Accelerate your mammalian cell culture research

CellXpert® CS220 CO$_2$ Incubator Shaker

Discover the new large capacity CO$_2$ Incubator Shaker from Eppendorf
Do you want to accelerate your research while minimizing the risk of costly delays for your mammalian suspension cultures? Discover the only CO$_2$ incubator shaker in the market with an integrated 180 °C sterilization and an outstanding capacity-to-footprint ratio. Learn more about the cost- and time-saving features that will help your team remain focused on the tasks critical to your success.

Improved contamination protection
> Seamless stainless-steel chamber with few internal parts–no crevices, cables, or heating fins for contaminants to hide
> Integrated 180 °C chamber sterilization routine
> Hygienic design according to EN ISO 14159:2008 standard

More flasks, less space
> For plates, tubes and shake flasks up to 8x 5 L Corning®/ Thomson Optimum Growth®, 25x 1 L, 42x 500 mL, or 102x 125 mL Erlenmeyer flasks (on sticky pads)
> Up to 40 % higher flask capacity and highest platform size to footprint ratio

Main applications
> Expansion of mammalian cells in suspension (CHO or HEK293) for:
  - protein expression
  - screening
  - early process development
  - bioreactor inoculum prep
  - viral vector production (e.g., AAV, LV, Ad)
> MSC/iPSC-cultivation in normoxic conditions

eppendorf
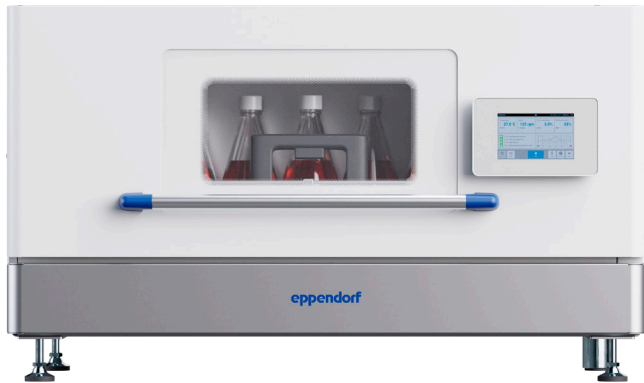
Integrated 2 h 180 °C sterilization routine & downloadable protocol
Since UV decontamination of surfaces and airstream is locally restricted, contamination risks remain. The CellXpert CS220 is the first shaker to apply the high contamination protection standards of cell cultivation in CO_2 incubators. All chamber components and the platform are included in the sterilization routine.

Reliability 24/7 over years
The Eppendorf X-Drive with four weight-supporting shafts is made for 24/7, vibration-free shaking of high loads over years. A global network of Eppendorf service technicians for preventative maintenance agreements ensure consistent instrument performance and peace of mind.

Complete control & remote monitoring
The touch display ensures easy device control and visual overviews of data and events (temperature, CO_2, rpm, rH, door openings, alarms). Use remote monitoring, instant alert notifications, and maintenance management functions of VisioNize® Lab Suite to grow at ease. Connect up to 3 devices for free.

Fast and easy experiment setup and cleaning
The space-saving door glides up and out of your way to ensure easy vessel loading onto the slide-out platform. The platform is locked and unlocked simply by the platform handle. In addition, the slide-out subplatform can be removed easily for full access and cleaning of the chamber bottom.

Technical specifications

Power supply	100 V – 127 V ±10 %, 50 Hz – 60 Hz
	220 V – 240 V ±10 %, 50 Hz – 60 Hz
Orbit options	20 - 300 rpm with 2.54 cm (1 in) orbit, 20 - 250 rpm with 5.1 cm (2 in) orbit
Capacity & maximum flask size, sticky pads on universal platform	8x 5 L Corning® & Thomson Optimum Growth® (max. flask size), 25x 1 L Erlenmeyer flasks, 42x 500 mL Erlenmeyer flasks, 102x 125 mL Erlenmeyer flasks
Temperature range	8 °C above ambient temperature – 60 °C
CO_2 range	0.1 %–20 % CO_2
Relative humidity range	Active bidirectional humidity control up to 85 % relative humidity, non-condensing
Installation options	Single unit on base or high feet; Double-stack on low feet or high feet; Triple-stack on low feet or high feet
Height of base and feet	Base: 65.7 cm (25.9 in); Low feet: 2 cm (0.8 in); High feet: 9.5 cm (3.7 in)

Dimensions external	Height, door closed	Height, door open	Width*	Depth**
Single unit on base	133.0 cm (52.4 in)	178.5 cm (70.3 in)	131.8 cm (51.9 in)	83.8 cm (33.0 in)
Single unit on high feet	77.3 cm (30.4 in)	122.8 cm (48.3 in)	131.8 cm (51.9 in)	80.5 cm (31.7 in)
Triple-stack on low feet	202.4 cm (79.7 in)	247.9 cm (97.6 in)	131.8 cm (51.9 in)	80.5 cm (31.7 in)
Weight	237 kg (522.5 lbs) (without accessories and feet/base)			
Data interface	BMS-relays, USB 2.0, Ethernet, Access port, VisioNize® Lab Suite			

* leave 20 cm (7.9 in) to each side for ventilation and water tank installation
** add 43 cm (16.9 in) for platform clearance, leave 10 cm (3.94 in) to the rear for ventilation

Looking for *Service Agreements* including annual full preventive maintenance or IQ/OQ GxP qualification services?
Achieve reliable culturing results and optimized instrument performance with regular professional instrument services!
For more information go to: www.eppendorf.com/service

Your local distributor: www.eppendorf.com/contact
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www.eppendorf.com/cellxpert-cs220

Hands-Free Sampling
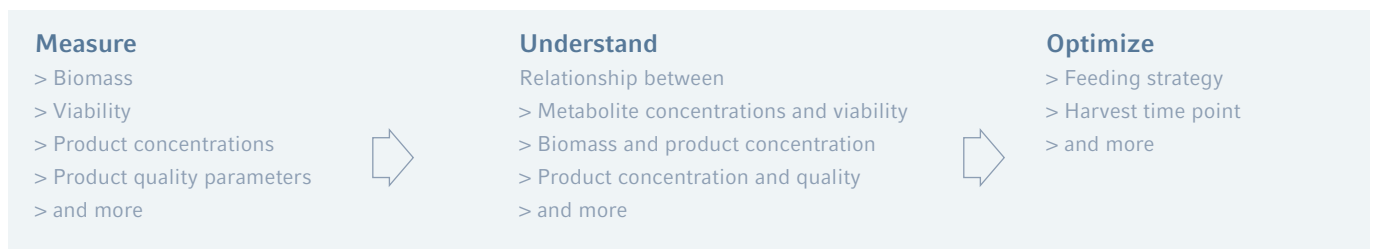
Delegate bioprocess sampling

Gain Better Bioprocess Data with Less Effort

The Bioprocess Autosampler takes manual work off your hands

You often need to sample your culture during the bioprocess, not just at the end. These samples help you monitor growth, product formation, and nutrient consumption. This way, you can identify interdependencies and take action at predefined times or specific events, like DO rising after carbon source depletion. The Bioprocess Autosampler from Eppendorf provides this solution to you. Whether you are working in cell culture or fermentation, in early R&D or process development, and using single-use or glass bioreactors, this system covers it all. The Bioprocess Autosampler can handle sampling and bolus addition at short, regular intervals, helping you gain complete datasets and automate bioprocess control.

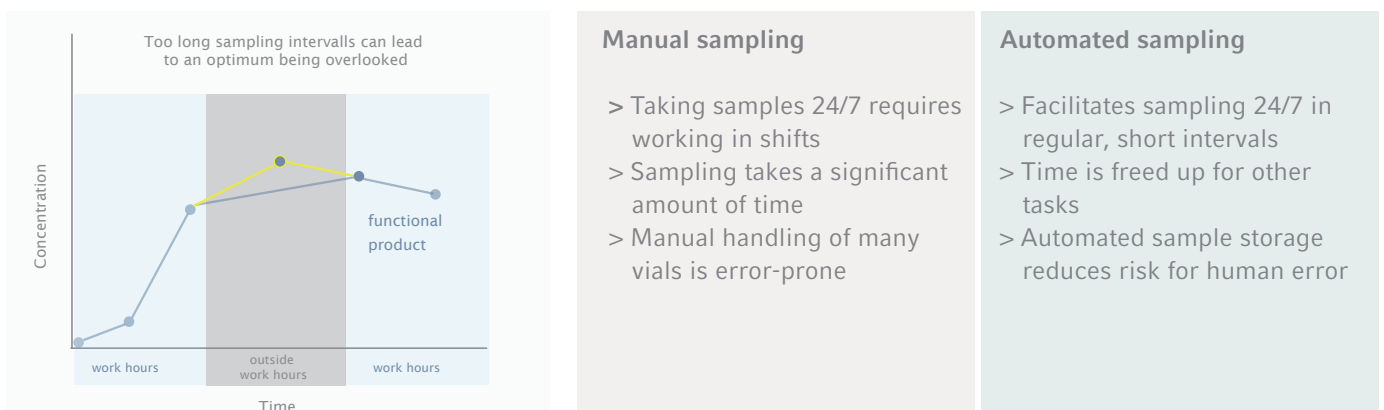**Bioprocess data is a prerequisite for process optimization**
Obtaining bioprocess data is the first step towards discovering interdependencies between process parameters and using this knowledge to optimize the outcome of your process.

Measure	Understand	Optimize
> Biomass	Relationship between	> Feeding strategy
> Viability	> Metabolite concentrations and viability	> Harvest time point
> Product concentrations	> Biomass and product concentration	> and more
> Product quality parameters	> Product concentration and quality	
> and more	> and more	

The advantages of automated sampling

Short and regular sampling intervals help obtaining strong datasets
Regular measurement of process parameters, the cells' status, and the concentration and quality of the product is the basis for a comprehensive view on the process. Such information is indispensable for process optimization.

Too long sampling intervalls can lead to an optimum being overlooked

Manual sampling

> Taking samples 24/7 requires working in shifts
> Sampling takes a significant amount of time
> Manual handling of many vials is error-prone

Automated sampling

> Facilitates sampling 24/7 in regular, short intervals
> Time is freed up for other tasks
> Automated sample storage reduces risk for human error

Efficiency

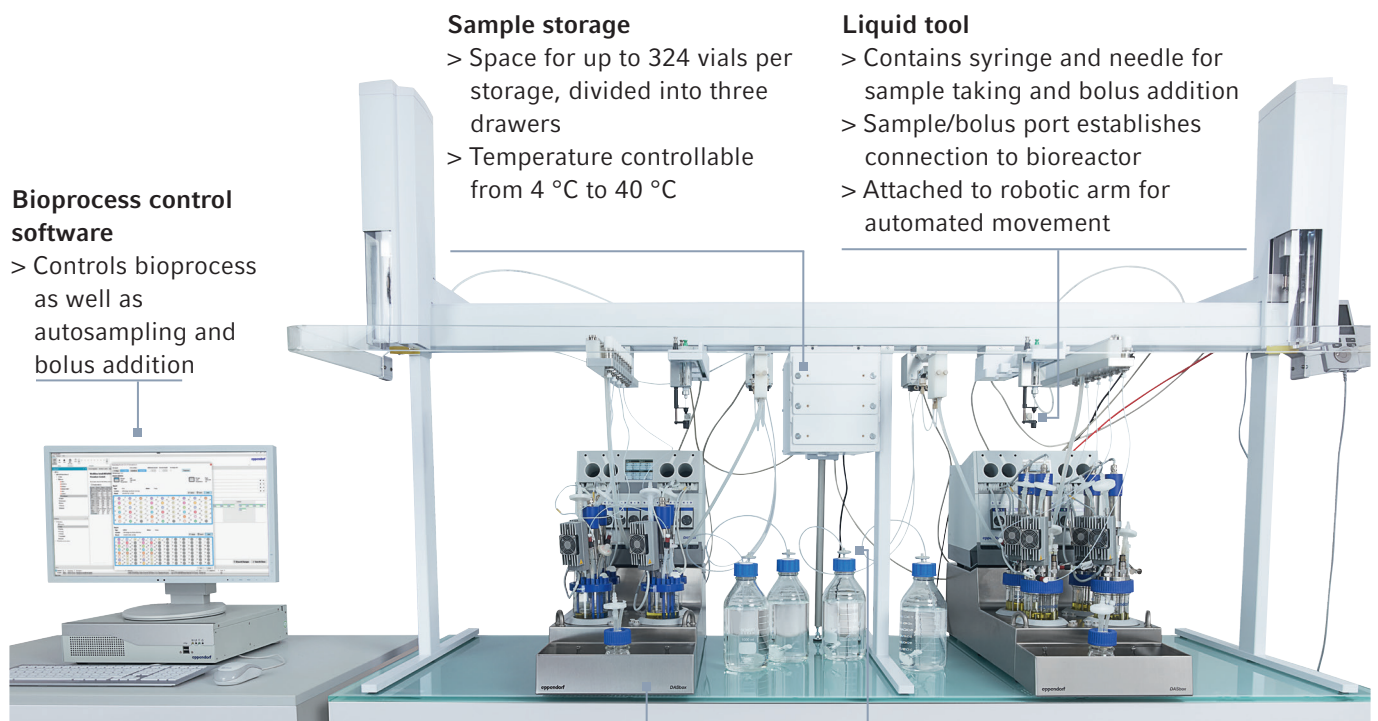**Automated bioprocess sampling made easy**

The Bioprocess Autosampler from Eppendorf takes samples from multiple bioreactors and stores them tempered for later analysis. It is compatible with glass and single-use bioreactors operated with a DASbox® Mini Bioreactor System, DASGIP® Parallel Bioreactor System, SciVario® twin or BioFlo® 320 bioreactor control system.

Autosampling at a glance

The Bioprocess Autosampler draws a sample from a bioreactor and transfers it to a predefined sample vial, which is stored in a tempered environment. The sampling device is automatically cleaned, so that the Bioprocess Autosampler is ready for the next sampling step.

Key features

> Enables regular and process-triggered automated sampling and bolus addition 24/7
> Saves space, because no sterile hood is necessary for operation
> Keeps you flexible, because it is compatible with differently sized single-use and glass bioreactors

Sample storage
> Space for up to 324 vials per storage, divided into three drawers
> Temperature controllable from 4 °C to 40 °C

Liquid tool
> Contains syringe and needle for sample taking and bolus addition
> Sample/bolus port establishes connection to bioreactor
> Attached to robotic arm for automated movement

Bioprocess control software
> Controls bioprocess as well as autosampling and bolus addition

Bioreactor control system
> The Bioprocess Autosampler is compatible with the DASbox Mini Bioreactor System, DASGIP Parallel Bioreactor Systems, SciVario twin and BioFlo 320

Bottle connection
> Access to cleaning solutions and waste for automated cleaning of needles and syringes
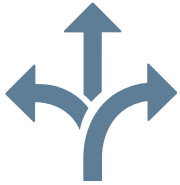
Flexibility

Adapt your sampling strategy to your needs

Save space, save your culture, stay flexible: The Bioprocess Autosampler from Eppendorf was designed to minimize the contamination risk during sampling while eliminating the need for working in a laminar flow cabinet. Sample size and sampling speed are variable to suit your individual needs.

Sampling procedure
> The Bioprocess Autosampler holds one sampling port per bioreactor
> Tubing connects the sampling port with a dip tube in the bioreactor
> Sampling ports harbor a septum, which preserves the sterility of the bioreactor
> For sampling, a needle connected to a syringe is automatically inserted into the port, pinching through the septum
> The sample is transferred to a sampling vial by pinching through a septum in the vial lid

Flexible sampling

> 1.5 mL and 10 mL sample vials can be used
> Sample volumes of 1.5 mL and 5 mL can be selected
> Compatible with differently-sized glass and single-use bioreactors with working volumes of 60 mL to 10 L

Aseptic operation

> Aseptic operation without the use of a laminar flow cabinet
> Sanitation procedure using ethanol is similar to procedures which are usually applied when sampling manually
> For additional safety, an air curtain surrounding the needle can be added as an option

Space-saving and easy to install

> Modular design that facilitates expansion of the number of bioreactors to be sampled and retrofitting of existing bioprocess systems
> Space-saving design mounted on the lab bench

Efficient sampling

> Low dead volume minimizes the reduction of culture volume
> High sampling speed
> Dual arm option for even higher sampling speed

Ease-of-Use

Autosampling and bioprocess control combined in the same software package

The Bioprocess Autosampler from Eppendorf is seamlessly integrated into DASware® control bioprocess control software. Like this, there is no need to familiarize yourself with an additional software product. Sampling schemes can be adapted easily and the location of the sampling vials in the fraction cooler can be precisely defined.
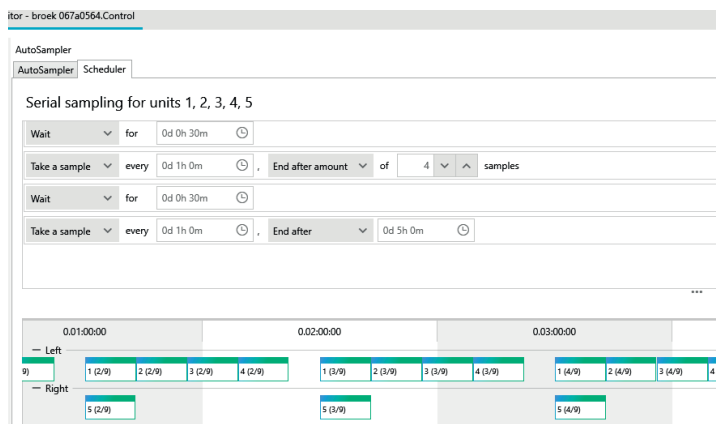
Define your sampling scheme in DASware control software
> Define sample intervals and sampling volume
> Predefine positions of vials in the sample storage
> Either serial sampling, where each sample is taken with the same syringe tool. After sampling a wash step is performed to prevent cross-contamination
> Or clustered sampling, where one syringe tool is used per bioreactor to ensure there is no cross-contamination*

* For cell culture applications, only clustered sampling is available
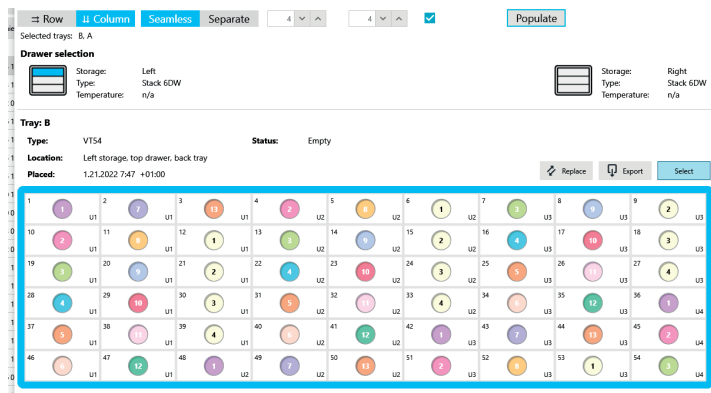
Flexibility
> Add samples to the sampling scheme during the run
> Include offline samples during the planning phase: Predefine storage location of offline samples and use process data obtained from them in addition to data from samples taken by the Bioprocess Autosampler

Example: Sampling from an *E. coli* fermentation process

> 8 bioreactors
> 8 sampling time points
> Each sample split up to 4 vials for further analysis

> 256 vials to be handled
Pre-defining their storage location and automizing the placement of the vials reduced the risk of mixing up samples.

Learn more in our application note
www.eppendorf.group/autosampler-application

Future-Proof

Autosampling from various bioreactor types and sizes

The Bioprocess Autosampler from Eppendorf is compatible with various glass and single-use bioreactors at small and bench scale and existing bioprocess systems can be retrofitted. Like this, the Bioprocess Autosampler adapts to changing requirements regarding working volume and bioreactor type.

Compatible bioprocess control systems
The Bioprocess Autosampler can be installed with new as well as retrofitted to existing bioreactor control systems.

DASbox® Mini Bioreactor System
> Compatible with glass and single-use bioreactors
> Working volume: 60 – 250 mL
> Autosampling of up to 16 bioreactors
> Visit www.eppendorf.group/dasbox-system for more
  information

DASGIP® Parallel Bioreactor System
> Compatible with glass and single-use bioreactors
> Working volume: 200 mL – 1.8 L
> Autosampling of up to 16 bioreactors
> Visit www.eppendorf.group/dasgip-system for more
  information

SciVario® twin
> Compatible with glass and single-use bioreactors
> Working volume: 200 mL – 10 L
> Autosampling of up to 8 bioreactors, controlled with up
  to 4 control stations
> Visit www.eppendorf.group/scivario-system for more
  information

BioFlo® 320
> Compatible with glass and single-use bioreactors
> Working volume: 320 mL – 10.5 L
> Autosampling of up to 4 bioreactors, controlled with up
  to 4 control stations,
> Visit www.eppendorf.group/bioflo320-system for more
  information

Technical Data

Bioprocess Autosampler specifications

Bioprocess Autosampler system	Single head	Dual head
Dimensions (W x D x H)	1768 x 795 x 1400 mm	2168 x 795 x 1400 mm
Net weight	45 kg (excluding bioprocess control system and PC)	65 kg (excluding bioprocess control system and PC)
Utility		
Electrical	100–240 VAC, 50/60 Hz	
Bioprocess Autosampler configurations	single or dual head system	
Sample storage	1 or 2 cooled sample storages (3 sample storage drawers per unit)	
Temperature range of sample storage	4–40 °C	
Available sample racks	For 1.5 mL vials (54 vials per rack, 2 racks per drawer) For 10 mL vials (15 vials per rack, 2 racks per drawer)	

Sampling time (per sample)[1]	1.5 mL samples	5.0 mL samples
Microbial applications		
Serial sampling	12.5 min	15 min
Clustered sampling with washing step	19 min	20 min
Clustered sampling without washing step	5 min	7.5 min
Cell culture applications		
Clustered sampling with washing step	25 min	28 min
Clustered sampling without washing step	5 min	7.5 min
Software	Minimal requirement: DASware® control 6.5; includes sampling planning module	

Specifications subject to change.

[1] approximate values at a sample rate of 50 µL/second

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Most Compact

DASbox® Mini Bioreactor System for cell culture and microbiology
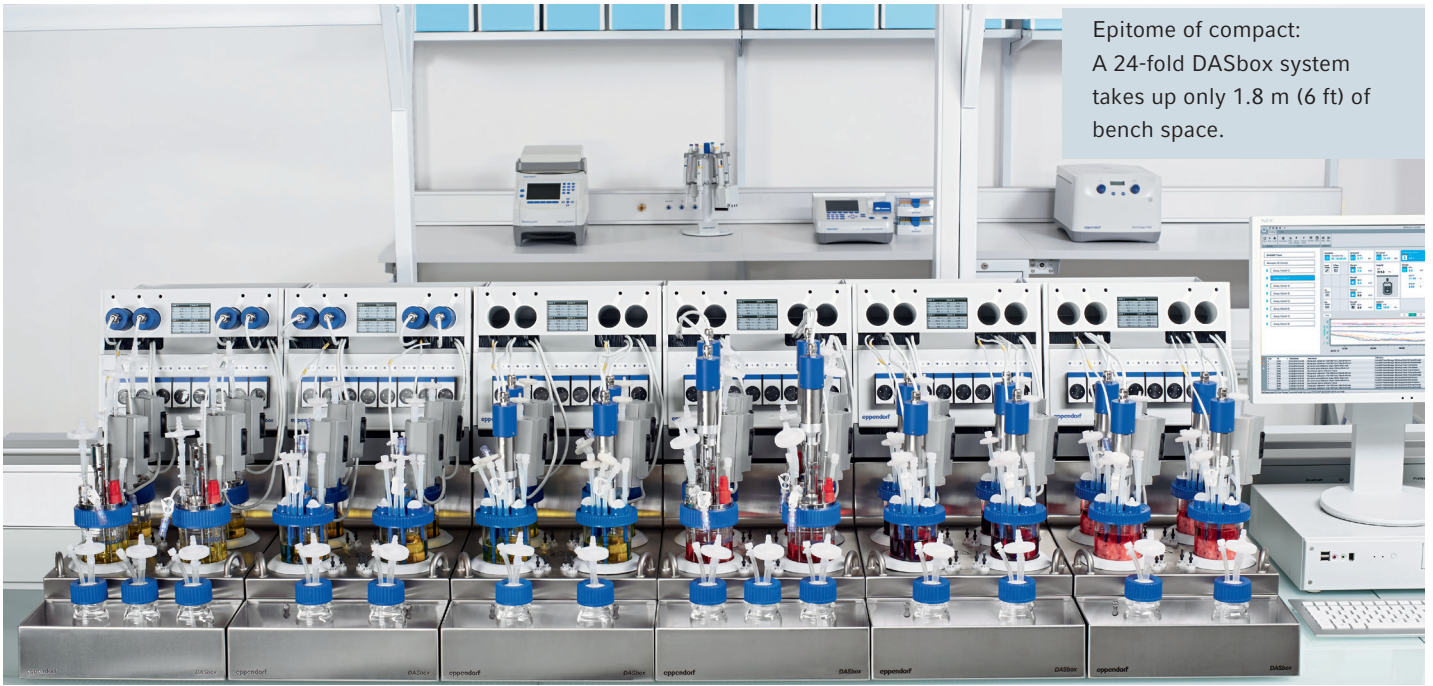
Parallel Process Development

Parallel operation to shorten your time-to-market
The smart design of the Eppendorf DASbox makes the 4-fold units ideal for parallel processing of up to 24 bioreactors. Together with the DASware® software solutions, the DASbox supports process development following the Quality by Design (QbD) approach by providing comprehensive information management, integration of third-party analyzers, and Design of Experiments (DoE) tools as well as remote access.

Compact design and small working volumes save lab space and valuable resources
Lab space is critical: The DASbox requires only 7.5 cm (3 in) of bench space per bioreactor maximizing use of lab space while being expandable in 4-fold unit increments to increase capacity as needed. Small working volumes of 60 – 250 mL make it a perfect fit for clone/cell line screening, media optimization and small scale process development.

One solution for all: fermentation and cell culture
Suitable for microbiology and cell culture, the DASbox features advanced process control and precise monitoring of all critical process parameters.

DASbox® single-use solutions: the BioBLU® 0.3
The Eppendorf BioBLU 0.3 Single-Use Bioreactors for use with the DASbox offer a proven rigid-walled single-use bioreactor portfolio—with vessels for cell culture and microbial applications, including high cell density fermentation and cultivation of stem cells.

As the smallest member of the BioBLU Single-Use Bioreactor family the BioBLU 0.3 allows for scalability from 65 mL up to 40 L working volume.

| BioBLU 0.3c | BioBLU 0.3f | BioBLU 0.3sc |
| for cell culture | for microbiology | for stem cells |

	Autoclavable glass bioreactors	BioBLU 0.3 Single-Use Bioreactor
Fermentation	■	■
Suspension cells	■	■
Stem cells	■	■

Watch our video:
www.eppendorf.com/dasbox-video

Small, but powerful.

LC Color Display
All vessels and parameters at
a glance.

**Integrated Feeding and
Monitoring**
Variable speed pumps and
standard pH and DO sensors
(redox or level options and
optical pH sensors available)

**Advanced Temperature
Control**
Liquid-free temperature
control unit for easy handling

TMFC Gassing
Integrated mass flow-
controlled gas mixing system
for continuous mixing of air,
N_2, O_2 and CO_2

Technical data

	DASbox® Mini Bioreactor System for Cell Culture	DASbox® Mini Bioreactor System for Microbiology
Parallel bioreactors	up to 24	up to 24
Software	DASware control, other DASware optional	DASware control, other DASware optional
Vessels	Glass and single-use vessels	Glass and single-use vessels
Working volumes	60 – 250 mL (glass)/100 mL – 250 mL (single-use)	60 – 250 mL (glass)/65 – 250 mL (single-use)
Drive	Overhead drive	Overhead drive
Impellers	Marine (glass)/pitched blade (single-use)/8-blade (glass, single-use)	Rushton-type
Agitation speed ranges	20 – 2,500 rpm (glass)/ 20 – 500 rpm (single-use, pitched blade impeller)/ 20 – 200 rpm (single-use, 8-blade impeller)	20 – 2,500 rpm (glass)/20 – 2,000 rpm (single-use)
Temperature control	Liquid-free heating and cooling (Peltier)	Liquid-free heating and cooling (Peltier)
Standard temperature range	10 – 60°C at 25°C RT	10 – 60°C at 25°C RT
Feeding lines per vessel	2 (standard)/4 (optional)	2 (standard)/4 (optional)
Standard feed rates (depending on tube diameter)	0.3 – 9.5 mL/h to 13 – 420 mL/h	0.3 – 9.5 mL/h to 13 – 420 mL/h
Gas flow control	TMFC; overlay and/or sparger	TMFC
Standard gas mixing	Air, N_2, O_2 and/or CO_2	Air, N_2, O_2 and/or CO_2
Standard gas flow rates	0.04 – 5 sL/h, 0.04 – 3.5 sL/h CO_2	0.2 – 25 sL/h, 0.2 – 18 sL/h CO_2
pH control	CO_2/base, and other set-ups	Acid and/or base, and other set-ups
DO control	Cascade (O_2 concentration, gas flow rate) and other set-ups	Cascade (agitation speed, O_2 concentration, gas flow rate), and other set-ups
ORP (redox) measurement	-	Optional (select redox or level)
Level/foam	Optional	Optional (select redox or level)
OD measurement	Optional (DASGIP OD4)	Optional (DASGIP OD4)
Exhaust condensation	Liquid-free (Peltier)	Liquid-free (Peltier)
Exhaust analysis	-	Optional (DASGIP GA4)

Specifications are subject to change without notice

Ordering information

Description	Order no. (system with glass vessels)	Order no. (system for single-use vessels)
DASbox® Mini Bioreactor System for Cell Culture Applications, max. 5 sL/h gassing		
4-fold system	76DX04CC	76DX04CCSU
8 fold system	76DX08CC	76DX08CCSU
16-fold system	76DX16CC	76DX16CCSU
24-fold system	76DX24CC	76DX24CCSU
DASbox® Mini Bioreactor System for Microbial Applications, max. 25 sL/h gassing		
4-fold system	76DX04MB	76DX04MBSU
8-fold system	76DX08MB	76DX08MBSU
16-fold system	76DX16MB	76DX16MBSU
24-fold system	76DX24MB	76DX24MBSU
BioBLU® 0.3c Single-Use Bioreactor, cell culture, 1 pitched-blade impeller, sterile, 4-pack		1386100000
BioBLU® 0.3c Single-Use Bioreactor, cell culture, 1 pitched-blade impeller, optical pH, sterile, 4-pack		1386100200
BioBLU® 0.3f Single-Use Bioreactor, fermentation, 2 Rushton-type impellers, sterile, 4-pack		1386100100
BioBLU® 0.3sc Single-Use Bioreactor, cell culture, 8 blade impeller, optical pH, sterile, 4-pack		1386100600

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