



上海本优机械有限公司  
SHANGHAI BEYOND MACHINERY CO., LTD.

地址: 上海市金山区亭林工业区亭谊路680号  
邮编: 201505  
电话: 021-57172333  
传真: 021-57172728  
手机: 13918792095

Add: No.680, Tingyi Road, Tinglin Industrial Park,  
Jinshan District, Shanghai, China  
PC.: 201505  
Tel: +86-21-57172333  
Fax: +86-21-57172728  
M.T.: +86-18802117272 13918793199  
Http: //www.shbenyou.com  
www.shbenyou.cn  
E-mail: master@shbenyou.com



蒸发器系列  
一站式服务解决方案

EVAPORATOR SERIES  
ONE-STOP SERVICE SOLUTION



## 企业简介

COMPANY  
INTRODUCTION

Turn-key projects of all kinds  
of fruits & vegetable deeply processing lines

上海本优机械有限公司是一家专注于健康装备领域的专业化科技发展型企业。公司集科研开发、工艺设计服务、工程总包、设备制造、安装调试及培训为一体，专业从事蒸发浓缩、结晶、化工环保、生物发酵、生物制药、果蔬汁、乳制品及饮料、肉骨加工、蛋品加工等整线交钥匙工程服务。

诚信、务实、创新、快乐的企业文化为上海本优汇聚了行业中众多富有实战经验的优秀专业技术人才。卓越的团队、精湛的管理、超前的创新，成就本优完美产品。上海本优机械热忱欢迎国内外新老客户莅临参观、指导。

Shanghai Beyond Machinery Co., Ltd. is a professional technologically developing enterprise devoted to the health equipment field. Integrating scientific research and development, process design and service, project general contracting, equipment manufacturing, installation and commissioning, as well as training, our company specializes in providing whole-line turn-key engineering services covering such fields as evaporation and concentration, crystallization, chemical industry, environmental protection, biological fermentation, biopharmaceutical industry, fruit and vegetable juices, dairy products and beverages, meat and bone processing, egg products processing, etc.

Beyond's company culture of Honesty, practicality, innovation, happiness gathered many excellent professional technical talents who is rich of practical experience. The predominant team with tactical management and advanced innovation achieve perfect product quality for BEYOND. Shanghai Beyond Machinery Co., warmly welcome our new and old customers come to visit our company and have business talks.



江苏生产基地 Jiangsu factory

上海生产基地 Shanghai factory

上海本优二期 Shanghai Beyond 2nd Stage

资质荣誉

# QUALIFICATION HONOR

Turn-key projects of all kinds of fruits & vegetable deeply processing lines



因追求而超越，因超越而前进，当“追求无限”成为一种信念，洒尽无数的汗水，梦想便已实现。荣誉见证了辉煌的光芒，更见证了价值实现的每一步印记。

Surpassing for the pursuit, advancing by transcendence, when 'pursuing infinity' becomes a belief, and sprinkling countless sweats, the dream has been realized. Honor has witnessed the brilliant light and witnessed every step of the value realization.



荣誉见证辉煌  
实力赢得未来  
Honors witness great work  
strengths win the future





#### 蒸发器系列 EVAPORATING EQUIPMENT SERIES

- 降膜蒸发器  
Falling film type evaporator
- 强制循环蒸发器  
Forced circulation evaporator
- MVR 蒸发器  
MVR type evaporator
- 刮板式薄膜蒸发器  
Scraper film evaporator

#### 主要应用领域 MAIN FIELD OF APPLICATION

- 食品  
Food
- 化工  
Chemical industry
- 生物制药  
Pharmaceutical
- 环保  
Environmental protection
- 冶金、造纸  
Metallurgy, paper

## 市场之路 ROAD OF MARKET



**You may not know us today,  
but we will build up the predestined relationship  
with you in the future.**

**今天，您或许还不了解我们。  
但明天我们必将与您结下不解之缘！**

本优公司秉承“信誉铸本优，精品迎未来”经营理念，凭借优秀的产品品质，完善的市场网络体系，规范的操作管理模式，竭诚为客户提供周到、快捷、专业服务。

由于长期对品质和服务的执着，本优公司在国内国际上的地位得到了广泛的认可。如今本优产品已成功出口，畅销世界各地，享有极高的声誉和影响力。

Beyond company always take "Better Credibility & Better Quality To change The Future" as the operation principle and improving motivity. Based on excellent products quality and network system, standardization management, Beyond company endeavor to provide the thoughtful, fast, and professional service.

With the consistent pursuing of high quality and service, Beyond Company has been widely agreed in both domestic and oversea market. Now we have successfully exported our products to many countries all over the world and won high reputation and great influence.

## 降膜蒸发器 EXCELLENT PROJECT

### 性能特点

1. 蒸汽加热均匀、传热效率高、加热时间短；
2. 可充分利用废热作为热源，降低生蒸汽用量；
3. 物料经分配装置均匀分配于蒸发器各加热管内，物料在重力和真空诱导及气流作用下，成膜状自上而下流动，运动过程中与加热管外壁加热蒸汽发生热交换而蒸发；
4. 蒸发过程在真空环境，蒸发温度相对较低，蒸发器不易结垢；
5. 适用于发泡性物料蒸发浓缩，由于料液在加热管内成膜状蒸发，即形成汽液分离，同时在效体底部，料液大部份即被抽走，只有少部分料液与所有二次蒸汽进入分离器强化分离，料液整个没有形成太大冲击，避免了泡沫的形成；
6. 对于果汁或乳品蒸发浓缩，设备可同时具备杀菌功能，物料先经预热，然后进入杀菌器，可达到90-125度，维持30-60秒左右，即进入效体，物料迅速闪蒸，温度瞬间下降；
7. 本设备可配备CIP清洗系统，实现就地清洗，整套设备操作方便，无死角；
8. 可配蒸汽喷射泵，降低蒸汽消耗量，节约运行成本；
9. 本设备连续进出料；
10. 本设备可配置自动控制系统，具有完整的组态、操作、监视及控制功能，系统包括通讯接口、显示报警、打印报表、控制等部分，实现进料量自动控制，加热温度自动控制，出料浓度自动控制，清洗自动控制。



### Performance Characteristics

1. Steam heating uniformity, has the characteristics of high heat transfer efficiency and short heating time.
2. It can use waste heat as heat source, reducing steam consumption.
3. The distribution device distribute the material evenly in the heating pipe of the evaporator, material will flow as membranous from top to bottom under the gravity, vacuum of induction and action of airflow, during exercise it will have heat exchange with the heating steam on the external surface of the heating tube of evaporate.
4. The evaporation process in vacuum environment, the evaporation temperature is relatively low, the evaporator is not easy to scale.
5. Suitable for foaming material evaporation and concentration, the liquid in the heating pipe is evaporated in form of the membrane in evaporator, that will be the formation of vapor-liquid separation, at the same time in the bottom most of liquid is pumped away, only a little feed liquid mix with secondary steam enter into the separator enhanced separation, in the whole process did not form too high impact, which will avoid to form bubble.
6. For fruit juice or milk evaporation concentration, this equipment can have the functions of sterilization, material preheat at first, and then enter the sterilizer, can reach 90-125 degrees, maintain 30-60 seconds, in effect body, the material is quickly flash evaporated, temperature decline transiently.
7. Equipment can be equipped with CIP cleaning system, realize the cleaning in place, complete sets of equipment is convenient for operation, no dead angle.
8. Available to equip with a steam jet pump, reduce the steam consumption, save operation cost.
9. Equipment can continuous feeding and discharging.
10. The equipment can be devised automatic control system, with the completely configuration, operation, monitoring and control function, system consists of communication interface, alarm, report printing, control parts, feed quantity automatic control, automatic control of heating temperature, outlet concentration automatic control, automatic control of the cleaning.

### 适用范围 Scope Of Application

适用于食品、制药、化工、生物、环保、废液回收等行业低温连续式蒸发浓缩，其具有传热效率高，物料受热时间短等显著特点，更适用于热敏性、发泡性等物料。

Applicable to the food, pharmaceutical, chemical, biological, environmental protection, waste recycling and other sectors of the low-temperature continuous evaporation and concentration, this evaporator has characteristics of high heat transfer efficiency, short heating time of materials etc, so especially suitable for heat-sensitive, foaming material etc.

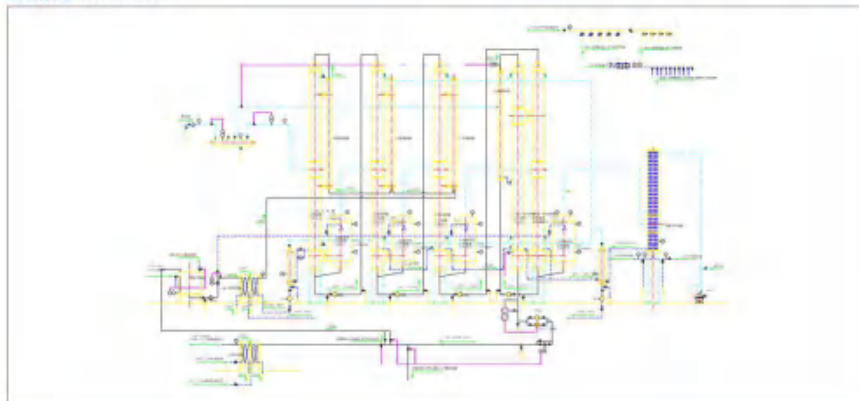
### 设备组成 Equipment Composition

蒸发器、分离器、冷凝器、热压泵、真空泵、料液泵、冷凝水泵、操作平台、电气仪表及阀门管路等系统组成。

The evaporator, separator, condenser, heat pressure pump, vacuum pump, product liquid pump, condensate pump, operating platform, instrument and valve pipeline system etc.



### 工艺流程 Process Flow



### 技术参数 Technical Parameters

型号 Model	BYJM-3-3	BYJM-3-5	BYJM-3-10	BYJM-3-20	BYJM-3-30	BYJM-3-50
水份蒸发量 Water evaporation(kg/hr)	3000	5000	10000	20000	30000	50000
生蒸汽消耗量 Steam consumption(yhr)	0.9-1.2	1.5-2	3-4	6-8	9-12	15-20
生蒸汽压力 Steam pressure(Mpa绝压 Absolute pressure)				0.4-0.8		
吨蒸汽蒸发水量(Water evaporation(tons) / 1 ton steam)				2.5-3.33		
真空度 Vacuum degree	一效 1 <sup>st</sup> effect(MPa)		-0.01-0.18			
	三效 3 <sup>rd</sup> effect(MPa)		-0.085			
蒸发温度 Evaporation temperature	一效 1 <sup>st</sup> effect(°C)		70-115			
	三效 3 <sup>rd</sup> effect(°C)		45-55			
外形尺寸(长×宽×高) External dimension(L×W×H)	5×2.8×10	6×3.5×11	7.2×4.1×11.3	9×5×14	11×6×14	12.5×7.6×14

注：1. 降膜蒸发器型号BYJM-Y-X，其中“Y”表示“效数”，“X”表示蒸发量(以上参数取三效为例，即Y=3)

“Y” for effect no. “X” for evaporation capacity, above is for 3 effects data

2. 效数和蒸发量可以根据客户需要设计 Effects and evaporation capacity designed to customer's needs.

## 强制循环蒸发器 FORCED CIRCULATION EVAPORATOR

### 适用范围

强制循环式单效、双效、三效及多效蒸发器，适用于高浓缩、高粘度，含不溶性固形物等食品、制药、化工、生物工程、环保工程、废液回收等行业进行低温浓缩。

### 系统组成

各效加热器、各效分离器、冷凝器、循环泵、效间泵、真空及排水系统、分汽缸、操作平台、电器仪表控制柜及阀门、管路等系统组成。

### 性能特点

1. 全套系统设计合理美观、运行稳定，高效节能，蒸汽耗量低；
2. 浓缩比大，强制循环式，使粘度较大的料液容易流动蒸发，浓缩时间短；
3. 特殊设计经简单操作可实现切换改造，以适应不同产品的生产；
4. 蒸发温度低，热量得到充分利用，料液受热温和，适用于热敏性物料的浓缩；
5. 蒸发器通过强制循环，在管内受热均匀，传热系数高，可防止“干壁”现象；
6. 料液进入分离器两分离，强化了分离效果，使整体设备具有较大的操作弹性；
7. 整套设备结构紧凑，占地面积小，布局简单流畅，代表了大型成套蒸发设备的发展方向；
8. 连续进出料，料液液位与所需浓度可实现自控；
9. 蒸发量：根据客户需要设计。

### Scope Of Application

Forced circulation type of single, double, three effect and multi-effect evaporator, suitable for high concentration, high viscosity, containing insoluble solids such as food, pharmaceutical, chemical, biological engineering, environmental engineering, waste recycling and other sectors of the low temperature concentration.

### System Composition

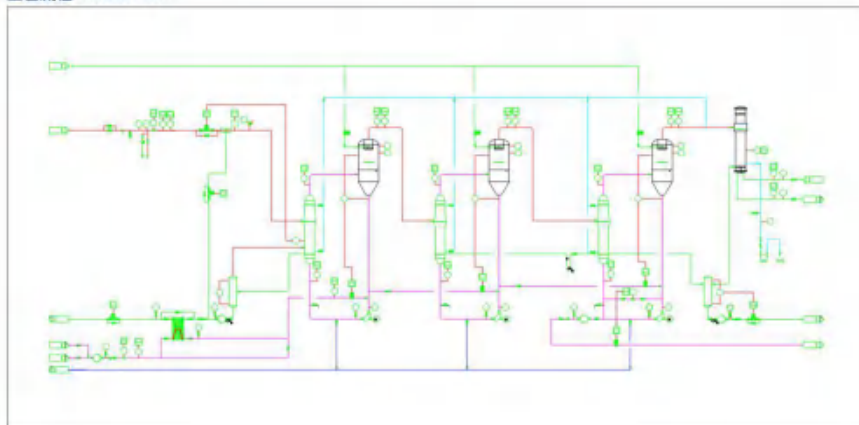
Heater of each effect, the separator, condenser, circulating pump, pump between effects, vacuum pump and water drainage system, steam distribution cylinder, operation platform, electric instrument control cabinet and valves, piping system.

### Performance Characteristics

1. Beautiful appearance, reasonable design of a full set of system, stable operation, high efficiency and energy saving, low steam consumption.
2. Concentration ratio high, forced circulation type, make high viscosity liquid to easy flow for evaporation, short time of concentration.
3. Special design through simple operation can be switched to change effect, in order to adapt to the production of different products.
4. Low evaporation temperature, heat is fully utilized, the liquid material is heated gently, suitable for heat-sensitive materials concentration.
5. Through forced circulation in evaporator, heating evenly in the pipe, high heat transfer coefficient, which can prevent the "dry wall" phenomenon.
6. Liquid be separated once again after enters the separator, strengthen the separation effect, make the whole device has a wide operating elasticity.
7. The whole device has compact structure, small occupation area, simple structure and smooth, represent large sets of evaporation equipment development direction.
8. Continuous feeding, feed liquid level and the required concentration can be controlled.
9. Evaporation: according to the customer need to design.



### 工艺流程 Process Flow



### 技术参数 Technical Parameters

型号 Model	BYQX-2-3	BYQX-2-5	BYQX-2-10	BYQX-2-20	BYQX-2-30
水份蒸发量 Water evaporation (kg/hr)	3000	5000	10000	20000	30000
生蒸汽消耗量 Steam consumption(t/hr)	1.2-1.65	2-2.75	4-5.5	8-11	12-16.5
生蒸汽压力 Steam pressure(Mpa绝对压Absolute pressure)	0.4-0.8				
吨蒸汽蒸发水量(吨) water evaporation(1 ton steam(t))	1.8- 2.5				
外形尺寸(长×宽×高) External size (L×W×H)(m)	6.7×4.4×8.6	7.2×4.8×11.5	8.5×5.4×11.5	9.6×6×13.5	13×6.5×13.5

- 注：1. 强制循环蒸发器型号BY<sub>M</sub>-Y-X，其中“Y”表示“效数”，“X”表示蒸发量(以上参数以双效为例，即Y=2)  
“Y” for effect no, “X” for evaporation capacity), above is for 2 effects.  
2. 效数和蒸发量可以根据客户需要设计  
Effects and evaporation capacity designed to customer's needs.

## MVR蒸发器

### MVR EVAPORATOR

#### 概述

机械蒸汽压缩MVR或MVC(Mechanical Vapor Compression)蒸发器,其原理是利用蒸汽压缩机压缩蒸发产生的二次蒸汽,提高二次蒸汽热量和温度,压缩后的蒸汽打入蒸发器作为热源,再次使其原液产生蒸发,从而达到不需要外部解蒸汽。依靠蒸发器系统自循环来达到蒸发浓缩的目的。通过PLC控制系统、组态软件等工程软件来控制系统温度、压力、马达转速,保持蒸发器稳定、高效智能运行。

#### 性能特点及适用范围

1. 没有废热蒸汽排放,节能效果十分显著,相当于10效蒸发器;
2. 运用该技术可实现对二次蒸汽的逆流洗涤,因此冷凝水干物含量远低于多效蒸发器;
3. 采用低温负压蒸发(50-90°C),有利于防止被蒸发物料的高温变性;
4. MVR蒸发器是传统多效降膜蒸发器的换代产品,是在单效蒸发器的基础上通过对二次蒸汽逆流洗涤及再压缩重新利用。

凡单效及多效蒸发器适用的物料,均适合采用MVR蒸发器,在技术上具有完全可替代性,并具有更优良的环保与节能特性。

MVR蒸发器技术由于其节能效果显著,70年代开始在国外迅速发展,现已广泛使用,应用于工业废水处理及乳品、制糖、淀粉、氧化铝、造纸、己内酰胺、海水淡化、炼焦厂回收二氧化硫生产硫酸铵)、盐化工等很多生产领域。



#### Summary

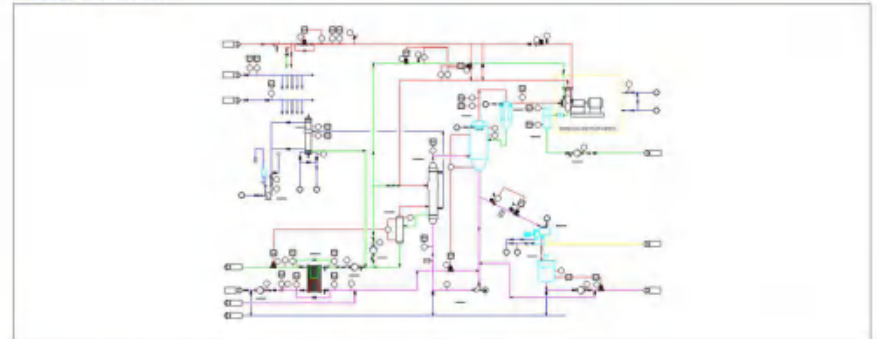
Mechanical vapor compression MVR or MVC (Mechanical Vapor Compression) evaporator; the principle is to use the secondary steam which is produced through compressing the steam by the steam compressor, secondary steam heat and temperature is increased by the compressor, steam compressed into the evaporator as the heat source, again makes the raw material liquid start evaporation, so there is no need to rely on external fresh steam, just need to rely on the evaporator system itself circulating to achieve the purpose of evaporation. Through the PLC control system, configuration software and engineering software to control the temperature, pressure, speed motor system, maintain stable, intelligent and efficient operation of the evaporator.

#### Performance Characteristics and Scope Of Application

1. No waste heat steam emissions, energy-saving effect is very significant, which is equivalent of 10 effect evaporator.
2. Using this technology can achieve to countercurrent washing of secondary steam, therefore the dry matter content in condensed water is far lower than the number of evaporator.
3. Using low temperature negative pressure evaporation (50-90°C), help to prevent the degeneration resulted from high temperature evaporation.
4. MVR evaporator is a substitute of traditional multi-effect falling-film evaporator, is based on single effect evaporator through the reuse of the secondary steam countercurrent washing and recompression. All material that applicable for single effect and multi-effect evaporator, are suitable for use in the MVR evaporator, technically have the substitutability. It has perfect characteristics of environmental protection and energy saving. Because of its significant energy-saving effect, MVR evaporator technology started rapid development in foreign countries at the beginning of 70's, now is widely used, which is used in industrial wastewater treatment and dairy, sugar, starch, alumina, papermaking, caprolactam, seawater desalination, application to industrial wastewater treatment and dairy, sugar, starch, alumina, papermaking, caprolactam, seawater desalination, coking plant (recovery of sulfur dioxide production sulfur ammonia), salt chemical industry, and other many production areas.



#### 工艺流程 Process Flow



#### 技术参数 Technical Parameters

型号 Model	BYMVR-0.5	BYMVR-1	BYMVR-1.5	BYMVR-2	BYMVR-5	BYMVR-10	BYMVR-15
蒸发量 Evaporation capacity	500kg/Hr	1000kg/Hr	1500kg/Hr	2000kg/Hr	5000kg/Hr	10000kg/Hr	15000kg/Hr
进口饱和蒸汽量 Inlet saturated steam capacity(kg/Hr)	500	1000	1500	2000	5000	10000	15000
进口饱和温度 Inlet saturation temperature(°C)	55.295	71.631	82.109	90	90	90	90
出口温升 Outlet temperature(°C)	12.590	14.145	15.185	16.000	16.000	16.000	16.000
出口饱和温度 Outlet saturation temperature(°C)	67.885	85.776	97.294	106.000	106.000	106.000	106.000
进口饱和压力 Inlet saturation pressure (kPa)(A)	15.975	33.441	51.567	70.117	70.117	70.117	70.117
出口饱和压力 Outlet saturation pressure(kPa)(A)	28.432	59.596	91.921	125.029	125.029	125.029	125.029
压缩比 Compression ratio	1.780	1.782	1.783	1.783	1.783	1.783	1.783
电机功率 Motor power(kw)	40	55	75	96	132	550	640
出口容积流量 Outlet volume flow(m³/s)	0.795	0.7971	0.7985	0.7997	0.7997	0.7997	0.7997
排气管流速 Exhaust velocity(m/s)	22.736	22.795	22.837	22.87	22.87	22.87	22.87
外形尺寸 External size(L×W×H)mm	4×4×10	6×4.5×12	8×5.5×14	8×5.5×14	9.5×6×15	12.6×6.5×17	13.6×6×17

蒸发量根据客户要求设计 Evaporation capacity designed to customer's needs.

## 刮板式薄膜蒸发器 SCRAPER FILM EVAPORATOR

### 概述

刮板式薄膜蒸发器是利用高速旋转将液体分布成均匀薄膜而进行蒸发或蒸馏的一种高效蒸发、蒸馏设备，也可进行脱臭、脱泡反应及加热、冷却等单元操作，可广泛应用于中、西制药、食品、轻工、石油、化工、环保等行业。

离心式刮板式薄膜蒸发器采用国外先进技术，在国内刮板式薄膜蒸发器领域内具有国际水平的领先地位。

### 性能特点

本设备是目前国外最新结构蒸发器，在流量很小的情况下也能形成薄膜，在筒体蒸发段内壁表面附着处理液中的沉积物可被活动刮板迅速移去，和固定刮板的刮板蒸发器相比，蒸发量可提高40-69%它具有下列性能与特点：

1. 传热系数值高，蒸发能力大，蒸发强度可达到100kg/m<sup>2</sup>hr，热效率高；
2. 物料加热时间短，约5秒至10秒之间，且在真空条件下工作，对热敏性物料更为有利，保持各种成份不产生任何分解，保证产品质量；
3. 适应粘度变化范围广，高低粘度物均可以处理，物料粘度可高达10万厘泊(CP)；
4. 改变刮板沟槽旋转方向，可以调节物料在蒸发器的打搅时间；
5. 蒸发段筒体内壁经过精密磨削并抛光处理，表面不易产生结晶、结垢；
6. 操作方便，产品指标调节容易，在密闭条件下，可以自控进行连续性生产；
7. 设备占地面积小，结构简单，维修方便，清洗容易。



### Summary

Scraper film evaporator is a high efficient evaporation or distillation equipment, which distribute liquid to uniform thin film through high-speed rotation for evaporation or distillation, and it can also carry out deodorization, de-foaming reaction and heating, cooling unit operations, it can be widely applicable to Chinese and western medicine, food, light industry, petroleum, chemical industry, environmental protection industry etc.

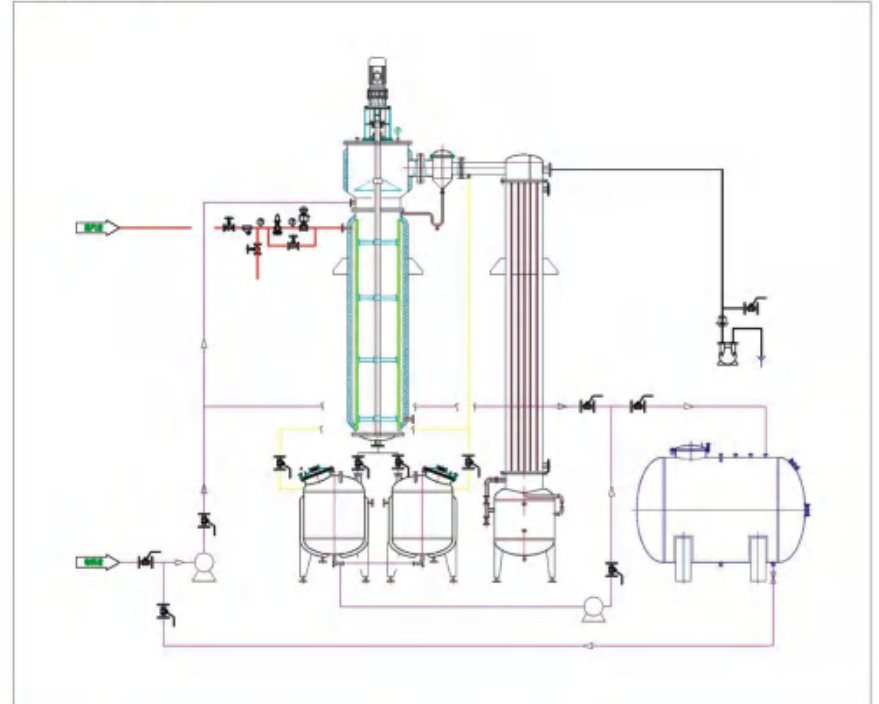
Centrifugal scraped film evaporator adopts foreign advanced technology, stand at a leading position with international level in the field of scraper film evaporator.

### Performance Characteristics

This equipment is the newest structure of evaporator in the world, also can form the thin film on the very small flow. The sediment in liquid adheres the cylinder inner wall surface at the evaporation period can be quickly removed by scraper, compared with fixed gap scraper evaporator, evaporation can improve 40-69%, it has the following features:

1. High heat transfer coefficient and evaporation capacity, evaporation intensity can reach 100kg/m<sup>2</sup>/HR, high thermal efficiency.
2. Material heating time is short, between 5 to 10 seconds, and can operate in the vacuum condition, more beneficial for heat-sensitive materials, keeping the various ingredients do not produce any decomposition, to ensure product quality.
3. Adaptable to large viscosity range, handle both high and low viscosity material, material viscosity can reach up to 100000 CPS (CP).
4. By changing the direction of rotation of scraper trench, can adjust the material treatment time in the evaporator.
5. The evaporation section of the inner wall of the barrel body through precision boring and polishing treatment, the surface is not easy to produce coke, scaling.
6. Convenient operation, easy adjustment of product index, can automatic continuous produce in airstirt condition.
7. Equipment covers small area, simple structure, convenient repair, easy to clean.

### 工艺流程 Process Flow



### 技术参数 Technical Parameters

型号 Model	BYGB-1	BYGB-2	BYGB-4	BYGB-6	BYGB-8	BYGB-10	BYGB-12	BYGB-15	BYGB-20
换热面积 Heat exchange area(m <sup>2</sup> )	1	2	4	6	8	10	12	15	20
蒸汽压力 Steam pressure(Mpa)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
真空度 Vacuum degree(Kpa)	70	70	70	70	70	70	70	70	70
蒸发量 Evaporation capacity (kg/h)	150	300	600	900	1200	1500	1800	2100	2600
耗能 Steam consumption(kg/h)	165	330	650	1200	1600	1800	2200	2500	3100
电机功率 Motor power(KW)	1.5	3	5.5	7.5	7.5	11	11	15	18.5
转速 Speed(rpm)	130	130	130	85	85	85	63	63	63
设备高度 Equipment height(mm)	2600	4872	5640	6406	6990	7320	9460	10500	12400

蒸发量根据客户要求设计 Evaporation capacity designed to customer's needs.