M1248-0002 M1248-0003	120V, 50/60Hz 230/240V, 50/60Hz

(†) Shaker does not include 12" x 16.5" platforms which must be ordered separately. See below. (\*\*) Elevated temperatures attained with aid of a gable cover using bath liquid with a high boiling point to minimize evaporation. For lower temperatures an optional cooling assembly is available. See next page.

## C-LINE SHAKERS

## C76 Interchangeable Platforms &amp; Accessories

12" x 16.5" (30.5 x 42 cm) Stainless Steel

Catalog No.	Description	Clamps
M1231-9930*	Universal Platform	—
M1231-9933	50 mL Erlenmeyer Flask Dedicated Platform	31
M1231-9934	125 mL Erlenmeyer Flask Dedicated Platform	22
M1231-9935	250 mL Erlenmeyer Flask Dedicated Platform	13
M1231-9936	500 mL Erlenmeyer Flask Dedicated Platform	8
M1231-9937	1 L Erlenmeyer Flask Dedicated Platform	6
M1231-9938	2 L Erlenmeyer Flask Dedicated Platform	2
M1231-9939	Sub-Platform for mounting half-size platforms containing flasks and test tube racks. Sub-Platform holds 2 half-size flask platforms or 4 racks.	—

## C76 Half-Size Platforms (Half Platforms require Sub-Platform listed above)

Catalog No.	Description	Half Platforms Per Bath	Clamps Per Platform
AG7-50	50 mL Erlenmeyer Flask Half Platform	2	13
AG7-125	125 mL Erlenmeyer Flask Half Platform	2	8
AG7-250	250 mL Erlenmeyer Flask Half Platform	2	5

## C76 Test Tube Racks

Catalog No.	Description	Racks Per Bath	Tubes Per Rack
AG7-TT13	Rack for 13 mm Tubes	4	60
AG7-TT16	Rack for 16 mm Tubes	4	36
AG7-TT20	Rack for 20 mm Tubes	4	29
AG7-TT25	Rack for 25 mm Tubes	4	18

## C76 Additional Accessories

Catalog No.	Description
M1231-2010	Gable Cover, Plexiglas, minimizes heat loss and heat-up time. Not recommended for temperatures above 60°C.
M1231-2000	Gable Cover, Stainless Steel, for high-temperature applications up to 100°C. Reduces heat-up time. Minimizes evaporation.
M1231-9920**	Cooling Assembly, factory installed only. Must be ordered with unit for factory installation
M1248-0730	Spare Set of Arms
M1231-6000††	Spare Parts Kit

(\*) Flask clamps for Universal Platform must be ordered separately. See pages 8 & 10. (\*\*) For below-ambient temperature an optional factory installed cooling coil is available.  
 (††) Refer to page 95 for details of Spare Parts Kit.

## ULTRA-LOW TEMPERATURE (-86°C) FREEZERS

### Selecting an Ultra-Low Temperature Freezer: Five Considerations

The purchase of a ULT freezer is of critical importance to a laboratory. Whereas in the past, models were roughly equivalent, today's freezers can vary considerably in performance, energy consumption and reliability. The ULT freezer is an integral and valuable instrument in the operation of any sample storage application, yet many purchasing decisions are based solely on price. Here are five factors to consider when selecting an ultra-low temperature freezer.

#### Reliability:

The foremost consideration in a ULT freezer purchase is reliability. The value of products stored in this type of unit can rapidly approach millions of dollars, especially when the effort and critical nature of the samples are factored. Yet, many laboratories continually store these valuable samples in units of inferior quality. This is equivalent to hanging a masterpiece on a needle. It may work for a while, but ultimately your samples' integrity will be compromised. It is important to look at how these units are built; the quality of the compressors, the construction of the door and gaskets, and the operation of the control system. These key system components have a profound effect on the reliability of the system.

#### Performance:

The second component to consider is performance. The time it takes for a unit to recover after a door opening, the pull-down time to get to the temperature setpoint, and the temperature uniformity are all vital to maintaining sample integrity. A unit incapable of minimizing these frequent swings in temperature will inevitably cause sample degradation.

#### Efficiency:

A third measure to consider, and one becoming more valuable by the day, is the energy efficiency of the unit. ULT freezers are traditionally high-energy consumers requiring frequent compressor cycling for optimal performance. It is important to look at cycling times and, more importantly, kW/h consumption rates, to gain a clear understanding of what the freezer is costing the facility. With energy costs soaring, the operating efficiency difference between manufacturers can be significant. Also critical is the impact these freezers have on our environment. A high-efficiency model will not only benefit the organization financially, but also benefit the global environment by lowering its carbon footprint.

#### Footprint:

The footprint of the unit is a fourth consideration. How many samples can be stored and how much space does the unit consume? Cost per square foot for laboratory space is extremely expensive and most laboratories are space-limited. The ULT freezer should be able to seamlessly integrate into the area without becoming obtrusive. In addition, stringent safety guidelines require specific walk-through and spatial zones for which a traditional freezer may be too large.

#### Customer Service:

It is important to recognize the level of customer service being offered. If there is a problem or you have a question, how quickly do you receive a response? How long is the lead time for delivery? You should not have to wait months for your freezer to arrive. How well is the service call handled? Customer service may not be something you initially consider, but if there is a problem, you want a partner, not a supplier.

**When these five key features are taken into consideration during the selection process, along with value, it becomes clear that an NBS -86° ULT Freezer is the intelligent choice for your laboratory.**



## All NBS Freezers Are Environmentally Friendly & Energy Efficient

All NBS Freezers are exceptionally energy efficient. Our freezers consume roughly half the power of competitors' ULT freezers of similar size, drastically reducing your energy bills and reducing greenhouse gasses that effect our environment. How do we do it?

**Specialized low-temperature seals** on outer & inner doors prevent cold air loss.

**Insulated inner doors & sub-lids** reduce temperature fluctuation.

**New ice-proof, inner-door latches** minimize cold air loss. (Innova models only.)

**Multiple compartments** reduce cold air loss when the outer door is opened.

**Use of a single, powerful fan** (most freezers require two) reduce energy consumption.

**Two-stage cascade refrigeration system** provides efficient circulation of refrigerants.

**Efficient compressors** reduce cycle times, to significantly reduce energy usage.

**Filter cleaning indicator** prevents compressor overheating.

To calculate how much you can over the life of your freezer, see [www.nbsc.com/freezers](http://www.nbsc.com/freezers).

## Eco-Friendly Green Freezers, Innova® U725-G & Premium U570-G Upright Models

NBS is proud to offer our first hydrocarbon-based refrigerant freezers, to further help prevent global warming. These models are identical in all respects to our energy-efficient and eco-friendly Innova U725 & Premium U570 freezers except that in addition to eliminating all use of CFCs and HCFCs, these models are also free of hydrofluorocarbons (HFCs):

- HFCs are a known greenhouse gas and contributor to global warming.
- By switching to hydrocarbon propane/butane based refrigeration system, NBS is able to offer **the most environmentally friendly, energy efficient ULT freezer on the market**, while maintaining safety and reliability.
- Water-cooled options are available for even more energy and environmental savings.

### NBS Freezers are Eco-Friendly

- No CFCs or HCFCs (chlorofluorocarbons / hydrochlorofluorocarbons) are used, to reduce emission of greenhouse gasses, as well as minimize depletion of the ozone layer.
- Four new HFC-Free "Green" Models are now offered.
- NBS freezers are 95 - 98% recyclable (by weight).
- And they meet all WEEE Directives for Disposal, as set by the European Union.

## Which Model is Right For You?

**Space-Saving Innova® Freezers** – utilize Vacuum Insulation Panel technology to provide up to 30% more internal capacity than freezers of equal size. Seven models are offered. See pages 32-34.

**Economical Premium Freezers** – these conventionally-insulated models provide a cost-effective alternative, with many of the same features and quality as the Innova models. See pages 34-35.

**NEW HFC-Free Green Freezers** safeguard your samples and the environment. Currently available in 50 Hz models only. See below for details.



Innova® U725-G



Premium U570-G

Model	Catalog No.	Electrical Service
<b>Innova U725-G Upright</b>	U9440-0005 Air-Cooled	230V, 50Hz
	U9440-0004 Water-Cooled	230V, 50Hz
<b>Premium U570-G Upright</b>	U9270-0005 Air-Cooled	230V, 50Hz
	U9270-0004 Water-Cooled	230V, 50Hz

(†) These models are currently only available with 230 V, 50 Hz power and are supplied with both UK and Schuko power cords.

## ULTRA-LOW TEMPERATURE (-86°C) FREEZERS

### Innova® -86°C Freezers with Space-Saving Vacuum Insulation Panel Technology

Energy-efficient, quiet-running and dependable, Innova Freezers use space-saving Vacuum Insulation Panel technology to reduce wall thickness for a significant increase in storage capacity. Advanced features include:

**New gasketed, insulated inner doors** that lift off without tools for easy cleaning.

**Heated air vent with ice-clearing plunger** to allow doors to be opened at any time.

**Easy-to-read LED display** with display of system alarms and diagnostics.

**Internal voltage stabilizer** including buck/boost (60 Hz models only).

**Advanced security:** four-digit password protects temperature and alarm settings; keyed door lock with optional padlock adapter; lockable security plate protects power and alarm on-off switches; and remote alarm contacts for connection to your external building alarm/monitoring system.

**CE, UL & WEEE certifications.**

**Six space-saving Innova models to choose from:**

- Two Unique Upright Sizes – U101 & U360 are highlighted below and on page 33.)
- Two Large-Capacity Uprights: For easy access to samples, choose the U535 or larger U725, each with three compartments and two adjustable-height shelves.
- Two Chests: If a chest style is preferred, choose C585 or C760. Insulated sub-lids provide added sample protection.
- CO<sub>2</sub> and LN<sub>2</sub> Back-up Systems, racking and more are available – see page 35.

Model No.	Style	Capacity		Max. Box Capacity			Dimensions (H x W x D)	
		Liters	Cubic Ft.	2"	3"	4"	External <sup>†</sup>	Internal
<b>U101</b>	Upright	101	3.6	60	36	24	32.7" x 35.4" x 22.3" 83 x 90 x 56.6 cm	25.2" x 18.9" x 13" 64 x 48 x 33 cm
<b>U360</b>	Upright	360	12.7	252	180	108	76.8" x 26.4" x 34.1" 195 x 67.0 x 86.7 cm	53.7" x 17.3" x 24.2" 136.5 x 44.0 x 61.5 cm
<b>U535</b>	Upright	535	18.9	336	240	144	76.8" x 31.5" x 34.1" 195 x 80 x 86.7 cm	53.7" x 25.2" x 24.2" 136.5 x 64 x 61.5 cm
<b>U725 &amp;U725-G</b>	Upright	725	25.6	504	360	216	76.8" x 40.4" x 34.1" 195 x 102.5 x 86.7 cm	53.7" x 34.1" x 24.2" 136.5 x 86.5 x 61.5 cm
<b>C585</b>	Chest	585	20.7	416	288	192	43" x 66.5" x 30.9" 109.2 x 169 x 78.5 cm	30.7" x 47.2" x 24.6" 78 x 120 x 62.5 cm
<b>C760</b>	Chest	760	26.9	572	396	264	43" x 80.7" x 30.9" 109.2 x 205 x 78.5 cm	30.7" x 61.4" x 24.6" 78 x 156 x 62.5 cm

(†) To allow for handles and hinges, add 3.1" (80 mm) to width of upright freezers and 4.3" (110 mm) to the depth of chest freezers.

### Innova® U101 Personal-Sized, -86°C Upright Freezer For On or Under Your Lab Bench

Why store your valuable samples down the hall, when you can have the convenience and security of a personal-sized, 3.6 cu. ft (101 L) upright freezer on or under your lab bench?

- Integrated key lock on handle.
- Two inner doors prevent cold air loss; lift off for easy cleaning.
- Capacity: Hold up to 6000 samples (60 two-inch boxes).
- Stackable.
- Rear wheels provide easy mobility.
- All the advantages of our other Innova models.



Front-opening door for easy access to all samples

Model	Catalog No.	Electrical Service
<b>Innova U101 Upright</b>	U9420-0000 U9420-0001	120V, 60Hz* 230V, 50Hz‡
Stacking Kit	P0625-0020	—
External Voltage Stabilizer	M1322-0000	120V, 60 Hz
Air Filter, Washable Spare	K0200-0506	—

(\*) Dedicated 20 Amp line required for 120 V freezers. (‡) All 50 Hz freezers are supplied with both UK and Schuko power cords.

## Innova® U360 Ultra-Slim Upright Freezer with Advanced Control & Monitoring

Ultra-slender, 12.7 cu. ft. (360 liters), the Innova upright U360 offers all the advantages of our other Innova freezers, plus an advanced new controller with:

- Large, back-lit display (4.75" x 2.7" [12 x 6.8 cm]) for on-screen monitoring, programming & data graphing.
- Automated data logging of temperature, alarms and door openings.
- User-programmable setpoints, alarms & passwords – Programmable alarm delays, with log showing alarm acknowledgments.
- On-screen messaging and diagnostics.
- Three compartments with insulated, gasketed, lift-off inner doors, and an advanced new low-noise, energy-saving refrigeration system are a few of the other advantages.



Just 26.4" wide (67 cm) including the handle!

Model	Catalog No.	Electrical Service
<b>Innova U360 Upright</b>	U9425-0000 U9425-0001	120V, 60Hz* 230V, 50Hz‡
Internal, Slide-In Voltage Stabilize	P0625-1090	120V, 60Hz
Air Filter, Washable Spare	P0625-1110	—

(\*) Dedicated 20 Amp line required for 120 V freezers. (‡) All 50 Hz freezers are supplied with both UK and Schuko power cords.

## ULTRA-LOW TEMPERATURE (-86°) FREEZERS

## More Innova® Freezer Models, Uprights and Chests



U535



U725



C585



C760

Model	Catalog No.	Electrical Service
<b>Innova® U535 Upright</b>	U9430-0000 U9430-0002 U9430-0001	120V, 60Hz* 208/220V, 60Hz 230V, 50Hz†
<b>Innova® U725 Upright†</b>	U9440-0002 U9440-0001	208/220V, 60Hz* 230V, 50Hz†
<b>Innova® C585 Chest</b>	U9400-0000 U9400-0002 U9400-0001	120V, 60Hz* 208/220V, 60Hz 230V, 50Hz†
<b>Innova® C760 Chest</b>	U9410-0002 U9410-0001	208/220V, 60Hz 230V, 50Hz†

(\* ) Dedicated 20 Amp line required for 120 V freezers (†) All 50 Hz freezers are supplied with both UK and Schuko power cords.  
(†) See also 50 Hz HFC-free Green-model U725-G on page 31.

## Premium -86°C Ultra-Low Temperature Freezers with Traditional Urethane Foam Insulation

**Insulation:** Conventional urethane foam insulation.

**Display and Control:** Easy-to-read LED display; S.M.A.R.T. PLUS™ controller presents error and alarm codes and detailed systems information.

**Advanced Features:** NEW vent plunger; heated air vent prevents vacuum formation; keyed lock; user-defined password protection; stainless-steel interior; 4 shelves included in upright models; removable power cords and numerous options and accessories.

Model No.	Style	Capacity		Max. Box Capacity			Dimensions (H x W x D)	
		Liters	Cubic Ft.	2"	3"	4"	External†	Internal
<b>U410</b>	Upright	410	14.5	240	180	120	75.4" x 31.5" x 33.5" 191.5 x 80 x 85.2 cm	49.8" x 21.7" x 22.6" 126.5 x 55 x 57.5 cm
<b>U570 &amp; U570-G</b>	Upright	570	20	400	300	200	75.8" x 40.3" x 33.5" 192.5 x 102.5 x 85.2 cm	49.8" x 30.1" x 22.6" 126.5 x 76.5 x 57.5 cm
<b>C340</b>	Chest	340	12	260	180	120	42.3" x 52.8" x 33.1" 107.5 x 134 x 84 cm	30.0" x 30.0" x 23.2" 76 x 76 x 59 cm
<b>C660</b>	Chest	660	23.3	520	360	240	42.3" x 80.7" x 33.1" 107.5 x 205 x 84 cm	30.0" x 57.9" x 23.2" 76 x 147 x 59 cm

(†) To allow for handles and hinges, add 3.1" (80 mm) to width of upright freezers and 4.3" (110 mm) to the depth of chest freezers.

## Premium Freezer Models, Uprights and Chests

Four space-saving Premium models to choose from:

- Two Uprights: For easy access to samples, choose the U410 or U570, each with five compartments and four adjustable-height shelves.
- Two Chests: If a chest style is preferred, choose C340 or C660. Two insulated panels provide added insulation.
- CO<sub>2</sub> and LN<sub>2</sub> Back-up systems available – see below.



U410



U570



C340



C660

Model	Catalog No.	Electrical Service
<b>Premium U410 Upright</b>	U9260-0000	120V, 60Hz*
	U9260-0002	208/220V, 60Hz
	U9260-0001	230V, 50Hz <sup>†</sup>
<b>Premium U570 Upright</b>	U9270-0000	120V, 60Hz*
	U9270-0002	208/220V, 60Hz
	U9270-0001	230V, 50 Hz <sup>†</sup>
<b>Premium C340 Chest</b>	U9230-0000	120V, 60Hz*
	U9230-0001	230V, 50Hz <sup>†</sup>
<b>Premium C660 Chest</b>	U9250-0002	208/220V, 60Hz
	U9250-0001	230V, 50Hz <sup>†</sup>

(\* ) Dedicated 20 Amp line required for 120 V freezers. (†) All 50 Hz freezers are supplied with both UK and Schuko power cords.

## CO<sub>2</sub> & LN<sub>2</sub> Freezer Back-up Systems, Innova® & Premium ^

Totally independent systems utilize their own temperature probe and battery back-up to provide protection, even during a power outage.

Catalog No.	Description
<b>Innova® Freezers</b>	
U9043-0002	CO <sub>2</sub> Back-up, 120 - 220V, 60Hz
U9043-0004	CO <sub>2</sub> Back-up, 230V, 50Hz
U9044-0002	LN <sub>2</sub> Back-up, 120 - 220V, 60Hz
U9044-0004	LN <sub>2</sub> Back-up, 230V, 50Hz
<b>Premium Freezers</b>	
U9043-0006	CO <sub>2</sub> Back-up, 120 - 220V, 60Hz
U9043-0008	CO <sub>2</sub> Back-up, 230V, 50Hz
U9044-0006	LN <sub>2</sub> Back-up, 120 - 220V, 60Hz
U9044-0008	LN <sub>2</sub> Back-up, 230V, 50Hz

(^ ) NBS recommends that all back-up systems be factory installed.

## FREEZER ACCESSORIES, ALL MODELS

### Freezer Accessories (More accessories on pages 35 and below)

Catalog No.	Description
<b>7-Day Chart Recorder</b>	
K0440-0355	7-Day Chart Recorder
K0540-0025	Chart Recorder Paper, pack of 100 charts
K0660-0051	Chart Recorder Pens, pack of 3
<b>Shelves†</b>	
K0280-1031	Extra Shelf, Premium Model U410
K0280-1030	Extra Shelf, Premium Model U570
P0625-1180	Extra Shelf, Innova® Model U360
K0280-1034	Extra Shelf, Innova® Model U535
K0280-1036	Extra Shelf, Innova® Model U725
<b>Padlock Adapter Kit: All upright models</b>	
P0625-1170	Kit allows up to two user-supplied padlocks to be secured to outer door handle for extra security.
<b>External Voltage Stabilizer: for Premium and U101 Freezers only</b>	
M1322-0000	External Voltage Stabilizer, 120V, 60Hz
M1322-0002	External Voltage Stabilizer, 208/220V, 60Hz
<b>Automated Data Logging Software</b>	
M1291-0054	BioCommand® SFI - Automated Data Logging Software (see page 44).

CALL for Availability

(†) All shelves provided with 4 shelf clips for installation.

## Inventory Racking Systems, Innova® & Premium

Lightweight for easy transport, yet durably constructed of non-corrosive aluminum, our freezer racking is exclusively designed for New Brunswick Scientific freezers to maximize storage space; and provide one of the lowest costs per capacity in the industry. Racks for upright freezers feature drawers that pull forward for easy accessibility to your samples. Standard racking holds boxes of various sizes, or we can supply racks to any specification. Other racking systems may be available. Contact your NBS sales representative for details.



### How To Select Racking Accessories

**Step 1.** Select your box size in the chart below.

**Step 2.** Choose the correct divider for your tube/vial diameter.

**Step 3.** Choose the appropriate rack to match your box size from the chart on the next page.

### 1. NBS Plastic-Coated Cardboard Boxes

Choose correct Box for your tube/vial C660	Catalog No.	Max Tube Height		Box Dimensions (H x W x D)	
		Inches	mm	Inches	mm
	B50-SQ	2"	50	5.2 x 5.2 x 1.97"	132 x 132 x 50 mm
B75-SQ	3"	75	5.2 x 5.2 x 2.76"	132 x 132 x 75 mm	
B95-SQ	4"	100	5.2 x 5.2 x 3.4"	132 x 132 x 100 mm	

### 2. Dividers for NBS Plastic-Coated Cardboard Boxes

Choose correct Box Divider for your tube/vial Diameter	Catalog No.	Maximum Tube Diameter		Matrix	No. of Vials or Tubes
		Inches	mm		
	D100	0.46	11.8	10 x 10	100
D81	0.51	13.0	9 x 9	81	
D64	0.59	15.0	8 x 8	64	
D49	0.69	17.4	7 x 7	49	

## 3. Racks and Boxes

To determine the Rack Catalog Number and Price, select your box size, and read down the chart columns.				To determine maximum quantity of Racks and Boxes your freezer can hold, read across the chart rows.				
Freezer Model	2" or 50 mm	3" or 75 mm	4" or 100 mm	Total Racks per Freezer	x	Boxes per Rack	=	Total # Boxes per Freezer
U101	K0641-3003			6	x	10	=	60
		K0641-3004				6		36
			K0641-3005			4		24
U360/U535	K0641-3000			9 / 12	x	28 28	=	252 336
		K0641-3001				20 20		180 240
			K0641-3002			12 12		108 144
U725	K0641-3000			18	x	28	=	504
		K0641-3001				20		360
			K0641-3002			12		216
C585	K0641-1690			32	x	13	=	416
		K0641-1700				9		288
			K0641-1750			6		192
C760	K0641-1690			44	x	13	=	572
		K0641-1700				9		396
			K0641-1750			6		264
U410	K0641-1900			15	x	16	=	240
		K0641-1890				12		180
			K0641-1880			8		120
U570	K0641-1900			25	x	16	=	400
		K0641-1890				12		300
			K0641-1880			8		200
C340	K0641-1690			20	x	13	=	260
		K0641-1700				9		180
			K0641-1750			6		120
C660	K0641-1690			40	x	13	=	520
		K0641-1700				9		360
			K0641-1750			6		240
Rack Capacity Per Shelf & Per Freezer								
Style	Model	Max. Racks Per Shelf		Max No. of Shelves		Max. Racks Per Freezer		
Upright	U101 Innova	3		2		6		
	U360 Innova	3		3		9		
	U535 Innova	4		3		12		
	U725 Innova	6		3		18		
	U410 Premium	3		5		15		
	U570 Premium	5		5		25		
Chest	C585 Innova	N/A		N/A		32		
	C760 Innova	N/A		N/A		44		
	C340 Premium	N/A		N/A		20		
	C660 Premium	N/A		N/A		40		
External Rack Dimensions (Depth x Width x Height)								
Style	Model	Inches			mm			
Upright	U101 Innova	12.13 x 5.55 x 11.52			308 x 141 x 292.5			
	U360, U535 & U725 Innova	22.24 x 5.55 x 16.16			565 x 141 x 410.5			
	U410 & U570 Premium	22.24 x 5.55 x 9.25			565 x 141 x 235			
Chest	ALL Models	5.35 x 5.47 x 29.61			136 x 139 x 752			

## ABOUT GALAXY INCUBATORS

**NEW**

### New Brunswick Galaxy® CO<sub>2</sub> Incubators

The sophistication required of today's cell culture laboratories is increasing rapidly in light of historic advances in the emerging fields of Stem Cell, IVF, as well as traditional cell culture. The specific requirements for experimentation have gone beyond a "one size fits all" platform to fit the need for both a robust and highly controllable incubator. These advancements have altered the role of the CO<sub>2</sub> incubator into an integral instrument of research advancement.

In response to these needs, NBS redesigned our Galaxy brand of CO<sub>2</sub> incubators to offer more standard features and more options. Additionally, we now offer a new full-featured, economical model, the Galaxy 48 S. By responding to the rapidly growing needs of cell culture, NBS has the CO<sub>2</sub> incubator to drive today's research, as well as meet the future demands of your laboratory.

#### Standard Features

**Direct-Heating System:** A unique heating profile uses natural convection to gently bathe cells in warm air. This not only allows for superior uniformity, but also guards against the rapid fluctuations seen in traditional fan-driven incubators which can cause drastic changes in genotypic and phenotypic expression of cells.

**Fanless Design with Seamless Deep-Drawn Chamber:** By eliminating the fan and housing, the Galaxy incubator is able to provide the maximum usable space in the chamber. There is no increase in desiccation on the top shelf so your samples are uniform throughout the chamber. In addition, the fanless design removes a historical hotspot of contamination as well as eliminates the need for expensive internal HEPA filters. This, combined with the seamless chamber, leaves contaminants no place to hide.

**Advanced Display and Controller:** The large 5.3" (13.5 cm) display on the Galaxy R Series incubators allows for comprehensive and rapid analysis of system performance and incorporates user-friendly intuitive controls. In addition, these models offer 72-hour on-board graphing capability of temperature, gas, and alarms.

**IR CO<sub>2</sub> Sensor:** The Infra-Red CO<sub>2</sub> sensor provides superior accuracy and stability over traditional thermo-conductivity sensors.

**NEW – Sealing Inner Glass Door:** Standard on 170 R & S models. Engineered to offer more rapid gas and temperature recovery, and allow users the ability to see their cultures while maintaining critical atmosphere.

**NEW – 25mm Access Port:** Standard on 170 R & S, and 48 R & S models, the access port allows additional probes and equipment to be used inside the incubator.

**NEW – RS-232 Port:** The RS-232 communications port allows for data off-loading and logging to a PC.

**NEW – Perforated Shelves:** The newly designed perforated shelves offer increased performance in temperature, gas and humidity recovery.



#### Options

**High-Temperature Disinfection:** One touch 120° C 4-hour sterilization cycle for enhanced contamination protection. Available on the 170 R & S, and 48 R.

**Oxygen Control:** Three levels of oxygen control to provide a hypoxic or hyperoxic environment.

- 1.0 – 19% O<sub>2</sub> Most common option is ideal for the majority of hypoxic applications
- 0.1 – 19% O<sub>2</sub> Option for strict hypoxic conditions.
- 1.0 – 95% O<sub>2</sub> Tri-gas option for both hypoxic and hyperoxic studies.

Applications: Stem Cell, IVF, *In-Vivo* mimicking  
Available on the 170 R, 48 R, and 14 S

**NEW – Cooling Option:** Improved cooling option using a Peltier cooling unit to provide the ability to culture cells at or 10°C below ambient temperatures.

Applications: Plant Cell, Biofuels  
Available on the 170 R

**NEW – Active Humidification System:** (AHS) allows you to set and maintain humidity using non-condensing humidification. This option also provides superior humidity recovery and humidity stability and prevents desiccation.

Applications: Low Volume, Microtiter Plate Culture  
Available on the 170 R

**Humidity Monitoring Package:** The humidity package features a humidity sensor, display and humidity tray warning system for additional monitoring and control.

Applications: All  
Available on the 170 R and 48 R

FULL-SIZED CO<sub>2</sub> INCUBATORS

## Galaxy® 170 R & S, 170 Liter/6.0 cu. ft. Capacity

The 170 Series offers the advanced LCD display with on-board 72-hour data logging.

**Standard Features:** include an IR CO<sub>2</sub> Sensor, sealed inner glass door, RS-232 communications port, and a 25 mm Access port. The integrated LCD controller allows simple on-screen programming of alarms and settings. The R Series allows for the full range of options including O<sub>2</sub> Control, Active Humidification, High-Temperature Disinfection, Active UV-Sterilization and cooling. Galaxy 170 incubators offer 6.0 cu. ft. of a highly controlled incubation environment, and a tremendous amount of usable space, all in a conveniently small footprint. These units are stackable with stand, and shelving is easily removable without tools for a rapid wipe down.

**R Series:** The full-featured R unit includes a large 5.3" (13.5 cm) intuitive controller with on-board data logging and simple access to alarms and settings, and allows complete access to the full range of upgrades including the new AHS and Cooling modules as well as O<sub>2</sub> control and High-Temperature Disinfection.

**S Series:** A full-featured unit with an LED control system and High-Temperature Disinfection.

**Volume:** 170L, 6.0 cu. ft.

**Shelves:** 4 Shelves

**External Dimensions:** 27" W x 26.7" D x 33.2" H,  
(68.7 x 68 x 84.4 cm)

**Internal Dimensions:** 21" W x 17.5" D x 27.2" H,  
(54 x 44.4 x 69.3 cm)

**Weight:** 198 lbs. (90 kg)

**Range:** 4°C above Ambient to 50°C

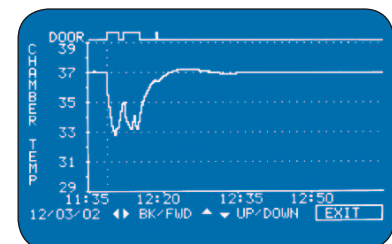
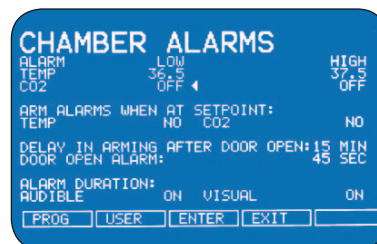
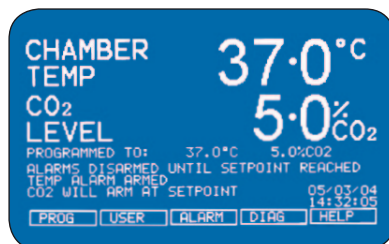
**Uniformity:** +/- 0.2°C

**Certification:** CE



Galaxy 170 R

Model	Catalog No. for 120V	Catalog No. for 230V	Factory Installed Options
<b>Galaxy® 170 R</b>	CO170R-120-0000	CO170R-230-0000	
	CO170R-120-1000	CO170R-230-1000	High-Temp Disinfection
	CO170R-120-0200	CO170R-230-0200	1 - 19% O <sub>2</sub> Control
	CO170R-120-1200	CO170R-230-1200	High-Temp Disinfection, 1 - 19% O <sub>2</sub> Control
<b>Galaxy® 170 S</b>	CO170S-120-0000	CO170S-230-0000	
	CO170S-120-1000	CO170S-230-1000	High-Temp Disinfection



Galaxy R Series incubators feature a large back-lit display, providing a detailed record of chamber conditions – including an automated 72-hr. record of historical data.

For more options and configurations see page 42.

PERSONAL-SIZED CO<sub>2</sub> INCUBATORS**NEW****Galaxy® 48 R & S,  
48 Liter / 1.7 cu. ft. Capacity**

Galaxy 48 R & S Incubators are specifically designed for smaller laboratories and applications requiring a higher level of isolation. They provide many of the same standard features as the 170 Series, and include a viewing window on the outside door, to provide sophisticated performance in a smaller package.

**R Series:** Offers large 5.3" (13.5 cm) LCD intuitive interface with 72-hour data logging and easy access to setpoints and alarms. This unit is upgradeable with many options including O<sub>2</sub> control and High-Temperature Disinfection.

**S Series:** A full-featured unit with an LED control system.

**Volume:** 48 L, 1.7 cu. ft.

**Shelves:** 3 Shelves

**External Dimensions:** 19" W x 18.7" D x 25.4" H,  
(48.4 x 47.5 x 64.5 cm)

**Internal Dimensions:** 15.8" W x 12" D x 15.8" H,  
(40.1 x 30.8 x 40.1 cm)

**Weight:** 71 lbs. (32 kg)

**Range:** 4°C above Ambient to 50°C

**Uniformity:** +/- 0.2°C

**Certification:** CE



Galaxy 48 R

Model	Catalog No. for 120V	Catalog No. for 230V	Factory Installed Options
<b>Galaxy® 48 R</b>	CO48R-120-0000	CO48R-230-0000	
	CO48R-120-1000	CO48R-230-1000	High-Temp Disinfection
	CO48R-120-0200	CO48R-230-0200	1 - 19% O <sub>2</sub> Control
	CO48R-120-1200	CO48R-230-1200	High-Temp Disinfection, 1 - 19% O <sub>2</sub> Control
<b>Galaxy® 48 S</b>	CO48S-120-0000	CO48S-230-0000	

For more options and configurations see page 43.

MICRO-SIZED CO<sub>2</sub> INCUBATOR

## Galaxy® 14 S, 14 Liter/0.5 cu. ft. Capacity

The unique Galaxy 14 S, originally designed for the IVF market, is ideal for isolation of sensitive cultures. Its compact size allows the unit to be placed directly in your work area and its 0.5 cu.ft. capacity allows for an enhanced uniformity and temperature specification.

**S Series:** The 14 S offers compact CO<sub>2</sub> culture capability in a package that does not intrude on your valuable laboratory space. Also available with a 1 - 19% O<sub>2</sub> control option, ideal for IVF and stem cell applications.

**Volume:** 14 L, 0.5 cu. ft.

**Shelves:** 2 Shelves

**External Dimensions:** 12.3" W x 11" D x 17.8" H,  
(31.3 x 28.5 x 45.1 cm)

**Internal Dimensions:** 9.2" W x 8.2" D x 11.5" H,  
(23.3 x 20.8 x 29.2 cm)

**Weight:** 28 lbs. (12.5 kg)

**Range:** 4°C above Ambient to 50°C

**Uniformity:** +/- 0.2°C

**Certification:** CE




Model	Catalog No. for 120V	Catalog No. for 230V	Factory Installed Options
<b>Galaxy® 14 S</b>	CO14S-120-0000	CO14S-230-0000	
	CO14S-120-0200	CO14S-230-0200	1 - 19% O <sub>2</sub> Control

For more options and configurations see page 43.

## INCUBATOR OPTIONS AND ACCESSORIES

Galaxy Incubator Model **	170 R	170 S
Standard, 120V	CO170R-120-0000	CO170S-120-0000
Standard, 230V	CO170R-230-0000	CO170S-230-0000
With High-Temp. Disinfection, 120V	CO170R-120-1000	CO170S-120-1000
With High-Temp. Disinfection, 230V	CO170R-230-1000	CO170S-230-1000
With 1 - 19% O <sub>2</sub> Control, 120V	CO170R-120-0200	—
With 1 - 19% O <sub>2</sub> Control, 230V	CO170R-230-0200	—
With High-Temp. & 1 - 19% O <sub>2</sub> Control, 120V	CO170R-120-1200	—
With High-Temp. & 1 - 19% O <sub>2</sub> Control, 230V	CO170R-230-1200	—
<b>Additional Factory-Installed Options</b>		
O <sub>2</sub> Control, 0.1 - 19%	P0628-5410	—
O <sub>2</sub> Control, 1 - 95%	P0628-5400	—
Cooling System (below ambient) ø	P0628-6810	—
Active Humidification ø	P0628-6800	—
Building Management System Relays	P0628-5540	P0628-5651
Single Inner Glass Door	Standard	Standard
Split Inner Doors - 2	—	—
Split Inner Doors - 4	P0628-6780	P0628-6780
Split Inner Doors - 8	P0628-6781	P0628-6781
Humidity Alert Package (Display and Alarm)	P0628-6820	—
Internal Sealed Power Supply (IP66)	P0628-5560	P0628-5560
Copper Chamber	P0628-5612	P0628-5612
<b>Accessories – Gas Management &amp; Analysis</b>		
Two Stage CO <sub>2</sub> Regulator	P0628-5010	P0628-5010
Two Stage N <sub>2</sub> Regulator	P0628-7220	—
CO <sub>2</sub> Supply Line HEPA Filters (2)	P0628-5020	P0628-5020
CO <sub>2</sub> In-line Pressure Regulator	P0628-5030	P0628-5030
CO <sub>2</sub> Cylinder Auto-Changeover Controller	P0628-5000	P0628-5000
Auto-Zero HEPA Filters (5)	P0628-5060	P0628-5060
CO <sub>2</sub> Gas Analyzer Kit	P0628-5040	P0628-5040
Spare CO <sub>2</sub> Gas Analyzer Tubes (10)	P0628-5050	P0628-5050
Electronic CO <sub>2</sub> Gas Analyzer	P0628-6150	P0628-6150
Electronic CO <sub>2</sub> & O <sub>2</sub> Gas Analyzer	P0628-6831	P0628-6831
Electronic CO <sub>2</sub> & O <sub>2</sub> Gas A. w/ °C & RH meas.	P0628-6832	P0628-6832
Calibration Gas 5%, 20L Disposable Canister	P0628-7211	P0628-7211
Control Valve & Flow Indicator for 20L Canister	P0628-6061	P0628-6061
Calibration Gas 5%, 105L Disposable Canister	P0628-7210	P0628-7210
0.3L/min Flow Regulator w/ pressure Gauge†	P0628-7221	P0628-7221
<b>Accessories – Shelves, Pans &amp; Stacking Stand</b>		
Multi-Position Shelf Rack	Standard	P0628-6390
Additional Shelf, non-perforated	P0628-6241	P0628-6241
Additional Shelf, perforated	P0628-6251	P0628-6251
Lower and Upper Stacking Frame, with casters	P0628-6270	P0628-6270
Lower Stacking Frame, with casters	P0628-6490	P0628-6490
Upper Stacking Frame	—	—
Stacking Frame for Stacking 2 Incubators	—	—
<b>Accessories – Electronics &amp; Software</b>		
BioCommand® SFI Software*	M1291-0054	M1291-0054

\*\*Catalog numbers subject to change without notice. Additional incubator configurations are also available. Ordering them, or ordering custom options, will affect delivery and shipping. Not all options are compatible. Ask your local NBS Sales Rep for quotation. All models are 50/60 Hz units. \* Call for availability.

(†) For Reusable 105 Liter cylinder. (ø) Please check availability before ordering. Cooling option cannot be combined with High-Temperature Disinfection options.

Galaxy Incubator Model **	48 R	48 S	14 S
Standard, 120V	CO48R-120-0000	CO48S-120-0000	CO14S-120-0000
Standard, 230V	CO48R-230-0000	CO48S-230-0000	CO14S-230-0000
With High-Temp. Disinfection, 120V	CO48R-120-1000	—	—
With High-Temp. Disinfection, 230V	CO48R-230-1000	—	—
With 1 - 19% O <sub>2</sub> Control, 120V	CO48R-120-0200	—	CO14S-120-0200
With 1 - 19% O <sub>2</sub> Control, 230V	CO48R-230-0200	—	CO14S-230-0200
With High-Temp. & 1 - 19% O <sub>2</sub> Control, 120V	CO48R-120-1200	—	—
With High-Temp. & 1 - 19% O <sub>2</sub> Control, 230V	CO48R-230-1200	—	—
<b>Additional Factory-Installed Options</b>			
O <sub>2</sub> Control, 0.1 - 19%	P0628-6280	—	—
O <sub>2</sub> Control, 1 - 95%	P0628-5260	—	—
Cooling System (below ambient) ø	—	—	—
Active Humidification ø	—	—	—
Building Management System Relays	P0628-5340	P0628-5341	P0628-6300
Single Inner Glass Door	—	—	P0628-6210
Split Inner Doors - 2	P0628-5330	P0628-5330	—
Split Inner Doors - 4	—	—	—
Split Inner Doors - 8	—	—	—
Humidity Alert Package (Display and Alarm)	P0628-6770	—	—
Internal Sealed Power Supply (IP66)	P0628-5350	P0628-5350	—
Copper Chamber	—	—	—
<b>Accessories – Gas Management &amp; Analysis</b>			
Two Stage CO <sub>2</sub> Regulator	P0628-5010	P0628-5010	P0628-5010
Two Stage N <sub>2</sub> Regulator	P0628-7220	—	P0628-7220
CO <sub>2</sub> Supply Line HEPA Filters (2)	P0628-5020	P0628-5020	P0628-5020
CO <sub>2</sub> In-line Pressure Regulator	P0628-5030	P0628-5030	P0628-5030
CO <sub>2</sub> Cylinder Auto-Changeover Controller	P0628-5000	P0628-5000	P0628-5000
Auto-Zero HEPA Filters (5)	P0628-5060	P0628-5060	P0628-5060
CO <sub>2</sub> Gas Analyzer Kit	P0628-5040	P0628-5040	P0628-5040
Spare CO <sub>2</sub> Gas Analyzer Tubes (10)	P0628-5050	P0628-5050	P0628-5050
Electronic CO <sub>2</sub> Gas Analyzer	P0628-6150	P0628-6150	P0628-6150
Electronic CO <sub>2</sub> & O <sub>2</sub> Gas Analyzer	P0628-6831	P0628-6831	P0628-6831
Electronic CO <sub>2</sub> & O <sub>2</sub> Gas A. w/ °C & RH meas.	P0628-6832	P0628-6832	P0628-6832
Calibration Gas 5%, 20L Disposable Canister	P0628-7211	P0628-7211	P0628-7211
Control Valve & Flow Indicator for 20L Canister	P0628-6061	P0628-6061	P0628-6061
Calibration Gas 5%, 105L Disposable Canister	P0628-7210	P0628-7210	P0628-7210
0.3L/min Flow Regulator w/ pressure Gauge†	P0628-7221	P0628-7221	P0628-7221
<b>Accessories – Shelves, Pans &amp; Stacking Stand</b>			
Multi-Position Shelf Rack	P0628-5100	P0628-5100	P0628-6170
Additional Shelf, non-perforated	P0628-5070	P0628-5070	P0628-6180
Additional Shelf, perforated	P0628-5080	P0628-5080	P0628-7200
Lower and Upper Stacking Frame, with casters	P0628-5091	—	—
Lower Stacking Frame, with casters	P0628-5090	P0628-5090	—
Upper Stacking Frame	P0628-6720	P0628-6720	—
Stacking Frame for Stacking 2 Incubators	—	—	P0628-6230
<b>Accessories – Electronics &amp; Software</b>			
BioCommand® SFI Software*	M1291-0054	M1291-0054	M1291-0054

\*\*Catalog numbers subject to change without notice. Additional incubator configurations are also available. Ordering them, or ordering custom options, will affect delivery and shipping. Not all options are compatible. Ask your local NBS Sales Rep for quotation. All models are 50/60 Hz units. \* Call for availability.

(†) For Reusable 105 Liter cylinder. (ø) Please check availability before ordering. Cooling option cannot be combined with High-Temperature Disinfection options.

Please consult your NBS sales representative for assistance selecting the right combination for your lab.

## AUTOMATED DATA LOGGING SOFTWARE / ROLLER DRUMS

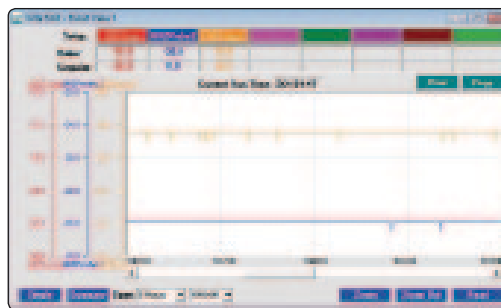


## BioCommand® SFI Data-Logging Software

**BioCommand® SFI Track and Trend Software:** The BioCommand SFI software package is designed specifically for standard laboratory equipment including Shakers, CO<sub>2</sub> Incubators and ULT Freezers\*. The software package allows you to track key operational information such as time, temperature, shaking speed, CO<sub>2</sub> concentrations and humidity.

### Features:

- Design and save templates designed to track the operational parameters you select.
- Monitor multiple units from the same PC.
- Trend and archive critical data including temperature, agitation speed and gas concentration for up to 32 units simultaneously.
- Provides indications of alarm conditions identified by the product.
- Graphical representation of the output.



Model	Catalog No.	CALL for Availability
<b>BioCommand® SFI</b>	M1291-0054	
Cable for Shakers	M1293-8021	
Cable for Freezers	M1293-8022	
Cable for CO <sub>2</sub> Incubators	M1293-8023	

(\*) Units must have RS-232, RS-422 or USB port.

## Tissue/Microbial Culture Roller Drum, TC-7 & TC-8

Precision tool designed for the growth of tissue and bacterial cultures by the roller tube method.

**Interchangeable Drums:** accommodate 13 mm, 16 mm, 18 mm & 25 mm test tubes and 50 mL centrifuge tubes. Drums sold separately.

**Speed:** 6 to 56 rpm in Model TC-7 and 0.2 to 3.5 in Model TC-8.

**Overall dimensions:** 15" W x 13.5" D x 18" H max. (Height varies dependent on angle adjustment; 37.4 x 34 x 46 cm).

**Net weight:** 16 lbs. (7.3 kg).



Model	Catalog No.	Speed (RPM)	Electrical Service
<b>TC-7</b>	M1053-4004	6 - 56	120V, 50/60Hz
	M1053-4005	6 - 56	220/230V, 50/60Hz
<b>TC-8</b>	M1053-5004	0.2 - 3.5	120V, 50/60Hz
	M1053-5005	0.2 - 3.5	220/230V, 50/60Hz

## Interchangeable Roller Drums, 14" (36 cm) diameter

Catalog No.	Description
ATC-TT16	Holds 164 test tubes 16 mm and smaller
M1053-0450	Holds 164 test tubes 18 mm and smaller
ATC-TT25	Holds 80 test tubes 25 mm and smaller
M1053-0360	Holds 46 size 50 mL centrifuge tubes, 30 mm and smaller
M1053-0306	Holds 311 test tubes, 13 mm diameter x 100 mm length

AGAR STERILIZER

## MediaMatic® MM9 Benchtop Media Sterilizer

Sophisticated, versatile media sterilizer, benchtop autoclave and controlled water bath.

**Volume:** prepares from 1 to 9 liters of media in about an hour.

**Features:** simple operation combined with 45 storable programs and two-speed stirring provide for controlled production of media and agar.

**Advanced Features:** Built-in printer provides record of all production parameters. Headplate opens without tools or removing bolts – just twist open! Sterile filtered air vent. Uniquely flexible machine can be used for media preparation, general autoclaving for flasks and controlled temperature water-bath applications.

**Overall Dimensions:** 19.3" W x 22.5" D x 17.2"H (49 x 57 x 43.7 cm).

**Net weight:** 108 lbs. (49 kg).

**Certifications:** CE & UL.



Connects easily to PourMatic® for complete Media Prep System!

Model	Catalog No.	Electrical Service
<b>MediaMatic</b>	M1325-0000 M1325-0002	120/240V, 60Hz 230V, 50Hz

### MediaMatic Accessories

Catalog No.	Description
P0626-0010	Inner Vessel, stainless steel
P0626-0020	Magnetic Stirrer
P0626-0030	Sterile Air Filter, 0.45µM
P0626-0040	Seal for Vessel Lid, replacement
P0626-0050	Dispense Fitting for media withdrawal
P0626-0100	Base Plate & Flexible PT 100 Temperature Sensor (required when autoclaving flasks)
P0626-0060	Dispense Tube (decanting), silicone
P0626-0080	Dispense Tube (decanting), stainless steel
P0626-0070	Printer Paper Roll, 1 per pack
P0626-0090	Temperature Sensor, double PT 100 flexible
P0626-0091	Temperature Sensor, double PT 100 rigid
M1325-2210	Cooling Water Regulator Kit

## AUTOMATED DISH FILLER

### PourMatic® Model MP-1000 Automated Plate Pouring System

Dependable, automated petri dish pouring system.

**Capacity:** holds up to 320 petri dishes (100 x 15 mm, or 60 x 15 mm) with a dispensing capacity of 5 - 40 mL. Pours and stacks 320 plates in about 20 minutes.

**Features:** simple dispense line connection using the Masterflex EZ Load Pump head.

**Advanced Features:** optional conversion kits allow easy conversion of 100 mm plate instrument to 60 mm plates and vice versa. A coding ink jet printer is available for printing directly onto the plates. Contact your local NBS sales representative for details.

**Overall Dimensions:** 20.5" W x 24" D x 34" H (52 x 61 x 86.4 cm).

**Net weight:** 80 lbs. (36.3 kg).

**Certifications:** CE & cETL



For 60 or 100 mm plates.  
Connects easily to MediaMatic®  
for a complete Media Prep System!












Model	Catalog No.	Electrical Service	Plate Size
<b>PourMatic</b>	M1224-0002 M1224-0006	120V, 60Hz 220V, 50Hz	100 mm
	M1224-0001 M1224-0005	120V, 60Hz 220V, 50Hz	60 mm

### PourMatic MP-1000 Accessories

Catalog No.	Description
P0160-4440	Spring Clamp for securing tubing
M1224-3000	Dispensing Line Kit, includes stainless steel plug-in deflecting nozzle, 12 ft. (3.7m) silicone tubing, 2 spring lamps
P0300-0350	UV Lamp, 4 watts (spare)
P0740-2505	Silicone Tubing, 25 ft. (7.6m) 4.8 mm i.d.
M1224-0160	Conversion Kit from 100 mm to 60 mm plates
M1224-0100	Conversion Kit from 60 mm to 100 mm plates
M1224-0110	Dual Nozzle Kit for Pouring Bi-Plates comes complete with one additional Masterflex quick-load pump head
M1224-9200	Dispensing Nozzle, stainless-steel (spare)
M1224-9740	Foot Pedal Pump Switch, factory installed
P0620-6430	Ink Jet Printer (Requires bracket assembly below), installation & training also available
M1240-1000	Bracket Assembly for Ink Jet Printer (must be used with printer above)

FERMENTOR / BIOREACTOR FEATURE COMPARISON

Selecting the Right Model Fermentor / Bioreactor

	Volume: T=Total W=Working	Sterilization Method *	Bacterial/Yeast/Fungi	Plant/Algae	Mammalian/Animal	Insect	Interchangeable Vessels	Controller †	Touchscreen Controller	Heat Induction	Air Flow Control †	Gas Mixing Options	Validatable	Page	
<b>FibraStage®</b> Single-Use Cell Culture System	(W) 500 mL	S	•	•	•									49	
<b>CelliGen™ BLU</b> Single-Use Bioreactor	(T) 5.0 - 14.0 L (W) 1.3 - 10.5 L	S			•	•	•	RPC	•		R or TMFC	3/4 Gas	•	50	
<b>BioFlo®/ CelliGen 115</b> Fermentor/ Bioreactor	(T) 1.3 - 14.0 L (W) 0.4 - 10.5 L	A	•	•	•	•	•	RPC	•		R or TMFC	2/3/4 Gas		55	
<b>BioFlo 310</b> Fermentor	(T) 2.5 - 14.0 L (W) 0.8 - 10.5 L	A	•	•	•	•	•	RPC	•	•	R or TMFC	2/3/4 Gas	•	62	
<b>CelliGen 310</b> Bioreactor	(T) 2.5 - 14.0 L (W) 0.8 - 10.5 L	A		•	•	•	•	RPC	•		R or TMFC	2/3/4 Gas	•	66	
<b>BioFlo 415</b> Fermentor	(T) 7.0 - 19.5 L (W) 2.0 - 15.5 L	SIP	•	•			•	RPC	•	•	TMFC	2/3/4 Gas	•	71	
<b>BioFlo 510</b> Fermentor	(T) 19.5 - 40.0 L (W) 5.2 - 32.0 L	SIP	•	•				RPC/ PLC	•	•	R or TMFC	2/3/4 Gas	•	73	
<b>CelliGen 510</b> Bioreactor	(T) 19.5 - 40.0 L (W) 5.2 - 32.0 L	SIP		•	•	•		RPC/ PLC	•		R or TMFC	2/3/4 Gas	•	73	
<b>BioFlo 610</b> Fermentor	(T) 65.0 - 125 L (W) 13.0 - 100 L	SIP	•	•		•		RPC	•	•	R or TMFC	1/2 Gas	•	75	
<b>BioFlo Pro</b> Fermentor	(T) 75.0 - 3000 L (W) 32.0 - 2400 L	SIP	•	•				PLC	•	•	R or TMFC	2 Gas	•	77	
<b>CelliGen Pro</b> Bioreactor	(T) 75.0 - 650 L (W) 18.8 - 520 L	SIP		•	•	•		PLC	•		R or TMFC	4 Gas	•	77	

(\*) Sterilization Methods: A=Autoclavable, S=Single-Use, SIP=Sterilizable-in-Place (†) Controllers: RPC=Reactor Process Controller, PLC=Programmable Logic Controller (‡) Air Flow Controllers: R=Rotameter, TMFC=Thermal Mass Flow Controller

## INCREASE CELL CULTURE YIELDS!

### FibraCel® Disks: A Solid Support Growth Material for Mammalian, Animal and Insect Cells

**Applications:** for growth of mammalian, animal and insect cells, used predominantly for production of secreted products such as recombinant proteins and viruses. Used in NBS' FibraStage, CelliGen® BLU, CelliGen® 310, CelliGen® 510 and CelliGen® Pro Bioreactors, and is available for use with disposable bags or other bioreactor systems.

**Anchorage-dependent cultures:** cell density and productivity can be up to ten times higher when using FibraCel® disks instead of ordinary microcarriers.

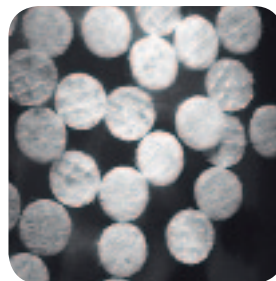
**Suspension cultures:** disks are electrostatically treated to facilitate suspension cells adhering to the disk and becoming entrapped in the disks' fiber system, where they remain throughout the process.

**Disk composition:** manufactured to cGMP guidelines, composed of USP Class VI polypropylene and polyester non-woven fiber.

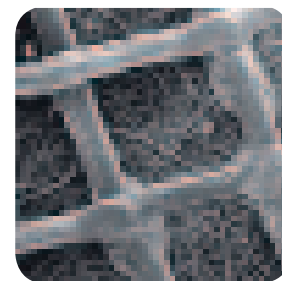
**Attachment:** cells can attach within 15 - 60 minutes on FibraCel®, compared to approximately six hours for cells to attach to ordinary microcarriers. FibraCel® bed is inoculated in a single step – no periodic stoppage needed to stir cells.

#### Advantages over standard microcarriers:

- Low pressure drop across the bed for easier scale-up.
- High surface-to-volume ratio increases the total biomass that can be maintained in the bioreactor for higher productivity.
- Cells are less susceptible to shear forces from impeller blades and sparger gas bubbles as they remain entrapped in the disk bed, shielded from turbulence.
- Higher mass transfer of nutrients and oxygen across the disk bed results in cells that are just as viable at the bottom of the bed as they are at the top.
- Simple and efficient separation of biomass from secreted products. FibraCel offers sustained long-term periods of high-density growth in perfusion, without any danger of clogging and with elimination of the need for cell filtration to separate cells from the end product.



FibraCel Disks



High resolution micrograph of FibraCel Disks showing polyester mesh with polypropylene support

FibraCel® Disk Specifications		Typical Quantity of FibraCel® Used	
Disk Diameter	6 mm	FibraStage	10 Grams
Autoclavable	Yes	2.5 L Vessel	50 Grams
Endotoxin Tested	Yes	5.0 L Vessel	150 Grams
Bioburden Tested	Yes	7.5 L Vessel	250 Grams
Cytotoxicity Tested	Yes	14.0 L Vessel	500 Grams

Catalog No.	Description
M1292-9984	FibraCel Disks, 50 grams
M1292-9988	FibraCel Disks, 250 grams

#### Cells Successfully Grown on FibraCel Disks

Hybridoma	Anchorage-Dependent	Insect
DA4.4, 123A, 127A, GAMMA, 67-9-B	Human Osteosarcoma, MRC-5, BHK, VERO, CHO, rCHO-tPA, rCHO - Hep B Surface Antigen, HEK 293, rHEK 293, rC127 - Hep Surface Antigen, Normal Human Fibroblasts, Stroma, Hepatocytes	Tn-368 SF9 rSF9 Hi-5

## SINGLE-USE, BENCHTOP CELL CULTURE SYSTEM

## FibraStage™ Single-Use, High-Density Cell Culture System, 500 mL

A small-scale, single-use system simplifies production of secreted products, virus or cells from anchorage-dependent and some suspension cultures.

**Consumables:** Pre-sterilized, single-use 500 mL bottle(s), pre-filled with 10 grams of the Fibracel® disks provide a low-shear environment and extremely high-surface area for cell growth.

**Non-consumable components:** FibraStage console with controller and adjustable-speed platform that collapses/expands the bottles, exposing cells to nutrients and gasses. Requires use of a CO<sub>2</sub> incubator for temperature and gas control.

**Control and display:** Keypad with LED display regulates bottle movement and "hold time," for efficient nutrient and gas exchange.

**Capacity:** 500 mL bottles; console holds up to four bottles.

**Overall dimensions:** 10.4" W x 14.1" D x 12.2" H (26.4 x 35.9 x 30.9 cm).

Ask your representative about our 30-day in-lab trial offer.



Controls up to four 500 mL bottles simultaneously

Model	Catalog No.	Description
FibraStage	M1327-1000	Console & Controller*
	M1327-9980	Disposable Bottles, Pack of 4

(\* ) Includes forceps for cell sampling and crystal violet dye.

To convert your FibraStage to a Continuous system, add a 3-head pump, and two tubing sets with pump heads from the continuous system options listed below. A 2 L media bottle is also highly recommended. When used as a continuous system, maximum capacity is three bottles.

## FibraStage™ Accessories

Catalog No.	Description
<b>Additional Parts for FibraStage Systems</b>	
P0620-6460	FibraStage™ Adapter (required for Europe)
P0640-0518	FibraStage™ Bottle Opener (To open bottle for harvesting disks)
P0440-0500	Glucose Monitoring Kit (Includes 50 test strips)
P0440-0508	Glucose Test Strips (Includes 50 test strips)
P0620-6470	9-Pin Signal Cable
P0640-0610	Crystal Violet dye (100 mL for cell counting – Nucleus counting kit)
P0640-0600	Cell Dissociation Tool (To compress the bottom of the bottle)
P0640-0620	FibraStage™ Bottle Cap
<b>Continuous System Options</b>	
P0620-3040	FibraStage™ 3-Head Pump (3 individually controlled motor units) tubing & pump head not included.
P0740-2730	Tubing Set & Pump Head (Includes 1 set of tubing, tubing connectors and pump head)
P0740-2740	Tubing Only (Includes 5 sets of tubing)
M1228-5014	2 L Media Addition Bottle
M1327-9981	Continuous System Disposable Bottles, Pack of 4

## SINGLE-USE BENCHTOP CELL CULTURE BIOREACTORS



## CelliGen™ BLU Bioreactor with Single-Use Vessels, 5.0 & 14.0 Liters

CelliGen™ BLU combines all the convenience of single-use technology with the trusted performance, advanced process management and true scalability of a stirred-tank design. Ideal for research or production.

**Applications:** Mammalian and animal cell lines in batch, fed-batch and continuous culture.

**Single Use Vessel<sup>Δ</sup>:** Interchangeable, single-use, rigid-wall vessels, offered in 5.0 and 14.0 liter (total volume) capacities. All components are pre-validated, pre-sterilized and constructed from USP Class VI materials, making them acceptable for GMP environments. Pre-sterilization eliminates the need for autoclaving, and facilitates rapid turn-around between runs. Includes pitched-blade impeller, tubing, filters, and headplate penetrations for RTD temperature sensor, pH and DO probes, addition (three), harvest, overlay, and sparge.

**Sophisticated control station:** Compact unit with powerful RPC (Reactor Process Controller) provides integrated control of up to 32 process parameters, trends up to 8 parameters simultaneously, stores up to 10 recipes, and provides built-in security features. See page 54.

Includes: Industrial touchscreen interface with adjustable-position, 15" (38.1 cm) color display; 3 integrated pumps; magnetic-drive motor; temperature control; pH, DO, and 3- or 4-gas mixing; 2 USB ports; and 7 analog inputs and 7 outputs to add ancillary devices.

**Gas flow control:** 1, 3, or 4 Thermal Mass Flow Controllers (TMFC) or a Rotameter for sparge line. Rotameter or TMFC for optional gas overlay.

**Additional options:** Scale for measuring additions and level; validation package, and more. For related accessories, including BioCommand® SCADA Software, gas analyzers and more, see also pages 80 - 86.



New CelliGen BLU systems use single-use vessels <sup>Δ</sup> and a compact non-disposable control station. 5.0 L vessel shown

### Pre-Configured Control Station Kits\* to Simplify Ordering

Catalog No.	Electrical Service	Gas Flow Control	
		Sparge	Overlay
M1363-120-10M M1363-230-10M	100 - 120V, 50/60 Hz 200 - 240V, 50/60 Hz	1 TMFC, 0.002 - 0.1 SLPM	Rotameter, 0.1 - 5.0 SLPM
M1363-120-10A M1363-230-10A	100 - 120V, 50/60 Hz 200 - 240V, 50/60 Hz	1 TMFC, 0.002 - 0.1 SLPM	TMFC, 0.1 - 3.0 SLPM
M1363-120-30A M1363-230-30A	100 - 120V, 50/60 Hz 200 - 240V, 50/60 Hz	3 TMFC, 0.002 - 0.1 SLPM	TMFC, 0.1 - 3.0 SLPM
M1363-120-40A M1363-230-40A	100 - 120V, 50/60 Hz 200 - 240V, 50/60 Hz	4 TMFC, 0.002 - 0.1 SLPM	TMFC, 0.1 - 3.0 SLPM

(\*) Vessel Kits and Vessels must be ordered separately. See page 51.

Note: CelliGen™ BLU Control Stations are not interchangeable with CelliGen™ / BioFlo® 310 control stations.

(Δ) Patent pending

**Don't see a pre-configured kit that meets your needs?**

**Follow the instructions on the next page to build a custom system designed specifically for your process needs.**

### How To Order:

1. Choose a **Pre-Configured Control Station Kit** from the chart on page 50. Alternately, custom-configure your control station as described in step #1a.
- 1a. If ordering a **Custom-Configured Control Station**, choose from these **factory-installed options**: Voltage, sparge gas flow control, scale or no scale, and overlay option. Identify your selections by creating a configured catalog number using our "Intelligent Numbering System", as listed below.

#### Control Station: M1363

**Voltage:** 120 = 100 - 120 V, 50/60 Hz  
230 = 200 - 240 V, 50/60 Hz

**Sparge Gas:** R = Rotameter  
1 = 1 TMFC  
3 = 3 TMFCs  
4 = 4 TMFCs

**Scales:** 0 = No Scale  
S = Scale

**Gas Overlay:** 0 = No Overlay  
M = Overlay with manual flow control (Rotameter)  
A = Overlay with automatic flow control (TMFC)

An example of a configured catalog number is M1363-120-4SA. For assistance, please contact your local sales representative.

2. **Add Vessel Kit**, which includes heat blanket, RTD temperature sensor, pH and DO probes with cables, and needle-free syringes. (Vessel not included.)
  - 5.0 L Vessel Kit \_\_\_\_\_ M1363-0105
  - 14.0 L Vessel Kit \_\_\_\_\_ M1363-0114
3. **Add Single-Use Vessels.**  
(Items in Vessel Kit, described above, not included.)
  - 5.0 L, pack of 1 \_\_\_\_\_ M1363-0115
  - 5.0 L, pack of 4 \_\_\_\_\_ M1363-0117
  - 14.0 L, pack of 1 \_\_\_\_\_ M1363-0116
  - 14.0 L, pack of 4 \_\_\_\_\_ M1363-0118

#### 4. Add Optional Accessories:

- Replacement Heat Blanket, 5.0 L \_\_\_\_\_ M1363-8012
- Replacement Heat Blanket, 14.0 L \_\_\_\_\_ M1363-8013
- Pressure Regulator Kit \_\_\_\_\_ M1363-5002
- Needle-Free Syringe (10 pack) \_\_\_\_\_ M1363-9910
- Replacement pH Probe, 5.0 L, includes cable \_\_\_\_\_ P0300-2371
- Replacement pH Probe, 14.0 L, includes cable \_\_\_\_\_ P0300-2370
- Replacement DO Probe, 5.0 L \_\_\_\_\_ P0720-6524
- Replacement DO Probe, 14.0 L \_\_\_\_\_ P0720-6523
- Replacement DO Cable, 5.0 L & 14.0 L \_\_\_\_\_ P0720-2338

Additional related accessories, including BioCommand® SCADA Software, chillers, gas analyzers and more are described on pages 80 - 86. Interested in packed-bed vessels, tube welders, media filters and bags, or validation? Ask your representative for details.



14.0 L and 5.0 L single-use vessels<sup>Δ</sup> are pre-sterilized, ready for immediate use. Just add media and inoculate. Includes pitched-blade impeller, sparge, tubing and filters, as shown above left. Image at right provides a close-up view of headplate penetrations.

(Δ) Patent pending

## WHICH IMPELLER IS BEST FOR YOUR CELL LINE?

### A Guide to Impeller Selection in Fermentors and Bioreactors

When growing Eukaryotes or Prokaryotes in a stirred-tank reactor, it's critical to choose the impeller type best suited to your process. This article provides a brief overview of our impellers and how they work, to guide you in selecting the best impeller for your application. For a table of cell lines commonly used in fermentation and cell culture processes, matched with the impeller(s) best suited for their growth, see our website at [www.nbisc.com/papers](http://www.nbisc.com/papers) or contact us for assistance.

#### Cell Lift Impellers for Microcarrier Culture

The Cell Lift impeller, designed and patented by New Brunswick Scientific, provides uniform circulation for microcarrier cultures. This is an ultra-low-shear impeller, in which the flow is caused by three discharge ports located on the impeller shaft. The rotation of the ports creates a low differential pressure at the base of the impeller tube, lifting the microcarriers up through the tube and expelling them out through the ports. This continuous recirculation loop keeps the cells uniformly dispersed throughout the vessel.



Cell Lift Impeller

Gases are introduced through a ring sparger, which generates bubbles which pass along the impeller between the exterior of the inner tube and an outer membrane known as the aeration cage. A mesh lining, on the outer membrane of the cage, has 85 µm penetrations small enough to ensure that cells growing on the microcarriers cannot pass through. Gas exchange occurs at the membrane-media interface, ensuring that the cells remain in a bubble-free environment and are not subjected to shear due to bubble breakage. The bubbles are then expelled out the ports, located at the top of the impeller, into a second screened-in cage. A foam breaker directs air, supplied by a gas overlay, into the cage to break up any foam that has developed.

The Cell Lift impeller can be used in batch and fed-batch processes of shear-sensitive animal cells. It can also be used for continuous perfusion processes with the addition of a decanting column(s) and a media feed in/broth pump out setup.

#### Packed-Bed Basket Impellers for Secreted Products

Another unique New Brunswick Scientific design, the packed-bed basket impeller is used primarily for manufacturing high yields of secreted products from anchorage-dependent or suspension cultures in perfusion. The basket is comprised of two horizontally-positioned, perforated metal screens that extend to the vessel walls. Enclosed between the screens, a bed of Fibracel® disks serves as a solid support matrix for cell growth. Cells growing in the disk bed become immobilized on or between the disks, where they remain throughout the culture run, protected from external shear forces. Media is circulated by way of a hollow impeller tube with discharge ports positioned above the basket. Like the Cell Lift impeller, rotation of these discharge ports creates a low differential pressure at the base of the impeller tube, which circulates the media throughout the system. The media receives gases through a sparger located at the bottom of the inner tube, protecting the cells from being exposed to the gas liquid interface. This results in low turbulence and low shear stress on the culture. Exceptionally high cell densities are achievable due to the high surface-to-volume ratio provided by the disk bed, coupled with the ability to use perfusion.



Basket with Fibracel

## Rushton-Type Impellers Ideal for Fermentation

The blades of Rushton and Rushton-type impellers are flat and set vertically along the agitation shaft, producing a unidirectional radial flow. These impellers are commonly used in fermentations of cell lines that require high oxygen rates, such as yeast, bacteria, and some fungi.



Rushton-Type Impeller

## Marine Blade Impellers for Shear-Sensitive Microorganisms

The leading face of the blades on this impeller can be flat or concave, while the back side is convex, producing an axial flow. Marine Blade impellers are used for applications requiring gentle mixing without causing cell damage. Due to their unidirectional flow, however, the KLa of Marine Blade impellers tend to be slightly lower than that of impellers which employ both axial and radial mixing.



Marine Blade Impeller

## Pitched Blade Impellers for Shear-Sensitive Microorganisms

The blades on this impeller are flat, and set at approximately 45° angles, producing both an axial and radial flow. The combination provides better overall mixing, and creates a higher oxygen mass transfer rate (KLa) than that of unidirectional (axial or radial) flow impellers. Pitched Blade impellers are low shear impellers, designed to gently mix the contents of the culture without causing cell damage. They are most commonly used with mammalian, insect, or other shear-sensitive cell lines, growing either in suspension or with the aid of microcarriers. They are also widely used in fermentation processes dealing with highly viscous cultures, such as filamentous bacteria and fungi, as well as some biofuels processes.



Pitched Blade Impeller

## Spin Filters for All Cell Lines

Spin filters are retention devices commonly used to keep cells inside the vessel during continuous or perfusion culture. In NBS bioreactors, spin filters with a low-shear Marine Blade impeller are offered for suspension and microcarrier applications. The Spin Filter Kit consists of a screened cage surrounding the impeller shaft, with very small filter pore openings that keep cells isolated outside the cage. Inside the rotating cage, a dip-tube is provided for continuous withdrawal of culture broth. A media feed tube is used outside the cage to provide a steady supply of fresh nutrients. NBS spin filters are offered with 10 µm openings for suspension cultures and 75 µm openings for microcarrier cultures. Due to its gentle mixing nature, the spin filter is typically used with cell lines that are microcarrier-dependent or highly sensitive to shear. They are ideal for production of secreted proteins, as they keep the harvested media cell-free and thereby simplify purification.



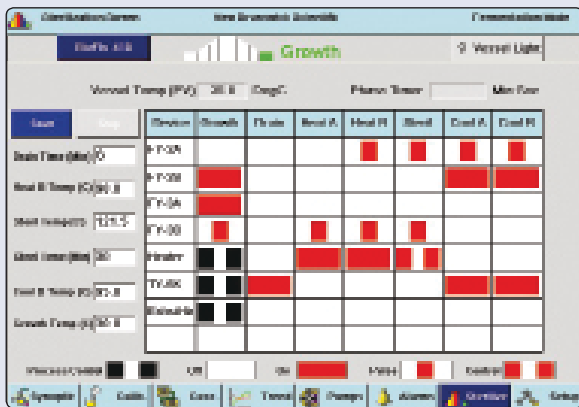
Spin Filter with  
Marine Blade

## RPC REACTOR PROCESS CONTROLLER

### RPC Reactor Process Controller, Used In BioFlo® & CelliGen™ BLU, 115, 310, 415, 510 & 610 Fermentors and Bioreactors

**Reactor Process Controller (RPC)** is an advanced controller used in most NBS benchtop and pilot-plant fermentors and bioreactors. The advantages of a common control platform are easier scale-up, reduced learning curve, and uniformity among NBS products. The RPC system uses a touchscreen interface to simplify setup, calibration and monitoring, and is capable of controlling up to 32 process loops per fermentor or bioreactor. When used in our BioFlo® & CelliGen™ 310 systems, it enables simultaneous control of up to 4 vessels – and over 120 process loops – from a single controller. In the 115, it can simultaneously control up to 3 vessels – over 90 process loops.

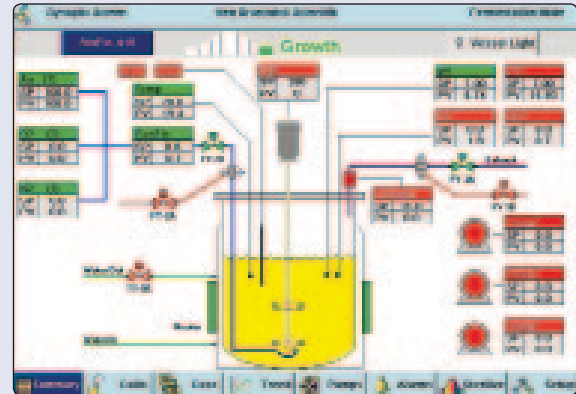
A variety of other screens are also provided for setting up and controlling pumps, alarms, cascade control strategies, and much more.



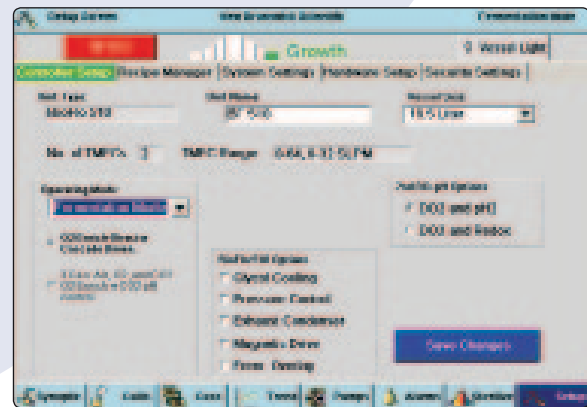
Enter and view sterilization parameters and valve sequences from the Sterilization Screen shown. (Available only on sterilizable-in-place 415, 510 and 610 models).

Parameter	Setpoint	Temperature	Flow	Control Action	Units	Status
Agit	0.0	0.0	0.0	0.0	0.0	0.0
Temp	37.0	37.0	0.0	0.0	0.0	0.0
pH	7.0	7.0	0.0	0.0	0.0	0.0
DO	0.0	0.0	0.0	0.0	0.0	0.0
AirFlow	0.0	0.0	0.0	0.0	0.0	0.0
CO2 In	0.0	0.0	0.0	0.0	0.0	0.0
CO2 Out	0.0	0.0	0.0	0.0	0.0	0.0
DO	0.0	0.0	0.0	0.0	0.0	0.0
DO	0.0	0.0	0.0	0.0	0.0	0.0

Summary Screen lets you conveniently view setpoints, current values, cascade loops and more — for up to 10 parameters simultaneously. All 32 parameters can be viewed simply by scrolling up or down.



Synoptic View provides a pictorial alternative to the summary screen for viewing and editing process values.



The Setup Screen lets you easily configure your settings – Adjust gas flow options, change vessel size for more accurate PI values, save up to 10 recipes, add additional fermentors, and more.



Trend graphing makes it simple to track and export data on up to eight process variables per reactor over a six day span. Customize the view by selecting the parameters, colors and interval between sample measurements.

## AUTOCLAVABLE BENCHTOP FERMENTORS & BIOREACTORS

### BioFlo® / CelliGen™ 115, Entry-Level Fermentor/ Bioreactor, 1.3 – 14.0 Liters

The BioFlo®/CelliGen™ 115 is an easy-to-use, entry-level system, with built-in controls for operation as a microbial fermentor as well as mammalian/animal cell culture bioreactor. This versatility, coupled with its ability to control up to three independent reactors from a single control station, makes it ideally suited to use in R&D labs, universities, teaching facilities, testing labs, and more.

**Applications:** Microbes, yeast, insect, plant or mammalian cells, in batch, fed-batch and continuous culture.

**Pre-configured kits:** Simplify ordering by choosing a pre-configured kit for basic or advanced fermentation or advanced cell culture. Kits include everything you need to get started, from vessel and control station to cable ties and tubing. See chart on page 56 for details, or custom-configure a system to your specifications by selecting from our wide range of options.

**Vessel:** Eight interchangeable, autoclavable, glass vessels are offered in 1.3, 3.0, 7.5 & 14.0 liter (total volume) capacities. Choose double-wall water-jacketed vessel with magnetic-drive motor, or heat-blanketed vessel with direct-drive motor.

**Impellers:** Rushton-type, pitched-blade and marine-blade impellers and spin-filter retention devices are offered. Basic and Advanced Fermentation Kits include 2 Rushton-type Impellers as standard; Cell Culture Kits include a pitched-blade impeller as standard. See page 52.

**Sophisticated control station:** Compact unit with powerful RPC (Reactor Process Controller) provides integrated control of process parameters, in each reactor. Cost-saving utility stations are offered for operation of 2nd and 3rd vessel. See page 54.

Includes: 3 integrated pumps; integrated water manifold; and 2 USB ports.

**Industrial touchscreen control interface:** Bright, easy-to-read, color display is built into the Control Station for system management and monitoring.

**Gas flow control:** Manual gas-flow control via one or two Rotameters is standard with pre-configured kits and automatic gas mixing comes standard with cell culture systems. Systems can be customized with up to 4 Rotameters, TMFC for automatic gas-flow control and automatic gas mixing via solenoids.

**Additional options:** pH & DO probes, addition bottle kit, start-up kit and much more. Related accessories, including BioCommand® SCADA Software, gas analyzers and more are described beginning on page 80.



**NEW**

### System Controllers And Components

- Control Station** (and optional utility stations for second and third vessel) include an integrated water manifold to save space. Footprint measures just 15.6" W x 16" D (39.6 x 40.6 cm).
- Rotameters/TMFC** – each Control or Utility Station can accommodate up to four Rotameters – available in a variety of flow rates – or a Thermal Mass Flow Controller. (Two Rotameters shown).
- Color Touchscreen Interface**, 8.4" (21.3 cm), is standard on Control Stations. (Not provided on supplemental utility stations.)
- Sample Assembly** – a syringe-activated device for removing media samples without contaminating the culture. The sampler installs in a headplate port. Samplers are sized to vessels.
- Heat-Blanketed Vessels** are available in four sizes. Shown with direct-drive motor.
- Three Fixed-Speed (12 RPM) Peristaltic Pumps** can be linked directly to acid, base, foam, level.
- Quick Connects for Water In/Out** allow utilities to be attached and detached in seconds.
- Connections for pH/DO, Sparge, Motor, Heater, Temperature Probe and Foam/Level** are easily accessed from the side.
- Optional Addition Bottle Holder** saves valuable lab space.
- Double-Wall Water-Jacketed Vessels** are available in four sizes. Shown with Magnetic Drive motor.
- Exhaust Condenser** – essential in most applications for keeping exhaust filters dry and vessel contents from evaporating during culture.

continued on next page

## AUTOCLAVABLE BENCHTOP FERMENTORS & BIOREACTORS

### BioFlo® & CelliGen™ 115 Pre-Configured Kits Contain Everything You Need to Get Started

Basic and Advanced Fermentation Kits, as well as Advanced Cell Culture Kits simplify ordering. If a pre-configured system doesn't meet your process requirements, a fully configurable system can be designed by selecting from our available options:

- pH/DO
- Automatic gas mixing
- Thermal Mass Flow Control (TMFC)
- Rotameters
- Pumps
- Foam/Level.

**Need a second or third system?** Budget-saving utility stations and "Add-A-Vessel Kits" take the cost and work out of ordering added units.

**Do you already own an NBS BioFlo 110 vessel?** Save money by re-using your existing vessel. Retro Kits are also offered to convert your existing cable connections to fit the new system.

**We've thought of everything, including offering "start-up kits"** containing essential tubing, cable ties, tape, connectors and more – catalog number M1369-0300.

### Contents of Pre-Configured Kits

Kit Contents	Advanced Fermentation Kit	Advanced Cell Culture Kit	Basic Fermentation Kit
Vessel Kit – Basic*			•
Vessel Kit – Advanced *	•	•	
Master Control Station with Touchscreen	•	•	•
Temperature Control	•	•	•
Agitation Control	•	•	•
pH/DO Control	•	•	
Foam/Level Control	•	•	
3 Fixed-Speed Pumps	•	•	
Manual Gas Mix	•		•
Automatic Gas Mix via 4 Solenoids		•	
Manual Gas Flow via Rotameters (Qty. Rotameters shown)	2	1	1

(\*) For details of vessel kit components, see the Add-A-Vessel table on page 57.

### Standard Flow Rates

Vessel Size (L)	Fermentation Kits SLPM	Cell Culture Kits SLPM
1.3	0.25 - 2.5	0.05 - 0.5
3.0	0.5 - 5.0	0.12 - 1.2
7.5	0.1 - 11.4	0.25 - 2.5
14.0	2.0 - 20.0	0.5 - 5.0

## Contents of Add-A-Vessel Kits

Vessel Kits contain most ancillary components required for independent operation as a second or third vessel.

Contents	Adv. Fermentation Vessel Kit		Adv. Cell Culture Vessel Kit		Basic Fermentation Vessel Kit	
	Heat Blanket	Water Jacket	Heat Blanket	Water Jacket	Heat Blanket	Water Jacket
Dish-Bottom Vessel with stainless steel headplate	•	•	•	•	•	•
Vessel Stand	•		•		•	
Agitation Motor, 50–1200 rpm	•	•			•	•
Agitation Motor, 30–300 rpm			•	•	•	
Direct-Drive Assembly	•	•			•	•
Magnetic-Drive Assembly Option			•	•		
Heater Blanket	•		•		•	
Jacket-Water Heater		•		•		•
Immersion Cooling Coil	•		•		•	
Thermowell	•	•	•	•	•	•
RTD Probe	•	•	•	•	•	•
Baffle Assembly	•	•			•	•
Rushton Impellers (2)	•	•			•	•
Pitched Blade Impeller			•	•		
Exhaust Condenser	•	•	•	•		
Tube/Assembly Sampler	•	•	•	•		
Tri-Port Adapter	•	•	•	•		
Septum Kit	•	•	•	•		
Liquid Addition Tube and Headplate Adapter	•	•	•	•		
Two Addition Bottles and Tubing	•	•	•	•		

## BioFlo® 115 Advanced Fermentation Kits — Ordering Information

Advanced Fermentation Kits are available with choice of voltage and heat-blanketed vessel (**HB**) or water-jacketed vessel (**WJ**).

Total Volume (L)	Working Volume (L)	Electrical Service	HB Kit	WJ Kit
			Catalog No.	Catalog No.
1.3	0.4 - 1.0	100 - 120V 200 - 240V	M1369-1121	M1369-1111
			M1369-1151	M1369-1161
3.0	0.8 - 2.2	100 - 120V 200 - 240V	M1369-1122	M1369-1112
			M1369-1152	M1369-1162
7.5	2.0 - 5.6	100 - 120V 200 - 240V	M1369-1125	M1369-1115
			M1369-1155	M1369-1165
14.0	4.0 - 10.5	100 - 120V 200 - 240V	M1369-1130	M1369-1120
			M1369-1150	M1369-1160

### Add-A-Vessel Advanced Fermentation Kits <sup>⊖</sup>

Available with choice of heat-blanketed vessel (**HB**) or water-jacketed vessel (**WJ**).

1.3	0.4 - 1.0	–	M1369-1601	M1369-1611
3.0	0.8 - 2.2	–	M1369-1602	M1369-1612
7.5	2.0 - 5.6	–	M1369-1605	M1369-1615
14.0	4.0 - 10.5	–	M1369-1610	M1369-1620

(⊖) When ordering Add-a-Vessel Kits, a control station or utility station is required.

continued on next page

## AUTOCLAVABLE BENCHTOP FERMENTORS & BIOREACTORS

### BioFlo® 115 Basic Fermentation Kits — Ordering Information

Advanced Fermentation Kits are available with choice of voltage and heat-blanketed vessel (**HB**) or water-jacketed vessel (**WJ**).

Total Volume (L)	Working Volume (L)	Electrical Service	HB Kit		WJ Kit	
			Catalog No.		Catalog No.	
1.3	0.4 - 1.0	100 - 120V 200 - 240V	M1369-1101		M1369-1621	
			M1369-1141		M1369-1631	
3.0	0.8 - 2.2	100 - 120V 200 - 240V	M1369-1102		M1369-1622	
			M1369-1142		M1369-1632	
7.5	2.0 - 5.6	100 - 120V 200 - 240V	M1369-1105		M1369-1625	
			M1369-1145		M1369-1635	
14.0	4.0 - 10.5	100 - 120V 200 - 240V	M1369-1110		M1369-1630	
			M1369-1140		M1369-1640	

#### Add-A-Vessel Basic Fermentation Kits <sup>◇</sup> (BioFlo® 115)

Available with choice of heat-blanketed vessel (**HB**) or water-jacketed vessel (**WJ**).

Total Volume (L)	Working Volume (L)	Electrical Service	HB Kit Catalog No.	WJ Kit Catalog No.
1.3	0.4 - 1.0	–	M1369-1001	M1369-1011
3.0	0.8 - 2.2	–	M1369-1002	M1369-1012
7.5	2.0 - 5.6	–	M1369-1005	M1369-1015
14.0	4.0 - 10.5	–	M1369-1010	M1369-1020

(◇) When ordering Add-a-Vessel Kits, a control station or utility station is required.

### CelliGen™ 115 Advanced Cell Culture Kits — Ordering Information

Advanced Cell Culture Kits are available with choice of voltage and heat-blanketed vessel (**HB**) or water-jacketed vessel (**WJ**) and choice of magnetic (**M**) or direct-drive (**D**) agitation systems.

Total Volume (L)	Working (L) Volume	Electrical Service	Agitation System	HB Kit		WJ Kit	
				Catalog No.		Catalog No.	
1.3	0.4 - 1.0	100 - 120V 200 - 240V	M	M1369-1201		M1369-1211	
			D	M1369-1301		M1369-1311	
			M	M1369-1401		M1369-1171	
			D	M1369-1501		M1369-1371	
3.0	0.8 - 2.2	100 - 120V 200 - 240V	M	M1369-1202		M1369-1212	
			D	M1369-1302		M1369-1312	
			M	M1369-1402		M1369-1172	
			D	M1369-1502		M1369-1372	
7.5	2.0 - 5.6	100 - 120V 200 - 240V	M	M1369-1205		M1369-1215	
			D	M1369-1305		M1369-1315	
			M	M1369-1405		M1369-1175	
			D	M1369-1505		M1369-1375	
14.0	4.0 - 10.5	100 - 120V 200 - 240V	M	M1369-1210		M1369-1220	
			D	M1369-1310		M1369-1320	
			M	M1369-1410		M1369-1170	
			D	M1369-1510		M1369-1370	

#### Add-A-Vessel Advanced Cell Culture Kits <sup>◇</sup>

Available with choice of heat-blanketed vessel (**HB**) or water-jacketed vessel (**WJ**).

Total Volume (L)	Working Volume (L)	Electrical Service	Agitation System	HB Kit Catalog No.	WJ Kit Catalog No.
1.3	0.4 - 1.0	–	D	M1369-1041	M1369-1021
3.0	0.8 - 2.2			M1369-1042	M1369-1022
7.5	2.0 - 5.6			M1369-1045	M1369-1025
14.0	4.0 - 10.5			M1369-1050	M1369-1030
1.3	0.4 - 1.0	–	M	M1369-1051	M1369-1031
3.0	0.8 - 2.2			M1369-1052	M1369-1032
7.5	2.0 - 5.6			M1369-1055	M1369-1035
14.0	4.0 - 10.5			M1369-1060	M1369-1040

(◇) When ordering Add-a-Vessel Kits, a control station or utility station is required.

Approximate Vessel Dimensions, as Prepared for Autoclave

<b>Heat Blanketed Vessels</b>											
Vessel Total Volume (L)	With Exhaust Condenser						Without Exhaust Condenser				
	Length		Width		Height		Diameter		Height		
	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	
1.3 & 3.0	9.5	24	8.5	22	22	56	8.5	22	16.5	42	
7.5	14.5	37	11.5	29	25.5	65	11.5	29	19.5	49.5	
14.0	11.5	29	11.5	29	29	74	11.5	29	24	61	
On Optional Slant Rack											
7.5	28	71	11.5	29	18	46	-	-	-	-	
14.0	31.5	80	11.5	29	20	51	-	-	-	-	

<b>Water-Jacketed Vessels</b>											
Vessel Total Volume (L)	With Exhaust Condenser						Without Exhaust Condenser				
	Length		Width		Height		Diameter		Height		
	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm	
1.3	11.5	29	11.5	29	20.5	52	9.25	23.5	16	41	
3.0	11.5	29	11.5	29	22.5	56.5	9.25	24	18	45	
7.5	11.5	29	11.5	29	26.8	68	11.5	29	20.5	52	
14.0	11.5	29	11.5	29	31.5	80	11.5	29	26.5	67	
On Optional Slant Rack											
7.5	26	66	11.5	29	18.5	47	-	-	-	-	
14.0	28.5	72	11.5	29	20.5	52	-	-	-	-	

Accessories for Fermentation & Cell Culture – BioFlo®/CelliGen™ 115

Catalog No.	Description
<b>pH Probe Kits (Probe, Cable, Adapter)</b>	
M1369-9970	For 1.3 L Vessels
M1369-9977	For 3.0 L Vessels
M1369-9982	For 7.5 L Vessels
M1369-9985	For 14.0 L Vessels
<b>Replacement pH and DO Probe Cable/Adapter</b>	
P0720-2276	pH cable (all vessels)
P0720-2336	DO cable (all vessels)
M1273-5040	pH/DO probe adapter (12mm compression)
<b>DO Probe Kits (Probe, Cable, Adapter)</b>	
M1369-9974	For 1.3 L Vessels
M1369-9979	For 3.0 L Vessels
M1369-9986	For 7.5 L Vessels
M1369-9988	For 14.0 L Vessels
<b>Replacement Foam/Level Kits (Foam probe, Level probe, Cable, Adapters)</b>	
M1369-9947	For 1.3 L Vessels
M1369-9951	For 3.0 L Vessels
M1369-9960	For 7.5L & 14.0 L Vessels
<b>Replacement Foam/Level Cable/Adapter</b>	
M1361-8014	Foam/Level cable (all vessels)
M1273-5042	Foam/Level probe adapter (12mm compression)

Catalog No.	Description
<b>Replacement Motors</b>	
M1369-3120	Direct Drive, For 1.3 & 3.0 L Fermentors
M1369-3125	Direct Drive, For 7.5 & 14.0 L Fermentors
M1369-3135	Direct Drive, For All vessel sizes, Cell Culture
M1369-3130	Magnetic Drive, For All vessel sizes
<b>Replacement Heater Blankets</b>	
M1369-8021	For 1.3 L Vessels
M1369-8022	For 3.0 L Vessels
M1369-8020	For 7.5 L Vessels
M1369-8023	For 14.0 L Vessels
<b>Replacement Water Jacket Heaters</b>	
M1369-3107	For 1.3 & 3.0 L Vessels
M1369-3108	For 7.5 & 14.0 L Vessels
<b>Replacement Glass Vessels</b>	
M1273-9907	1.3 L Heat Blanket Vessel
M1273-9909	3.0 L Heat Blanket Vessel
M1273-9916	7.5 L Heat Blanket Vessel
M1273-9918	14.0 L Heat Blanket Vessel
M1273-9908	1.3 L Water Jacket Vessel
M1273-9915	3.0 L Water Jacket Vessel
M1273-9917	7.5 L Water Jacket Vessel
M1273-9919	14.0 L Water Jacket Vessel

continued on next page

## AUTOCLAVABLE BENCHTOP FERMENTORS &amp; BIOREACTORS

## Accessories for Fermentation &amp; Cell Culture – BioFlo®/CelliGen™ 115 (continued)

Catalog No.	Description
<b>Replacement Exhaust Condensers</b>	
M1273-9945	For 1.3, 3.0 and 7.5 L Vessels
M1273-9957	For 14.0 L Vessels
<b>Headplate Adapters &amp; Plugs</b>	
M1273-9961	Tri-port Adapter
M1273-5040	pH/DO Probe Adapter (12 mm compression)
M1273-5042	Foam/Level Probe Adapter (12mm compression)
M1273-3031	Septum Kit
M1273-5054	6mm Adapter kit, (6mm port for 6mm tube)
M1273-9575	6mm Single Addition Tube for 6mm adapter
M1273-5056	Adapter Kit, 12mm port to 6mm tube
M1273-5058	Adapter Kit, 12mm port to 12mm tube
M1273-9405	6.35 mm Port Plug
M1273-9406	12mm Port Plug
M1273-9407	19mm Port Plug
<b>Replacement and Spare Parts</b>	
M1273-9900	Headplate Port Washers/O-Rings
M1273-9991	Spare Parts Kit, 1.3 & 3.0 L HB Vessel
M1273-9992	Spare Parts Kit, 7.5 & 14.0 L HB Vessel
M1273-9998	Spare Parts Kit, 1.3 & 3.0 L WJ Vessel
M1273-9999	Spare Parts Kit, 7.5 & 14.0 L WJ Vessel
<b>Impellers</b>	
M1273-9291	Rushton Impeller, 1.3 & 3.0 L
M1273-9292	Rushton Impeller, 7.5 L
M1273-9293	Rushton Impeller, 14.0 L
M1273-9206	Pitched Blade, 1.3 & 3.0 L, Upflow
M1273-9207	Pitched Blade, 7.5 & 14.0 L, Upflow
M1273-9290	Pitched Blade, 1.3 & 3.0 L, Downflow
M1273-9212	Pitched Blade, 7.5 & 14.0 L, Downflow
M1273-9901	Marine Blade, 1.3, 3.0 L
M1273-9902	Marine Blade, 7.5 & 14.0 L
M1273-3201	Spin Filter Suspension Cells, 1.3 L
M1273-3202	Spin Filter Suspension Cells, 3.0 L
M1273-3205	Spin Filter Suspension Cells, 7.5 L
M1273-3210	Spin Filter Suspension Cells, 14.0 L
M1273-3211	Spin Filter Microcarriers, 1.3 L
M1273-3212	Spin Filter Microcarriers, 3.0 L
M1273-3215	Spin Filter Microcarriers, 7.5 L
M1273-3220	Spin Filter Microcarriers, 14.0 L

Catalog No.	Description
<b>Microspargers</b>	
M1273-5007	Sintered/Porous Microsparger, 1.3 L HB Vessel
M1273-5003	Sintered/Porous Microsparger, 1.3 L WJ Vessel
M1273-5004	Sintered/Porous Microsparger, 3.0 L
M1273-5005	Sintered/Porous Microsparger, 7.5 L
M1273-5006	Sintered/Porous Microsparger, 14.0 L
<b>Sampling Assemblies</b>	
M1273-9946	Sampling Assembly, 1.3 L
M1273-9949	Sampling Assembly, 3.0 L
M1273-9953	Sampling Assembly, 7.5 L
M1273-9956	Sampling Assembly, 14.0 L
<b>Rotameter Kits</b>	
M1287-3520	0 - 20 SLPM Rotameter with stand & tubing
M1287-3510	0 - 5 SLPM Rotameter with stand & tubing
<b>Miscellaneous</b>	
M1273-9266	Autoclave Rack for 7.5 and 14.0 L Vessels
M1273-5001	Water Regulator Kit (4 manifolds)
M1273-5002	Air Regulator Kit (4 manifolds)
M1117-2040	Water Regulator/Filter Kit (for single system)
M1230-3030	Air Regulator/Filter Kit (for single system)
M1273-9936	Bearing Housing Cap (10 pack)
M1273-9989	Addition Bottle Kit (250 mL)
M1273-9990	Addition Bottle Kit (500 mL)
M1273-9940	Addition Bottle Holder Kit
P0860-1050	Silicone Grease for Seals/O-rings
P0160-4460	Silicone Tubing Clamp
P0240-2680	Polysulfone Quick-Connect (Female) 1/4" (0.635 cm)
P0240-2670	Polysulfone Quick-Connect (Male) 1/4" (0.635 cm)

## Vessel Headplate Ports

Vessel Size (L)	6 mm	12 mm	19 mm	Total Ports
1.3	1	9	0	10
3.0	6	7	0	13
7.5	7	8	1	16
14.0	7	8	1	16

## Replacement Parts – BioFlo® 110

Catalog No.	Description
<b>Controllers</b>	
M1273-3100	Power Controller, 100-120V
M1273-3110	Power Controller, 200-240V
M1273-3103	Levels/Foam Controller (no probes, cables or adapters)
M1273-3106	4-Pump Module, 100-120V
M1273-3116	4-Pump Module, 200-240V
M1273-3104	Gas Mix Controller
M1273-3102	pH/dO <sub>2</sub> Controller (no probes, cables or adapters)
M1273-3109	Thermal Mass Flow Controller (0 - 20 SLPM) for fermentation
M1273-3112	Thermal Mass Flow Controller (0 - 5 SLPM) for cell culture
<b>Jacket Water Heaters</b>	
M1273-3107	Jacket Water Heater, 1.3 - 3.0 L Vessels
M1273-3108	Same as above, 7.5 - 14.0 L Vessels
<b>Heater Blankets</b>	
M1273-9931	For 1.3 L Vessels
M1273-9932	For 3.0 L Vessels
M1273-9930	For 7.5 L Vessels
M1273-9933	For 14.0 L Vessels

Catalog No.	Description
<b>Motors</b>	
M1273-3120	Direct Drive , Ferm., 1.3 - 3.0 L
M1273-3125	Direct Drive, Ferm., 7.5 - 14.0 L
M1273-3135	Direct Drive, Cell Culture, all vessels
M1273-3130	Magnetic Drive, all vessels
<b>pH Probes</b>	
P0720-5582	1.3L pH Probe
P0720-5584	3.0L pH Probe
P0720-5580	7.5L pH Probe
P0720-5583	14.0L pH Probe
<b>pH Probe Cable</b>	
P0720-2095	BioFlo® 110 pH Probe Cable (all sizes)
<b>dO<sub>2</sub> Probes</b>	
P0720-6580	1.3L Direct or Magnetic Drive
P0720-6282	3.0L Direct or Magnetic Drive
P0720-6283	7.5L Direct or Magnetic Drive
P0720-6284	14.0L Direct or Magnetic Drive
<b>dO<sub>2</sub> Probe Cable</b>	
P0720-2331	BioFlo® 110 DO Probe Cable (all sizes)

## AUTOCLAVABLE BENCHTOP FERMENTORS & BIOREACTORS



### BioFlo® 310 Compact Autoclavable Benchtop Fermentor, 2.5 – 14.0 Liters

BioFlo 310 is a validatable, benchtop, autoclavable fermentor with advanced controller and touchscreen interface capable of operating up to four reactors simultaneously.

**Applications:** Bacteria, yeast or fungi, and with optional accessories can be adapted for mammalian, animal, insect or plant cells. For batch, fed-batch and continuous culture.

**Sophisticated control station:** Compact unit with powerful RPC (Reactor Process Controller) provides integrated control of up to 32 process parameters, trends up to 8 parameters, and stores 10 recipes, in each reactor, and includes built-in security features. See page 54.

Includes: Large industrial touchscreen interface with adjustable-position, 15" (38.1 cm) color display; 3 integrated pumps; control of agitation, temperature, pH, DO, foam/level, and 2-, 3- or 4-gas mixing; 2 USB ports; and 7 analog inputs and 7 outputs to add ancillary devices. Cost-saving utility stations are offered for operation of 2nd, 3rd and 4th vessel.

**Vessel:** Interchangeable, autoclavable vessels with unique heat exchanger enables rapid temperature removal after autoclaving and from exothermic cultures, and rapid rises for temperature inductions. Offered in 2.5, 5.0, 7.5 & 14.0 L (total volume) capacities.

**Impellers:** 2 Rushton-type impellers standard. Pitched-blade and marine-blade, optional. See page 52.

**Gas flow control:** Sparge gas with 1 TMFC and 4 solenoid valves is standard. Or custom configure up to 4 TMFCs with choice of various flow rates, or Rotameter. Gas overlay available.

**Additional options:** pH & DO probe kits, 2nd DO - pH /Redox sensor, scales, validation packages, and more shown on page 63. Related accessories, including BioCommand® SCADA Software, gas analyzers, and more are described beginning on page 80.



Trend up to 144 hours of process data. Monitor and control it all on a large, 15" (38.1 cm) touchscreen interface

### Pre-Configured Systems

Catalog No.	Total Volume (L)	Working (L) Volume	Electrical Service	System Includes
M1287-1170	2.5	0.75 - 1.75	100 - 120V, 50/60 Hz	Master Control Station with Touchscreen Display, 1 TMFC (0.4 - 20 SLPM) Automatic Gas Mixing, Vessel Assembly* with Direct Drive Motor, pH/DO Probe Kit, and Sample Assembly
M1287-1171	5.0	1.25 - 3.75		
M1287-1172	7.5	2.0 - 5.5		
M1287-1173	14.0	3.0 - 10.5		
M1287-1174	2.5	0.75 - 1.75	200 - 240V, 50/60 Hz	
M1287-1175	5.0	1.25 - 3.75		
M1287-1176	7.5	2.0 - 5.5		
M1287-1177	14.0	3.0 - 10.5		

(\*) Vessel assembly includes glass vessel with stainless-steel headplate and dished-jacketed bottom, exhaust condenser, sampling assembly, two 6-blade Rushton-type impellers, foam/level sensor, direct drive motor, and more.

**How to order a BioFlo® 310 with multiple Thermal Mass Flow Controllers (TMFCs) with various ranges, and/or 2nd, 3rd and 4th Utility Station, and/or 2nd DO - pH/Redox sensors**

1. **Choose Voltage:**
  - 100 - 120V \_\_\_\_\_ M1287-1010
  - 200 - 240V \_\_\_\_\_ M1287-1020
  
2. **Choose Cabinet:**
  - Master Control Station \_\_\_\_\_ M1287-2110
  - Utility Station with no display \_\_\_\_\_ M1287-2112
  
3. **Choose Gases:**
  - 0 TMFC (requires a Rotameter)\*\*\* \_\_\_\_\_ M1287-2010
  - 1 Rotameter (0 - 20 SLPM) \_\_\_\_\_ M1287-3510
  - 1 Rotameter (0 - 5 SLPM) \_\_\_\_\_ M1287-3520
  - 1 TMFC (0.4 - 20 SLPM)\*\*\* \_\_\_\_\_ M1287-2012
  - 1 TMFC (0.1 - 5 SLPM)\*\*\* \_\_\_\_\_ M1287-2011
  - 2 TMFC (0.1 - 5 SLPM) \_\_\_\_\_ M1287-2013
  - 2 TMFC (0.4 - 20 SLPM) \_\_\_\_\_ M1287-2014
  - 3 TMFC (0.4 - 20 SLPM) \_\_\_\_\_ M1287-2016
  - 4 TMFC (0.1 - 5 SLPM) \_\_\_\_\_ M1287-2017
  - 4 TMFC (0.4 - 20 SLPM) \_\_\_\_\_ M1287-2018

**3a. When should you select multiple TMFCs?**  
 When you require each gas to be individually controlled, monitored and displayed in SLPM.

**3b. Which TMFC is right for your process?**  
 For fermentation we recommend 0.4 - 20 SLPM and 0.1 - 5 SLPM for smaller size vessels or multiple TMFCs.

(\*) TMFC = Thermal Mass Flow Controller  
 (\*\*) SLPM = Standard Liters Per Minute  
 (\*\*\*) 0 and 1 TMFCs are built with 4-gas manifold for 4 gas mixing

**4. Add Vessel Kits:**

Vessel Total Volume (L)	With Motor	Without Motor
	Catalog No.	Catalog No.
2.5	M1287-0300	M1287-0320
5.0	M1287-0301	M1287-0321
7.5	M1287-0302	M1287-0322
14.0	M1287-0303	M1287-0323

5. **Add 2nd DO - pH/Redox board, optional:**
  - Factory installed \_\_\_\_\_ M1287-3540

**6. Add Probe Kits which include probe and cable:**

**pH/DO Probe Kits**

- M1287-0400 \_\_\_\_\_ 2.5 L
- M1287-0401 \_\_\_\_\_ 5.0 L
- M1287-0402 \_\_\_\_\_ 7.5 L
- M1287-0403 \_\_\_\_\_ 14.0 L

**Redox Probe Kits**

- M1287-0410 \_\_\_\_\_ 2.5 L
- M1287-0411 \_\_\_\_\_ 5.0 L
- M1287-0412 \_\_\_\_\_ 7.5 L
- M1287-0413 \_\_\_\_\_ 14.0 L

7. **Add Options and Accessories:**  
 see page 64 and related accessories beginning on page 80.

**Upgrade your existing BioFlo 3000 vessel or existing cabinet to a BioFlo 310. You can gain the power of the advanced BioFlo 310 controller while saving money by re-using your existing vessels/controller.**

**How to Order:**

**To use your existing BioFlo 3000 Vessel with a BioFlo 310 Cabinet:**

1. **Choose Cabinet: (Includes Master Control Station with 1 TMFC, 0.4 - 20 SLPM – complete Fermentation cabinet)**
  - 120V Master Control Station \_\_\_\_\_ M1287-1003
  - 230V Master Control Station \_\_\_\_\_ M1287-1005
  
2. **Choose Motor Conversion Kits: (Includes new motor, cables and tubing)**
  - For BioFlo 3000 Vessels, 1 & 3 L \_\_\_\_\_ M1287-1200
  - For BioFlo 3000 Vessels, 6 L \_\_\_\_\_ M1287-1201
  - For BioFlo 3000 Vessels, 14 L \_\_\_\_\_ M1287-1202

**To use your existing BioFlo 3000 Cabinet with a BioFlo 310 Vessel:**

1. **BioFlo 310 Retro Kit (Includes vessel assembly, vessel kit, tubing kit and motor)**
  - For BioFlo 310 Vessels, 2.5 L \_\_\_\_\_ M1287-1205
  - For BioFlo 310 Vessels, 5.0 L \_\_\_\_\_ M1287-1206
  - For BioFlo 310 Vessels, 7.5 L \_\_\_\_\_ M1287-1207
  - For BioFlo 310 Vessels, 14.0 L \_\_\_\_\_ M1287-1208

## AUTOCLAVABLE BENCHTOP FERMENTORS & BIOREACTORS

### Options and Accessories – BioFlo® 310

Catalog No.	Description
<b>Cell Culture Conversion Kit/Gas Overlay</b>	
M1287-3501	Microbial to Cell Culture Conversion Kit adapts the BioFlo 310 fermentor to enable high performance growth of mammalian, insect or plant cells using your existing CelliGen Plus or future CelliGen 310 vessel. Includes a TMFC with 4 gas mix which plugs into your BioFlo 310 cabinet, reducing the flow rate from 0 - 20 SLPM to 0 - 5 SLPM. Enables dual control for sparge and gas overlay. For Information on Cell Culture Vessels see pages 66-70.
<b>2nd DO-pH/Redox Options</b>	
M1287-3530	2nd DO-pH/Redox Controller (Field Installed)
<b>Replacement Glass Vessels</b>	
M1287-9930	Replacement Vessel, 2.5 L
M1287-9931	Replacement Vessel, 5.0 L
M1287-9932	Replacement Vessel, 7.5 L
M1287-9933	Replacement Vessel, 14.0 L
<b>Validation Kits</b>	
M1287-0101	Basic Validation
M1287-0102	Basic Plus Validation
<b>Optional Autoclave Rack</b>	
XMF-8624	Angled Autoclave Rack
M1227-9231	Angled Autoclave Rack, low profile for 14 L vessels

Catalog No.	Description
<b>Additional Options</b>	
M1287-0020	RS-232 8-Port (Serial) Controller (required when connecting scales)
P0440-4489	Mettler Toledo Scale Display (required with each of the scales below)
P0440-4325	Mettler Toledo Scale, 15 Kg (33.0 lbs)
P0440-4321	Mettler Toledo Scale, 32 Kg (70.5 lbs)
P0440-4326	Mettler Toledo Scale, 60 Kg (132.2 lbs)
P0440-4327	Mettler Toledo Scale, 150 Kg (330.4 lbs)
M1287-9966	Barnant Variable Speed Pump, 115V (connects via Analog I/O) 0 - 100 rpm
M1287-9967	Barnant Variable Speed Pump, 230V (connects via Analog I/O) 0 - 100 rpm
M1273-5001	Water Regulator/Filter Kit (4 Manifolds)
M1273-5002	Air Regulator/Filter Kit (4 Manifolds)
M1287-5042	Sampling Assembly (included in fermentation vessel kits)
M1287-9964	Optional Sampling Assembly adapter (used with Corning 15 ml or BD Falcon 50 ml disposable vials)
M1287-5031	Septum Adapter Kit (Includes 10 Septa)
M1287-5030	Probe Adapter Kit (12 mm compression)
M1287-5034	6 mm Adapter Kit (Holds 1/4" Tube)
M1287-9914	User's Kit for 2.5, 5.0 and 7.5 L – Includes tubing, clamps, filters, connectors, addition vessels and other commonly required items
M1287-9915	User's Kit for 14 L, same as above
M1273-9989	Addition Bottle Kit, 250 mL
M1273-9990	Addition Bottle Kit, 500 mL
M1287-9212	Tri-Port Addition Kit
M1287-5043	Single Addition Kit
M1287-6020	Spare Parts Kit, 2.5 L
M1287-6021	Spare Parts Kit, 5.0 L
M1287-6022	Spare Parts Kit, 7.5 L
M1287-6023	Spare Parts Kit, 14.0 L



Up to four reactors can be controlled with a single Control Station

## Vessel Dimensions – BioFlo®/CelliGen™ 310

Vessel Total Volume (L)	Vessel Dimensions With Exhaust Condenser									
	BioFlo® 310				CelliGen™ 310					
	Length & Width		Height		Length		Width		Height	
	Inches	cm	Inches	cm	Inches	cm	Inches	cm	Inches	cm
2.5	8	20.3	21	53.3	8	20.3	8.5	21.6	22	55.9
5.0	9.5	24.1	24	61.0	9.5	24.1	9.5	24.1	25	63.5
7.5	10.5	26.7	25	63.5	11	27.9	11	27.9	26	66.0
14.0	11.75	29.9	28	71.1	12.75	32.4	12.75	32.4	29	73.7

Recommended Autoclave Dimensions - BioFlo®/CelliGen™ 310				
Catalog No.	Vessel Size (L)	Max Length Rack Mounted	Max Width Rack Mounted	Max Height Rack Mounted
XMF-8624 Autoclave Rack	2.5	26" (66 cm)	10.8" (27.4 cm)	18.0" (45.7 cm)
	5.0	26" (66 cm)	10.8" (27.4 cm)	20.5" (52 cm)
	7.5	26" (66 cm)	10.8" (27.4 cm)	21.8" (55.3 cm)
	14.0	27" (68.5 cm)	14.0" (35.5 cm)	22.2" (57 cm)
M1227-9231 Autoclave Rack, Low Profile	<b>For CelliGen™ 310</b>			
	14.0	30.0" (76.2 cm)	13.0" (33 cm)	18.0" (45.7 cm)
	<b>For BioFlo® 310</b>			
14.0	29.0" (73.6 cm)	14.0" (35.5 cm)	20.0" (50.8 cm)	

## Vessel Ports – BioFlo®/CelliGen™ 310

Vessel Headplate Ports - BioFlo®/CelliGen™ 310				
Vessel Size (L)	6 mm	13 mm	19 mm	Total Ports
2.5	1	9	0	10
5.0	3	10	1	14
7.5	3	12	1	16
14.0	3	12	1	16

## AUTOCLAVABLE BENCHTOP BIOREACTORS



## CelliGen™ 310 Autoclavable Stirred-Tank/ Packed-Bed Bioreactor, 2.5 – 14 Liters

CelliGen™ 310 is a validatable, benchtop, autoclavable bioreactor with advanced controller and touchscreen interface capable of operating up to four reactors simultaneously.

**Applications:** Mammalian, animal, insect or plant cells, in batch, fed-batch and continuous culture.

**Sophisticated control station:** Compact unit with powerful RPC (Reactor Process Controller) provides integrated control of up to 32 process parameters, trends up to 8 parameters, and stores 10 recipes, in each reactor, and includes built-in security features. (See page 54.)

Includes: Large industrial touchscreen interface with adjustable-position, 15" (38.1 cm) color display; 3 integrated pumps; control of agitation, temperature, pH, DO, foam/level, and 2-, 3-, or 4-gas mixing; 2 USB ports; and 7 analog inputs and 7 outputs to add ancillary devices. Cost-saving utility stations are offered for operation of 2nd, 3rd and 4th vessel.

**Vessel:** Interchangeable, double-walled glass, water-jacketed, autoclavable vessels, offered in 2.5, 5.0, 7.5 & 14.0 L (total volume) capacities.

**Impellers:** Choice of 5 types, including patented low-shear NBS Cell-Lift impeller for microcarriers, packed-bed basket for high yields of secreted products, pitched blade, marine blade, and spin-filter. See page 52.

**Gas flow control:** Sparge gas with 1 TMFC\* (0.1 - 5 SLPM\*\*) and 4 solenoid valves is standard. Or custom-configure up to 4 TMFCs with choice of various flow rates, or Rotameter. Gas overlay with TMFC or Rotameter, optional.

**Additional options:** pH & DO probe kits, 2nd DO - pH /Redox sensor, scales, validation packages, and more listed on page 67. Related accessories, including BioCommand® SCADA Software, gas analyzers, and more are described beginning on page 80.



Trends 8 loops and up to 144 hours of process data.

### Pre-Configured Systems

Catalog No.	Total Volume (L)	Working (L) Volume	Electrical Service	System Includes †
M1287-1260	2.5	0.6 - 1.4	100 - 120V, 50/60 Hz	Master Control Station, 1 TMFC (0.1 - 5 SLPM) with 4-Gas Mixing, Touchscreen Display, Magnetic-Drive Motor & Vessel Kit †
M1287-1261	5.0	1.2 - 3.5		
M1287-1262	7.5	1.5 - 5.0		
M1287-1263	14.0	3.5 - 10.0		
M1287-1264	2.5	0.6 - 1.4	200 - 240V, 50/60 Hz	
M1287-1265	5.0	1.2 - 3.5		
M1287-1266	7.5	1.5 - 5.0		
M1287-1267	14.0	3.5 - 10.0		

(\*) TMFC = Thermal Mass Flow Controller (\*\*) SLPM = Standard Liters Per Minute (†) Impeller Kit and Probe Kit selections must additionally be specified. See Probe Kits on next page and Impeller Kits on page 69. Note: CelliGen™ 310 & CelliGen™ BLU Control Stations are not interchangeable. (‡) Vessel Kit includes water-jacketed glass vessel with stainless-steel headplate, exhaust condenser, foam/level sensor and more.

**How to order a CelliGen™ 310 with multiple Thermal Mass Flow Controllers (TMFCs) with various ranges, and/or 2nd, 3rd and 4th Utility Station, and/or 2nd DO - pH/Redox sensors**

1. **Choose Voltage:**
  - 100 - 120V \_\_\_\_\_ M1287-1010
  - 200 - 240V \_\_\_\_\_ M1287-1020
2. **Choose Cabinet:** (see description on page 66)
  - Control Station \_\_\_\_\_ M1287-2110
  - Utility Station with no display \_\_\_\_\_ M1287-2112
3. **Choose Gases:**
  - 0 TMFC (requires a Rotameter)\*\*\* \_\_\_\_\_ M1287-2010
    - 1 Rotameter (0 - 20 SLPM) \_\_\_\_\_ M1287-3510
    - 1 Rotameter (0 - 5 SLPM) \_\_\_\_\_ M1287-3520
  - 1 TMFC (0.4 - 20 SLPM)\*\*\* \_\_\_\_\_ M1287-2012
  - 1 TMFC (0 - 1 SLPM)\*\*\* \_\_\_\_\_ M1287-2019
  - 1 TMFC (0.1- 5 SLPM)\*\*\* \_\_\_\_\_ M1287-2011
  - 2 TMFC (0.1- 5 SLPM) \_\_\_\_\_ M1287-2013
  - 2 TMFC (0.4 - 20 SLPM) \_\_\_\_\_ M1287-2014
  - 3 TMFC (0.1 - 5 SLPM) \_\_\_\_\_ M1287-2015
  - 3 TMFC (0.4 - 20 SLPM) \_\_\_\_\_ M1287-2016
  - 4 TMFC (0 - 0.5 SLPM) \_\_\_\_\_ M1287-2021
  - 4 TMFC (0 - 1 SLPM) \_\_\_\_\_ M1287-2020
  - 4 TMFC (0.1 - 5 SLPM) \_\_\_\_\_ M1287-2017
  - 4 TMFC (0.4 - 20 SLPM) \_\_\_\_\_ M1287-2018

5. **Select Impeller Kit** (see page 69).
6. **Add 2nd DO - pH/Redox board, optional:**
  - Factory installed \_\_\_\_\_ M1287-3540
7. **Select pH/D.O. Probe Kit which include probe and cable:**

**For all Impellers except Packed-Bed Basket:**

  - M1287-0400 \_\_\_\_\_ 2.5 L
  - M1287-0401 \_\_\_\_\_ 5.0 L
  - M1287-0402 \_\_\_\_\_ 7.5 L
  - M1287-0403 \_\_\_\_\_ 14.0 L

**For Packed-Bed Basket Impellers Only:**

  - M1287-0674 \_\_\_\_\_ 2.5/5.0 L
  - M1287-0675 \_\_\_\_\_ 7.5 L
  - M1287-0676 \_\_\_\_\_ 14.0 L
8. **Add Fibracel Disks, if using Packed-Bed Basket Impeller:**
  - M1292-9984 \_\_\_\_\_ 50 grams
  - M1292-9988 \_\_\_\_\_ 250 grams

(\*) TMFC = Thermal Mass Flow Controller  
 (\*\*) SLPM = Standard Liters per Minute  
 (\*\*\*) 0 and 1 TMFCs are built with 4-gas manifold for 4 gas mixing

**3a. What gas flow rate is right for your impeller?**  
 In Cell Culture Process – Refer to chart below. Gas flow values may vary depending on your requirement. All gases combined should add up to the total gas range desired.

**4. Add Vessel Kits^:**

Vessel Total Volume (L)	With Motor	Without Motor
	Catalog No.	Catalog No.
2.5	M1287-0310	M1287-0330
5.0	M1287-0311	M1287-0331
7.5	M1287-0312	M1287-0332
14.0	M1287-0313	M1287-0333

(^) For Vessel Dimensions see page 65.

Typical Quantity of Fibracel Used:	
2.5 L Vessel	50 Grams
5.0 L Vessel	150 Grams
7.5 L Vessel	250 Grams
14.0 L Vessel	500 Grams



Up to four reactors can be controlled with a single Control Station.

Gas Flow recommendations [SLPM] when using different impellers and vessel sizes in CelliGen™ 310				
Impellers	Total Volume: 2.5 L	Total Volume: 5.0 L	Total Volume: 7.5 L	Total Volume: 14.0 L
Packed-Bed Basket	0 - 0.1	0 - 0.15	0 - 0.2	0 - 0.3
Pitched / Marine Blade	0 - 0.3	0 - 0.5	0 - 0.5	0 - 0.7
Spin Filter	0 - 0.5	0 - 0.5	0 - 0.5	0 - 1.0
Cell Lift	0 - 1.0	0 - 1.5	0 - 2.5	0 - 5.0

(Ø) When using a Cell Lift or Basket impeller, the minimum and maximum working volume is always the maximum volume shown for that vessel size.

## AUTOCLAVABLE BENCHTOP FERMENTORS & BIOREACTORS

Upgrade your existing CelliGen Plus vessel or existing cabinet to a CelliGen 310. You can gain the power of the advanced CelliGen 310 controller while saving money by re-using your existing vessels/controller.

### How to Order:

To use a CelliGen 310 Cabinet with a your existing CelliGen Plus Vessel:







1. Choose Cabinet: (Includes Master Control Station with 1 TMFC, 0.1 - 5 SLPM – complete Cell Culture cabinet)
  - 120V Master Control Station \_\_\_\_\_ M1287-1002
  - 230V Master Control Station \_\_\_\_\_ M1287-1004
2. Choose Motor Conversion Kits: (Includes new motor, cables and tubing)
  - For CelliGen Plus Vessels, 2.2 & 5 L \_\_\_\_\_ M1287-1203
  - For CelliGen Plus Vessels, 7 & 14 L \_\_\_\_\_ M1287-1204

To use your existing CelliGen Plus Cabinet with a new CelliGen 310 Vessel:

1. CelliGen 310 Retro Kit (Includes vessel assembly, vessel kit, tubing & motor).
  - For CelliGen 310 Vessels, 2.5 L \_\_\_\_\_ M1287-1210
  - For CelliGen 310 Vessels, 5.0 L \_\_\_\_\_ M1287-1211
  - For CelliGen 310 Vessels, 7.5 L \_\_\_\_\_ M1287-1212
  - For CelliGen 310 Vessels, 14.0 L \_\_\_\_\_ M1287-1213

## Impellers

(See article on page 52 for more information)

<p><b>Basket Impeller with Fibracel® Disks</b></p>  <p>For high yields of secreted products from suspension or anchorage-dependent cells. Perfusion only.</p> <p>Also for processes using viral infections, BEVS and gene therapy. Cells are immobilized on Fibracel® disks and no special cell retention devices are required.</p>	<p><b>Basket Impeller</b></p> 	<p><b>Patented low-shear Cell Lift</b></p>  <p>For traditional vaccines as well as gene therapy processes using micro-carriers, batch or perfusion. Perfusion requires a cell retention device such as a decanting column.</p> <p>Also for processes using viral infections. High <math>K_L a</math>.</p>	<p><b>Marine Blade</b></p>  <p>For suspension cells in batch, fed-batch, or perfusion. In perfusion a cell retention device is required.</p> <p>Also for processes using viral infections.</p>	<p><b>Spin Filter with Marine Blade</b></p>  <p>For suspension (10<math>\mu</math> screen) and for micro-carriers (75<math>\mu</math> screen). Dip tube inside Spin Filter harvests cell-free medium. Perfusion only.</p>	<p><b>Pitched Blade</b></p>  <p>For insect and other suspension cells as well as microcarriers in batch, fed-batch or perfusion. A cell retention device is required in perfusion.</p> <p>Also for processes using viral infections.</p>
---	--	---	--	---	--

## Options &amp; Accessories – CelliGen™ 310

Catalog No.	Description
<b>Gas Overlay</b>	
M1287-3500	Gas Overlay with TMFC (0.1 - 5 SLPM)
M1287-3550	Gas Overlay without TMFC (requires Rotameter)
M1287-3505*	Gas Overlay Vessel Kit (includes stainless steel tube & adapter, filter and silicone tubing).
<b>Scales</b>	
M1287-0020	RS-232 8-Port (Serial) Controller (required when connecting 1- 8 scales to CelliGen™ 310)
P0440-4489	Mettler Toledo Scale Display (required with each of the above scales)
P0440-4325	Mettler Toledo Scale, 15 Kg (33.0 lbs)
P0440-4321	Mettler Toledo Scale, 32 Kg (70.5 lbs)
P0440-4326	Mettler Toledo Scale, 60 Kg (132.2 lbs)
P0440-4327	Mettler Toledo Scale, 150 Kg (330.4 lbs)
<b>Replacement Glass Vessels</b>	
M1287-9920	2.5 L Glass Vessel
M1287-9921	5.0 L Glass Vessel
M1287-9922	7.5 L Glass Vessel
M1287-9923	14.0 L Glass Vessel
<b>Additional Options</b>	
M1287-9966	Barnant Variable Speed Pump, 115V (connects via Analog I/O) 0 - 100 rpm
M1287-9967	Barnant Variable Speed Pump, 230V (connects via Analog I/O) 0 - 100 rpm
M1273-5001	Water Regulator/Filter Kit (4 Manifolds)
M1273-5002	Air Regulator/Filter Kit (4 Manifolds)
M1287-5042	<b>Sampling Assembly, used with cell lift impeller</b>
M1287-1190	<b>2.5 L Decanter Assembly, used with cell lift impeller</b>
M1287-1191	5.0 L Decanter Assembly, used with cell lift impeller
M1287-1192	7.5 L Decanter Assembly, used with cell lift impeller
M1287-1193	14.0 L Decanter Assembly, used with cell lift impeller

(◇) Includes dip tube.

(\*) Recommended when purchasing overlay.

Catalog No.	Description
<b>Validation Kits</b>	
M1287-0111	Basic Validation
M1287-0114	Basic Plus Validation
<b>2nd DO-pH/Redox Options</b>	
M1287-3530	2nd DO-pH/Redox Controller (Field Installed)
<b>Impeller Kits (includes Shaft, Impeller &amp; Sparger)</b>	
M1287-1110	<b>2.5 L Cell Lift Impeller Kit for microcarriers (85µm)</b>
M1287-1111	5.0 L Cell Lift Impeller Kit for microcarriers (85µm)
M1287-1112	7.5 L Cell Lift Impeller Kit for microcarriers (85µm)
M1287-1113	14.0 L Cell Lift Impeller Kit for microcarriers (85µm)
M1287-1150	<b>Air Wash Kit for increasing oxygen transfer rate. (Used with Cell Lift only)</b>
M1287-5072	<b>2.5 L Marine Blade Impeller Kit for suspension cells</b>
M1287-5073	5.0 L Marine Blade Impeller Kit
M1287-5074	7.5 L Marine Blade Impeller Kit
M1287-5075	14.0 L Marine Blade Impeller Kit
M1287-5068	<b>2.5 L Pitched Blade Impeller Kit for suspension cells</b>
M1287-5069	5.0 L Pitched Blade Impeller Kit
M1287-5070	7.5 L Pitched Blade Impeller Kit
M1287-5071	14.0 L Pitched Blade Impeller Kit
M1287-1140	<b>2.5 L Basket Impeller Kit for secreted proteins - need to order Fibracel separately</b>
M1287-1141	5.0 L Basket Impeller Kit
M1287-1142	7.5 L Basket Impeller Kit
M1287-1143	14.0 L Basket Impeller Kit
M1287-1125 <sup>◇</sup>	<b>2.5 L Spin Filter Impeller Kit - for suspension cells (10µm)</b>
M1287-1126 <sup>◇</sup>	5.0 L Spin Filter Impeller Kit (10µm)
M1287-1127 <sup>◇</sup>	7.5 L Spin Filter Impeller Kit (10µm)
M1287-1128 <sup>◇</sup>	14.0 L Spin Filter Impeller Kit (10µm)
M1287-1135 <sup>◇</sup>	<b>2.5 L Spin Filter Impeller Kit - for microcarriers (75µm)</b>
M1287-1136 <sup>◇</sup>	5.0 L Spin Filter Impeller Kit (75µm)
M1287-1137 <sup>◇</sup>	7.5 L Spin Filter Impeller Kit (75µm)
M1287-1138 <sup>◇</sup>	14.0 L Spin Filter Impeller Kit (75µm)

continued on next page

## AUTOCLAVABLE BENCHTOP FERMENTORS &amp; BIOREACTORS

## CelliGen™ 310 Options &amp; Accessories (continued)

Catalog No.	Description
<b>Impeller Only</b>	
M1287-9227	2.5 L Pitched Blade Impeller only, Right-hand
M1287-9228	5.0 L Pitched Blade impeller only, Right-hand
M1287-9229	7.5 L Pitched Blade impeller only, Right-hand
M1287-9230	14.0 L Pitched Blade impeller only, Right-hand
M1287-9287	2.5 L Pitched Blade impeller only, Left-hand
M1287-9288	5.0 L Pitched Blade impeller only, Left-hand
M1287-9289	7.5 L Pitched Blade impeller only, Left-hand
M1287-9290	14.0 L Pitched Blade impeller only, Left-hand
M1287-9950	2.5 & 5.0 L Marine Blade Impeller only, Right-hand pitch (directs flow up).
M1287-9952	7.5 L Marine Blade Impeller only, Right-hand pitch (directs flow up).
M1287-9954	14.0 L Marine Blade Impeller only, Right-hand pitch (directs flow up).
M1287-9951	2.5 & 5.0 L Marine Blade Impeller only, Left-hand pitch (directs flow down).
M1287-9953	7.5 L Marine Blade Impeller only, Left-hand pitch (directs flow down).
M1287-9955	14.0 L Marine Blade Impeller only, Left-hand pitch (directs flow down).

Catalog No.	Description
<b>Microspargers, 5 micron</b>	
M1287-5010	2.5 L Microsparger
M1287-5011	5.0 L Microsparger
M1287-5012	7.5 L Microsparger
M1287-5013	14.0 L Microsparger
<b>Replacement Screen &amp; O-Ring Kit for Cell Lift Impeller</b>	
M1287-9985	For 2.5 L vessel
M1287-9986	For 5 L vessel
M1287-9987	For 7.5 L vessel
M1287-9988	For 14.0 L vessel
<b>Perfusion Kits</b>	
M1287-1185	2.5 L Perfusion Kit
M1287-1186	5.0 L Perfusion Kit
M1287-1187	7.5 L Perfusion Kit
M1287-1188	14.0 L Perfusion Kit
<b>Spare Parts Kits</b>	
M1287-6030	For 2.5 L Vessels
M1287-6031	For 5.0 L Vessels
M1287-6032	For 7.5 L Vessels
M1287-6033	For 14.0 L Vessels

SIP FERMENTORS

## BioFlo® 415 Compact Sterilizable-In-Place Benchtop Fermentor for R&D, 7 – 19.5 Liters



BioFlo® 415 is a validatable lab fermentor which uniquely uses a built-in electric heater and utilizes your water supply to automatically achieve sterilization on your lab bench without the need for an external steam source.

**Applications:** Bacteria, yeast or fungi, in batch, fed-batch or continuous culture.

**Sophisticated control station:** Compact unit with powerful RPC (Reactor Process Controller) provides integrated control of up to 32 process parameters, trends up to 8 parameters simultaneously, stores up to 10 recipes, and includes built-in security features. (See page 54.)

Includes: Large industrial touchscreen interface with adjustable-position, 15" (38.1 cm) color display; 3 integrated pumps; control of agitation, temperature, pH, DO, foam/level, and up to 4-gas mixing; 2 USB ports; and 7 analog inputs and 7 outputs to add ancillary devices.

**Vessel:** Interchangeable, stainless-steel, sterilizable-in-place vessels offered in 7.0 & 14.0 liter capacities with 2:1 aspect ratio, and 19.5 liter capacity with 3:1 ratio. Vessel assembly includes top magnetic-drive motor, exhaust condenser and sparger assembly with SIP filters, foam/level probe kits and more.

**Impellers:** 7.0 and 14.0 L vessel include 2 Rushton-type impellers. 19.5 L vessel includes 3 Rushton-type impellers. Pitched-blade and marine-blade, optional.

**Gas flow control:** Thermal Mass Flow Controller (0.5 – 25 SLPM)\* with 4 solenoid valves for gas mixing is standard. Replace the TMFC with a low-cost Rotameter, or upgrade by adding up to 4 TMFCs.

**Additional options:** Single or redundant pH, DO & Redox Kits; sampling assembly; scales; validation packages, and more listed on page 72. Related accessories, including BioCommand® SCADA Software, gas analyzers, and more are described beginning on page 80.



No autoclave or steam generator needed to autoclave vessels

### Pre-Configured Systems

Catalog No.	Total Volume (L)	Working (L) Volume	Electrical Service	System Includes
M1360-1120	7	2 - 5	100V - 240V, 50/60 Hz	BioFlo® 415 Control Station, 1 TMFC (0.5 – 25 SLPM) with 4-Gas Mixing, Touchscreen Display and Vessel Assembly Kit. Call for Detailed Quotation
M1360-1121	14	4 - 10		
M1360-1123	19.5	5 - 15.5		

(\*) SLPM = Standard Liters Per Minute.

## SIP FERMENTORS

## How To Order BioFlo® 415:

- Specify Pre-Configured Kit from chart on the previous page dependent on your vessel size.
- Specify cord set type (no additional charge):
  - North America \_\_\_\_\_ M1360-0100
  - Elsewhere \_\_\_\_\_ M1360-0200
- Select any of the highly recommended options from the list below. (Not included in the pre-configured kits.)
  - Probe kits (pH, DO, Redox kits include probes and cables)
  - Baffle Plug Kit and Pitched or Marine Blade (required for cell culture process)
  - Needles and QMI 7-port Septum Kit
  - Sample Assembly
- For a different configuration than listed above, including multiple TMFCs with various ranges and/or 2nd DO- pH/ Redox sensor:
 

Specify from the cord set type (see item 2) and select Gases from list below:

  - 0 TMFC (requires a Rotameter)\*\*\* – M1360-2030
  - 3 TMFC (0.5 - 25 SLPM) \_\_\_\_\_ M1360-2036
  - 1 TMFC (0.1- 5 SLPM)\*\*\* \_\_\_\_\_ M1360-2031
  - 4 TMFC (0 - 0.5 SLPM) \_\_\_\_\_ M1360-2041
  - 1 TMFC (0.5 - 25 SLPM)\*\*\* \_\_\_\_\_ M1360-2032
  - 4 TMFC (0 - 1.0 SLPM) \_\_\_\_\_ M1360-2040
  - 2 TMFC (0.1- 5 SLPM) \_\_\_\_\_ M1360-2033
  - 4 TMFC (0.1 - 5 SLPM) \_\_\_\_\_ M1360-2037
  - 2 TMFC (0.5- 25 SLPM) \_\_\_\_\_ M1360-2034
  - 4 TMFC (0.5 - 25 SLPM) \_\_\_\_\_ M1360-2038
  - 3 TMFC (0.1 - 5 SLPM) \_\_\_\_\_ M1360-2035
- To upgrade your existing BioFlo® 410 to a BioFlo 415®:
 

Choose cabinet M1360-1005 and specify cord set type (see item 2).

## BioFlo 415® Options &amp; Accessories †

Catalog No.	Description
<b>Spare Vessel Assembly Kits (Include components listed in "Vessel Assembly" description on page 71.)</b>	
M1360-2020	7.0 L System with Magnetic Drive
M1360-2021	14.0 L System with Magnetic Drive
M1360-2023	19.5 L System with Magnetic Drive
M1360-2050	Fluidine Tank Bottom Drain/Harvest Valve
<b>Probe Kits</b>	
<b>7.0 Liter Systems</b>	
M1294-9820	pH probe, Mettler Ingold Gel Filled
M1294-9822	dO2 probe, Mettler Ingold
M1360-9832	Redox probe, Hamilton Gel Filled
<b>14.0 Liter Systems</b>	
M1294-9824	pH probe, Mettler Ingold Gel Filled
M1294-9826	dO2 probe, Mettler Ingold
M1360-9834	Redox probe, Hamilton Gel Filled
<b>19.5 Liter Systems</b>	
M1294-9828	pH probe, Hamilton Gel Filled
M1294-9830	D.O. probe, Hamilton
M1360-9836	Redox probe, Hamilton Gel Filled
<b>Impellers</b>	
M1273-9206	Pitched Blade Impeller (up flow), 7.0 L
M1294-9940	Pitched Blade Impeller (up flow), 14.0 L
M1294-9942	Pitched Blade Impeller (up flow), 19.5 L

Catalog No.	Description
<b>Impellers (continued)</b>	
M1273-9290	Pitched Blade Impeller (down flow), 7.0 L
M1294-9941	Pitched Blade Impeller (down flow), 14.0 L
M1294-9943	Pitched Blade Impeller (down flow), 19.5 L
M1294-9948	Marine Blade Impeller, 7.0 L
M1294-9944	Marine Blade Impeller, 14.0 L
M1294-9945	Marine Blade Impeller, 19.5 L
<b>Additional Options</b>	
M1294-5023	QMI 7-Port Septum Kit (19 mm port)
P0720-6570	DO Probe Membrane Replacement Kit
M1294-9544	PG 13.5 Probe-Adapter for 19 mm port
M1294-9542	19 mm Probe-Adapter for 19 mm port
M1273-5001	Water Regulator/Filter Kit (4 Manifolds)
M1273-5002	Air Regulator/Filter Kit (4 Manifolds)
P0440-0064	Needle (Pack of 100) 18 Gauge 1-1/2" (3.8 cm) Length (used for multiple septum ports)
M1294-9954	Baffle Plug Kit (New vessel headplate)
M1360-0101	Basic Validation
M1360-0102	Basic Plus Validation
M1360-0103	Enhanced Validation
M1294-5013	Sampling Assembly
M1360-9969	Spare Parts Kit

(\*) SLPM = Standard Liters per Minute (\*\*) TMFC = Thermal Mass Flow Controller (\*\*\*) 0 and 1 TMFC are built with 4-gas manifold for 4 gas mixing  
 (†) If product received in 2006 or before, please contact NBS for correct part numbers.

## SIP FERMENTORS AND BIOREACTORS

## BioFlo® 510 & CelliGen™ 510 Sterilizable-In-Place Culture Systems, 19.5 & 40.0 Liters



BioFlo® 510 Fermentors & CelliGen™ 510 Bioreactors are intermediate systems ideal for pilot through production applications. Compact systems fit on the bench or on optional mobile skid. A modular design and wide variety of standard and optional components provide the flexibility to customize these systems to meet your process requirements.

**Applications:** Bacteria, yeast, insect, plant or mammalian cells, in batch, fed-batch or continuous culture.

**Sophisticated control station:** Powerful RPC (Reactor Process Controller) provides integrated control of up to 32 process parameters, trends up to 8 parameters simultaneously, stores up to 10 recipes, and includes built-in security features. (See page 54.)

Includes: Large industrial touchscreen interface with adjustable-position, 15" (38.1 cm) color display; 3 integrated pumps; 2 USB ports; 7 analog inputs and 7 outputs to add ancillary devices; integrated load cell and more.

**Vessel:** Electropolished 316L stainless-steel, sterilizable-in-place vessels offered in 19.5 & 40.0 liter capacities with 2:1 aspect ratio.

**Impellers:** Fermentor includes (2) Rushton-type impellers, with pitched-blade and marine-blade, option. Bioreactor offers choice of pitched-blade, marine-blade, spin filter, Cell-Lift\* or packed-bed basket\* impellers. (\* 40 L only. See page 52.)

**Gas flow control:** Sparge gas with Thermal Mass Flow Controller (TMFC) for 4-gas control and 4 solenoid valves is standard. Replace the TMFC with a low-cost Rotameter, upgrade by adding up to 4 TMFCs. Gas overlay and air-wash systems with choice of flow rates available.

**Additional options:** See list below for wide range of options. Related accessories, including BioCommand® SCADA Software, gas analyzers, and more are described beginning on page 80.



Bench or mobile system

### Standard Features

- RPC (Reactor Process Control ) Software
- Top-Mounted Drive with Double-Mechanical Seal
- ASME/CE Electropolished Vessel
- Baffles (Standard on BioFlo 510 Fermentation System)
- Load Cell
- Bright, 15" Industrial Color Touchscreen Controller
- 3-Fixed Speed Pumps
- User-Definable, Pressure Hold Sequence
- User-Definable, Sterilization Sequence Program
- Control System Security
- Temperature Control
- Resterilizable Harvest Port
- Ring Sparger
- Inlet/Exhaust Filters
- 7 Analog Inputs and 7 Analog Outputs

continued on next page

## SIP FERMENTORS AND BIOREACTORS

### How To Order BioFlo® 510 & CelliGen™ 510:

1. Specify base system vessel size
2. Select options from the list below.
3. Consult an NBS application specialist for your specific needs.

### BioFlo® 510 & CelliGen™ 510 Options

#### Gas flow

- Rotameter:
  - 0 - 3 SLPM
  - 0 - 64 SLPM
  - 0 - 32 SLPM
- Various combinations of 2, 3, or 4 TMFCs:
  - 0.06 - 3 SLPM
  - 0.6 - 32 SLPM
  - 0.3 - 15 SLPM
  - 1 - 64 SLPM
- Overlay with TMFC (0 - 15 or 0 - 32 SLPM)
- Air Wash System with TMFC (0 - 15 or 0 - 32 SLPM)
- Overlay Valve only

#### Exhaust line

- Exhaust Condenser
- Automatic Pressure Control

#### Impellers

- Rushton Type - Used commonly for robust cell lines such as bacteria, yeast and algae, where maximum OTR is desired. Provided as standard on BioFlo® 510 fermentors
- Pitched Blade - Commonly used with mammalian, insect or other shear sensitive cell lines for batch, fed-batch, or continuous cultures. Produces axial and radial mixing
- Pitched Blade with Magnetic Drive - For critical cell culture applications
- Marine Blade - Commonly used with mammalian, insect or other shear sensitive cell lines for batch, fed-batch, or continuous cultures. Produces axial mixing
- Spin Filter - For Suspension or Microcarrier cultures where a dip tube inside the filter withdraws cell media as harvest or waste
- Cell Lift - Specially designed to provide uniform circulation for both Suspension and Microcarrier cultures. Can be used with optional decanting columns for perfusion cultures (40 L only)
- Packed-Bed Basket Impeller - For secreted products from anchorage dependent and suspension cells, this impeller immobilizes cells in a bed of Fibracel® disks to provide extremely high cell densities (40 L only)

#### Probes

- Single or Redundant pH/DO Control Systems
- Redox Control System
- Foam/Level Detection System

#### Addition and sampling

- Resterilizable Sample Valve
- Resterilizable Addition Valves (4 Maximum)
- Resterilizable Addition/Harvest Valve with Diptube (2 Maximum)
- ½" Sanitary Fitting 7-Port Septum
- Addition Vessels (Glass / Stainless Steel)
- Decanters
- Sterile Sampling Assembly (Kit of 3)

#### SCADA software (see page 85)

- BioCommand® Track and Trend
- BioCommand® Batch Control
- BioCommand® Batch Control Plus

#### Validation

- Basic Package
- Basic Plus Package
- Enhanced Package

#### Utility regulator & pre-filter kits

- Process Air Pre-Filter/Regulator Kit
- Instrument Air Pre-Filter/Regulator Kit
- Water Pre-Filter/Regulator Kit
- Process Steam Pre-Filter/Regulator Kit
- Utility Steam Pre-Filter/Regulator Kit
- Utility Connection Kit

#### Additional options

- Allen Bradley Compact Logix PLC Control System
- Sprayballs for clean-in-place of Vessel
- External Variable Speed Pumps
- External Scales
- 8-Port Serial Controller (RS-232)
- Spare Parts Kits
- Preventative Maintenance Kits
- Mobile Skid
- System Passivation

## SIP FERMENTORS

## BioFlo® 610 Mobile Pilot Plant Fermentor, 65 – 125 Liters



The BioFlo® 610 is a compact, mobile-pilot plant fermentor for process development and small-scale production. A modular design and wide variety of standard and optional components provide the flexibility to customize the system to meet your process requirements.

**Applications:** Bacteria, yeast, plant, or insect cells, in batch, fed-batch or continuous culture.

**Sophisticated control station:** Powerful RPC (Reactor Process Controller) provides integrated control of up to 32 process parameters, trends up to 8 parameters simultaneously, stores up to 10 recipes, and includes built-in security features. (See page 54.)

Includes: Large industrial touchscreen interface with adjustable-position, 15" (38.1 cm) color display; 3 integrated pumps; 2 USB ports; 7 analog inputs and 7 outputs to add ancillary devices; integrated load cell and more.

**Vessel:** 316L stainless-steel, sterilizable-in-place vessels offered in 65 & 125 liter capacities with 3:1 aspect ratio.

**Impellers:** Rushton-style impellers, standard. Pitched-blade and marine-blade, optional.

**Gas flow control:** Single-gas system with Thermal Mass Flow Controller (TMFC) is standard. Replace the TMFC with a low-cost Rotameter, or upgrade by adding a second TMFC for two-gas mixing. Gas overlay available.

**Additional options:** See list below for wide range of options. Related accessories, including BioCommand® SCADA Software, gas analyzers and more are described beginning on page 80.

### Standard Features

- RPC (Reactor Process Control ) Software
- Bottom-Mounted Drive with Double-Mechanical Seal
- ASME/CE Vessel
- Baffles (Removable)
- Load Cells
- Bright, 15" Industrial Color Touchscreen Controller
- 3-Fixed Speed Pumps
- User-Definable, Pressure Hold Sequence Program
- User-Definable, Sterilization Sequence Program
- Control System Security
- Temperature Control
- Resterilizable Harvest Port
- Ring Sparger
- Inlet/Exhaust Filters
- 7 Analog Inputs and 7 Analog Outputs



Bench or mobile system

## SIP FERMENTORS

### How To Order BioFlo® 610:

1. Specify base system vessel size
2. Select options from the list below.
3. Consult an NBS application specialist for your specific needs.

### BioFlo® 610 Options

#### Gas flow control

- Single Gas
- Two Gas
- Overlay Valve

Gas Flow	65 L Vessels (Shown in SLPM)	125 L Vessels (Shown in SLPM)
Rotameter	9.5 - 95	15.0 - 150
1 TMFC	1.5 - 75	3.0 - 150
2 TMFC	1.5 - 75 0.6 - 32	3.0 - 150 1.0 - 64

#### Exhaust line

- Exhaust Condenser
- Automatic Pressure Control

#### Impellers

- Rushton-Type, Standard
- Pitched Blade, Optional
- Marine Blade, Optional

#### Probes

- Single or Redundant pH/DO Control Systems
- Redox Control System
- Foam/Level Detection System

#### Addition and sampling

- Resterilizable Sample Valve
- Resterilizable Addition Valves (4 Maximum)
- 1½" Sanitary Fitting 7-Port Septum
- Addition Vessels (Glass / Stainless Steel)
- Sterile Sampling Assembly (Kit of 3)

#### SCADA software (see pages 85)

- BioCommand® Track and Trend
- BioCommand® Batch Control
- BioCommand® Batch Control Plus

#### Validation

- Basic Package
- Basic Plus Package
- Enhanced Package

#### Utility regulator & pre-filter kit

- Process Air Pre-Filter/Regulator Kit
- Instrument Air Pre-Filter/Regulator Kit
- Water Pre-Filter/Regulator Kit
- Process Steam Pre-Filter/Regulator Kit
- Utility Steam Pre-Filter/Regulator Kit
- Utility Connection Kit

#### Additional options

- Sprayballs for clean-in-place of Vessel
- External Variable-Speed Pumps
- External Scales
- 8-Port Serial Controller (RS-232)
- Spare Parts Kits
- Preventive Maintenance Kits
- System Passivation
- Vessel Electropolish

## SIP FERMENTORS AND BIOREACTORS

## Modular, Customizable SIP BioFlo® Pro Fermentors & CelliGen™ Pro Bioreactors, 75 – 3000 Liters

Now featuring Allen Bradley CompactLogix Programmable Automation Controller

**The New Standard In Large-Scale Customizable Bioprocess Equipment**  
Adheres to cGMP and GaMP guidelines

New Brunswick Scientific's fully modular fermentors and bioreactors offer a unique solution for pilot through production-scale bioprocessing, combining quick delivery, dependable operation and system flexibility, all at an affordable price. The BioFlo Pro and CelliGen Pro systems utilize industry-standard components for dependable operation, and an Allen Bradley programmable-logic controller (PLC) for easy integration into any production facility. The modularity of the system offers many options that can be added, removed, or changed at any time to meet your various process requirements. From validation packages to redundant probes, dual inlet/outlet filters, and multiple resterilizable-in-place addition valves, these systems have the options you need, at the price and delivery you require. Fermentors available in 75, 150, 300, 500, 1000, 1500 & 3000 liter sizes; Bioreactors available in 75, 150, 300 & 650 liter sizes.



### Standard Features

- Allen Bradley CompactLogix Controller
- 316L ASME code/CE Stainless-Steel Vessel:

#### Fermentors, all sizes - 3:1 ratio:

- Bottom-Drive, Double-Mechanical Seal

#### Bioreactors:

- 75 - 150 L, 1.9:1 ratio  
Top-Drive, Double-Mechanical Seal
- 300 L, 1.6:1 ratio  
Top-Drive, Double-Mechanical Seal
- 650 L, 2:1 ratio  
Bottom-Drive, Double-Mechanical Seal
- Automatic Sterilization Program
- Large, Color, Operator-Interface Terminal
- Open-Frame Piping Skid
- Manual Air-Flow Control
- Safety Features; Headplate Open Interlock, Emergency Stop, Rupture Disk, Jacket Relief Valve
- Automatic Temperature Control
- SIP / CIP Drain Valve
- SIP Inlet / Exhaust Filters
- Automatic Agitation Control
- Resterilizable Harvest Port
- NEMA-4 Rated Electrical Cabinet

(\*) 2 maximum for fermentation; 4 maximum for cell culture

### Options

#### Exhaust line

- Exhaust Condenser
- Automatic Backpressure Control
- Dual Exhaust Filters (in parallel)
- Single or Dual Exhaust Filters with test integrity ports

#### Pumps

- 4 Built-In Fixed-Speed Addition Pumps
- External Variable-Speed Pumps\*

#### Housings/Probes

- pH / dO<sub>2</sub> Probes and Transmitters
- Redox Probe and Transmitter
- Retractable Probe Housings
- Redundant Probe Kits

#### Foam kits

- Foam Kit
- High-Foam Kit
- High-High Foam Kit

#### Filter/regulator kits

- Process Steam
- Utility Steam
- Water
- Instrument Air
- Utility Connection Kit

continued on next page

## SIP FERMENTORS AND BIOREACTORS

## BioFlo® / CelliGen™ Pro Options (continued)

**Sampling**

- Sampling Valve (Resterilizable)
- Novaseptum™ Sampling System<sup>^</sup>
- Sterile Sampling Assembly (Kit of 3)

**Vessel volume/weight**

- Vessel Volume via differential pressure
- Load Cells
- Level Probe

**Additional accessories**

- Clean-In-Place Option (transfer panel/spray balls)
- Cooling by dedicated heat exchanger for chiller
- Low-Seal Pressure Switch for Double-Mechanical Seal
- Thermometer (Digital)
- Electropolish
- Passivation
- Transfer Lines (Resterilizable)
- Utility Connection Kit

(^) NA-Connect® and Novaseptum™ are registered trademarks of Millipore

(†) Delta V™ is a registered trademark of Emerson

**Data recording**

- BioCommand® SCADA Software (see pages 85)
- (7) Inputs (4-20 mA) for Ancillary Devices
- Delta V™ connectivity<sup>†</sup>

**Validation packages**

- Basic Validation
- Basic Plus Validation
- Enhanced Validation

**Parts kits**

- Spare Parts Kits
- Preventative Maintenance Kit

## Additional Options for BioFlo® Pro Fermentors only

Now featuring the Allen Bradley CompactLogix Programmable Automation Controller

**How To Order:**

1. Specify vessel size
2. Select options from the list below.  
(Standard features listed on page 77)
3. Consult an NBS application specialist for your specific need

**Air inlet line**

- Thermal Mass-Flow Controller
- Dual-Inlet Air Filters (in series)
- Dual-Inlet Air Filters with test integrity ports
- Gas Overlay
- 2-Gas Mix (O<sub>2</sub> supplementation)

**Impellers**

- Rushton-Type, Standard
- Pitched Blade, Optional
- Marine Blade, Optional

**Addition or inoculation**

- Addition Valve (up to 5)
- 7-Port or 12-Port Septums
- Stainless-Steel Addition Vessels - 4 L, 7.5 L, 11 L & 19 L
- Addition-Vessel Scales
- Glass Bottles for Addition/Harvest, 0.25 - 10L



## Additional Options for CelliGen™ Pro Bioreactors only

Now featuring the Allen Bradley CompactLogix Programmable Automation Controller

### How To Order:

1. Specify vessel size
2. Select options from the list below.  
(Standard features listed on page 77)
3. Consult an NBS application specialist for your specific needs.

#### Air inlet line

- 4-Gas Mix (CO<sub>2</sub>, O<sub>2</sub>, N<sub>2</sub> and Air)
- Single Mass-Flow Controller
- 4 Thermal Mass Flow Controllers (CO<sub>2</sub>, O<sub>2</sub>, N<sub>2</sub> and Air)
- Dual-Inlet Air Filters (in series)
- Dual-Inlet Filters with test integrity ports
- Gas Overlay with TMFC
- Air Wash

#### Impellers

- Pitched Blade, Standard (Suspension)
- Marine Blade, Optional (Suspension)
- Spin Filter, Optional (Suspension or Microcarrier)
- Cell Lift, Optional (Microcarrier)
- Packed-Bed Basket, Optional (FibraCel® Disks)

#### Addition or inoculation

- 1/2" Addition Valve (up to 3)
- 1" Addition Valve
- 7-Port or 12-Port Septums
- Stainless-Steel Addition Vessels - 4 L, 7.5 L, 11 L & 19 L
- Glass Bottles for Addition/Harvest 0.25 - 10L
- Addition-Vessel Scales



## ACCESSORIES FOR NBS FERMENTORS AND BIOREACTORS

In addition to the accessories listed here, NBS can supply a variety of ancillary equipment which can interface with our fermentors and bioreactors. Please allow our process engineers to suggest reliable equipment to utilize in your

Catalog No.	Description
<b>Pumps And Accessories</b>	
P0620-0653	Watson-Marlow 101 U/R, low capacity 1-32 rpm variable speed pump. Accepts external signals up to 60 V or 32 mA for automatic start/stop operation and reversible pumping by remote control, 120V 60Hz, 15 W
P0620-0654	Same as above, but 220V-240 V, 50/60Hz, 15W
P0620-0662	Watson-Marlow 101 F/R, low capacity 24 rpm fixed speed pump, 120V 60Hz, 25 W
P0620-0664	Same as above, but 20 rpm, 220V-240V, 50/60Hz, 25W
P0620-0920	Watson-Marlow 520 U/R, large capacity 1-220 rpm variable speed pump with front panel auto/manual control. Accepts external signals up to 60 V or 32 mA for automatic start/stop operation and reversible pumping by remote control, 120V 60Hz, 100W (Must be used with M1228-8001. See below)
P0620-0921	Same as above, but 220V-240V, 50/60Hz, 100W (Must be used with M1228-8001. See below)
P0620-2410A	Masterflex Pump, fixed speed 30 rpm with Easy-Load II Pump head, 120V, 60Hz
P0620-2411A	Same as above, but 230V, 50Hz
M1228-8001	External Control Cable for controller P0620-0920 or P0620-0921 through BioFlo® 3000 console
M1287-9966	Barnant Easy Load Pumps, 1-100 rpm variable speed pumps. 6 Ft. cable with 2 open wires to directly connect to BioFlo/CelliGen 310 or BioFlo 415 Analog I/O. 120V, 50/60 Hz
M1287-9967	Same as above, but 220-230V, 50/60 Hz

process development, on-line analysis, up- and down- stream processing. The following section presents only a selected list of the most commonly requested items.

Catalog No.	Description
<b>Autoclavable Connectors</b>	
P0240-1090	Female Glass Joint for sterile connection (One set requires male connector, listed below)
P0240-1080	Male Glass Joint for sterile connection
M1153-9633	Resterilizable Quick Connect, 19 mm for SIP units
M1153-9639	Resterilizable Quick Connect, 25 mm for SIP units
P0240-5000	Luer-lock Syringe Connector
P0440-0061A	4-1/4" Hypodermic Needle, 8 gauge, (Dozen)

Variable speed pumps may be remotely controlled using the BioFlo 310, CelliGen 310, BioFlo 510, CelliGen 510, BioFlo Pro, General Purpose Controller or 4-20 mA Interface Box. Call NBS for additional pump information.

#### Chillers

NBS can supply chillers for most fermentors/bioreactors. See also page 83.

#### Steam Generators

NBS can supply utility and clean steam generators for most fermentors/bioreactors in various electrical services.

#### Sampling Probes (Cell Free)

Withdraws sterile, cell-free samples from bioreactor/fermentor for either off-line or on-line analysis.

#### Light Sources

NBS offers special cold light sources in wave lengths from 300 - 800 nm and with various illumination intensities.

#### Biochemistry Analyzers

NBS will assist customers in the selection of off-line or on-line process analysis equipment and interfacing to any NBS fermentor/ bioreactor for analysis of glucose, lactate, glutamate, ethanol, sucrose, lactose, galactose, choline, hydrogen peroxide and methanol. Call for detailed information.

Accessories for NBS Fermentors and Bioreactors (continued)

Catalog No.	Description
<b>Addition Vessels (Stainless Steel)</b>	
M1290-0550	<b>4 L Addition Vessel Kit</b> Assembly includes stainless-steel vessel with dip tube, stainless-steel process valve, silicone tubing and 0.2µm vent filter
M1290-0551	7.5 L Additional Vessel Kit
M1290-0552	11 L Addition Vessel Kit
M1290-0553	19 L Addition Vessel Kit

Catalog No.	Description
<b>Addition / Harvest Bottle (Glass)</b>	
M1362-9905	<b>0.25 L Addition / Harvest Bottle Kit</b> Assembly includes a clear Pyrex glass bottle with aseptic reservoir cap including a full length stainless-steel dip tube and 0.2µm vent filter
M1362-9906	0.5 L Addition / Harvest Bottle Kit
M1362-9901	1 L Addition / Harvest Bottle Kit
M1362-9902	2 L Addition / Harvest Bottle Kit
M1362-9903	5 L Addition / Harvest Bottle Kit
M1362-9904	10 L Addition / Harvest Bottle Kit

It is recommended that a 3/16" ID silicone tubing (P0740-2505) be ordered to attach the Addition / Harvest bottles to the appropriate hose barb on the fermentation / bioreactor system.

Replacement Silicone Tubing

The numbers in the top half of the chart identify tubing by fermentor/bioreactor model. The lower portion of the chart identifies corresponding part number, I.D. and O.D.

Silicone Tubing (Replacement)								
Fermentor/ Bioreactor	Vessel Size	Gas Connectors	Acid, Base Antifoam, Addition Port	Harvest Tube	Cooling Coil	Single Addition Port	Triple Addition Port	Side Addition Port
BioFlo 115	All	1	8	5	5	5	8	–
BioFlo 310 & CelliGen 310	All	10	8	5	–	5	8	–
Item	Part Number	I.D.		O.D.		Length		
1	P0740-3110	1/12"	2.0 mm	1/4"	6.4 mm	50'	17.8 m	
2	P0740-3111C3	1/8"	3.2 mm	1/4"	6.4 mm	50'	17.8 m	
3	P0740-2542	1/4"	6.4 mm	3/8"	9.8 mm	25'	8.9 m	
4	P0740-2445	1/8"	3.2 mm	1/4"	6.4 mm	25'	8.9 m	
5	P0740-2505	3/16"	4.8 mm	5/16"	8.0 mm	25'	8.9 m	
6	P0740-2590	5/16"	8.0 mm	7/16"	11.1 mm	50'	17.8 m	
7	P0740-2430	3/32"	2.4 mm	1/4"	6.4 mm	50'	17.8 m	
8	P0740-2396	1/16"	1.6 mm	3/16"	4.8 mm	50'	17.8 m	
9	P0740-2721C3	3/8"	9.5 mm	5/8"	16.6 mm	25'	8.9 m	
10	P0740-3113C3	5/32"	1.5 mm	1/4"	6.4 mm	25'	8.9 m	

## FERMENTOR &amp; BIOREACTOR ACCESSORIES

## NucleoCounter® Automated Mammalian Cell Counter

Available in North America only.

Designed to automatically count mammalian cells in research and production environments. An integrated fluorescence microscope in the NucleoCounter detects signals from a fluorescent dye, propidium iodide, that is bound to the cells' nuclei. The resulting counts can be total cells or viable cells depending on sample preparation. Each count requires one NucleoCassette® and aliquots of Reagent A100 and Reagent B.

**Overall dimensions:** 15" L x 8.7" D x 10.2" H (22 x 38 x 26 cm).

**Net weight:** 7 lbs (3 kg).

**Requires 120 VAC.**



Compact NucleoCounter & NucleoCounter YC-100 need no maintenance, calibration or cleaning

Model	Catalog No.	Electrical Service
<b>NucleoCounter</b>	M1293-0000	120V, 60Hz
<b>Required Accessories (see additional accessories below)</b>		
P0820-5190	Reagent A100 (Lysis Buffer).	
P0820-5180	Reagent B (Stabilization Buffer).	
P0820-5200	Reagent C (Blood Applications)	
M1293-0020	Starter Kit - Includes one bottle of reagent A100 and one bottle of Reagent B, 2 dispensers, reagent holder, 100 NucleoCassettes & NucleoView software	

## NucleoCounter® YC-100 Automated Yeast Cell Counter

Available in North America only.

Designed to automatically count yeast cells in R&D and QC production environments, brewery and biofuels research. Suitable for performing total yeast cell counts as well as estimating viability. An integrated fluorescence microscope in the NucleoCounter detects signals from a fluorescent dye, propidium iodide, that is bound to the cells' nuclei. Suitable for performing total yeast cell counts well as estimating viability. Can be connected to a PC for documentation, data storage and image collection. Each count requires one NucleoCassette™ and aliquots of Reagent YC-100.

**Overall dimensions:** 15" L x 8.7" D x 10.2" H (22 x 38 x 26 cm).

**Net weight:** 7 lbs (3 kg).

**Requires 120 VAC.**

Model	Catalog No.	Electrical Service
<b>NucleoCounter YC-100</b>	M1293-1000	120V, 60Hz
<b>Required Accessories (see additional accessories below)</b>		
P0820-5185	Reagent YC-100	



NucleoView Software automatically calculates cell viability, allows you to view the sample image, and download data to your PC

### NucleoCounter and NucleoCounter YC-100 Accessories

Catalog No.	Description
M1293-0100	NucleoCassettes® – Disposable, plastic sampling iodide, used to count cells when filled with treated sample and inserted into the NucleoCounter. Plunger loading ensures that the correct amount of sample (50 µl) is taken into the cassette with 2 µl delivered to the counting chamber. Cassettes are packaged in foil bags of 10. Sold in quantities of 100 cassettes.
M1293-0900	QC Test Kit
P0820-5179	Dispenser Pump – Used to dispense microliter quantities of Reagent A100 and Reagent B
P0860-5178	Reagent Holder holds two 500 mL Reagent Bottles
P0540-5440	NucleoView® Software – Enables the user to view the counted cell area and data log the count for future use.

## Neslab ThermoFlex™ Recirculating CFC-Free, Mobile Chiller

Recirculating chiller for use with low-to-high density cultures to maintain sub-ambient temperatures.

**Applications:** for use with most NBS benchtop fermentors & bioreactors. Call for details.

**Cooling capacity:** 1400 Watt heat removal for the 120V, 60Hz unit & 1170 Watt heat removal capacity for the 230V, 50Hz unit, at 20°C.

**Features:** positive-displacement pump, 1.9 gallon reservoir, digital controller display, level indicator, integrated funnel and air filter.

**Dimensions:** 27.4" H x 14.2" W x 24.7" D (69.6 x 36.1 x 62.7 cm).

**Net weight:** 126 lbs (57.2kg).



Model	Catalog No.	Description	Electrical Service
<b>Neslab ThermoFlex™ Recirculating Chiller</b>	P0620-2796	P0620-2796 Thermoflex 1400 PD 2, IPR plus PRV	120V 60 Hz
	P0620-2798	P0620-2798 Thermoflex 1400 PD 2, IPR plus PRV	230V 50 Hz
	P0620-0959	P0620-0959 Plumbing Package	
	P0620-2799	P0620-2799 Pressure Regulator (0-20 psi)	
	M1287-9918	M1287-9918 Pressure Gauge (0-30 psi)	

NBS can also supply chillers for SIP fermentors/bioreactors. Call for details.

## General Purpose Controller For Fermentation & Cell Culture Process Control

NBS' General Purpose controller lets you incorporate data from almost any analytical instrument into your process, as well as control auxiliary pumps and valves, for total process optimization. Acting as a stand-alone controller, the General Purpose controller allows quick and simple connections to any piece of laboratory equipment that outputs or accepts 0 - 5 VDC, 0 - 10 VDC or 4 - 20 mA.

Quantity	Input Types
4	4 - 20 mA
4	0 - 5 V or 0 - 10 V

Quantity	Output Types
5	4 - 20 mA, 0 - 5 V, and 0 - 10 V in any combination

The General Purpose Controller requires a computer and monitor for initial configuration and for use as a local user interface, if desired. Unit includes BC Local software, wall mount power transformer, and 6 foot RS-232 null modem cable. Software requires 486 computer or higher with unused COM port, SVGA monitor, Windows OS. Connects to NBS BioCommand supervisory software packages or any industrial SCADA package via standard bus protocol.

Model	Catalog No.	Electrical Service
<b>General Purpose Controller</b>	M1266-0000	120V, 50/60 Hz
	M1266-0001	220V, 50/60 Hz

## FERMENTOR & BIOREACTOR ACCESSORIES

### Interface Kit for RS-232 Device

The RS-232 Device Interface Kit provides the ability to integrate up to eight (8) simple RS-232 devices into your fermentation process to obtain weight measurements, flow rates or other data. This information can be integrated directly into OPC-compatible BioCommand packages for the development of powerful feed strategies based on weights or pump flow rates. The kit includes one USB cable to connect to your PC, one eight-port RS-232 serial box, and OPC server software designed specifically to communicate with BioCommand. This kit is designed to communicate with Mettler scales which use SICS level 0 communication protocol. Contact your local sales representative for details on connecting to other simple RS-232 devices.

Model	Catalog No.
<b>RS-232 OPC Server Kit</b>	M1295-0002

### EX-2000 Off-Gas Oxygen / Carbon Dioxide Monitor

The EX-2000 gas analyzer provides continuous and unattended monitoring of exhaust carbon dioxide (CO<sub>2</sub>) and oxygen (O<sub>2</sub>) gasses in benchtop fermentors & bioreactors.

**Applications:** suitable for use with any size fermentor/bioreactor.<sup>†</sup>

**Features:** infrared (IR) sensor determines carbon dioxide concentration. Electrochemical sensor monitors the oxygen concentration. Factory calibrated.

**Signal output:** provides 4 - 20 mA output. Requires interfacing into ML-6100 or General Purpose Controller or 4 - 20 mA Multi-Loop Controller with BioCommand® software to allow for visualization and archiving of carbon dioxide and oxygen levels. BioCommand also allows for supervisory control and calculations.

**Construction:** Enclosure material is corrosion-resistant fiberglass (NEMA 12); all external interface-plumbing components are 316 stainless steel. All necessary tubing and connection fittings are included for out-of-the-box installation.

**Dimensions:** 13" W x 16.2" H x 8.07" D (33 x 41.1 x 20.5 cm).

**Net weight:** 9 lbs. (4.1 kg).

Contact NBS for system recommendations.



May be wall-mounted, or used on the benchtop. Shown with optional stand.

Model	Catalog No.	Electrical Service
<b>EX-2000 Monitor</b>	M1276-0000	100 - 240V 50/60 Hz
<b>Stand for bench mounting</b>	M1276-5000	

(†) For temperature maintenance or for rapid cooling applications in larger fermentors and bioreactors, ask your NBS sales representative for assistance.

NBS can also recommend and supply a variety of other systems for measurement of exhaust CO<sub>2</sub>, O<sub>2</sub> and other gases as well as systems for sample pre-treatment. Call for details on these analyzers and how they can be interfaced with your fermentor/bioreactor and BioCommand bioprocess software.

## BioCommand® Bioprocessing Software — Track and Trend, Batch Control, and Batch Control Plus



New Brunswick Scientific has developed three, next-generation BioCommand® software packages to enhance your ability to monitor, control and log data from your fermentation and cell culture processes through your personal computer (PC). These Supervisory Control and Data Acquisition (SCADA) packages provide the tools needed for research, optimization, and if needed, the security and audit trails to meet your regulatory requirements. All are OPC compatible to enable your fermentor or bioreactor to "talk" to any other OPC-compatible device in your lab or production facility.

### BioCommandTrack and Trend

This entry-level package has been designed specifically for researchers and scientists requiring basic data management and monitoring capabilities. It provides the ability to trend and control parameter setpoints, establish alarm settings, and produce batch records; and is ideal for basic process management.

### BioCommand Batch Control

This intermediate package includes all the capabilities of BioCommand Track and Trend, plus additional enhanced control features including a sophisticated programming module, custom synoptic display window, and equipment lock-out feature. The added control features of this software package make it ideal for optimizing your process.

### BioCommand Batch Control Plus

Our premium package includes all of the features of the previous two packages, as well as includes three levels of security, event logs, and audit-trail capabilities to be compatible with the FDA 21 CFR Part 11 electronic signature and electronic batch record requirements. BioCommand Batch Control Plus allows the power of BioCommand software to be utilized in an FDA validated process.

Model	Catalog No.
<b>BioCommand Track and Trend</b>	M1326-0000 <sup>⊙</sup>
<b>BioCommand Batch Control</b>	M1326-0010 <sup>⊙</sup>
<b>BioCommand Batch Control Plus</b>	M1326-0020 <sup>⊙</sup>

(⊙) Includes one M1286-0100 Kit.  
Order one additional M1171-8010 cable for each additional controller.

## OPC Server

**Applications:** For use with NBS Bioreactors and Fermentors.

### Features:

- True OPC-compatible application. Can interface and connect to OPC compliant 3rd party equipment.
- Can be used to provide connectivity to 3rd party SCADA such as MatLab, Labview and other OPC-compatible packages.
- Can be used without OPC-compatible BioCommand packages to provide connectivity to 3rd party SCADA such as MatLab, Labview and other OPC-compatible packages.

Model	Catalog No.
<b>OPC Server</b>	M1291-0011 <sup>⊙</sup>

## BioCommand Accessories

Catalog No.	Description
M1286-0100	Connection Kit, Contains one 50' / 16 meter RS-422 Serial Cable, one RS-232/RS-422 Converter and one BioCommand Cable. Kit contains M1171-8010, M1286-8010 & P0460-7550 or may also be ordered individually as listed below.
M1171-8010	50' / 16 meter RS-422 Serial Cable. One cable is included with each BioCommand package. Purchase one additional cable for each additional process controller. Multiple cables may be connected for longer lengths. Length each: 50 feet /16 meters
P0460-7550	RS-232/RS-422 Converter, Used to convert RS-232 serial pin-out to RS-422 cable connection
M1286-8010	BioCommand Cable, Converts RS-232 signal to RS-422 to facilitate BioCommand communication with controller.
M1287-0020	Interface Box, Converts up to eight RS-232 COM ports into USB for customers whose computers lack an RS-232 connection.

## FERMENTOR & BIOREACTOR ACCESSORIES

### Contract Laboratory Services

As an equipment manufacturer with in-house fermentation and cell culture laboratories, New Brunswick Scientific (NBS) offers contract fermentation and cell culture services. Unlike larger contract research organizations, NBS offers low overhead and highly trained and qualified staff with expertise in fermentation and cell culture processes. NBS has over 50 years of experience in successful scale-up and optimization of non-cGMP cell culture and fermentation processes. We maintain stirred-tank and packed-bed bioreactors and fermentors for research through to production. Whether you require biomass, partial clarification of intracellular or extracellular products in raw or fractionated forms, NBS can help meet your needs. Services include consultation for new processes, process development, biomass production, secreted protein recovery, as well as batch, fed-batch and continuous fermentation and cell culture processing. If preferred, customers are welcome to work side-by-side with the NBS team. Please call for a free consultation.

#### New Brunswick Scientific's wide range of services include:

- Media formulation
- Computer-control strategies
- Process development
- Process optimization
- Scale-up
- Downstream clarification
- Benchtop to pilot-scale contract production

#### Expertise extends to a range of cell types including, but not limited to:

- |                            |   |
|----------------------------|---|
| • Recombinant animal cells | • Insect cells                          |
| • NSO cells                | • Recombinant <i>E. coli</i>            |
| • BHK cells                | • Yeast with expertise in <i>Pichia</i> |
| • CHO cells                | • <i>Bacillus</i>                       |
| • VERO cells               | • <i>Streptomyces</i>                   |
| • 293 cells                | • Rat liver cells                       |
| • HEK cells                | • <i>Baculovirus</i>                    |

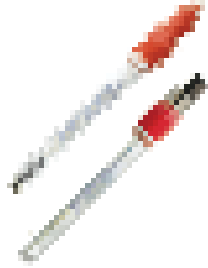
### Training

Training is available on any NBS fermentors and bioreactors. Training sessions can be set up at your site or can be held in our headquarters laboratories in Edison, NJ USA.

Training is designed to assist new and existing users by familiarizing them with the components and operation of their fermentor or bioreactor. Guidance is provided to users on their application. Client-site training is performed only after delivery and setup of the equipment and after utility services have been connected and an NBS service representative has checked the system. For further information, contact your local NBS representative.



## Superior Process Measurements for the BioTechnology Industry



### High-Quality pH Electrodes

- Available in ruggedized digital meters
- Multiple automatic measurements
- High and low maintenance options
- Microleakage measurement
- Fully automatic and automatic



### Transfer to the 21<sup>st</sup> Century

- Available ruggedized for the 21<sup>st</sup> century system
- Remote display - ruggedized pH
- Automatic and automatic
- Smart, ruggedized meters



### Industry Standard

- Available in ruggedized digital meters
- Ruggedized and automatic
- Precision ruggedized meters
- Ruggedized meters, ruggedized meters
- Ruggedized meters, ruggedized meters
- Ruggedized meters, ruggedized meters



### Transfer to the 21<sup>st</sup> Century

- Available ruggedized for the 21<sup>st</sup> century system
- Remote display - ruggedized pH
- Automatic and automatic
- Smart, ruggedized meters



### Features

- Ruggedized
- Automatic
- Precision ruggedized meters
- Ruggedized meters, ruggedized meters

### Multiple Process Management (MPP)

- Ruggedized meters, ruggedized meters
- Ruggedized meters, ruggedized meters
- Ruggedized meters, ruggedized meters
- Ruggedized meters, ruggedized meters
- Ruggedized meters, ruggedized meters
- Ruggedized meters, ruggedized meters

INGOLD

Local Ing Process Analytic

Call [www.mt.com/pcc](http://www.mt.com/pcc) for more information

METTLER TOLEDO

## PROBES FOR FERMENTATION & CELL CULTURE

NBS can supply spare probes and accessories from among the broad line of Mettler Ingold and Hamilton products. For spare probes, see below and pages 89 - 92. Directions for using these charts are shown below:

- For pH probes see page 89. For dO<sub>2</sub> probes see page 91.
- Locate your vessel in the left column of the appropriate chart.
- Slide your finger across to the right until you come to a box with a number in it, then look at the top of the column above the number to find the catalog number for that probe. NOTE: Vessels can accommodate more than one type of probe.

Each time you see a number for a particular vessel, it indicates that probe can be used with that vessel.

- The number inside the box refers to the associated reference charts for cables, adapter, and housings, which follow below.

### Redox Probes

Catalog No.		Mettler Ingold				Hamilton	
		P0720-5780	P0720-5781	P0720-5782	P0720-6532	P0720-6531	P0720-6530
Immersion Depth		120 mm	200 mm	325 mm	325 mm	425 mm	625 mm
Vessel Connector		PG 13.5	PG 13.5	PG 13.5	PG 13.5	PG 13.5	PG 13.5
Cable end		K8	K8	K8	K8	K8	K8
Type		Gel	Gel	Gel	Gel	Gel	Gel
BioFlo 110/115	1.3 L & 3L		1				
BioFlo 110/115	7.5 L			1	1		
BioFlo 110/115	14.0 L			1		1	
BioFlo 310	2.5 L		2				
BioFlo 310	5.0 L & 7.5 L			2			
BioFlo 310	14.0 L			2	2	2	
BioFlo 410/415	7 L			2			
BioFlo 410/415	14 L			2	2	2	
BioFlo 410/415	19 L						2
BioFlo 510	all vessels	3, 7 & 9					
BioFlo 610	all vessels	3, 7 & 9					
BioFlo Pro	all vessels	4 & 6		4, 5 & 8			

### Redox Cables and Housings

Ref.	Catalog No.	Description
<b>Cables referenced in table above</b>		
1	P0720-2763	Redox Cable, 110/115
2	P0720-2275	Redox Cable, BioFlo 310, 410 and 415
3	P0720-2277	Redox Cable, BioFlo 510
4	M1290-0610	pH/Redox Cable for BioFlo and CelliGen Pro
5	M1290-8012	pH/Redox Ground Wire Extension for Retractable Probe Housings (325mm)
<b>Housings referenced in table above</b>		
6	P0720-6450C1	25mm Ingold Port 12mm Housing with Material Certificate (BioFlo/CelliGen Pro Only)
7	P0720-6240C3	25mm Ingold Port 12mm Housing with Material Certificate
8	P0720-5570C	INTRAC 797, Stainless Steel Retractable Probe Housing, 25mm Ingold Port, 325mm Probe Length w/ Material Certificate
9	M1361-9208	510 Port Adapter - Converts 1.5" Sanitary to 25mm Ingold Port

### Redox Transmitters

Catalog No.	Description
P0620-5974	Transmitter, Panel Mount, (required with BioFlo 110/115 Redox probes)
P0620-5975	Transmitter, Wall Mount, (required with BioFlo 110/115 Redox probes)

## Optical Density (Turbidity) & CO<sub>2</sub> Probes

Catalog No.	Description
<b>Turbidity Probes</b>	
P0720-5950*	Turbidity Probe, Autoclavable 12mm/297mm Length InPro 8100 (Cable not included)
P0720-5951*	Turbidity Probe, Autoclavable 12mm/120mm Length InPro 8100 (Cable not included)
P0720-5961	Turbidity Probe, SIP 12mm/120mm Length InPro 8200 with Cable
P0720-5962	Turbidity Probe, SIP 12mm/205mm Length InPro 8200 with Cable
P0720-5963	Turbidity Probe, SIP 12mm/297mm Length InPro 8200 with Cable
P0720-5960	Turbidity Probe, SIP 12mm/407mm Length InPro 8200 with Cable
<b>Turbidity Accessories</b>	
P0720-2430	5M Turbidity Cable
P0620-5551	Turbidity Transmitter, TRB 8300
<b>CO<sub>2</sub> Probes (VP Connector)</b>	
P0720-6480	CO <sub>2</sub> Probe, 12mm/120mm length
P0720-6481	CO <sub>2</sub> Probe, 12mm/220mm length
P0720-6482	CO <sub>2</sub> Probe, 12mm/320mm length
<b>CO<sub>2</sub> Accessories</b>	
P0620-6580	CO <sub>2</sub> Transmitter, 5100E
P0720-9660	CO <sub>2</sub> Cable, VP CABLE VP6-ST/3M (9.9FT)

(\* Cable not included. Must be ordered separately.

## pH Probes

Catalog No.		Mettler Ingold				Hamilton	
		P0720-5581	P0720-5582	P0720-5584	P0720-5580	P0720-5583	P0720-6540
Immersion Depth		120 mm	200 mm	225 mm	325 mm	425 mm	625 mm
Vessel Connector		25 mm	PG 13.5	PG 13.5	PG 13.5	PG 13.5	PG 13.5
Cable end		K9	K9	K9	K9	K9	K9
Type		Gel	Gel	Gel	Gel	Gel	Gel
BioFlo 110 <sup>a</sup> / 115 <sup>b</sup> /3000 <sup>a</sup>	1.3 L / 1.6 L		2 <sup>a</sup> /4 <sup>b</sup>				
BioFlo 110 <sup>a</sup> / 115 <sup>b</sup> /3000 <sup>a</sup>	3 L			2 <sup>a</sup> /4 <sup>b</sup>			
BioFlo 110 <sup>a</sup> / 115 <sup>b</sup> /3000 <sup>a</sup>	7.5 L / 6.6 L				2 <sup>a</sup> /4 <sup>b</sup>		
BioFlo 110 <sup>a</sup> / 115 <sup>b</sup> /3000 <sup>a</sup>	14.0 L					2 <sup>a</sup> /4 <sup>b</sup>	
BioFlo 310	2.5 L		3				
BioFlo 310	5.0 L & 7.0 L			3			
BioFlo 310	14.0 L				3		
CelliGen 310	2.5L		3				
CelliGen 310	5.0 L & 7.5 L			3			
CelliGen 310	14.0 L				3		
CelliGen 310 Basket	2.5 L to 7.5		3				
CelliGen 310 Basket	14.0 L <sup>†</sup>			3			

continued on next page

## PROBES FOR FERMENTATION &amp; CELL CULTURE

## pH Probes (continued)

Catalog No.	Mettler Ingold				Hamilton	
	P0720-5581	P0720-5582	P0720-5584	P0720-5580	P0720-5583	P0720-6540
Immersion Depth	120 mm	200 mm	225 mm	325 mm	425 mm	625 mm
Vessel Connector	25 mm	PG 13.5	PG 13.5	PG 13.5	PG 13.5	PG 13.5
Cable end	K9	K9	K9	K9	K9	K9
Type	Gel	Gel	Gel	Gel	Gel	Gel
CelliGen Plus	2.2 L	2				
CelliGen Plus	5.0 L & 7.5 L			2		
CelliGen Plus	14.0 L				2	
CelliGen Plus Basket	2.2 L <sup>†</sup>	2				
CelliGen Plus Basket	5.0 L <sup>†</sup> & 7.5 L <sup>†</sup>	2				
CelliGen Plus Basket	14.0 L <sup>†</sup>		2			
BioFlo 410/415	7.0 L			3		
BioFlo 410/415	14.0 L				3	
BioFlo 410/415	19.5 L					3
BioFlo 4500	all vessels	2 & 8		2 & 9		
BioFlo 5000	all vessels	1 & 8		1 & 9		
BioFlo/ CelliGen 510	all vessels	4, 8 & 10				
BioFlo 610	all vessels	4, 8 & 10				
BioFlo/ CelliGen Pro	all vessels	5 & 7		5, 6 & 9		

## pH Probe Cables &amp; Housings

Ref.	Catalog No.	Description
<b>Cables referenced in table above</b>		
1	P0720-2093	AK9 Cable for BioFlo 5000
2	P0720-2095	AK9 cable, 3ft, BioFlo IIC, 2000, III, 110, 3000, IV, 4000, 4500, CelliGen and CelliGen Plus
3	P0720-2273	pH Cable for BioFlo 310, 410, 415 and CelliGen 310
4	P0720-2276	pH Cable for BioFlo 115, 510 and CelliGen 115, 510
5	M1290-0610	pH/Redox Cable for BioFlo and CelliGen Pro
6	M1290-8012	pH/Redox Ground Wire Extension for Retractable Probe Housings (325mm)
<b>Cables for older NBS equipment, not referenced in table above</b>		
	M1131-8010	AK9 Cable, 8ft (2.4m). For Micros, MPP, MicroGen (ML-4100), MicroLift, and ML4100
	P0720-2090	AK9 Cable, Analog For MultiGen, BioFlo I, MicroFerm and MicroGen
	M1238-8001	pH Cable for BioFlo 6000 (Ingold Probes Only)
<b>Housings referenced in table above</b>		
7	P0720-6450C1	25mm Ingold Port 12mm Probe Housing with Material Certificate (BioFlo/CelliGen Pro Only)
8	P0720-6240C3	25mm Ingold Port 12mm Probe Housing with Material Certificate
9	P0720-5570C	INTRAC 797, Stainless Steel Retractable Probe Housing, 25mm Ingold Port, 325mm Probe Length w/ Material Certificate
10	M1361-9208	510 Port Adapter - Converts 1.5" Sanitary to 25mm Ingold Port

dO<sub>2</sub> Probes

Catalog No.		Mettler Ingold (InPro 6800)						Hamilton	
		P0720-6270	P0720-6280	P0720-6281*	P0720-6580	P0720-6282	P0720-6283	P0720-6284	P0720-6520
Immersion Depth		80 mm	120 mm	160 mm	160 mm	220 mm	320 mm	420 mm	625 mm
Vessel Connector		25 mm	PG 13.5	PG 13.5	PG 13.5	PG 13.5	PG 13.5	PG 13.5	PG 13.5
Cable end		T82	T82	VP	T82	T82	T82	T82	T82
BioFlo 110 <sup>a</sup> / 3000 <sup>b</sup>	1.3 L / 1.6 L			3 or 1					
BioFlo 110 <sup>a</sup> /3000 <sup>b</sup>	3.0 L / 3.3 L					1, 11 & 14			
BioFlo 110 <sup>a</sup> /3000 <sup>b</sup>	7.5 L / 6.6 L						1, 12 & 14		
BioFlo 110 <sup>a</sup> /3000 <sup>b</sup>	14.0 L							1 & 13	
BioFlo 115	1.3 L				6				
BioFlo 115	3.0 L					6			
BioFlo 115	7.5 L						6		
BioFlo 115	14.0 L							6	
BioFlo 310	2.5 L / 5.0 L			5					
BioFlo 310	7.5 L / 14.0 L					5			
CelliGen 310	2.5 L / 5.0 L			5					
CelliGen 310	7.5 L / 14.0 L					5			
CelliGen Plus <sup>†</sup>	2.2 L					1 & 13			
CelliGen Plus <sup>†</sup>	5.0 L					1			
CelliGen Plus <sup>†</sup>	7.5 L						1		
CelliGen Plus <sup>†</sup>	14.0 L							1 & 13	
CelliGen Plus <sup>a</sup> /310 <sup>b</sup> (Basket Only)	2.2 L / 2.5 L		1 & 13 <sup>a</sup> /5 <sup>b</sup>						
CelliGen Plus <sup>a</sup> /310 <sup>b</sup> (Basket Only)	5.0 L		1 <sup>a</sup> /5 <sup>b</sup>				1 <sup>a</sup> /5 <sup>b</sup>		
CelliGen Plus <sup>a</sup> /310 <sup>b</sup> (Basket Only)	7.5 L					1 <sup>a</sup> /5 <sup>b</sup>		1 <sup>a</sup> /5 <sup>b</sup>	
CelliGen Plus <sup>a</sup> /310 <sup>b</sup> (Basket Only)	14.0 L					1 <sup>a</sup> /5 <sup>b</sup>		1 <sup>a</sup> /5 <sup>b</sup>	
BioFlo 410/415	7.0 L						5		
BioFlo 410/415	14.0 L							5	
BioFlo 410/415	19.5 L								5
BioFlo 4500	all vessels	1 & 8	1 & 8				1 & 9		
BioFlo 5000	all vessels	2 & 8	2 & 8				2 & 9		
BioFlo/CelliGen 510	all vessels		6, 8 & 10						
BioFlo 610	all vessels		6, 8 & 10						
BioFlo/CelliGen Pro	all vessels		4 & 7				4 & 9		

(†) For CelliGen Plus Probe Adapters, ask your local NBS sales representative.

(\*) 1L BioFlo 110 probes require a VP connector cable, P0720-2332, or probe adapter P0720-6470.

continued on next page

## PROBES FOR FERMENTATION & CELL CULTURE

### dO<sub>2</sub> Cables, Housings and Accessories (plus pH General Accessories)

Ref.	Catalog No.	Description
<b>Cables referenced in table on previous page</b>		
1	P0720-2331	DO Cable, BioFlo IIC, III, 3000, 4000, IV, 4500, 110 (except 1.6L) and CelliGen Plus
2	M1131-8009	DO Cable, BioFlo 5000, Micros, MicroLift, MPP and ML4100
3	P0720-2332*	DO Cable, BioFlo 110 (1.3L) & BioFlo III/3000 (1.6L)
4	P0720-2342	DO Cable, BioFlo and CelliGen Pro
5	P0720-2333	DO Cable, BioFlo 310, 410, 415 and CelliGen 310
6	P0720-2336	DO Cable, BioFlo 115 and 510
<b>Housings referenced in table on previous page</b>		
7	P0720-6450C1	25mm Ingold Port 12mm Probe Housing with Material Certificate (BioFlo®/CelliGen™ Pro Only)
8	P0720-6240C3	25mm Ingold Port 12mm Probe Housing with Material Certificate
9	P0720-5570C	INTRAC 797, Stainless Steel Retractable Probe Housing, 25mm Ingold Port, 325mm Probe Length w/ Material Certificate
10	M1361-9208	510 Port Adapter - Converts 1.5" Sanitary to 25mm Ingold Port
<b>Adapters referenced in table on previous page</b>		
11	M1016-0900	PG13.5 thread adapter for 3/8" NPT port
12	M1226-9446	PG13.5 thread adapter for 3/8" NPT port, 3-5/8"
13	M1176-9540	DO Port Length Extender (same threads), 1-11/16"
<b>Adapters not referenced in table on previous page</b>		
	M1176-9575	dO <sub>2</sub> port length extender (same threads), 3-1/32"
	M1176-9579	dO <sub>2</sub> port length extender (same threads), 3-1/4"
<b>Gasket referenced in table on previous page</b>		
14	M1016-0890	Gasket for probe adapters M1016-0900 & M1226-9446
<b>dO<sub>2</sub> Accessories, Mettler Ingold not referenced in table on previous page</b>		
	P0620-5192	dO <sub>2</sub> Amplifier & cables. Converts polarographic signal to galvanic for CelliGen, 120 V, 50/60 Hz. Not CE rated.
	P0620-5193	Amplifier, same as above but 220 V 50/60 Hz
	P0620-5580	dO <sub>2</sub> Transmitter Mettler Model 4500, 115 V
	P0720-2560	dO <sub>2</sub> Cable, 3 meters for Mettler Model 4500
	P0720-2561	dO <sub>2</sub> Cable, 5 meters for Mettler Model 4500
	P0720-5567	dO <sub>2</sub> probe cap
	P0720-6268	dO <sub>2</sub> Membrane Kit for Inpro 6000. Includes four membranes, O-rings, & 25 mL electrolyte
	P0720-6339	dO <sub>2</sub> Membrane Kit for Inpro 6000. Includes one membrane, O-rings, & 25 mL electrolyte
	P0720-6470*	Probe Adapter, converts T-82 to VP connector
<b>pH &amp; dO<sub>2</sub> General Accessories, not referenced in table on previous page</b>		
	P0720-5750	Polarization module for constant preconditioning of sensor without amplifier electronics. Battery included
	P0720-5631	pH & dO <sub>2</sub> simulator/calibrator. For checking integrity of pH & DO electronics & cables

(\*) 1L BioFlo 110 probes require a VP connector cable, P0720-2332, or probe adapter P0720-6470.

## FOR LIQUID SEPARATION AND SOLIDS REMOVAL

## CEPA High-Speed Centrifuges

The CEPA centrifuges described in this catalog are designed for rapid cell removal and clarification of fermentation broth and similar liquid-solid mixtures in "clarifying" configurations; or for the separation of two liquids in "separating" configurations. Models range from a small lab unit, through large production-scale systems capable of processing up to 3,000 L/hr. All use bottom feed, retain solids in the bowl and expel supernatant from upper tray(s). All wetted surfaces are stainless steel (except optional silicone bottom valve). All floor models feature 3-phase electric motors for rapid acceleration. Basic configurations include one bowl, ancillary equipment<sup>1</sup>, and tools. Virtually all combinations of options are available on all models in all voltages.<sup>2</sup>

### LE Benchtop Model Laboratory Centrifuge

All model LEs feature variable speed and digital tachometer. Recommended for separating 2 - 15 liters. Maximum throughput rate is 30 L/hr.

### Z41 Floor Model Centrifuge

Recommended for laboratory or pilot-scale volumes of 20 - 75 L. Maximum throughput rate is 500 L/hr.

### Z61 Floor Model Centrifuge



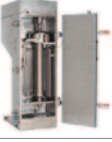

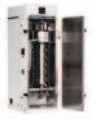
Recommended for pilot-scale volumes of 30 - 200 L. Maximum throughput rate is 1,500 L/hr.

### Z81 Production Floor Model Centrifuge

Recommended for pilot and production process volumes of 100 - 500L. Maximum throughput rate is 2,000 L/hr.

### Z101 Production Floor Model Centrifuge

As powerful as the Z81, and with a 25% larger cylinder capacity, Z101 is typically used with 150 - 600L process volumes. Maximum throughput rate is 3000L/hr.

Model	Specifications	Recommended Accessories	
<b>LE</b>	<b>Power:</b> 330 Watts <sup>3</sup> <b>Bowl Volume:</b> 0.25 L <b>Rotational Speed:</b> 15,000 - 45,000 rpm <b>Max Acceleration:</b> 50,000 G <b>Height:</b> 27" (68.3 cm)	Spare Parts Kit, XLE-SP1 Extra clarifying cylinders Adjustable separating cylinders Cooling Coils	
<b>Z41</b>	<b>Power:</b> 0.9 kW <sup>3</sup> <b>Bowl Volume:</b> 2 L <b>Rotational Speed:</b> 20,000 rpm <b>Max Acceleration:</b> 17,000 G <b>Height:</b> 46" (117 cm)	Spare Parts Kit, X41-SP1 Extra clarifying cylinders Extra separating cylinders Cooling Coils	
<b>Z61</b>	<b>Power:</b> 1.5 kW <sup>3</sup> <b>Bowl Volume:</b> 6 L <b>Rotational Speed:</b> 17,000 rpm <b>Max Acceleration:</b> 18,000 G <b>Height:</b> 61" (155 cm)	Spare Parts Kit, X61-SP1 Extra clarifying cylinders Extra separating cylinders Cooling Coils	
<b>Z81</b>	<b>Power:</b> 2.2 kW <sup>3</sup> <b>Bowl Volume:</b> 8 L <b>Rotational Speed:</b> 16,000 rpm <b>Max Acceleration:</b> 18,000 G <b>Height:</b> 61" (155 cm)	Spare Parts Kit, X81-SP1 Extra clarifying cylinders Extra separating cylinders Cooling Coils	
<b>Z101</b>	<b>Power:</b> 2.2 kW <sup>3</sup> <b>Bowl Volume:</b> 10 L <b>Rotational Speed:</b> 14,000 rpm <b>Max Acceleration:</b> 15,500 G <b>Height:</b> 63" (160 cm)	Spare Parts Kit, X81-SP1 Extra clarifying cylinders Extra separating cylinders Cooling Coils	

(1) Ancillary equipment, which varies with the model, includes various cleaning tools such as special brushes and other implements.

(2) Maximum throughput shown was obtained with water. Throughput will decrease with thicker or more viscous cultures.

(3) Various voltages available.

continued on next page

## FOR LIQUID SEPARATION AND SOLIDS REMOVAL

## CEPA Optional Features

**Clarifying bowl**

Retains solids such as biomass and discharges liquid through single-level upper discharge ports.

**Separating bowl**

Separates liquids of different densities, retains solids and discharges liquids through bi-level upper discharge ports.

**Closed bowl (non-continuous)**

For precise sediment determination of measured charges. Contains no feed or discharge lines.

**Emulsifying bowl**

For emulsification of two liquids.

**Adjustable separating bowl**

A separating cylinder with interchangeable separating rings for optimizing performance with different liquid combinations.

**Bottom valve**

Centrifugally actuated silicone rubber valve prevents centrifuge contents from emptying when cylinder rotation is stopped. The valve prevents feed input when rotational speeds are less than 80% of maximum.

**Cooling coil**

Stainless steel. Allows circulation of cold water or other coolants to lower the temperature of the cylinder's contents during centrifugation.

**Enclosed models**

CEPA centrifuges are available mounted in cast-metal chambers with stainless steel-clad interiors. Sealed by a sturdy door the enclosure facilitates quieter operation, control of gaseous environment at atmospheric pressure.

**HEMA configuration**

CEPA centrifuges can be supplied with serum-clarifying cylinders and full length cooling coils for blood fractionation.

**Explosion proof**

For use where risk of explosion exists.



## ORDERING INFORMATION

## To Place Orders

New Brunswick Scientific (NBS) maintains sales and service offices throughout the world. In North America, please place your order with our headquarters office shown below. Elsewhere, please contact your local NBS office (listed on the back cover of this catalog) or contact your local NBS distributor.

### New Brunswick Scientific Headquarters

PO Box 4005, 44 Talmadge Road  
Edison, NJ 08818-4005, USA

### Customer Service Phone

N. America: 1 800 631 5417  
Elsewhere: +1 732 287 1200, 2

### Fax

N. America: 1 800 489 1400  
Elsewhere: +1 732 248 0589

### Email Orders

orders@nbsc.com

### Specify

- Model number/name
- Catalog number
- Electrical service

### Provide

- Bill To and Ship To addresses
- Contact name and Email address for order acknowledgement
- Quote number, if applicable
- See also paragraph under "Shipping"

Orders will be promptly acknowledged via e-mail, indicating the date of anticipated shipment and price.

## Product Specifications

Specifications of the products described in this catalog are subject to change without notice. Such changes may result from our long-standing commitment to improve performance, and extend the service life and applications of our products. NBS may change product design and specifications at any time without incurring obligation. To ensure that the equipment meets your individual requirements, up-to-date specifications will be incorporated in formal quotations to afford you a means for final review and approval of the equipment before making a purchase. Photos shown are for illustration purposes and are not shown to scale.

## Credit Cards

In North America, NBS accepts VISA, MasterCard and American Express.

## Shipping

Freight charges are pre-paid and added to invoice, unless you specify otherwise. Orders are shipped via best method, or you may designate a specific carrier, mode of shipment, and/or inside delivery to a location other than the receiving dock. Please also specify if your loading dock requires a truck with lift gate.

## Spare Parts Kits

To eliminate downtime, a supply of expendable replacement parts should be available at all times for uninterrupted operation of major equipment. Most products are available with optional kits of recommended spare parts to make expendable components immediately available should you need them. The kits are listed under "Accessories" for each product. Standard kits contain parts such as fuses, belts, O-rings, gaskets, membranes, filters, motor brushes, ball bearings, etc. More comprehensive kits contain a larger number of spare parts, including bearing housings, valves, motors and circuit boards. Each kit varies, depending on the equipment's electrical service and year of manufacture. For a description of Kit contents, contact your local sales representative and specify the equipment serial number and electrical service, or use our convenient online form at [www.nbsc.com/service](http://www.nbsc.com/service).

## Equipment Returns

- If for any reason you need to return your NBS equipment, you must first obtain a Return Material Authorization (RMA) from your local NBS sales office.
- If the equipment arrived damaged, immediately contact the transit carrier to file a claim.
- If returning your equipment for repair, an "Equipment Return Material Authorization (RMA) and Decontamination Certificate" must be filled out and attached to the carton, and a second copy must be attached to the unit. Forms are available online at [www.nbsc.com](http://www.nbsc.com) under the "How Can We Help" tab.

## WARRANTY INFORMATION

## Warranty

New Brunswick Scientific's equipment is protected by a comprehensive warranty. The warranty covers faulty components and assembly, and our obligation under this warranty is limited to repairing or replacing the instrument or part thereof, which shall prove to be defective after our examination. The NBS warranty does not cover loss of time or materials, such as the loss of biological or biochemical by-products caused by any work interruption resulting from equipment failure; it does not extend to equipment that has been subject to misuse, neglect, accident or improper installation or application; nor does it cover any machine that has been repaired or altered by anyone other than an authorized NBS factory-trained service representative, without prior approval from your local NBS sales office. Expendable items such as bearings and seals, lamps, probes, sensors including incubator sensors, glass, filters, etc., are not covered. The warranty begins on the date the equipment ships and extends for a period as per the chart below.

## Warranty Registration

To register your warranty with NBS, complete the on-line form at [www.nbsc.com](http://www.nbsc.com) under the "How Can We Help?" tab, or use the warranty card enclosed with your equipment.

## Extended Warranty Option

A variety of service plans are offered to help minimize downtime from unexpected malfunctions in equipment operation. See pages 97 - 98 for details.

Instrument		Parts Warranty	Labor Warranty
Shakers	Innova	3 Years	2 Years
	I Series	2 Years	2 Years
	Excella & C-76	2 Years	2 Years
	Accessories*	1 Year	1 Year
Incubators	CO <sub>2</sub> Incubators:	2 Years	2 Years
	Accessories <sup>†</sup>	1 Year	1 Year
Freezers	ULT Freezers	5 Years VIP panels: 12 years	2 Years
	Accessories <sup>‡</sup>	1 Year	1 Year
Fermentors, Bioreactors & All other NBS Equipment		1 Year	1 Year

(\*) Chart recorders, photosynthetic light banks, etc.

(†) Stacking stand, casters, shelves, etc.

(‡) Chart recorders, CO<sub>2</sub>/LN<sub>2</sub> back up systems, etc.

## NBS EQUIPMENT SERVICE PLANS

## Protect Your Investment

NBS offers a variety of service options to keep your equipment up and running, and your research and production schedules on track. We can accommodate virtually any budget, through a choice of service plans.

### What we provide

- Electrical, electronic and mechanical safety checks
- Problem analysis, complete functional check-up and testing of all systems
- Functional checks of sensors and instrumentation
- For details, see next page

### Why choose NBS

- Training, experience, and know-how. We hire only seasoned service professionals and provide year-round, on-going training, both in our factory and the field, to ensure that we maintain the best-trained service staff in the industry.
- Parts inventory. We maintain an extensive inventory of replacement parts, strategically located throughout the globe, for rapid response to your needs.
- Scheduling capabilities. Our computerized management system for service scheduling has been upgraded to provide an even higher level of customer satisfaction, and we continue to work on new ways to improve our support to you.
- Special pricing. We offer a discount on parts with preventive maintenance contracts, as well as discounts for multiple units under contract.



## Extended Warranty

This plan is a one-year extension of the original equipment warranty; it includes parts and labor as needed.

- Equipment covered: all currently sold NBS products
- Length of contract: 12 months after the expiration of original warranty
- When to purchase: at the time of equipment purchase

## Repair Service On-Call

NBS also offers on-call repair service – no contracts needed! Simply contact your local NBS representative for details.

## Service Contracts

Service contracts are designed to keep NBS equipment in top-running condition.

- Equipment covered: all current- and recent-model NBS equipment. Ask your NBS sales or service representative for details.
- Length of contract: 12 months
- When to purchase: any time, products may be subject to NBS' equipment inspection and mutual acceptance.

## NBS EQUIPMENT SERVICE PLANS

### Maintenance Support for Your NBS Equipment

In order to ensure your equipment remains in peak operating condition, we recommend performing a checkup of your equipment's components and performance at regularly-scheduled intervals. Our factory-trained team of service personnel and authorized third-party service organizations can offer these services to you. Checkups vary by product model, but generally include comprehensive inspection and testing of the parts outlined below.

#### Freezers: -85°C and -45°C

- Actual/target temperature comparison
- Condenser and compressor
- Fixed lines and pipes
- Lid or door seals
- CO<sub>2</sub> or LN<sub>2</sub> emergency cooling system
- Electrical safety
- Additional test protocols may be performed as needed

#### Shakers: Innova®, Excella®, C-Line and I Series models

- Electrical (mains) connection
- Control of rotational frequency
- Temperature regulation
- Ventilator, shaker gear, motor drive wheels
- Motor brushes & V-belt
- Electrical safety
- Function key, thermostats, and rectifier
- Display elements
- Condenser, evaporator and ventilation filter units
- Controller functions
- Lid and door hinges, joints or seals
- Additional test protocols may be performed as needed

#### CO<sub>2</sub> Incubators

- Electrical (mains) connection
- Rubber seals and water trays
- Fan
- Door switch
- Sensors for temperature and CO<sub>2</sub>
- Electrical safety
- Alarms
- Gas ports and their supply lines
- Valves, relays, and filter
- Additional test protocols may be performed as needed

#### Fermentors and Bioreactors

(We currently offer service for the following models: BioFlo®: 110, 115, 310, 3000, 410, 415, 4500, 5000, 510, 610 and Pro fermentors & CelliGen™: 115, 310, 510, Plus, BLU and Pro bioreactors)

- Operating controls, switches, signal lights, fuse holders, fuses
- Electrical safety
- Water circulation, water feed pump
- Impeller shaft seal, Impeller drive motor, bearing housing, ball bearing, seals
- Gas mixing units
- Thermal mass flow meters/ controllers
- Supply voltages, buffer battery of the electronic board
- Solenoid valves, steam traps, sampling and supply valves, swivel valves, exhaust valves
- Inspection or illumination windows, O-rings,
- Steam connections, air connections and water connections, excess temperature fuse
- V-belt, tube switch
- Tube pressure regulator, bearing housing
- Cell-Lift impeller
- Heating
- Drive motor, magnetic coupling
- Additional test protocols may be performed as needed

## INDEX BY CATALOG NUMBER

NBS Part No.	Page	NBS Part No.	Page	NBS Part No.	Page	NBS Part No.	Page
ACE-1000S	10	D49	36	M1190-9001	10	M1194-0013	18
ACE-10S	10	D64	36	M1190-9002	10	M1194-6001	20
ACE-2000S	10	D81	36	M1190-9003	10	M1194-9903	14, 19, 27
ACE-3000S	10	K0200-0506	33	M1190-9004	10	M1194-9904	14, 19, 24, 27
ACE-4000S	10	K0280-1030	36	M1190-9005	10	M1194-9905	14, 19, 24, 27
ACE-5000S	10	K0280-1031	36	M1190-9900	19	M1194-9906	14, 19, 24, 27
ACE-6000S	10	K0280-1034	36	M1190-9901	19	M1194-9907	14, 19, 24, 27
ACFE-2800S	10	K0280-1036	36	M1190-9902	19	M1194-9908	14, 19, 20, 24, 27
ACSB-1000S	10	K0440-0355	36	M1190-9903	19	M1194-9909	14, 19, 24, 27
ACSB-500S	10	K0540-0025	36	M1190-9904	19	M1194-9910	14, 19, 24, 27
AG-00	13, 20, 25	K0641-1690	37	M1190-9905	19	M1194-9912	20
AG-1	13, 20, 25	K0641-1700	37	M1190-9906	19	M1194-9915	20
AG-2	13, 20, 25	K0641-1750	37	M1190-9907	19	M1194-9916	20
AG2-00	19, 28	K0641-1880	37	M1190-9908	19	M1194-9917	20
AG2-10	19, 28	K0641-1890	37	M1190-9909	19	M1194-9918	20
AG-21-00	21	K0641-1900	37	M1190-9910	19	M1194-9919	20
AG-28	13, 20, 25	K0641-3000	37	M1190-9911	19	M1194-9920	20
AG2-UT	19, 28	K0641-3001	37	M1190-9915	19, 28	M1194-9921	20
AG-4	13, 20, 25	K0641-3002	37	M1190-9916	19, 28	M1194-9922	20
AG-6	13, 20, 25	K0641-3003	37	M1190-9917	19, 28	M1194-9923	14, 19, 24, 27
AG7-125	17, 29	K0641-3004	37	M1190-9918	19, 28	M1194-9924	20, 21
AG7-250	17, 29	K0641-3005	37	M1190-9919	19, 28	M1194-9925	20
AG7-50	17, 29	K0660-0051	36	M1190-9920	19	M1194-9926	20
AG7-TT13	17, 29	M1001-0240	19, 28	M1191-0000	18	M1194-9927	20
AG7-TT16	17, 29	M1001-9920	19, 28	M1191-0001	18	M1195-1020	17
AG7-TT20	17, 29	M1016-0890	92	M1191-0002	18	M1196-0000	21
AG7-TT25	17, 29	M1016-0900	92	M1191-0003	18	M1196-0001	21
ATC-TT16	44	M1020-1220	17	M1191-0010	18	M1196-0002	21
ATC-TT25	44	M1053-0306	44	M1191-0011	18	M1196-0003	21
B50-SQ	36	M1053-0360	44	M1191-0012	18	M1196-6000	22
B75-SQ	36	M1053-0450	44	M1191-0013	18	M1196-9447	22
B95-SQ	36	M1053-4004	44	M1191-0020	18	M1196-9900	22
CO14S-120-0000	41	M1053-4005	44	M1191-0021	18	M1196-9901	22
CO14S-120-0200	41	M1053-5004	44	M1191-0022	18	M1196-9902	22
CO14S-230-0000	41	M1053-5005	44	M1191-0023	18	M1196-9903	22
CO14S-230-0200	41	M1117-2040	14, 19, 20, 21, 24, 27	M1191-0030	18	M1196-9904	22
CO170R-120-0000	39	M117-8010	85	M1191-0031	18	M1196-9905	22
CO170R-120-0200	39	M1131-8009	92	M1191-0032	18	M1196-9906	22
CO170R-120-1000	39	M1131-8010	90	M1191-0033	18	M1196-9907	22
CO170R-120-1200	39	M1153-9633	80	M1191-6102	21	M1224-0001	46
CO170R-230-0000	39	M1153-9639	80	M1191-9904	21	M1224-0002	46
CO170R-230-0200	39	M1171-8010	85	M1191-9905	20	M1224-0005	46
CO170R-230-1000	39	M1176-9540	92	M1191-9908	13, 20, 25	M1224-0006	46
CO170R-230-1200	39	M1176-9575	92	M1191-9909	13, 20, 25	M1224-0100	46
CO170S-120-0000	39	M1176-9579	92	M1191-9910	13, 20, 25	M1224-0110	46
CO170S-230-0000	39	M1190-0000	18	M1191-9911	13, 20, 25	M1224-0160	46
CO170S-230-1000	39	M1190-0000	18	M1191-9912	21	M1224-3000	46
CO48R-120-0000	40	M1190-0001	18	M1191-9913	21	M1224-9200	46
CO48R-120-0200	40	M1190-0001	18	M1191-9914	21	M1224-9740	46
CO48R-120-1000	40	M1190-0002	18	M1192-6002	15	M1226-9446	92
CO48R-120-1200	40	M1190-0002	18	M1192-9901	14, 20, 24	M1227-9231	64, 65
CO48R-230-0000	40	M1190-0003	18	M1194-0000	18	M1228-5014	49
CO48R-230-0200	40	M1190-0010	18	M1194-0001	18	M1228-8001	80
CO48R-230-1000	40	M1190-0011	18	M1194-0002	18	M1230-3030	60
CO48R-230-1200	40	M1190-0012	18	M1194-0003	18	M1231-0000	16
CO48S-120-0000	40	M1190-0013	18	M1194-0010	18	M1231-0001	16
CO48S-230-0000	40	M1190-6100	19	M1194-0011	18	M1231-0002	16
D100	36	M1190-9000	10	M1194-0012	18	M1231-0003	16

## INDEX BY CATALOG NUMBER

NBS Part No.	Page
M1231-0730	17
M1231-2000	17, 29
M1231-2010	17, 29
M1231-6000	17, 29
M1231-9920	17, 29
M1231-9930	16, 29
M1231-9933	16, 29
M1231-9934	16, 29
M1231-9935	16, 29
M1231-9936	16, 29
M1231-9937	16, 29
M1231-9938	16, 29
M1231-9939	16, 29
M1232-0100	22
M1232-0101	22
M1232-0110	22
M1232-0111	22
M1233-9930	14
M1233-9932	14, 20, 24
M1238-8001	90
M1240-1000	46
M1243-2500	13, 21, 25
M1248-0002	28
M1248-0003	28
M1248-0730	29
M1250-9504	10
M1250-9600	10
M1250-9700	10
M1250-9902	14, 19, 24, 27
M1250-9903	14, 19, 20, 24, 27
M1250-9904	13, 20, 25
M1250-9906	14, 19, 24, 27
M1250-9920	13, 20, 25
M1250-9921	20, 25
M1266-0000	83
M1266-0001	83
M1273-3031	60
M1273-3100	61
M1273-3102	61
M1273-3103	61
M1273-3104	61
M1273-3106	61
M1273-3107	61
M1273-3108	61
M1273-3109	61
M1273-3110	61
M1273-3112	61
M1273-3116	61
M1273-3120	61
M1273-3125	61
M1273-3130	61
M1273-3135	61
M1273-3201	60
M1273-3202	60
M1273-3205	60
M1273-3210	60
M1273-3211	60
M1273-3212	60

NBS Part No.	Page
M1273-3215	60
M1273-3220	60
M1273-5001	64, 69, 72
M1273-5002	64, 69, 72
M1273-5003	60
M1273-5004	60
M1273-5005	60
M1273-5006	60
M1273-5007	60
M1273-5040	60
M1273-5042	59
M1273-5054	60
M1273-5058	60
M1273-9206	72
M1273-9207	60
M1273-9212	64
M1273-9266	60
M1273-9293	60
M1273-9291	60
M1273-9292	60
M1273-9293	60
M1273-9405	60
M1273-9406	60
M1273-9407	60
M1273-9575	60
M1273-9900	60
M1273-9901	60
M1273-9902	60
M1273-9907	59
M1273-9908	59
M1273-9909	59
M1273-9915	59
M1273-9916	59
M1273-9917	59
M1273-9918	59
M1273-9919	59
M1273-9930	61
M1273-9931	61
M1273-9932	61
M1273-9933	61
M1273-9936	60
M1273-9940	60
M1273-9945	60
M1273-9946	60
M1273-9949	60
M1273-9953	60
M1273-9956	60
M1273-9957	60
M1273-9961	60
M1273-9989	64
M1273-9990	64
M1273-9998	60
M1273-9999	60
M1276-0000	84
M1276-5000	84
M1282-0000	11
M1282-0001	11
M1282-0002	11

NBS Part No.	Page
M1282-0003	11
M1282-0004	11
M1282-0005	11
M1282-0006	11
M1282-0007	11
M1282-0010	11
M1282-0011	11
M1282-0012	11
M1282-0013	11
M1282-0014	11
M1282-0015	11
M1282-0016	11
M1282-0017	11
M1282-0291	12
M1282-0500	12
M1282-0501	12
M1282-0600	12
M1282-0700	12
M1282-0800	12
M1282-5011	12
M1282-6000	12, 13
M1282-8038	12
M1282-9904	11
M1282-9905	11
M1282-9906	11
M1282-9907	11
M1282-9908	11
M1282-9909	11
M1282-9910	11
M1282-9911	11
M1282-9913	11
M1282-9915	11
M1282-9921	12
M1282-9922	12
M1282-9925	11
M1282-9926	11
M1282-9927	11
M1282-9928	11
M1286-0100	85
M1286-8010	85
M1287-0020	64, 69, 85
M1287-0101	64
M1287-0102	64
M1287-0111	69
M1287-0114	69
M1287-0300	63
M1287-0301	63
M1287-0302	63
M1287-0303	63
M1287-0310	67
M1287-0311	67
M1287-0312	67
M1287-0313	67
M1287-0320	63
M1287-0321	63
M1287-0322	63
M1287-0323	63
M1287-0330	67

NBS Part No.	Page
M1287-0331	67
M1287-0332	67
M1287-0333	67
M1287-0400	63, 67
M1287-0401	63, 67
M1287-0402	63, 67
M1287-0403	63, 67
M1287-0410	63
M1287-0411	63
M1287-0412	63
M1287-0413	63
M1287-0674	67
M1287-0675	67
M1287-0676	67
M1287-1002	68
M1287-1003	63
M1287-1004	68
M1287-1005	63
M1287-1010	63, 67
M1287-1020	63, 67
M1287-1110	69
M1287-1111	69
M1287-1112	69
M1287-1113	69
M1287-1125	69
M1287-1126	69
M1287-1127	69
M1287-1128	69
M1287-1135	69
M1287-1136	69
M1287-1137	69
M1287-1138	69
M1287-1140	69
M1287-1141	69
M1287-1142	69
M1287-1143	69
M1287-1150	69
M1287-1170	62
M1287-1171	62
M1287-1172	62
M1287-1173	62
M1287-1174	62
M1287-1175	62
M1287-1176	62
M1287-1177	62
M1287-1185	70
M1287-1186	70
M1287-1187	70
M1287-1188	70
M1287-1190	69
M1287-1191	69
M1287-1192	69
M1287-1193	69
M1287-1200	63
M1287-1201	63
M1287-1202	63
M1287-1203	68
M1287-1204	68

INDEX BY CATALOG NUMBER

NBS Part No.	Page
M1287-1205	63
M1287-1206	63
M1287-1207	63
M1287-1208	63
M1287-1210	68
M1287-1211	68
M1287-1212	68
M1287-1213	68
M1287-1260	66
M1287-1261	66
M1287-1262	66
M1287-1263	66
M1287-1264	66
M1287-1265	66
M1287-1266	66
M1287-1267	66
M1287-2010	63, 67
M1287-2011	63, 67
M1287-2012	63, 67
M1287-2013	63, 67
M1287-2014	63, 67
M1287-2015	67
M1287-2016	63, 67
M1287-2017	63, 67
M1287-2018	63, 67
M1287-2019	67
M1287-2020	67
M1287-2021	67
M1287-2110	63, 67
M1287-2111	63, 67
M1287-2112	63, 67
M1287-3500	69
M1287-3501	64
M1287-3505	69
M1287-3510	63, 67
M1287-3520	63, 67
M1287-3530	64, 69
M1287-3540	63, 67
M1287-3550	69
M1287-5010	70
M1287-5011	70
M1287-5012	70
M1287-5013	70
M1287-5030	64
M1287-5031	64
M1287-5034	64
M1287-5042	64, 69
M1287-5043	64
M1287-5068	69
M1287-5069	69
M1287-5070	69
M1287-5071	69
M1287-5072	69
M1287-5073	69
M1287-5074	69
M1287-5075	69
M1287-6020	64
M1287-6021	64

NBS Part No.	Page
M1287-6022	64
M1287-6023	64
M1287-6030	70
M1287-6031	70
M1287-6032	70
M1287-6033	70
M1287-9212	64
M1287-9227	70
M1287-9228	70
M1287-9229	70
M1287-9230	70
M1287-9287	70
M1287-9288	70
M1287-9289	70
M1287-9290	70
M1287-9914	64
M1287-9915	64
M1287-9918	83
M1287-9920	69
M1287-9921	69
M1287-9922	69
M1287-9923	69
M1287-9930	64
M1287-9931	64
M1287-9932	64
M1287-9933	64
M1287-9950	70
M1287-9951	70
M1287-9952	70
M1287-9953	70
M1287-9954	70
M1287-9955	70
M1287-9964	64
M1287-9966	64, 69, 80
M1287-9967	64, 69
M1287-9985	70
M1287-9986	70
M1287-9987	70, 80
M1287-9988	70
M1289-0001	10
M1289-0002	10
M1289-0003	10
M1289-0004	10
M1289-0005	10
M1289-0006	10
M1289-0010	10
M1289-0020	10
M1289-0030	10
M1289-0040	10
M1289-0050	10
M1289-0060	10
M1289-0100	10
M1289-0200	10
M1289-0300	10
M1289-0400	10
M1289-0500	10
M1289-0600	10
M1289-0700	10

NBS Part No.	Page
M1290-0550	81
M1290-0551	81
M1290-0552	81
M1290-0553	81
M1290-0610	88, 90
M1290-8012	88, 90
M1291-0011	85
M1291-0054	36, 42, 43, 44
M1292-9984	48, 67
M1292-9988	48, 67
M1293-0020	82
M1293-0100	82
M1293-0900	82
M1293-1000	82
M1293-8021	44
M1293-8022	44
M1293-8023	44
M1294-5013	72
M1294-5023	72
M1294-9542	72
M1294-9544	72
M1294-9820	72
M1294-9822	72
M1294-9824	72
M1294-9826	72
M1294-9828	72
M1294-9830	72
M1294-9940	72
M1294-9941	72
M1294-9942	72
M1294-9943	72
M1294-9944	72
M1294-9945	72
M1294-9948	72
M1294-9954	72
M1295-0002	84
M1299-0061	15
M1299-0080	15
M1299-0081	15
M1299-0082	15
M1299-0083	15
M1299-0084	15
M1299-0085	15
M1299-0086	15
M1299-0087	15
M1299-0090	15
M1299-0091	15
M1299-0092	15
M1299-0093	15
M1299-0094	15
M1299-0095	15
M1299-0096	15
M1299-0097	15
M1299-6000	15
M1320-0000	12
M1320-0001	12
M1320-0002	12
M1320-0003	12

NBS Part No.	Page
M1320-0004	12
M1320-0005	12
M1320-0006	12
M1320-0007	12
M1320-0010	12
M1320-0011	12
M1320-0012	12
M1320-0013	12
M1320-0014	12
M1320-0015	12
M1320-0016	12
M1320-0017	12
M1320-0300	13
M1320-0400	13
M1320-0500	13
M1320-0600	13
M1320-0700	13
M1320-6000	13
M1320-8029	13, 14, 15
M1322-0000	33, 36
M1322-0002	36
M1324-0000	23
M1324-0001	23
M1324-0002	23
M1324-0003	23
M1324-0004	23
M1324-0005	23
M1324-0006	23
M1324-0007	23
M1324-0500	23
M1324-0600	23
M1324-0700	23
M1324-0800	23
M1324-9904	23
M1324-9905	23
M1324-9906	23
M1324-9907	23
M1324-9908	23
M1324-9909	23
M1324-9910	23
M1324-9911	23
M1325-0000	45
M1325-0002	45
M1325-2210	45
M1326-0000	85
M1326-0010	85
M1326-0020	85
M1327-1000	49
M1327-9980	49
M1327-9981	49
M1335-0000	14
M1335-0001	14
M1335-0002	14
M1335-0003	14
M1335-0004	14
M1335-0005	14
M1335-0006	14
M1335-0007	14

## INDEX BY CATALOG NUMBER

NBS Part No.	Page	NBS Part No.	Page	NBS Part No.	Page	NBS Part No.	Page
M1335-0010	14	M1360-2035	72	M1369-1055	58	M1369-1601	57
M1335-0011	14	M1360-2036	72	M1369-1060	58	M1369-1602	57
M1335-0012	14	M1360-2037	72	M1369-1101	58	M1369-1605	57
M1335-0013	14	M1360-2038	72	M1369-1102	58	M1369-1610	57
M1335-0014	14	M1360-2040	72	M1369-1105	58	M1369-1611	57
M1335-0015	14	M1360-2041	72	M1369-1110	58	M1369-1612	57
M1335-0016	14	M1360-2050	72	M1369-1111	57	M1369-1615	57
M1335-0017	14	M1360-9832	72	M1369-1112	57	M1369-1620	57
M1335-0080	14	M1360-9834	72	M1369-1115	57	M1369-1621	58
M1335-0300	14	M1360-9836	72	M1369-1120	57	M1369-1622	58
M1335-0400	14	M1360-9969	72	M1369-1121	57	M1369-1625	58
M1335-0500	14	M1361-9208	88, 90, 92	M1369-1122	57	M1369-1630	58
M1335-0501	14	M1362-9901	81	M1369-1125	57	M1369-1631	58
M1335-0600	14	M1362-9902	81	M1369-1130	57	M1369-1632	58
M1335-0800	14	M1362-9903	81	M1369-1130	57	M1369-1635	58
M1335-0810	14	M1362-9904	81	M1369-1140	58	M1369-1640	58
M1335-6000	14	M1362-9905	81	M1369-1141	58	M1369-1640	58
M1350-0000	27	M1362-9906	81	M1369-1142	58	M1369-3107	59
M1350-0001	27	M1362-9906	81	M1369-1145	58	M1369-3108	59
M1351-0000	26	M1363-0105	51	M1369-1150	57	M1369-3120	59
M1351-0001	26	M1363-0114	51	M1369-1151	57	M1369-3125	59
M1352-0000	24	M1363-0115	51	M1369-1152	57	M1369-3130	59
M1352-0001	24	M1363-0116	51	M1369-1155	57	M1369-3135	59
M1352-0002	24	M1363-0117	51	M1369-1160	57	M1369-8020	59
M1352-0003	24	M1363-0118	51	M1369-1161	57	M1369-8021	59
M1352-0004	24	M1363-120-10A	50	M1369-1162	57	M1369-8022	59
M1352-0005	24	M1363-120-10M	50	M1369-1165	57	M1369-8023	59
M1352-0006	24	M1363-120-30A	50	M1369-1170	58	M1369-9947	59
M1352-0007	24	M1363-120-40A	50	M1369-1171	58	M1369-9951	59
M1352-6000	24	M1363-230-10A	50	M1369-1172	58	M1369-9960	59
M1353-0000	25	M1363-230-10M	50	M1369-1175	58	M1369-9970	59
M1353-0001	25	M1363-230-30A	50	M1369-1201	58	M1369-9974	59
M1353-0002	25	M1363-230-40A	50	M1369-1202	58	M1369-9977	59
M1353-0003	25	M1363-5002	51	M1369-1205	58	M1369-9979	59
M1353-0004	25	M1363-8012	51	M1369-1210	58	M1369-9982	59
M1353-0005	25	M1363-8013	51	M1369-1211	58	M1369-9985	59
M1353-0006	25	M1363-9910	51	M1369-1212	58	M1369-9986	59
M1353-0007	25	M1369-1001	58	M1369-1215	58	M1369-9988	59
M1354-0000	27	M1369-1002	58	M1369-1220	58	P0160-4440	46
M1354-0001	27	M1369-1005	58	M1369-1301	58	P0160-4460	60
M1355-0000	26	M1369-1010	58	M1369-1302	58	P0240-1080	80
M1355-0001	26	M1369-1011	58	M1369-1305	58	P0240-1090	80
M1360-0100	72	M1369-1012	58	M1369-1310	58	P0240-5000	80
M1360-0101	72	M1369-1015	58	M1369-1311	58	P0300-0350	46
M1360-0102	72	M1369-1020	58	M1369-1312	58	P0300-2370	51
M1360-0103	72	M1369-1021	58	M1369-1315	58	P0300-2371	51
M1360-0200	72	M1369-1022	58	M1369-1320	58	P0440-0061A	80
M1360-1120	71	M1369-1025	58	M1369-1370	58	P0440-0064	72
M1360-1121	71	M1369-1030	58	M1369-1371	58	P0440-0500	49
M1360-1123	71	M1369-1031	58	M1369-1372	58	P0440-0508	49
M1360-2020	72	M1369-1032	58	M1369-1375	58	P0440-4321	64, 69
M1360-2021	72	M1369-1035	58	M1369-1401	58	P0440-4325	64, 69
M1360-2023	72	M1369-1040	58	M1369-1402	58	P0440-4326	64, 69
M1360-2030	72	M1369-1041	58	M1369-1405	58	P0440-4327	64, 69
M1360-2031	72	M1369-1042	58	M1369-1410	58	P0440-4489	64, 69
M1360-2032	72	M1369-1045	58	M1369-1501	58	P0460-7550	85
M1360-2033	72	M1369-1050	58	M1369-1502	58	P0540-5440	82
M1360-2034	72	M1369-1051	58	M1369-1505	58	P0620-0653	80
		M1369-1052	58	M1369-1510	58	P0620-0654	80

## INDEX BY CATALOG NUMBER

NBS Part No.	Page	NBS Part No.	Page	NBS Part No.	Page	NBS Part No.	Page
P0620-0662	80	P0628-5560	42	P0720-5584	61, 89, 90	U9043-0002	35
P0620-0664	80	P0628-5612	42	P0720-5631	92	U9043-0004	35
P0620-0920	80	P0628-5651	42	P0720-5750	92	U9043-0006	35
P0620-0921	80	P0628-6061	42, 43	P0720-5780	88	U9043-0008	35
P0620-0959	83	P0628-6150	42	P0720-5781	88	U9044-0002	35
P0620-2410A	80	P0628-6150	42, 43	P0720-5782	88	U9044-0004	35
P0620-2411A	80	P0628-6170	43	P0720-5950	89	U9044-0006	35
P0620-2796	83	P0628-6180	43	P0720-5951	89	U9044-0008	35
P0620-2798	83	P0628-6210	43	P0720-5960	89	U9230-0000	35
P0620-2799	83	P0628-6230	43	P0720-5961	89	U9230-0001	35
P0620-3040	49	P0628-6241	42	P0720-5962	89	U9250-0001	35
P0620-5192	92	P0628-6251	42	P0720-5963	89	U9250-0002	35
P0620-5193	92	P0628-6270	42	P0720-6240C3	88, 90, 92	U9260-0000	35
P0620-5551	89	P0628-6280	43	P0720-6268	92	U9260-0001	35
P0620-5580	92	P0628-6300	43	P0720-6339	92	U9260-0002	35
P0620-5974	88	P0628-6390	42	P0720-6450C1	88, 90, 92	U9270-0000	31
P0620-5975	88	P0628-6490	42	P0720-6470	92	U9270-0001	31
P0620-6430	46	P0628-6720	43	P0720-6480	89	U9270-0002	31
P0620-6460	49	P0628-6770	43	P0720-6481	89	U9270-0004	31
P0620-6470	49	P0628-6780	42	P0720-6482	89	U9270-0005	31
P0620-6580	89	P0628-6781	42	P0720-6520	91	U9400-0000	34
P0625-0020	33	P0628-6800	42	P0720-6523	51	U9400-0001	34
P0625-1090	33	P0628-6810	42	P0720-6524	51	U9400-0002	34
P0625-1110	33	P0628-6820	42	P0720-6530	88	U9410-0001	34
P0625-1170	36	P0628-6831	42, 43	P0720-6531	88	U9410-0002	34
P0625-1180	36	P0628-6832	42, 43	P0720-6532	88	U9420-0000	33
P0626-0010	45	P0628-7200	43	P0720-6540	89, 90	U9420-0001	33
P0626-0020	45	P0628-7210	42, 43	P0720-6570	72	U9425-0000	33
P0626-0030	45	P0628-7211	42, 43	P0720-6580	61	U9425-0001	33
P0626-0040	45	P0628-7220	42, 43	P0720-6282	61	U9430-0000	34
P0626-0050	45	P0628-7221	42, 43	P0720-6283	61	U9430-0001	34
P0626-0060	45	P0640-0518	49	P0720-6284	61	U9430-0002	34
P0626-0070	45	P0640-0600	49	P0720-9660	89	U9440-0001	31
P0626-0080	45	P0640-0610	49	P0740-2396	81	U9440-0002	31
P0626-0090	45	P0640-0620	49	P0740-2430	81	U9440-0004	31
P0626-0091	45	P0720-2090	90	P0740-2445	81	U9440-0005	31
P0626-0100	45	P0720-2093	90	P0740-2505	46, 81	XMF-8624	64, 65
P0628-5000	42, 43	P0720-2095	90	P0740-2542	81		
P0628-5010	42, 43	P0720-2095	90	P0740-2590	81		
P0628-5020	42, 43	P0720-2273	90	P0740-2721C3	81		
P0628-5030	42, 43	P0720-2275	88	P0740-2730	49		
P0628-5040	42, 43	P0720-2276	59, 90	P0740-2740	49		
P0628-5050	42, 43	P0720-2277	88	P0740-3110	81		
P0628-5060	42, 43	P0720-2331	92	P0740-3111C3	81		
P0628-5070	43	P0720-2332	92	P0740-3113C3	81		
P0628-5080	43	P0720-2333	92	P0820-5179	82		
P0628-5090	43	P0720-2336	59, 92	P0820-5180	82		
P0628-5091	43	P0720-2338	51	P0820-5185	82		
P0628-5100	43	P0720-2342	92	P0820-5190	82		
P0628-5260	43	P0720-2430	89	P0820-5200	82		
P0628-5330	43	P0720-2560	92	P0860-5178	82		
P0628-5340	43	P0720-2561	92	PTL-386	21		
P0628-5341	43	P0720-2763	88	PTL-393	21		
P0628-5350	43	P0720-5567	92	S2116-3051P	10		
P0628-5400	42	P0720-5570C	88, 90, 92	S2116-3101P	10		
P0628-5410	42	P0720-5580	61, 89, 90	TTR-210	10		
P0628-5520	42	P0720-5581	89, 90	TTR-215	10		
P0628-5540	42	P0720-5582	61, 89, 90	TTR-221	10		
		P0720-5583	61, 89, 90				







# Expect More from Your -86° Freezer



More Energy Savings. More Capacity. More Choices.

New Brunswick Scientific's Innova® & Premium Freezers provide more of everything:

- **More Energy Savings.** Our ultra-efficient design reduces energy consumption by about half, compared to competitor's models. That's a savings of \$2,000 to \$3,000 in operating costs, per freezer, over ten years. Ask your NBS rep for assistance calculating your savings.
- **More Capacity Without Increasing the Footprint.** Innova models provide up to 30% more storage through use of vacuum-insulation panel technology. Let us show you how.
- **More Choices.** With over ten models, including the unique upright under-counter Innova U101, New Brunswick has the right freezer to fit your specific application.
- **More Value.** NBS freezers offer more for less. More standard features, higher-quality components, superior manufacturing, and lower operating costs add up to the best value on the market today. Why trust your research to anything less?

a culture of innovation

Download the brochure at [www.nbsc.com](http://www.nbsc.com)  
or see pages 30 – 37.



**New Brunswick**  
an appendorf company

## New Brunswick Scientific Sales and Support

NBS equipment is sold and supported worldwide. Don't see your country listed below?  
Write to us at [www.nbsc.com/offices](http://www.nbsc.com/offices) and we'll put you in contact with an office near you.

### USA HEADQUARTERS

New Brunswick Scientific  
Box 4005, 44 Talmadge Rd.  
Edison, NJ 08818-4005 USA  
Tel.: 1 800 631 5417  
+ 1 732 287 1200  
Fax: + 1 732 287 4222  
[bioinfo@nbsc.com](mailto:bioinfo@nbsc.com)  
[www.nbsc.com](http://www.nbsc.com)

### CHINA

For Shakers, CO<sub>2</sub> Incubators,  
and Freezers  
**Eppendorf China Ltd.**  
China Head Office Shanghai  
17th Floor, You You  
International Plaza  
No. 76 Pu Jian Road  
Shanghai 200127 P.R. CHINA  
Tel.: +86 21 38560500  
Fax: +86 21 38560555  
[market.info@eppendorf.cn](mailto:market.info@eppendorf.cn)  
[www.eppendorf.cn](http://www.eppendorf.cn)

### GERMANY

**Eppendorf Vertrieb**  
Deutschland GmbH  
Peter-Henlein-Straße 2  
50389 Wesseling-Berzdorf  
GERMANY  
Tel.: +49 2232 418-0  
Fax: +49 2232 418-155  
[vertrieb@eppendorf.de](mailto:vertrieb@eppendorf.de)  
[www.eppendorf.de](http://www.eppendorf.de)

### UNITED KINGDOM

**New Brunswick Scientific (UK) Ltd.**  
17 Alban Park, Hatfield Road  
St. Albans, Hertfordshire AL4 0JJ  
UK  
Tel.: 0800 581331  
Tel.: +44 (0)1727 853855  
Fax: +44 (0)1727 835666  
[bioinfo@nbsuk.co.uk](mailto:bioinfo@nbsuk.co.uk)  
[www.nbsuk.co.uk](http://www.nbsuk.co.uk)

### AUSTRIA + HUNGARY

**Eppendorf Austria GmbH**  
Ignaz Köck Straße 10/2, OG  
A-1210 Wien AUSTRIA  
Tel: +43 1 890 13 64 0  
Fax: +43 1 890 13 64 20  
[office@eppendorf.at](mailto:office@eppendorf.at)  
[www.eppendorf.at](http://www.eppendorf.at)

### CHINA

For Bioprocess Equipment  
**New Brunswick Scientific**  
A903 Yin Hai Building  
No. 250, Cao Xi Road  
Shanghai 200235  
P.R. CHINA  
Tel.: +86 21 64845955  
64845966  
Fax: +86 21 64845933  
[nbschc@online.sh.cn](mailto:nbschc@online.sh.cn)

### ITALY

**Eppendorf s.r.l.**  
Via Zante 14  
20138 Milano ITALY  
Tel.: +390 2 55 404 1  
Fax: +390 2 58 013 438  
[eppendorf@eppendorf.it](mailto:eppendorf@eppendorf.it)  
[www.eppendorf.it](http://www.eppendorf.it)

### BELGIUM

**New Brunswick Scientific NV-SA**  
Stationsstraat 180/4  
3110 Rotselaar BELGIUM  
Tel.: +32 1656 2831  
Fax: +32 1657 2753  
[sales@nbsnv-sa.be](mailto:sales@nbsnv-sa.be)  
[www.nbsc.com](http://www.nbsc.com)

### CZECH REPUBLIC

**Eppendorf Czech & Slovakia**  
s.r.o.  
Kolovratská 1476  
251 01 Říčany u Prahy  
CZECH REPUBLIC  
Tel./Fax: +420 323 605 454  
[eppendorf@eppendorf.cz](mailto:eppendorf@eppendorf.cz)  
[www.eppendorf.cz](http://www.eppendorf.cz)

### INDIA

**Eppendorf India Limited**  
Doshi Towers, 4th Floor  
156, Poonamallee High Road  
Kilpauk, Chennai 600010  
INDIA  
Tel.: +91 44 42 11 13 14  
Fax: +91 44 42 18 74 05  
[info@eppendorf.co.in](mailto:info@eppendorf.co.in)  
[www.eppendorf.co.in](http://www.eppendorf.co.in)

### FRANCE

**Eppendorf France S.A.R.L.**  
60, route de Sartrouville  
78230 Le Pecq FRANCE  
Tel.: +33 1 30 15 67 40  
Fax: +33 1 30 15 67 45  
[eppendorf@eppendorf.fr](mailto:eppendorf@eppendorf.fr)  
[www.eppendorf.fr](http://www.eppendorf.fr)

### NETHERLANDS

**New Brunswick Scientific B. V.**  
Kerkenbos 1101,  
6546 BC Nijmegen  
NETHERLANDS  
Tel.: +31 (0)24 3717 600  
Fax: +31 (0)24 3717 640  
[sales@nbsbv.nl](mailto:sales@nbsbv.nl)  
[www.nbsc.com/bv](http://www.nbsc.com/bv)

### SWITZERLAND

**Vaudaux-Eppendorf AG**  
Im Kirschgarten 30  
CH-4124 Schönenbuch  
SWITZERLAND  
Tel.: +41 61 482 1414  
Fax: +41 61 482 1419  
[vaudaux@vaudaux.com](mailto:vaudaux@vaudaux.com)  
[www.vaudaux-eppendorf.ch](http://www.vaudaux-eppendorf.ch)

a culture of innovation



**New Brunswick**  
an eppendorf company