



Stämm High-throughput Bioprocessor

Technical Brochure

STÄMM

Inspired by nature,
Driven by data,
Built for humanity.

System overview

The **High Throughput Bioprocessor (HTB)** is an easy-to-use platform designed to streamline and accelerate bioprocess development. Designed for **RUO**, it enables **parallel operation of single-use bioreactors** with integrated monitoring, automated control of culture conditions, and seamless data capture for each vessel.

Engineered for simplicity and performance, **the HTB** provides laminar, bubble-free, low shear-stress conditions to support optimal cell growth.

Pre-designed batch and intensified perfusion processes make setup straightforward, while advanced process control ensures consistent, reliable results.

By combining automation, **high throughput, and user-friendly operation**, the HTB accelerates biopharmaceutical **R&D** with minimal complexity.



This current version is for Research Use Only (RUO).
Not for use in diagnostic or therapeutic procedures.

+ Single-Use + Automated + Ultra Low-Shear Bioreactor + Continuous, High-Performance Processing

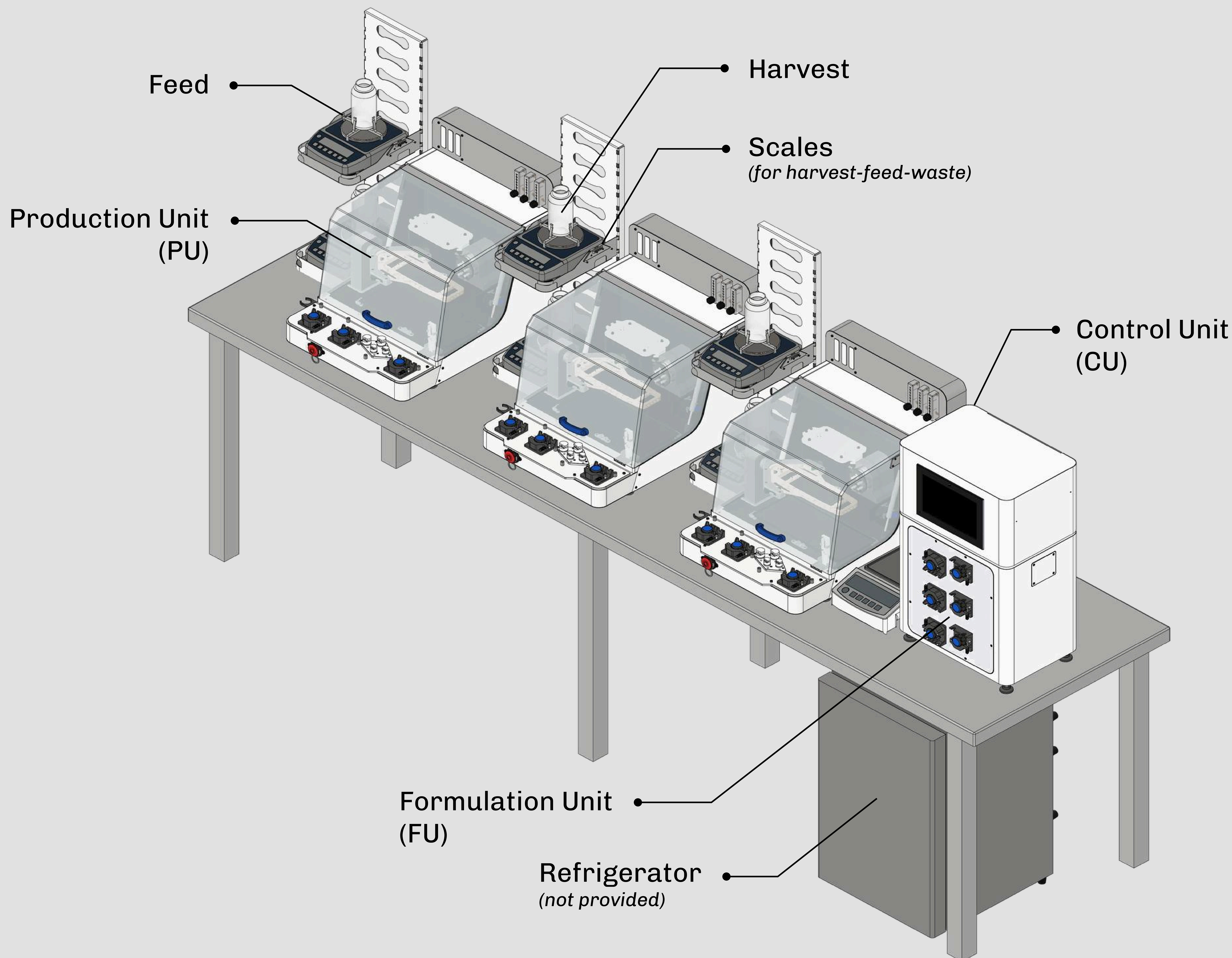
The HTB System

- + The HTB is a **modular system** that provides the flexibility to run several independent processes across each Production Unit.
- + The Control Unit automatically coordinates and runs up to **three parallel processes**.

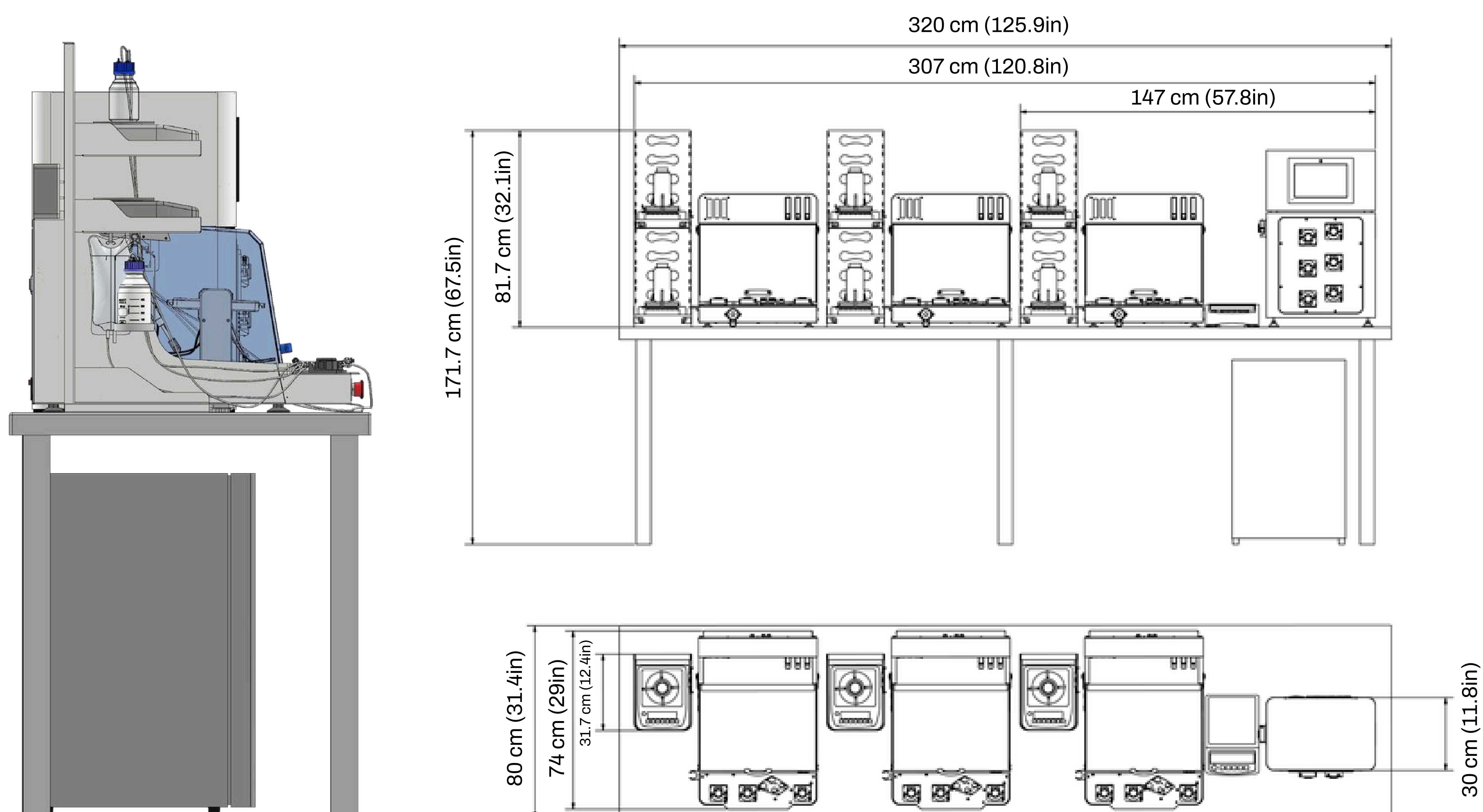
The HTB System Units and Features:

- + The **Consumable Cartridge** is a plug-and-play, single-use bioreactor that couples with the Production Unit and provides a self-contained environment for the bioprocess.
- + The **Production Unit (PU)** provides the structural elements and services necessary to integrate the Consumable Cartridge and controls the working conditions throughout the process.
- + The **Control Unit (CU)** provides a digital interface for monitoring and interacting with the HTB. It allows users to access system data, visualize key process variables, and operate or configure specific functionalities necessary for the bioprocess.
- + The **Process Monitoring and Configuration System** coordinates the process operations and gathers data from them. It is the interface point between the local system and the remote management software.
- + The **Formulation Unit (FU)** (optional) provides automated multiplexing and delivery of the culture media necessary for the bioprocess to the Consumable Cartridge. It controls media preparation and feeding under sterile conditions for the entire bioprocess.
- + The **Counter Sedimentation Unit** prevents the settling of suspension cells by gently rotating the Consumable Cartridge.
- + The **Fluidic System** provides all structural elements and actuators necessary for the integration and control of the fluidic circuit that runs through the consumable cartridge.
- + The HTB uses standard **Feed and Harvest Containers**, of volumes up to 2 L, to directly connect to the Fluidic System.

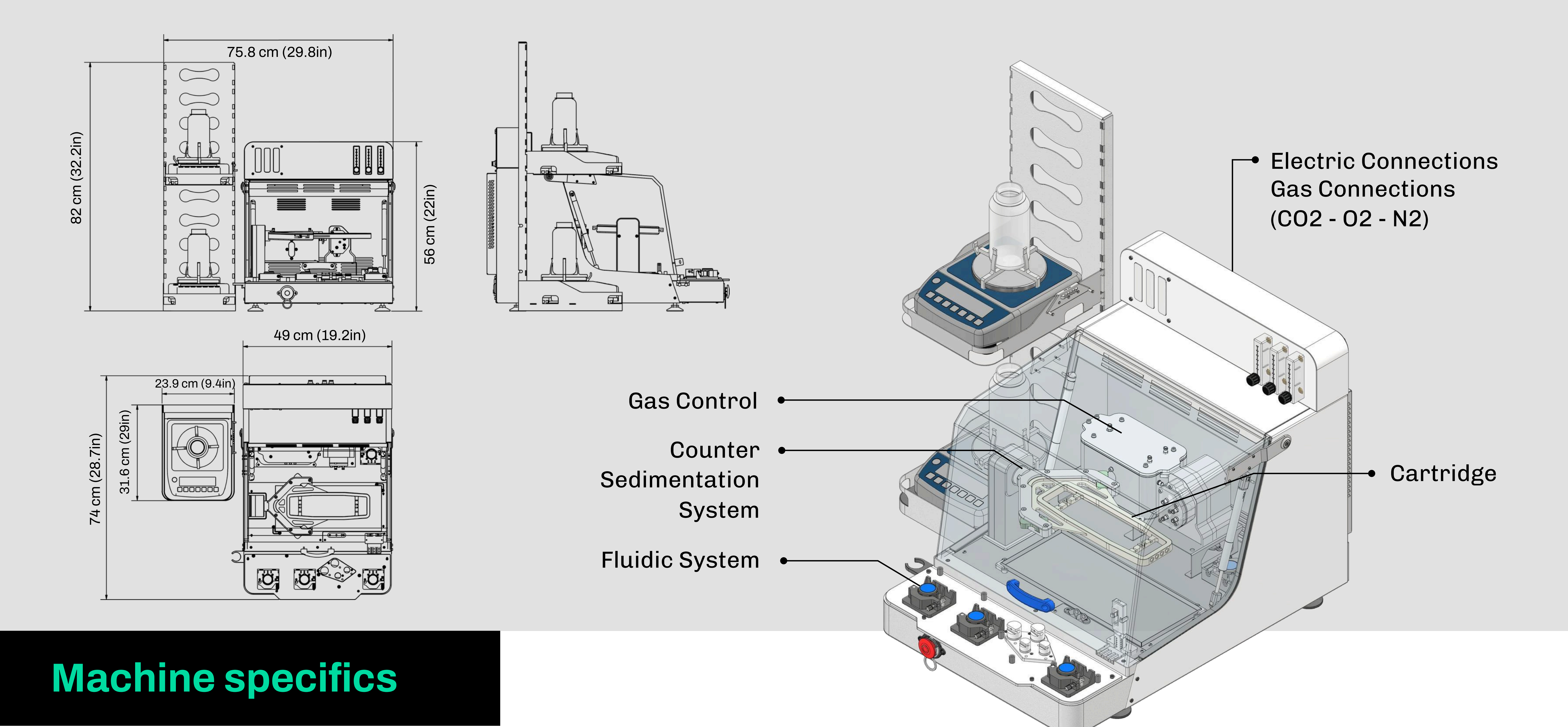
Information and specifications are subject to change as technical enhancements or other changes are introduced.
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Reference dimensions



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Machine specifics

General Hardware Specifications	
Installation Type	Benchtop
Dimensions (for three units)	
Length	320 cm (125.9 in)
Depth	74 cm (29 in)
Height	81.7 cm (32.1 in)
Parallel Processing Units	1 to 3
Bioreactor Volume	From 50 or 250 mL
Electrical	PU 110-240 V, 50-60 Hz. CU & FU 80- 264 V. 47 -63 HZ
Fluidic control	Solenoid valves and peristaltic pumps
Sensors	In-line: DO, pH
Media Formulation (optional)	Automatic
Process Control	
Temperature	
Temperature Control Range	25-40 °C (+/- 0.5 °C)
Gases	
O ₂ Control Range	0-100% (±2% at 21% O ₂)
CO ₂ Control Range	0-20% (+/- 0.5% at 5% of CO ₂)
Fluidic	
Flow Rate (mL/min)	
Minimum	0.1 mL/min
Maximum	25 mL/min
Dissolved Oxygen	
DO Measurement Range	0-240 mmHg
DO Measurement (accuracy)	±0.4% O ₂ at 20.9% O ₂
DO Measurement Resolution	±0.024-±0.24 mmHg
pH	
pH Measurement Range	5.5-8.5
pH Measurement (accuracy)	0.1 pH at pH 7
pH Measurement Resolution	0.01 pH at pH 7
Sampling	
Ports	Three Redundant Sampling
Automation	Semi-automated
Automated Media Formulation (optional)	
Capacity	Up to 5 reagents Up to 750 mL per formulation
Flow Rate	0.1-25mL/min

Applications

The HTB can be used for **process development, including cell culture optimization, media and feed strategy evaluation, perfusion protocol optimization, and production of pre-clinical products.**

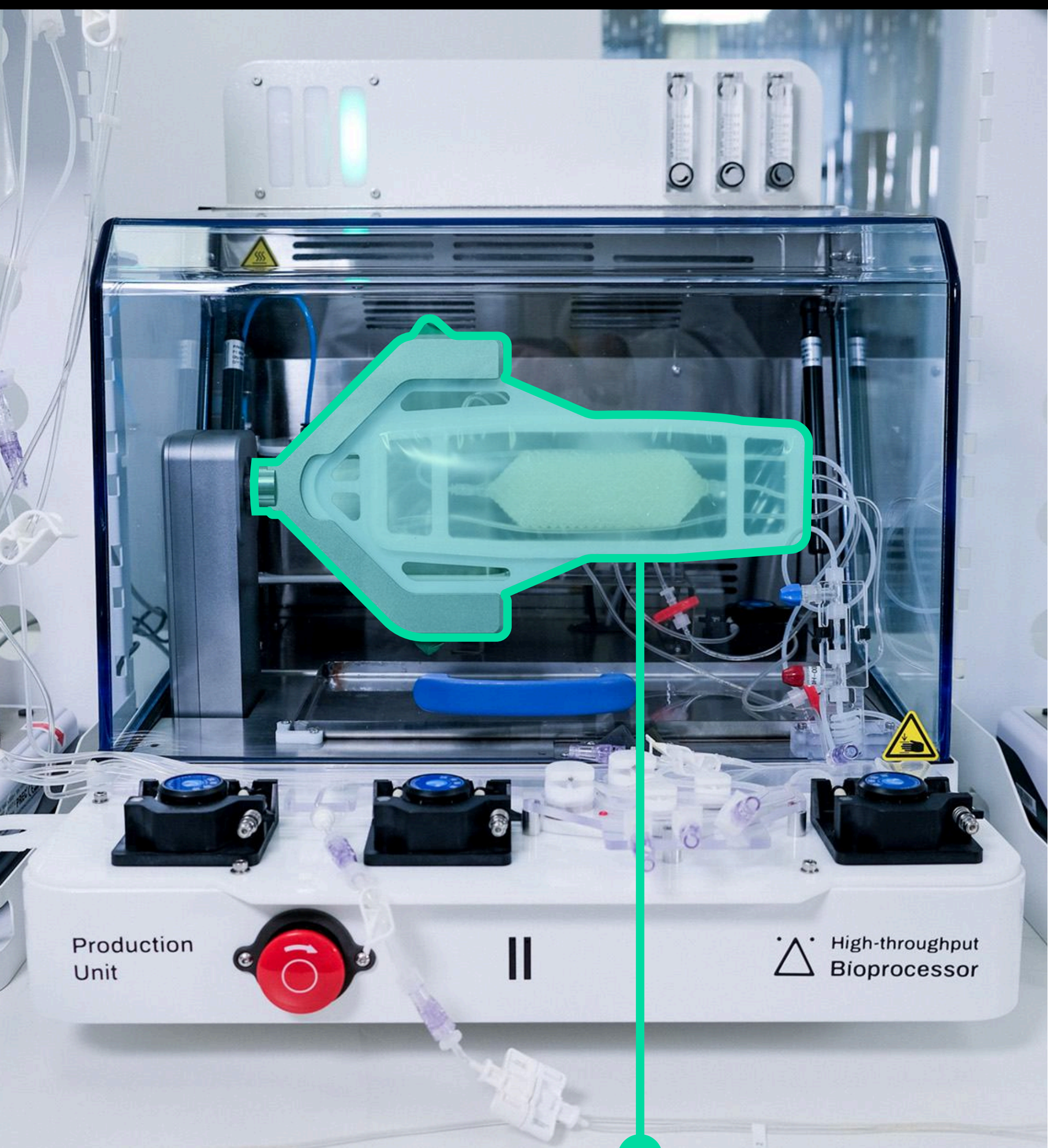
It allows scientists to simultaneously run multiple experiments (e.g. varying feed rates, cell lines, testing out different conditions) in perfusion or batch mode, with each bioreactor capable of continuous operation for extended durations (up to 30 days per process).

To increase process reproducibility and minimize manual intervention, the platform incorporates automation, including media formulation and feed; environmental control and adjustments; in-line/at-line sensing; and harvesting.

- + Antibody production
- + Suspension cell outgrowth
- + Adherent cell outgrowth



Consumable cartridge and Bubble-Free Bioreactor



The **Bubble-Free Bioreactor (BFB)** is the core of the Consumable Cartridge.

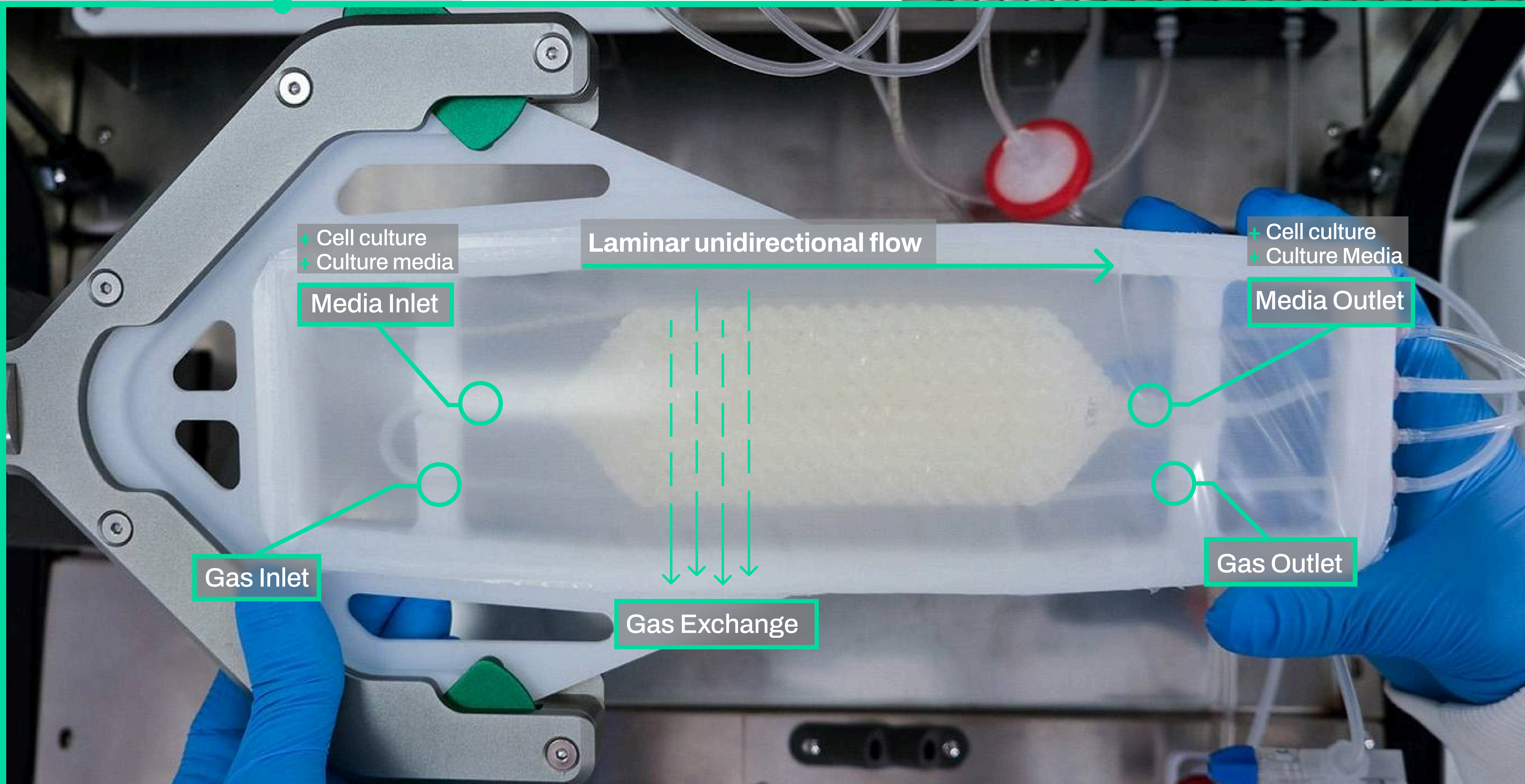
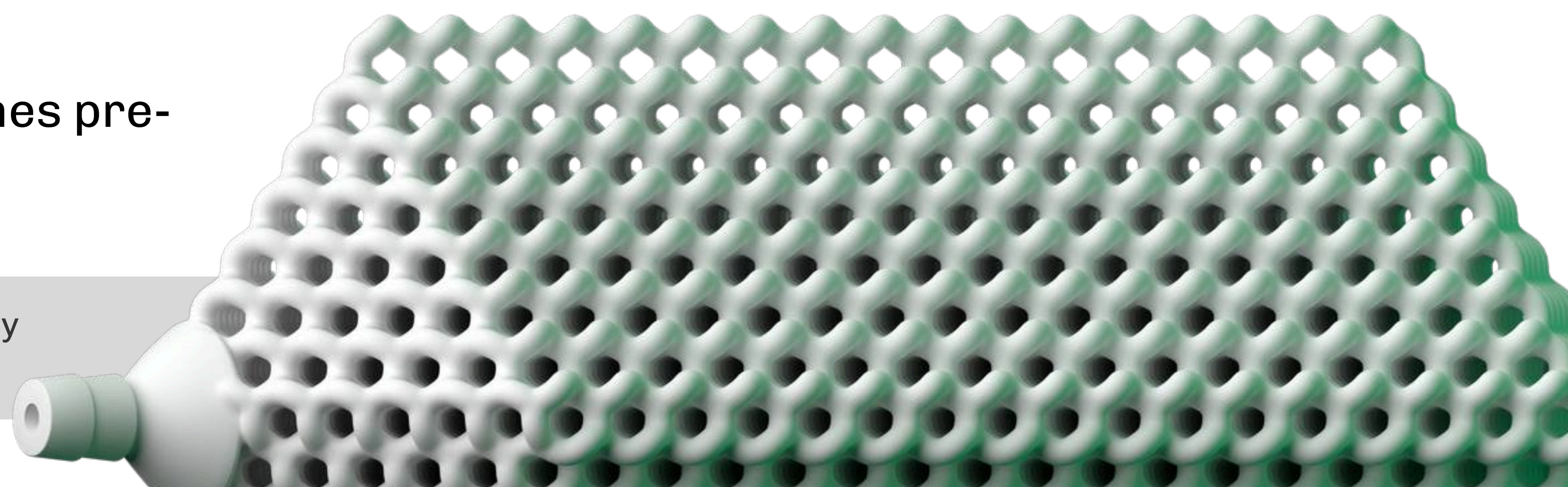
This single-use, 3D-printed culture vessel provides gentle, laminar-flow conditions and supports intensified processes with bubble-free, efficient gassing through its maximized surface area, ideal for adherent or suspension cell culture.

The Consumable Cartridge comes pre-assembled and sterilized.

3D-printed gyroid architecture inspired by nature with a triply-periodic geometry

This **self-contained unit** is designed for a quick and easy, aseptic installation with only 4 connectors.

It slides and locks into place, with magnetic assistance, ready for the user to clamp in order to secure it, before attaching the gas and media connectors.

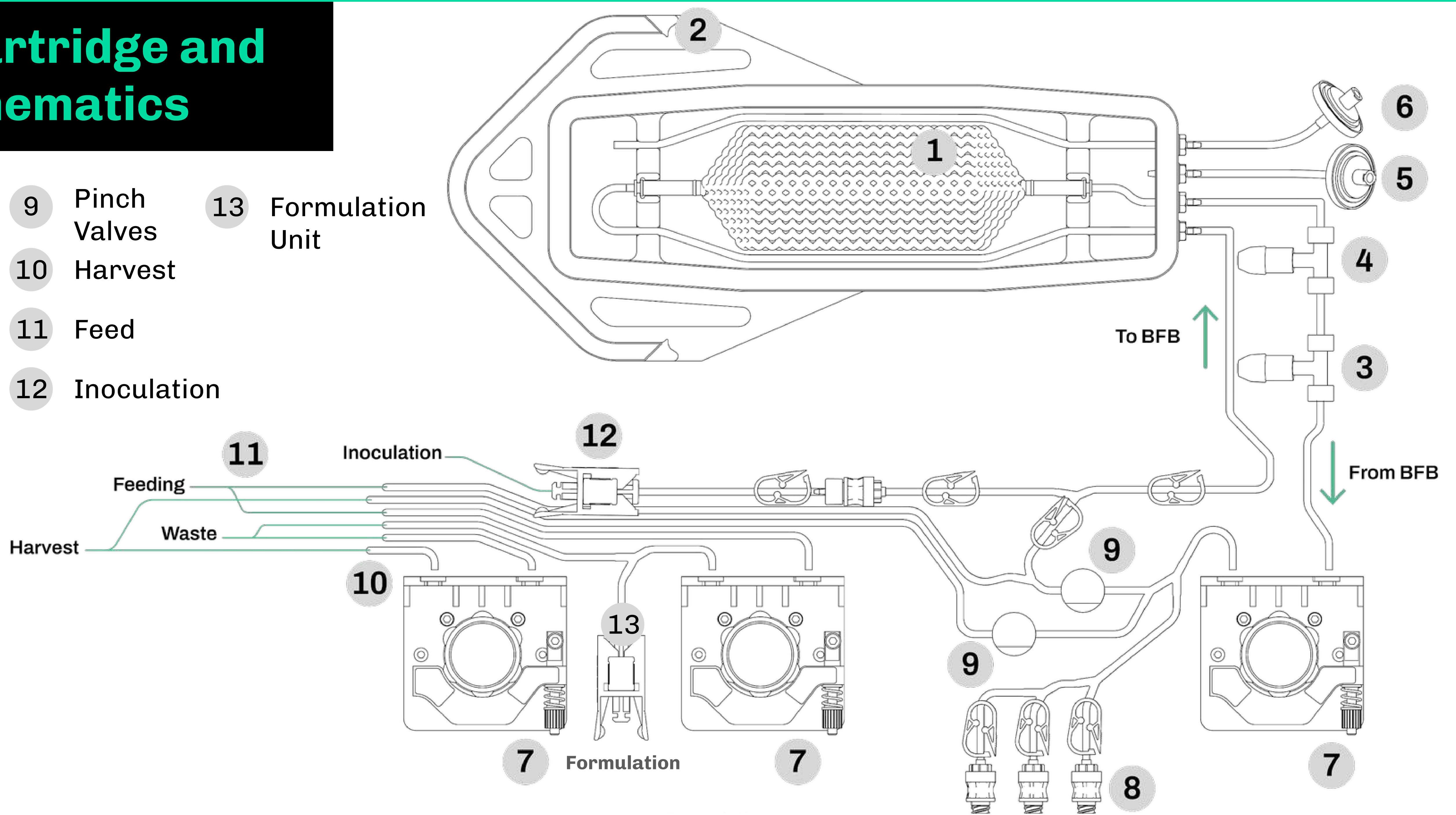


Consumable Cartridge and Connection Schematics

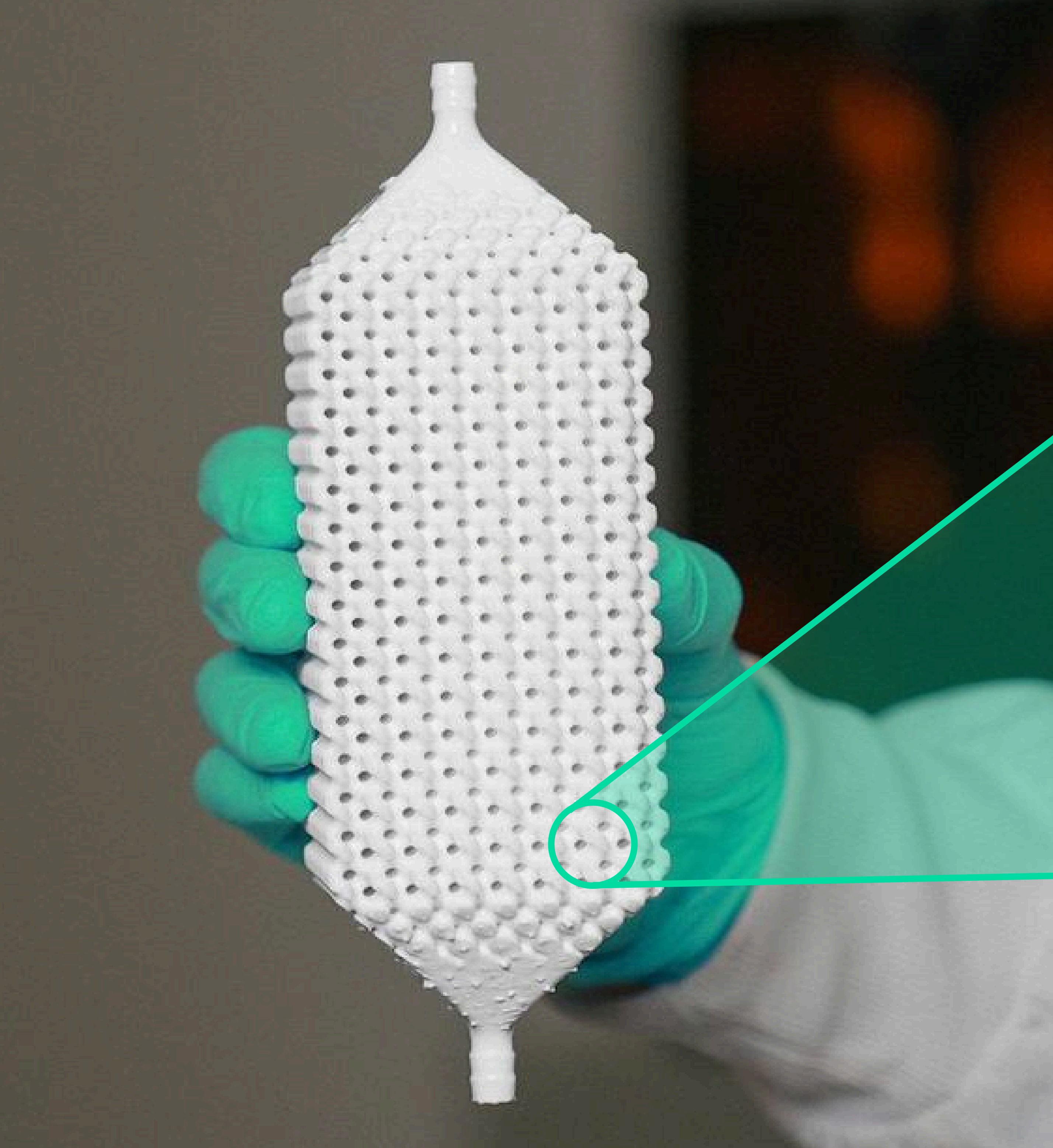
- 1 Bubble-Free Bioreactor
- 2 Cartridge Support Structure
- 3 pH Sensor
- 4 O2 Sensor
- 5 Gas Inlet
- 6 Gas Outlet
- 7 Peristaltic Pump
- 8 Sampling Ports (x3)

- 9 Pinch Valves
- 10 Harvest
- 11 Feed
- 12 Inoculation
- 13 Formulation Unit

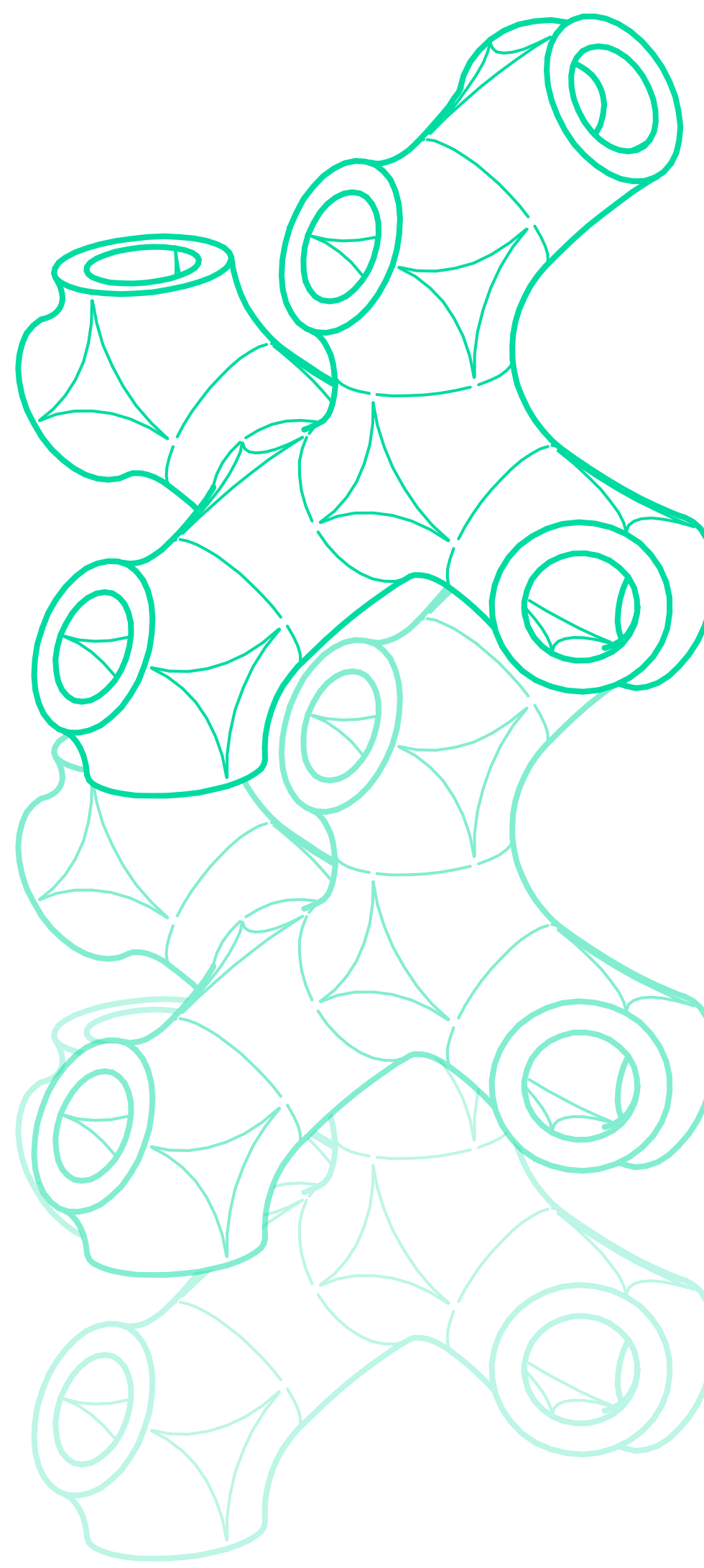
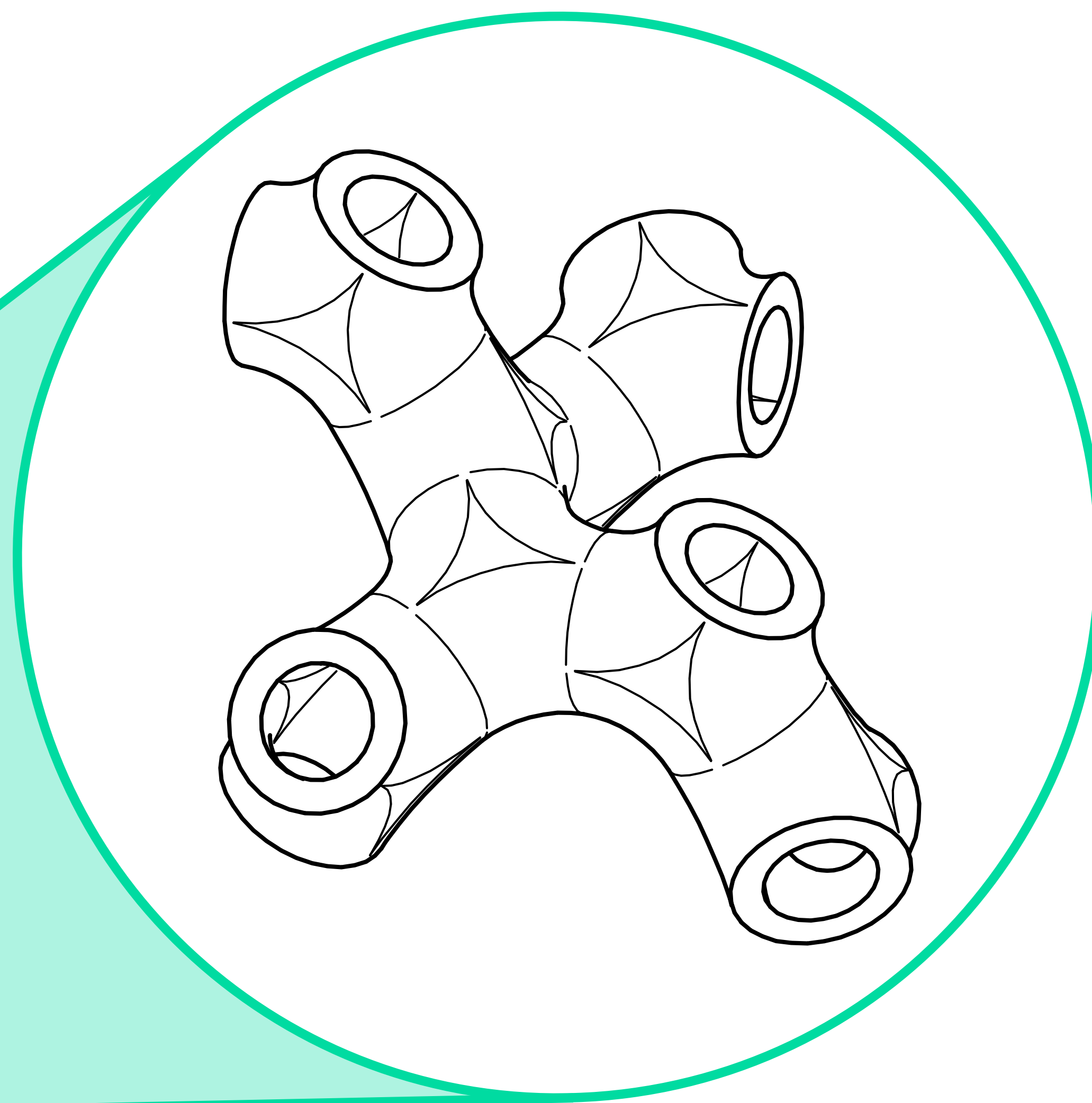
- ## 13 Formulation Unit



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Up to 250ml productive volume or 5000cm² of surface to enable applications ranging from Process development to pre-clinical production.



Cartridge Features

- + Isolated chamber for controlled conditions:
 - + O₂
 - + CO₂
 - + Humidity
- + From 50ml and 250ml volumes
- + 1000cm² and 5000cm² surfaces
- + Batch and perfusion culture

Automated Process Monitoring and Configuration

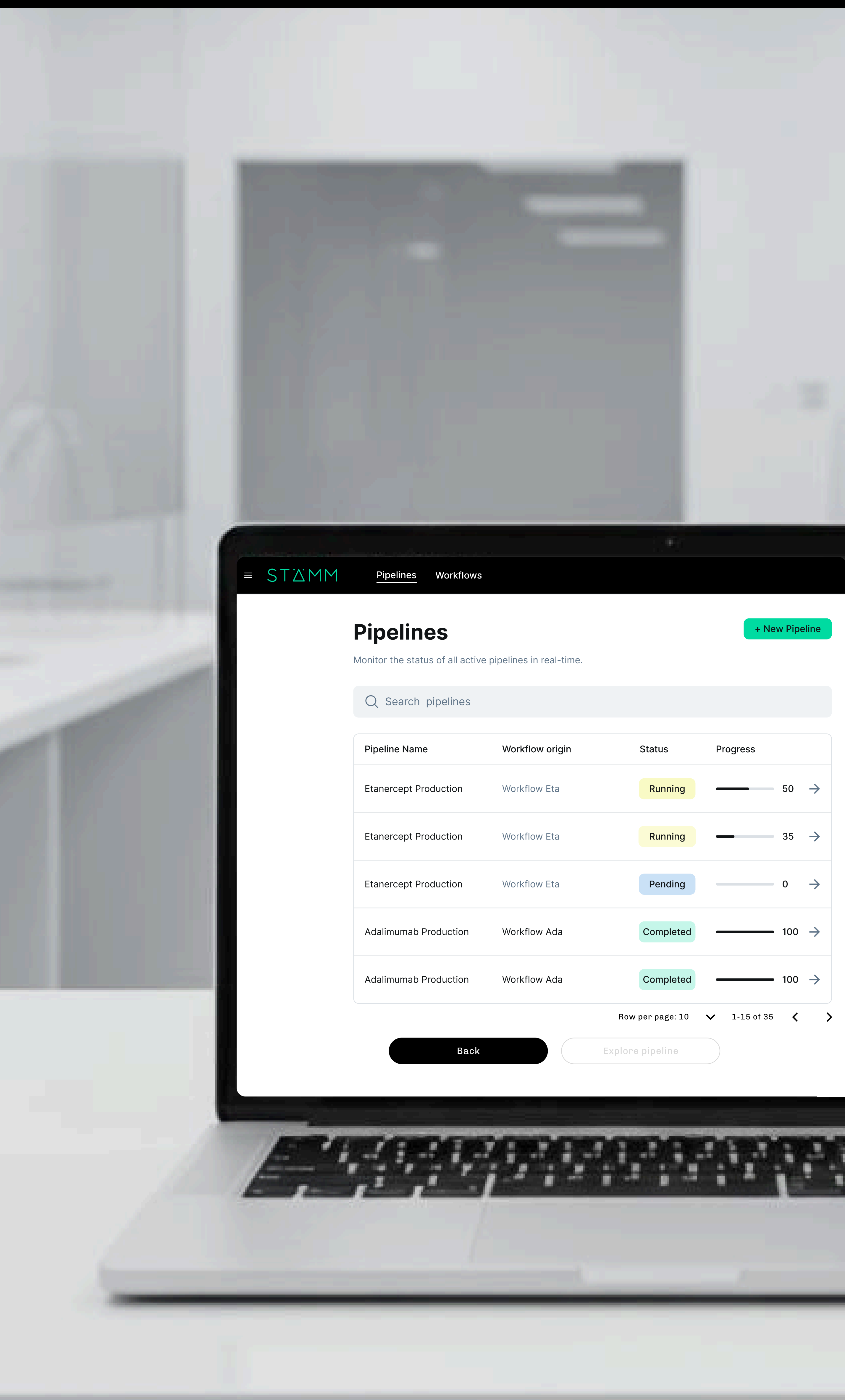
Cloud Bio-manufacturing is a software that allows for the design, control, and monitoring of the production process and critical process parameters, as well as data collection.

A library of proven operational protocols is available, and the interface facilitates the configuration of user-defined automated workflows.

All operational and biological data is collected and available to the user via a cloud-based platform.

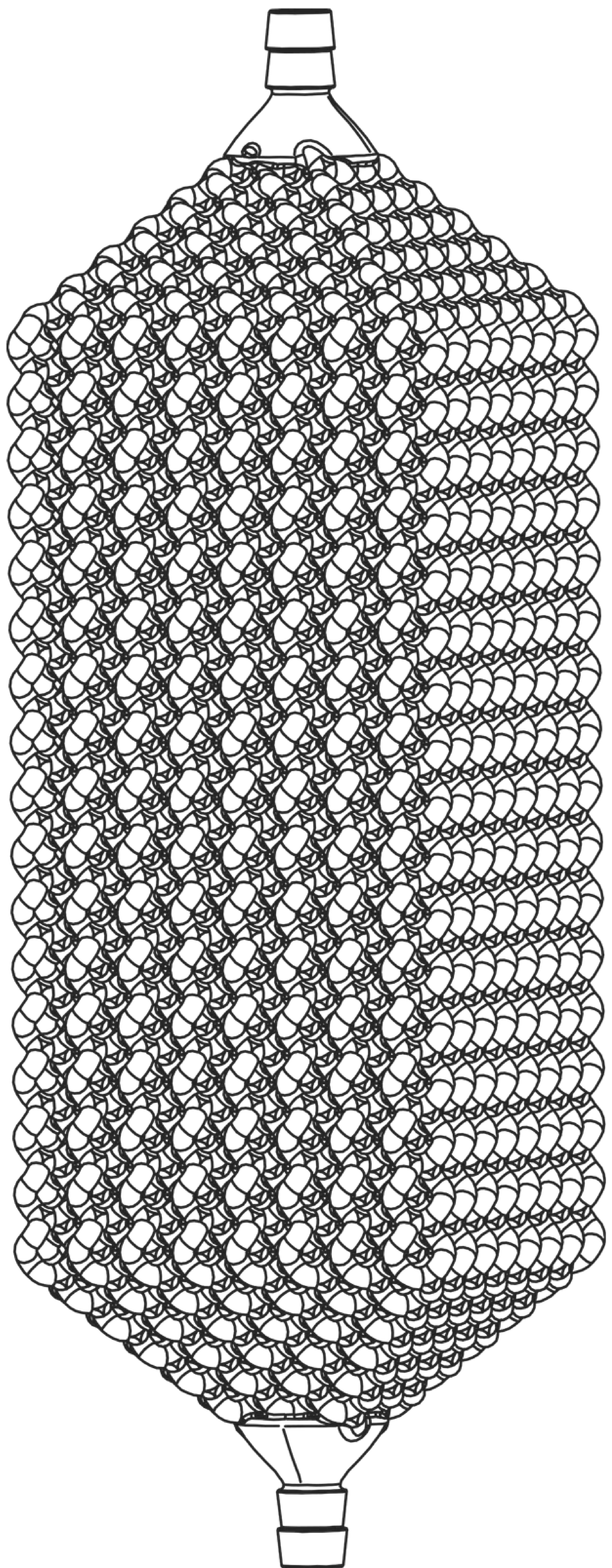
Key features

- + Real-time process monitoring and control
- + Management of parameters of the biological processes
- + Design and development of biological processes
- + Seamless data collection and transfer for analysis
- + Process traceability



Revolutionizing the way biomanufacturing is done.

Inspired by nature's solutions, Stämm is transforming biomanufacturing to accelerate life-changing therapies, with sustainable, future-ready solutions that meet the evolving needs of our clients and improve global health.





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Let's define modern
biomanufacturing.

Stämm High-throughput Bioprocessor for Cell & Gene Therapies

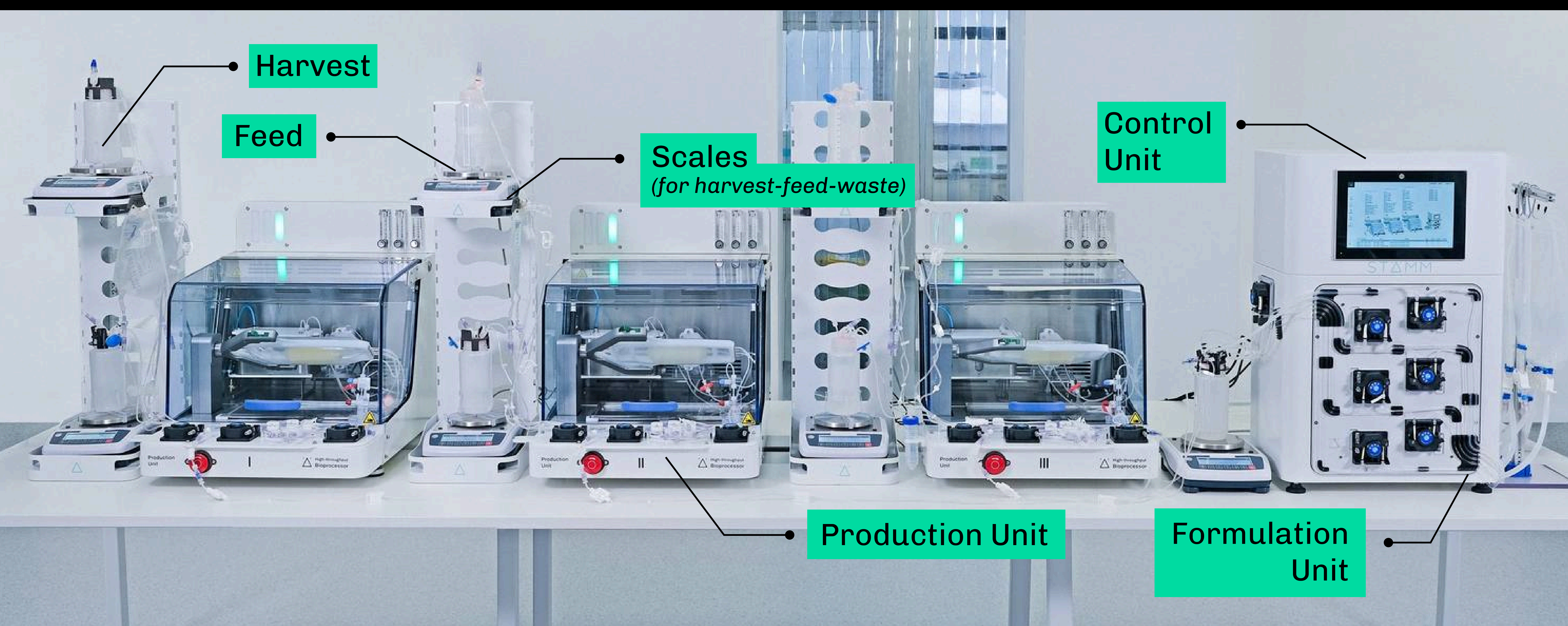
System overview

The **High Throughput Bioprocessor (HTB)** is an easy-to-use semi-automated platform designed to streamline and accelerate bioprocess development.

It is a closed bioprocessor that eliminates scalability constraints, high footprint requirements, manual labor intensity, and increased contamination risks associated with conventional culture systems.

Engineered for simplicity and performance, the HTB provides laminar, bubble-free, low shear-stress conditions to support optimal cell growth. Passive gas exchange occurs through gas-permeable walls.

Combined with in-line monitoring and software control, this enables controlled oxygen conditions without impellers, spargers, or bubbles.



+ Single-Use + Automated + Ultra Low-Shear Bioreactor + Continuous, High-Performance Processing

The HTB System

+ The HTB is a **modular system** that provides the flexibility to run several independent processes across each Production Unit.

+ The Control Unit automatically coordinates and runs up to **three parallel processes**.

Highlighted Applications in Cell & Gene Therapy

The HTB is an ideal, scalable (scale-out) platform that strives to be the solution to patient-specific therapeutic manufacturing, targeting to provide more than 10,000 doses per year in future versions.

It is suitable for high-density mammalian cell culture applications in both adherent (HEK, MSC, iPSC) and suspension (CHO, JURKAT) cultures.

In 5-day expansions, human iPSCs successfully maintain their pluripotency within the BFB. Cells show high expression (>80%) of the cell surface antigens SSEA4 and TRA-1-60.

Stämm's bioprocessor significantly reduces Cost of Goods (COGs) and batch-to-batch variability by decreasing media and flask usage and eliminating manual work.

General Hardware Specifications

Installation type: Bench-top

Parallel Processing Units: Configurable from 1 to 3 units.

Dimensions (for three units):

Length: 320 cm (125.9 in).

Depth: 80 cm (31.4 in).

Height: 81.7 cm (32.1 in).

Parallel Processing Units: 1 to 3.

Bioreactor Volume: Available in 50 mL and 250 mL volumes.

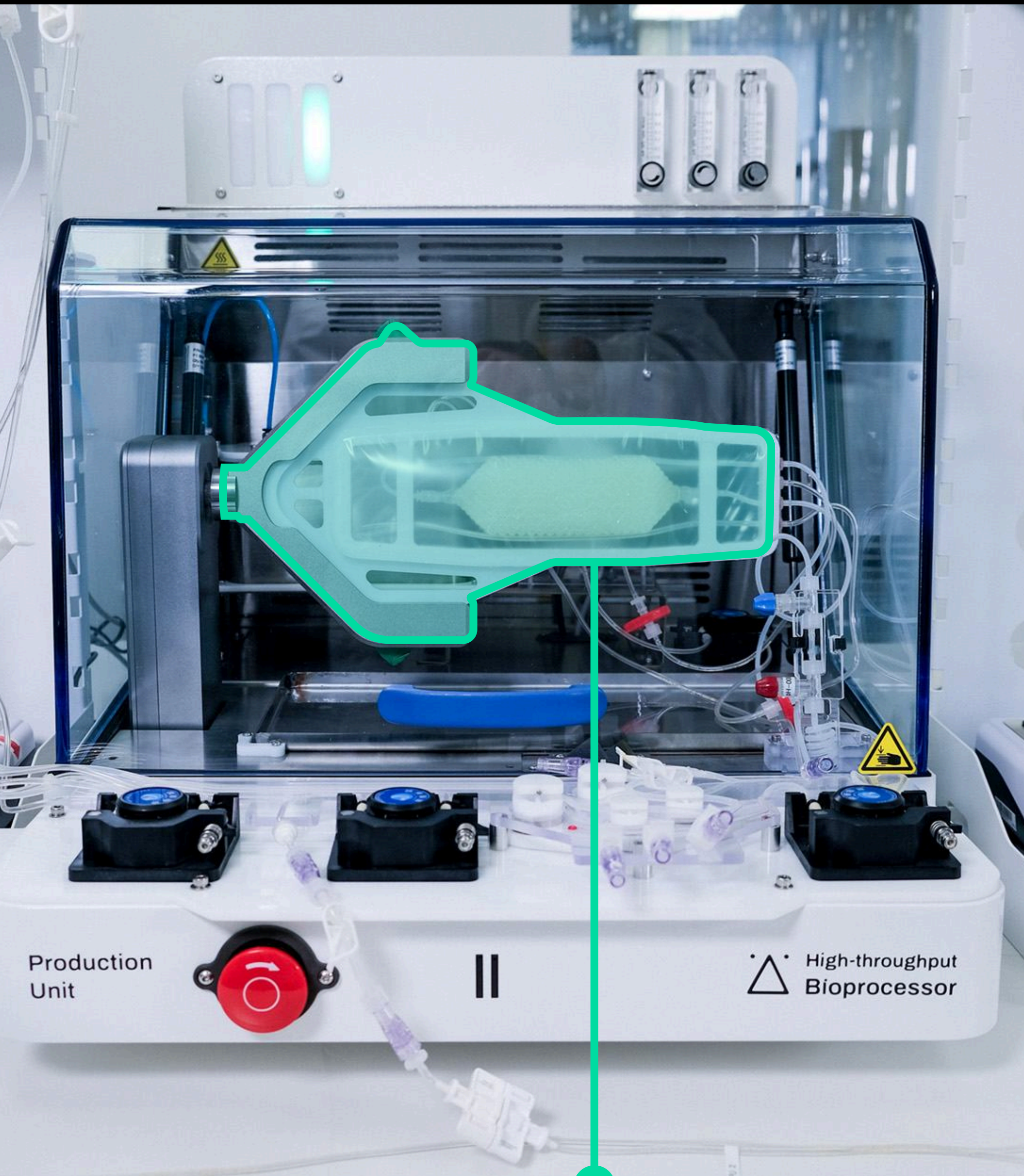
Electrical: Production Unit (PU) 110-240 V, 50-60 Hz. Control Unit (CU) & Formulation Unit (FU) 80-264 V, 47-63 Hz.

Fluidic control: Solenoid valves and peristaltic pumps.

Sensors (optional): In-line: DO, pH.

Media Formulation (optional): Automatic.

Consumable cartridge and Bubble-Free Bioreactor



The Bubble-Free Bioreactor (BFB) is the core of the single-use cartridge.

It is designed for a quick and easy, aseptic installation with only 2 connectors. Its high surface-to-volume ratio of 20cm²/mL optimizes mass and gas transfer dynamics.

This structural efficiency saves 60% of culture media when compared to traditional expansion methods.

Characteristics:

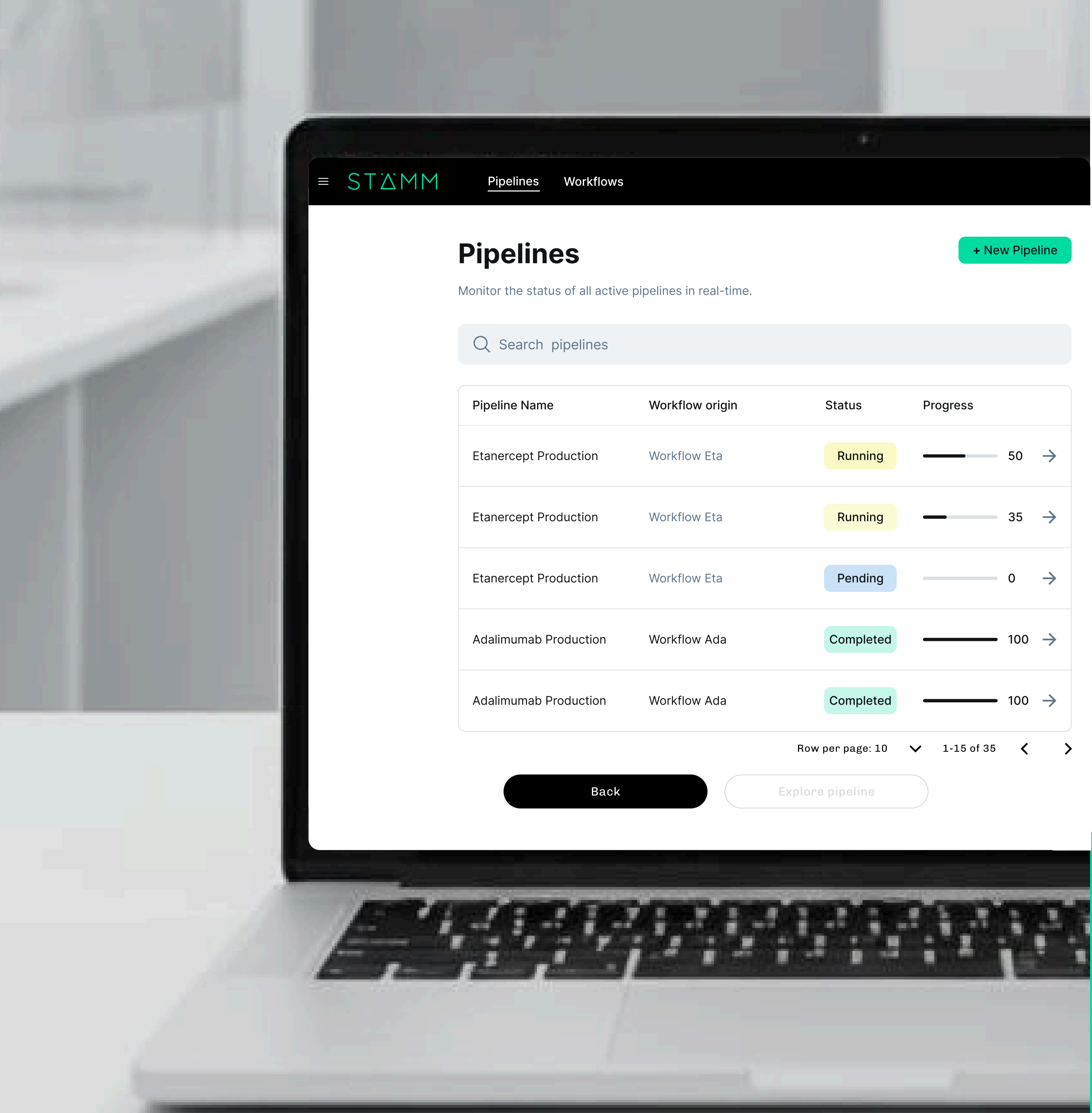
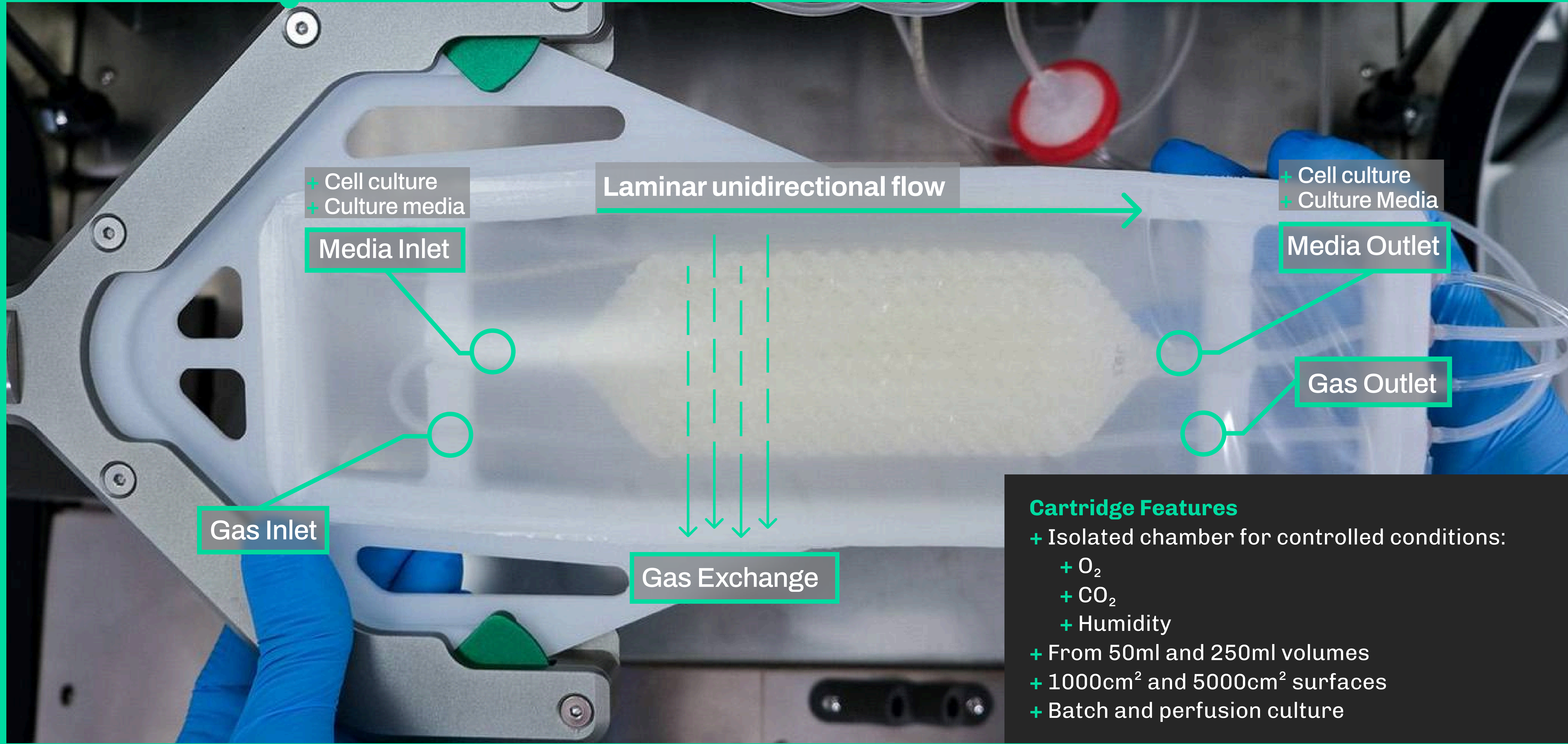
+ A 4X increase in peak viable cell density (VCD) compared to conventional fed-batch bioreactors.

+ Efficient support of low-density expansion, scaling from approximately 330 cells/cm² to 465,000 cells/cm².

+ High cell viability. Levels of 95% are reached for iPSCs. A 98% overall viability is also sustained for adherent cells like HEK293T.

+ Guaranteed uniform distribution of nutrients and gases, along with uniform growth of cells throughout the device.

+ Automated harvest method that recovers approximately 95% of cells. This automated cell extraction process does not require tangential flow filtration (TFF).



Automated Process Monitoring and Configuration

Cloud Bio-Manufacturing is a software that allows for the design, control, and real-time monitoring of the production process.

Key features

- + Facilitate the management of biological process parameters.
- + Enable seamless data collection and transfer for analysis.
- + Guarantee full process traceability.



Let's define modern biomanufacturing.

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