

**Genizer**  
www.Genizer.com

18 Technology Dr., Suite 159 Irvine, California 92618 USA

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 [LA@Genizer.com](mailto:LA@Genizer.com)  +1(949) 932-0294  [www.Genizer.com](http://www.Genizer.com)

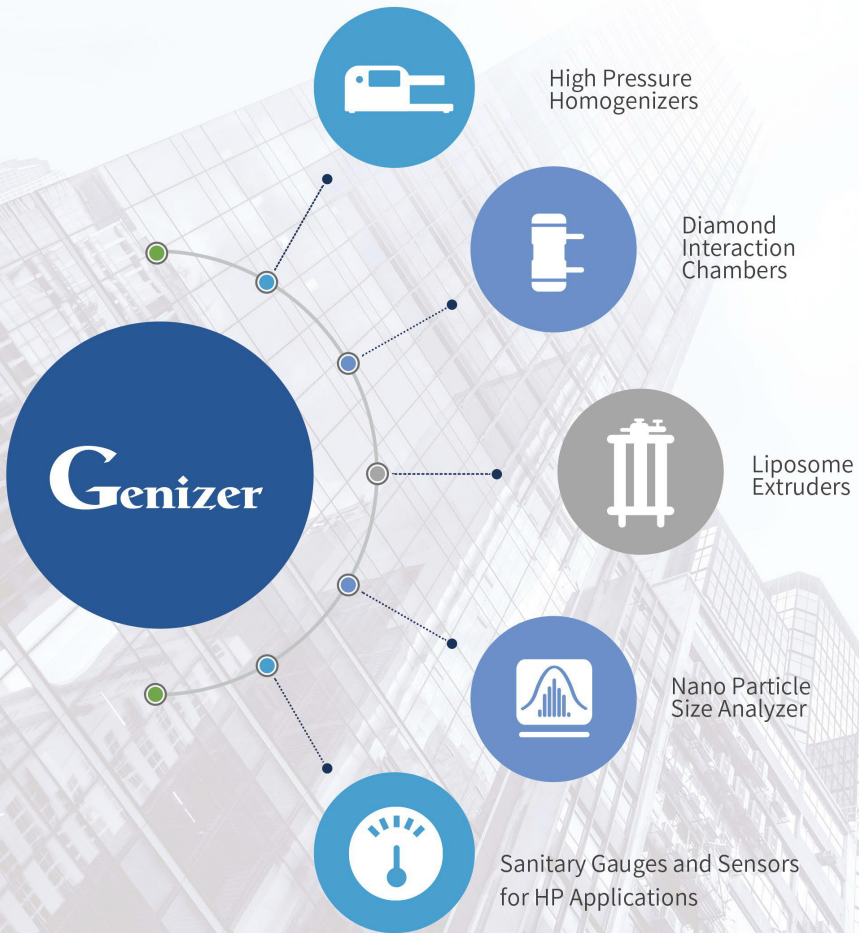
**Genizer**  
SOLUTION FOR NANO

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# WHAT WE OFFER

Genizer™ is committed to providing 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 providing 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.

# HIGH PRESSURE MICROFLUIDIZATION HOMOGENIZER

## NANOGENIZER

- LABORATORY
- POPULAR MODEL

NanoGenizer™ is a precision equipment that uses Diamond Interaction Chamber Technology to achieve nano-dispersion, particle size reduction and emulsification of materials.



## ABOUT THE NANOGENIZER

NanoGenizer utilizes mature and stable high-pressure microjet technology, Pressurize liquid or solid-liquid suspension material under the action of a intensifier pump, Accurate pressure regulation boosts the material pressure to a set pressure value between 20Mpa and 300Mpa. The pressurized material shoots at the diamond microchannel with a fixed geometry and produces a supersonic microjet, subjected to millions of physical shears per second within a particular geometric channel, So that the material to obtain nano homogenization, ultra-micro emulsification, nano dispersion, disruption and other effects.

### PRODUCT PARAMETERS

Max. Flow Rate	60 ~ 100mL/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



**HP 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 (P.B)**  
Touch screen interface



**Plug & Play**  
Using electrical power



**Cooling Unit**  
Real-time cooling unit



**Compact**  
Movable and light weight



**Compliance**  
CE & RoHS certs

# CORE TECHNOLOGY

Genizer high pressure homogenizers excel at reaction chamber technology.

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

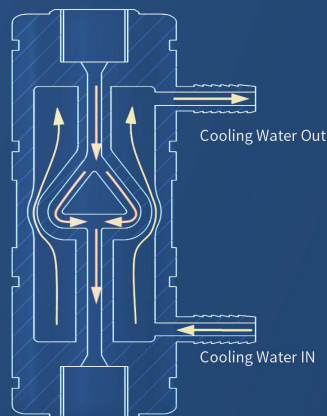


## Diamond Interaction Chambers

### Core Part of Genizer's Homogenizers

The microjet diamond interaction chamber is made of 316L stainless steel outside and made of high quality diamond inside.

When the material passes through the diamond interaction chamber, it forms a high-speed microjet through a very small pore (less than 100 microns) under the action of ultra-high pressure (up to 60,000psi/4,000bar/400MPa), and the speed can reach 500m/s (more than 340m/s above the speed of sound). After intense shearing, oscillation, collision, hole effect and thurroscope and other effects of processing, the material physical, chemical, structural properties and other changes, and finally achieve particle size reduction



#### Full Replacement

Full replacement Compatible with the chamber of MFIC processors

#### Cooling Option

Real-time cooling option for temperature sensitive materials

#### Electro-Polish

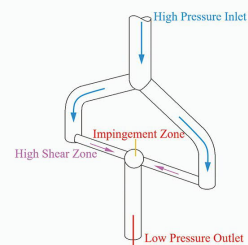
Electro-polishing and inner passivation for pharmaceutical applications

#### High Shear Forces

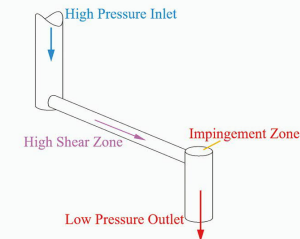
The high-speed jet is inside the diamond micropores and is subjected to more than a million shears per second

## Technical Principles

In addition to the higher shear and homogenization efficiency of the diamond interaction chamber, its internal polycrystalline diamond channel has a fixed "Y" or "Z" shape geometry, ensuring that the processing effect of the material before and after each pulse passes through the cavity is consistent and the repeatability of different pulse treatment chamber is high, and the particle size of the treated material after treatment is therefore narrower.



Y-type DIXC Single-channel



Z-type DIXC Single-channel



### Y-TYPE DIXC

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

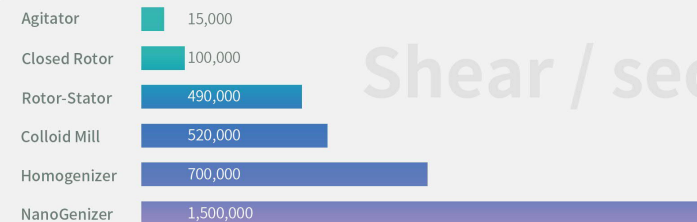


### Z-TYPE DIXC

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.



The shear force of the NanoGenizer high-pressure homogenizer on the material is unmatched by traditional valves or other homogenization equipment.



# APPLICATION AND INDUSTRIES

Genizer™ uses knowledge and experience to give formulation development experts more alternatives and capacities for cell disruption, emulsification and particle size reduction quickly and easily. Our team is ready to work with you on the best nano material solution – employing the appropriate high pressure equipment and optimal processing parameters – for your unique and favorable formulation.

Genizer™ high pressure homogenizers are capable of achieving consistent and scalable results in the areas of nanoemulsions, liposome, dispersion, cell rupture and nano particle size reduction. Our high-pressure homogenizers are used extensively by leading companies in the pharmaceutical, biotechnology, chemical, energy, cosmetic/cosmeceutical and food/nutraceutical industries.



## Nanoemulsions

Superior interaction chamber technology to nano-size the particles and yield extremely small nanoemulsions



## Particle Size Reduction

Genizer™ high pressure homogenizers stand alone in their ability to achieve uniform particle size distribution



## Liposomes

Genizer™ technology successfully processes Liposomes in a quick and mild way for liposomal formulation



## Cell Disruption

Achieve efficient cellular lysis and disruption, which allows for easiest purification in the downstream



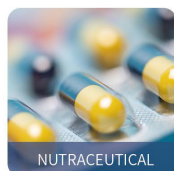
## Lipid Nanoparticles

Genizer™ is capable of manufacturing lipid nanoparticles (LNP)



## Polymer Nanoparticles

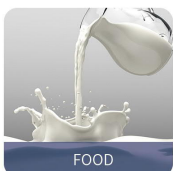
The optimized technology for producing nano-scale, and filterable polymer nanoparticles



NUTRACEUTICAL



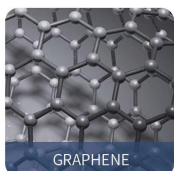
BIOTECHNOLOGY



FOOD



ENERGY



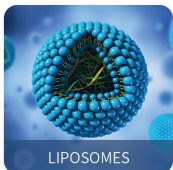
GRAPHENE



VACCINE



COSMETICS



LIPOSOMES



FAT EMULSION



INK

# 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

# HIGH PRESSURE MICROFLUIDIC MIXING-TEC HOMOGENIZER

## MIXGENIZER

LABORATORY

DUAL PUMPS

MICROMIXING

MixGenizer is a homogenizer especially designed for mixing and homogenizing the sample fluids from two or more inlet ports.



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



**MicroMixing**  
Diamond IX  
chamber technology



**Performance**  
More than 100 mL/min  
at 30,000 psi



**Uniform**  
Uniform particle  
size distribution



**Efficient**  
Eco-friendly, low  
sample volume



**Safety**  
Chemical sanitary  
material



**Smart** (P.8)  
Touch screen  
interface



**Plug & Play**  
Using electrical  
power



**Cooling Unit**  
Real-time cooling  
unit



**Compact**  
Movable and light  
weight

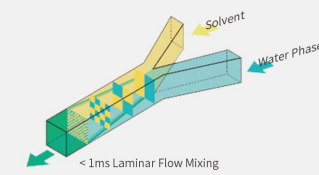
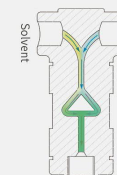


**Compliance**  
CE & RoHs certs

### Y-TYPE DIAMOND MIXING CHAMBER

Special designed DIX chamber for MixGenizer

The two streams are injected into the Genizer ultra high pressure dual pumps from the inlet reservoir and mix homogeneously at the diamond interaction chamber where the fluids pass through the fixed micro-channels and experience high shears and strong impacts. It can be used for laboratory preparation of liposomes, nanosuspensions, microemulsions, lipid microsphere, nanoemulsions, dairy products, infusion solutions, cell disruption, juice homogeneity, fine chemical engineering, dye and etc.



# 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 40L/H.

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 Pressure Homogenizer can produce flow rate as much as 120L/hour.

The Manufacture Scale High Pressure 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

Max. Flow Rate	40L/hr
Min. Sample	100mL
Max. Pressure	45,000psi
Mixing Accuracy	1%
Mixing Arrange	25%-100%
Weight	~ 260kg (573lbs)
Max. Temp.	80°C (176°F)
Power	380V/430V
Cleaning	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<sup>(P.S)</sup>**  
Touch screen interface
- Plug & Play**  
Using electrical power
- Cooling Unit**  
Real-time cooling unit
- Compact**  
Movable and light weight
- Compliance**  
CE & RoHs certs

# 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



## 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



**Portable**  
Movable and light  
weight



**Efficient**  
Eco-Friendly, low  
sample volume



**Safety**  
Chemical sanitary  
material



## EASY TO CONNECT

Compatible with liposome extruders

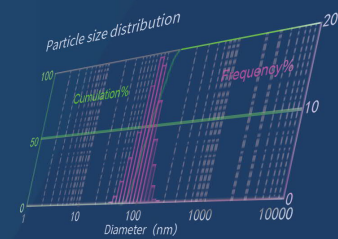
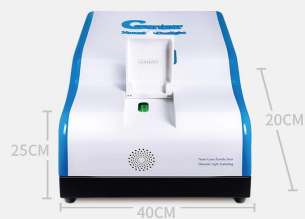




# DUAL LASER SOURCES DLS TECHNIQUE NANO PARTICLE SIZE ANALYZER

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

<b>Size Range</b>	1nm-10µm
<b>Concentration Range</b>	0.1 mg/mL-100 mg/mL
<b>Temperature</b>	0°C-79.9°C±0.1°C
<b>Sampling Time</b>	Less than four minutes
<b>Detector</b>	Photomultiplier tube (PMT)
<b>Weight</b>	15kg



## Hand Driven Liposome Extruder

Designed for Small volume

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



## Jacketed Liposome Extruder

N<sub>2</sub> Powered Liposome Extrusion Unit

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



## Online Liposome Extruder

Scale up to Production Scale

<b>Capacity Range</b>	25 mL ~ 20 L
<b>Max. Pressure</b>	3,000 psi-6,000 psi
<b>Membrane Size</b>	25, 47, 90, 142, 293 mm
<b>Temp. Control</b>	Jacketed thermo barrel



## 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	20~56cm <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)



## SPARES



Inlet & Outlet Check Valves



High Pressure Fittings



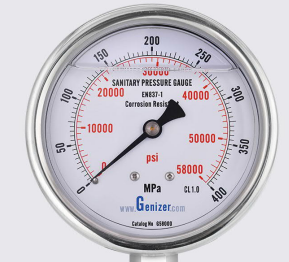
Bearings for Plunger



Plunger Seal Ring Sets



Track-Etch Membranes



Pressure Gauges