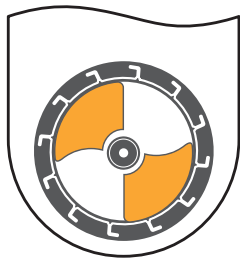


VERTICAL-WHEEL®
BIOREACTORS



PBS 3

Next Generation Single-Use Bioreactors with Revolutionary Vertical-Wheel® Technology

Benefits of PBS Bioreactors

Superior Mixing Performance

Gentle yet complete particle suspension with minimal shear forces in a homogeneous mixing environment.

True Scalability

Similar hydrodynamic conditions can be achieved across all bioreactor volumes, from benchtop to clinical and commercial scale.

Embedded Controller

Intuitive touchscreen interface allows for customizable, secure, and remote access control and alarm reporting.

Certified Plastic Components

Product contact materials certified to be animal-derived component free and to meet the requirements for USP Class VI Testing for Plastics <88> and/or ISO 10993, with complete material lot traceability.

Qualified For Clinical Use

Materials and software tested and certified to meet safety and regulatory requirements for clinical phases, including first-in-human studies.



Contact us to learn more

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www.pbsbiotech.com



Vertical-Wheel impeller is fully contained within U-shaped, single-use vessel and rotated by magnetic coupling

- Optimal for culturing human cell therapy products such as MSCs or primary cells grown on microcarriers, or PSCs grown as cell aggregates
- Minimal shear forces benefit cells grown on the surface of suspended microcarriers and eliminate need for shear protectants
- Homogeneous fluid dynamic conditions result in uniformly spherical aggregates, with inverse correlation between diameter and agitation rate
- Process conditions and results can be recreated across all volumetric scales, enabling truly scalable manufacturing of cell therapy products

Technical Highlights

PBS 3

FEATURES

General

Size:

- Width
- Depth
- Height

15 in (38 cm)
18.5 in (48 cm)
26.5 in (67 cm)

Weight

80 lb (36 kg)

Agitation mechanism

Driven by magnetic coupling

Agitation control range

5 – 50 RPM (± 1 RPM)

Working volume range

1.8 – 3.0 L

Gassing mode

Headspace overlay with an optional microporous sparger

Installation type

Benchtop

Electrical

120V or 240V, 50-60 Hz

Peristaltic Pumps

Media addition and harvest

Fixed-speed, uni-directional

Addition A (base, feed media, anti-foam)

Variable-speed, uni-directional

Addition B (base, feed media, anti-foam)

Variable-speed, uni-directional

Sampling

Fixed-speed, bi-directional

Controls

Control interface

Fully-integrated touchscreen control with network connectivity capability

Control hardware/software

Industrial embedded real-time control

Data communication

Built-in data historian, remote control panel accessible over ethernet

Process Controls

Gas control

4 mass flow controllers for air, N₂, O₂, CO₂

Gas flow rate range (accuracy)

- Air MFC: up to 500 mL/min ($\pm 5\%$ of reading)
- N₂ MFC: up to 500 mL/min ($\pm 5\%$ of reading)
- CO₂ MFC: up to 100 mL/min ($\pm 5\%$ of reading)
- O₂ MFC: up to 500 mL/min ($\pm 5\%$ of reading)

Temperature control range (accuracy)

5°C above ambient to 40°C ($\pm 0.2^\circ\text{C}$)

Dissolved oxygen control

2-sided PID control with N₂ and O₂, or manual control

pH control

2-sided PID control with CO₂ and base addition pump, or manual control

Exhaust system

Condenser trap, 0.2 micron exhaust filter, filter oven

Safety interlocks

- Agitation with heater
- Level with pumps and heater

Sensor Types

Agitation

Hall effect (magnetic sensing)

Temperature

Class A platinum RTD

Dissolved oxygen

Polarographic (user-added) or fluorimetric (single-use)

pH

Electrochemical (user-added or single-use)

Level

Load cell

Single-Use Vessel

Vessel construction

Injection-molded polycarbonate vessel

Gamma radiation exposure

25-40 kGy

Liquid handling lines

Silicone/C-flex

Gassing lines

Silicone

Product contact materials

Meet requirements for USP Class VI Testing for Plastics <88> and/or ISO 10993

Configuration of tubing and filters

Customizable in addition to the standard configuration