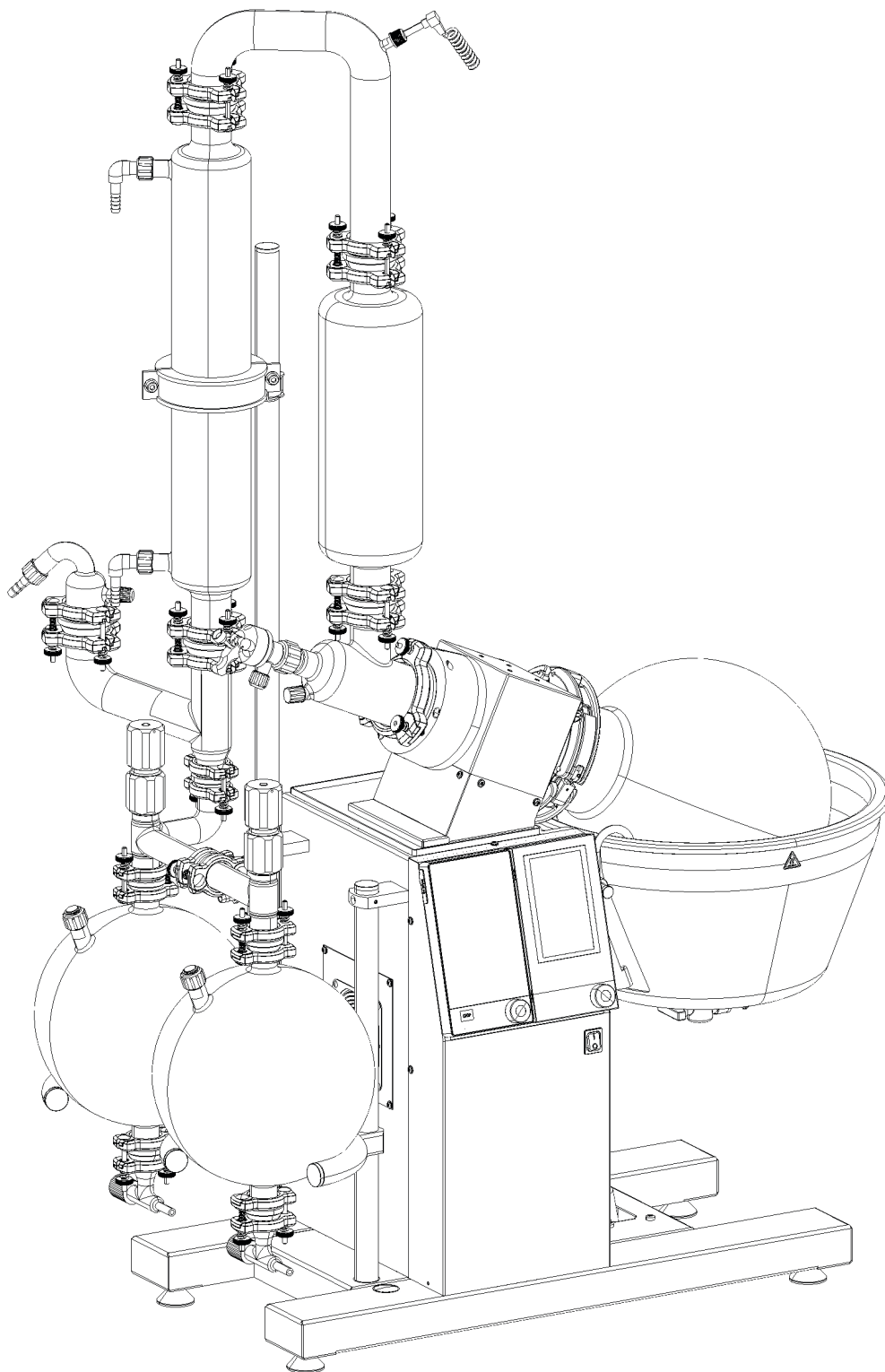




Rotavapor® R-220 Pro

Technical data sheet

The Rotavapor® R-220 Pro is designed to fulfill a wide range of distillation applications in the industrial environment. Safety, robustness and easy handling are the key benefits of this system. Seven different glass configurations and a wide range of accessories guarantees the perfect setup for maximum performance.



Overview

The Rotavapor® R-220 Pro is available in different versions and configurations to cover a broad range of applications. The following table provides a rough overview of the available versions.

R-220 Pro				
	Essential	Basic	High Performance	Continuous
Including vacuum controller		•	•	•
Continuous distillation				•
High distillation rate (> 16 L Ethanol / h) *			•	
7 different glass configurations		•		

* For a comprehensive comparison of the distillation rates, see section "Performance" on page 8.

A wide range of applications can be performed with the R-220 Pro. Nevertheless some versions are specially designed to fulfill specific needs. The following table helps to choose the most suitable version.

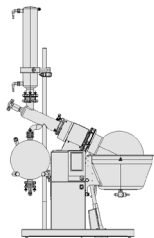
R-220 Pro				
Application	Essential	Basic	High Performance	Continuous
For easy distillable or drying products	++	++	+	-
Heat sensitive products	++	++	+	++
Reflux distillations (e.g. Recrystallization)	-	++	-	-
Continuous distillation (fully automated filling and draining process)	-	-	-	++
Solvent recycling	+	++	++	++
Foaming applications	-	++	+	-
Automatic distillation	-	++	+	-

Legend:

- +++ : Recommended version that is specially designed for this application
- + : Possible to perform this application, but not optimized for it.
- : not possible or recommended

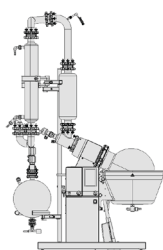
Glass configurations

Each platform has its glass configuration according to their purpose



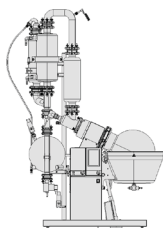
Rotavapor® R-220 Pro Essential

The “Essential” version is equipped with a vertical condenser and one receiving flask with a volume of 10 L. This configuration covers all the basic distillation needs. It is not recommended for bumping or foaming samples and also distillations under reflux are not possible. Overall height incl. R-220 Pro: 1.70m



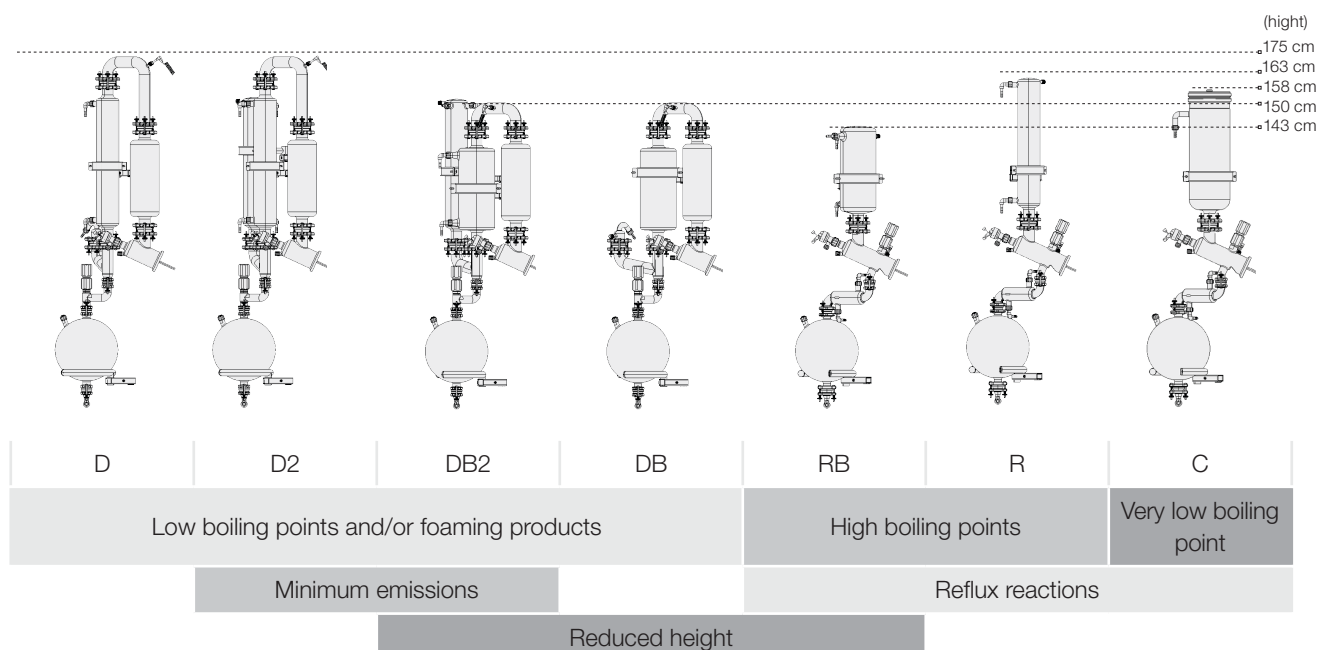
Rotavapor® R-220 Pro High Performance

The glass configuration of the “High performance” version, consists of two parallel condensers to be able to condense the higher amount of evaporated solvent. Combined with two receiving flasks of 10 L each. Overall height incl. R-220 Pro: 1.80m



Rotavapor® R-220 Pro Continuous

The “Continuous” setup contains a shorter but equally efficient condenser and one receiving flask. It is based on the descending configuration. For details and further information about the continuous version, see page 12. Overall height incl. R-220 Pro: 1.75m



Order code

Choose the configuration according to your needs:



Rotavapor® R-220 Pro

- 1 230 V, 3.6 kW, oil and water
- 2 200 V, 3.6 kW, oil and water
- 6 400 V, 3.6 kW, oil and water
- 9 400 V, 4.2 kW, water bath



Evaporating flask

- B 10 L evaporating flask
- C 20 L evaporating flask
- X No flask
6L flask or drying flask (10 L or 20 L)
has to be ordered separately



Condenser assembly

- 21 R, reflux
- 22 RB, reflux reduced height
- 23 C, cold trap
- 24 D, descending
- 25 DB, descending reduced height
- 26 D2, descending with secondary condenser
- 27 DB2, descending reduced height with secondary condenser



Receiver assembly

- 1 One receiving flask
- 2 Two receiving flasks

Rotavapor® R-220 Pro Essential (without Interface I-300 Pro)

1 1 8 7 6 C 2 0 1

Voltage

- 1 230 V, 3.6 kW, oil and water
- 2 200 V, 3.6 kW, oil and water
- 6 400 V, 3.6 kW, oil and water

Rotavapor® R-220 Pro Continuous

1 1 8 7 4 C 2 9 1

Voltage

- 1 230 V, 3.6 kW, oil and water
- 2 200 V, 3.6 kW, oil and water
- 6 400 V, 3.6 kW, oil and water
- 9 400 V, 4.2 kW, water bath

Rotavapor® R-220 Pro High Performance (400 V / 6.3 kW)

1 1 8 7 7 4 C 3 4 2

Scope of delivery

All Rotavapor® R-220 Pro models are delivered ready to use, including all needed tools and are complete with:

Components	R-220 Pro
Glass configuration according to order configuration	1
Evaporating flask according to order configuration	1
All needed tubing's (vacuum and cooling)	1
Seal removing tool	1
Operation manual	1

Technical data

	R-220 Pro	R-220 Pro Essential	R-220 Pro Continuous	R-220 Pro High Performance
Dimensions (W x D x H)	1200 x 710 x 1750 mm	1100 x 560 x 1700 mm	1200 x 600 x 1750 mm	1200 x 710 x 1800 mm
Weight	100 kg	85 kg	100 kg	110 kg
Connection voltage	200 VAC (1Ph, N, G) ± 10 % 220 - 240 VAC (1Ph, N, G) ± 10 % 400 VAC (3Ph, N, G) ± 10 %	200 VAC (1Ph, N, G) ± 10 % 220 - 240 VAC (1Ph, N, G) ± 10 % 400 VAC (3Ph, N, G) ± 10 %	200 VAC (1Ph, N, G) ± 10 % 220 - 240 VAC (1Ph, N, G) ± 10 % 400 VAC (3Ph, N, G) ± 10 %	- - - 400 VAC (3Ph, N, G) ± 10 %
Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Power consumption (3600 W heater)	5000 W	5000 W	5000 W	-
Power consumption (4200 W heater)	5500 W	-	5500 W	-
Power consumption (6300 W heater)	-	-	-	7500 W
Pollution degree	2	2	2	2
Overvoltage category	II	II	II	II
Approval (200 VAC Connection Voltage)	CE	CE	CE	CE
Approval (220 -240 VAC Connection Voltage)	CE UL / CSA	CE UL / CSA	CE -	CE -

	R-220 Pro	R-220 Pro Essential	R-220 Pro Continuous	R-220 Pro High Performance
Approval (400 VAC Connection Voltage)	CE UL / CSA	CE UL / CSA	CE -	CE -
Rotation Motor	1-phase 0.6 A at 50 Hz 10 Nm	1-phase 0.6 A at 50 Hz 10 Nm	1-phase 0.6 A at 50 Hz 10 Nm	1-phase 0.6 A at 50 Hz 10 Nm
Rotation controlling	Electronically	Electronically	Electronically	Electronically
Rotation speed	5 – 150 rpm	5 – 150 rpm	5 – 150 rpm	5 – 150 rpm
Rotation Accuracy	± 1 rpm at 5 rpm to ± 5 rpm at 150 rpm	± 1 rpm at 5 rpm to ± 5 rpm at 150 rpm	± 1 rpm at 5 rpm to ± 5 rpm at 150 rpm	± 1 rpm at 5 rpm to ± 5 rpm at 150 rpm
Cooling consumption (adjustable via integrated needle valve)	120 – 200 L/h	120 – 200 L/h	120 – 200 L/h	120 – 200 L/h
Cooling restriction abs. without pulsation	max. 2.7 bar	max. 2.7 bar	max. 2.7 bar	max. 2.7 bar
Heating bath medium (3600 W heater)	Water or oil	Water or oil	Water or oil	-
Heating bath medium (4200 W heater)	Water	-	Water	-
Heating bath medium (6300 W heater)	-	-	-	Water
Heating capacity (3600 W heater)	Ambient to 180 °C	Ambient to 180 °C	Ambient to 180 °C	-
Heating capacity (4200 W heater)	Ambient to 100 °C	-	Ambient to 100 °C	-
Heating capacity (6300 W heater)	-	-	-	Ambient to 100 °C
Heating bath accuracy	± 2 °C	± 2 °C	± 2 °C	± 2 °C

Ambient conditions

For indoor use only.

Max. altitude above sea level	2000 m
Ambient temperature	5 - 40 °C
Maximum relative humidity	80 % for temperatures up to 31 °C decreasing linearly to 50 % at 40 °C

Safety

Safety coated glassware	Yes, except the evaporating flask
Over temperature protection of the bath	<ul style="list-style-type: none">· Separate monitoring circuit with manual reset· Error if temperature is 15 °C above set value
Rotation	<ul style="list-style-type: none">· Soft start· Stop in case of blocked rotation
At any Error	<ul style="list-style-type: none">· Bath lowering, heater off, rotation off· Type of error showed on display· Reset with main switch

Display

Bath temperature	1 °C steps
Cooling temperature (option)	1 °C steps
Vapor temperature	1 °C steps
Set rotation speed	1 rpm steps
Set bath temperature	1 °C steps
Actual vacuum	1 mbar steps
Set vacuum	1 mbar steps

Materials

Housing	Stainless steel 1.4301 (AISI 304)
Gear head	Aluminum cast (3.2373)
Paint	Powder coated with Epoxy (EPX)
Bath pan	Stainless steel 1.4404 (AISI 316 L)
Heating element	Stainless steel 1.4404 (AISI 316 L)
Glass	Borosilicate 3.3
In contact with product	FDA compliant materials
Leakage of the complete system	<1 mbar/min

Sensors

Vapor temperature	PT-1000, 2 wire
Bath temperature	PT-1000, 2 wire
Speed sensor	Hall-sensor
Vacuum	Ceramic, capacitive

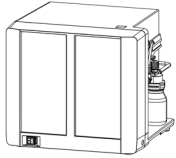
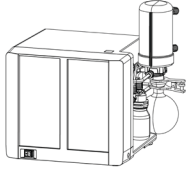
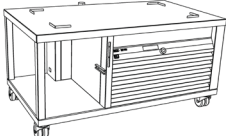
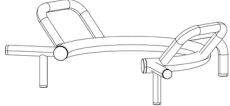
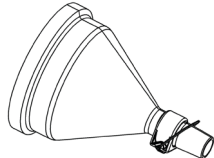
Features R-220 Pro

Two displays	All parameters at a glance on two large displays Always all information available and easy operation at the same time
Easy flask handling	Snap flask coupling to fix the evaporating flask Ensures the safe and easy mounting of the evaporating flask by a single person
Safety coated glass ware	All glass assemblies (except the evaporating flask) are coated with a robust and transparent safety coating To protect the operator from injuries in case of a glass breakage
Indication of process parameters of R-220 Pro	Displays all operating parameters Indicates set and actual values of heating bath and coolant temperature and rotation speed
Dynamic distillation	Distillation process starts immediately after choosing the solvent from the library Starts the distillation immediately and adjusts the vacuum dynamically – even if the chiller or bath have not reached their set temperatures.
Remote control	The Interface I-300 Pro can be removed and used in combination with a 15 m communication cable to remotely control the complete system Enables the Rotavapor® to be operated from a distance or from behind a closed fume hood
Remote monitoring	BUCHI Rotavapor® APP for iOS, Android and Windows offers push notifications and live view of all process parameters Allows to track current status of distillation remotely via smartphones / tablets and informs user when process is terminated
Charting	All parameters are graphically displayed to facilitate the supervision of distillation. With the Rotavapor® App also on your mobile device
Data recording	Process can be exported on an SD card for further analysis and traceability purpose Enables the continuous recording of all process parameters
Wear part library	Internal library lists common wear parts inclusive of order code Allows a convenient replacing process of wear parts and alerts user to check vacuum seal

Features R-220 Pro

Leak test	Integrated test checks system for possible leaks and displays result Allows verifying tightness of the system automatically
Different operating modes	Manual vacuum control · Manual management of pressure settings and aeration Timer function · Manual vacuum control, stops process after preset time has elapsed Continuous pumping · Pump runs constantly AutoDest · Performs automatic multi-stage distillation with specific settings adjusted by the system Methods (SOP's) · Performs distillation according to a sequence of programmed steps with defined times and parameters and graphical illustration
Multi-languages	en, de, fr, it, es, zh, ja, ru, pt-br, id, ko
Overpressure prevention	Automatic aeration when pressure is above 1000 - 1300 mbar (adjustable)
ECO-mode	Shuts down activity of bath and chiller, hence lowers energy consumption if system remains inactive for a predefined time period

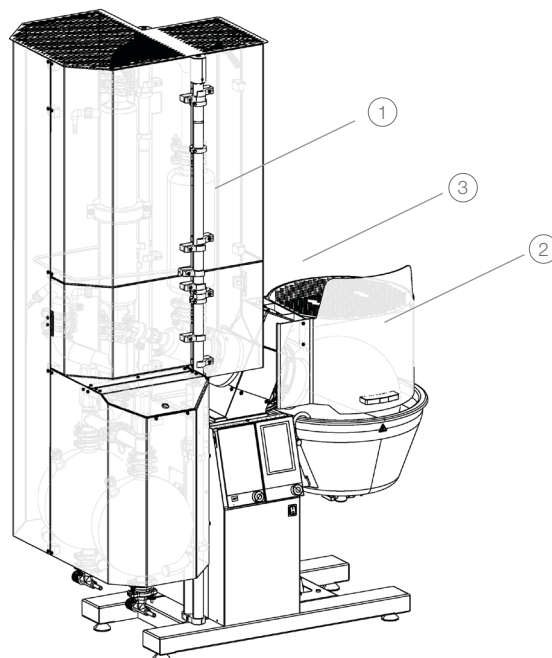
Accessories

	Order number	
<p>Vacuum Pump V-600</p> <p>Chemically resistant 3-stage diaphragm pump, optimally suited to work with R-220 Pro. It impresses with its silent and economical operation. Capacity and final vacuum: 3.1 m³/h, 1.5 mbar</p>	11V600800	
<p>Vacuum Pump V-600</p> <p>Chemically resistant 3-stage diaphragm pump, optimally suited to work with R-220 Pro. It impresses with its silent and economical operation. With secondary condenser. Capacity and final vacuum: 3.1 m³/h, 1.5 mbar</p>	11V600810	
<p>Recirculating Chiller F-325</p> <p>Recirculating chiller with a cooling capacity of 2500 W at 15 °C. This chiller is not only cooling the Rotavapor® R-220 Pro but also operates as a trolley and host of the Vacuum Pump V-600. Dimensions are (WxDxH): 1100 x 660 x 560 mm</p>	11F32501	
<p>Manual flask handler for 20 L flask</p> <p>For easy mounting and removal of the flasks along with safe transport.</p>	041400	
<p>Flange adapter for flasks , SJ29.2/32</p> <p>To use a 1, 2 or 3 L evaporating flask with SJ29.2/32</p>	11058738	
<p>Trolley</p> <p>Stainless steel trolley with extra space for Vacuum Pump V-600. Not necessary if utilizing the Recirculating Chiller F-325</p>	041257	
<p>Foam detector assembly</p> <p>Internal sensor detects rising foam and triggers a short aeration pulse, eliminating foam. Only in combination with a descending glass assembly</p>	11056083	
<p>AutoDest sensor cpl.</p> <p>For automatic distillation. Measures temperature of cooling media. Vacuum is adjusted according to cooling capacity of condenser. Meant to be used with the Rotavapor R-220 Pro</p>	11064486	
<p>Vacuum valve, 4 mm, 24 V, connection piece 12.5 mm</p> <p>Electrical valve for vacuum regulation when operated with a non-BUCHI vacuum pump.</p>	11055928	
<p>Vapor duct with integrated sinter plate</p> <p>The integrated sinter plate P3 protects the condenser assembly against powder and dust during the drying process.</p>	041100	
<p>Cooling water flow sensor</p> <p>Checks the flow of coolant, stopping operation when flow of coolant is insufficient or interrupted.</p>	11055971	
<p>Cooling water temperature sensor</p> <p>Needed to display the coolant temperature for optimal distillation settings.</p>	11055988	
<p>Cooling water valve</p> <p>Eliminates unnecessary water waste by stopping cooling water flow when not in use.</p>	041191	

	Order number
Level sensor for receiving flask For defined concentration of product or to prevent an overflow of the secondary condenser if combined with a Vacuum Pump V-600 with secondary condenser	11056192
Stopper, PE, 120 mm To close the evaporating flask	11057349
Communication cable. BUCHI COM, 15 m, 6p to remote control the R-220 Pro	11064090
IQ/OQ R-220 Pro official BUCHI document	11064749
Repeating OQ R-220 Pro	11064750

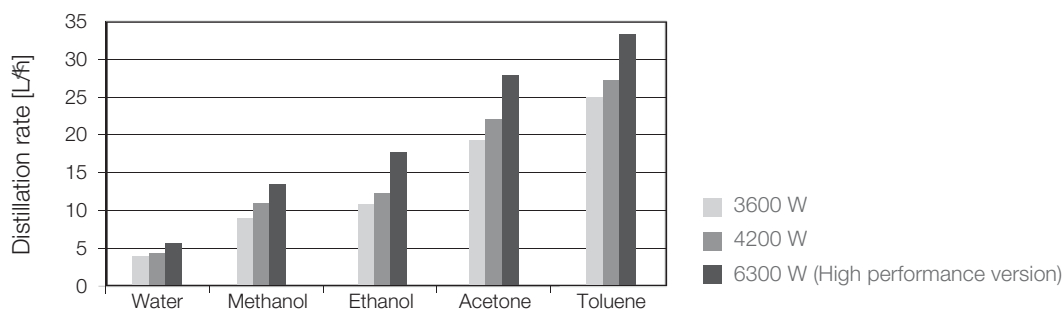
Safety devices

	Order number	Picture
Standard safety shield Safety shield for the following glass assemblies, with one receiving flask: D, D2, R, C	11055796	①
Standard safety shield, two flasks Safety shield for the following glass assemblies, with two receiving flask: D, D2, R, C	11055797	①
Safety shield, Bullfrog Safety shield for the following glass assemblies, with one receiving flask: DB, DB2, RB	11055798	①
Safety shield, Bullfrog, two flasks Safety shield for the following glass assemblies, with two receiving flask: DB, DB2, RB	11055799	①
Bath shield cpl. Separate bath shield complete	11055364	②
Protective grid cpl. Protects the glass assembly and the bath against falling objects (only in conjunction with corresponding safety shield)	11056081	③



Performance

The following chart shows the maximum distillation rate of the different R-220 Pro versions



The maximum achievable distillation rate is not just related to the heating capacity, but also on rotation speed, flask size and temperature difference between bath and cooling.

To get a high distillation rate:

- set a high rotation speed
- choose a large evaporating flask (20 L)
- set a high temperature difference between bath and cooling

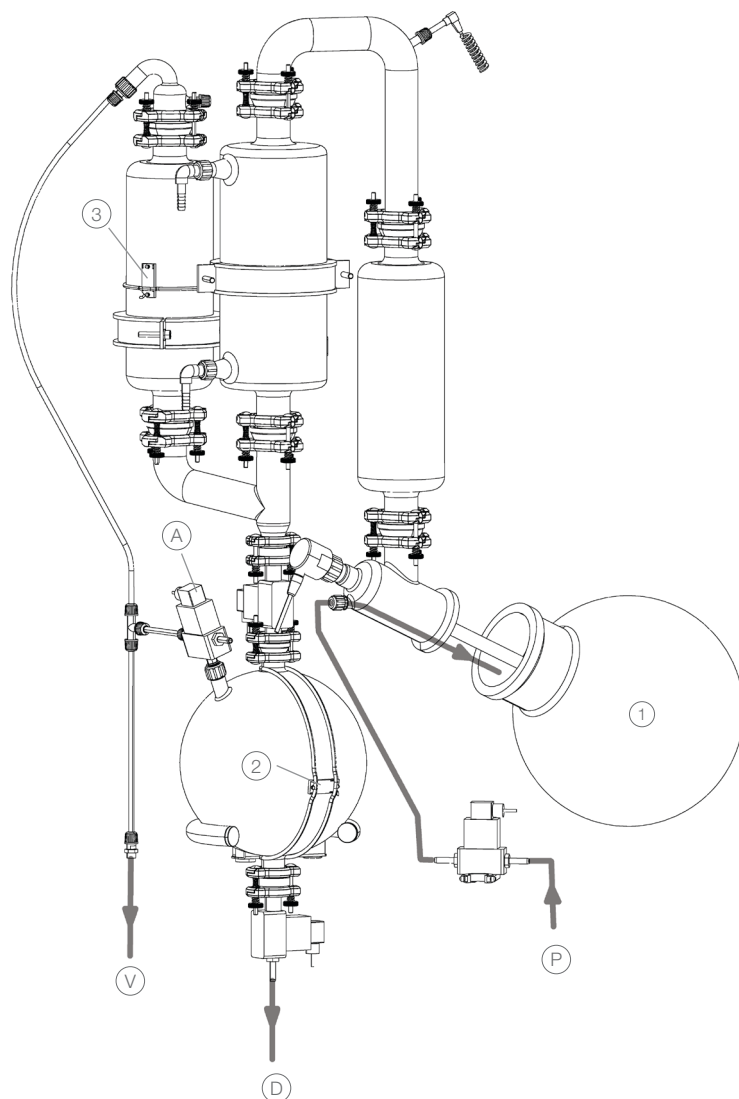
Functional principle - continuous distillation

The continuous version of the Rotavapor® R-220 Pro is based on the descending glass assembly. Four valves and three sensors are controlling the distillation process. This allows distillations of large volumes almost unattended.

This version is particularly suitable for solvent recycling or concentrations in industrial preparative chromatography.

The system controls the followings functions:

- Automatically empties the receiving flask when full.
- Simultaneously refills the evaporation flask.
- Monitors fill levels in both the evaporating and receiving flasks.
- Controls valves for filling and draining.
- Safety shut down in case of flooding the system, empty product tank or blocked drain.



- | | |
|----------------------------------|--------------------------|
| ① Level sensor evaporating flask | Ⓓ Solvent outlet (drain) |
| ② Level sensor receiving flask | Ⓟ Product feed |
| ③ Level sensor safety | Ⓥ Vacuum source |
| Ⓐ Aeration receiving flask | |