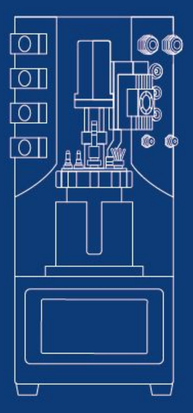
HOLVES

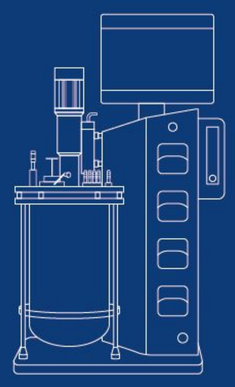
BIOPROCESS+

HOLVES Bioprocess Equipment and Systems

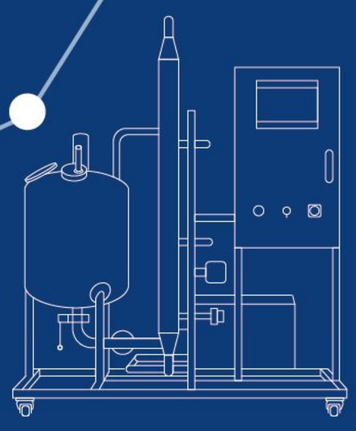
PROCESS DEVELOPMENT
PILOT SCALE-UP
BIOMANUFACTURING



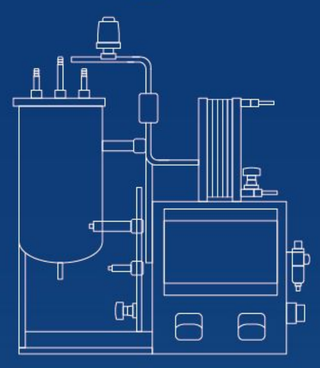
High–Throughput
Parallel Bioreactors



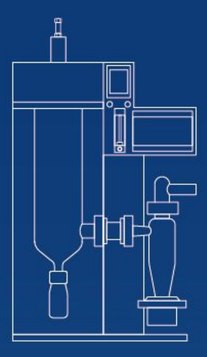
Laboratory Glass
Fermenters / Bioreactors



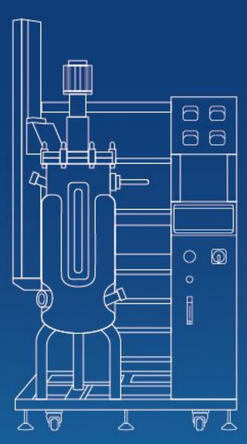
Membrane Separation
and Filtration Systems



Tangential Flow
Ultrafiltration Systems



Spray Dryer



Stainless Steel
Fermenters / Bioreactors

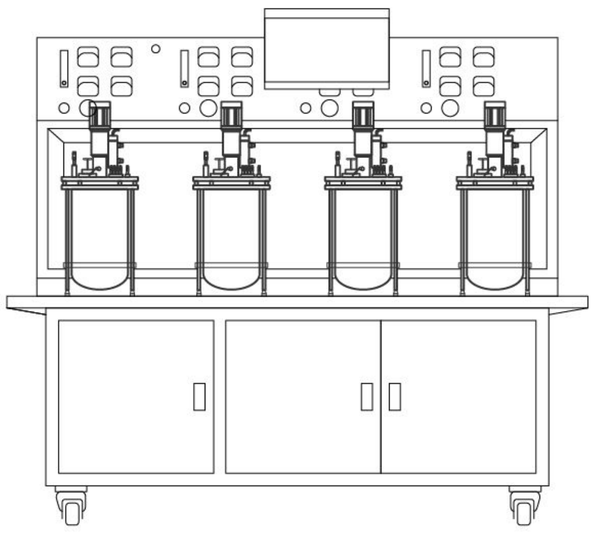


01 HOLVES | About HOLVES Page 03/04

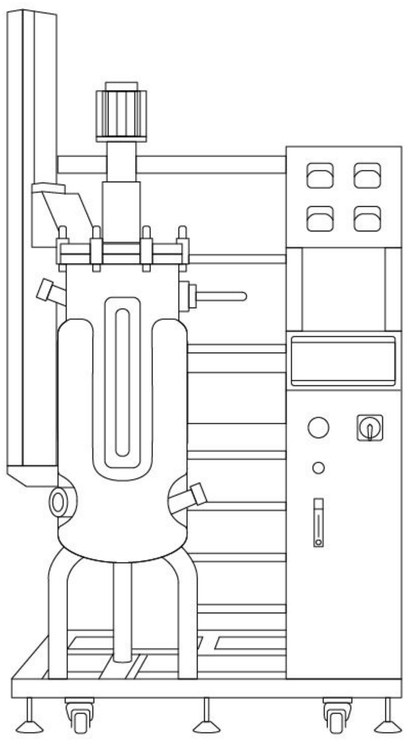
02 PRODUCTS | Product Portfolio Page 05/14



5 L Fermenter



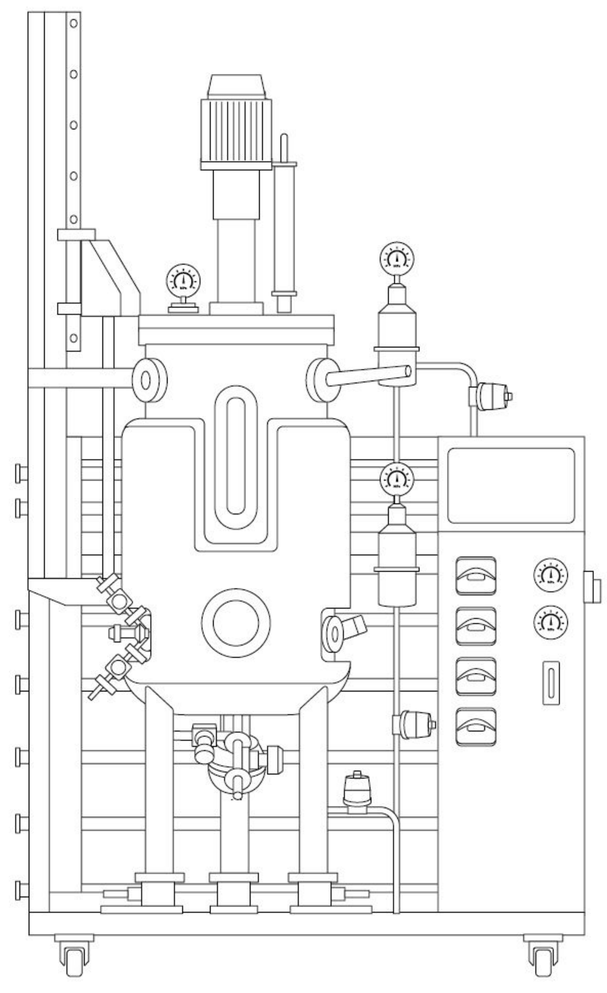
7 L Fermenter



100 L Fermenter



500 mL Bioreactor



1000 L Bioreactor

03 CONTROL | Control and Software Page 15/16

04 DATA | Data and Intelligence Page 17/18

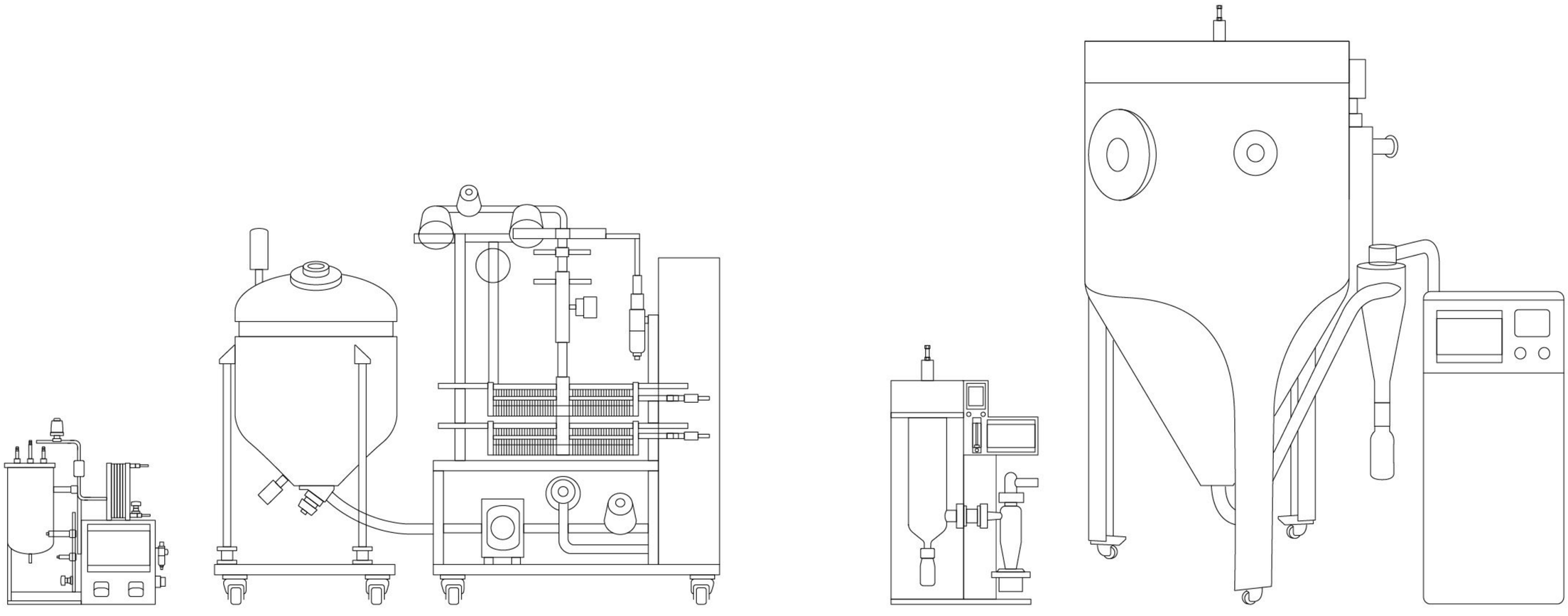
05 PLATFORMS | Platform Ecosystem Page 19/20

06 PROCESS | Process Applications Page 21/22

Recombinant Proteins / Enzyme Products

07 SERVICE | Engineering and Service Page 23/26

Brand and Corporate Capabilities



0.1m²

80m²

1800mL/h

5L/h

TFF System

Spray Dryer

Equipment-Level Control and Specialized Process Functions

Nexus Insight + Standalone Scientific Analysis Software

MatrixH / BioFlow

GLP-1

Engineering, Process Project Delivery, GMP Documentation and Qualification

ABOUT HOLVES
COMPANY PROFILE

Founded in 2010, HOLVES is an innovation-driven company focused on life sciences. Serving synthetic biology, biopharmaceuticals and innovative biomedical applications, the company specializes in equipment development and manufacturing. Its core products include advanced fermenters, bioreactors, ultrafiltration systems and spray dryers, covering the entire workflow from laboratory research and development to industrial-scale production.

With intelligent automation at the core of its technology, HOLVES works to improve control of critical process parameters and ensure consistent organization of data across equipment. This enables process knowledge developed during R&D to be validated, reused and carried forward into scale-up.

Establishing the Business

2010
Brand Established

The HOLVES brand and Beijing HOLVES Biotechnology Co., Ltd. were established, marking the company's entry into bioprocess equipment.

2012
International Partnerships

HOLVES became a distributor for NBS bioreactors from the United States and GEA spray dryers from Germany, gaining experience in advanced process design and manufacturing through project implementation.

R&D and Manufacturing

2017
Manufacturing Base Established

A standardized manufacturing facility entered operation, and Anhui HOLVES Engineering Technology Co., Ltd. was established, creating an integrated structure for R&D, engineering and manufacturing.

2019
Expansion of Proprietary Products

The Cla and Eu laboratory fermenter series and compact tangential flow ultrafiltration systems were introduced, launching a new phase of in-house development and product portfolio expansion.

2022
Enhanced System Capabilities

The ultrafiltration portfolio continued to expand, and the Su310 stainless steel fermenter series was introduced for pilot scale-up and small-scale production.

Platform Ecosystem

2026
Platform Ecosystem Established

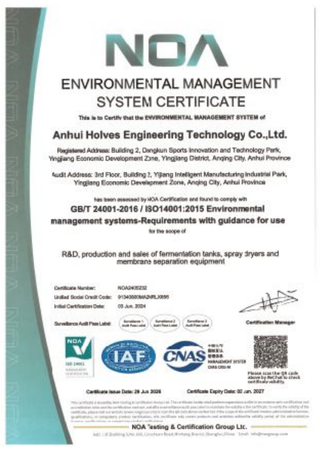
Further development of high-throughput parallel bioreactors and specialized data analysis software supported the establishment of the MatrixH™ High-Throughput Screening Platform and BioFlow™ Intelligent Bioprocess Platform.

Certifications and Credentials

As of September 2026

8

ISO & CE Certifications









As of September 2026

5

Granted Invention Patents









As of September 2026

14

Utility Model Patents and Software Copyright









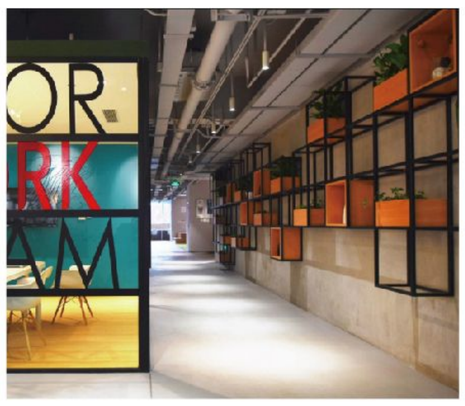
As of September 2026

Corporate Credentials





Company Locations



2010

Beijing Headquarters

4F, Future Building, Changying, Chaoyang District, Beijing, China



2017

Anqing Manufacturing Base

Bldg 2, Yijiang Smart Manufacturing Park, Yingjiang District, Anqing, Anhui



2025

Anqing Manufacturing Base

No. 9 Xinxing Road, Yingjiang District, Anqing, Anhui, China



2026

Hefei Branch

Tower A, Xinda Yinxin Plaza, High-Tech Zone, Hefei, Anhui, China

MatrixH PBR

High-Throughput Parallel Bioreactor

MatrixH PBR is a new-generation, high-throughput parallel bioreactor platform developed in-house by HOLVES. It integrates parallel cultivation, intelligent control, data acquisition and analysis, enabling simultaneous operation of multiple reactor units with independent parameter control and centralized data management. Designed for strain screening, media optimization, feeding strategy development and process window exploration, the platform helps researchers efficiently compare multiple conditions and validate processes.



High-Throughput Parallel Experiments

Flexible configurations of 8, 16, 32 or 64 reactor units enable simultaneous experiments under multiple conditions, significantly increasing experimental throughput and process development efficiency.

Efficient Multivariable Screening

Parallel comparisons of strains, media and critical process parameters, combined with design of experiments (DoE), enable efficient identification of key factors and suitable process windows.

Precise, Independent Control

Each reactor unit independently controls pH, dissolved oxygen (DO), temperature, agitation, feeding and aeration, accurately reproducing experimental conditions and improving result reproducibility and reliability.

Centralized Data Management

Automatic acquisition and centralized management of full-process data support batch comparisons and trend analysis, creating a traceable process data foundation for R&D decisions.



1000mL



500mL

500/1000mL
Available Vessel Volumes

6+
Controlled Parameters

1000+
Data Points Acquired per Second

24/7
Stable Operation and Monitoring

Laboratory Glass Fermenters / Bioreactors

Easy to use

Eu210 Series
Advanced Laboratory Fermenter

Volume 1L-13L

Cell Culture

Vaccines



The Eu210 series is a premium flagship fermenter developed by HOLVES. With upgraded configurations throughout the series, it incorporates original components including a high-performance SIMATIC-1200 processor, precision Watson-Marlow peristaltic pumps and imported thermal mass flow controllers (MFCs).

This fully equipped laboratory system is designed for in-depth process research. It offers stable computing performance and extensive expansion interfaces for weighing, off-gas analysis, oxidation-reduction potential (ORP) and biomass analysis modules.

Cla210 Laboratory Fermenter

Laboratory / Bench Scale

Volume 3L-13L

An integrated fermenter for teaching, basic R&D and routine process development. Its compact design and intuitive operation support multiparameter cultivation control and flexible expansion into a multi-vessel system.

Bacterial Fermentation

Protein Therapeutics



Twin220 Parallel Fermenter

Laboratory / Bench Scale

Volume 3L-13L

A multi-vessel configuration in which one controller operates two fermentation units. It supports switching between parallel dual-vessel and single-vessel operation, making it suitable for comparative experiments, reproducibility verification and small-scale parameter screening.

Bacterial Fermentation

Protein Therapeutics



Hub240 Parallel Fermenter

Laboratory / Bench Scale

Volume 3L-13L

An integrated platform combining multiple vessels, a laboratory workbench, cooling and gas supply circuits. Centralized control through a large human-machine interface (HMI) supports parallel studies under multiple conditions and efficient use of laboratory space.

Cell Culture

Bacterial Fermentation



Pb210 Photobioreactor

Laboratory / Bench Scale

Volume 3L-13L

A closed photobioreactor system designed for cultivating photosynthetic bacteria and algae. It provides adjustable control of critical parameters including illumination, temperature, pH, DO, agitation and gas flow.

Cell Culture

Bacterial Fermentation



Glass Vessels

HOLVES glass vessels are designed for laboratory fermentation and cell culture and are compatible with the full HOLVES range of glass fermenters and bioreactors. Available volumes include 3 L, 5 L, 7 L and 13 L. Selected series can be customized to suit the culture system, port configuration and process requirements.

Each vessel comprises a borosilicate glass culture container, external support frame, 316L stainless steel headplate and H-Mix agitation assembly. The modular construction simplifies assembly, disassembly, cleaning and maintenance. Pressure testing and simulated operating conditions during manufacturing and acceptance verify seal integrity, safety and stable operation.



3L　5L　7L　13L

Impeller Selection

Appropriate impeller selection promotes uniform distribution of cells, gases and nutrients, maintains temperature stability and reduces cell settling. Impellers should be selected to match the cell type and process requirements, balancing cell viability, oxygen transfer efficiency and final yield.



Rushton Turbine Impeller

suitable for microbial fermentation with high oxygen demand



Pitched-Blade Impeller

balances bulk mixing, mass transfer efficiency and culture uniformity



Helical Impeller

suitable for shear-sensitive cell culture



Spin Filter

continuously retains cells while harvesting clarified culture medium



Cell-Lift Impeller

combines low-shear circulation with an outer screen that retains microcarriers



Packed-Bed Basket Impeller

supports high-density culture and harvesting of secreted products

Smart Universal

Su310 Series

Intelligent Stainless Steel Fermenter

Pilot Scale / Small-Scale Production



A new-generation stainless steel fermenter for pilot scale-up and small-scale production. Its compact construction, intelligent control and modular customization connect laboratory processes with practical engineering implementation.

Su310 features an integrated frame layout. Models of 50 L and below can be equipped with high-performance servo drives for smoother operation; models of 30 L and above can be equipped with automatic headplate lifting. The system supports automatic sterilization, vessel pressure control, Feed-Sup® intelligent feeding, process analytical technology (PAT), off-gas analysis, weighing and multi-vessel expansion to accommodate processes ranging from microbial fermentation to cell culture.

Volume 10L-2000L

multiple vessel volumes meet laboratory, pilot-scale and commercial-scale production requirements.

Integrated Control System

close integration of equipment and controls reduces the footprint and simplifies installation and operation.

Dual Filtration Protection

dual filtration strengthens the system's sterile barrier and reduces the risk of process contamination.

Flexible Multi-Vessel Expansion

single-vessel and multi-vessel configurations support process expansion and capacity upgrades.

One-Touch Access to Key Functions

automatic sterilization, vessel pressure control and headplate lifting improve operating efficiency and safety.

Customized Solutions

system configurations can be tailored to material characteristics, process requirements and site conditions.

Su310 Intelligent Stainless Steel Fermenter - Model Selection

Model	Su310 10L	Su310 30L	Su310 50L	Su310 100L	Su310 200L	Su310 300L	Su310 500L	Su310 1000L	Su310 2000L
Working Volume Range (L)	3-8	8-24	12-40	25-80	40-160	80-240	100-400	200-800	400-1600
Agitation Drive	Leadshine / Panasonic servo motor / SEW geared motor, with PID control								
Agitation Speed (rpm) ±1	20-800			20-600	20-400			20-300	
Temperature Control Range	Ambient temperature: 5–60 °C or above; measurement range: 0–150 °C; accuracy: ±0.1 °C; resolution: 0.01								
Gas Flow Regulation	Glass rotameter, upgradable to MFC; air supply, with optional CO_2 / O_2 / N_2 and multigas aeration strategies								
Peristaltic Pumps	with PID-based interlocked control; customization available, including additional feed pumps								

Omnipotent

Omni Cell510 Series

All-Purpose Stainless Steel Bioreactor

Pilot Scale / Small-Scale Production



Purpose-built for cell culture process development, the platform serves laboratory research, pilot scale-up and the production of clinical samples under GMP conditions. Built around an intelligent stainless steel bioreactor, it balances standardization, flexible configuration and investment efficiency to deliver a stable, reliable and integrated solution.

The platform combines precise automatic control with modular design to maintain stable control of critical culture parameters. It accommodates different processes, functional configurations and upgrade requirements, supporting a smooth transition from laboratory development to pilot scale-up and clinical sample production.

GMP Four-Valve Manifold System

The GMP four-valve manifold system supports critical operations including feeding, inoculation, base addition, perfusion, sampling and harvesting. It provides sterile connections and flexible switching between process lines and the vessel. Separate diaphragm valve assemblies or forged, integrated multichannel valve blocks can be used to meet different process, cleaning and sterilization requirements.

Compact, Integrated Design

Multiple process flow paths are integrated within a compact space, reducing external piping and connections to minimize leakage and contamination risks.



Real-Time Cold-Spot Monitoring

Monitoring the least favorable temperature locations during sterilization provides data for confirming sterilization effectiveness and validating the process.

Dual Sterilization Modes

The valve manifold can be sterilized together with the vessel or independently, allowing the mode to be selected according to production, maintenance and validation requirements.

Component Selection and Maintenance

Valves from brands including GEMÜ, Bürkert and Hebron can be specified, simplifying spare-part selection, inspection, disassembly and replacement.

Omni Cell510 Stainless Steel Bioreactor - Model Selection

Model	Cell510 30L	Cell510 50L	Cell510 100L	Cell510 200L	Cell510 300L	Cell510 500L	Cell510 1000L	Cell510 2000L
Working Volume Range (L)	8-24	12-40	25-80	40-160	80-240	100-400	200-800	400-1600
Agitation Drive	Leadshine, with PID control							
Agitation Speed (rpm) ±1	20-800		20-400				20-300	
Temperature Control Range	Ambient temperature: 5–60 °C or above; measurement range: 0–150 °C; accuracy: ±0.1 °C; resolution: 0.01							
Filters	0.2 μm coarse filtration and 0.01 μm fine filtration, using polytetrafluoroethylene (PTFE)							
Peristaltic Pumps	with PID-based interlocked control; customization available, including additional feed pumps							

Tangential Flow Ultrafiltration Systems

Key to TTF

K_2T-Lab Pro Series

Automated Tangential Flow Ultrafiltration System

0.1m²-0.5m²

A multifunctional, automated benchtop TFF system for laboratory use, designed to meet process development and GMP production needs. Compatible with hollow fiber modules and membrane cassettes, it offers user-defined endpoint control to simplify downstream processing and improve efficiency.

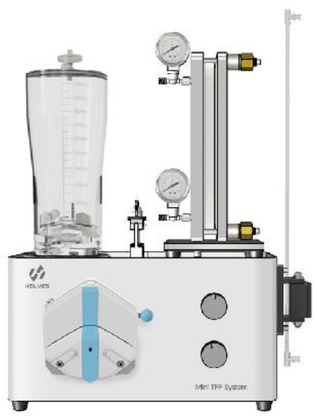


K_2T-Mini Basic TFF System

Laboratory / Bench Scale

50cm²-0.1m²

A benchtop system for valuable, low-volume samples and early-stage process screening. Low recirculation and hold-up volumes support concentration, diafiltration and buffer exchange.



K_2T-Mini TFF System

Laboratory / Bench Scale

50cm²-0.1m²

Compatible with membrane cassettes and hollow fiber modules, suitable for concentration, diafiltration and clarification of vaccine, antibody and recombinant protein samples.



K_2T-Lab Manual TFF System

Laboratory / Bench Scale

0.1m²-0.3m²

A manual benchtop system for small-scale laboratory filtration, teaching and research. Its straightforward design and flexible operation facilitate membrane material screening and basic parameter studies.



K_2T-Pilot Pilot-Scale TFF System

Pilot Scale / Small-Scale Production

0.5m²-2.5m²

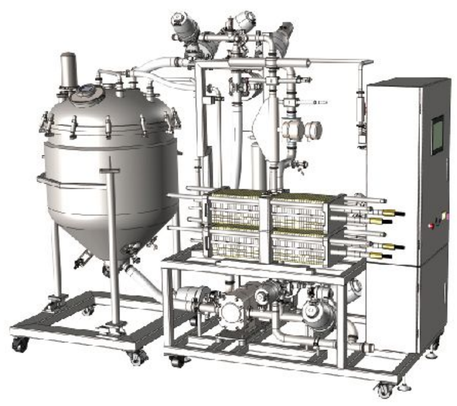
Designed for pilot-scale trials and small-scale production, the system uses a separate recirculation tank and ultrafiltration unit. It supports concentration, diafiltration, clarification, cleaning in place (CIP) and automatic collection.



K_2T-Product Production-Scale TFF System

Production Scale

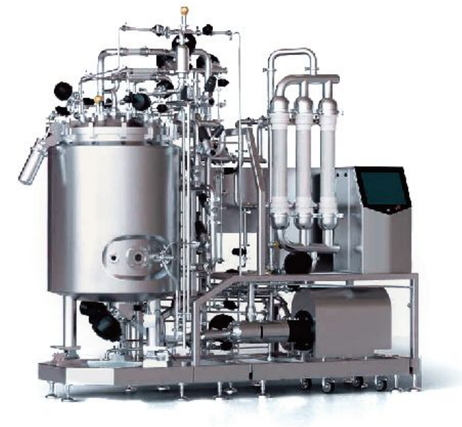
Designed for industrial processing of antibodies, vaccines, recombinant proteins and blood products. Membrane area, tanks, pump assemblies, monitoring modules and control programs can be customized to the required scale.



K_2H Series Hollow Fiber Membrane Systems

Multiple Scale Options

High-area hollow fiber membrane modules feature short flow paths and low pressure drop, making them suitable for microfiltration and ultrafiltration of shear-sensitive samples and linear scale-up from R&D to production.



K_2P Series Intelligent Bioprocess Pump

Laboratory / Bench Scale

Built around a quaternary diaphragm pump, the system combines low shear, low pulsation and hygienic design for filtration, chromatography, solution preparation, feeding and perfusion culture.



Flat-Sheet TFF Cassettes

As pioneers in tangential flow ultrafiltration, PALL and Millipore have long provided high-quality filtration solutions and related consumables. HOLVES maintains close cooperation with both companies to develop increasingly suitable solutions and systems. HOLVES also supplies original imported PALL and Millipore membrane cassettes, with systems closely aligned with their original core designs and technical data. Its tangential flow ultrafiltration systems provide comprehensive, cost-effective solutions that meet demanding requirements.

HOLVES offers a new generation of original PALL and Millipore flat-sheet cassettes:

- Sizes including 50 cm^2, 200 cm^2, 0.1 m^2, 0.5 m^2 and 2.5 m^2.
- Second- and third-generation membrane cassettes.
- Three membrane materials: PES (polyethersulfone), RC (regenerated cellulose) and PVDF (polyvinylidene fluoride).
- A range of turbulence-promoting screen configurations for concentrating and separating solutions of different concentrations or viscosities.



Model	Molecular Weight Cut-Off (kDa)	Recommended Molecular Size Range for >99% Retention (kDa)
PES-5	5	12-25 (Growth factors, hormones)
PES-8	8	25-50 (Growth factors, hormones)
PES-10	10	50-100 (Growth factors, hormones)
PES-30	30	100-140 (Enzymes)
PES-50	50	140-300 (IgGs)
PES-100	100	300-500 (Small viruses, antigens)
PES-300	300	>500 (IgMs, large viruses)
PES-500	500	>0.3 μm (Colloids, particles)
PES-1000	1000	>0.3 μm (Colloids, particles)
RC-5	5	8-18 (Proinsulin, hematopoietic factors)
RC-10	10	18-60 (Hemoglobin, enzymes)
RC-30	30	60-200 (Monoclonal antibodies)
RC-100	100	200-500 (Small viruses, viral antigens)
RC-300	300	>500 (IgMs, large viruses)
RC-1000	1000	>0.3 μm (Colloids, particles)
PVDF (MF)	0.1μm / 0.22μm / 0.45μm / 0.65μm	Large microbial cells and particles

Membrane Separation Filtration Systems

K_2C-CS350 Series

Pilot-Scale Ceramic Membrane Filtration System

0.75m² / 1.5m²

A semi-automated, pilot-scale ceramic membrane microfiltration / ultrafiltration (MF/UF) system for small-scale industrial production.

The system features an integrated mobile skid design. A complete semi-automated pilot-scale ceramic membrane filtration system includes ceramic membrane elements, membrane modules, a recirculation pump, manual valves, inline instrumentation, auxiliary equipment, a control system, a support frame, and associated storage tanks and utilities.



K_2C-CS320 Ceramic Membrane Filtration System

Laboratory / Bench Scale

A compact system for laboratory ceramic membrane microfiltration and ultrafiltration testing, suitable for membrane pore-size screening, process parameter studies, and small-scale clarification and concentration.



CM-05 Semi-Automated Ceramic Membrane Filtration System

Laboratory / Bench Scale

Equipped with two ceramic membrane modules, the system supports microfiltration, ultrafiltration, purification, concentration and oil-removal testing in aqueous or organic solvent systems. It is easy to clean and maintain.



K_2C-CS380 Production-Scale Ceramic Membrane Filtration System

Production Scale

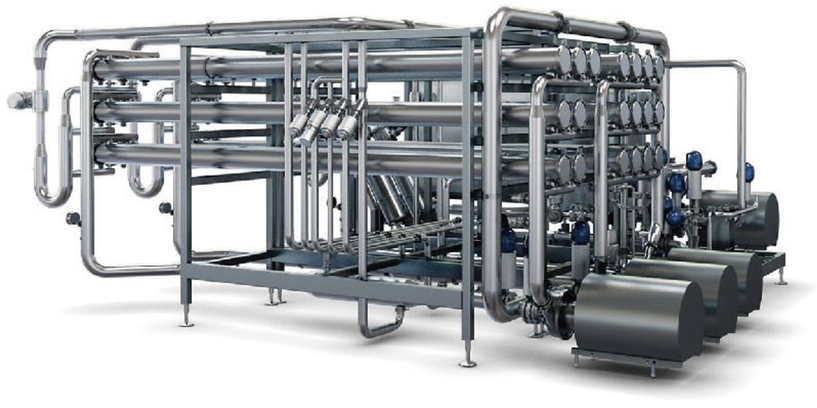
A fully automated ceramic membrane system for industrial production, customizable by throughput, membrane area and process route. It supports hygienic manufacturing, CIP / sterilization in place (SIP), and centralized control.



K_2S Series Spiral-Wound Membrane Systems

Multiple Scale Options

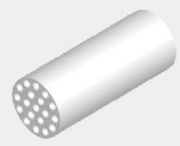
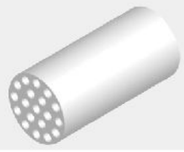
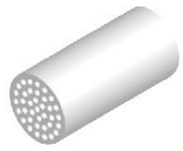
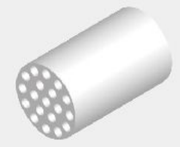
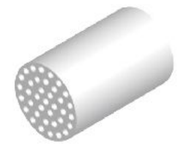
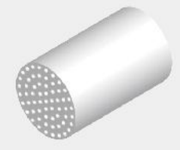
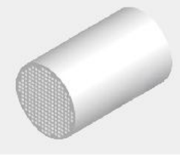
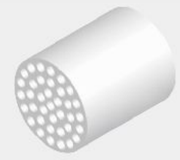
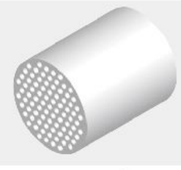
Built around spiral-wound membrane elements, the system can be configured with microfiltration, ultrafiltration, nanofiltration or reverse osmosis membranes to suit the process. Applications include concentration, desalting, decolorization, purification and microbial removal.



Ceramic Membrane Selection

All selections are all German atech ceramic membranes.
Pore Size / Molecular Weight Cut-Off: 1.2µm / 0.8µm / 0.4µm / 0.2µm / 0.1µm / 0.05µm / 150kD / 100kD / 25kD / 15kD / 5kD / 1kD

atech innovations gmbh

Model	Channels	ID (mm)	OD (mm)	S (m^2)	Length (mm)	Figure
7/6	7	6	25.4	0.16	1178	
19/3.3	19	3.3	25.4	0.1 / 0.24	500 / 1178	
61/2	61	2	25.4	0.51	1178	
19/4	19	4	31	0.29	1178	
37/3	37	3	31	0.42	1178	
19/6	19	6	41	0.43 / 0.54	1178 / 1500	
37/3.8	37	3.8	41	0.53 / 0.67	1178 / 1500	
61/2.5	61	2.5	41	0.58 / 0.72	1178 / 1500	
91/2.4	91	2.4	41	0.9 / 1.13	1178 / 1500	
208/1.5	208	1.5	41	1.5 / 1.88	1178 / 1500	
19/8	19	8	52	0.57 / 0.72	1178 / 1500	
37/5.7	37	5.7	52	0.8 / 1.0	1178 / 1500	
61/4	61	4	52	1.03 / 1.29	1178 / 1500	
85/3.3	85	3.3	52	1.06 / 1.32	1178 / 1500	
211/2	211	2	52	1.59 / 1.99	1178 / 1500	

Spray Dryer

H-Spray Mini Small Spray Dryer

Laboratory / Bench Scale

Max. 1800 ml/H

A spray dryer for very small batches in universities, research institutes, and food, pharmaceutical and chemical laboratories. Suitable for preparing particulate powders and studying selected heat-sensitive materials.

- Small-Quantity Preparation for R&D
- Two-Fluid Atomization
- Automated Control and Intuitive Operation

Biological Products

Food



H-Spray 5S Pilot-Scale Spray Dryer

Pilot Scale-Up

Max. 5 L/H

A compact system for formulation validation and pilot scale-up, with modular expansion capabilities. Suitable for pharmaceutical, food, beverage, chemical and advanced materials applications.

- Higher Efficiency for Pilot Scale-Up
- Co-Current Two-Fluid Atomization
- Modular Expansion for a Broad Range of Applications

Biological Products

Energy Materials



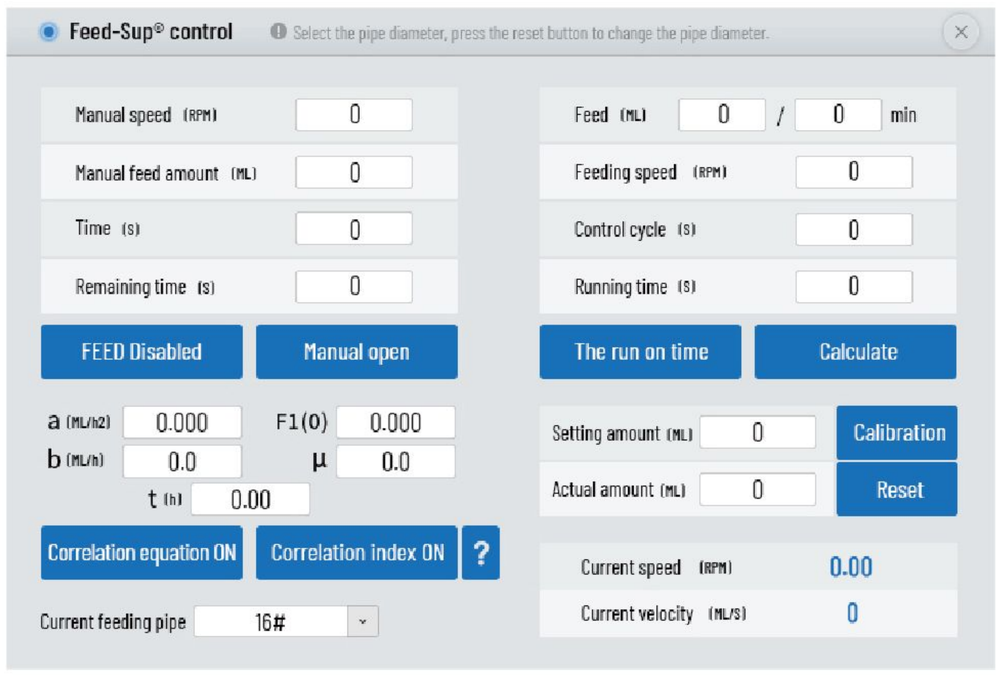
Spray Dryer - Model Selection

Selection Item	H-Spray Mini	H-Spray 5S
Product Positioning	Laboratory preparation of small sample batches and process screening	Larger-batch experiments and pilot scale-up
Max. Water Evaporation Rate	1.8 L/h	5 L/h
Feed Rate Range	0-2.0 L/h	0-5.0 L/h
Inlet Air Temperature	30-250 ℃; accuracy ±1 ℃	30-300 ℃; accuracy ±2 ℃
Outlet Air Temperature	30-120 ℃; accuracy ±1 ℃	30-120 ℃; accuracy ±2 ℃
Atomization Method	0.7 mm internal-mixing two-fluid nozzle	Original imported two-fluid atomizer
Hot Air Distribution	Standard hot air system	H-Adv integrated hot air distributor with adjustable airflow direction
Induced-Draft System	0.2 kW, variable-frequency speed control	1.5 kW high-pressure blower, variable-frequency speed control
Electric Heater	3.0 kW / AC 220 V	10 kW / AC 380 V

Feed-Sup® Intelligent Feeding

Feed-Sup® provides precise feeding for cell culture and fermentation. Feeding strategies can be based on time, equations, exponential profiles or critical process parameters, with direct- or reverse-acting cascade control linked to variables such as pH and DO. This aligns nutrient supply more closely with the metabolic state of microorganisms or cells at each process stage.

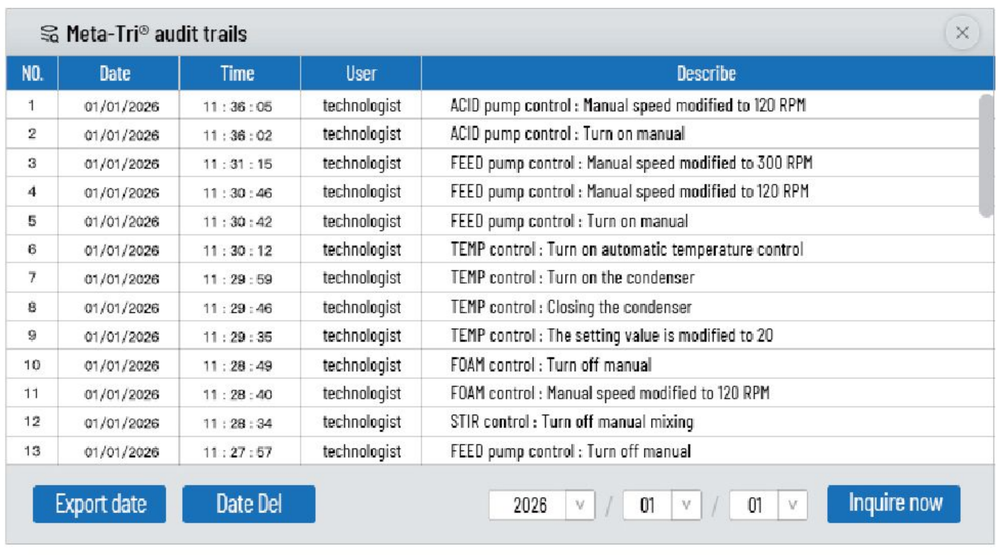
- Manual / Timed Feeding
- pH / DO Cascade Control
- Equation-Based Feeding
- Exponential Feeding



Metal-Tri® Audit Trail

Metal-Tri® automatically records critical actions throughout equipment operation using user identification, access controls and activity logs. The system records the time, account, affected object and details of each action, providing evidence for investigations of anomalies, data integrity management and compliance reviews.

- Critical Action Logging
- Tiered User Authorization
- Traceable Configuration Changes
- Data Export and Archiving



Smart-SC® Intelligent Sequence Control

Smart-SC® translates time, DO, pH, mixing states and conditional branches into configurable sequence-control logic. Users can define parameter targets and trigger conditions for each phase, reducing manual supervision during long experiments and improving consistency when reproducing a process.

- Time-Based
- pH/DO-Based
- Mix-Based
- if-Based



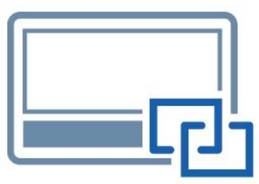
Intelligent Control Software

HOLVES control software covers fermentation, bioreactors, filtration systems and spray drying equipment. A unified interface brings together parameter monitoring, PID control, process sequence control, trend recording, alarm management, access control and auditing, and data export, making complex processes easier to understand and execute.



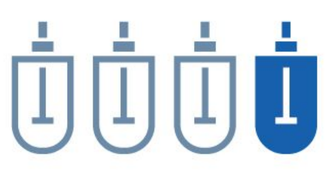
HF-Control V2.0

Proven, stable local control for fermentation and cultivation



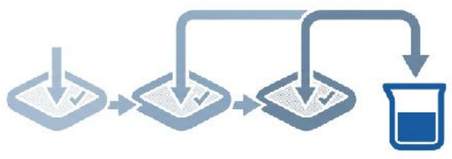
HF-Control V3.0

Linked multi-vessel control and automatic process execution



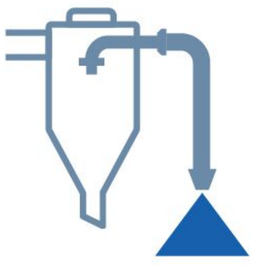
MatrixH Link

High-throughput parallel operation, coordinated control of multiple units and process coordination



K_2T-Control

Filtration workflow visualization and automated transmembrane pressure (TMP) programs



HS-Control

Spray drying process monitoring and coordinated parameter control



K_2P-Control

Precise pumping, flow measurement and multimode control





HMI Control Software → Nexus → Factor Scope

Three-Layer Data Architecture

Layer 1
Local Equipment Control Software

HF-Control, K_2T-Control and other intelligent equipment-level software provide real-time monitoring and operational control, including parameter settings, PID regulation, sequence control, feeding, filtration programs, alarms and on-site operation.

Layer 2
Nexus Insight™ Connectivity and Data Acquisition

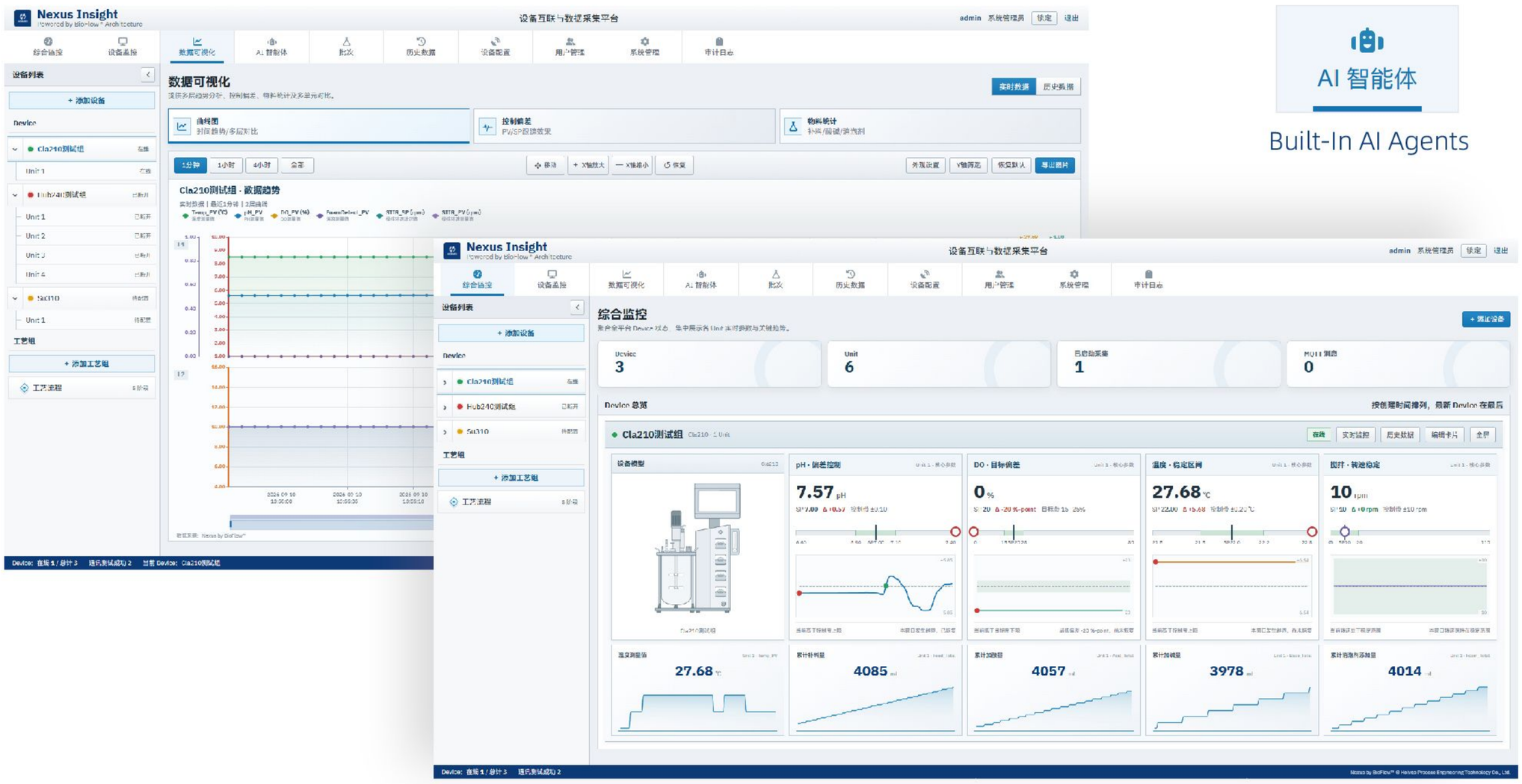
Nexus Insight connects different Devices and Units through a common data mapping framework that integrates data from multiple sources. It brings together real-time data, historical records, trends, batches and process workflows, with intelligent analysis powered by AI agents. Enterprise capabilities include access management, data export, audit trails, and backup and recovery.

Layer 3
Factor Scope™ DoE and Process Analytics Software

Factor Scope supports experimental design, phase analysis, feature engineering, statistical modeling, machine learning and process optimization. It helps users identify key factors in process data, compare batches and build interpretable process models.

Nexus Insight™
Equipment Connectivity and Data Acquisition

Nexus Insight is a platform for bioprocess equipment connectivity, data acquisition and centralized management. It provides a unified entry point for data across equipment, units and batches, turning data from an equipment by-product into a traceable, analyzable process asset. The platform also integrates AI agent capabilities.

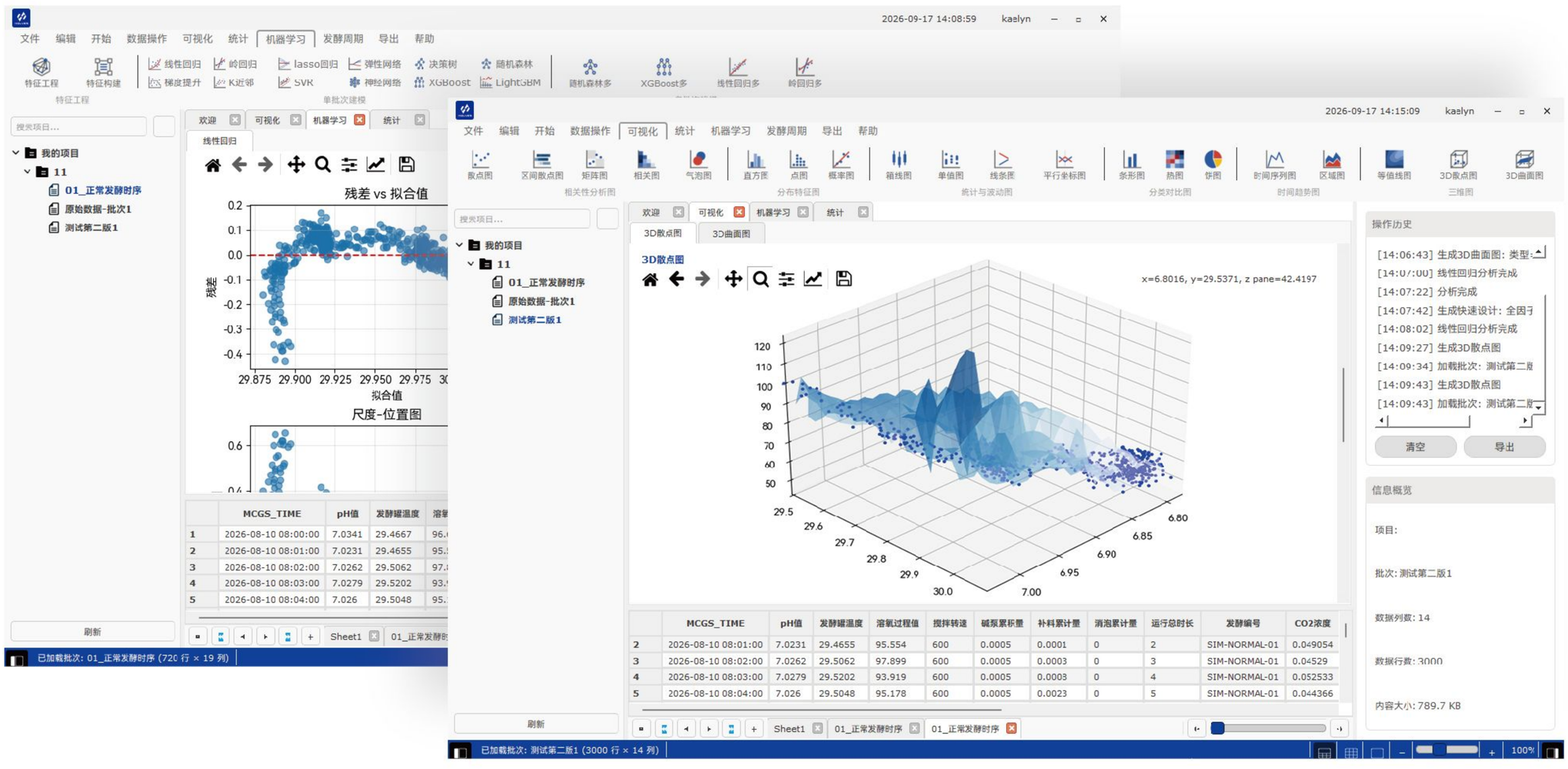


AI 智能体

Built-In AI Agents

Factor Scope™
Design of Experiments and Process Analytics Software

Factor Scope provides in-depth process analytics for fermentation, bioreactors, and upstream and downstream processes. It supports equipment data standardization, cleaning, phase identification, feature calculation, experimental design and model-based analysis. It turns data into findings that inform the next round of experiments.



Bringing Dispersed Bioprocess Equipment Together into a Continuously Coordinated Process System

HOLVES connects R&D, scale-up and engineering implementation through two platforms: MatrixH™ for screening, optimization and validation, and BioFlow™ for carrying processes forward into scale-up and transfer. Nexus and Factor Scope support data management and analysis throughout the process.

MatrixH™
High-Throughput Screening Platform

—

From Parallel Screening to Multi-Vessel Validation

Coordination Between Computational Analysis and Wet–Lab Experiments

MatrixH™ supports strain screening, media optimization and process condition development. Using MatrixH PBR parallel bioreactors as its experimental foundation, it combines MatrixH Link® process control and execution, Factor Scope data analysis and multi-vessel bioreactor validation. Together, these provide a process development framework spanning experimental design, parallel cultivation, data analysis and verification of results.

Different strains, media, feeding strategies and critical process parameters can be compared in parallel under controlled bioreactor conditions. Batch analysis and multi-vessel validation progressively narrow down the results, establishing a process basis for subsequent bench-scale studies, pilot trials and scale-up.

Parallel Screening

Parallel cultivation under multiple conditions with bioreactor-level control

Data Analysis

Multibatch comparisons and key factor analysis

设备接口

能力 · 管路 · 阀门 · 公用工程 · 维护边

Process Execution

Structured experimental protocols and consistent execution

Multi-Vessel Validation

Verification of screening results and narrowing of conditions before scale-up

01 Protocol Design — Strains / media process variables / DoE

→ **02 MatrixH PBR** — Parallel cultivation under multiple conditions independent control

→ **03 Factor Scope** — Batch comparisons / parameter relationships / statistical analysis

→ **04 Hub240** — Verification of candidates / validation before scale-up

→ **05 Process Results** — Control strategies / batch data / recommended process window

PLATFORMS

BioFlow™
Intelligent Bioprocess Platform

—

Coordinating Equipment, Controls, Data and Engineering Delivery Around the Process Route

BioFlow™ serves bioprocess R&D, pilot-scale work and engineering applications. Based on HOLVES technologies for fermentation and bioreactors, membrane separation, ultrafiltration, spray drying and automation, the platform is configured to suit the customer's process route, facility scale and project scope.

The platform aligns process routes, equipment interfaces, control logic, batch data and project delivery around a common process objective. This establishes clear connections between process units in throughput, material transfer, automation, data recording and engineering implementation. Third-party equipment, existing control systems and higher-level information systems can be integrated as required.

界

Process Route
Process pathway from cultivation to finished product

Interfaces
Capacity, piping, valves, utilities, maintenance boundaries

Control Logic
Recipes, phases, states, alarms, interlocks

Batch Data
Acquisition, recording, linking, analysis, review

Project Delivery
R&D, testing, validation support, on-site implementation

Upstream Culture

Parallel screening / bench-scale cultivation / pilot scale-up

Separation & Clarification

Pretreatment / solid-liquid separation / material transfer

Membrane Filtration & Concentration

TFF / ultrafiltration / ceramic membranes / concentration / diafiltration

Spray Drying & Finished Product Preparation

Feed preparation / atomization and drying / separation and collection / product output

Recombinant Proteins / Enzyme Products

HOLVES provides equipment combinations covering key stages in recombinant protein and enzyme production, from strain screening and pilot scale-up to separation, purification and powder preparation. After fermentation, processing follows different routes depending on whether the target product is intracellular or extracellular. The routes converge at chromatographic purification.

Typical Process Route

Screening → Validation → Scale-Up → Separation Purification → Powder Preparation

Shared Upstream Process

01 Condition Screening
MatrixH PBR
Screen strains, media and parameters

02 Seed Culture Preparation
shaking incubator
Activate and expand the culture to obtain a stable inoculum

03 Laboratory Validation
Twin220 / Hub240
Verify process stability and reproducibility

04 Pilot Scale-Up
Su310
Validate critical parameters and suitability for scale-up

Route A: Intracellular Products

Cell Harvesting
High-speed refrigerated centrifuge / K_2C-CS320 / CS350
Separate and collect the target cells

Cell Disruption
High-pressure homogenizer
Release the intracellular target product

Separation and Refolding
High-speed refrigerated centrifuge
Remove cell debris and refold proteins as required

Initial Ultrafiltration
K_2T-Lab Pro / K_2T-Pilot
Perform concentration and buffer exchange

Route B: Extracellular Products

Supernatant Clarification
High-speed refrigerated centrifuge / K_2C-CS320 / CS350
Remove cells and suspended impurities

Initial Ultrafiltration
K_2T-Lab Pro / K_2T-Pilot
Perform concentration and buffer exchange

Shared Downstream Process

05 Chromatographic Purification
Chromatography system
remove impurities and increase target product purity

06 Final Ultrafiltration
K_2T-Lab Pro / K_2T-Pilot
Concentrate and exchange into the formulation medium

07 Powder Preparation
H-Spray Mini / H-Spray 5S / freeze dryer
perform spray drying or freeze drying

Long-Acting GLP-1 Analogs

Producing long-acting GLP-1 analogs involves more than microbial fermentation. Key stages also include obtaining peptide precursors, releasing the target peptide, site-specific side-chain modification and reverse-phase purification. Coordinated equipment operation, fluid handling and data management support the entire workflow from expression and purification to final formulation.

Typical Process Route



01 Expression System Screening

MatrixH PBR
Screen strains, media and induction conditions

02 Seed Culture and Fermentation Scale-Up

Shaking incubator / Twin220 / Hub240 / Su310
Establish seed cultures and achieve high-density expression

03 Precursor Recovery

High-speed refrigerated centrifuge / K_2C-CS350
Harvest cells or recover secreted precursors

04 Target Peptide Release

High-pressure homogenizer / refolding tank / cleavage reaction system
Disrupt cells, refold and cleave fusion proteins

05 Peptide Precursor Purification

Chromatography system / K_2T series
Remove host-derived impurities and purify peptide precursors

06 Side-Chain Modification for Extended Action

Modification reaction system
Perform site-specific acylation or side-chain conjugation

07 Polishing Purification

High-pressure chromatography / Reverse-phase chromatography system
Remove modification isomers and related impurities

08 Final Formulation

Sterilizing filtration / filling system / freeze dryer
Complete solution preparation, sterilizing filtration, and filling

K_2T Series

Used for concentration, diafiltration and buffer exchange of fusion proteins or larger peptide precursors, while recording process data such as flow rate, pressure, TMP and diafiltration volume. At the small-peptide stage, suitability must be confirmed through process validation, taking molecular weight, membrane retention, adsorption losses and product yield into account.

K_2P Bio Intelligent Pump

Provides smooth fluid transfer for target peptide cleavage, side-chain modification, chromatography sample loading and other shear-sensitive materials. Constant-flow, constant-pressure or metered-delivery modes can be selected to improve the stability and reproducibility of transfers between units.

Nexus + Factor Scope

Nexus consolidates data from fermentation, precursor recovery, molecular modification, TFF, chromatography and final processing.

Factor Scope supports phase alignment, multibatch comparisons and analysis of key features, providing a data basis for identifying yield losses, investigating deviations and transferring processes.

ENGINEERING & SERVICE

01 Process and Solution Development

Equipment selection, system configuration, primary interfaces and project scope are defined around the target process, throughput and critical parameters, establishing clear requirements for subsequent engineering design.

02 Engineering and Manufacturing

Process requirements are translated into equipment, piping, instrumentation, electrical and automation designs. Manufacturing, inspection and factory testing bring these designs into practical operation.

03 Installation and Commissioning

Depending on the project scope, support includes on-site installation interfaces, individual equipment commissioning, integrated system commissioning, operator training and acceptance, completing the handover from manufacturing to operation.

04 Operational Support

Ongoing technical support covers equipment operation, servicing and maintenance, spare parts, process adjustments and system expansion to meet requirements throughout the equipment's operating lifecycle.

PROCESS PROJECT DELIVERY

As projects progress from the laboratory to pilot scale and production, delivery requirements expand from individual equipment to process integration, interface completeness, control logic and on-site implementation.

HOLVES defines the scope of Process delivery according to process maturity, project complexity, quality requirements and the customer's engineering resources. Engineering services build on equipment supply at a level appropriate to the project's actual needs.

Streamlined Process Delivery

R&D and pilot-scale projects with clearly defined process boundaries

The scope focuses on core equipment, critical interfaces, control logic, factory acceptance testing (FAT), site acceptance testing (SAT) and essential technical documents. It defines clear project boundaries while keeping engineering complexity under control.

Core Equipment | Critical Interfaces | Control Logic | FAT / SAT | Core Documentation

Integrated Process Delivery

Pilot-scale and production projects involving coordinated equipment and a well-defined engineering scope

Equipment configuration, material transfer, piping and instrumentation, control logic, engineering interfaces and project documentation are managed within a unified implementation process spanning design, manufacturing, testing, on-site implementation and system delivery.

Process Design | Coordination | Engineering Interfaces | System Control | Project Docs

Modular Skid Integration

For projects suited to modular implementation, equipment, pump assemblies, piping, valves, instrumentation and control units can be preassembled, integrated and tested at the factory. Systems arrive on site largely complete, with remaining work primarily involving positioning, external connections, system verification and commissioning. This reduces on-site installation and multidisciplinary coordination.

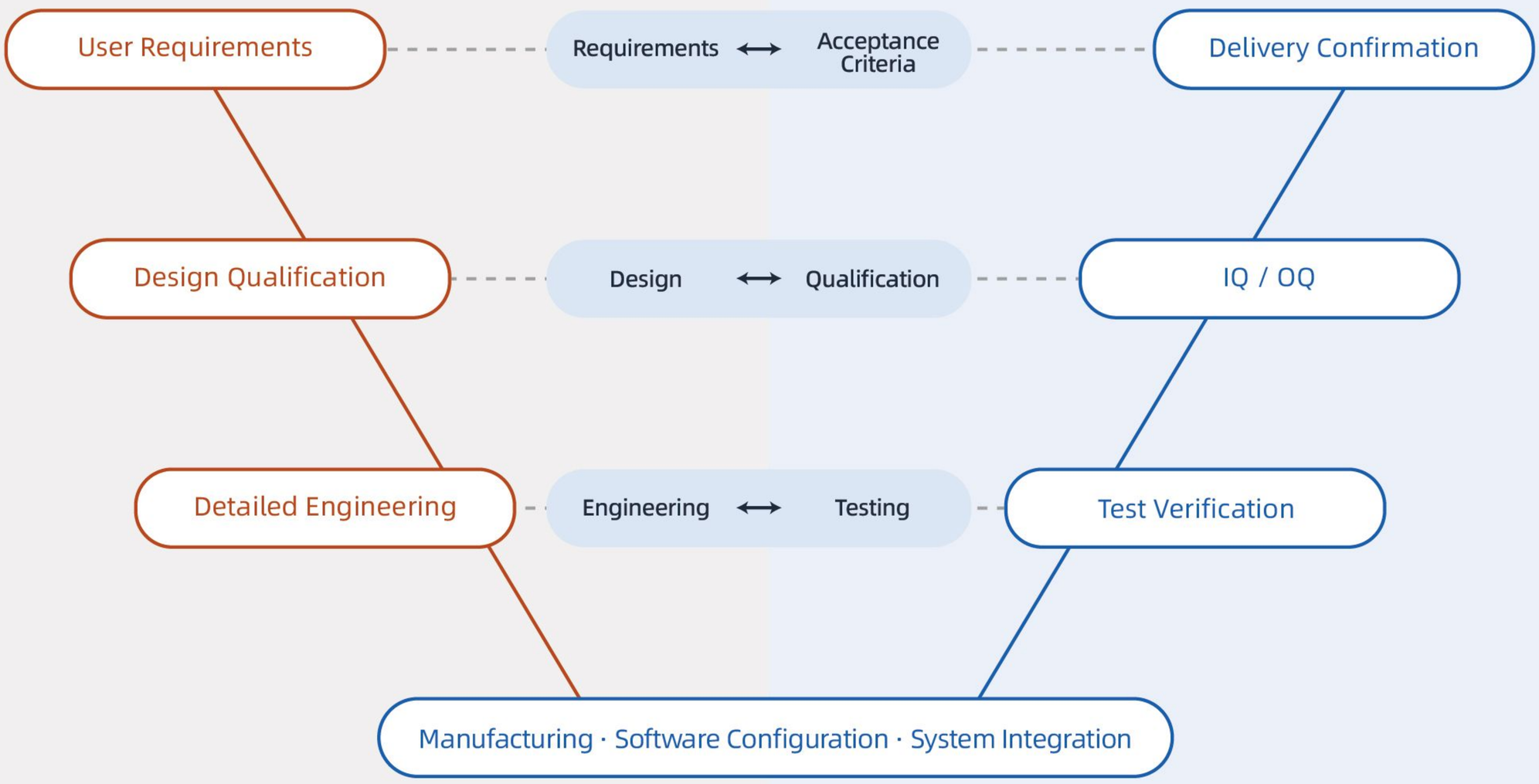
Factory Prefabrication | Module Integration | System Testing | On-Site Connections

GMP Documentation and Validation Support

Equipment requirements for GMP / GxP projects extend beyond hardware configuration to the completeness and traceability of design inputs, manufacturing records, test results and qualification documents. Based on the customer's user requirements specification (URS), quality system and contractual scope, HOLVES develops the relevant technical documentation, quality records and validation support materials throughout project implementation. This maintains alignment between project requirements, engineering implementation, and testing and qualification.

V-Model Project Delivery

Establishing a Traceable Chain of Project Evidence from User Requirements, Design and Implementation to Testing, Qualification and Delivery



REQUIREMENTS & DESIGN

URS responses, technical specifications, piping and instrumentation diagrams (P&IDs), DQ documents, equipment layouts, instrumentation and control documentation, and related project design qualification documents.

MANUFACTURING & QUALITY

Records covering materials, welding, surface treatment, critical components, manufacturing inspections and quality traceability, prepared according to project requirements.

TESTING & QUALIFICATION

FAT / SAT covering equipment functions, instrumentation, alarms, interlocks and system operation, with IQ / OQ documentation and execution support provided according to the project scope.

SOFTWARE & DATA INTEGRITY

For applicable projects, technical descriptions and test records cover functions including user permissions, audit trails, electronic records, and data backup and recovery.

CUSTOMER REFERENCES

HOLVES products and process systems are used in universities and research institutes, industrial biotechnology and synthetic biology, biopharmaceuticals, food and specialty industries.

1000+
CLIENTS SERVED

1 ACADEMIA & RESEARCH

清華大學
浙江大學 ZHEJIANG UNIVERSITY
上海交通大學 SHANGHAI JIAO TONG UNIVERSITY
中国科学院 过程工程研究所
中国科学院 微生物研究所
中国科学院 深圳先进技术研究院
中国农业科学院 生物技术研究所
ETH zürich

2 INDUSTRIAL BIOTECH

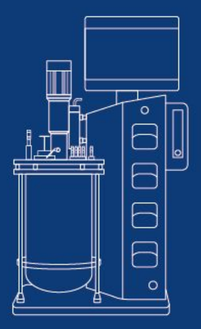
Angel安琪
FREDA 福瑞达医药
CATHAY INDUSTRIAL BIOTECH
东晓生物 DONGXIAO BIOTECHNOLOGY
Bioextrax
MEIHUA
EPPEN伊品
Bestzyme

3 BIOPHARMA

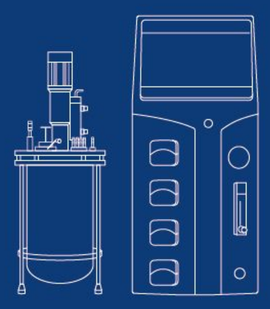
SINOVAC 科兴
万泰生物 WANTAI BioPharm
AsymBio 凯莱英生物
康龙化成 PHARMARON
精准生物 PRECISION BIOTECH
通化東宝 Tong Hua Dong Bao Group
中国医药工业研究总院有限公司 China State Institute of Pharmaceutical Industry Co., Ltd.
上海医药工业研究院有限公司 Shanghai Institute of Pharmaceutical Industry Co.,Ltd.
国药集团 SINOPHARM

4 FOOD & SPECIALTY INDUSTRIES

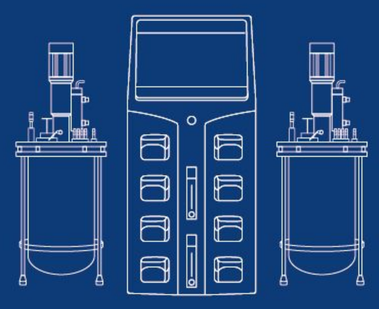
雀巢 Nestlé
海天
三元
中国烟草 CHINA TOBACCO | 中国烟草总公司 郑州烟草研究院
SVOLT 蜂巢能源
金达威集团 KINGDOMWAY
SDIC 国投微藻生物科技中心



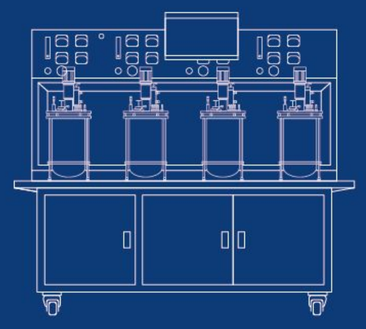
Cla210
Laboratory Fermenter



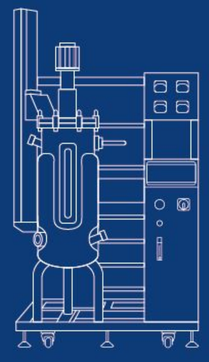
Eu210
Laboratory Fermenter



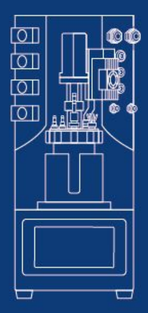
Twin220
Parallel Fermenter



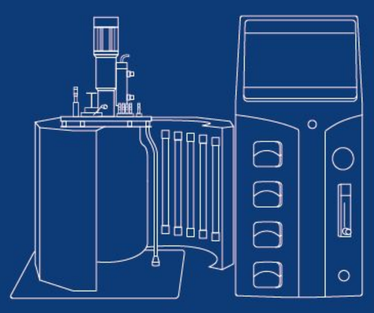
Hub240
Parallel Fermenter



Su310
Stainless Steel Fermenter



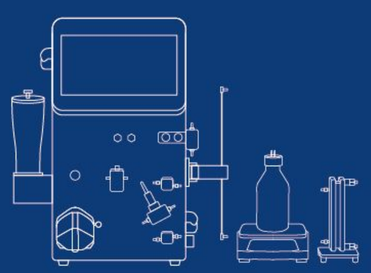
MatrixH PBR
Parallel Bioreactor



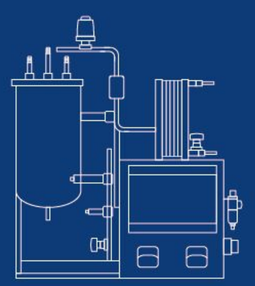
Pb210
Photobioreactor



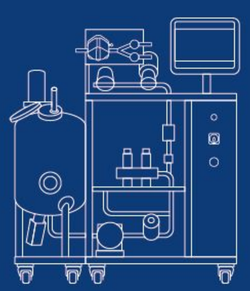
K_2P
Bio Intelligent Pump



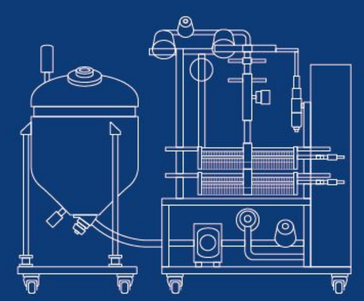
K_2T-Mini
Tangential Flow UF System



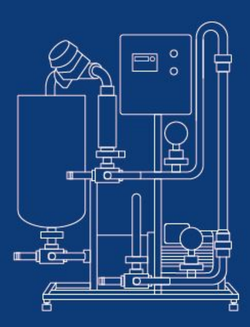
K_2T-Lab Pro
Auto Tangential Flow UF System



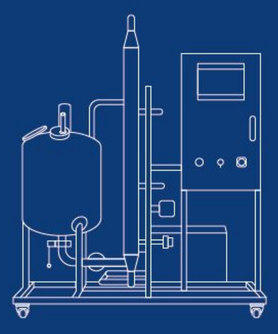
K_2T-Pilot
Pilot-Scale UF System



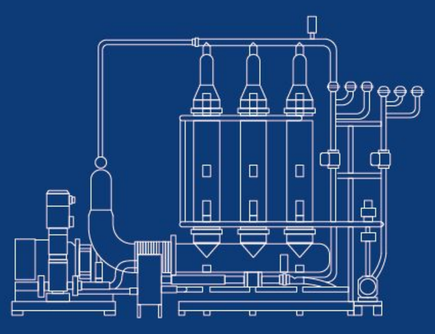
K_2T-Product
Production-Scale UF System



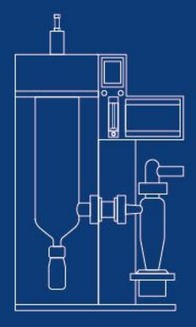
K_2C-CS320
Desktop Ceramic Membrane
Filtration System



K_2C-CS350
Pilot-Scale Ceramic Membrane
Filtration System



K_2C-CS380
Production-Scale Ceramic Membrane
Filtration System



H-Spray Mini
Small Spray Dryer

[Headquarters]

Beijing Holves Biotechnology Co., Ltd.

Address: 4F, Future Building, Changying,
Chaoyang District, Beijing, China

Tel: +86 10 64919358

Email: info@holves.com

[Factory]

Holves Process Engineering Technology Co., Ltd.

Address: No. 4, Lianxing Road, Yingjiang Economic
Development Zone, Anqing City, Anhui Province, China

Tel: +86 556 5561288

Website: www.bjholves.com

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