

## Falling Film Evaporator /Laboratory and Processing Equipment

**XINSHENG Pharmaceutical Instrument Co., Ltd**



## Description

A falling film evaporator is an industrial device to concentrate solutions, especially with heat sensitive components. The fluid will create a film along the tube walls, progressing downwards(falling)-hence the name.

In general the evaporation takes place inside the vertical tubes, which is called shell-and-tube heat exchanger, crowned by a proprietary liquid distribution device. The fluid distributor has to be designed carefully in order to ensure an efficient and uniform distribution of the liquid to all the tubes along which the product flows as a continuous film falls, driven by gravity.

The falling film evaporator is the most commonly used type of film evaporator due to its wide operating range. It is specifically suited to process the products with a low viscosity and a low tendency for fouling. In hemp industry, the falling film evaporator is widely used as evaporation system for ethanol recovery in large scale, and it is much more efficient than rotary evaporator.



## Technical Features:

Higher Condensation Efficiency

"In series" plate heat exchanger for higher condensation efficiency.



Uniform Heating

Finely designed vertical shell-and-tube heat exchanger with a concentrically arranged centrifugal separator, to make it perfect for uniform heating.



Various Types of Feeding&Discharging

No transfer pump is required for feeding.

Optional discharging methods:

- collect and discharge in an ethanol tank
- discharge by diaphragm pump
- discharge by gear pump



Start&Stop Vacuum Control System

Separate manual or automatic start and stop control for vacuum pump.

Ethanol will not be sucked into the vacuum pump.



Multiple System Control Options

Manual control of various valves on the machine.

Control the machine by controlling the pneumatic valve in the integrated control panel.

Control the system by PLC.



## Technical Specification

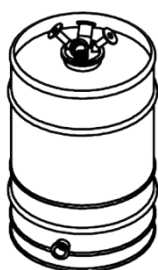
### Falling Film Evaporator /Laboratory and Processing Equipment

Model	FFE-50L	FFE-100L	FFE-200L	FFE-300L	FFE-500L	FFE-1000L	FFE-1500	FFE-2500L
Temperature Range	RT~130°C							
Pressure	≥-0.1Mpa							
Feeding Rate(L/h)	50	100	200	300	500	1000	2000	3000
Recovery Efficiency-Ethanol(L/h)	50	100	200	300	500	1000	2000	3000
Solvent Application	Ethanol, propanol , heptane, pentane, water, methanol							
Single Pass Recovery Efficiency	Ethanol 95-99.5%(different solvents may have different recovery efficiency)							
Solvent Loss	≤0.5%							
Residence Time	≤1 min							
Material Contact Part	SS316L and 3.3 high borosilicate glass							
Sealing Material	EPDM/PTFE(Choose sealing materials according to different solvents)							
Heating Type	Shell-and-tube heat exchanger							
Condenser Type	Plate or tube heat exchanger or coil heat exchanger							

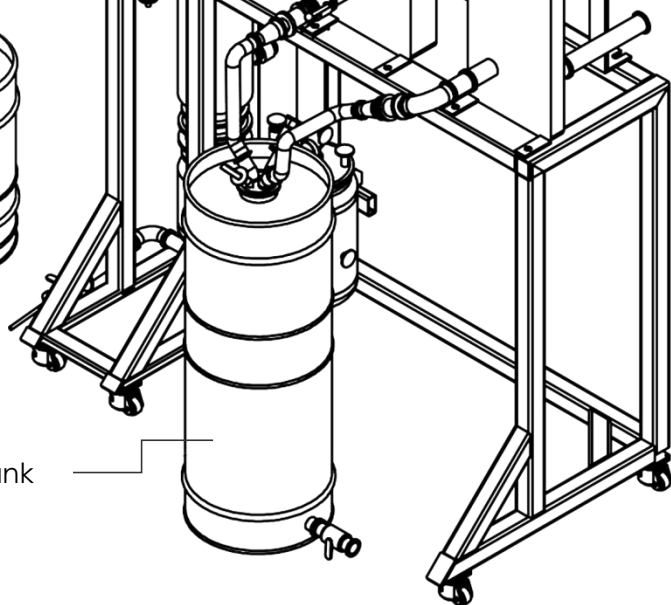


## OUR SOLVENT RECYCLING PROPOSALS

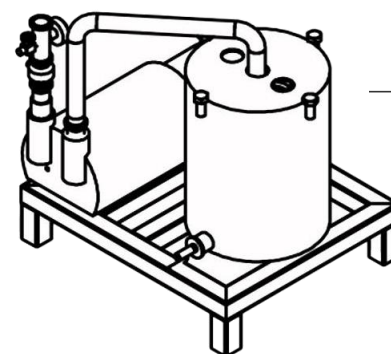
### Basic Type



Storage & Collection Tank



Vacuum System

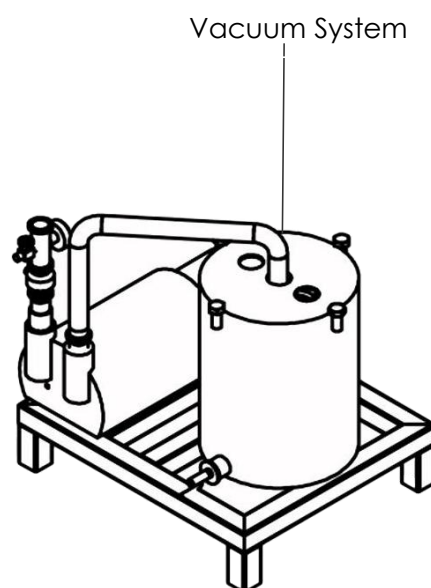
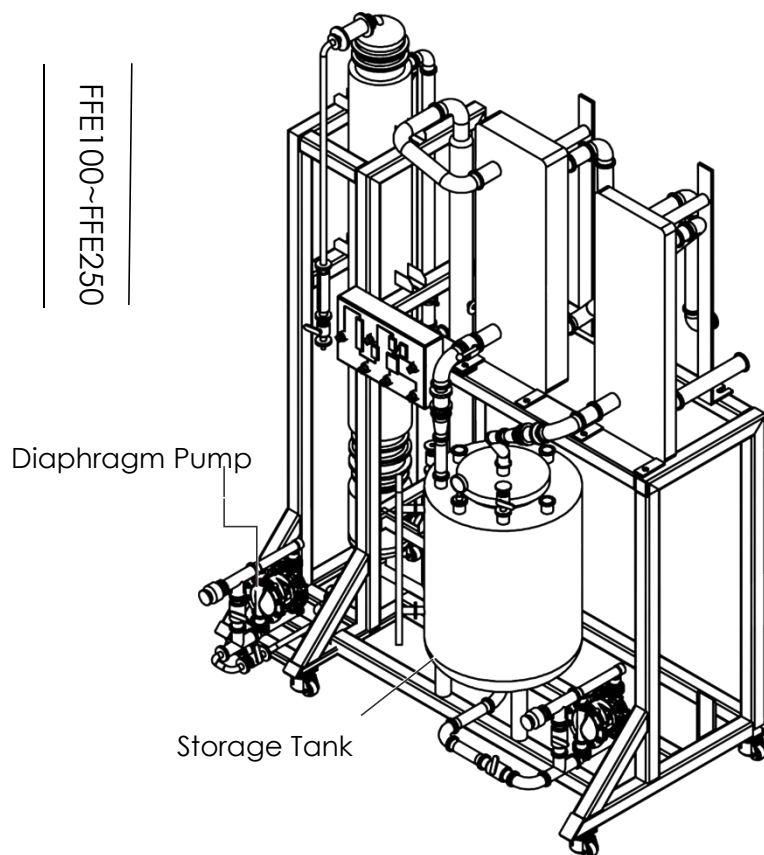


<b>Features</b>	Manual operation; Feeding supported by the vacuum environment; Discharging and collecting in an ethanol tank
<b>Suitable Models</b>	FFE-100L FFE-200L

## Air-Driven Type

Automatic Vacuum Feed Discharge

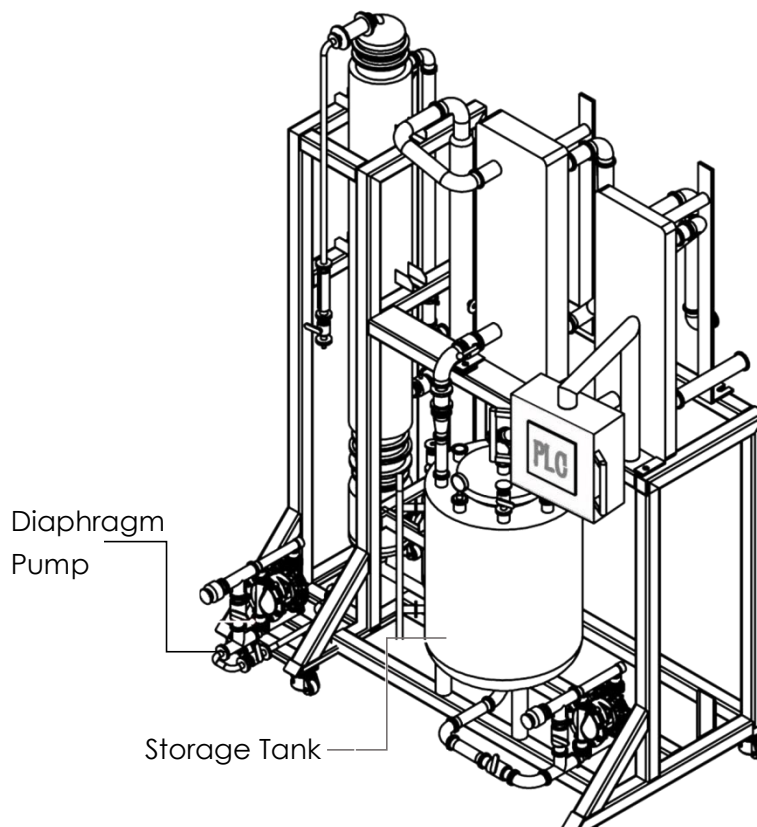
- Air-Driven



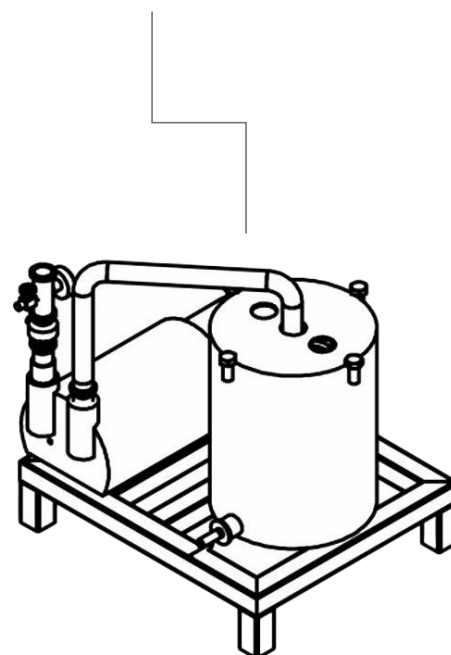
<b>Features</b>	Automatic operation driven by air; Continuous feeding by the vacuum environment; Discharging by diaphragm pump (under vacuum).
<b>Suitable Models</b>	FFE-50L FFE-100L FFE-200L FFE-300L FFE-500L FFE-1000L FFE-1500L FFE-2500L

## PLC Type

- PLC Type



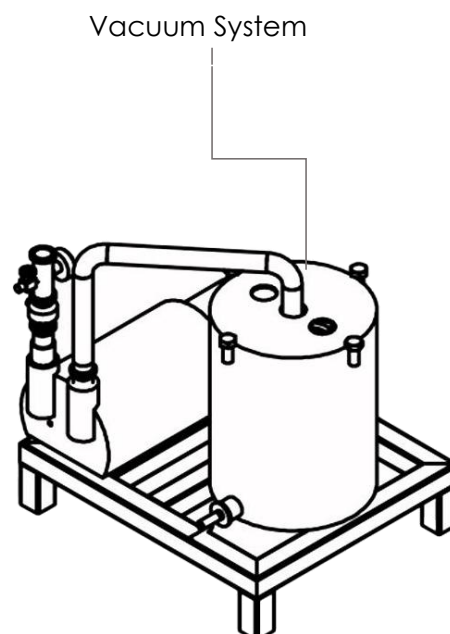
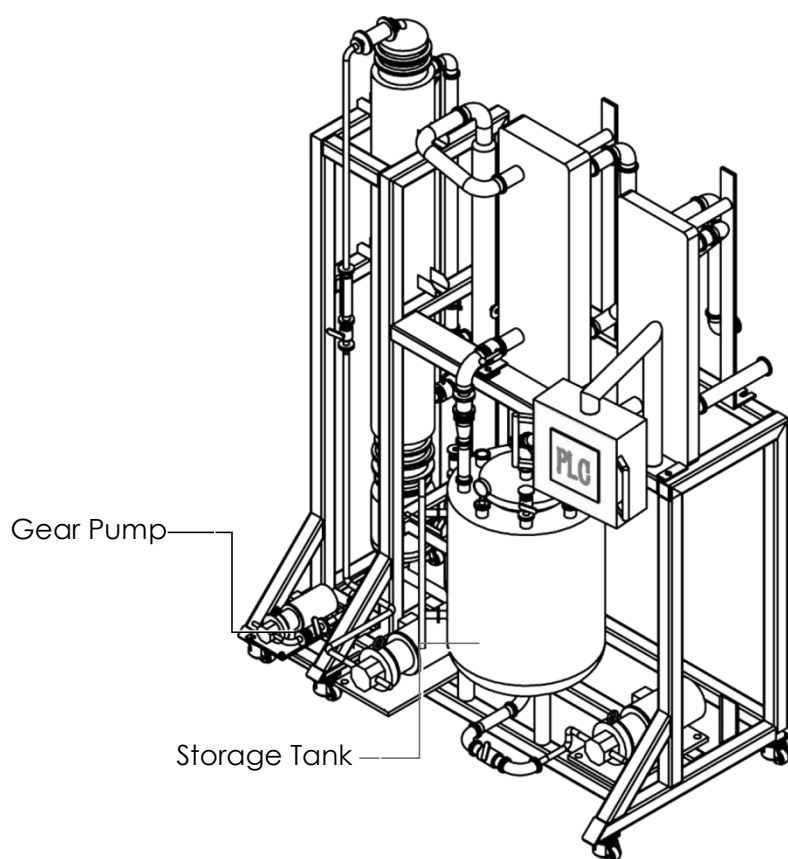
Vacuum System



<b>Features</b>	Completely automatic operation by PLC; Continuous feeding by the vacuum environment; Discharging by diaphragm pump (under vacuum).
<b>Suitable Models</b>	FFE-50L FFE-100L FFE-200L FFE-300L FFE-500L FFE-1000L FFE-1500L FFE-2500L

## PLC+Gear Pump Type

- PLC+Gear Pump Type



<b>Features</b>	<p>Completely automatic operation by PLC;          Features Continuous feeding by the vacuum environment;          Discharging by gear pump (under vacuum);          Realizing great quietness working with gear pumps.</p>
<b>Suitable Models</b>	<p>FFE-50L FFE-100L FFE-200L FFE-300L FFE-500L FFE-1000L FFE-1500L FFE-2500L</p>



## TURNKEY SOLUTION

### Cooling Option 1: Chiller

#### Matched Models

	FFE-50L	FFE-100L	FFE-200L	FFE-300L	FFE-1000L	FFE-1500L	FFE-2000L	FFE-2500L
Chiller	XSC-6	XSC-12	XSC-25			N/A		

Chiller	XSC-3	XSC-5	XSC-6	XSC-8	XSC-12	XSC-15	XSC-25	XSC-40
Voltage(V)	220		220/380		220/380/480		380/480	
Phase(P)	1				3			
Frequency(Hz)	50							
Power(kw)	3.1	4.8	5.3	7.9	10.5	13.7	22	34.7
Capacity(kw)	9.1	15	18	21.5	35	44	69	116
Flow(L/min)	26.7	43.3	51.7	61.7	100	127	197	333
Lift(m)	25	23	20.5	25	23	21	22	21
Weight(kg)	160	200	240	280	350	400	750	1100
Dimensions(m)	0.85*0.72*1.325	1.220*72*1.325	1.22*0.72*1.325	1.505*0.72*1.325	1.710*0.795*1.49	1.785*0.915*1.63	2.08*0.1.05*1.68	2.2*1.2*1.88



## Cooling Option 2: Chiller with Cooling Tower

### Matched Models

	FFE-50L	FFE-100L	FFE-200L	FFE-300L	FFE-500L	FFE-1000L	FFE-1500L	FFE-2500L
Chiller	N/A	XSC-3	XSC-5	XSC-5	XSC-8	XSC-15	XSC-25	XSC-40
Cooling Tower	N/A	XST-10	XST-20	XST-30	XST-50	XST-100	XST-150	XST-250

### Chiller parameters

	XSC-3	XSC-5	XSC-6	XSC-8	XSC-12	XSC-15	XSC-25	XSC-40
Voltage(V)	220		220/380		220/380/480			380/480
Phase(P)	1		3					
Frequency(Hz)	50							
Power(kw)	3.1	4.8	5.3	7.9	10.5	13.7	22	34.7
Capacity(kw)	9.1	15	18	21.5	35	44	69	116
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### Cooling Tower parameters

Model	XST-10	XST-20	XST-30	XST-50	XST-100	XST-150	XST-250	XST-300
Flow (m³/min)	10	20	30	50	100	150	250	300
Motor Power(kw)	0.8	0.37	1.1	1.1	2.2	4	7.5	11
Weight(kgs)	75	140	165	191	695	1015	2121	2235

Chiller



Cooling Tower



## Heating Options

Model	FFE-50L	FFE-100L	FFE-200L	FFE-300L	FFE-500L	FFE-1000L	FFE-1500L	FFE-2500L	
Electrical Heating Circulator	XSHC-A15	XSHC-A38	XSHC-A60	XSHC-A95	XSHC-A150	N/A			
Natural Gas Hot Water Boiler Heating System						N/A	WBH-A36-XS	WBH-A54-XS	WBH-A72-XS
Electricity	220/380/480V;3P;50/60Hz					220V;3P;50/60Hz	380V;3P;50/60Hz		
Total Power(kw)	16.5	41	63	98	155	15.5	16	31	
Gas Consumption(m/h)	N/A					40	55	75	
Heating Power(kw)	15	38	60	95	150	360	540	720	
Temperature	RT-90°C (water heating),RT-200°C (oil heating)					RT-90°C ( water heating)			
Flow(L/min)	50	110	250	320	400	1500	2300	3000	
Lift(m)	25	25	25	50	50	27	24	34	
Weight(kgs)	100	170	285	550	1200	410	480	620	
Dimensions(m)	0.76*0.62*0.84	1*0.8*1.1	1.2*0.75*1.1	1.45*0.85*1.35	1.8*1.4*1.7	1.5*0.65*1.25	1.62*0.85*1.5	1.85*0.85*1.5	

Electrical Heating Circulator



Gas Hot Water



## Vacuum Pump Options

### Vacuum Pump parameters

Model	XSVP-25	XSVP-50	XSVP-80	XSVP-110	XSVP-165	XSVP-230	XSVP-280	XSVP-400	XSVP-500
Capacity (m3/h)	25	50	80	110	165	230	280	400	500
Vacuum(Mpa)	-0.097	-0.097	-0.097	-0.097	-0.097	-0.097	-0.097	-0.097	-0.097
Power(kw)	0.81	1.45	2.35	3.85	4	5.5	7.5	11	15
Flow(L/min)	2	2	2.5	4.2	6.7	8.3	10	15	20
Noise(dB)	62	65	66	72	63	68	69	73	74
Weight(kgs)	37	41	66	85	120	150	210	280	390





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