We Feel Relaxed

Reducing the stress for your stem cells with a stirred-tank bioreactor
»Cultivating Stem Cells in a Stirred-Tank Bioreactor?«

»They Will Suffer From Shear Stress.«
Talk to our experts and learn how to reduce the stress for your stem cells and yourself.

Jens Schiffler
Head of European Bioprocess Sales & Service
+ 49 2461 980 425
schiffler.j@eppendorf.com

Stefan Wilson
UK
+ 44 7919 172 482
wilson.s@eppendorf.co.uk

Marcel Streefkerk
RUS, CIS, PL, Baltic
+ 49 2461 980 422
m.streefkerk@eppendorf.nl

David Bittner
DE (east), CH (german speaking)
+49 151 146 45 318
beyer.d@eppendorf.com

Jeroen Schouwenberg
NL
+ 49 2461 980 423
schouwenberg.j@eppendorf.com

Saskia Schoenen
DK, S, NO, FIN, IS
+ 49 2461 980 428
schoenen.s@eppendorf.com

Marc Skoupi
IT, DE (southwest)
+ 49 2461 980 426
skoupi.m@eppendorf.com

Sandra Beyer
FR, CH (french speaking)
+33 6 24 64 69 25
beyer.s@eppendorf.fr

Jakob Ehmsen
AT, CZ, SK, SE Europe
+ 43 1890 136 415
ehmsen.j@eppendorf.at

Danilo Bittner
ES, PT, DE (northwest)
+ 49 2461 980 165
bittner.d@eppendorf.com 
From the parallel mini bioreactor system for early stage bioprocess development, the benchtop and parallel bioreactor systems for the laboratory scale to the sterilize-in-place solutions for production: Eppendorf offers users from industry and research extensive bioprocess solutions from a single source and meets the highest quality demands.

»Solutions that grow with you.«
Benchtop bioreactors and fermentors

0.4 - 40 L

SIP bioreactors and fermentors

0.3 - 40 L

10.75 - 1,200 L

Pilot scale

Production scale
»I cannot reduce the stirring speed to minimize the stress for my cells, but they still settle.«

»Test and optimize different process parameters.«

> 4-fold parallel system extendable to up to 24 parallel operated glass or single-use bioreactors
> Compact mini bioreactor system: requires only 7 cm (3 inches) bench space per bioreactor
> Optimal tool for DoE and scale down approaches
> Agitation control supporting overhead-driven Rushton, marine-type or pitched blade impellers
> Innovative liquid-free temperature control system needs no coolant agent supply and supports independent temperature control for each bioreactor
> Accurate monitoring and control of pH, DO and level
> Variable speed pumps for accurate liquid addition and operation in batch, fed-batch, continuous and cyclic perfusion mode
> 4 mass flow controllers per bioreactor allow for individual mixing of air, N₂, O₂ and CO₂ to headspace and/or submerged
> Novel liquid-free Peltier exhaust condenser with easy to handle slide in - slide out activation and deactivation
> DASware control Software for advanced process control
> Compatible with DASware Software Suite for interconnectivity and bioprocess information management
»Discover our newest vessel, optimized for slow stirring and aggregate formation«

> Designed in collaboration with our customers
> Especially developed for stem cell process development
> 8-blade impeller ensures gentle mixing of your cell culture
> Reduced cell settling and very good mixing already at low rpm reduce the stress for your stem cells
> Improved DO-cap with chamfer corners and reduced overall diameter to reduce cell sedimentation on the cap
> C-flex tubing allowing for welding connection
> optical pH option for non-invasive pH-measurements

»My experiments just won’t work, and I don’t know why?«
»My processes are running fine, but I am afraid that scaling-up is too challenging.«

»Benefit from our renowned polymer expertise and switch to BioBLU® Single-Use Vessels.«

> Single-use solutions for small, bench and pilot-scale cell culture applications
> The rigid-walled, stirred-tank design eliminates the potential for tears, pits, and folds during installation and provides many advantages over single-use bag design
> The single-layer polymer design mitigates issues related to leachables and extractables
> Technical and material documentation available to support your process validation activities
> Reduced validation costs for cleaning and sterilization
> Optional: Built-in optical pH sensor technology for BioBLU 0.3c – 50c
»Step-by-step increase your working volume with our BioFlo® 320 Control Station.«

> Extensive working range of 250 mL - 40 L on a single control platform.
> Interchangeable autoclavable and BioBLU Single-Use Vessels.
> Integrated Mettler Toledo® Intelligent Sensor Management (ISM®) platform.
> Control up to eight systems from a single-user interface.
> Field-upgradable TMFC drawers for sparge and overlay gas.
> Enhanced software package with new cascade and time profile features.
> Built-in optical pH sensing technology for use with the BioBLU Single-Use Vessels.
> Ethernet communication for multi-unit control, Eppendorf SCADA software, and IP addressing.
> Up to six integrated pumps capable of operating in variable speed mode.
> Eight independently controlled process gas supplies.
> Validation packages available for GMP regulated processes.

»I am afraid of cross-contamination between individual runs.«
<table>
<thead>
<tr>
<th></th>
<th>DASbox® Mini Bioreactor System</th>
<th>Small Scale Parallel Bioreactor Systems</th>
<th>Bench Scale Parallel Bioreactor Systems</th>
<th>BioFlo® 120</th>
<th>BioFlo® 320</th>
<th>CelliGen® 510</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working volume range¹</td>
<td>100³ - 250 mL</td>
<td>0.2 - 1.8 L</td>
<td>0.7 - 3.8 L</td>
<td>0.25 - 40 L</td>
<td>0.25 - 40 L</td>
<td>10.75 - 32 L</td>
</tr>
<tr>
<td>Single-use vessels</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glass vessels,</td>
<td>•</td>
<td></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>autoclavable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stainless-steel vessels,</td>
<td>•</td>
<td></td>
<td></td>
<td>•</td>
<td></td>
<td>•</td>
</tr>
<tr>
<td>SIP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interchangeable vessels</td>
<td>•</td>
<td></td>
<td></td>
<td>•</td>
<td></td>
<td>•</td>
</tr>
<tr>
<td>Bacteria/yeasts/fungi</td>
<td>•</td>
<td></td>
<td></td>
<td>•</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plant cells/algae</td>
<td>•</td>
<td></td>
<td></td>
<td>•</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mammalian/animal cells</td>
<td>•</td>
<td></td>
<td></td>
<td>•</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stem cells</td>
<td>•</td>
<td></td>
<td></td>
<td>•</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insect cells</td>
<td>•</td>
<td></td>
<td></td>
<td>•</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of parallel units</td>
<td>Up to 24</td>
<td>Up to 16</td>
<td>Up to 16</td>
<td>Up to 8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controller²</td>
<td>DWC</td>
<td>DWC</td>
<td>DWC</td>
<td>BCS</td>
<td>BCS</td>
<td>RPC/PLC</td>
</tr>
<tr>
<td>Touchscreen controller</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BioCommand®</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DASware®</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas mixing options</td>
<td>4 gas</td>
<td>4 gas</td>
<td>4 gas</td>
<td>4 gas</td>
<td>4 gas</td>
<td>4 gas</td>
</tr>
<tr>
<td>(air, N₂, O₂, CO₂)</td>
<td></td>
<td>(air, N₂, O₂, CO₂)</td>
<td>(air, N₂, O₂, CO₂)</td>
<td>(air, N₂, O₂, CO₂)</td>
<td>(air, N₂, O₂, CO₂)</td>
<td>(air, N₂, O₂, CO₂)</td>
</tr>
<tr>
<td>Gas flow control¹</td>
<td>TMFC</td>
<td>R or TMFC</td>
<td>R or TMFC</td>
<td>R or TMFC</td>
<td>TMFC</td>
<td>TMFC</td>
</tr>
<tr>
<td>Exhaust analysis</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optical density</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td></td>
<td></td>
</tr>
<tr>
<td>measurement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Validation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ Realized using multiple vessels
² Controllers: DWC=DASware control, RPC=Reactor Process Controller, BCS=BioFlo Control Software, PLC=Programmable Logic Controller
³ Gas Flow Controllers: R=Rotameter, TMFC=Thermal Mass Flow Controller
⁴ OD measurement possible via third-party equipment
⁵ min working volume of 60 mL for single-use vessels with Rushton impeller
# Eppendorf Bioprocess Software — Much More Than Just Bioprocess Control

Eppendorf offers BioCommand®, DASware® control Supervisory Control and Data Acquisition (SCADA) software packages for advanced bioprocess control. The comprehensive DASware software suite provides next-generation bioprocess management.

## DASware software suite

### Next-generation bioprocess management

A suite of smart and flexible software solutions to accelerate bioprocess development, with DASware control for parallel bioprocess control. The DASware licences enable interconnectivity of bioreactors with external lab-devices, comprehensive data- and information management, Design of Experiments (DoE) and remote control of bioprocesses. DASware can be used with any Eppendorf benchtop bioreactor solution.

<table>
<thead>
<tr>
<th>DASware control</th>
<th>DASware connect</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; Advanced process monitoring, control, and data logging - for parallel cultivation with individual control of each bioreactor</td>
<td>&gt; Integration into process control systems and legacy corporate historians facilitating company-wide access to all relevant bioprocess data</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DASware access</th>
<th>DASware design</th>
<th>DASware discover</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; Remote monitoring and control of bioprocesses via PC, Notebook and Netbook or with the DASGIP iApp via iPhone®, iPod touch® and iPad®</td>
<td>&gt; Applies the Design of Experiments (DoE) concept via a full factorial DoE builder or by importing DoE designs from third-party DoE tools</td>
<td>&gt; A comprehensive and user-friendly information management solution for bioprocessing</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DASware analyze</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; Seamless integration of external lab devices to the bioreactor allows for process automation and feedback control loops</td>
</tr>
</tbody>
</table>