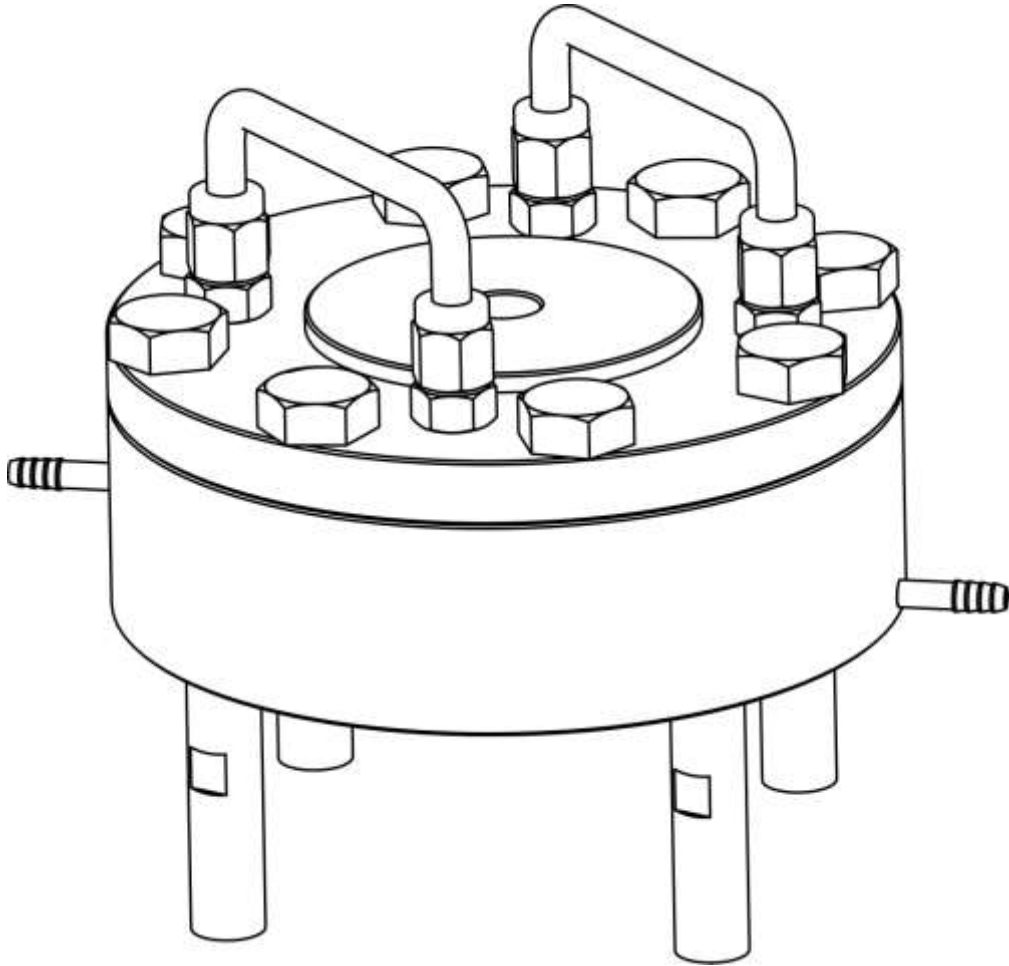


## **High Pressure Extruder System**

### **Temperature Control Online Type**

Catalog No. Gextruder-5ml/min;  
Gextruder-50ml/min; Gextruder-400ml/min;  
Gextruder-1500ml/min; Gextruder-5000ml/min



## **Open-box Inspection**

Check whether there is any packing damage. Refer to the shipping list for the integrity of the product.

## **2. Product Introduction**


### **2.1 Brief Introduction**


Genizer™ jacketed temperature-control liposome extruder is made of pharmaceutical grade 316L stainless steel approved by FDA and GMP. The laser-drilled stainless steel micron pore supporting plate guarantees the maximum pressure operation. The main application of extruder is nanoparticulation and homogenization of pharmaceutical liposome and emulsion. The extruder prepares liposomes and emulsions with 50nm-400nm track-etched membrane. The extruder supports Handgenizer™ and other high pressure homogenizers, therefore allows the simultaneous operation of high pressure homogenizing and filters extruding. With the jacketed temperature-control design, the equipment is able to heat or cool materials, therefore applicable to the high-viscosity products.


## 2.2 Specifications


Maximum pressure	400 bar
Finished product size	50-500 nm
Maximum concentration	200 mg/ml
Operation capacity	5-500 ml/min
Operating temperature	-4°C-100°C
Product material	316L stainless steel
Working condition	High-pressure pump
Material standard	Pharmaceutical grade

## 3. Safety Information

 **Note:** The designed maximum pressure of equipment is 3,000 psi. Please do not exceed this pressure during operation.

 **Warning:** Do not use extruder that has no fasteners or missing fasteners, check the wear pattern of lever, and replace if necessary.

 **Danger:** Always check the wear pattern of all O-rings, and replace if necessary. Damaged or worn O-rings may suddenly rupture, which could lead to a sudden decompression of the extruder.

 **Warning:** The temperature control device equipped on the

extruder might get hot during operation, which can cause burns, please be careful.



**Warning:** When lifting and moving equipment, gently, to avoid injury hit people.



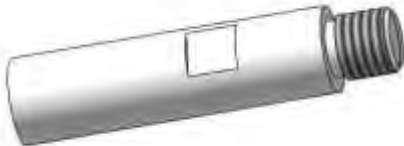


**Warning:** Genizer<sup>TM</sup> high pressure extruder should be performed in accordance with the relevant safety requirements. The operator must wear protective clothing or shelter. Any personal or property damage caused by safety requirements violation should be responsible by organization or individual who is operating it.



**Warning:** Using original parts to replace worn or damaged parts. Replacement with non-original parts will not be warranted.

## **4. Parts List**

The following is the description of common parts used for Genizer<sup>TM</sup> temperature control of online high pressure extruder system

Part No.	Part name	Quantity	
1	Pillar	4	
2	Filter support base	1	
3	Stainless steel micron pore support plate	1	

Part No.	Part name	Quantity	
4	Small O-ring	1	
5	Large O-ring	1	
6	Gland	1	
7	Fastener	8	 or 

The following items are optional parts.

a. Nano-membrane b. high-pressure homogenizer or high pressure pump

## 5. The assembly procedure

The following describes the assembly process of Genizer™ temperature control of high-pressure online extruder system step by step. Please refer to the parts list for assembly.

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### Step 1



Install the four pillars (1) on the filter supporting base (2). And then place the assembling units at a suitable platform, remove unnecessary equipment from the work area.

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### Step 2



Install the stainless steel micron pore support plate (3) on the filter support base (2).

Note: the pore on the stainless steel micron pore support plate (3) should be upward during installation.

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**Step 3**



Place the desired size of nanometer membrane carefully on the stainless steel micron pore of the support plate (3).

Note: The nanometer film must be flat without wrinkles or bubbles, humidify it before place.

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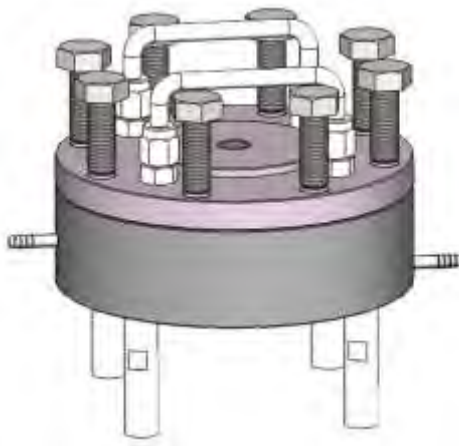
**Step 4**



Install the small O-ring (4), large O-ring (5) and the gland (6) on the filter support base (2) in order.

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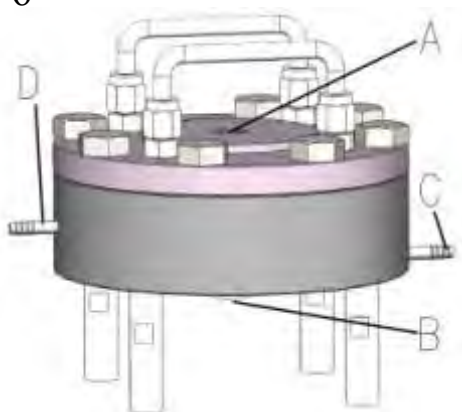
**Step 5**



Install the eight fasteners (7) on the filter support base (2), and tighten it.



**Step 6**



A connector is material import

B connector is material outlet

C connector is water bath outlet

D connector is water bath inlet

Connect the connecting pipe to  
the corresponding place.

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## **6. General Procedure**

### **6.1 Procedure**

After connecting the pipes according to step 6, place the high-pressure materials into the device for work. If temperature control is needed, the materials shall be preheated to a specified temperature through the thermostatic water bath that connected with connector (C) and connector (D). High pressure micro materials shall be extruded from the nano pores on nanometer membrane, and then outflow from the material outlet connecting pipe (B).

## **6.2 General Cleaning Procedure**

It applies to the general cleaning of extruder, and certain compounds may require specific cleaning procedures.

1. The extruder should be washed out immediately after use, please disassemble its parts according to **4. Parts list**.

2. It is suggested to use phosphate-free detergent, water temperature should be moderate; additionally, a brush can be used in places that are difficult to clean, wash with plenty of tap water after warm soapy water.

3. Wash with distilled water for several times after tap water cleaning.

All stainless steel parts should be washed with 70% ethanol, except O-rings, as O-ring may be corroded in 70% of the organic solvent.

## **7. Trouble Shootings**

7.1 When the extruder is leaking, please re-assemble, and inspect if all O-rings are in good condition and installed correctly. If the fasteners are loose.

7.2 The following factors are likely to cause slow filtration:

7.2.1 Filtrating large particle materials through nano membrane with small pore, the process can be very slow, it is recommended to use nano membrane with larger pore for filtration, and then use a small one to continue.

7.2.2 Some material is coagulated at the operating temperature, resulting in large filter resistance, so it is recommended of changing the operating temperature.

7.2.3 Nano membrane has been blocked, which making the filtration capacity reduced greatly, replacement is advised.

7.2.4 It is may be caused by uneven distribution of the material mixture.

7.3 When the heating cylinder is not hot, please check whether the connection between heating cylinder and thermostatic water bath is right, and whether the circulation of pipe is smooth.



## Instruction Manual

### High-pressure Jacketed Extruder

#### Genizer Liposome Extruder System

Solution for liposome and nanoparticle extrusion

	Catalog No.	Thermo-control	Power mode		Micron-pore plate	Maximum pressure	Dimension L×W×H(cm)/Weight(kg)	Nano membrane
			Air	Online				
Test Scale	<b>HandExtruder-1ml-RT</b>	Optional	/	/	/	150 psi	23×17×33/2 (jacketed)	30 nm
	<b>HandExtruder-1ml</b>						23×17×13/2	
	<b>GExtruder-10ml</b>	Optional	Y	Y	Y	3,000 psi	23×13×25/4 (jacketed)	
	<b>GExtruder-5ml/min</b>						10×10×8/1	
	<b>GExtruder-100ml</b>	Optional	Y	Y	Y	3,000 psi	23×20×32/7 (jacketed)	80 nm
	<b>GExtruder-50ml/min</b>						12.5×12.5×9/2	
Pilot Scale	<b>GExtruder-800ml</b>	Optional	Y	Y	Y	3,000 psi	25×25×37/20 (jacketed)	100 nm
	<b>GExtruder-400ml/min</b>						18×18×10/5	
	<b>GExtruder-3000ml</b>	Optional	Y	Y	Y	3,000 psi	30×25×55/45 (jacketed)	200 nm
	<b>GExtruder-1500ml/min</b>						30×25×25/21	
Production Scale	<b>GExtruder-10000ml</b>	Optional	Y	Y	Y	3,000 psi	45×40×65/130 (jacketed)	800 nm
	<b>GExtruder-5000ml/min</b>						45×40×30/90	
Customize Scale	<b>GExtruder 0-50000ml or Multi-Extruder</b>	Optional	Y	Y	Y	up to 6,000 psi	TBD (jacketed) TBD	

Notice: The dimension, structure and parameter should be subject to the final product.