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Product Datasheet

# Ambr® 250 High Throughput Generation 2

## The Industry Standard High Throughput Bioreactor System, Optimized for Process Characterization

## Product Information

The Ambr® 250 High Throughput Generation 2 is a multi-parallel bioreactor system that accelerates process development and characterization timelines and reduces costs. The platform includes a fully continuous gas supply system, matching large-scale bioreactors and optimizing scale-down models. Integrated analytics options, including capacitance-based BioPAT® Viamass, support diverse feedback control.

The powerful, flexible control software streamlines user workflows and supports data integrity requirements. Embedded cameras facilitate system monitoring, user interactions, and process robustness.

## Features and Benefits

- Automated workstation with liquid handler for up to 24 single-use 250 mL bioreactor vessels
- Continuous gassing matches larger scales and improves process control
- Many analytical options, including BioPAT® Viamass
- User-friendly interface with enhanced data integrity
- Integrated cameras improve user interactions and system robustness

# Introduction

The Ambr® 250 High Throughput Generation 2 is an automated, high-throughput bioreactor system designed to streamline bioprocess development and optimization. Supporting both cell culture and microbial fermentation applications, it enables efficient process characterization, clone selection, and media development. With its advanced parallel processing capabilities, the system facilitates scale-down model development, fed-batch and perfusion studies, and comprehensive design of experiments (DoE) in a single run—helping you accelerate workflows and drive innovation in bioprocessing.

## Relevant Applications

- Bioreactor design of experiments studies in a single run
- Fed-batch cell culture
- Perfusion cell cultures
- Suspension, microcarrier, and cell aggregate cultures
- Microbial fermentation

## Relevant Process Steps

- Scale-down model development and qualification
- Early- and late-stage process development
- Process characterization studies
- Clone or strain screening and selection
- Media development

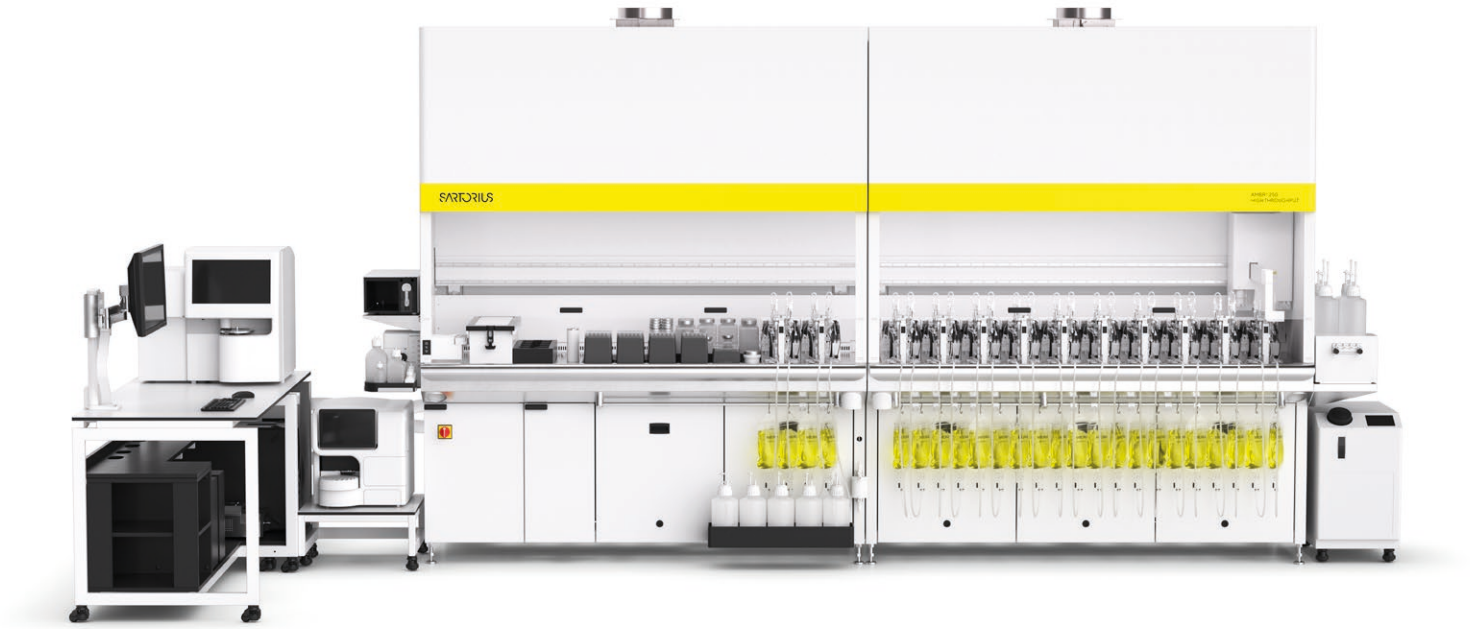
## System Overview

The Ambr® 250 High Throughput Generation 2 is a comprehensive solution that includes the main workstation with various process and analytical options, a system control PC with dedicated software, and a choice of single-use bioreactor vessels and other consumables.

**Software**
The flexible and powerful control software has been optimized to streamline user workflows and provide an intuitive user experience. The user interface retains the same core functionality as the first-generation solution and includes new features, including a new Help Center and support for data integrity requirements.

**Process Options**
The system supports diverse process options, including perfusion cell culture, a freezer for pipetted samples, automated cleaning of reagent pump lines and used pipette tips, plus a chiller to support system cooling requirements.

**Analytical Options**
Analytical capabilities include embedded online monitoring of various parameters in the bioreactor vessels and exit gas lines, plus integration of third-party cell culture analyzers for cell counting and metabolite analysis. For details see the **Ambr® brochure Integrated Cell Culture Analyzers.**



# Single-Use Bioreactor Vessels

The bioreactor vessels are designed to be easy-connect and are available for a wide range of applications. They are available in configurations with either baffled dual 20 mm pitch-blade (mammalian) or Rushton (microbial) impellers or unbaffled with a single elephant-ear pitched-blade impeller. Perfusion vessels come equipped with a microsparger, pressure sensors, pump chambers, and tubing for either tangential flow filtration (TFF) or alternating tangential flow (ATF) filtration. All vessels include feed lines, a dissolved oxygen sensor, and a pH probe. Some vessel variants are available with additional single-use sensors for direct monitoring within the bioreactor—for further information, see the **Ambr® 250 High Throughput brochure Consumables and Accessories.**

Ambr® 250 High Throughput Mammalian vessel with dual pitch-blade impeller


Ambr® 250 High Throughput perfusion TFF vessel with 0.2 µm filter

# Technical Specifications

| Operating Parameter | Specification |
|---|---|
| Agitation speed | 100 – 4,500 rpm |
| Culture temperature | 18 – 65 °C ± 0.5 °C |
| Post-culture period chilling | 6 – 8 °C |
| Temperature shift rate | ≥ 5 °C per 30 mins |
| pH range | 2.0 – 8.5 |
| pH monitoring accuracy | ± 0.02 pH units |
| DO (% air saturation) monitoring range | 0 – 200% |
| DO monitoring accuracy | ± 2% @ 100% |
| $pCO_2$ monitoring range | 15 – 200 mmHg |
| $pCO_2$ monitoring accuracy | ± 10% or 10 mmHg after 1pt calibration |
| BioPAT® Viamass monitoring range | 0–400 pF/cm |
| Cell culture gas configuration | Air/$N_2$, $O_2$, and $CO_2$ |
| Microbial gas configuration | Air, $N_2$, and $O_2$ |
| Maximum sparged gas flow (total) | 750 mL/min |
| Maximum headspace gas flow (per gas and total) | 60 mL/min |
| Gas flow monitoring accuracy | ± 5% @ > 50 mL/min |
| Exhaust gas $CO_2$ monitoring | 0 – 20% |
| Exhaust gas $CO_2$ monitoring accuracy | ± 5% @ 5% $CO_2$ |
| Exhaust gas $O_2$ monitoring | 0 – 50% |
| Exhaust gas $O_2$ monitoring accuracy | ± 2% @ 21% $CO_2$ |
| Dispense pump flow rate with in-line filters | 0 – 10 mL/min (viscosity dependent) |
| Dispense pump flow rate (without in-line filters) | 0 – 100 mL/min (except antifoam, viscosity dependent) |
| Dispense pump flow rate accuracy | ± 5% @ 20 µL/hr |
| Dispense pump volume accuracy | ± 5% > 10 µL |
| Independent pumps per vessel | 4 (perfusion option: 3 for feeding, 1 for permeate) |
| 1 mL tip sample volume per aspirate | 30 – 950 µL (at > 170 mL working volume, if from bioreactor) |
| 10 mL tip sample volume per aspirate | 0.5 – 9.5 mL |
| Chilled sample temperature control | 4 – 8 °C or ambient |
| Frozen temperature control | –20 °C |

| Bioreactor Vessels | Specification |
|---|---|
| Construction material | Polycarbonate, polypropylene, polyethylene |
| Dimensions | 60 mm internal diameter, 120 mm internal height |
| Total volume | 350 mL |
| Working volume | 100 – 250 mL |

| Bioreactor Parameters | Cell Culture | Perfusion | Microbial |
|---|---|---|---|
| Baffles | 4 (or 0) | 4 | 4 |
| Number of impellers | 2 (or 1) | 2 | 2 |
| Impeller type | Pitched-blade (or elephant-ear) | Pitched-blade | Rushton |
| Impeller diameter | 26 mm (or 30 mm) | 26 mm | 20 mm |

| Perfusion Parameters | Specification |
|---|---|
| Crossflow rate range | 0 – 100 mL/min |
| Flow path smallest ID | 2.0 mm |
| Crossflow pump stroke volume | 10 mL |
| Perfusion crossflow loop working volume | 7 – 17 mL ATF \| 23 mL TFF |
| Bioreactor working volume (with bleed to level) | 210 mL |
| Permeate flow rate | 0.1 – 4.0 VVD |
| Automated bleed volume | 5 mL per bleed |

# Ordering Information

| System \| Option \| Field Upgrade | 12-Way System | 24-Way System |
|---|---|---|
| Ambr® 250 High Throughput system package | 001-8G101-P | 001-8G102-P |
| Ambr® 250 High Throughput integrated analytics furniture. A set of laboratory benches tailored for Ambr® 250 High Throughput control PC, monitor, and integrated third-party analyzers | 001-8G130 | 001-8G130 |
| Online BioPAT® Viamass (capacitance) option for a new Ambr® 250 High Throughput system. For use with BioPAT® Viamass enabled vessels in cell culture applications | 001-8G105-P | 001-8G106-P |
| Ambr® 250 High Throughput Perfusion. Optional capability to support perfusion cell culture using fully integrated single-use perfusion bioreactors | 001-8G23-P | 001-8G24-P |
| Online $pCO_2$ measurement. Enables real-time continuous monitoring of cell culture $pCO_2$ | 001-8G103 | 001-8G104 |
| Integrated exhaust gas analysis (exit gas $O_2$ and $CO_2$ sensors) | 001-8G03 | 001-8G04 |
| Online biomass measurement. Real-time continuous growth monitoring for microbial processes | 001-8G80 | 001-8G81 |
| Integrated external analyzers*: Ambr® Analysis Module for pH and BioPAT® Spectro, Beckman Coulter Vi-CELL BLU, Roche Cedex HiRes, Nova Biomedical BioProfile® FLEX2 | — | — |
| AutoCIP module. Fully automates reagent switching during the pump clean-in-place cycle, reducing hands-on time | 001-8G70 | 001-8G70 |
| On-deck sample freezer. Enables the user to freeze and control sample temperature from –20 °C to ambient | 001-8G06 | 001-8G06 |
| Self-contained chiller unit for providing bioreactor cooling | 001-8G08 | 001-8G08 |
| External condensing. Enables excess liquid to be stripped from the culture | 001-8G27 | 001-8G28 |
| Portable hand-held priming controller | 001-8G07 | 001-8G07 |
| Ambr® 250 automated pipette rinse. Allows rinsing of pipettes with decontamination liquid before disposal | 001-2G63 | 001-2G63 |

Additional options for external data integration are available. Please contact your local representative for information. For available consumables, please see brochure **Ambr® 250 High Throughput Consumables and Accessories.**

*For details see **Ambr® brochure Integrated Cell Culture Analyzers.**

**Germany**
Sartorius Stedim Biotech GmbH
August-Spindler-Strasse 11
37079 Goettingen
Phone +49 551 308 0

**USA**
Sartorius Stedim North America Inc.
565 Johnson Avenue
Bohemia, NY 11716
Toll-Free +1 800 368 7178

**For more information, visit**
sartorius.com



Status: 3 | 2025