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Essential Equipment for
Advanced Laboratory & Industrial Use.



Large Scale Rotary Evaporator Nuseries
Flash Evaporator MF^o§F Serice



**Safety
Precaution**

For your safety, please read the
Instruction manual carefully before
operating the product.

The appearance and the specification of the products are subject to change without notice for improvement.

TOKYO RIKAKIKAI CO., LTD.

10L Rotary Vacuum Evaporator N-3000

Features

- As drain valve is incorporated in receiver flask, evaporated solvents can be under reduced pressure.
- Built-in vacuum controller implements suitable vacuum rate control according to solvent. Hazardous solvents restricted by law can be recovered at high recovery.
- Many safety features are incorporated as standard. Independent overheat Thermal low liquid level protector, overflow tube, etc.
- Highly reproducible operation with display of temperature and rotation speed.
- Stable up/down movement of the bath is implemented by motorized auto.
- Heating reproducible operation with digital display of temperature and rotation speed.
- Stable up/down movement of the bath is implemented by motorized auto.
- Heating bath accepts both water and oil. High boiling point materials can be in oil bath.
- Mechanical vacuum seal secures high level sealing.
- One touch clamp is equipped as standard to make sample flask mounting / simple and easy.
- The opening of the flask is wide enough (100mm) for cleaning.
- Teflon solenoid valve enables automatic vacuum control in accord with the solvent.



N-3000

10L Explosion proof model N-3000D

Features

- Explosion-proof type that uses an air motor that will not create heating electricity in its driving parts. This model is suitable for the concentration and recovery of solvents with low boiling points.
- The bath can be moved up and down by just turning the handle.
- A drain valve is fixed to the receiving flask, enabling collection of the condensed liquid under reduced pressure.



N-3000D

Although the N-3000 evaporator is a large scale instrument, it fits for one-man operation. Easy handling and practical usability have been the main purpose in designing every part.



The drain valve realizes easy continuous operation.



The N-3000 is equipped with an independent overheat protector.



One-touch clamp fixing of the sample flask allows one-man operation.



Digital display of vacuum, temperature and rotation speed. (N-3000)



Mechanical vacuum seal secures high level sealing.



Teflon solenoid valve enables automatic vacuum control.



Built-in vacuum controller

The vacuum controller NVC2100 is standard built-in. This device regulates the vacuum according to 10 pre-set and settable programs for different solvents. The programs include ramp control, step control with 20 steps, and 10 substances are pre-programmed. User-friendliness has always been top priority for the N-3000 design team.

Vacuum Controller NVC-2100 (Built-in for N-3000)



Two kinds of digital displays available: numerical display of pressure and graphic display to show the ongoing status of controlling. The set pressure value can be changed at anytime, regardless of the operation status (run/stop) while checking the vacuum condition.

By simply starting operation with a vapor temperature setting close to ambient, bumping of the precious sample is automatically prevented and the proper vacuum rate is automatically selected.

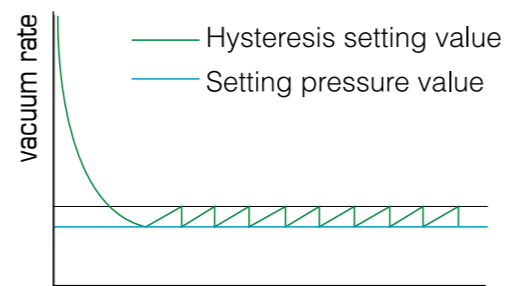
Graphic display shows the ongoing status of controlling.

■ Graphic display

4 vacuum control modes available.

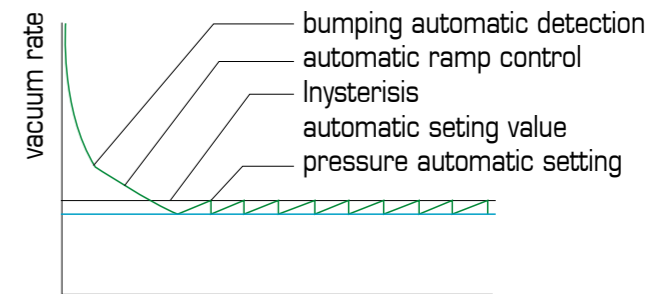
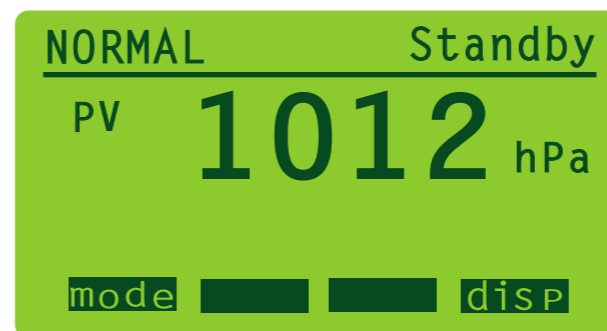
NORMAL MODE

Allows adjustment of pressure while monitoring concentration during operation as well as when selecting the appropriate pressure, the controller starts automatically, eliminating the need to button or adjust other settings.



ATUO MODE

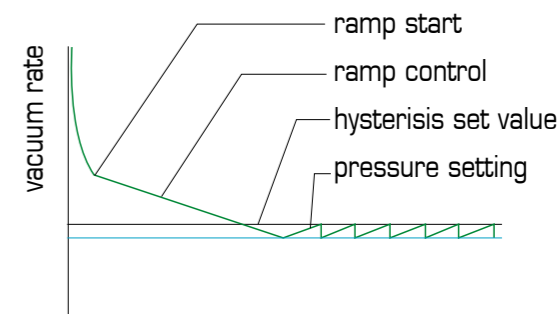
After setting the desired vapor temperature (optional), the controller will automatically determine level of vacuum and initiate evaporation while also regulating solvent "bumping".



※ Temperature sensor (option) is necessary

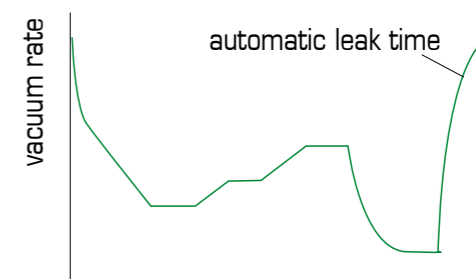
PROGRAM MODE

Optimal vacuum settings for 10 different solvents are programmed and stored in memory (die dichloromethane, acetone, dichroethane, chloroform, trichloroethane, ethyl acetate, benzer, b toluene.)



STEP PROGRAM

Allows programming up to 20 steps into the evaporation process, including climb, descent gra control, and atmospheric pressure release options. A built-in AC outlet for a diaphragm pump to automatically regulate the pump via a controller, including when to start and stop the open



- Set pressure value can be changed anytime (NORMAL MODE)
- By adding Vapor temp. sensor (option), pressure can be controlled automa MODE)
Appropriate vacuum value for 10 solvents are memorized.

Program No.1	Diethyl ether	Program No.6	Hexane
Program No.2	Dichloromethane	Program No.7	Trichloroe
Program No.3	Acetone	Program No.8	Ethyl ace
Program No.4	Dichloroethane	Program No.9	Benzene
Program No.5	Chroroform	Program No.10	Toluene

- 20 steps rise/down ramp, fixed-point control, air leak can be combined. (ST MODE)
- Service consent for diaphragm vacuum pump control is equipped.

Specifications

Product Name	10L Rotary Vacuum Evaporator	
Model	N-3000	N-3000D
Cat.No	221128	221138
Rotation speed	from 10 to 130rpm	
Rate of evaporation	Max.3.5L/h (for water)	Depends on steam energy. cooling/operation conditions
Ultimate vacuum pressure	<133.3Pa (1 Torr)	
Temperature range	RT+10-180°C	RT+10°C-80°C
Temp. accuracy	°±1°C (for water). °±3°C (for oil)	
Bath temp. control	P.I.D. microprocessor control	NA
Safety function	Thermal empty heating protector, Independent overheat protector, ELCB, Motor-fuse, Overflow duct, Up/down limiter for the bath	
Display	Bath temp., Sample flask rotation speed. Digital display.	NA
Bath lifting mechanism	Motorized auto-lifting system	Manual
Vacuum control function	Stationary (1-760mmHg/1-1013hPa), Automatic (Vapor temp. sensor, option). Program control (Programmed for each 10 typical solvents), Step control	NA
Heater	For temp. control, 3.5kW	Heat exchanger
Driving motor	Induction motor 60W	Air motor 250W
Condenser	Vertical triple spiral tube, 0.5m ²	
Sample flask	Round shaped flask 10L	
Receiving flask	Round shaped flask, 5L, with drain valve	
Vacuum seal	Mechanical seal	
Bath dimensions (mm)	Diameter 360 x 200H, 20L, material: SUS304	
Connection size	Vacuum nozzle: OD 16mm, Cooling nozzle: OD 16mm	
Bath height adjustment	145mm	145mm(maunal)
Ambient temperature	5-35°C	
Overall Dimensions (mm) & weight	930W x 450D x 1890H/96kg	930W x 472D x 1890H/93kg
Input power	AC220V, 1ø, 3.8kVA	NA



10L Standard System

Product name	Model	Product code
Rotary evaporator	N-3000	221128
Low temp. water cicularator	CA-2600	197118
Vacuum pump	GCD-051XF	191080
Cold trap	UT-3000A	216158
Oil mist trap	OMC-050 with clamp	118680
Cooling hose set	ID 15mm 5mx2	174460
Vacuu hose	ID 12xOD30mm 5m	119210



10L Explosion Proof System

Product name	Model	Product code
Rotary evaporator	N-3000D	221130
Low temp. water cicularator	CA-2600	197118
Vacuum pump	GCD-051XF	191080
Cold trap	UT-3000A	216158
Oil mist trap	OMC-050 with clamp	118680
Cooling hose set	ID 15mm 5mx2	174460
Vacuu hose	ID 12xOD30mm 5m	119210

- ※ Low temp. water circulator and vacuum pump are not explosion proof.
- ※ Air copmpressor and air piping are necessary.



Features

- Thanks to the big cooling capacity of 3000W, the unit implements wide application. In addition to its main application, cooling laboratory equipment like 10L rotary evaporator, the unit can be used in various fields where heat generating components are used; industrial, analytical, measuring equipment and semiconductor manufacturing equipment.
- Equipped with various functions like external temperature sensor terminal, temperature recorder output, alarm output, auto start and auto stop.
- Various terminals and alarm functions are equipped as standard to allow wide range of applications.

Refrigerating unit	Air cooling. R407C. 1.1kW
Operation temp. range	-10°C-35°C (without heater)
Cooling capacity	300W (2580kcal/hr) at liquid temp. 20°C
Pump max. external flow	23.5/27L/min (50/60Hz)
Pump head pressure	9.5/13m (50/60Hz)



Operation panel



Emergency stop button (CA-2600S)



Built-in bypass valve



External signal outlet



Specifications

Product Name	Medium-power Low Temp. Circulator (Cool Ace)	
Model	CA-2600	CA-2600S
Cat.No	197110	199410
Circulation method	Closed loop	
Temperature range	-10 -35°C (without heater)	
Temperature accuracy	±2°C	
Cooling Capacity	3000W (2580kcal/hr) (at liquid temp. 20°C) 2500W (2150kcal/hr) (at liquid temp. 20°C)	
Pump max flow & head pressure	Max. flow discharge 23.5/27L/min. max. head pressure 9.5/13m (50/60Hz)	
Temperature control	Capillary tube volume change +refrigerator ON-OFF control	
Temperature sensor	Thermistor	
Cooling coil materials	Copper with nickel coating	
Temp. setting & display	Sheet key input. digital display. minimum display scale 1°C	
Safety functions	Eicb. Overcurrent breaker. Self-diagnostic temp. control. Thermal sensor failure. Refrigerator overload relap. High-pressure switch. Refrigerator protection timer. Virculation pump thermal protector. Circulation water pressure deviation alarm (option). Circulation water flow decrease alarm (option)	
External output	External temperature sensor terminal. Temperature recorder output terminal. alarm output terminal	
Remote-controlled output	NA	with output terminal
Emergency stop button	NA	Yes
Additional functions	Flow volume adjustment. Bypass valve. Flow volume adjustment valve	
Refrigerator. refrigerant	Air cooling type. R407. 1.1kW	
Circulation pump	Magnetically driven pump. power supply output 41/59W (50/60Hz)	
External circulation nozzle	Inlet and outlet connection. OD 16mm (Rc1/2" female)	
Bath inner material & volume	SUS304.ø280 x 270H. 16.5L (water volume 14L)	
Ambient temperature	5-35°C	
Overall dimensions (mm)	450(555)W x 515D x 1010(1025)H	
Net weight	84kg	
Power source utility	AC200V. single phase. 20A. 50/60Hz	
Input power	2kVA	

Small sized oil rotary vacuum pump suitable for vacuum oven and freeze d

Special treatment "Clean S" is made on individual parts.

Safety features are equipped such as Reflux prevention mechanism, Gas-ba

Force oiling system, Protection circuit against excess current, and forced c

Easy displacement or chage of oil-filter.

Cooling Hose set



Tube ID	Cat. No. (2m)	Cat. No. (5m)
9.0mm	112700	174420
15.0mm	143340	174460

Vacuum Hose

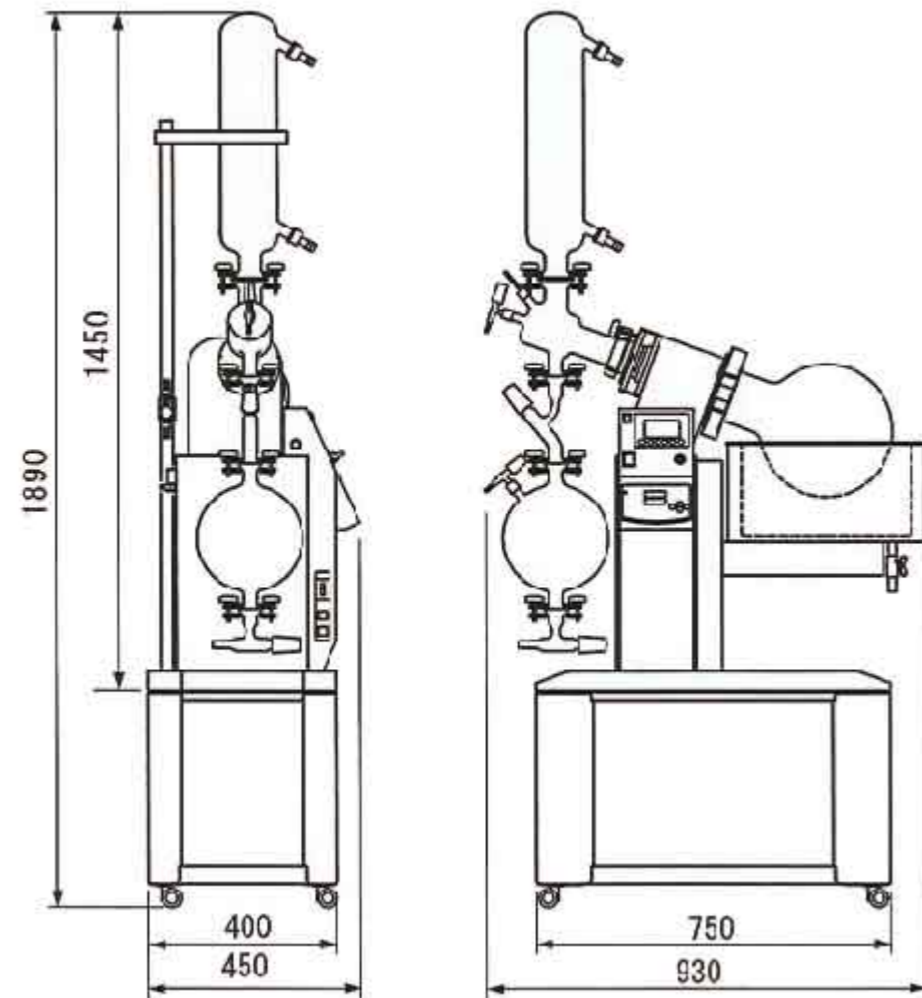


Spec.	Cat. No.	O'ty
ID6 x OD15mm	119170	5m
ID12 x OD30mm	119210	5m



- Floor type cold trap with digital indication of trap temperature. Lowest temperature -80°C and condensing capacity 1~4kg.
- Equipped with drain cock which enables one touch draining.
- Glass or metal traps are available.
- Vacuum piping is compactly armged to minimize stress on hose and pipes.
- Transparent lid with nozzle can rotate 360°C to eliminate bending stress on vacuum hose.

N-3000 Dimensions (mm)



Features

- Full line of large capacity evaporators 20L, 50L and 100L.
- Large volume samples can be condensed, evaporated, dried and recovered at low temperature quickly.
- Sample flask can be easily attached by using flask base.
- Many safety features are incorporated such as leakage protector, over current protector, bath overheat protector, overflow tube, drainage resistive sheet panel.
- Accurate temperature control enables easy bath temperature setting and confirmation. Temperature controller adopts digital temperature setting and display.
- Continuous sample injection is possible. Recovery of eluted solvents from drain pipe during operation is possible.
- Equipped with vacuum gauge.
- Effective recovery and prevention of secondary vaporization are realized by the cone type cooler for condenser and the sub-cooler on top of receiver flask.
- Sample flask can be detached easily by screw frange.
- Vacuum control is possible with optional vacuum controller NVC-2100.

Specifications

Product Name	Large Scale Rotary Vacuum			
Model	N-21NS	N-21	N-51	N-101
Cat.No.	195580	117130	117140	117150
Rotation speed range	20~120rpm	20~120rpm, steppless	10~80rpm, stepples	
Ultimate vacuum	less 133.3Pa (1 Torr)			
Temp. control range	RT+5~80°C			
Temp. control accuracy	±1~2°C (When sample flask is rotating)			
Bath temp. setting & display	Digital setting, digital display			
Safety functions	Overheat protector, Leakage protector, Empty heating protector, Sensor cut etc	Overflow tube, Water supply pipe, Float type overheat protector, Heater cut alarm, Leakage protector, Drainage resistive sheet panel, Overload protector, Non-contact zero cross output		
Bath jack function	Electrical auto jack	Electro-hydraulic auto jack		
Heater	1~6kW, 4 step	Temp. control: 2kW Aux.1kW+3kW	Temp.control: 3kW Aux.2.5kW+3.5kW	Temp. control:4kW Aux.3kW+5kW
Motor	induction motor			400W
Circulation pump (shower)	—			7L/min. Motor output 10/15W(50/60Kz)
Condenser	Vertical 4 spiral		Vertical 4 spiral, cone type	
	cooling area: 1.0m2		cooling area: 2.0m2	cooling area: 2.7m2
Sample flask	20L	20L	50L	100L
Receiver flask	10L	10L	20L	50L
Vacuum seal	Teflon seal			
Bath diameter (mm) & capacity	Ø450°; 280H 40L	Ø430°; 250H 36.2L	Ø560°; 300H 73.9L	Ø700°; 350H 134.7L
Weight	200kg	220kg	280kg	330kg
Power source	3Ø 220V 6.8kVA	3Ø 220V 6.8kVA	3Ø 220V 9.8kVA	3Ø 220V 12.8kVA

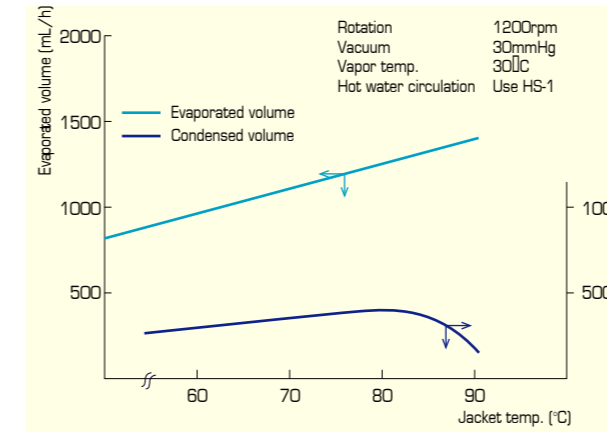
Thin film Vacuum Evaporator MF-10A•10B•10C



Features

- Designed for the concentration or purification of thermally sensitive materials or of viscous materials or of high boiling point materials.
- The double-walled evaporator jacket is made of borosilicate glass and this makes it possible to visually observe the evaporation process.
- Vacuum distillation shortens the time needed for the feed liquid to pass and increases the efficiency of heat transfer.
- With model MF-10B, the amount of sample feeding is controllable by a level sensor, enabling concentration while controlling the liquid level in the evaporation tube.
- Model MF-10C is equipped with a mantle heater and a stainless steel evaporation tube. It is suitable for high temperatures and the temperature can be set up to 180°C.

Data
Water evaporation rate (MF-10A)



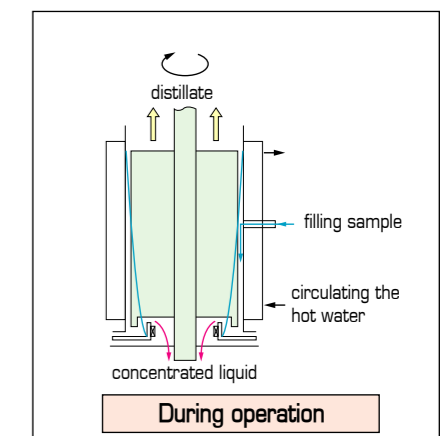
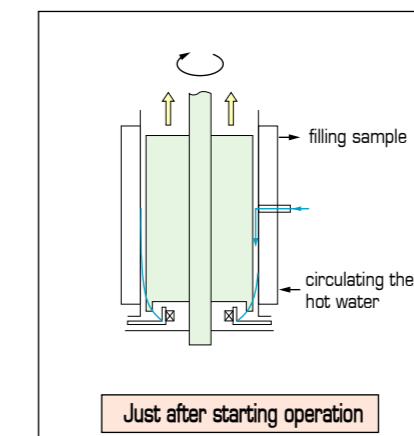
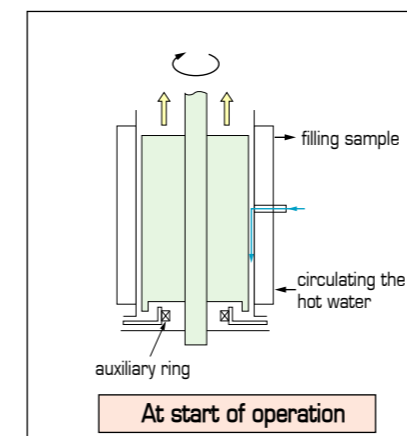
Thin Film Evaporation

- Forms a uniform thin film on the evaporation area by centrifugal action and stirring effect, enabling to concentrate the foaming solvents or high-viscous solvents.
- Needs short time for heating so that the sample can be concentrated without being too much degraded by heat.
- Can increase the rotation speed of propellers in order to raise the concentration ratio.
- Can remove the liquid by opening/closing the cock of receiver flask and concentrates the sample continuously.



Specifications

Product name	Thin film vacuum evaporator		
Model	MF-10A	MF-10B (With liquid sensor)	MF-10C (High temp)
Cat. No.	117440	117450	117450
Rotation speed	140-1200rpm (50/60Hz) steplessly variable		
Rate of evaporation	1140mL/hr (water) circulating hot water 70°C, vacuum 4.0kPa (30Torr)		
Ultimate vacuum	Capacity of vacuum pump 133.3 Pa (1Torr)		
Temp. setting range	—		RT +5-180°C
Rotation speed setting & display	Volume setting and digital display		
Timer function	ON-OFF timer, solenoid valve		
Feed liquid control	—	sensor PT-100W	Vacuum seal
Motor	DC brushless motor 60W		
Rotation axis seal	Vacuum seal		
Evaporation tube	Jacket type, evaporation surface 0.04m ²	Stainless steel (SUS304)	
Condenser	Vertical double spiral tube, condenser surface 0.3m ²		
Receiving flask	Concentration side 1L volume, Evaporation side 1L volume		
Heating source	Hot water circulator (option)		Mantle heater 800W
Material	Borosilicate glass, teflon, stainless steel SUS304		
Connection size	Cooling nozzle, hot water nozzle OD 12mm, suction nozzle, sample nozzle OD8mm		
Sample injection	Solenoid valve, timer, needle valve	Automatic control by liquid level sensor	Solenoid valve, timer, needle valve
Ambient temperature	5~35°C		
Overall dimensions (mm) & weight	625W x 400D x 1416H, 40kg		
Input voltage	100V		

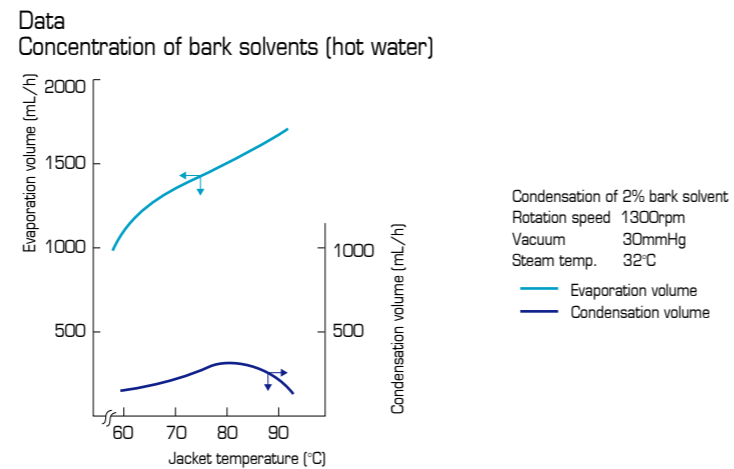


Thin Film Vacuum Evaporator Model F-70•F-150

F-70



- Thin-film evaporator with evaporating capacity of 1.7L/h for concentrations of boiling and foaming properties.
- The unique control ring (PAT.) and rotation speed control heating time. Heat sensitive materials can be condensed under proper condition.
- Drain cock is provided for recovery vessels of evaporated solvents and condensed solvents. By utilizing the cocks, continuous condensation and recovery is possible.
- Large-sized evaporator with evaporating capacity up to 20L/h available by steam heating (F-150).
- Max. 200°C heating is possible (F-150).



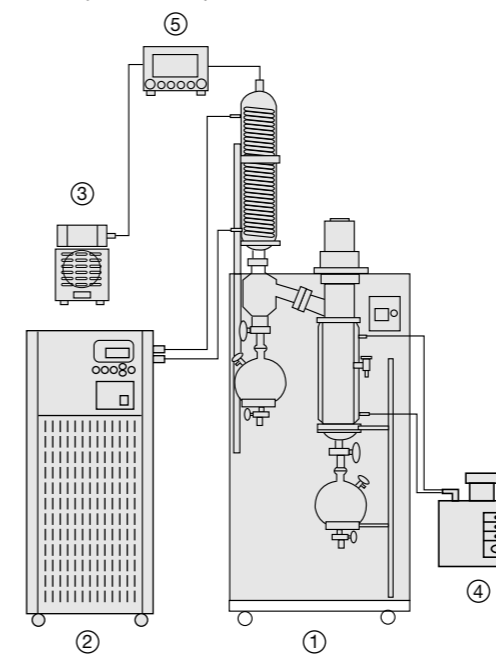
Jacket type evaporation tube



Specifications

Product name	Thin film vacuum evaporator	
Model	F-70	F-150
Type	Water 1.5L	Water 5.28L Steam 20L
Cat.no	117590	117700
Rotation speed	40-1300rpm (50/60Hz) Stepplessly variable	180-1800rpm (50/60Hz) Stepplessly variable
Rate of evaporation	1.5L/h (water) recycling hot water 70°C vacuum 2.5 x 10Pa (19Torr)h	5.28L/h (hot water 70°C) 20L/h (steam 98.1kPah) vacuum 3.3 x 10²Pa (25Torr)h vacuum 8.0 x 10²Pa (60Torr)h
Final vacuum pressure	133.3 Pa (1Torr)	
Rotation axis seal	Non seal by magnet coupling	Mechanical seal
Evaporation tube	Jacket type evaporation surface 0.05m²	Jacket type SUS304 evaporation surface 0.125m²
Condenser	Vrtyical triple spiraltube Cooling surface 0.5m²	Vrtyical triple spiraltube Cooling surface 1.33m²
Receiving flask	Concentration 3L, evaporation 3L with drain cock	Concentration 10L, evaporation 10L with drain cock
Construction material	borosilicate glass, teflon, stainless steel SUS304	
Connection size (ODmm)	Hot water nozzle 12, cool water nozzle 16, sample nozzle 8	Suction nozzle 21, cool water nozzle 17
Sample injection	Needle valve	Needle valve with flow meter
Operation temperature	5~35°C	
Overall dimensions (mm)	620W x 500D x 1970H•100kg	1150W x 600D x 2760H
Supply voltage	2A 200VA AC100V	16A 3.2kVA AC200V 3ø

F-70 System Example



① Flash evaporator	F-70	117590
② Cold temp. Water circulator	VA-2600	197110
③ Diaphragm vacuum pump	DIVAC2.2L	171550
④ Hot water circulator	HS-1	113880
⑤ Vacuum control unit	NVC-2100	216630
Vacuum control valve	CV-2	196920
Vacuum hose	ID9xOD21mm, 5m	119190
Cooling hose	ID15mm 2mx2	143340
Silicone hose	ID12xOD17mm, 5m	144170
Vacuum hose adaptor B	ID17xOD13mmx1	119250