VKL 70 - 5 RS

www.rootsciences.com

info@rootsciences.com

Single stage short path distillation plant

Below a distillation plant for use is described. The plant may be used for:

- Distillation of cannabis oils
- Continuous distillation of production-scale quantities for heat sensitive chemical, pharmaceutical and food products.
- Process development
- Feasibility studies

For better understanding please follow the flow sheet P&ID 8639-a-14-02 (Base Quote) enclosed to this specification.

The achievable pressure may be as low as 0.001 mbar in the short path evaporator.

Technical data of the distillation unit:

Type of evaporator	:	VKL 70-5 FDRR SKR
Maximum distillation temperature	:	300 °C
Minimal achievable operating pressure (depending on product)	:	< 10^{-3} mbar with rotary vane and oil diffusion vacuum pump,
Throughput	:	0.1 – 1.5 l/h (depending on product)
Evaporation surface	:	0.052 m²
Surface of internal condenser	:	0.080 m²

Other general data:

- Dosing vessel, evaporator, cold trap and collection vessels are fabricated in Borosilicate-Glass
- Wiper basket and rotary transmission are fabricated in SS 1.4571 (316 Ti) or SS 1.4404 (316L)
- Gaskets are fabricated in FKM (Viton)
- All glass connections will be manufactured with standard grindings or ball grindings.
- The unit will be equipped with a power distribution system. Customer supply will be 240 volts/60 Hz/single phase (two hot wires) with no loadable neutral line.
- All electrical consumers will be CE marked (European standard).
  Applied standards: EN (European Standard) and DIN (German Industrial Standard)
  American standards have not been considered.
- None of the equipment is in explosion proof design
- The distillation plant will be completely assembled at our factory in Niederwinkling, Germany. It will be completely checked and tested. For shipment the plant will be disassembled again.

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Item. 1. Feed

Feed tank in jacketed design with flanged lid with spare nozzles.	:	2,000 ml
Gear pump in jacketed design (design temperature 300°C), the speed of the pump is adjustable by frequency inverter. Frequency inverter is located at plant skid	:	Max. 2.8 l/h
Feed line to evaporator in jacketed design		
Drain valve (not jacketed)		
Overflow valve in heatable design		

Item. 2. Short-Path Evaporator VKL 70-5 FDRR

Evaporator surface	:	0.052 m²
Internal condenser (coil)	:	0.080 m²
Wiper basket with vacuum rotary transmission	:	SKR block rotor
Gasket of transmission	:	Lip sealing
Material of fabrication of metal parts	:	SS 1.4571
Material of fabrication of glass parts	:	Borosilicate glass 3.3
Number of wiper strands	:	3
Wiper basket drive continuously variable	:	60 – 500 min^{-1} 70 Watt
Digital display of wiper speed at motor drive		
Evaporator temperature	:	Max. 300 °C
Operating pressure (depending on product)	:	0,001 mbar
SKR wiper blocks	:	PTFE/graphite compound
Product nozzles	:	Rotulex (bowl grindings)
Vacuum nozzle	:	KS 50
Nozzle for heating medium	:	DN 15
Feed nozzle in jacketed design	:	Yes
Residue nozzle in jacketed design	:	Yes
Distillate nozzle in heatable design	:	Yes

Item. 3. Distillate and residue discharge (each)

Gear pump in jacketed design (design temperature 300°C), the speed of the pump is adjustable by frequency inverter. Frequency inverter is located at plant skid	:	Max. 2.8 l/h
Discharge siphon after the gear pump in jacketed design (used as pressure lock against the atmosphere).		

Item. 4. Vacuum System

Flanged cold trap for liquid chilling media		
vacuum nozzle	:	KS 50
Condensate discharge nozzle of cold trap	:	NS 29/32
Condensate collecting vessel for cold trap condensate	:	50 ml
Oil diffusion vacuum pump for achieving stable vacuum conditions at low pressures	:	40 l/s
two stage rotary vane pump with exhaust filter	:	2.5 m³/h
Vacuum pump equipped with vacuum pump oil		
dosing valve for pressure adjustment and for venting		
1 vacuum measuring device with one gauge. Digital display. Measuring range 0.0005 mbar – 1,300 mbar		
All necessary connection pipes or hoses to the vacuum system		

Item. 5. Heating and Cooling

Heating unit

1 independent heating unit for - evaporator jacket		
Circulation themostat with digital temperature adjustment and numeric display, including circulation pump		
Temperature range	:	300°C
Power	:	3 kW
Medium (not in scope of supply)	:	Thermal oil

The system will be equipped with all necessary connecting hoses (thermo insulated tubes made of stainless steel) to connected to the unit.

Heating unit

1 independent heating unit for
- Residue line

Circulation themostat with digital temperature adjustment and numeric display, including circulation pump

Temperature range	:	150 °C
Power	:	2 kW
Medium (not in scope of supply)	:	Thermal oil

The system will be equipped with all necessary connecting hoses (thermo insulated tubes made of stainless steel) to connected to the unit. All necessary jumpers in the heated lines are included as well.

Heating unit

1 independent heating unit for
- feed line

Circulation themostat with digital temperature adjustment and numeric display, including circulation pump

Temperature range	:	150 °C
Power	:	2 kW
Medium (not in scope of supply)	:	Thermal oil

The system will be equipped with all necessary connecting hoses (thermo insulated tubes made of stainless steel) to connected to the unit. All necessary jumpers in the heated lines are included as well.

Cooling unit

1 independent cooling unit for
- internal condenser and distillate discharge line

Circulation themostat with digital temperature adjustment and numeric display, including circulation pump connected to cooling or tap water

Temperature range (rating)	:	-20 – 100 °C
Heating Power	:	2 kW
Cooling power @ 20°C	:	0.16 kW
Medium (not in scope of supply)	:	Depending on temperature

The system will be equipped with all necessary connecting hoses (thermo insulated tubes made of stainless steel) to connected to the unit. All necessary jumpers in the heated lines are included as well.

1 independent cooling unit for
- cold trap

Circulation themostat with digital temperature adjustment and numeric display, including circulation pump connected to cooling or tap water

Temperature range (rating)	:	-30 – 100 °C
Heating Power	:	2 kW
Cooling power @ 0°C	:	0.25 kW
Cooling power @ - 20°C	:	0.15 kW
Medium (not in scope of supply)	:	Depending on temperature

The system will be equipped with all necessary connecting hoses (thermo insulated tubes made of stainless steel) to connected to the unit. All necessary jumpers in the heated lines are included as well.

Item. 6. Rack/Frame, connecters

Frame made of stainless steel pipes (DN 32) with connection clamps for variable use. The frame will be equipped with 4 wheels and is moveable. Collecting tray for leaking liquid is included.

The plant will be completely assembled with all necessary clamps, gaskets and valves in our workshop in Niederwinkling. For transportation it will be partly disassembled again.

Item. 7. Power supply to power distribution system (by customer)

Voltage	:	240 V
Frequency	:	60 Hz
No of phases	:	1 (two hot wires)
Power distribution system included	:	Yes
Frequency inverters located at plant skid	:	Yes

Item. 8. Included spare parts

1 set of tools

1 set of wiper elements

1 set of static gaskets

1 set of shaft sealing of rotary transmission

1 set of bearings for rotary transmission

1 set of stuffing box rings for gear pumps

Item. 9. Documentation (1 set in English language)

Detailed assembly instructions

Operating instructions

Terms of Payment

50% down payment when order placed.

50% after receipt of plant.

Lease terms available upon request.

Delivery Time

6 to 8 weeks after reception of order and down payment.

Warranty

The warranty time for the mechanical parts will be 12 months after delivery. The warranty is limited to part service only. No warranty on glass parts.