

Single-Use Bioreactors

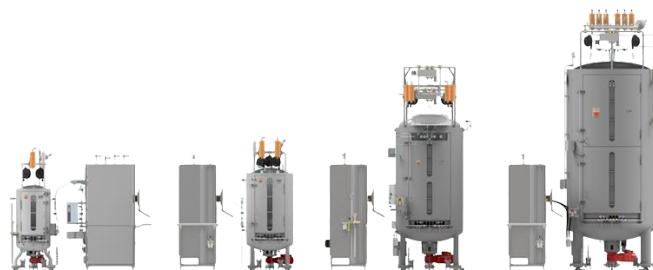


Introduction

ABEC's Custom Single Run (CSR) Single-Use Bioreactors and Disposable Containers (DC) set an industry benchmark in productivity and performance. By leveraging decades of ABEC design experience and innovation, the CSR systems enable customers to recognize cost, flexibility, and time-to-market benefits of single-use processing. The CSR Bioreactor designs are also consistent with well-established stirred-tank reactor configurations, achieving seamless process scale-up and transfer. The CSR Bioreactor leads the industry with cell culture volumes up to 6,000L Vw, delivering significantly more capacity per unit area of floor space and lowering cost of goods (COGS); key metrics in high-value, multi-product biopharmaceutical facilities

Benefits

- Highest productivity/yield
- Seamless technology transfer and scalability
- Lowest COGs
- Lowest supply chain risk



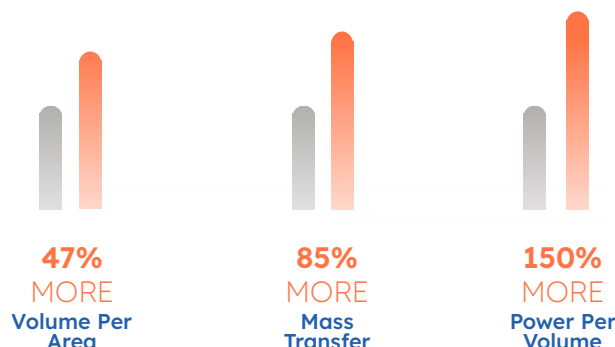
ABOVE:
Cell culture train of CSR Bioreactors.
Left to right: 200L, 600L, 2kL, 6kL Vw



ABOVE: Image of an ABEC 6,000L CSR Bioreactor system installed with a Disposable Container (DC)

Unique Features

- Maximum process performance and multi-product flexibility
- Customizable sizes and the largest production volumes in single use
- Highly customizable system and DC to suit process and facility needs
- Global, in-house manufacturing of all equipment and consumable
- Quick turnover of Disposable Container (DC) set that can be removed and a new one installed within 1 hour
- Temperature control option via dimples jacket
- Stainless baffles welded to sidewalls of CSR holder
- Non-proprietary control system options
- Transparent supply chain with multiple qualified suppliers





Typical Specifications

ABEC's CSR systems are customizable to meet specific process and operational requirements. Typical design elements and specification ranges are shown

Working Volumes	Customizable: 25L up to 6,000L
Turndown Ratios	Customizable
Agitator Mounting	Bottom Center
Agitator Motor Coupling	Mechanical
Agitator Seal	Mechanical/SiC
No. Baffles	Up to 4
Impeller Type	Customizable: Low Shear Elephant Ear / Hydrofoil
Direction of Rotation	Down-pumping or Up-pumping
Tip Speed	Up to 2.0 m/s (400ft/min)
Spargers	Customizable: Single or Dual Drilled Tubes: 0.5 to 3.2 mm Frit: 20 to 300 µm
Performance at 6,000L V _w	$k_L a > 50 \text{ h}^{-1}$ $\text{CO}_2 \text{ stripping} > 5 \text{ h}^{-1}$ Blend time < 60 s
Disposable Container (DC) Materials of Construction	Film: RENOLIT SELMED Infuflex 9101 Multilayer LDPE/EVOH Impellers: HDPE Seal Housing, Shaft Coupling: LDPE Agitator Shaft: 316L SS
Process Controls	Customizable: Open architecture via Emerson, Rockwell, or Siemens hardware or software
Process Monitoring	Customizable: Single use or traditional sensor technology pH, DO, antifoam (non-invasive), pCO ₂ , optical density, conductivity