



# Falling Film Evaporator

/ Laboratory and Processing Equipment



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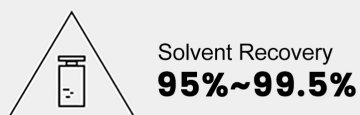
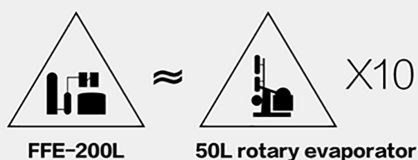
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## FALLING FILM EVAPORATOR

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.



## 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.  
*Feeding flow rate can be measured and read by a rotermeter.*
- Optional discharging methods:
  - a. collect and discharge in an ethanol tank
  - b. discharge by diaphragm pump
  - c. discharge by gear pump



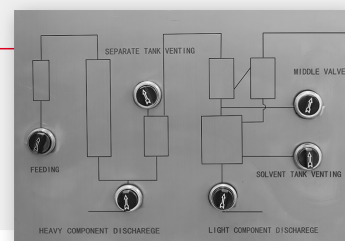
### Start & Stop Vacuum Control System

- Separate manual or automatic start & 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.

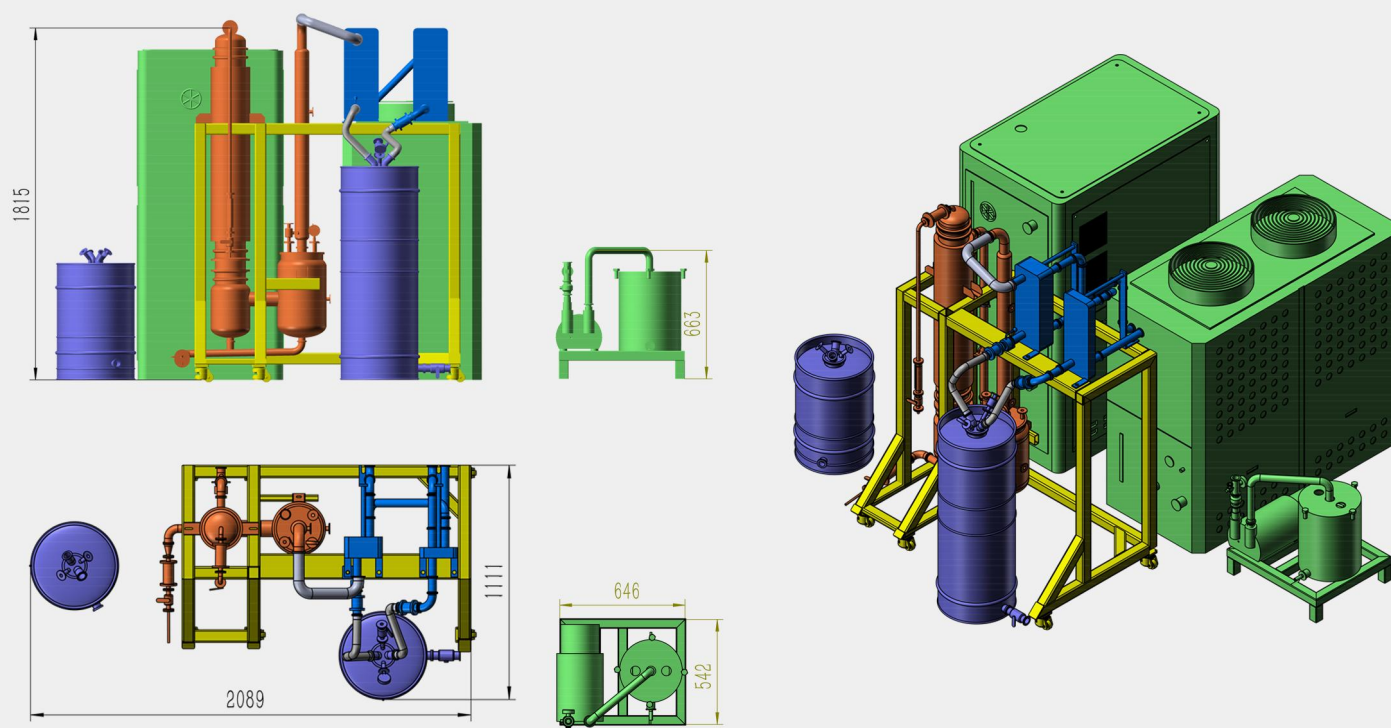


## TECHNICAL DATA

<i>Model</i>	FFE-50L	FFE-100L	FFE-200L	FFE-300L	FFE-500L	FFE-1000L	FFE-1500L	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	≤1min							
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							



## STRUCTURE DISPLAY---Basic Type



### Basic Type

### Control Method

Feeding

Flow control valve

Light component discharge

Collecting in an ethanol tank by gravity

Heavy component discharge

Collecting by pressure difference

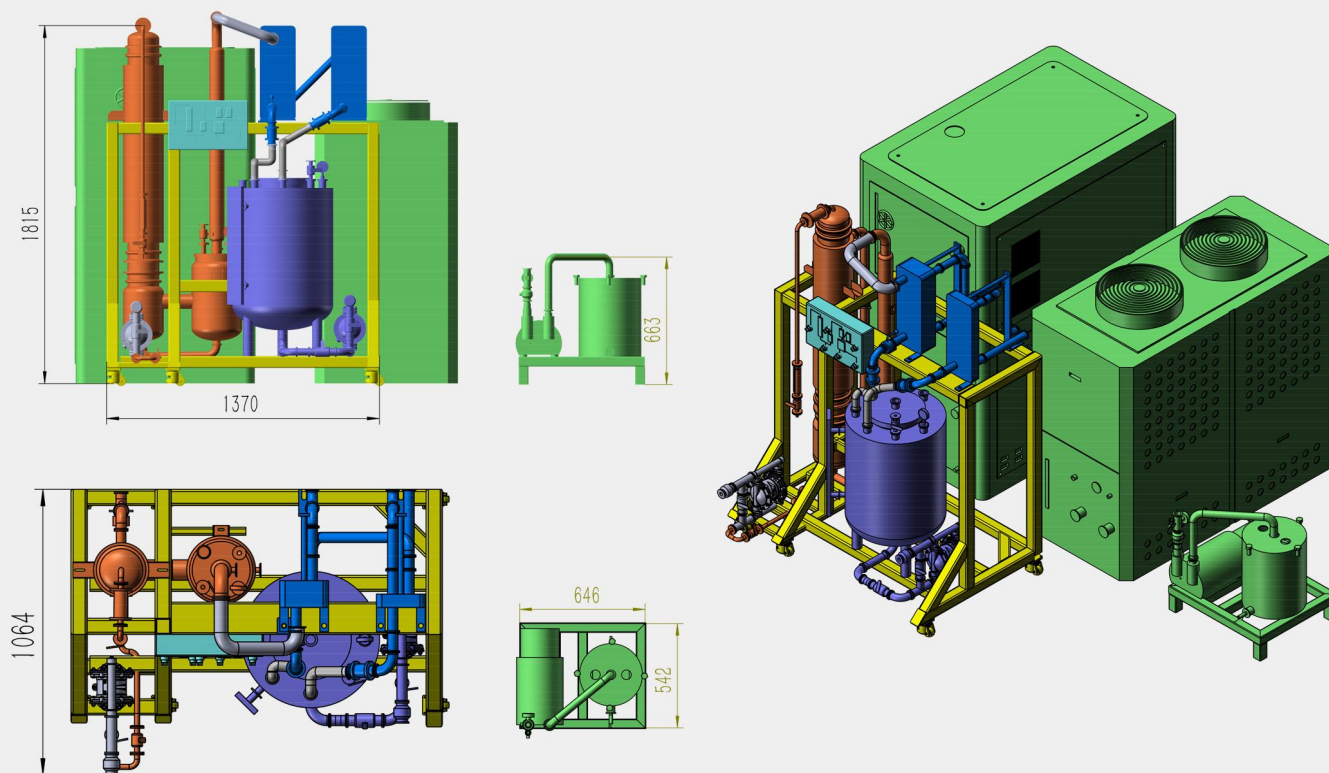
System Control

Manual operation

Suitable Model

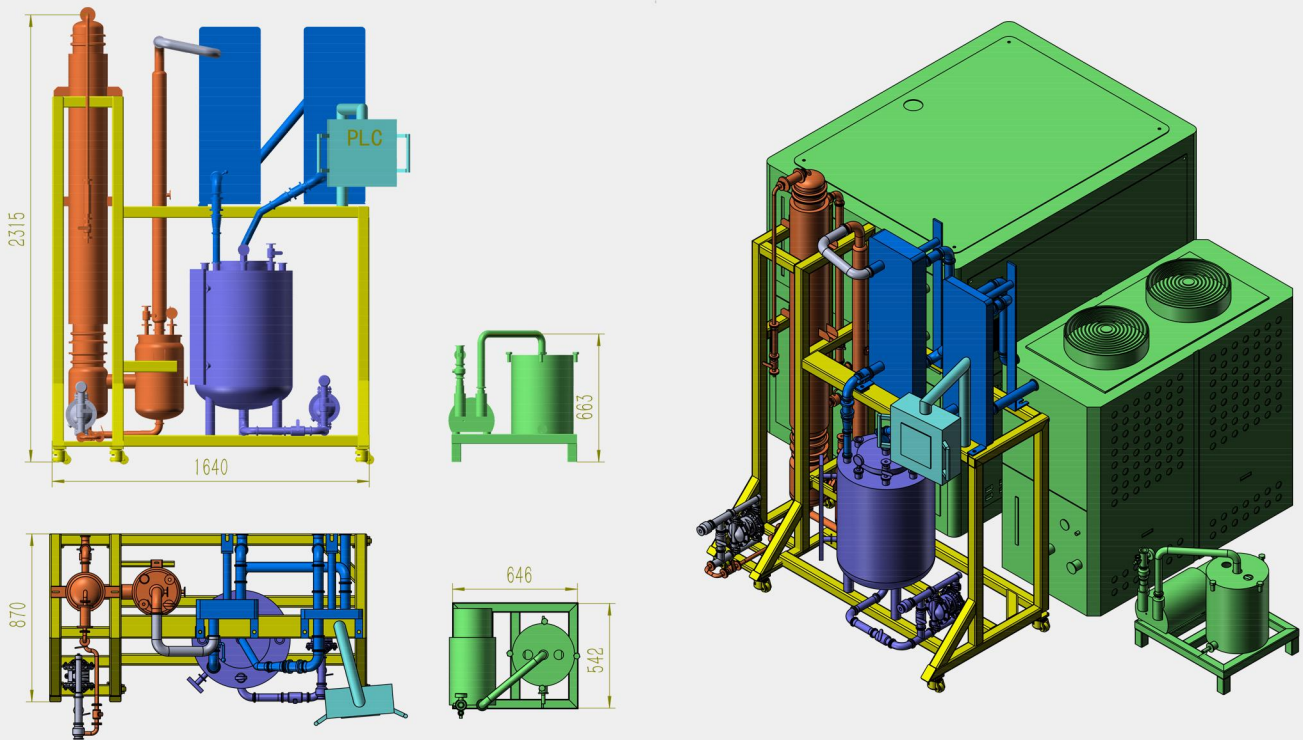
FFE-100L, FFE-200L

## STRUCTURE DISPLAY---Air-driven Type



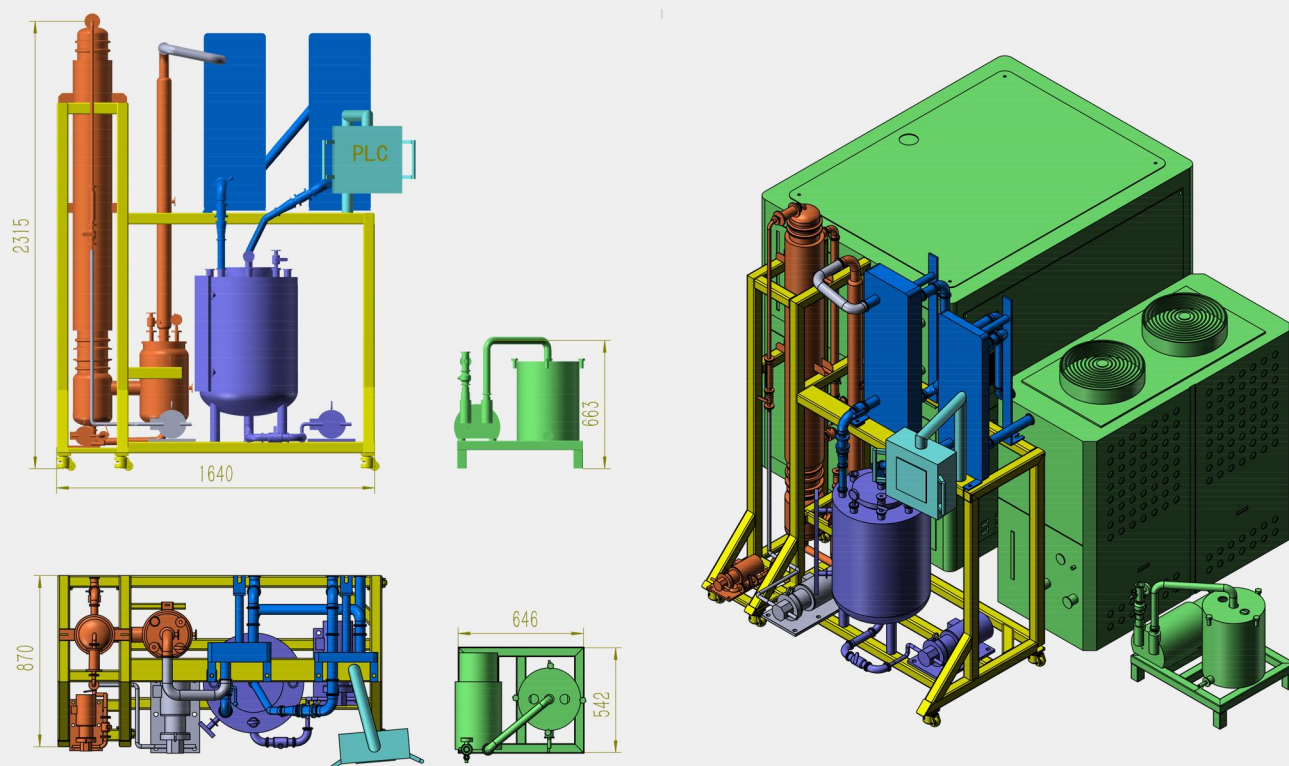
Air-driven Type	Control Method
Feeding	Flow control valve
Discharge	Diaphragm pump, continuous working
System Control	Air-driven
Suitable Model	FFE-100L, FFE-200L, FFE-300L, FFE-500L, others

## STRUCTURE DISPLAY ---PLC Type



PLC Type	Control Method
Feeding	Flow control valve
Discharge	Diaphragm pump, continuous working
System Control	PLC
Suitable Model	FFE-100L, FFE-200L, FFE-300L, FFE-500L, others

## STRUCTURE DISPLAY---PLC + Gear Pump Type



### PLC + Gear Pump Type

### Control Method

Feeding

Gear pump, continuous working, great quietness

Discharge

Gear pump, continuous working, great quietness

System Control

PLC

Suitable Model

FFE-100L, FFE-200L, FFE-300L, FFE-500L, others



# TURNKEY SOLUTION

## Cooling Option 1: Chiller

### Matched Models

	FFE-50L	FFE-100L	FFE-200L	FFE-300L	FFE-500L	FFE-1000L	FFE-1500L	FFE-2500L
Chiller	LSJ-6	LSJ-12	LSJ-25	N/A				

### Chiller Parameters

	LSJ-3	LSJ-5	LSJ-6	LSJ-8	LSJ-12	LSJ-15	LSJ-25	LSJ-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	1.22*0.72*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*0.105*1.68	2.2*1.2*1.88



# TURNKEY SOLUTION

## 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	LSJ-3	LSJ-5	LSJ-5	LSJ-8	LSJ-15	LSJ-25	LSJ-40
Cooling Tower	N/A	LST-10	LST-20	LST-30	LST-50	LST-100	LST-150	LST-250

### Chiller Parameters

	LSJ-3	LSJ-5	LSJ-6	LSJ-8	LSJ-12	LSJ-15	LSJ-25	LSJ-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(kgs)	160	200	240	280	350	400	750	1100
Dimensions(m)	0.85*0.72*1.325	1.22*0.72*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*0.105*1.68	2.2*1.2*1.88

### Cooling Tower Parameters

Model	LST-10	LST-20	LST-30	LST-50	LST-100	LST-150	LST-250	LST-300
Flow(m³/h)	10	20	30	50	100	150	250	300
Motor Power(kw)	0.18	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

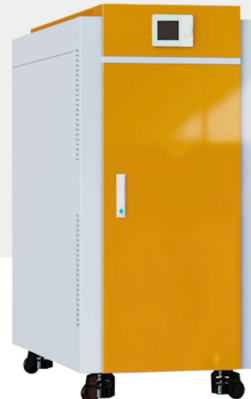
# TURNKEY SOLUTION

## Heating Options

Model	FFE-50L	FFE-100L	FFE-200L	FFE-300L	FFE-500L	FFE-1000L	FFE-1500L	FFE-2500L
Electrical Heating Circulator	UC-200-A15	UC-200-A38	UC-200-A60	UC-200-A95	UC-200-A150	N/A		
Natural Gas Hot Water Boiler Heating System	N/A					GWB-A36-SM	GWB-A54-SM	GWB-A72-SM
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(m³/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 Boiler

# TURNKEY SOLUTION

## Vacuum Pump Options

Model	WRVP-25EX	WRVP-50EX	WRVP-80EX	WRVP-110EX	WRVP-165EX	WRVP-230EX	WRVP-280EX	WRVP-400EX	WRVP-500EX
Capacity(m <sup>3</sup> /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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