





# Genizer

**SOLUTIONS FOR NANOMATERIALS**

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# WHAT WE OFFER

Genizer™ is committed to provide best in advanced nano-equipment to meet the needs of the pharmaceutical, cosmetic, biotechnology and nanomaterial industries.



# AROUND THE WORLD

Located in Los Angeles, serving the world




Genizer™ was founded in 2009 by pharmaceutical scientists with more than 10 years professional experience in nanotechnology and biotechnology. With a mission to support more scientists and engineers worldwide, Genizer is committed to supplying high quality and best advanced high pressure homogenizers and liposome extruders, as well as other nanotechnology equipments and services with the best value to meet the needs of the pharmaceutical, cosmetic, fine chemistry, food, beverage, nutrition, biotechnology and nano-material industries.

# COPRORATE

+1 (949) 932-0294 (IRVINE, CA USD HQ- PST)  
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# HIGH PRESSURE MICROFLUIDIZATION HOMOGENIZER NANOGENER

LABORATORY

POPULAR MODEL

NanoGenizer™ is a specialized device in the field of nanotechnology that utilizes dynamic high-pressure microjets, ultrahigh-frequency shear, high-energy impingement (high-speed jet collision), and cavitation effects to achieve nanoscale particle size reduction and accomplish goals such as uniform dispersion, fragmentation, emulsification, and encapsulation of active substances.

It is applicable to various fields such as pharmaceuticals, cosmetics, food, and new energy for the preparation of liposomes, nanodroplets, microspheres, nanomicelles, albumin nanoparticles, collagen proteins, conductive catalysts, and novel nanomaterials.

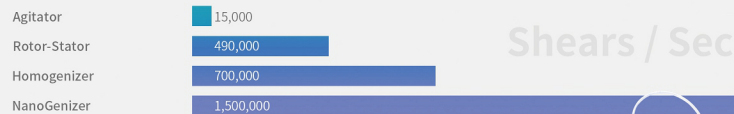


## ABOUT THE NANOGENER

NanoGenizer™ utilizes mature and stable high-pressure microjet technology to process liquid or solid-liquid suspension materials. Under the action of an intensifier pump, the material is pressurized, and accurate pressure regulation ensures that the material reaches a set pressure value ranging from 20 MPa to 300 MPa. The pressurized material is then propelled through a diamond microchannel with a fixed geometry, generating a supersonic microjet. Within this specific geometric channel, the material undergoes millions of physical shears per second, enabling nano homogenization, ultra-micro emulsification, nano dispersion, and disruption effects to be achieved.









### Intense shear force

NanoGenizer™ offers an unmatched shear rate, ensuring uniform particle size distribution and excellent homogenization performance.



Max. Flow Rate	60 ~ 120mL/min
Min. Sample	1mL
Max. Pressure	15,000 ~ 45,000psi
Weight	~ 35 kg (77 lbs)
Max. Temp.	80°C (176°F)
Power	110V/220V/230V
Cleaning	Flush to Clean



 <b>HP Microfluidics</b> Diamond IX Chamber Technology	 <b>Performance</b> Strong performance up to 45,000 psi	 <b>Uniform</b> Uniform particle size distribution	 <b>Efficient</b> Eco-Friendly low sample volume	 <b>Scalable</b> Compatible with Liposome Extruder
 <b>Smart</b> Touch screen interface <small>(More info in P21)</small>	 <b>Plug &amp; Play</b> Using electrical power	 <b>Cooling Unit</b> Real-time cooling Unit	 <b>Compact</b> Movable and Light weigh	 <b>Compliance</b> CE & RoHS Certs

# CORE TECHNOLOGY

Genizer high pressure homogenizers excel at reaction chamber technology.

Fixed-geometry micro-channels inside the diamond interaction chamber.

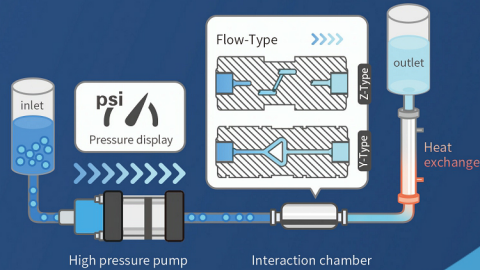


## Diamond Interaction Chambers

### Core Part of Genizer's Homogenizers

NanoGenizer™ utilizes a diamond interaction chamber with a 316L stainless steel exterior and a diamond interior. This design ensures no metal contamination under high pressure.

Materials passing through the diamond interaction chamber of NanoGenizer™ experience ultrasonic microjets generated by diamond microchannels. These microjets, ranging in size from hundreds of microns, reach supersonic speeds of over 500 m/s at ultra-high pressures (up to 400 MPa), surpassing the speed of sound (340 m/s). Within the diamond microchannels, materials undergo intense shear, oscillation, collision, cavitation effects, and impingement, leading to physical, chemical, and structural changes. This process refines and evenly distributes particle sizes, greatly enhancing properties like emulsification, solubility, stability, and transparency.



## Technical Advantages

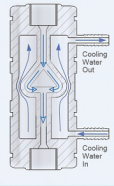
### Full Replacement

Full replacement for the chamber of MFIC processors



### Cooling Option

Real time cooling option for temperature sensitive materials



### Electro-Polish

Electro-polishing and inner passivation for pharmaceutical applications



### High Shear Forces

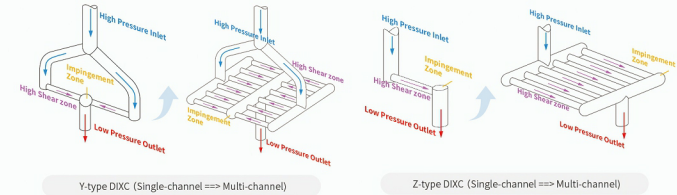
The high-speed jets inside the diamond micropores and is subjected to more than a million shears per second



## Scale-up

The diamond interaction chamber has two types: "Y" and "Z" (based on the internal diamond channel shape). The microchannels remain constant, ensuring consistent treatment of 1 mL of material per pulse. This yields high repeatability and a narrower particle size distribution.

Microjet technology is scalable, replicating lab results in pilot and production scales. Scaling involves duplicating diamond microchannels while maintaining forces. Increasing flow rate in the same time frame amplifies production while maintaining consistency between lab and factory.



## Recommendations



### Y-TYPE DIXC

The "Y" Type is more suitable for the treatment of liquid-liquid materials such as emulsification, drug encapsulation and liposome preparation.

### Z-TYPE DIXC

The "Z" type is more suitable for the treatment of solid-liquid materials such as cell disruption or nano-dispersion, degranulation, particle size reduction, and mechanical peeling.

Suitable for	Chamber	Pressure suggestions	Suitable for	Chamber	Pressure suggestions
Liposomes (water-in-oil)	F12Y / F20Y	( 15,000 - 30,000 psi )	Liposomes (oil-in-water)	H30Z	( 3,000 - 8,000 psi )
Emulsions (water-in-oil)	F12Y / F20Y	( 15,000 - 30,000 psi )	Emulsions (oil-in-water)	H30Z	( 3,000 - 8,000 psi )
Animal cell disruption	H30Z	( 2,000 - 5,000 psi )	Algal cell disruption	H10Z	( 20,000 - 30,000 psi )
Bacterial cell disruption	H10Z	( 10,000 - 25,000 psi )	Yeast cell disruption	H10Z	( 20,000 - 30,000 psi )
Nanosuspensions	F12Y / H10Z	( 10,000 - 30,000 psi ) ( 15,000 - 30,000 psi )	Nanodispersion	H10Z	( 10,000 - 30,000 psi )



# COMPREHENSIVE CRO SERVICES

Utilizing our advanced microfluidic nano-manufacturing platform, we offer expert development for nanoformulations, including pharmaceuticals, cosmetics, and more. Covering experimental and pilot-scale, ensuring quality results.

Genizer

## Diverse Types

Whether your project demands liposomes, nanoemulsions, nanoparticles, albumin nanoparticles, polymer micelles, lipid-based nanoparticles, or LNPs, we provide professional R&D support. Trust us to meet your specific nanoformulation requirements.

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## Analysis Services

To ensure top-quality nanoformulations, we offer comprehensive characterization services, covering particle size, zeta potential, single nanoparticle sizing, UV spectrophotometer analysis, and HPLC for precise quantification.

Genizer

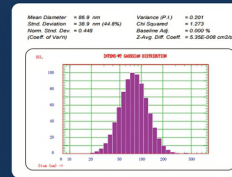
## Comprehensive Solution

Our expertise and advanced technology instill confidence in your projects, providing full support throughout drug development, including in vivo and in vitro efficacy testing, to expedite experiments and enhance assessment accuracy.

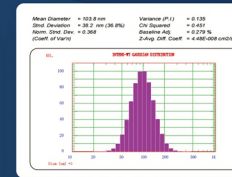
For more features, contact [service@genizer.com](mailto:service@genizer.com)

# SERVICE & SAMPLES

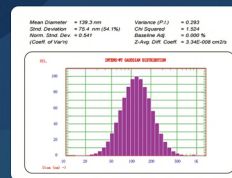
When you choose us as your partner, you're not just selecting a service provider but an innovative collaborative team. We understand the potential of nanotechnology, and our goal is to help you unlock boundless possibilities in this field.



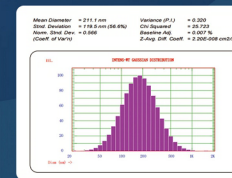
**Composition** HSPC, CHOL, DSPE-PEG2000, DOX, Water, etc.  
**Average Particle Size** 80-100nm, Encapsulation Efficiency of 95%



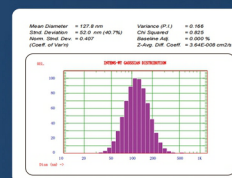
**Composition** DSPC, CHOL, DSPE-PEG2000, CPT-11, Water, etc.  
**Average Particle Size** 103nm, Encapsulation Efficiency of 91%



**Composition** PLGA, PVA, Water, etc.  
**Average Particle Size** 139nm, Encapsulation Efficiency of 92%



**Composition** Soybean Oil, Phospholipid, etc.  
**Average Particle Size** Average Particle Size of 200nm



**Composition** Coenzyme, Egg Yolk Phospholipid  
**Average Particle Size** Average Particle Size of 130nm

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# HIGH PRESSURE MICROFLUIDIC MIXING-TEC HOMOGENIZER MIXGENIZER

LABORATORY

DUAL PUMPS

MICROMIXING


MixGenizer has a dual pump head functionality, allowing two separate homogenization process pipelines to prevent cross-contamination between different materials. This feature is beneficial for applications such as CMP polishing fluids, hydrogen fuel cell catalysts, cosmetic emulsions, and make-up, effectively providing the capabilities of two NanoGenizers in one device.



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Max.Flow Rate	100mL/min
Min. Sample	1mL
Design.Pressure	30,000psi
Mixing Accuracy	1%
Mixing Arrange	25%-100%
Weight	~58kg (128lbs)
Max. Temp.	80°C (176°F)
Power	110V/220V/230V
Cleaning	Flush to Clean
Warranty	1 year



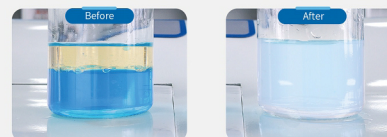
 <b>MicroMixing</b> HP Microfluidic Mixing Technology	 <b>Performance</b> more than 100 mL/min at 30,000 psi	 <b>Uniform</b> Uniform particle size distribution	 <b>Efficient</b> Eco-Friendly low sample volume	 <b>Scalable</b> Compatible with Liposome Extruder
 <b>Smart</b> Touch screen interface	 <b>Plug &amp; Play</b> Using electrical power	 <b>Cooling Unit</b> Real-time cooling Unit	 <b>Compact</b> Movable and Light weigh	 <b>Compliance</b> CE & RoHS Certs

## Y-TYPE DIAMOND MIXING CHAMBER

Special designed DIX chamber for MixGenizer

Microfluidics and high-pressure microjet technology integrate for precise mixing and nanosizing. Two-phase samples enter micro-scale diamond microchannels in a "Y"-shaped chip, undergoing shearing and pressure collision for optimal results.

- The microfluidic chip controls minimal contact between phases, preventing heat release or explosive reactions.
- Proportional injection and reaction avoid phase saturation.
- The process achieves high-pressure nanosizing and mixing in a single step.



# DUAL PUMPS FOR PILOT SCALE ELECTRIC PILOTGENIZER

PILOT - SCALE

DUAL PUMPS

STAINLESS STEEL

MASSIVE FLOW

PilotGenizer is designed for pilot-scale production at ultra-high pressure and features a microfluidics Diamond Interaction Chamber in the product path. The maximum working pressure is up to 3,000 bar (45,000 psi), with output flow rate up to 30L/hr.

Genizer® also provide the Production Scale High pressure homogenizer with **Dual pumps** and Manufacture Scale High pressure homogenizer with **Quadra pumps** for constant pressure.

The Production Scale High press homogenizer can produce flow rate as much as 120L/hour. The Manufacture Scale High press homogenizer can produce flow rate as much as 500L/hour.



## ABOUT THE PILOTGENIZER

Using the Diamond Interaction Chamber technology, the PilotGenizer is capable of generating high shear level, and achieving significant particle size reduction and uniform particle distribution.

No moving parts in the core interaction chamber, the PilotGenizer ensures that the every milliliter get the same high shear treatment from your laboratory to pilot plant.

### PRODUCT PARAMETERS

<b>Max.Flow Rate</b>	30L/hr (45kpsi)   70L/hr (20kpsi)
<b>Min. Sample</b>	200mL
<b>Max.Pressure</b>	45,000psi
<b>Weight</b>	~ 350kg
<b>Max. Temp.</b>	80°C (176°F)
<b>Power</b>	380V/430V
<b>Cleaning</b>	Flush to clean/CIP/SIP



**Microfluidics**  
Diamond IX Chamber  
Technology



**Performance**  
Strong performance up  
to 45,000 psi



**Uniform**  
Uniform particle size  
distribution



**Efficient**  
Eco-Friendly  
low sample volume



**Safety**  
Chemical sanitary  
material



**Smart**  
Touch screen  
interface  
More info in P21)



**Cooling Unit**  
Real-time cooling  
Unit



**Scalable**  
Compatible with  
Liposome Extruder



**FDA Compliant**  
Compliance with FDA  
Audit Standards



**Regulated**  
Pharma Regs:  
CIP/SIP/IQ/OQ

# PRODUCTION-GRADE WILL-SERIES

PRODUCTION-GRADE

HIGH-CAPACITY

STABLE

CUSTOMIZABLE

The WILL series high-pressure homogenizer is designed for pilot and large-scale production, using sanitary-grade 316 stainless steel, ceramic, and PTFE to ensure clean, safe operation. Running at up to 45,000 psi with interaction chamber technology, it achieves optimal results in a single pass. With continuous or batch modes, it meets high-volume needs while ensuring reproducible results for industries such as pharmaceuticals and food additives.



## APPLICATIONS AND ADVANTAGES ANALYSIS

This breakthrough high-pressure homogenization system provides precise particle size control for pharmaceutical, biotech, and specialty materials industries. With over 200 rigorous tests, it ensures stable operation in harsh conditions. We deliver end-to-end solutions from development to large-scale production, enabling product upgrades and smart manufacturing.

### FUNCTIONS:

Immiscible Emulsification

Nano Suspension

Submicron Size Reduction

De-Agglomeration

### INDUSTRY:

Pharmaceuticals

Biotech

Chemical

Coatings

Cosmetics

Food Additives

### KEY PERFORMANCE

- ✔ **Particle Size:** Uniform submicron distribution
- ✔ **Temperature:** Built-in sanitary heat exchanger
- ✔ **Hygiene:** 316L stainless steel, GMP-compliant
- ✔ **Automation:** PLC control, multiple cycles
- ✔ **Diamond Chamber:** Enhanced pressure resistance

### ADVANTAGES OVERVIEW

- 🔧 **Pressurized Feed:** High-Viscosity Optimized
- 🛡️ **Smart Backflush:** Prevents clogging
- 📄 **Compliance:** Audit trails, access control
- 🔄 **Sample Saving:** Low-Residue Piping
- 📈 **Scalable:** Lab-to-production linear transfer

### Type

Type	WILL-120L	WILL-240L	WILL-480L
Capacity	120 L/hr	240 L/hr	480 L/hr
Min. Sample	2 L	4 L	6L
Pressure	30,000 psi	30,000 psi	30,000 psi
Weight	~1000 kg	~1300 kg	~2200 kg
Core Part	Multi-channel Diamond Interaction Chamber		
Power	18kW	37 kW	55 kW
Plunger Pump	Single	Dual	Dual
Requirements	Hydraulic oil heat exchanger, cooling water for material heat exchanger, compressed air (50-150 psi, 1 scfm @ 50 psi)		



# MICROFLUIDIC NANO MIXING SYSTEM

## NANOMIXER

LAB MODEL

PRECISE RATIO

VISIBLE MIXING

SERVO DRIVE

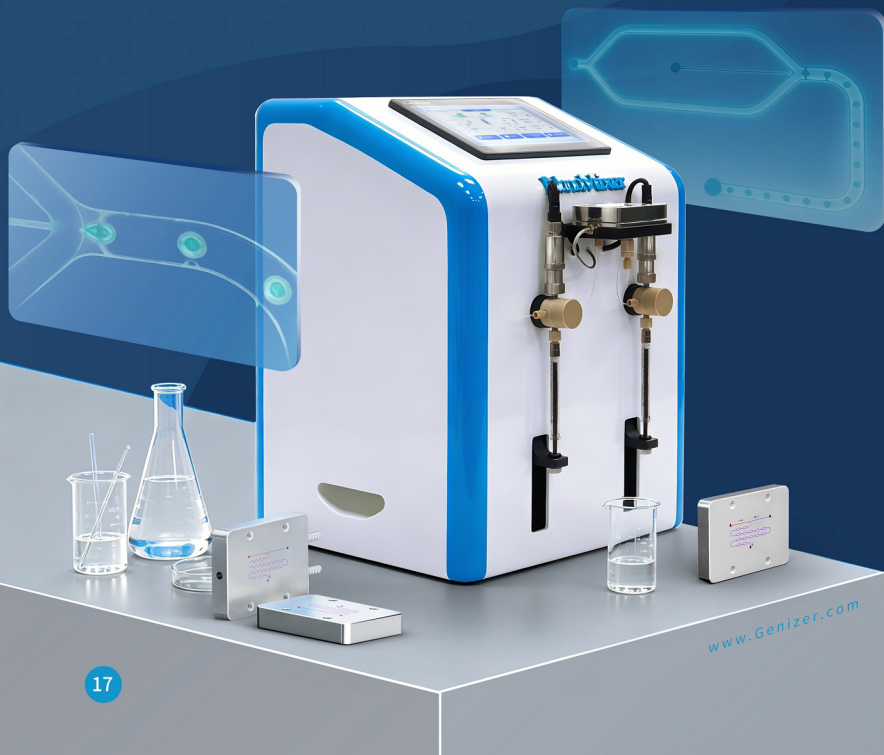
NanoMixer is a high-precision microfluidic mixing platform tailored for nucleic acid delivery and nanomedicine R&D.

It enables the preparation of nanoformulations with **precise structure, uniform particle size and high batch repeatability** using micro samples.

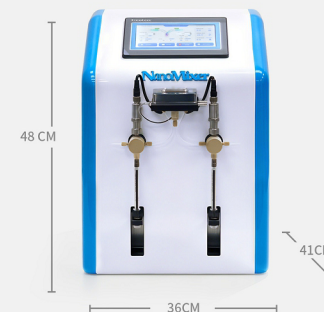
Leveraging advanced microfluidic micromixing technology, combined with multi-channel precision structure and programmable parameter control, the platform efficiently and controllably produces mRNA, DNA, siRNA and lipid nanoparticles (LNP).

The entire process requires no vortex or ultrasound assistance, featuring gentler preparation and superior reproducibility.

With GMP-oriented design, it is compatible with various lipid systems, accelerates condition screening and greatly shortens the R&D cycle. It delivers an optimal solution from laboratory basic research to preclinical process development.



<b>Channels</b>	2/3/4 Multi-group Control
<b>Min Sample</b>	0.5 mL
<b>Pressure</b>	200 psi (1.38 MPa)
<b>Flow Range</b>	0-20 mL/min
<b>Max Flow Ratio</b>	1:100
<b>Flow Accuracy</b>	±1.0% RD
<b>Weight</b>	16kg (35lbs)
<b>Working Temp</b>	4-80°C
<b>Limit Temp</b>	-20 ~121°C
<b>Voltage</b>	110V/220V/230V
<b>Dimension</b>	36(L) × 41(W) × 48(H) cm
<b>Maintenance</b>	Flush to clean
<b>Warranty</b>	1 year



### Uniform, Controllable Size High Batch Stability

Adopting visualized 316L stainless steel microfluidic chips and passive micromixing, it ensures gentle, efficient micro-mixing. It steadily generates 50-200 nm mRNA, DNA, siRNA and LNP. With PDI < 0.15, encapsulation rate > 90% and batch CV < 3%, it meets high-grade formulation R&D standards.

### Modular Multi-channel Formulation Compatible

It supports 2/3/4-channel intelligent multi-component control and 2-channel continuous mixing. Flexible modes of A+B, A+B+C and A+B+C+D are optional. Applicable for liposome and multi-component nucleic acid formulation development, it accelerates process screening and boosts R&D efficiency.

### Precise Flow, Low Residue Sample Saving

Built with independent precision syringe pumps, it achieves 0.01 mL/min flow accuracy and stable ratio control. Low dead-volume flow path ensures system residual ≤ 150 µL. Integrated auto reversing valve prevents backflow and suck-back for high sample utilization. Minimal 0.5 mL loading volume cuts costly sample consumption.

### Wide Precise Temp Optimize Lipid Transition

The system features wide temperature control of 4 °C-80 °C, suitable for lipid phase transition sensitive systems. It precisely regulates nucleation and particle growth during LNP formation, improving encapsulation stability, particle size distribution and experimental reproducibility.

# HAND DRIVEN HOMOGENIZER HANDGENIZER

LABORATORY

HAND DRIVEN

POTABLE

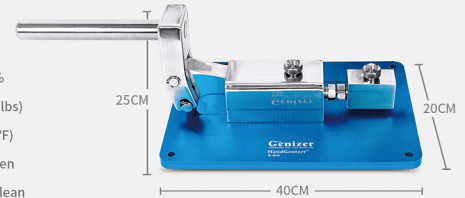
Portable hand driven homogenizer for concept testing up to 30,000 psi.  
 Low-cost high pressure homogenizer  
 Portable design delivers the light weight and small dimensions  
 Convenient hand driven without compressed gas  
 A better choice for small-scale formulation screening  
 An alternative to the high pressure homogenizers driven by compressed air



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## PRODUCT PARAMETERS

Max.Flow Rate	25mL/min
Min. Sample	1mL
Max.Pressure	30,000psi
Mixing Arrange	25%-100%
Weight	~ 15kg (32lbs)
Max. Temp.	80°C (176°F)
Power	Hand Driven
Cleaning	Flush to Clean



**Microfluidics**  
Diamond IX Chamber  
Technology



**Performance**  
Ultra-high pressure up  
to 30,000 psi



**Compact**  
Movable and Light  
weight



**Efficient**  
Eco-Friendly  
low sample volume



**Scalable**  
Compatible with  
Liposome Extruder

## EASY TO CONNECT

Compatible with liposome extruders



Combined With DIXC



Combined With DIXC & Online Extruder

# DIFFERENT POWER SOURCES LIPOSOME EXTRUDERS

BIOLOGICAL

PHARMACEUTICAL

FOOD

MATERIALS

With the advancement of cosmetics and pharmaceutical formulation technologies, liposome technology is rapidly developing. Particle size control is crucial in liposome research.

Genizer™ offers a range of liposome extrusion devices. These include manual extruders powered by hand-assisted propulsion, pneumatic extruders powered by nitrogen gas, and online extruders that connect to homogenizers to achieve further homogenization effects. These devices provide diverse solutions for particle size control in liposome research.



## Hand Driven Liposome Extruder

Designed For Small Samples

Gas Tight Syringes	0.5 to 2.5 mL
Max. Pressure	500 psi
Membrane Size	19 mm
Temp. Control	Optional for Cooling



## Jacketed Liposome Extruder

Air Powered Liposome Extrusion Unit

Capacity Range	10 ~ 3,000 mL
Max. Pressure	1,500 psi
Membrane Size	25, 47, 90, 142 mm
Temp. Control	Jacketed thermo barrel



## Online Liposome Extruder

Scale Up to Production Level

Capacity Range	25 mL ~ 20 L
Max. Pressure	3,000 psi
Membrane Size	25, 47, 90, 142, 293 mm
Temp. Control	Jacketed thermo barrel



# MULTI ONLINE LIPOSOME EXTRUDER SYSTEM

PRODUCTION-GRADE

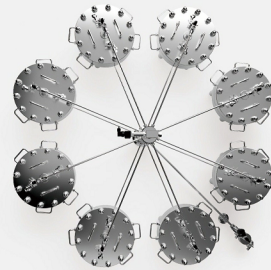
SANITARY

CUSTOMIZABLE

The multi-online liposome extruder system uses multiple pharmaceutical-grade 316L stainless steel units connected by high-pressure tubing and powered by PilotGenizer homogenizers. With PLC control for real-time monitoring of temperature, pressure, and flow, it ensures stable, efficient production. The system produces 10 to 200 liters of liposomes per hour, offering high flexibility and scalability for large-scale manufacturing.

## PRODUCT PARAMETERS

Design Pressure	3,000psi
Final Particle Size	50 - 800 nm
Max. Concentration	200 mg/ml
Operating Capacity	50 - 3,300 ml/min
Operating Temperature	-4°C - 80°C
Product Materials	316L stainless steel
Working Conditions	Connected to HPH
Material Standards	Pharmaceutical-grade

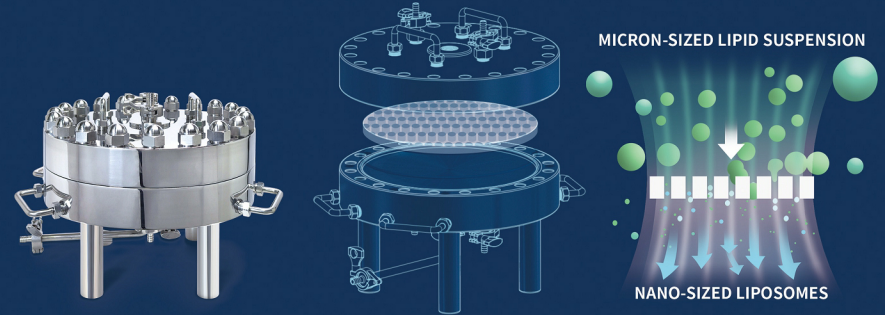


180CM



# CORE PART OF THE SYSTEM

This unit is the core of the system, featuring key components such as the feed inlet, extrusion membrane, filter support, and outlet. All parts in contact with materials are made of pharmaceutical-grade 316L stainless steel to ensure high hygiene standards during nanoformulation. Materials pass through the precisely sized extrusion membrane and undergo multiple extrusion cycles for uniform particle size refinement.



# DUAL LASER SOURCES DLS TECHNIQUE PARTICLE SIZE ANALYZER

HIGH PRECISION

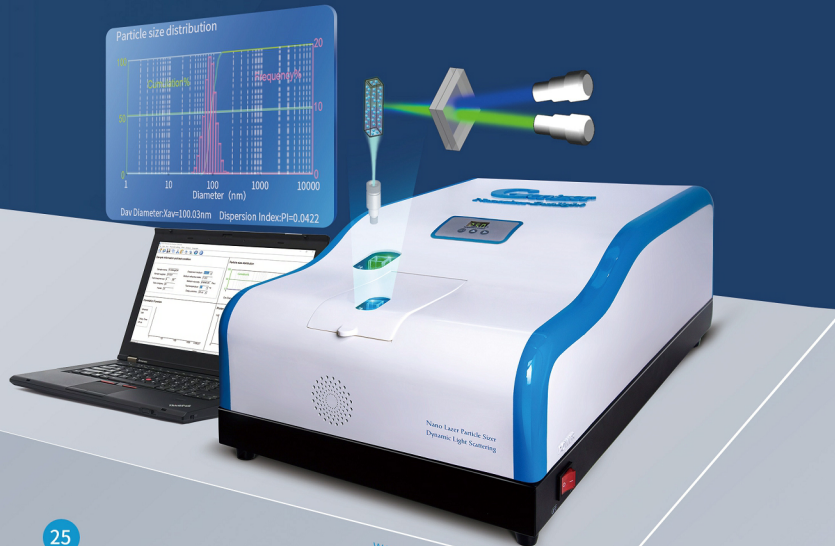
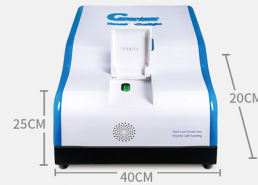
DLS DUAL-WAVELENGTH

DYNAMIC MONITORING

WIDE APPLICABILITY

Laser particle sizer with dual wavelength especially designed for submicron and nano particle size testing. High detection sensitivity, accurate precision and rapid measurement. Blue laser and green laser for more applications. Real-time detection of dynamic changes of the sample, Fully automatic operation

Size Range	1nm-10 $\mu$ m
Concentration Range	0.1 mg/mL-100 mg/mL
Temperature	0°C-79.9°C $\pm$ 0.1°C
Sampling Time	Less than four minutes
Detector	Photomultiplier tube (PMT)
Weight	15kg



## Assembled DIXCs Unit

Used at industrial scales

Pressure Range	20,000 – 45,000 psi
Sanitary	316L stainless steel, diamond
Cooling Option	Real-Time Cooling system

The fixed geometry within the DIXC is intended to create a uniform processing profile so that all materials will be processed with equal disruptive forces. Single-slotted interaction chambers have a single microchannel and are ideal choices for small batch research, while the multi-slotted interaction chamber comprises multiple microchannels in parallel, which can be used at industrial scales, by increasing the flow rate through the DIXC but with equal processing forces.



## Sanitary Heat Exchanger

Highly efficient designs

High pressure sanitary shell and tube heat exchangers. Highly efficient designs, with shell diameters ranging from 3/4" to 2" produce heat transfer rates up to 60kW with flow rates up to 1000L/hr.

Max. Pressure	5,000 psi
Sanitary	316L stainless steel
Transfer Area	20-56 cm <sup>2</sup>



## Dual-Parameter Transmitter

Temperature - Pressure Transmitter

Incorporating both a temperature sensor and pressure sensor into a single transmitter package, providing customers with significant cost reductions. Furthermore, it saves installation time and space, especially suitable for those high pressure applications in which dual measurements are required.

Temperature Range	0-150°C (300°F)
Pressure Range	0-20,000psi (150Mpa)



# HIGH - PRESSURE PROGRAMMING CONTROL SYSTEMS®

## PLC SYSTEM

The PLC system is a real-time user-friendly intelligent system specially developed for the Genizer homogenizer.

It is used to help customers more intuitively view the changes in temperature, pressure and other data during the operations.

It's available for operators to adjust operational parameter, including the stroke volume and circulation passes according to the needs of customers to better complete the experiment.



-  Touch screen control panel
-  Display of flow rate and time
-  Pressure control
-  Auto stop on volume time or pressure
-  Precision volume control
-  Overload protection

## SPARES



**Inlet & Outlet Check Valves**



**High Pressure Fittings**



**Bearings for Plunger**



**Plunger Seal Ring Sets**



**Track-Etch Membranes**



**Pressure Gauges**