

# UniFuge® Platform for Biologics Manufacturing

Gentle, Tunable & Scalable Tubular Bowl Technology for Separation



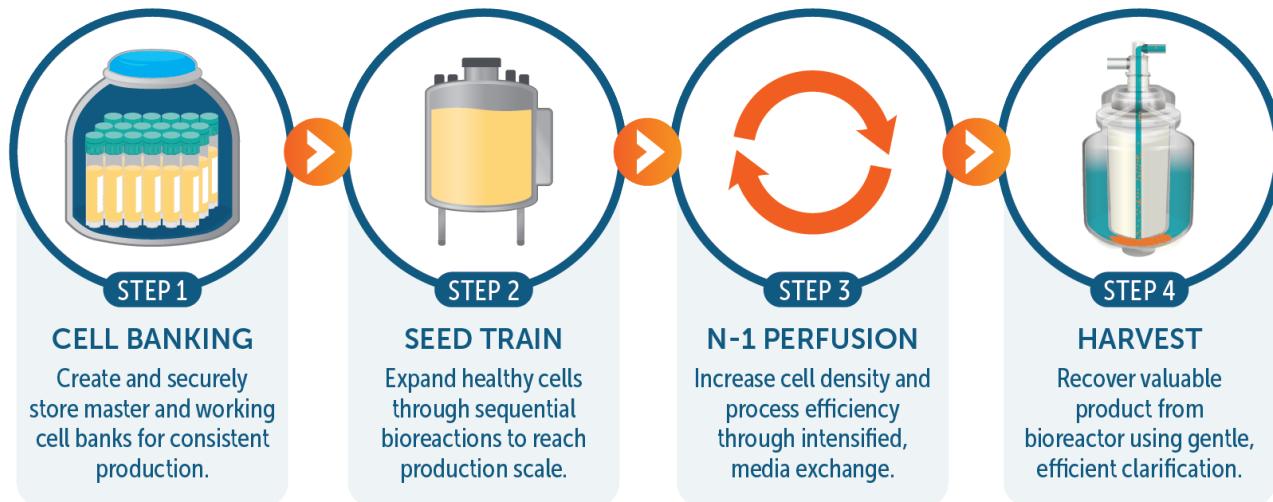
## UniFuge® Family

The UniFuge® platform delivers a versatile, single-use solution for biologics manufacturing; engineered for gentle, high throughput separation across critical upstream and downstream processes.

Powered by tubular bowl technology, UniFuge enables high recovery and product integrity for sensitive biologic materials, including mammalian cells and viral vectors. With scalable, automated operation, UniFuge streamlines workflows from development through commercial production.

## Separation Applications

The UniFuge family supports critical biologics manufacturing steps with gentle, scalable separation and media exchange.



### Cell Banking

Prepare high-density cell banks by concentrating and washing cells for reliable cryopreservation and seed train initiation. UniFuge's low-shear environment helps maintain cell viability and recovery, supporting consistent upstream performance across batches.

### N-1 Perfusion

Rapidly exchange spent media with fresh media and supplements to maintain culture health and productivity in perfusion-based processes throughout the seed train. UniFuge provides automated, closed-system operation to streamline bioreactor workflows.

### Clarification

Achieve efficient removal of cell debris and impurities during harvest, reducing filtration requirements for downstream purification. UniFuge reduces product loss, process time, and labor for reliable clarification for monoclonal antibodies and other biologics.

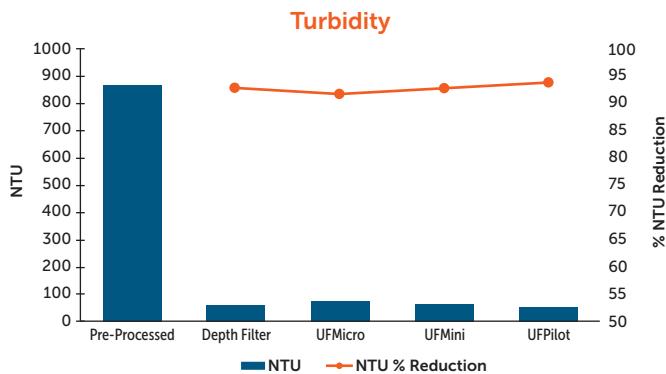
## UniFuge® Tubular Bowl Technology

UniFuge® leverages tubular bowl technology to deliver gentle, high throughput separation for biologics manufacturing. By balancing centrifugal force and fluid flow rates, UniFuge gently separates solids from process fluids to support healthy, efficient cell expansion upstream while reducing cell-derived impurities that burden downstream purification.

Within the closed, single-use chamber, clarified material can be washed or exchanged with fresh media or buffer without exposing the product to contamination risk. Automated discharge ensures consistent recovery and minimizes product loss during start-up or transfer steps.

## Proven Performance for Biologics Manufacturing

### Primary Clarification that Reduces Turbidity



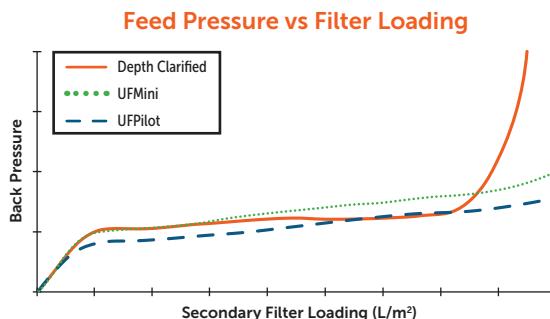
**Figure 1:** UniFuge® achieves >90% turbidity reduction (NTU) across scales, delivering cleaner feeds to downstream purification.

### What This Means for You

- Fewer depth filter changeouts
- Higher filter capacity
- Lower consumables cost



### Lower Back Pressure Extends Filter Life



**Figure 2:** UniFuge® primary clarification lowers back pressure across the full loading range (L/m²), extending secondary filter life versus depth filtration.

## Benefits

### High Product Integrity

- Gentle, low-shear processing protects monoclonal antibodies and recombinant proteins
- Maintains structural integrity for cells during handling and clarification

### Efficient Clarification

- Rapid removal of cells and debris for cleaner harvest
- Reduces turbidity by >90%, minimizing fouling in downstream filtration
- Improves Protein A column performance and cycle consistency

### Fast Media Exchange

- Enables quick media exchanges during N-1 perfusion or formulation steps
- Minimizes downtime between perfusion cycles

### Scalable & GMP-Ready

- Enables seamless scale-up and scale-down across development, pilot, and production without process redesign
- Automated operation with audit trail for 21 CFR Part 11 compliance
- Closed-system operation reduces contamination risk

## Technical Specifications

UniFuge® systems deliver reliable, scalable performance for biologics workflows, from small-scale development to large-volume commercial production.

Machine	UFMini	UFMini	UFMini	U2k
Attribute Module	UFMicro	UFMicro	UFMicro	Intermittent
<b>Functional</b>				
Recommended Bioreactor Volume	500mL - 10L	5 - 25L	25 - 500L	500 - 2000L+
Minimum Working Volume	90mL	300mL	1.8L	10L
Flow Rate	50 - 1000mL/min		.1 - 4L/min	5 - 20 L/min
G-force	50 - 4000 x g		200 - 4000 x g	500 - 3000 x g
<b>Physical</b>				
Footprint (Approx.)	69 x 56 x 38 cm w/d/h (27" x 22" x 15")		71 x 101 x 137 cm w/d/h (28" x 40" x 54")	81 x 200 x 153 cm w/d/h (32" x 79" x 60")
Weight (Approx.)	45 kg (100lbs)		254 kg (560lbs)	912 kg (2,010lbs)

## Enabling GMP compliance

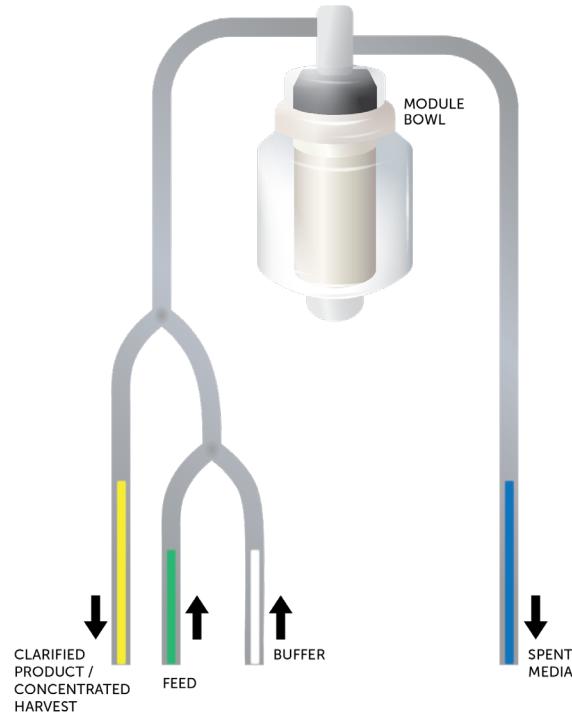
UniFuge products are designed to enable clinical and commercial biomanufacturing and are backed by testing and regulatory support.

### Instrument

- Audit Trail Data for 21 CFR Part 11 Compliance
- SCADA Capabilities
- cGMP, SAT and IQ/OQ documents

### Single-Use Modules

- Manufactured in ISO 13485 facility with Class 7 Cleanroom
- Biocompatibility: USP <87>, USP <88> Class VI (or ISO 10993)
- Physicochemical: USP <661> for plastic materials
- Animal Derived Component Free or treated to render BSE/TSE inactive
- Endotoxins: < 0.25 EU/mL
- Gamma irradiated



## Ordering Information

### UniFuge Equipment

Product	Description	Compatible Modules	Modules Product #
UniFuge UFMini	UFMini System	UFMicro module	C68390012
		UFMini module	C68390001
UniFuge UFPilot	UFPilot System	UFPilot Standard module	C61390184
UniFuge U2k	U2k System	U2k Intermittent module	C63390266

### Additional Resources

Learn about our solutions to help achieve bioprocessing goals from research to commercialization at

<https://www.carrbiosystems.com/application/biologics>

See how UniFuge can be used across modalities including recombinant proteins, vaccines, cell therapy, gene therapy, and cellular agriculture.  
[carrbiosystems.com/resources/publications](https://www.carrbiosystems.com/resources/publications)



### Contact Us

For customer service, contact:

[CustomerService@CarrBiosystems.com](mailto:CustomerService@CarrBiosystems.com)

For more information, or to request a quote, go to [carrbiosystems.com](https://www.carrbiosystems.com) or contact us at:

[Connect@CarrBiosystems.com](mailto:Connect@CarrBiosystems.com)



### Markets We Serve

Cell Therapies | Gene Therapies | Vaccines | Biologics | Cellular Agriculture | Nucleic Acids | Microbial Fermentation | Others