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.

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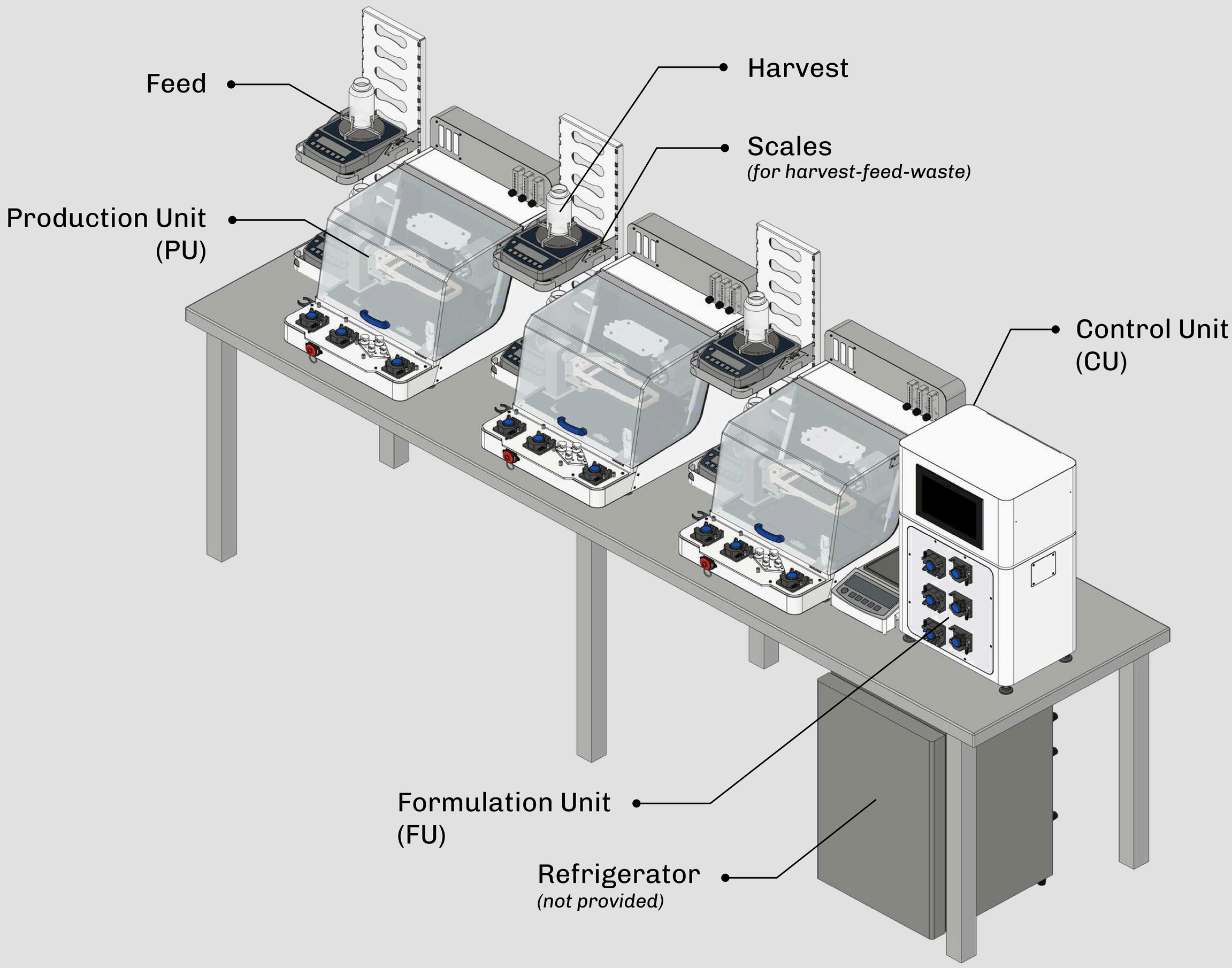
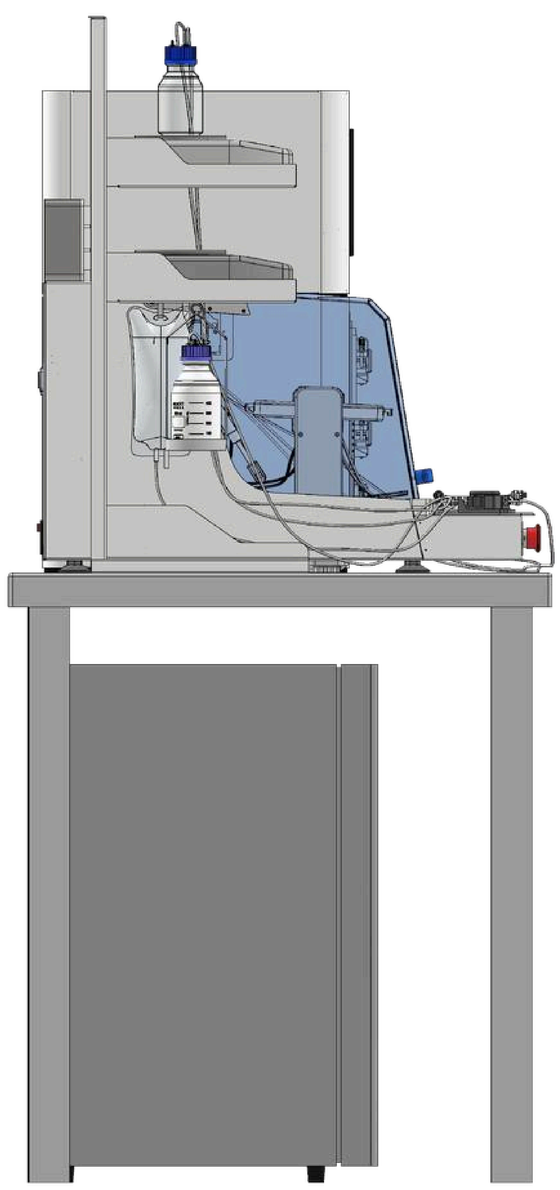
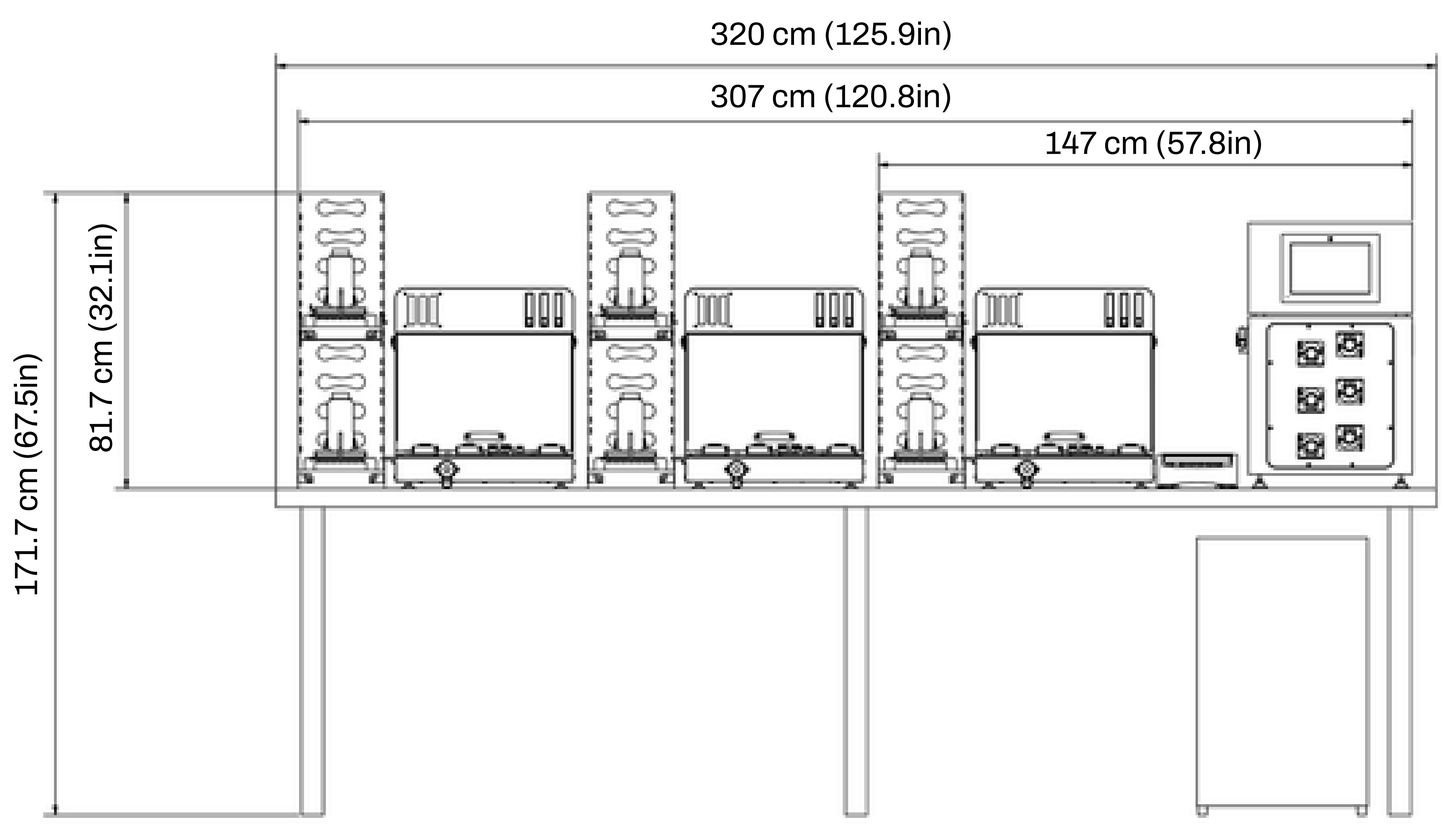
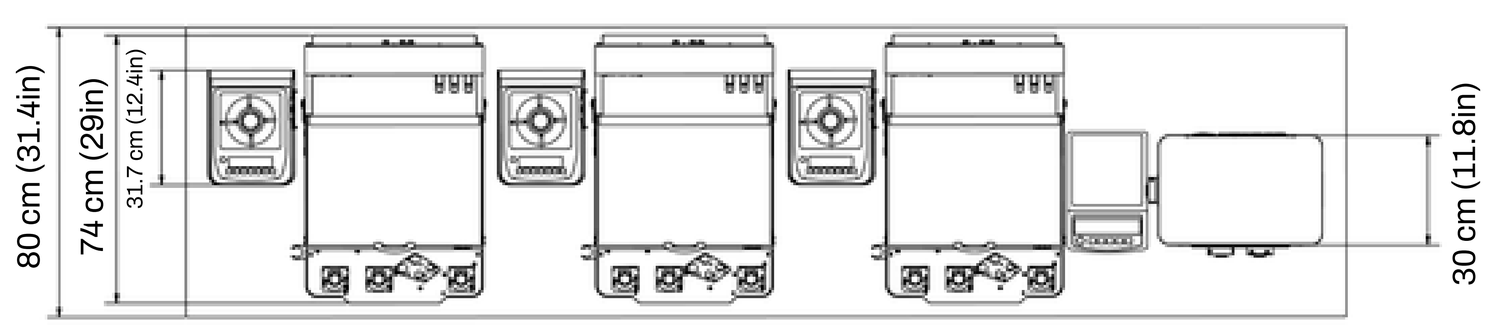


Reference dimensions







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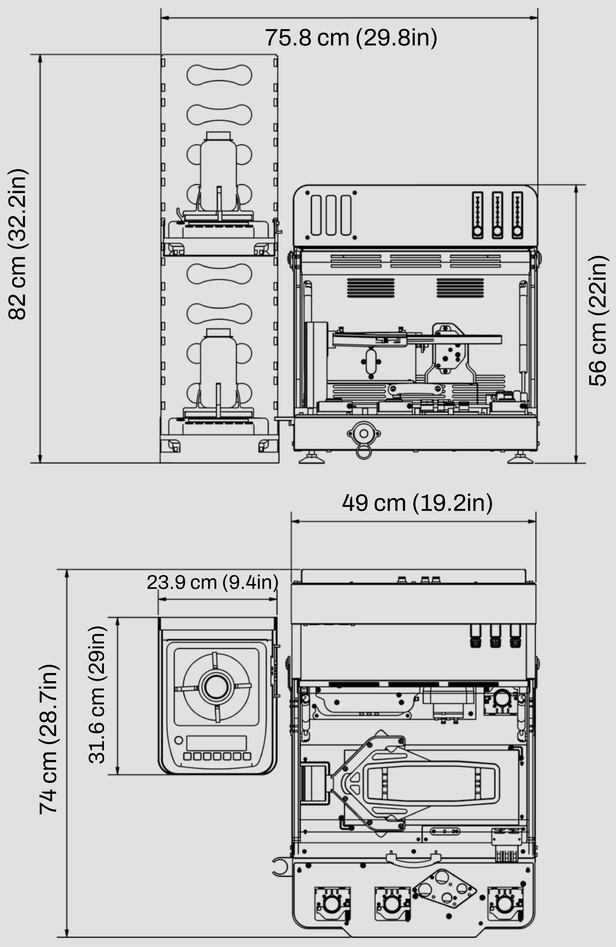

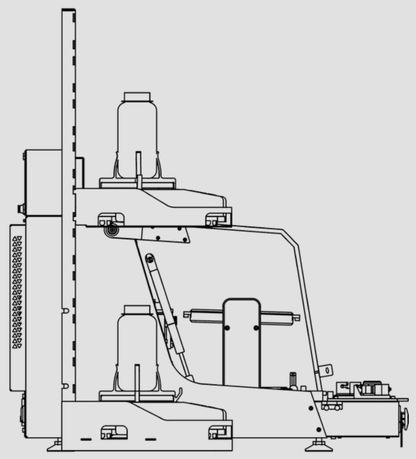

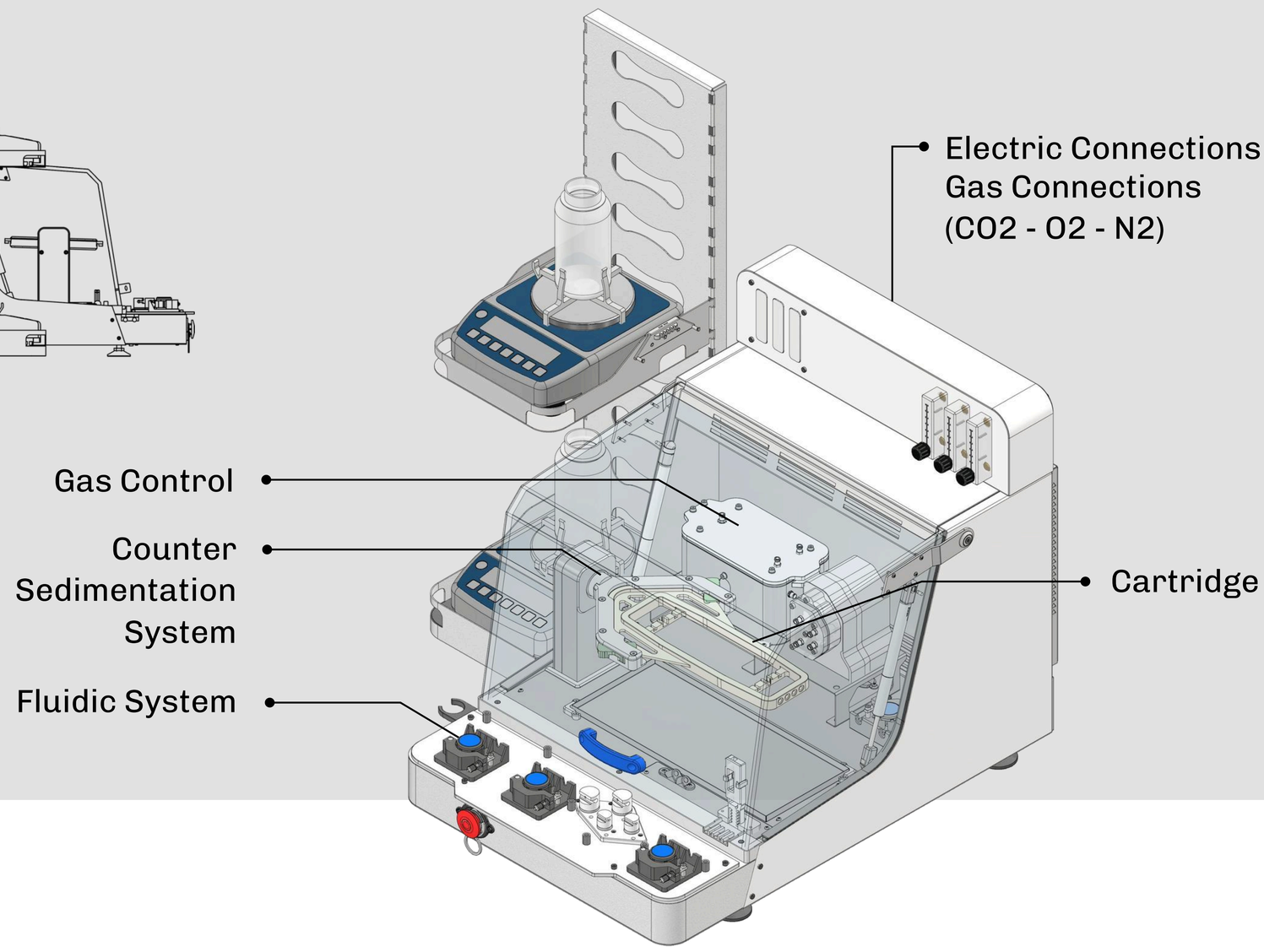

Machine specifics

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

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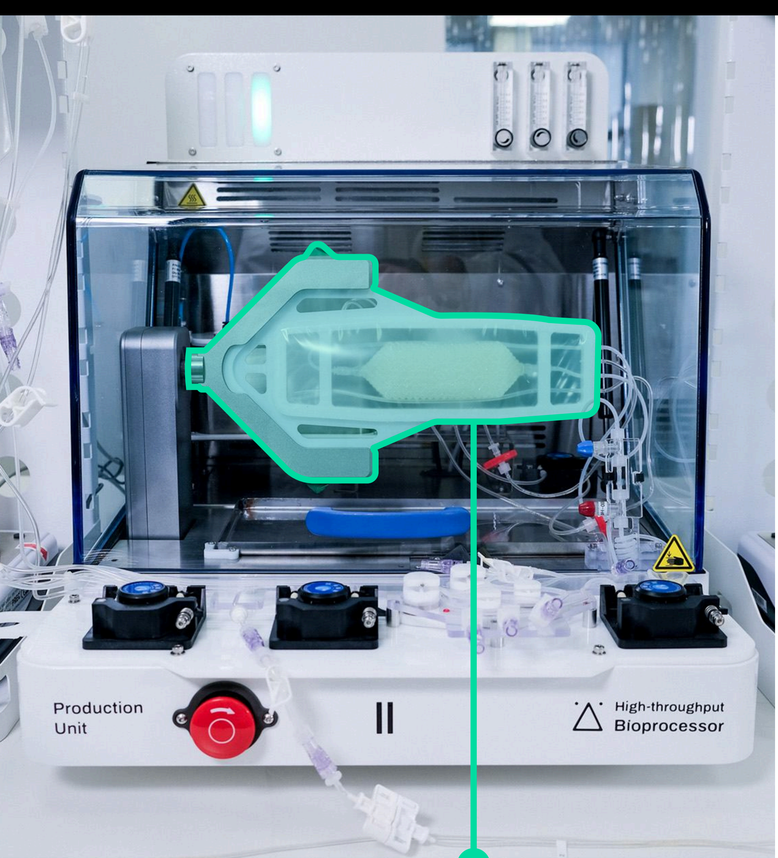
Consumable cartridge and Bubble-Free Bioreactor



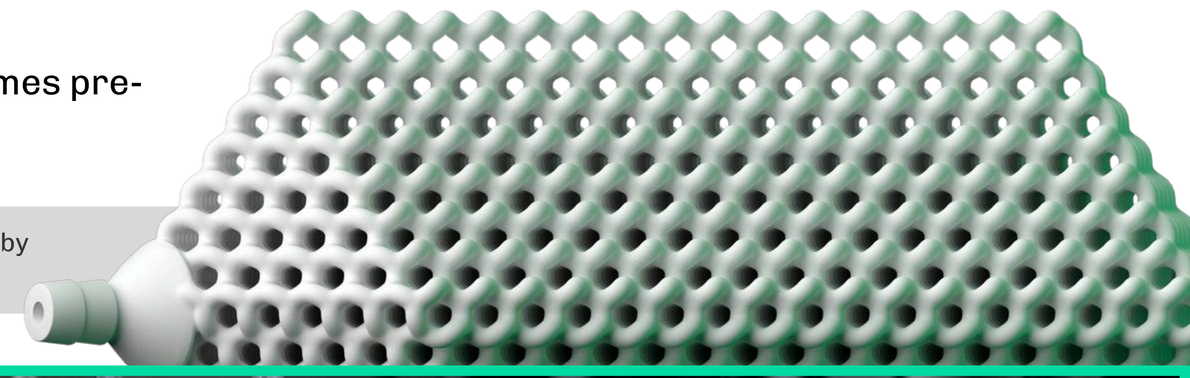
The **Bubble-Free Bioreactor (BFB)** is the core of the Consumable Cartridge.

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.

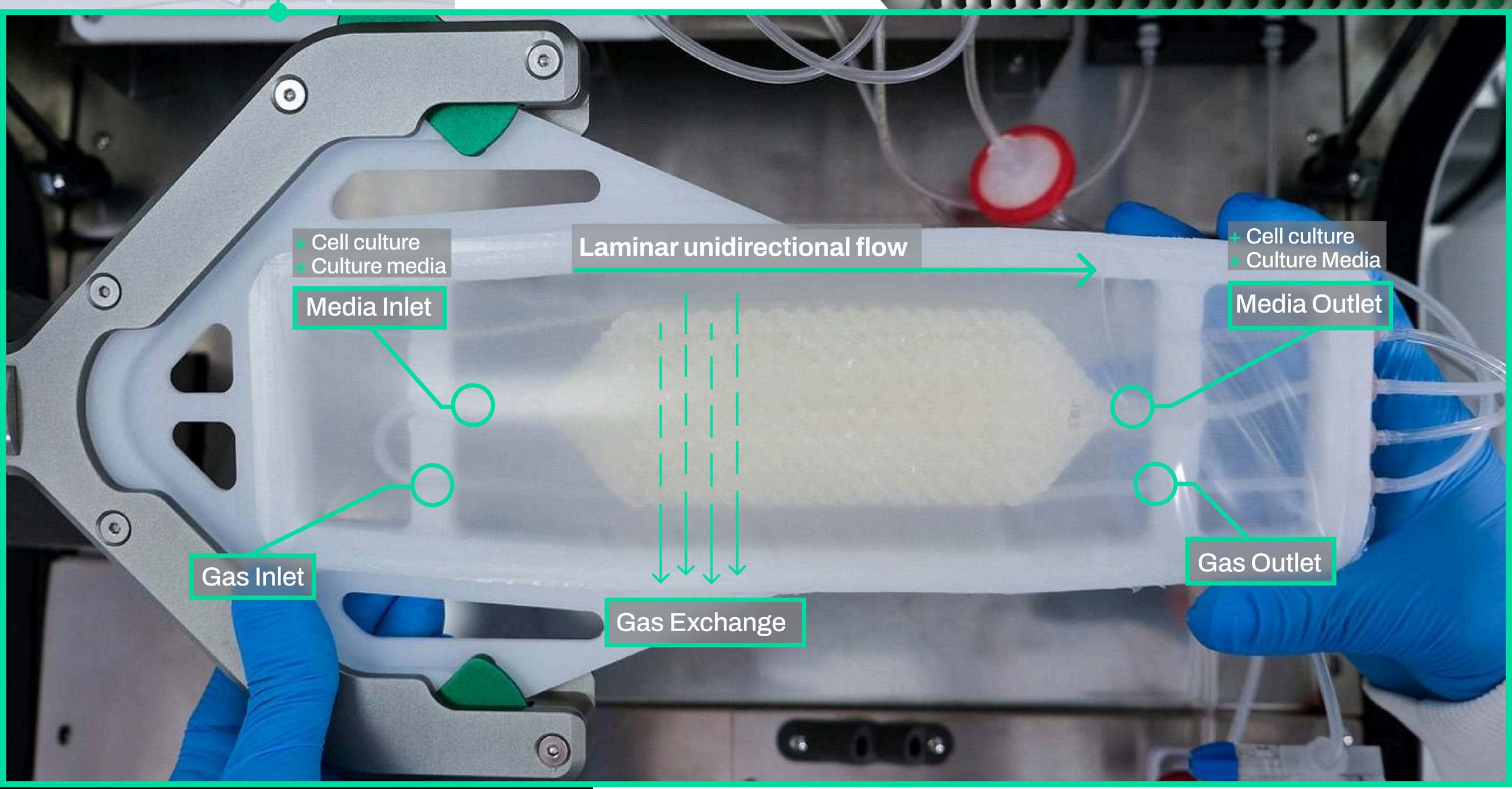
The Consumable Cartridge comes pre-assembled and sterilized.

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.

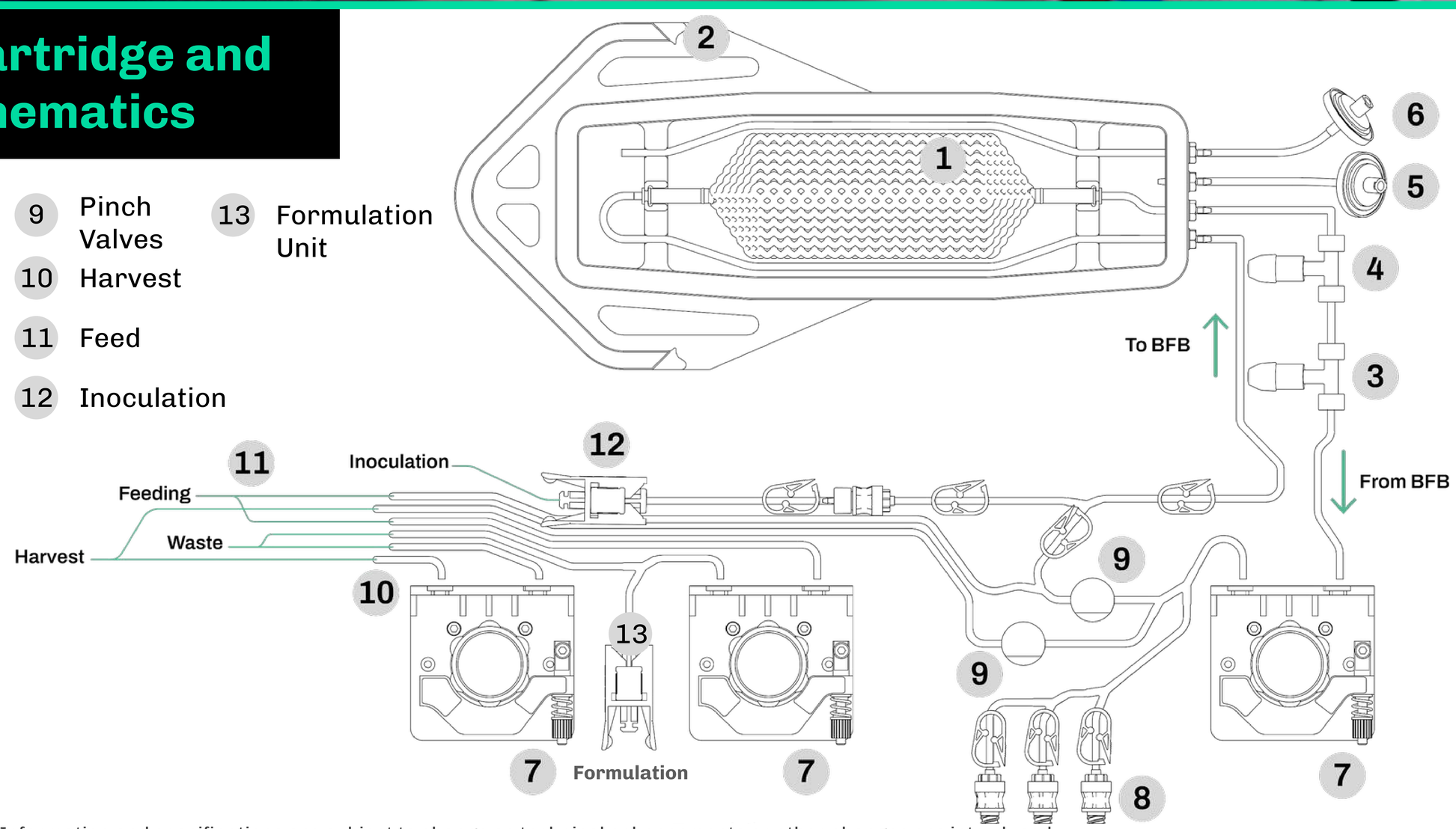


3D-printed gyroid architecture inspired by nature with a triply-periodic geometry



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



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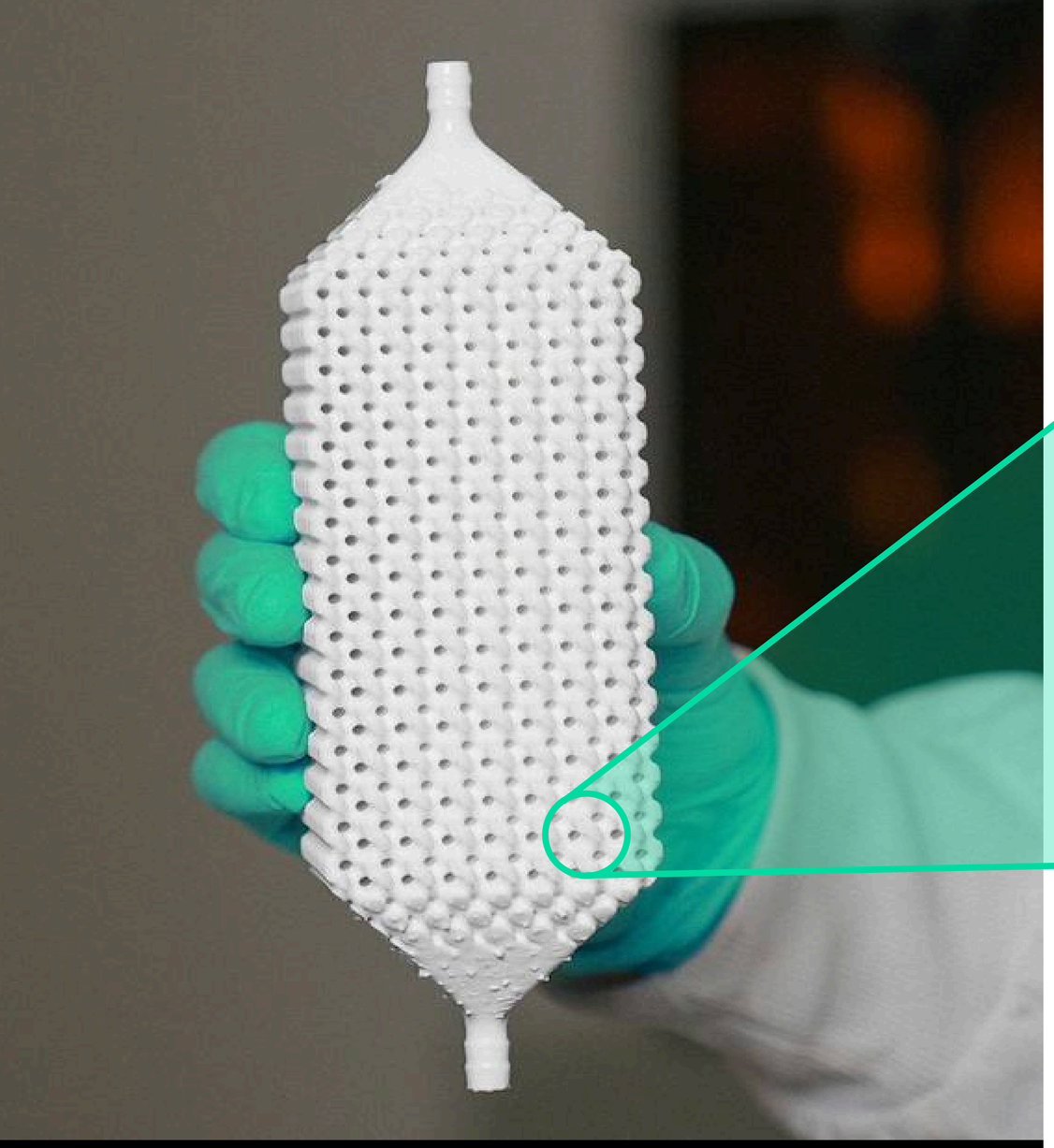
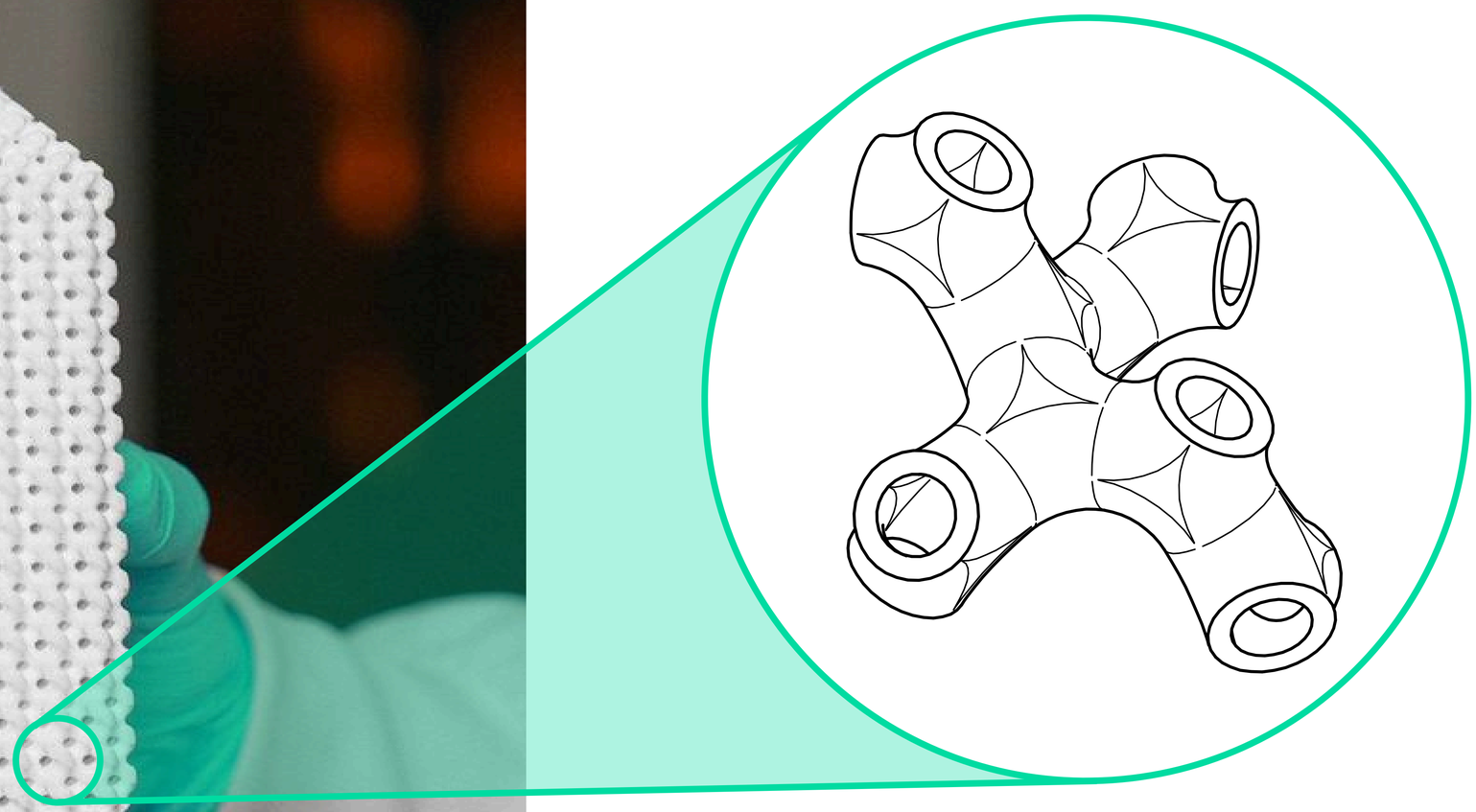
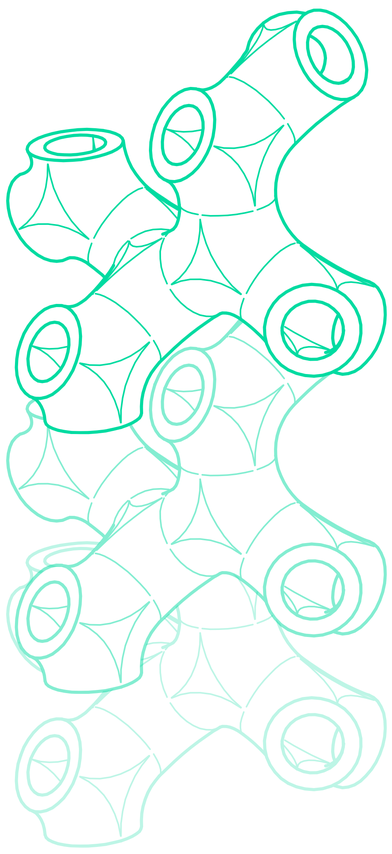


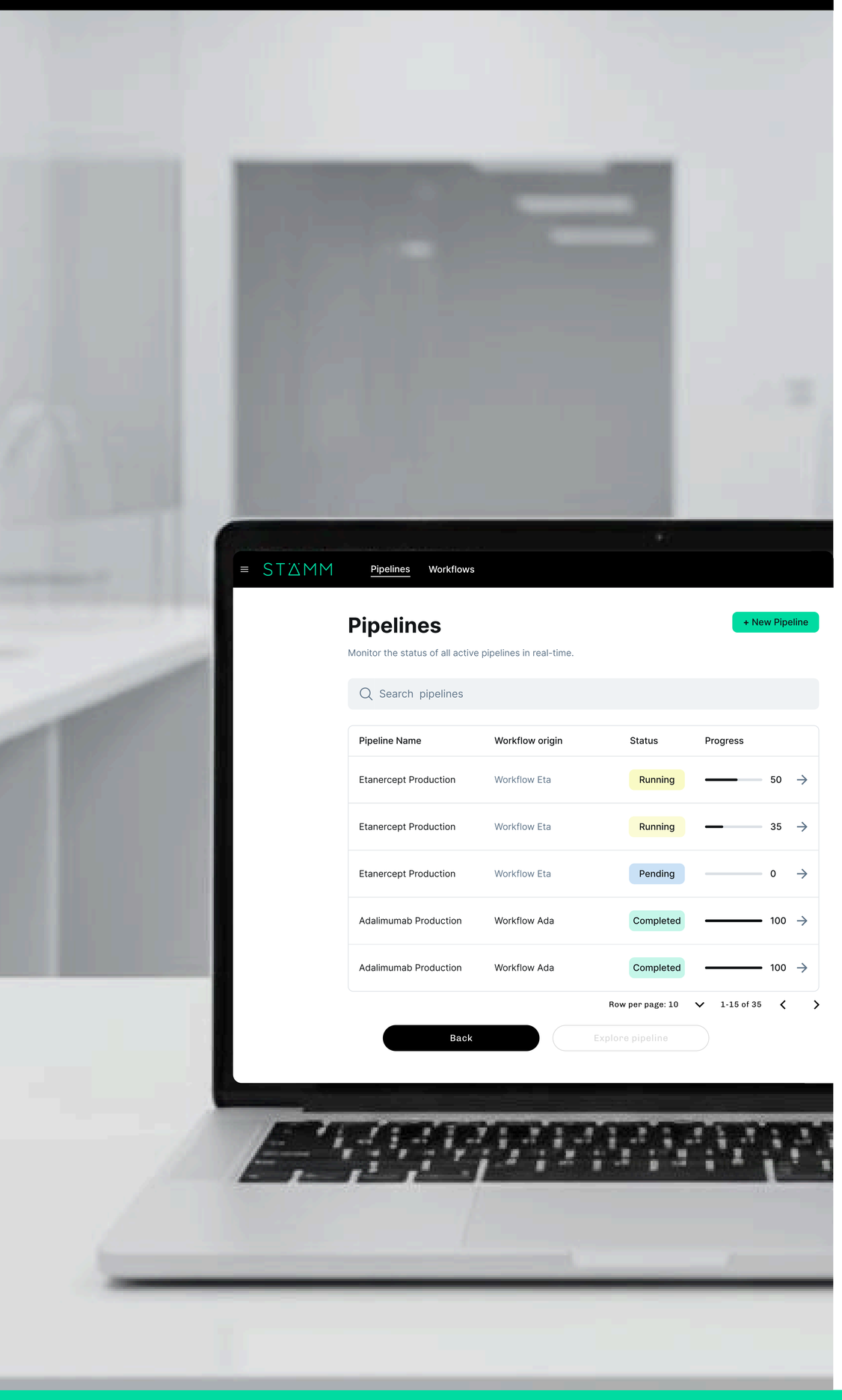


Up to 250ml productive volume or 5000cm² of surface to enable applications ranging from Process development to pre-clinical production.



Cartridge Features

+ Isolated chamber for controlled conditions:
  + O_2
  + CO_2
  + 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

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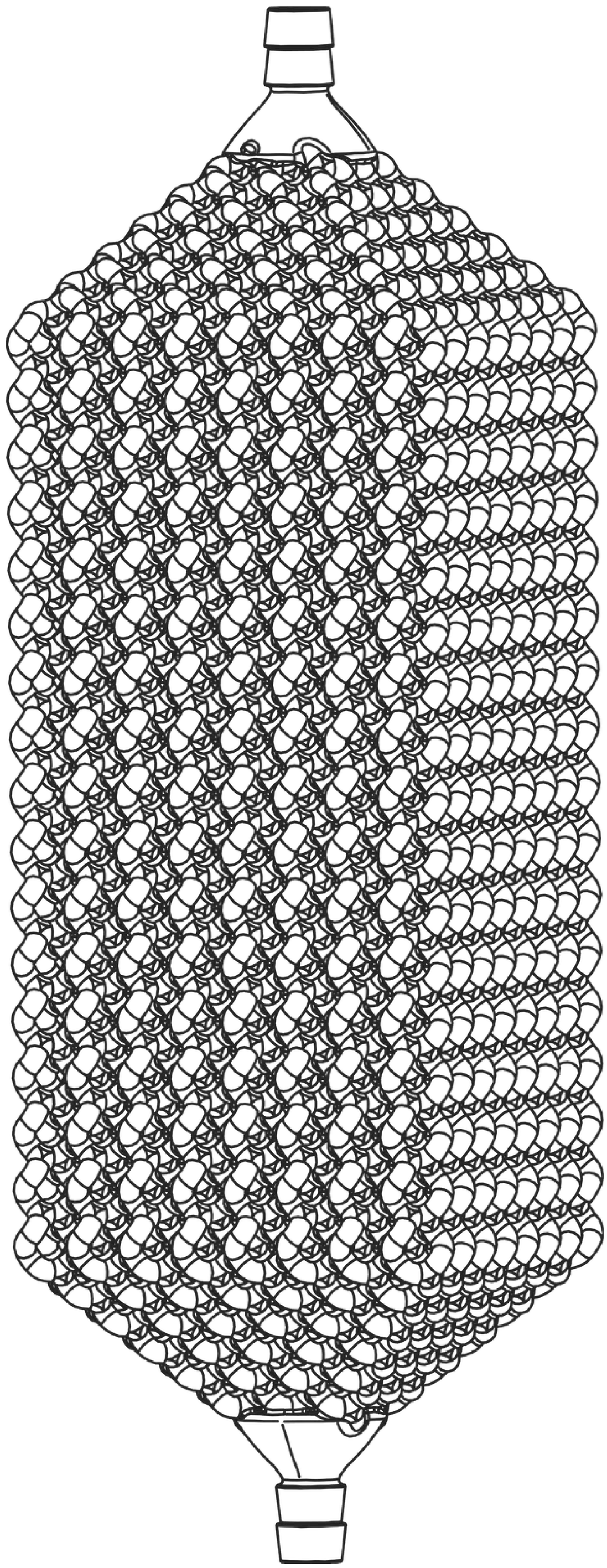

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Inspired by nature's solutions, Stämm is transforming biomanufacturing to accelerate life-changing therapies, with sustainable, future-ready solutions that meet the evolving needs of our clients and improve global health.

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Stämm High-Throughput Bioprocessor

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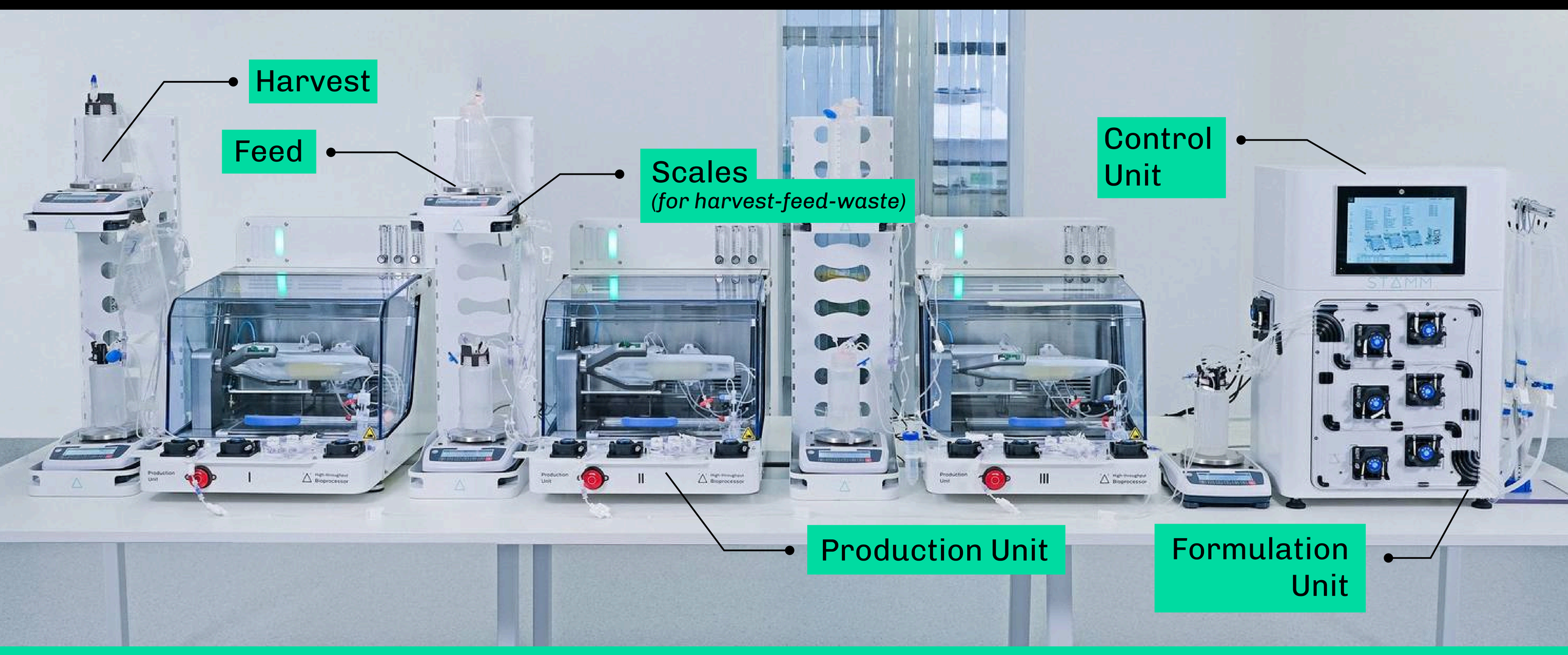

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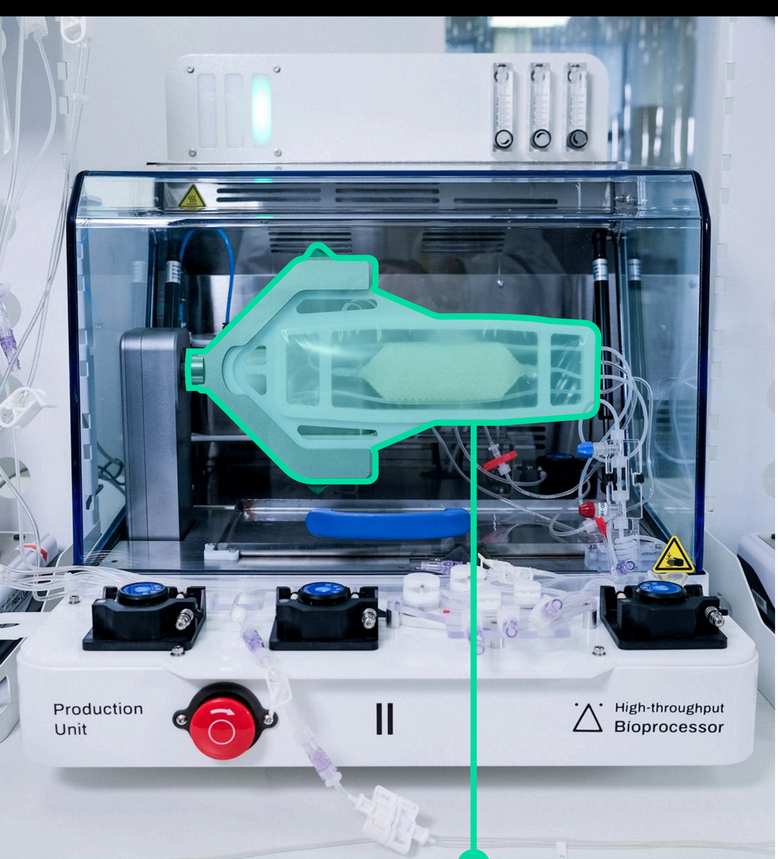

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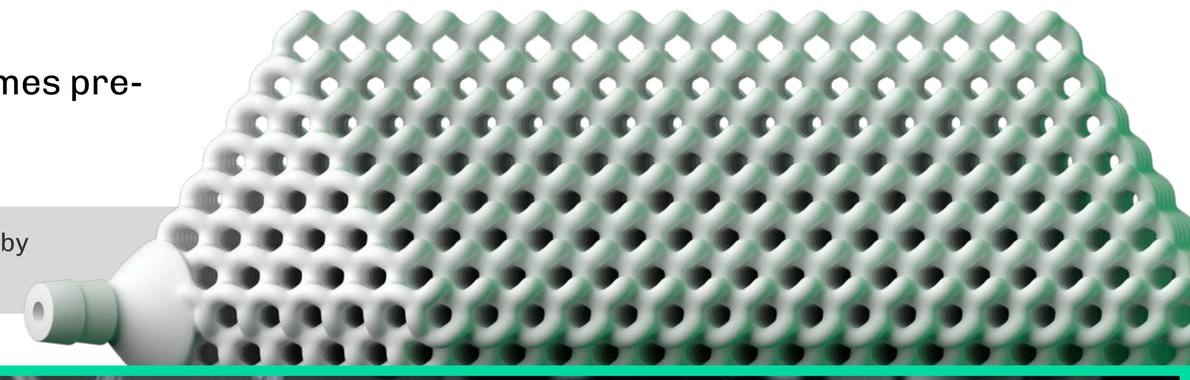

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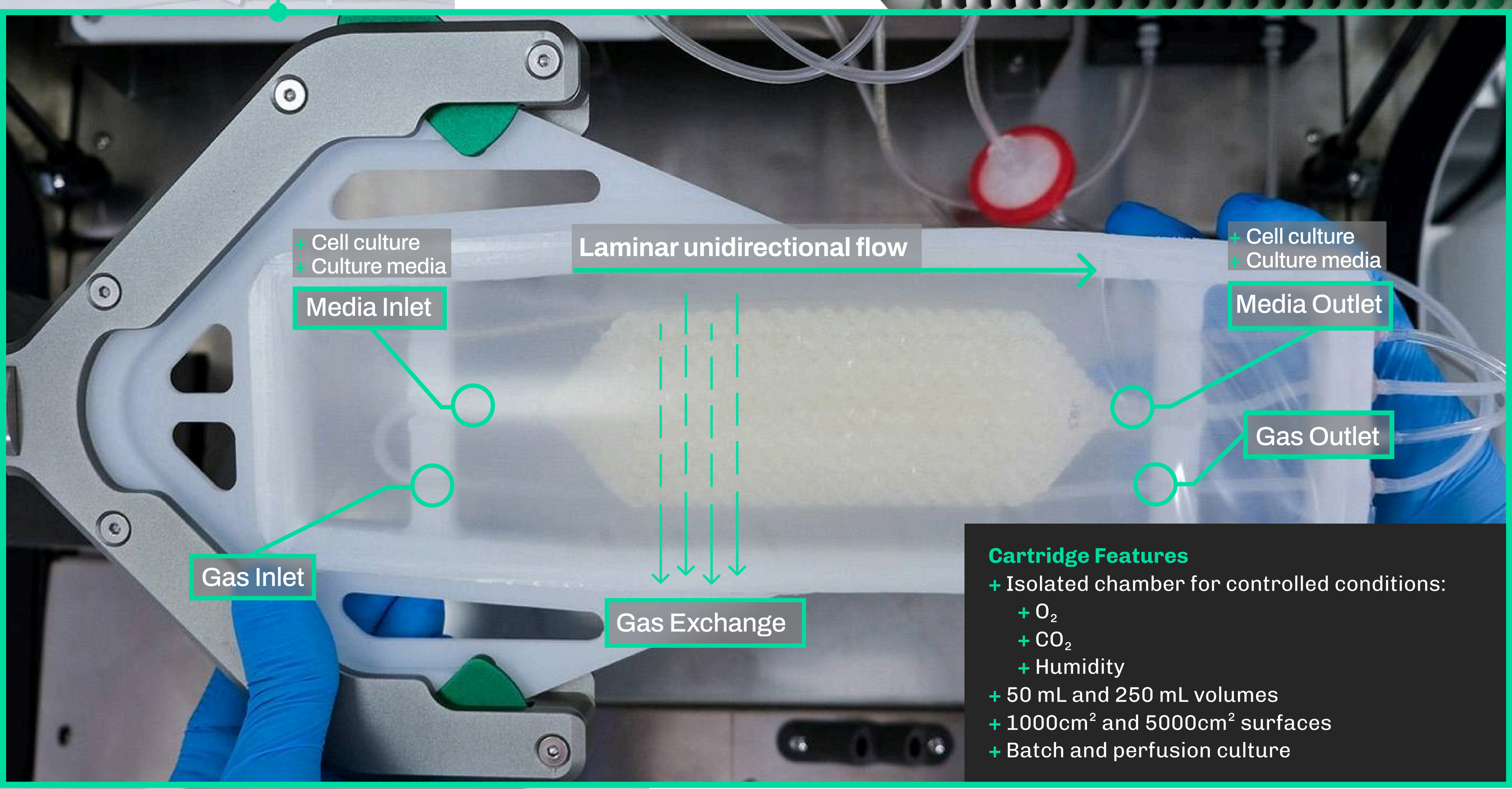

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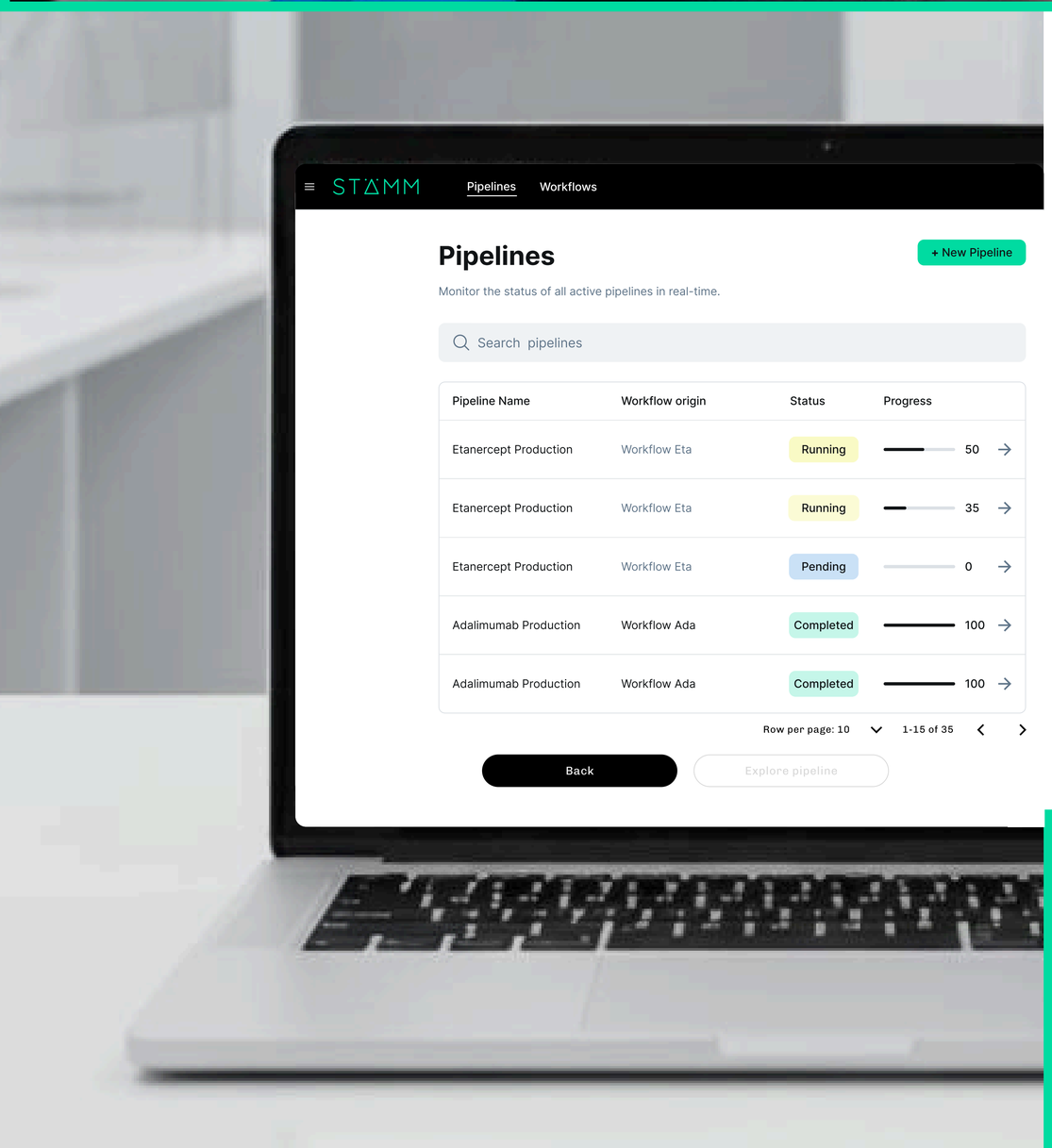

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