Boston Bioprocess

Capabilities Deck

2025

Bioreactors

Bioreactor Physical Size	Specifications		Typical Max Working Volume	Purpose
1.5 L	• Up to 5 pumps for feeds • 3.5 m/s agitator tip speed • Up to 16 reactors in parallel per run	• All bioreactors have advanced fermentation controls and programming on pH, DO, etc. • Off gas analyzer available • All bioreactors are glass vessels unless indicated otherwise	1 L*	• High throughput strain screening • Rapid process onboarding • Media or parameters optimization • Accelerates early decision making
14 L	• Up to 3 pumps for feeds • 4.7 m/s agitator tip speed • Up to 2 reactors in parallel per run		10 L*	• Bridging 1.5 L discovery with larger-scale development • Supports early DSP validation and sample generation
20 L	• Up to 3 pumps for feeds • 5.0 m/s agitator tip speed • Stainless steel vessel		16 L*	• Entry point to pilot-scale development, validate scale-up strategies • Generate initial batches for performance characterization
500 L	• Up to 4 pumps for feeds • 6.0 m/s agitator tip speed • Stainless steel vessel		400 L*	A robust pilot-scale fermenter ideal for process parameter optimization: • For producing larger sample volumes • Supports regulatory development activities or pre-GMP feasibility batches
1500 L	• Up to 4 pumps for feeds • 5.2 m/s agitator tip speed • Stainless steel vessel		1200 L*	Supporting sample generation for regulatory submissions, and late-stage process validation

*Recommended Max Working Volume

Centrifugation

Equipment	Specifications	Capacity	Purpose
Floor/Bucket Centrifuge	• Thermofisher Lynx 6000 • Temperature set points available • Up to 17,000 g RCF	• 6 x 1 L containers per loading	Batch-based solid-liquid cell separation in small volumes. Ideal for processing when flexibility is important
Disk Stack Centrifuge	• GEA – HSD1 • Automatic discharge mode and Continuous nozzle discharge mode • 1 L bowl size • 10,000 g max RCF	• 5 - 8 L/min* feed rate, continuous mode • 1 L/min* feed rate, discharge mode • 5,000 - 10,000 RPM	Used for solids (cells) liquid separation from fermentation broth Nozzle type disc stack: Enables continuous separation of solids (cells) from liquids. Constant ejection of solids without interrupting centrifugation Automatic Discharge Mode: Allows for periodic solids (cells) removal. Useful when feed variability or solids loading requires controlled discharge events
	• Alfa Laval Clara 20 • Automatic discharge mode • 2.2 L bowl size • 11,000 g max RCF	• 2 L/min* feed rate, discharge mode • 5,000 - 9,500 RPM	
	• Alfa Laval Clara 200 • Automatic discharge mode • 5 L bowl size • 10,000 g max RCF	• 15 L/min* feed rate, discharge mode • 5,000 - 7,500 RPM	
Decanter Centrifuge	• Alfa Laval SG2-100 • 3,140 g max RCF	• 5.5 L/min** feed rate	• Optimized for high solids, high PCV slurries • Effective for handling dense sludge or unconventional feedstocks

*Assuming 20% Packed Cell Volume (PCV) but throughput highly dependent on feed characteristics
*Assuming 30% Packed Cell Volume (PCV) but throughput highly dependent on feed characteristics

Cell Lysis

Equipment	Specifications	Capacity	Purpose
Bead Mill	• WAB Dyno-Mill KDL • Bead type and size are process dependent	• 1.4 L bead mill chamber volume • 1 - 50 L/hr processing range	General purpose bead mill for cell lysis, suitable for various applications • Can handle solid and liquid samples
	• WAB Dyno-Mill KD20 • Bead type and size are process dependent	• 16.5 L bead mill chamber volume • 70 – 500 L/hr processing range	For larger scale grinding and dispersion compared to the Dyno-Mill KDL • Can handle solid and liquid samples
GEA Panda 2000 (2-stage homogenizer)	• GEA Panda 200 • Bead type and size are process dependent	• 9 - 20 L/hr, dependent on pressure	High-pressure homogenizer for cell lysis (reduces particle size, disrupts cells, creates uniform mixtures) • Appropriate for liquid samples
Chemical Lysis	• Process dependent	• Refer to the auxiliary equipment slide	Option to perform chemical cell lysis if needed (Heat sensitive protein, protection from denaturation, etc)

Dead End Filtration

Equipment	Specifications	Capacity	Purpose
Depth Filtration	• Pico Plate & Frame Filter 30 Plate • 0.1 - 15 um pore size (not absolute)	• Up to 1.2 m^2, total surface area • 2 - 10 L/min*, filtration rate	Serves as a pre-filtration or clarification step to remove large particulates, cell debris, or aggregates before finer filtration Lenticular modules are highly scalable for larger batches or modular expansion
	• Filtrox 16" Lenticular Filtration • 0.04 - 35 um pore size (not absolute)	• Up to 10.8 m^2 total surface area • 2 - 10 L/min*, filtration rate	
Capsule Filtration	• Sterlitech and any other brands	Varies depending on brand, chemistries and sizes but can accommodate all vendors' specifications	A ready-to-use filtration solution combining housing and filter media in a compact format • Ideal for small-scale or single-use applications
Cartridge Filtration	• 2 x 30" Waco filter, up to 2 m^2 • 0.1-1.2 um pore sizes (absolute)	• 2.0 m^2 per housing for 30" cartridge • 2 - 10 L/min*, filtration rate	Provides robust filtration for medium to large process volumes Compatible with multiple pore sizes for staged filtration. Suitable for critical clarification and polishing steps
	• 2 x 20" Shelco filter, up to 1.34 m^2 • 0.1 - 1.2 um pore sizes (absolute)	• 1.34 m^2 per housing, filter area • 2 - 10 L/min*, filtration rate	
Bag Filters	• Cloth, plastics bag filters, pore size ranges from 1.0 um and above • 100 - 200 um max, polyester	Varies depending on brand, chemistries and sizes but can accommodate all vendors' specifications	A cost-effective bulk filtration option • Commonly used for initial clarification of high-load process streams or non-critical filtration

*Varies depending on feed characteristics

Chromatography

Equipment	Specifications	Capacity	Purpose
AKTA Avant	• Cytiva - AKTA Avant 150 (Bench) • 3 wavelength monitor • Quaternary Pump for buffer scouting • Filter choice is highly process dependent	Up to 150 mL/min (9L/hr)	Bench scale, chromatography development for high purity applications and projects
AKTA Process	• Cytiva - AKTA Process 10mm (Pilot) • 3 wavelength monitor • Filter choice is highly process dependent	Up to 10,000 mL/min (600 L/hr)	Pilot scale, chromatography development for high purity applications and projects

Tangential Flow Filtration

Equipment	Specifications	Capacity	Purpose
Ceramic Membrane	• Shan Dong Bona Group • Membrane = Alumina, Zirconia	0.095 m^2 filter SA	Pressure-driven separation, typically supporting volumes 10 - 20 L. Can be used for cell separation or further broth clarification
	• GEA Model R with Atech ceramic membranes • Membrane = Alumina, Zirconia	1.0 m^2 filter SA	Pressure-driven separation, typically supporting volumes more than 60 L. Can be used for cell separation or further broth clarification
Flat Sheet	• Repligen TangenX (Bench) • Membrane = Any Repligen TangenX compatible membrane	0.5 m^2 filter SA	Compact and flexible format for early-stage DSP process development, typically supporting volumes 1 - 20 L
	• Repligen TangenX (Pilot) • Membrane = Any Repligen TangenX compatible membrane	5 m^2 filter SA	Pilot-scale platform optimized for mid-scale DSP development more than 60 L
Spiral Wound	• Sterlitech 1812 Membrane Test Skid • 1.8” Spiral wound TFF • Membrane = PES, PS, PVDF, etc	0.3 m^2 filter SA	Entry-level spiral TFF setup for process development at 10 - 20 L scale. Offers ease of handling and efficient surface area-to-footprint ratio
	• GEA Model R • 2.5” Spiral wound TFF or 2 x 3.8” Spiral wound TFF columns • Membrane = PES, PS, PVDF, etc	0.7 m^2 Filter SA (per 2.5” housing) 7 m^2 Filter SA (per 3.8” housing)	Scalable TFF solution for larger DSP runs more than 60 L for sample generation. Ideal for both development and batch-ready membrane performance assessment

*SA = Surface area

Drying

Equipment	Specifications	Evaporated Capacity	Purpose
Spray Dryer	• Buchi 290 – Glass chamber • 120 C - 220 C inlet temp range • 2-fluid nozzle, top mounted (co-current)	Up to 2 L/day*	Lab scale spray dryer used for small batch production
	• Pilotech YC-019 - Stainless Steel Chamber • 105 C – 300 C inlet temp range • 2-fluid nozzle, top mounted (co-current)	Up to 5L/hr*	Lab and pilot-scale spray dryer, popular for flexibility and cost-effectiveness
	• Anhydro Spray Dryer - Stainless Steel Chamber • 105 C – 300 C inlet temp range • 2-fluid nozzle, bottom or top mount (co or counter current)	Up to 60 L/day*	Full-scale industrial spray dryer designed for large-volume, continuous production
Tray Drying	• Thermo Scientific Lindberg • 30 mmHg vacuum capability • Temperature control	Up to 20 L scale**	Product that is heat-sensitive, oxidation-prone, or requires low-temperature drying for quality preservation
	• Temperature and humidity control	Up to 1500 L scale**	Drying stable products at a larger scale
Freeze Drying	• Labconco Freezone • 3 x 11” x 9” trays per loading	Up to 20 L scale** 1 L – 2 L per loading**	Drying delicate/thermolabile materials. Precise control of temperature, vacuum, and drying profiles
	• Harvest Right HRC-100 • 7 x 29.5” x 11” trays per loading	Up to 500 L scale** 14 L – 21 L per loading**	Freeze drying at a larger scale

*Varies based on inlet temperature; **Varies based on solids loading and slurry characteristics

Auxiliary Equipment- Vessels & Unit OPs

Equipment	Specifications	Capacity	Purpose
Tank – 200 L	• CIP-able	200 L	Holding/processing tank
Feed Tank – 400 L	• CIP-able • Steam//water jacket • Bottom mount mag mix agitator	400 L	Often used as feed tank to 500 L fermenter and can be used as holding/processing tank
Harvest Tank – 800 L	• CIP-able • Steam//water jacket • Bottom mount mag mix agitator	800 L	Often used as harvest/dilution tank and can be used as holding/processing tank
Tank – 900 L	• CIP-able • Steam//chilling jacket • Bottom mount mag mix agitator	900 L	Holding/processing tank
Tank – 2000 L Tank	• CIP-able • Steam//chilling jacket • Top mount agitation	2000 L	Holding/processing tank
Vibratory Separator	• 30” SWECO Vibratory Separator for hard pellet solids	Varies depending on feed characteristics	Cell separation process

Class I Div I Volatiles Room Equipment

Equipment	Specifications	Capacity	Purpose
750 L Tank	• Hastelloy reactor • Bottom mount mag mix agitator • Supports full vacuum • Steam//chilling jacket	750 L	Mainly used for solvent extraction processes with hazardous chemicals Able to distill to or from any combination of these three tanks
900 L Tank	• 316 Stainless steel • Bottom mount mag mix agitator • Supports full vacuum • Steam//chilling jacket	900 L	
660 L Tank	• 304 Stainless steel • Double-action (counterrotating) side-scrape agitated • Supports full vacuum • Steam//chilling jacket	660 L	
Disc stack centrifuge	• GEA SC-06 • Explosion Proof • Max RCF = ~10,000 g • RPM = 5000 – 12150 • 2-phase (solid-liquid) separation	Varies depending on feed characteristics	Rental unit - can support hazardous and flammable material

Analytical Methods

Equipment	Equipment Type	Possible Applications
Roche CEDEX Bio / Bio HT	UV-Vis Bioanalyzer, UPLC	In-Process Metabolites: glucose, glycerol, methanol, ethanol, acetate, ammonium, nitrate, total protein, calcium etc.
WATERS Acquity H-Class+	HPLC / UPLC	Product content and purity, metabolites, activity assays
Mettler Toledo HE53	Moisture Analyzer	Moisture Content / Total Dissolved Solids
BMG Spectrostar Nano	UV-Vis plate reader (microplates, cuvette)	Protein content (Bradford, BCA), ELISA, Enzyme activity
Thermofisher Xcell SureLock MiniGel	Gel electrophoresis system Polyacrylamide	SDS PAGE/ Native PAGE
Thermofisher Xcell SureLock Blot Module	Blotting system	Western Blot
Bio-Rad PCR and gel system	PCR thermocycler, Gel electrophoresis Agarose	DNA multiplication and detection
Anton Paar DMA 35	Densitometer (hand-held)	Density measurements
Thermo Scientific Orion Turbidity meter	Turbidity meter	Turbidity measurements
USS DVT6 Digital Viscometer	Viscometer	Viscosity measurements
Thermofisher Genesys 30 and 50	UV-Vis spectrophotometer (cuvettes)	Photometry, Optical density, Activity assays

Additionally, we offer a variety of other analytical methods like: contamination checks, CFU counting, shelf-life studies, storage testing and many more.
We have established relationships with external testing labs and will find external collaborators for our clients as needed.

External Testing	Established External Partners
FDA certified Sample testing	Eurofins Scientific, Merieux NutriSciences
Mass spectrometry, Gas chromatography, FAME, flow cytometry, advanced microscopy, etc	University of Illinois UIUC, IBRL

Our Advantage

Why Boston Bioprocess?

Leading Development Focused CDMO

Boston Bioprocess is your agile and scalable CDMO with a focus on end-to-end support. We offer scalable infrastructure, fermentation expertise, and a collaborative approach tailored to your needs. Boston Bioprocess can connect clients to further scaling partners and offer seamless tech transferring. Our deep technical expertise makes us the ideal partner for de-risking development and accelerating commercialization.

25+ Clients — Founded in 2022 and have served 25+ clients across the globe

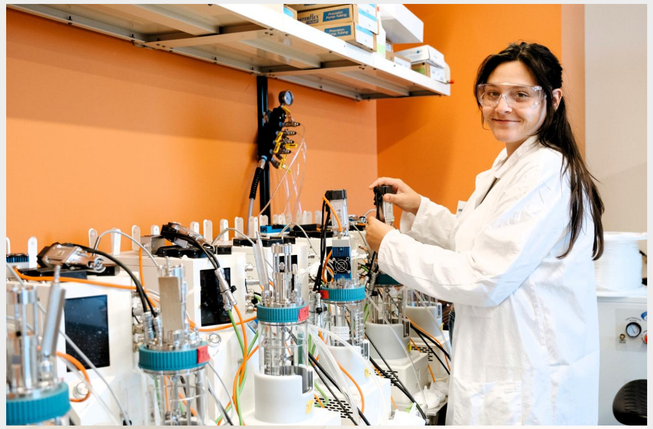
Data Oriented — Dedicated data science team accelerates process optimization through targeted, analytics-driven decision making

Industry Coverage — Proudly served clients across food and beverage, specialty enzymes, agricultural molecules, biofuels, and more

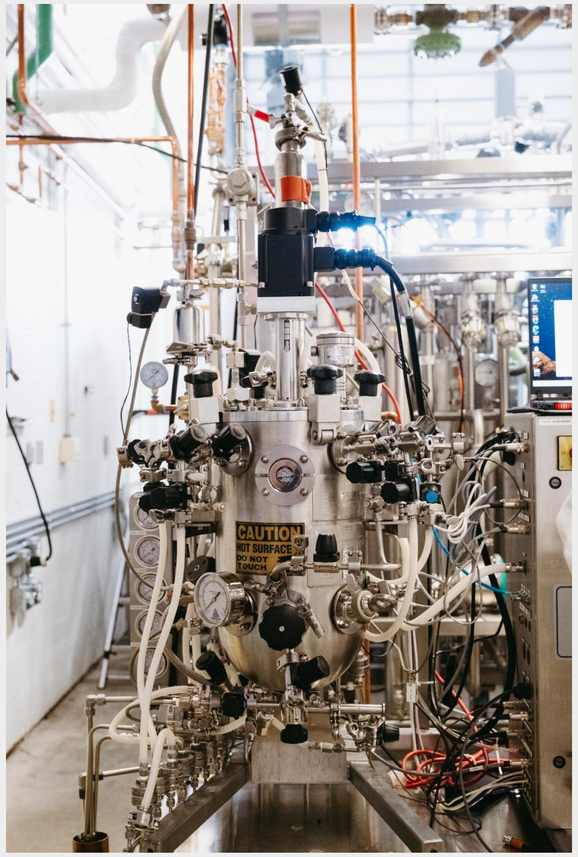
White-glove Collaboration — You get a dedicated project manager and a team of engineers, not just a help desk. Scientists talk to scientists

OUR CAPABILITY

Fermentation



1.5L and 15L Fermentation



20L Fermentation

500L Fermentation

OUR CAPABILITY

Downstream Processing

TFF Systems

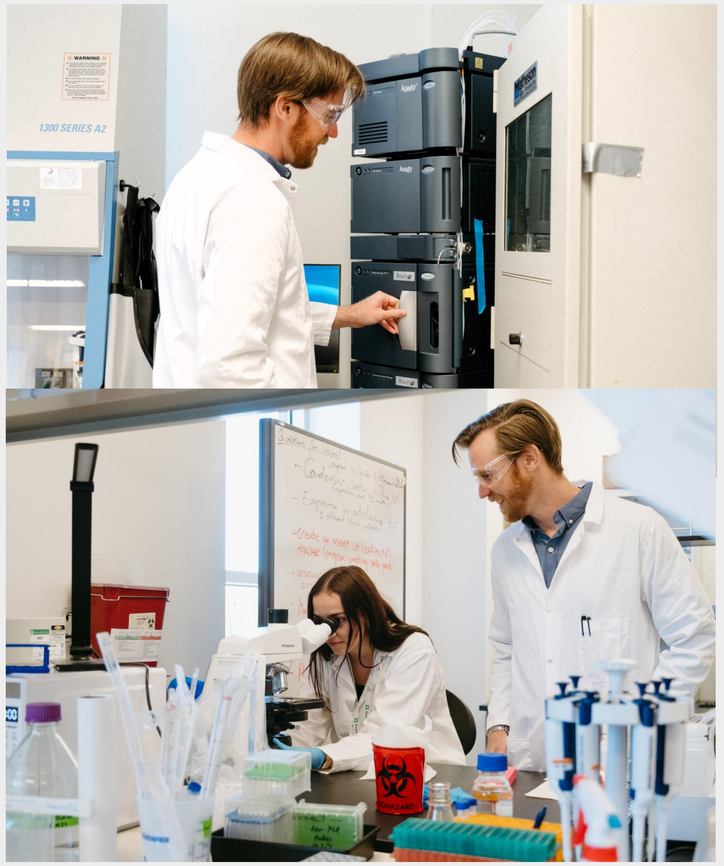
DSC and Homogenization

Spray Drying

OUR CAPABILITY

Analytical

CEDEX



HPLC and Cell Viability

SDS PAGE and Western Blot

Boston Bioprocess

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