

# Industrial Equipment

## Single - effect energy-saving concentrator

### Introduction

The equipment is applicable for the concentration and recovery of industrial organic solvent(Such as alcohol) of traditional Chinese medicine,western medicine,glucose, starch sugar,oral liquid,chemical industry,food,monosodium glutamate and dairy products.It's can be used in the low temperature vacuum concentration of heat sensitive substances with small batches and large varieties.

### Feature

1. Alcohol recovery: Large recovery capacity. Adopt vacuum concentration process. It enhances more than 5-10 times production capacity of the same kind of equipment. The energy consumption is 30% reduced.
2. Liquid concentration: The equipment adopts external heating natural cycling mode and vacuum negative pressure evaporating mode, with instant evaporation and great concentrated specific gravity up to 1.3.



Item	Heater		Evaporator		Condenser	
	Shell pass	Tube pass	Inside the tube	Jacket	Shell pass	Tube pass
Design pressure(MPa)	0.09	0.09	0.09	0.09	0.3	0.09
Working pressure(MPa)	<0.09	-0.07	-0.07	<0.09	0.25	-0.07
Design temperature(°C)	<100	<100	<100	<100	30-40	<100
Working temperature(°C)	<100	<100	<100	<100	30-40	<100
Medium	Steam	Liquid	Liquid	Saturated steam	Chilling water	Secondary steam
Main material	SUS304	SUS304	SUS304	Q235B	SUS304	SUS304
Volume(L)	1100					
Heat exchanging area(m <sup>2</sup> )	10			16.8		
Evaporation capacity(kg/h)	500					

Item	Heater		Evaporator		Condenser	
	Shell pass	Tube pass	Inside the tube	Jacket	Shell pass	Tube pass
Design pressure(MPa)	0.09	0.09	0.09	0.09	0.3	0.09
Working pressure(MPa)	<0.09	-0.07	-0.07	<0.09	0.25	-0.07
Design temperature(°C)	<100	<100	<100	<100	30-40	<100
Working temperature(°C)	<100	<100	<100	<100	30-40	<100
Medium	Steam	Liquid	Liquid	Saturated steam	Chilling water	Secondary steam
Main material	SUS304	SUS304	SUS304	Q235B	SUS304	SUS304
Volume(L)	1100					
Heat exchanging area(m <sup>2</sup> )	18			28		
Evaporation capacity(kg/h)	1000					

# Industrial Equipment

## Dual - effect energy-saving concentrator

### Introduction

Applicable to low temperature vacuum concentration of heat sensitive materials, especially applicable to concentration of traditional Chinese medicine, western medicine, starch sugar and other water solution.

### Feature

After being compressed through hot pump, the single effect secondary steam is supplied to the single effect heating, so that large amount of steam is saved and production cost is reduced.



### Specification

1. Extraction tank capacity (m<sup>3</sup>) : 1, 2, 3, 6.
2. Concentrator volume (m<sup>3</sup>) : 0.5, 1, 1.5, 2.5.
3. Water temperature: 90–100°C.
4. Alcohol temperature: 78–83°C.
5. Time: 4–5 H/b.
6. Vacuum degree: 0.05–0.08MPa.
7. Used pressure: 0.08–0.2MPa.

Traditional Chinese medicine

Item	Traditional Chinese medicine with heat pump	Traditional Chinese medicine
High ejection steam pressure (MPa)	0.5-0.6	0.1-0.25
Thermal compressor noise (DB (A))	80-85	
Theoretical steam-water ratio	0.30	0.50
Actual steam-water ratio	0.33-0.35	0.65-0.75
Single of effect	Shell vacuum (MPa)	0.03-0.04
	Heating steam temperature(°C)	85-90
	Vacuum degree of evaporation chamber(MPa)	0.06-0.068
	Boiling point(°C)	70-75
Second of effect	Shell vacuum (MPa)	0.060-0.068
	Heating steam temperature(°C)	70-75
	Vacuum degree of evaporation chamber(MPa)	0.082-0.089
	Boiling point(°C)	60-67
Cooling water consumption	1L	1.43L
Operability	Simple operation, easy to observe	
Economical efficiency	small ground occupation and low cost	small ground occupation and high cost

# Industrial Equipment

## Three - effect energy-saving concentrator

### Introduction

The concentrator adapted to traditional Chinese medicine, western medicine, glucose, starch, monosodium glutamate, food, chemical and other liquid condensed materials, especially for low-temperature heat-sensitive objects like vacuum concentration.

### Feature

1. The heating chamber tube, tube condenser, the middle of ISO standards are used to connect pipe polished mirror surface tube inside and outside to ensure smooth flow of materials, no arrest, no heating chamber of coking clogging, scaling and cleaning to reduce the number of increase production efficiency.
2. The heating chamber, evaporation rounded interior surface of the transition, no dead ends, all weld grinding, surface polished to  $Ra < 0.4 \mu m$ .
3. The concentrator and the natural cycle with external heating, vacuum evaporation, with evaporation speed, concentration ratio of heavy cream confined income.
4. The concentrator at the same time by three-way evaporator, secondary steam used repeatedly.



Item	MK3-5	MK3-10	MK3-15	MK3-20	MK3-30	MK3-50
Max evaporating capacity(Kg/h)	500	1000	1500	2000	3000	5000
Steam pressure(MPa)	0.3-0.09					
Steam consumption(kg/h)	≤200	≤400	≤600	≤800	≤1200	≤2000
Cooling water consumption(t/h)	5	10	13	15	18	25
Length(m)	5.0	6.5	7.0	7.5	7.8	8.0
Width(m)	1.3	1.5	1.7	2.0	2.0	2.0
Height(m)	3.3	3.5	4.3	4.5	4.5	4.5
	Vacuum degree(MPa)			Evaporating temperature(°C)		
Single-effect		-0.04			85	
Second-effect		-0.06			75	
Third-effect		-0.08			65	

# Industrial Equipment

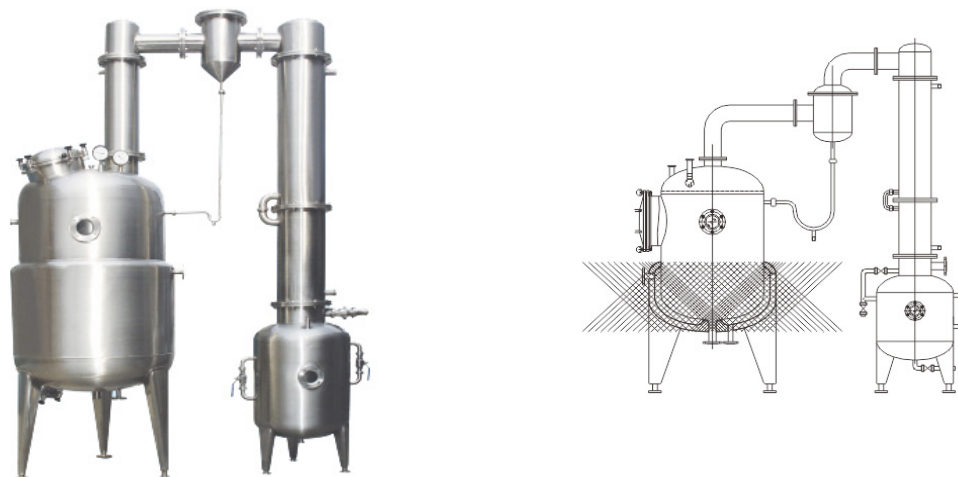
## Vacuum pressure-relief concentrator

### Introduction

The equipment is applicable for the concentration and recovery of industrial organic solvent (Such as alcohol) of, traditional Chinese medicine, western medicine, glucose, starch sugar, oral liquid, chemical industry, food, monosodium glutamate and dairy products. It can be used in the low temperature vacuum concentration of heat sensitive substances with small batches and large varieties.

### Feature

1. Alcohol reclamation. Large reclamation capacity and the vacuum concentration procedure make its production capacity five to ten times that the old counterpart and can lower the energy consumption for 30%, featuring little investment and high reclamation profit.
2. Concentrated liquid material: The device uses the modes of outer heated natural cycle and vacuum negative pressure evaporation featuring swift evaporation with concentration proportion of 1.3; The liquid material concentrates without bubble under full seal state. The drug liquid after concentration by the device features pollution-free and thick drug taste and easy cleaning.

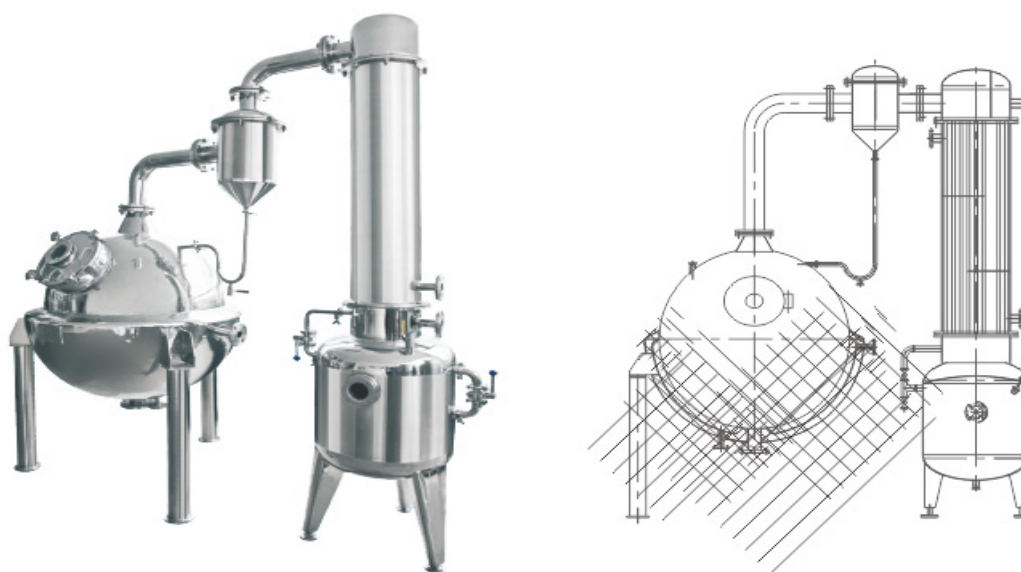


Specification \ Model	MK-5	MK-10	MK-20	MK-30	MK-50	MK-70	MK-100
Volume(L)	50	100	200	300	500	700	1000
Tank volume(L)	35	45	60	76	100	125	165
Interlayer pressure(Mpa)	0.098						
Vacuum degree(MPa)	0.06-0.07						
Heating are(m <sup>2</sup> )	0.25	0.59	0.8	1.1	1.45	1.8	2.2
Condensing area(m <sup>2</sup> )	1.2	1.7	2.4	3.0	3.3	3.6	4.1
Cooling are(m <sup>2</sup> )	0.29	0.35	0.45	0.6	0.7	0.85	1.05
Length(m)	1.2	1.7	1.7	1.7	2.1	2.4	2.39
Width(m)	0.6	0.8	0.8	1.0	1.2	1.3	1.3
Height(m)	2.2	2.7	2.7	3.4	3.4	3.4	3.72
Water consumption(kg/h)	3	5	6	8	10	11	15

## Ball Concentrator

### Introduction

The roundness concentration tank, consisting of main body, condenser, gas liquid separator and liquid receiving barrel, serves to concentrate, distill the material liquid and reclaim organic menstruum in the pharmacy, foodstuff and chemistry. The concentration under reduced pressure brings short time of concentration and prevent the destruction of the effective content in the thermal sensitive material. The fact that the part in contact with the material is made with stainless steel brings qualified anti-corrosion performance, meeting with the GMP standard.



Specification \ Model	MQ-300	MQ-500	MQ-700	MQ-1000
Evaporation quantity(kg/h)	70	120	145	195
Nominal volume(L)	300	500	700	1000
Inside diameter of ball(mm)	800	990	1115	1250
Steam pressure(MPa)	0.098			
Vacuum degree (MPa)	0.06-0.07			
Heating area(m <sup>2</sup> )	1.1	1.6	2	2.5
Condensing area (m <sup>2</sup> )	2.4	3.2	3.5	4.5
Outline dimension	1900*1100*2300	2030*1200*2500	2100*1300*2500	2335*1520*2765
Equipment weight(kg)	380	450	630	950
Steam consumption(kg/h)	77	132	159	214
Water consumption(t/h)	2	4	6	7
Steam inlet(m/m)	25	25	40	40
Water inlet and outlet(m/m)	30	30	40	40

## Filtration series

### Microporous filter

#### Introduction

The filter is made to FDA standard by bringing in technique, the raw material is high-quality stainless steel (304, 316L) is small, light, pollution-free and convenient to use besides, it has big filter area, low blocking rate, fast filter speed, good thermal stability and chemical stability. The filter can remove most granules so it's widely applied in fine filter and sterilization.



### Double filter

#### Introduction

This equipment is used to filter various solids or colloids in the liquids such as traditional Chinese medicine, western medicine, fruit juice, sirup, milk and beverages etc. Two filters can be changed over. The filter screen can be cleaned without stopping.



# Chemical Compatibility Table

**R: Resistant**      **LR: Limited Resistant**  
**NR: Not Resistant**      **"-": No data available**

Classification	Name	Nylon66	PVDF	PTFE	PES	PP	MCE	Silicone	Viton/TEV	EPDM
Acids	Acetic Acid	NR	R	R	NR	R	LR	LR	NR	R
	Hydrochloric Acid (conc.)	NR	R	R	R	R	NR	NR	NR	NR
	Hydrochloric Acid (6N)	NR	R	R	R	R	NR	NR	R	NR
	Nitric Acid (conc.)	NR	R	R	-	R	NR	NR	R	NR
	Nitric Acid (6N)	NR	R	R	-	R	NR	LR	R	NR
	Phosphoric Acid (conc.)	NR	R	R	-	R	NR	NR	R	R
	Sulfuric Acid (conc.)	NR	R	R	NR	R	NR	NR	R	NR
Bases	Hydrofluoric Acid (6N)	NR	R	R	-	NR	NR	NR	-	NR
	Ammonium Hydroxide (1N)	R	LR	R	R	R	R	R	R	R
	Ammonium Hydroxide (3N)	R	NR	R	R	R	NR	R	LR	LR
	Potassium Hydroxide (3N)	R	LR	R	R	R	NR	LR	R	R
	Sodium Hydroxide (3N)	R	LR	R	R	R	NR	R	R	R
Alcohols	Sodium Hydroxide (6N)	R	NR	R	R	R	NR	R	R	R
	Amyl Alcohol	R	R	R	R	R	NR	NR	R	R
	Benzyl Alcohol (100%)	R	R	R	R	R	NR	LR	R	R
	Butanol	R	R	R	R	R	R	R	LR	R
	Isopropanol	R	R	R	R	R	-	R	R	R
Ketones	Methanol	LR	R	R	R	R	LR	R	NR	R
	Acetone	R	LR	R	NR	R	NR	NR	NR	R
	Cyclohexanone	-	LR	R	NR	R	NR	NR	NR	NR
	Methyl Ethyl Ketone	LR	LR	R	-	R	-	NR	NR	R
Oils	Methyl Isobutyl Ketone	LR	LR	R	NR	R	-	NR	NR	R
	Cottonseed	R	R	R	-	R	-		R	R
	Lubricant	R	R	R	NR	R	-	R	R	R
	Peanut	R	R	R	-	R	-	R	R	R
Aromatic Hydrocarbons	Sesame	R	R	R	R	R	-	R	R	R
	Benzene	LR	LR	R	LR	NR	R	NR	R	NR
	Toluene	NR	LR	R	NR	NR	R	NR	R	NR
	Xylene	LR	LR	R	NR	NR	R	NR	R	NR

Classification	Name	Nylon66	PVDF	PTFE	PES	PP	MCE	Silicone	Viton/TEV	EPDM
Halogenated Hydrocarbons	Carbon Tetrachloride	LR	LR	R	LR	LR	NR	NR	R	NR
	Chloroform	LR	LR	R	NR	LR	NR	NR	R	NR
	Ethylene Dichloride	LR	LR	R	NR	LR	R	NR	LR	NR
	Freon TF	R	R	R	R	LR	R	NR	R	NR
	Freon TMC	LR	LR	R	NR	LR	R	NR	LR	NR
	Methylene Dichloride	NR	LR	R	NR	LR	NR	NR	LR	NR
	Perchloroethylene	-	LR	R	LR	LR	R	NR	R	NR
	Trichloroethylene	LR	NR	R	LR	LR	R	NR	R	NR
Glycols	Ethylene Glycol	R	R	R	LR	R	-	R	R	R
	Glycerol	R	R	R	LR	R	R	R	R	R
	Propylene Glycol	R	R	R	LR	R		R	R	R
Ethers	Ethyl Ether	NR	R	R	R	LR	NR	LR	NR	NR
	Isopropyl Ether	-	R	R	-	R	NR	NR	NR	NR
	Dioxane	R	R	R	-	R	NR	NR	NR	NR
	Tetrahydrofuran	NR	LR	R	NR	LR	NR	NR	NR	NR
Esters	Amyl Acetate	LR	R	R	-	R	NR	NR	NR	R
	Butyl Acetate	LR	R	R	-	LR	NR	NR	R	R
	Cellosolve Acetate	-	R	R	R	R	NR	NR	NR	R
Miscellaneous	Ethyl Acetate	LR	R	R	LR	LR	NR	R	R	R
	Methyl Acetate	LR	R	R	NR	R	NR	-	R	R
	Isopropyl Acetate	-	R	R	R	R	NR	LR	NR	R
	Aniline	LR	R	R	NR	LR	-	NR	R	R
	Dimethyl Formamide	R	NR	R	NR	R	-	R	NR	R
	Formaldehyde (37%)	R	R	R	R	R	-	R	NR	R
	Gasoline	LR	LR	LR	R	LR	R	NR	R	R
	Hexane (dry)	-	LR	LR	LR	LR	R	NR	R	NR
	Kerosene	-	R	R	R	R	-	NR	R	NR
	Phenol	R	R	R	NR	R	R	NR	R	NR
Pyridine	LR	R	R	NR	LR	NR	NR	NR	R	
Turpentine	-	R	R	R	LR	-	NR	R	NR	
Water	R	R	R	R	R	R	LR	R	R	
Acetonitrile	LR	R	R	R	LR	NR	-	NR	R	
Nickel Sulfate Solution	R	R	R	-	R	-	R	-	R	