



# Biostat® B

The Multi-Talented  
Bioreactor for Research  
and Development

Simplifying Progress

**SARTORIUS**

# Biostat® B at a Glance

Our Biostat® B is the ideal benchtop bioreactor for your lab. The multi-talented control tower opens up a new world of flexibility for your changing requirements. Use it as single or twin configuration, choose your cultivation chamber from our proven range of options (pictures below):

- Conventional stirred-tank Univessel® Glass
- Single-use stirred-tank Univessel® SU
- Wave-mixed RM Rocker with Flexsafe® RM bags



Univessel® Glass



Univessel® SU



RM Rocker

## Proven Technology

With several thousand installations in over 50 countries, Biostat® B is the most successful benchtop bioreactor in the world. Benefit from our experience and collaboration with customers worldwide.

## Configurable Design

Contact your Sartorius representative and configure your Biostat® B bioreactor solution matching your specific needs. Benefit from our flexible and scalable options.

## Reliable Quality

Every Biostat® B is thoroughly tested before it leaves our production facilities in Germany. Benefit from our global service and application specialist network for professional installation and training.



## Applications

- Process development, optimization and characterization
- Scale-up and scale-down studies
- Seed expansion and small scale production
- Cell bank production
- Protein supply
- Stem cell expansion and production (RM rocker)

## Cells

- Mammalian
- Insect
- Microbial
- Yeast
- Fungi
- Plant

## Industries

- Biopharmaceuticals
- Vaccines
- Cell therapies
- Industrial biotechnology
- Basic research
- Education

## Process Modes

- Batch
- Fed-batch
- Continuous
- Perfusion

▶ Watch Video:  
[www.sartorius.com/video-biostat-b](http://www.sartorius.com/video-biostat-b)



# Biostat® B – The Universal



## Univessel® Glass

Our proven autoclavable borosilicate glass culture vessel is available in four different volumes: 1 L, 2 L, 5 L and 10 L for all kinds of cell culture and microbial applications.

Fully interchangeable glass and single-use stirred-tank culture vessels.

## Univessel® SU

Our single-use 2 L stirred-tank vessel for cell culture applications combines scalable design with all the benefits of disposable solutions. No more worries about challenging timelines, workload or cross-contamination. Get started within minutes.



### Benefits

- Classic stirred-tank design simplifies your scale-up and scale-down studies
- Extensive performance and engineering data package available
- Save additional investment and use our special design for small autoclaves

### Benefits

- Fully single-use vessel, DO and pH sensors
- Proven, scalable stirred-tank design
- Connection kit to upgrade existing bioreactor controllers





# Controller for Your Lab



## Benefits

- Easy-to-use rocker with advanced alarms and safety features for reliable cultivation
- Space-saving, individual control of two RM bags on the same rocker platform
- Inline viable biomass measurement for reduced sampling need and contamination risk



## RM Rocker

Our proven wave-mixed bioreactor consists of a rocker unit with bag holder and pillow-shaped Flexsafe® RM single-use bags for culture volumes from 100 mL to 25 L. Use it as basic system or in combination with the Biostat® B control tower and single-use optical pH and DO sensors to enable advanced control strategies for batch, fed-batch and continuous perfusion.

## New Flexsafe® Bag Family

### Cell Growth

Excellent & reproducible growth behavior.

### Assurance of Supply

Guaranteed consistent quality & continuous supply.

### Robustness

Superior strength & flexibility of material.

### One for All

No matter what size or process step.

 **Watch Video:**  
[www.sartorius.com/sartorius/en/EUR/flexsafe](http://www.sartorius.com/sartorius/en/EUR/flexsafe)

# Biostat® B – Configurable Flexibility

Designed to meet your specific needs, Biostat® B covers a wide range of applications, extending from use as a flexible basic unit for preclinical research to a fully qualified system that complies with the requirements of a validated GMP environment.

## 12" Touch Screen

with closed frame; protected against water splashes and dust deposits. Easy-to-use and reliable operation of your Biostat® B due to intuitive design of human-machine interface and advanced touch-screen technology – even while wearing laboratory gloves.

## Control Tower

The control tower contains both the aeration, pump and temperature control modules, saving valuable bench space in your lab.

## New Standards for Interference-Free Measurements

All inlets and ports for, e.g. cooling water, process gasses, electricity, ethernet and potential-free alarm contact are located on the rear panel of the control tower. An equipotential bonding conductor shields the bioreactor against electromagnetic current and ensures interference-free measurements during your processes.



### Single | Twin Control Tower

One Biostat® B control tower can control up to two vessels completely independently to save valuable lab space.



### Storage Tray

A storage tray for accessories helps you organize your workplace.

### Connections for Sensors and External Accessories

Quick-connect couplings make it easy to attach all cables and supplies to the culture vessels. All connections are clearly marked with the same names used on the rear control tower panel and in the local control software menu for fast, error proof identification.

### Fast Load Peristaltic Pumps

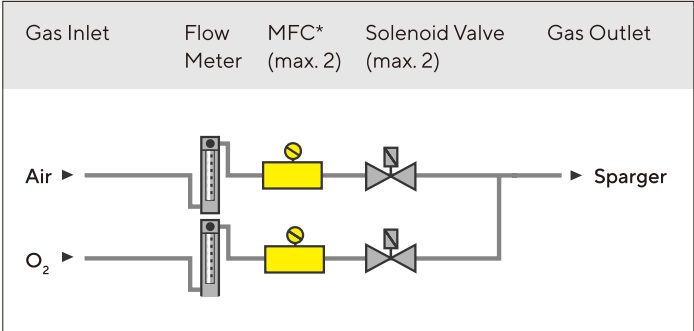
Insert the tubing in seconds:  
Open, insert tube, close, done! No more pinched fingers or torn gloves. Up to four internal pumps can be selected per vessel. Choose between speed-controlled pumps and fixed-speed pumps for feed and corrective agent addition.



# Aeration Strategies

A series of flexible aeration options turns the Biostat® B into a multi-talented bioreactor for a wide range of different applications, including high-cell density microbial fermentation requiring considerable amounts of oxygen to high-cell density cell culture applications requiring removal of excess carbon dioxide.

## Microbial Applications in Combination with Univessel® Glas

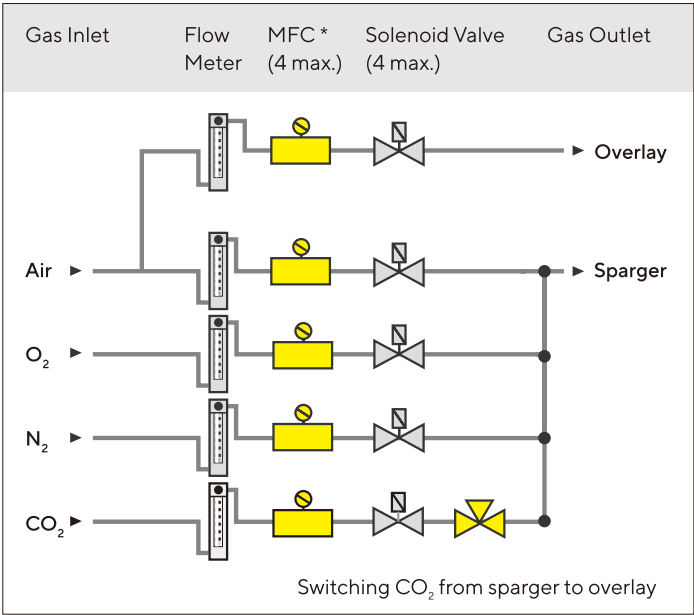


\*MFC = mass flow controller

Various controller and hardware configurations enable aeration strategies using air or oxygen or classical O<sub>2</sub> enrichment of air. For anaerobic processes, the air inlet can be used for nitrogen. The standard built-in solenoid valves in combination with a flow meter ensure reliable gas supply for simple applications. Optional mass flow controllers provide exact flow rate control of individual gases.

In combination with BioPAT® Xgas off-gas analysis, this allows mass balancing of consumed and produced gases.

## Cell Culture and Multi-Purpose Applications in Combination with Univessel® Glass and Univessel® SU

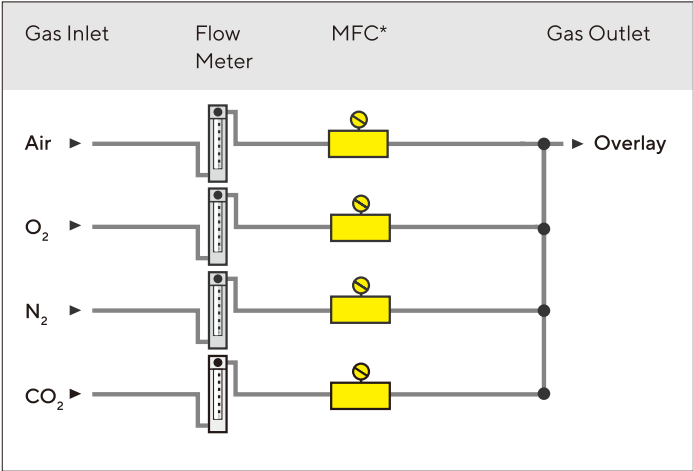


Five different gas lines (with flow meters) are equipped with solenoid valves and | or up to four optional mass flow controllers deliver ultimate flexibility and accuracy.

The Biostat® B allows you to optionally switch between sparger and overlay supply of CO<sub>2</sub> for pH control. In addition, a constant air | CO<sub>2</sub> mixture can be created in the overlay line to reproduce conditions set in a CO<sub>2</sub> incubator.

\*MFC = mass flow controller

# Cell Culture Applications in Combination with Our Rocking-Motion Bioreactor



The wave generated in the RM bags due to the rocking motion ensures effective gas exchange through the gas-liquid interface. Four different gas lines for air, O<sub>2</sub>, N<sub>2</sub> and CO<sub>2</sub> are equipped with flow meters and four high-precision mass flow controllers. An integrated pressure sensor continuously measures the pressure inside the bag. To ensure process safety, aeration is switched off when an upper threshold is reached.

\*MFC = mass flow controller

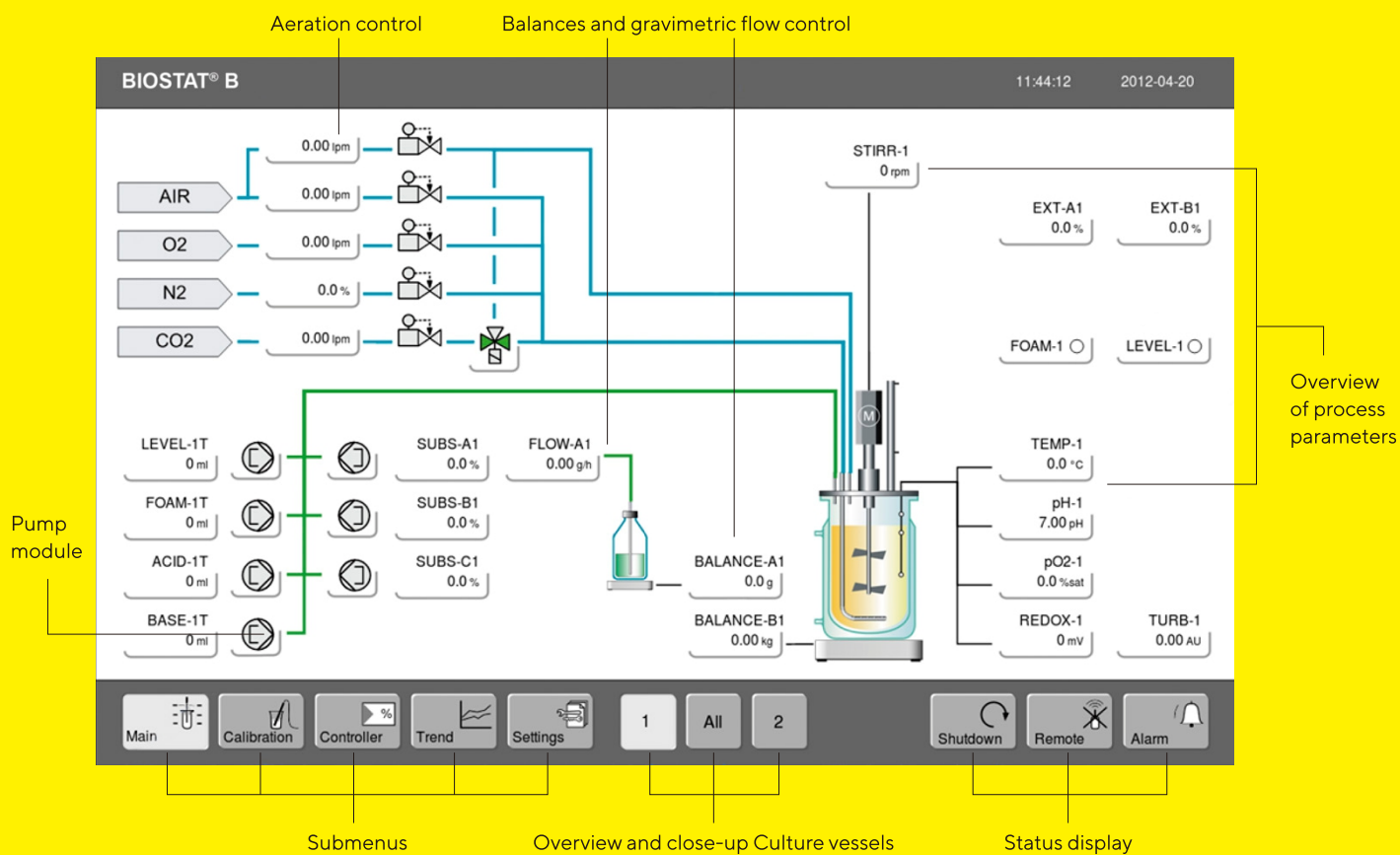


You can configure your Biostat® B aeration system in a similar way to your Biostat STR® single-use stirred tank bioreactor. Get ready for seamless scale-up and -down, from laboratory scale to large scale single-use production.

# BioPAT<sup>®</sup> DCU – Local Control

Since we introduced the first DCU-controlled bioreactors back in the late 80's, we have installed thousands of such bioreactors to date at leading companies in the pharmaceutical and biotech industry worldwide. We have continuously improved our robust, intuitive-use and industry-proven DCU control technology, now available in its fourth generation. It is our standard local control platform for our Biostat<sup>®</sup> bioreactors, Sartoflow<sup>®</sup> crossflow filtration units and Flexact<sup>®</sup> configurable systems available for a large number of unit operations.

The intuitive touch screen on the control tower is used to locally operate the Biostat<sup>®</sup> B:





# Automatic Feed Control and Continuous Processing

Design your process strategy or select different options. Configure your Biostat® B with gravimetric feed control, gravimetric level control or substrate addition profiles. This enables you to run your Biostat® B in batch, fed-batch, continuous or perfusion mode.

# Automatic pH Control

Control the pH of your culture by automatic acid and base addition or by CO<sub>2</sub> aeration and base addition. If you want to use your Biostat® B for both microbial and cell culture you can configure your bioreactor system with the option of either CO<sub>2</sub> aeration or acid addition for pH (acid) control.

# Automatic DO Control

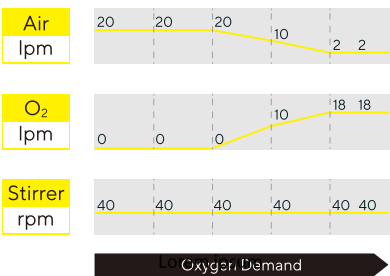
Besides classic DO cascade control, we have developed the unique advanced DO controller that gives you more flexibility to develop and optimize your DO control strategy.

The advanced DO controller supports parallel adjustment of all DO affecting parameter settings like stirrer speed and gas flow rates of air and pure oxygen, automatically and

simultaneously to control the DO set point. Optionally, you can keep the total gas flow rate constant and the ratio of pure oxygen in the gas mixture is increased automatically to match the oxygen consumption of the culture.

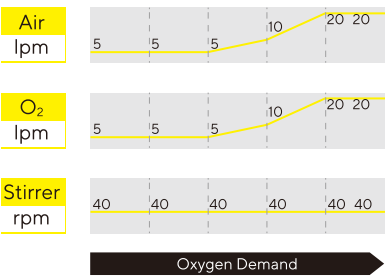
This gives you ultimate flexibility to adapt your aeration strategy to your process requirements.

## Constant Gas Flow



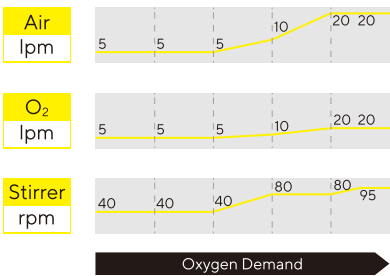
Constant gas flow decreases the flow of air and simultaneously increases oxygen flow keeping the total gas flow constant.

## Constant Gas Ratio



Constant gas ratio, increases both air and oxygen flows at the same rate keeping the ratio constant

## Bubble Size Optimization



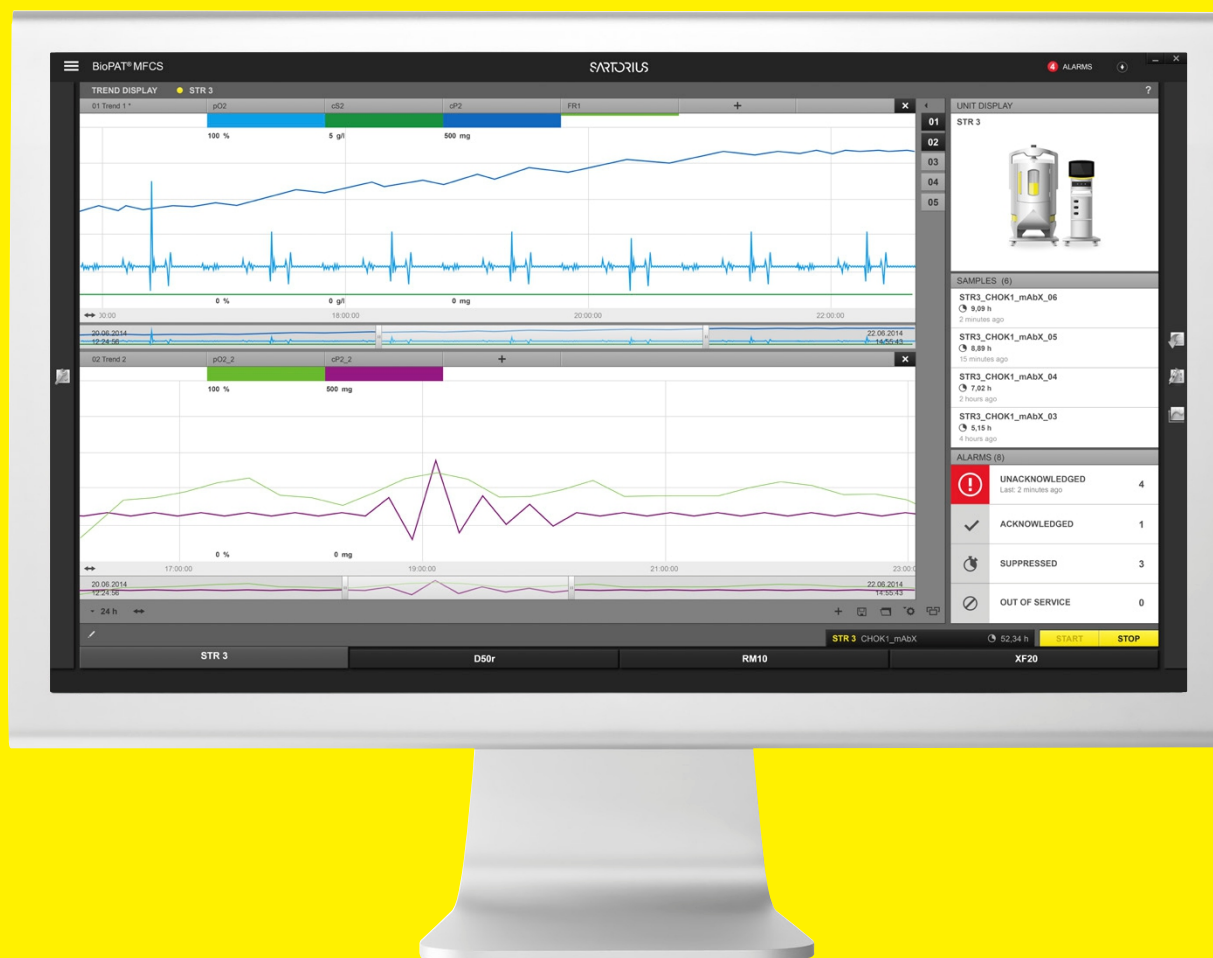
Bubble size optimization enables fine tuning of the oxygen percentage and gas-liquid interface area

# BioPAT® MFCS – The Bioprocess SCADA System

BioPAT® MFCS is our SCADA software for supervisory bioprocess control and data acquisition to ensure process reliability, when used in combination with the advanced Biostat® B Control Tower for local process control. It is ideal for efficient data acquisition and trend monitoring.

The optional advanced version; BioPAT® MFCS win includes modules such as:

- Multi-user network access for up to 16 process units
- Automation with recipes according to ANSI | ISA 88.01
- 21 CFR, Part 11 compatibility



# Technical Specifications

## Biostat® B

|   |   |
|---|---|
| <b>Control Tower Weight</b>                             |   |
| Single   Twin   | ~ 40   55 kg (88   121 lbs.)  |
| <b>Control Tower Dimensions (W × H × D)</b>             |   |
| Single   Twin   | 350 × 822 × 430 mm (14" × 32" × 17")  |
| <b>Utility Connections</b>                              |   |
| Power supply  | <ul style="list-style-type: none"><li>▪ 230 V (± 10%), 50 Hz, max. power consumption 10 A</li><li>▪ 120 V (± 10%), 60 Hz, max. power consumption 12 A</li><li>▪ Potential equalisation</li></ul>  |
| International protection rating                         | IP21  |
| Gases   | <ul style="list-style-type: none"><li>▪ Gas supply pressure, 1.5 barg</li><li>▪ Dry, oil and dust-free</li><li>▪ Hose barb for tubing, external diameter = 6 mm</li></ul>   |
| Water   | <ul style="list-style-type: none"><li>▪ Water supply pressure, 2 – 4 barg</li><li>▪ Flow rate up to 20 lpm</li><li>▪ Temperature min. = 4°C</li><li>▪ Discharge pressure-less</li><li>▪ Hose barb for tubing, external diameter = 10 mm</li><li>▪ Degree of hardness: max. 12° dH</li></ul> |
| <b>Control Tower</b>                                    |   |
| Housing   | Stainless steel, AISI 304   |
| Display   | Touch screen, 12", glass, capacitive  |
| Resolution  | 125 dpi   |
| SCADA communication                                     | Industrial Ethernet   |
| Potential-free (common) alarm contact                   | ▪   |
| Safety valve gas pressure                               | 1 bar (14.5 psi) for Univessel® Glass and SU   100 mbar for RM Rocker   |
| Water inlet pressure reduction                          | 1.5 bar (22 psi), integrated pressure control   |
| <b>Motor Drive (Univessel® Glass   SU)</b>              |   |
| Maintenance-free, quiet direct drive                    | Power: 200 W  |
| Maintenance-free top drive with magnetic motor coupling | Power: 200 W  |
| Rotation speed motor, direct coupling                   | 1L: 20 – 2,000 rpm<br>2L: 20 – 2,000 rpm<br>5L: 20 – 1,500 rpm<br>10L: 20 – 800 rpm<br>2L SU: 20 – 400 rpm  |



|                                 |  |
|---------------------------------|--|
| <b>RM Rocker 20   50</b>        |  |
| Power supply                    | <ul style="list-style-type: none"> <li>▪ 240 V (± 10%), 50 Hz, power consumption 10 A</li> <li>▪ 100 V (± 10%), 60 Hz, power consumption 12 A</li> </ul> |
| Power consumption               | 600 W  |
| International protection rating | IP23   |
| Rocking speed                   | 8–42 ± 1 (r/min)   |
| Rocking angle                   | 4–10 ± 0.3 (°)   |
| Load cells                      | 100–240 V   15 W   |

## Process Control | Sensors

|                              | Sensor   Measurement Range   Display Accuracy  | Univessel® Glass | Univessel® SU | RM Rocker 20   50 |
|------------------------------|--|------------------|---------------|-------------------|
| Temperature                  | Pt100   0–150°C (temperature control 0–80°C)   0.1°C   | ▪                | ▪             | ▪                 |
| Dissolved oxygen, reusable   | Polarographic or optical   0–100%   0.1%   | ▪                | ▪             |                   |
| Dissolved oxygen, single-use | 0–100%   0.1%  |                  | ▪             | ▪                 |
| pH, reusable                 | Combined measuring electrode   2–12 pH   0.01 pH   | ▪                | ▪             |                   |
| pH, single-use               | 6.5–8.5 pH   0.1 pH  |                  | ▪             | ▪                 |
| Foam control                 | Electrical conductive sensor, stainless steel, ceramic insulated   | ▪                |               |                   |
| Level                        | Electrical conductive sensor, stainless steel, ceramic insulated   | ▪                |               |                   |
| Turbidity                    | 1-channel NIR absorption sensor   0–6 AU   0.01 AU   | ▪                |               |                   |
| Redox                        | Combined measurement with pH sensor   –1,000–1,000 mV   1 mV   | ▪                | ▪             |                   |
| Balance substrate            | 7 kg max.   1 g<br>60 kg max.   10 g<br>300 kg max.   100 g  | ▪                | ▪             | ▪                 |
| Gravimetric Flow Controller  | Accuracy for 7 kg balance: 5 g/h<br>Accuracy for 60 kg balance: 50 g/h<br>Accuracy for 300 kg balance: 500 g/h | ▪                | ▪             | ▪                 |
| Balance culture vessel       | 60 kg max.   10 g  | ▪                | ▪             |                   |
| RM load cells                | 30 kg max.   10 g<br>Weight: 9 kg<br>Dimensions: 609   536   60–68 mm  |                  |               | ▪                 |
| External signal input        | 0–10 V or 4–20 mA<br>Univessel® Glass   SU: 4 max.<br>RM Rocker: 2 max.  | ▪                | ▪             | ▪                 |

## Aeration Module

|  |   |
|--|---|
| Outlet to culture vessel   bag   | Hose coupling Ø external = 6 mm   |
| <b>Univessel® Glass MO (Microbial)</b>   | <b>Two-gas mixing with sparger outlet</b>   |
| Air with O <sub>2</sub> Enrichment or Gas Flow Ratio mixing along with anaerobic fermentation; for further information, please see page on “Aeration Strategies” |   |
| Max. total flow  | Up to 20 L/min total volume flow  |
| Flow meters  | 2   |
| ▪ Flow Range   | Various models available: 0.1–20 liters per min. [lpm] (sparger)                      |
| ▪ Accuracy   | ± 5% full scale   |
| Mass flow controllers (optional)   | 2 max.  |
| ▪ Flow rate  | Various models available: 0.03–20 lpm (sparger)                                       |
| ▪ Accuracy   | ± 1% full scale   |
| <b>Univessel® Glass CC (Cell Culture)   Univessel® SU</b>  | <b>Four-gas mixing with sparger and headspace outlet</b>                              |
| Additive flow, 4-gas (Air, O <sub>2</sub> , N <sub>2</sub> , CO <sub>2</sub> ) mixture; for further information, please see page on “Aeration Strategies”        |   |
| Max. total flow  | Up to 13 L/min total volume flow  |
| Flow meters  | 5   |
| ▪ Flow Range   | Various models available:<br>3.3 ccm–1.6 lpm (sparger)<br>0.16 lpm–13 lpm (headspace) |
| ▪ Accuracy   | ± 5% full scale   |
| Mass flow controllers (optional)   | 4 max.  |
| ▪ Flow rate  | Various models available:<br>1 ccm–1.5 lpm (sparger)<br>0.03 lpm–10 lpm (headspace)   |
| ▪ Accuracy   | ± 1% full scale   |
| <b>Univessel® Glass, Dual Use</b>  | <b>Four-gas mixing with sparger and headspace outlet</b>                              |
| Additive flow, 4-gas (Air, O <sub>2</sub> , N <sub>2</sub> , CO <sub>2</sub> ) mixture; for further information, please see page on “Aeration Strategies”        |   |
| Max. total flow  | Up to 20 L/min total volume flow  |
| Flow meters  | 5   |
| ▪ Flow Range   | Various models available:<br>3.3 ccm–20 lpm (sparger)<br>50 ccm–20 lpm (headspace)    |
| ▪ Accuracy   | ± 5% full scale   |
| Mass flow controllers (optional)   | 4 max.  |
| ▪ Flow rate  | Various models available:<br>0.6 ccm–20 lpm (sparger)<br>10 ccm–20 lpm (headspace)    |
| ▪ Accuracy   | ± 1% full scale   |

| RM Rocker 20   50   |   | Four-gas mixing with sparger and headspace outlet |
|---|---|---|
| Additive flow, 4-gas (Air, O <sub>2</sub> , N <sub>2</sub> , CO <sub>2</sub> ) mixture; for further information, please see page on “Aeration Strategies” |   |   |
| Flow meters   | 4   |   |
| ▪ Flow Range  | Various models available:<br>16 ccm – 7 lpm (headspace) |   |
| ▪ Accuracy  | ± 5% full scale   |   |
| Mass flow controllers (optional)  | 4 max.  |   |
| ▪ Flow rate   | Various models available:<br>3 ccm – 5 lpm (headspace)  |   |
| ▪ Accuracy  | ± 1% full scale   |   |

## Pump Module

| Built-in Pumps   |   |
|--|---|
| Fixed speed (on   off controlled)                                | Watson Marlow 114, Fast Load pump head  |
| ▪ Speed 5 rpm<br>Flow rate (tubing wall thickness 1.6 mm)        | ID: 0.5 mm: 0 – 0.1 ml/min<br>ID: 0.8 mm: 0 – 0.2 ml/min<br>ID: 1.6 mm: 0.01 – 0.7 ml/min<br>ID: 2.4 mm: 0.03 – 1.5 ml/min<br>ID: 3.2 mm: 0.05 – 2.4 ml/min<br>ID: 4.8 mm: 0.09 – 4.3 ml/min          |
| ▪ Speed 44 rpm<br>Flow rate (tubing wall thickness 1.6 mm)       | ID: 0.5 mm: 0.02 – 0.9 ml/min<br>ID: 0.8 mm: 0.04 – 1.8 ml/min<br>ID: 1.6 mm: 0.12 – 6.2 ml/min<br>ID: 2.4 mm: 0.26 – 12.8 ml/min<br>ID: 3.2 mm: 0.41 – 20.7 ml/min<br>ID: 4.8 mm: 0.75 – 37.4 ml/min |
| Speed-controlled   | Watson Marlow 114, Fast Load pump head  |
| ▪ Speed 0.15 – 5 rpm<br>Flow rate (tubing wall thickness 1.6 mm) | ID: 0.5 mm: 0 – 0.1 ml/min<br>ID: 0.8 mm: 0.01 – 0.2 ml/min<br>ID: 1.6 mm: 0.02 – 0.7 ml/min<br>ID: 2.4 mm: 0.04 – 1.5 ml/min<br>ID: 3.2 mm: 0.07 – 2.4 ml/min<br>ID: 4.8 mm: 0.13 – 4.3 ml/min       |
| ▪ Speed 5 – 150 rpm<br>Flow rate (tubing wall thickness 1.6 mm)  | ID: 0.5 mm: 0.1 – 3 ml/min<br>ID: 0.8 mm: 0.2 – 6 ml/min<br>ID: 1.6 mm: 0.7 – 21 ml/min<br>ID: 2.4 mm: 1.45 – 43.5 ml/min<br>ID: 3.2 mm: 2.35 – 70.5 ml/min<br>ID: 4.8 mm: 4.25 – 127.5 ml/min        |
| External Pumps   |   |
| Speed-controlled   | Watson Marlow 120, Fast Load pump head, up to 200 rpm   |



## Temperature Control Module

|  | Heating and Cooling  | Heating Only  |
|--|--|---|
| <b>For Univessel® Glass<br/>Single-wall Culture Vessels</b>            | Electrical heating system and automatic cooling water valve; connection to heating blanket and cooling finger            | -   |
|  | Temperature control of 8°C above cooling-water inlet temperature up to 60°C  | -   |
|  | Heating blanket capacities 1 L   2 L   5 L   10 L: 100   170   400   780 W   | -   |
| <b>For Univessel® Glass<br/>Double-wall (Jacketed) Culture Vessels</b> | Open thermostat system with recirculation pump and automatic cooling water valve   | -   |
|  | Temperature control of 8°C above cooling-water inlet temperature of up to 80°C   | -   |
|  | Heating capacity: 600 W  | -   |
| <b>For Univessel® SU<br/>Single-use Culture Vessels</b>                | Open thermostat system with recirculation pump and automatic cooling water valve; connection to heating   cooling jacket | Electrical heating blanket                                    |
|  | Temperature control up to 50°C   | Temperature control up to 50°C<br>Heating capacity 2 L: 200 W |
| <b>For RM Rocker 20   50</b>   | Open thermostat system with recirculation pump and automatic cooling water valve   | Electrical heating plates                                     |
|  | Temperature control of 8°C above cooling-water inlet temperature of up to 40°C   | Temperature control from room temperature up to 40°C          |
|  | Heating capacity: 600 W  | Heating plates: 2 × 140 W                                     |

# Culture Vessel Univessel® Glass

| Autoclavable Single-wall or Double-wall (Jacketed) Glass Vessel              | 1 L   | 2 L       | 5 L       | 10 L       |
|--|---|-----------|-----------|------------|
| Material   | Borosilicate glass, stainless steel AISI 316L, EPDM |           |           |            |
| Sizes [L]  | 1   | 2         | 5         | 10         |
| Total volume [L]   | 1.6   | 3         | 6.6       | 13         |
| Working volume [L]   | 0.35–1  | 0.6–2     | 0.6–5     | 1.5   5–10 |
| Top port 19 mm   12 mm   6 mm  | 3   2   6   | 3   2   9 | 3   3   8 | 5   2   9  |
| Univessel® Glass, Single-wall  | 1 L   | 2 L       | 5 L       | 10 L       |
| Weight <sup>1</sup> [kg]   | 4.4   | 5.9       | 10.5      | 14.9       |
| Space requirements in autoclave [diameter × height mm]                       | 200 × 446   | 220 × 507 | 270 × 645 | 310 × 767  |
| Space requirements in autoclave, reduced <sup>2</sup> [diameter × height mm] | 450 × 330   | 490 × 391 | 570 × 496 | 600 × 618  |
| Univessel® Glass, Double-wall  | 1 L   | 2 L       | 5 L       | 10 L       |
| Weight <sup>1</sup> [kg]   | 5.3   | 6.9       | 12.6      | 18.5       |
| Space requirements in autoclave [diameter × height mm]                       | 320 × 446   | 335 × 507 | 395 × 645 | 435 × 767  |
| Space requirements in autoclave, reduced <sup>2</sup> [diameter × height mm] | 450 × 330   | 490 × 391 | 570 × 496 | 600 × 618  |

<sup>1</sup> With tripod and head plate, without medium  
<sup>2</sup> Adapter for exhaust cooler to reduce height in the autoclave optionally available

# Culture Vessel Univessel® SU

|  |            |
|--|------------|
| Single-use vessel made of pre-sterilized polycarbonate for cell culture applications |            |
| Total volume [L]   | 2.6        |
| Working volume [L]   | 0.6–2      |
| Max. temperature   | 50°C       |
| Operating pressure   | < 0.5 barg |

# Biostat® RM Rocker



| Biostat® RM Rocker                                   | 20   50 L  | 200 L   |
|--|--|---|
| Weight   | <ul style="list-style-type: none"> <li>RM 20 without Load Cell – 38 kg</li> <li>RM 20 with Load Cell – 47 kg</li> <li>RM 50 without Load Cell – 42.8 kg</li> <li>RM 50 with Load Cell – 51.8 kg</li> </ul>   | 197 kg  |
| Dimensions (H×W×D)                                   | <ul style="list-style-type: none"> <li>Biostat® RM 20 with bag holder 20, hood: 500×765×613 mm</li> <li>Biostat® RM 20 with bag holder 20, hood, Load Cell: 562×765×662 mm</li> <li>Biostat® RM 50 with bag holder 50, hood: 500×1085×625 mm</li> <li>Biostat® RM 50 with bag holder 50, hood, Load Cell: 562×1085×625 mm</li> </ul> | 1155×1940×1080 mm   |
| Construction Material of Culture Bag Holder and Hood | ABS  | ABS   |
| Power Supply   | <ul style="list-style-type: none"> <li>240 V, 50 Hz, power consumption 10 A</li> <li>100 V, 60 Hz, power consumption 12 A</li> </ul>   | <ul style="list-style-type: none"> <li>230 V, 50 Hz, power consumption 5.2 A</li> <li>120 V, 60 Hz, power consumption 10 A</li> </ul> |
| Power Consumption                                    | 600 W  | 1,200 W   |
| Ingress Protection Rating                            | IP 23  | IP 21   |
| Rocking Speed  | 8–42 ± 1 (r/min)   | 2–20 ± 1 (r/min)  |
| Rocking Angle  | 4–10°, ± 0.3°  | 2–10°, ± 0.3°   |
| Max Gas Supply Rate                                  | <ul style="list-style-type: none"> <li>Aeration rate: 50–1,000 mL/min</li> <li>Permitted bulk flow for stable CO<sub>2</sub> control within CO<sub>2</sub> ratio controller: 100–1,000 mL/min</li> </ul>   | 7 L/min for all gasses  |
| Load Cells   | 100–240 V   15 W<br>100 kg   10 g  | 100–240 V   15 W<br>400 kg   10 g   |
| Acoustic Emissions                                   | <ul style="list-style-type: none"> <li>Device switched on, idle, aeration off: 39 dB(A)</li> <li>Device switched on, 42 RPM, aeration off: 62 dB(A)</li> <li>Device switched on, idle, aeration on: 54 dB(A)</li> <li>Device switched on, 42 RPM, aeration on: 63 dB(A)</li> </ul>   | <ul style="list-style-type: none"> <li>Device switched on, idle: 56–61 dB(A)</li> <li>During operation: &gt; 65 dB(A)</li> </ul>      |
| <b>Temperature Control Module</b>                    |  |   |
| Heating  | 2×140 W  | 2×410 W   |

# Flexsafe® RM Bags

| Product Name                        | Quantity | Order Number  |
|-------------------------------------|----------|---------------|
| Flexsafe® RM Basic Culture Bags     |          |               |
| Flexsafe® RM 1 L Basic              | 5        | DFB001L       |
| Flexsafe® RM 2 L Basic              | 5        | DFB002L       |
| Flexsafe® RM 2 L Basic Screw Cap    | 5        | DFB002L--01SC |
| Flexsafe® RM 10 L Basic             | 5        | DFB010L       |
| Flexsafe® RM 10 L Basic Screw Cap   | 5        | DFB010L--01SC |
| Flexsafe® RM 20 L Basic             | 5        | DFB020L       |
| Flexsafe® RM 20 L Basic Screw Cap   | 5        | DFB020L--01SC |
| Flexsafe® RM 50 L Basic             | 5        | DFB050L       |
| Flexsafe® RM 50 L Basic Screw Cap   | 5        | DFB050L--01SC |
| Flexsafe® RM 50 L Basic (US)        | 5        | DFB050L--01UC |
| Flexsafe® RM 100 L Basic            | 2        | DFB100L       |
| Flexsafe® RM 200 L Basic            | 2        | DFB200L       |
| Flexsafe® RM Optical Culture Bags   |          |               |
| Flexsafe® RM 2 L Optical            | 5        | DFO002L       |
| Flexsafe® RM 2 L Optical Screw Cap  | 5        | DFO002L--01SC |
| Flexsafe® RM 10 L Optical           | 5        | DFO010L       |
| Flexsafe® RM 10 L Optical Screw Cap | 5        | DFO010L--01SC |
| Flexsafe® RM 20 L Optical           | 5        | DFO020L       |
| Flexsafe® RM 20 L Optical Screw Cap | 5        | DFO020L--01SC |
| Flexsafe® RM 50 L Optical           | 5        | DFO050L       |
| Flexsafe® RM 50 L Optical Screw Cap | 5        | DFO050L--01SC |
| Flexsafe® RM 100 L Optical          | 2        | DFO100L       |
| Flexsafe® RM 200 L Optical          | 2        | DFO200L       |
| Flexsafe® RM Perfusion Culture Bags |          |               |
| Flexsafe® RM 2 L Perfusion          | 3        | DFP002L-SM    |
| Flexsafe® RM 10 L Perfusion         | 3        | DFP010L-SM    |
| Flexsafe® RM 20 L Perfusion         | 3        | DFP020L-SM    |
| Flexsafe® RM 50 L Perfusion         | 3        | DFP050L-SM    |
| Flexsafe® RM 2 L Perfusion ATF      | 3        | DFP002L-AT    |
| Flexsafe® RM 10 L Perfusion ATF     | 3        | DFP010L-AT    |
| Flexsafe® RM 20 L Perfusion ATF     | 3        | DFP020L-AT    |
| Flexsafe® RM 50 L Perfusion ATF     | 3        | DFP050L-AT    |
| Flexsafe® RM 100 L Perfusion ATF    | 2        | DFP100L-AT    |
| Flexsafe® RM 200 L Perfusion ATF    | 2        | DFP200L-AT    |

| Product Name                             | Quantity | Order Number |
|--|----------|--------------|
| <b>Flexsafe® RM Viamass Culture Bags</b> |          |              |
| Flexsafe® RM 10 L Basic Viamass          | 5        | DFB010L--VM  |
| Flexsafe® RM 20 L Basic Viamass          | 5        | DFB020L--VM  |
| Flexsafe® RM 50 L Basic Viamass          | 5        | DFB050L--VM  |
| Flexsafe® RM 2 L Optical Viamass         | 3        | DFO002L-VM   |
| Flexsafe® RM 10 L Optical Viamass        | 5        | DFO010L--VM  |
| Flexsafe® RM 20 L Optical Viamass        | 5        | DFO020L--VM  |
| Flexsafe® RM 50 L Optical Viamass        | 5        | DFO050L--VM  |
| Flexsafe® RM 100 L Optical Viamass       | 2        | DFO0100L--VM |
| Flexsafe® RM 200 L Optical Viamass       | 2        | DFO0200L--VM |
| Flexsafe® RM 2 L Perfusion Viamass       | 3        | DFP002L-SMVM |
| Flexsafe® RM 10 L Perfusion Viamass      | 3        | DFP010L-SMVM |
| Flexsafe® RM 20 L Perfusion Viamass      | 3        | DFP020L-SMVM |
| Flexsafe® RM 50 L Perfusion Viamass      | 3        | DFP050L-SMVM |
| Flexsafe® RM 100 L Perfusion Viamass     | 2        | DFP100L-SMVM |
| Flexsafe® RM 200 L Perfusion Viamass     | 2        | DFP200L-SMVM |
| Flexsafe® RM 10 L ATF Viamass            | 3        | DFP010L-ATVM |
| Flexsafe® RM 20 L ATF Viamass            | 3        | DFP020L-ATVM |
| Flexsafe® RM 50 L ATF Viamass            | 3        | DFP050L-ATVM |
| Flexsafe® RM 100L ATF Viamass            | 2        | DFP100L-ATVM |
| Flexsafe® RM 200L ATF Viamass            | 2        | DFP200L-ATVM |

Schematic drawings can be found in Datasheet for Flexsafe® RM Bags.

Customized bag designs can be requested via engineered to order (ETO) process.

# Basic Configurations for Univessel® Glass

The Biostat® B is a highly flexible and modular system that can be individually adapted to the requirements of your application. Below you will find an overview of the basic equipment which you can extend with diverse options. Please contact your Sartorius Stedim Field Representative or Application Specialist for additional information.

## Microbial Packages

| Volume: 1 L, 2 L, 5 L or 10 L   |
|---|
| Digital controller, color display with touch screen   |
| Control temperature, pH, DO, stirrer speed  |
| Maintenance-free, quiet motor   |
| Storage tray for accessories  |
| Aeration module with 2 solenoid valves  |
| 2 flow rate controllers for manual flow rate control (Air   N <sub>2</sub> , O <sub>2</sub> ) |
| Software configured for microbial applications  |
| 4-stage DO cascade  |
| 2 integrated pumps for pH control (acid   base)   |
| Temperature control module for double-wall vessels  |
| 2 external signals 0–10 V   |
| Standard test and documentation   |
| Installation set for the gas and water connections  |
| Power cable   |
| Double-wall culture vessel  |
| Stirrer shaft with single-mechanical seal and direct coupling                                 |
| 2 addition bottles for correction agents  |
| Exhaust cooler  |
| Aeration filters  |
| Rushton impellers   |
| Ring sparger  |
| 4-way addition port   |
| Inoculation port  |
| Harvest pipe, height-adjustable   |
| Manual sampler  |
| Tool set for disassembly of vessel  |
| Pt100 temperature sensor  |
| pH sensor   |
| DO sensor, amperometric   |

## Cell Culture Packages

| Volume: 1 L, 2 L, 5 L or 10 L   |
|---|
| Digital controller, color display with touch screen   |
| Control temperature, pH, DO, stirrer speed  |
| Maintenance-free, quiet motor   |
| Storage tray for accessories  |
| Aeration module with 4 solenoid valves  |
| 5 flow rate controllers for manual flow rate control (Air Overlay, Air sparger, N <sub>2</sub> , O <sub>2</sub> , CO <sub>2</sub> ) |
| Software configured for cell culture applications   |
| 4-stage DO cascade  |
| 1 integrated pump for pH control (base)   |
| Temperature control module for single-wall vessels  |
| 2 external signals 0–10 V   |
| Standard test and documentation   |
| Installation set for the gas and water connections  |
| Power cable   |
| Single-wall culture vessel  |
| Heating blanket 120   230 V   |
| Stirrer shaft with single mechanical seal and direct coupling   |
| 1 addition bottle for correction agent  |
| Exhaust cooler  |
| Aeration filters  |
| 3-blade segment impeller  |
| Microsparger  |
| 4-way addition port   |
| Harvest pipe, height-adjustable   |
| Manual sampler  |
| Tool set for vessel dismantling   |
| Pt100 temperature sensor  |
| pH sensor   |
| DO sensor, amperometric   |



# Options

## Control System

|  |
|--|
| Advanced DO controller   |
| Flexible switching CO <sub>2</sub> from sparger to headspace   |
| Software for dual use MO   CC                                  |
| Mass flow controller   |
| Antifoam control via sensor                                    |
| Mechanical foam destroyer (MO applications)                    |
| Level control via sensor                                       |
| Weight measurement substrates   culture vessel                 |
| Gravimetric feed   level control                               |
| Substrate addition via time profile                            |
| Redox (ORP) measurement  |
| BioPAT® Fundalux turbidity measurement                         |
| BioPAT® Xgas O <sub>2</sub>   CO <sub>2</sub> off-gas analysis |
| System IQ   OQ   |
| BioPAT® MFCS SCADA system                                      |

## Univessel® Glass

|  |
|--|
| Double-wall culture vessel                                       |
| Magnetic coupling for drive motor                                |
| STT connectors for safe inoculation and media transfer           |
| Cooling finger (single-wall culture vessels)                     |
| Spin filter for perfusion mode                                   |
| Aeration basket for organisms sensitive to shear stress          |
| Rushton impellers   3-blade segment impellers                    |
| Baffles  |
| Bottle holder  |
| Adapter for height reduction of exhaust cooler for the autoclave |
| Inoculation port   |
| 3-way addition port  |
| Universal adapter ID 3.2 mm                                      |
| Harvest pipe bent for complete draining                          |
| Port adapter 19 mm – 12 mm                                       |
| Set of consumables   |

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