



# SpeedDry Vacuum Concentrators



Fast and gentle





# Gentle evaporation

## with rotational vacuum concentration

### **Specimens are valuable, and so is your time.**

With rotational vacuum concentration, you can prepare specimens quickly without sacrificing gentle handling. This method can be used for evaporation, drying, purification and concentration.

Rotational vacuum concentration can be a true alternative for anyone who has previously worked with distillation systems, rotary evaporators or freeze dryers. Distillation systems and rotary evaporators use high temperatures for evaporation and operate at nearly atmospheric pressure. They are fast, but not especially gentle.

Freeze drying systems operate at very low temperatures and high vacuum. The specimen goes directly from the solid, icy phase to the vapor phase by sublimation. This is extremely gentle, but time consuming.

SpeedDry from Christ is a therefore a good alternative. Rotational vacuum concentration occupies a position between the two methods mentioned above. The process takes place in vacuum, usually in the range of 2 mbar to 10 mbar. The reduced pressure lowers the boiling point of the solvent, so it evaporates at a lower temperature than with normal pressure. Rotational vacuum concentration avoids thermal stress on the specimens because evaporation takes place at a temperature lower than the usual ambient conditions.

The material is centrifuged at a moderate speed of 1,350 to 1,750 rpm during vacuum concentration. The resulting centrifugal force prevents specimen splashing from bumping. The evaporated solvent is collected in separators or cold traps. This simplifies reuse or disposal.

### **Save time and money**

Rotational vacuum concentration is especially economical in practice. This method is suitable for drying a wide variety of aqueous specimens, in particular solvent-based specimens. The volume range extends from one milliliter to three liters. The specimen is concentrated at the bottom of the vessel, unlike vortex shakers. This is especially advantageous with small volumes. The method also scores well for effectiveness: a large number of specimens can be dried simultaneously, saving time.

The drying processes are also easily reproducible. This is enabled by controlled process parameters, such as rotor chamber temperature and vacuum level.

### **Example applications**

- DNA/RNA (main solvents: water, ethanol, methanol)
- Oligosynthesis, peptides
- Polymerase chain reaction (PCR)
- HPCL (main solvents: water, acetonitrile)
- Isolation/synthesis of natural substances
- Storage and handling of substances (substance libraries)
- Combinational chemistry
- High throughput screening (HTS)
- Food and environmental analytics, toxicology
- Forensics
- General evaporation tasks in laboratories

# Excellent results guaranteed

## Outstanding functions and performance

Christ rotational vacuum concentrators are distinguished by numerous functions and features that contribute to especially good performance.

### Variable-speed magnetic drive

The combination of rotation and variable speed avoids bumping. There are no rotating parts outside the rotor drum, so the chemicals stay in the specimen chamber. This also reduces stress on the specimens and the device.

### Simple operation

The CDplus system controller is intuitive and especially user friendly. An automatic start/stop sequence independently controls vacuum application and release depending on the rotor speed. Venting is also performed automatically.

### Fast evaporation

Electric rotor chamber heating ensures high energy input. Cold traps reduce evaporation times with large sample volumes and enable solvent condensation.

### High chemical resistance

All devices have a chemical-resistant glass lid, a stainless steel rotor chamber and chemical-resistant seals. The rotors are anodized to increase their chemical resistance and durability. All devices are suitable for both aqueous and solvent-based specimens. The RVC 2-18 CDplus model is also available as a HCl-resistant version.

### Individually configurable system components

A variety of cold traps are available, with capacities from 2 to 4 liters and temperatures of  $-50\text{ }^{\circ}\text{C}$ ,  $55\text{ }^{\circ}\text{C}$  and  $85\text{ }^{\circ}\text{C}$ . You can choose from several chemical-resistant membrane vacuum pumps with final vacuum from 2 to 7 mbar, or chemistry hybrid pumps with final vacuum below 0.1 mbar. The latter are also suitable for solvents with relatively high boiling points, such as DMSO, DMF and NMP.

### Comprehensive line of rotors

From standard tubes to your special glassware, our in-house rotor production covers every need.



# Especially convenient operation

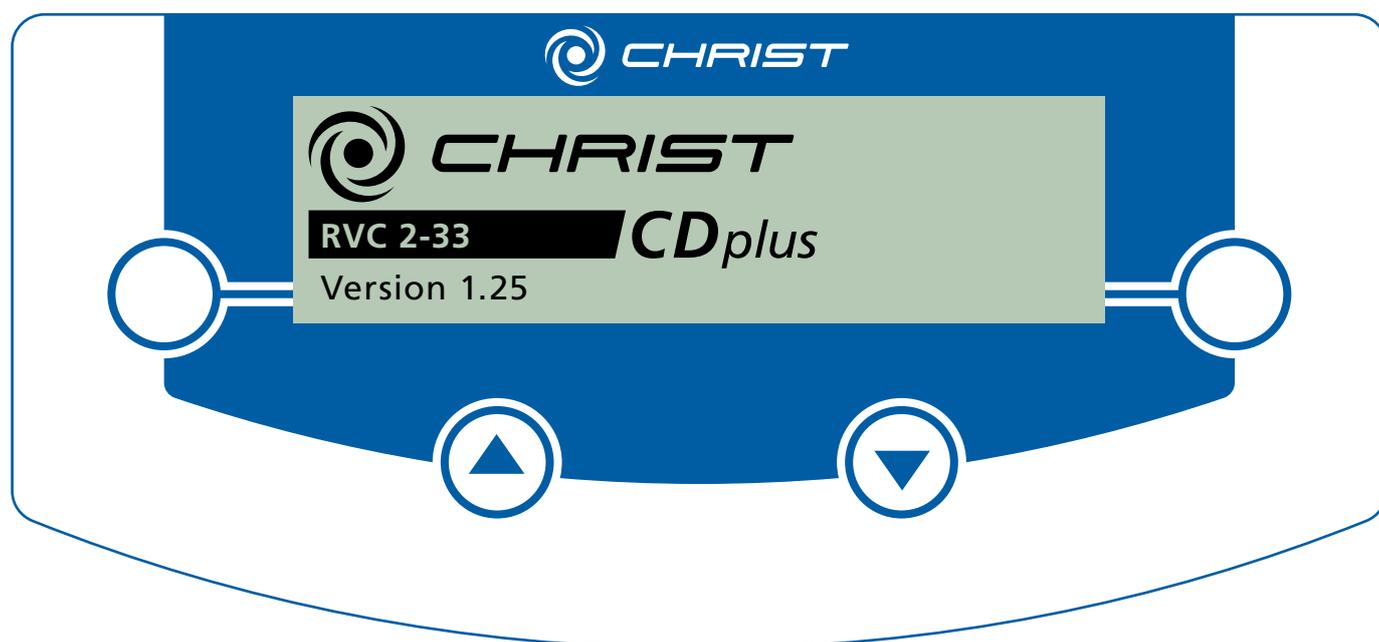
## Intuitive system control with CDplus

### Convenient and flexible

Our SpeedDry vacuum concentrators have numerous user-configurable parameters for optimal process control and monitoring. Essential information, including time, vacuum, rotor speed and rotor chamber temperature, can be seen at glance on the well-organised graphical display. System parameters such as lid open/closed status and alerts with error codes are conveniently visualized.

### CDplus controller features

- Well-organised graphical display
- Presentation of important process parameters
- Multiple language options
- Vacuum measurement and control
- Rotor speed control
- Rotor chamber heating adjustable in 1 K steps from +30 °C to +80 °C or +60 °C
- Run time setting from 5 minutes to 12 hours



# Mini concentrator

## RVC 2-18 CDplus

The RVC 2-18 CDplus mini concentrator is economical and compact. This benchtop device is specifically designed for the concentration of relatively small sample volumes and fits on every laboratory bench. Quick analyses at the workstation are easy with this device. It is ideal for gentle handling of DNA/RNA, proteins and other liquid specimens.

The mini concentrator is configured as standard with a chemical-resistant diaphragm pump with 2 m<sup>3</sup>/h suction capacity and an final vacuum of 7 mbar. A diaphragm pump with a higher final vacuum can optionally be used instead. You have complete flexibility in adapting the device to your wishes.

The system components can be combined to meet the needs of all common tasks. We will be pleased to advise you.



### Product features

- Intuitive operation
- Compact, space-saving benchtop unit
- Individually configurable with vacuum pump and cold trap
- Easy installation
- Suitable for various capacities, such as 72 x 1.5/2.0 ml Eppendorf Caps or 6 x 50 ml Falcon tubes



See the respective  
RVC product page  
for our rotor lists:  
[martinchrist.de/RVC](http://martinchrist.de/RVC)



### Recommended solvents

Acetonitrile

Methanol

Ethanol

Toluene

Isopropanol

Methylene chloride (DCM)

Acetone

Ethyl acetate

# HCl concentrator

## RVC 2-18 CDplus HCl Version

Special tasks require smart solutions. That's why we developed this mini concentrator with something extra: It can handle specimens containing aggressive substances, such as are commonly used in combinational chemistry or chemical decomposition methods. This model is a special version of the RVC 2-18 CDplus and has the same technical configuration as the basic device. It is compact and equipped with state-of-the-art technology. Users can choose from a wide range of rotors. The mini concentrator can be individually configured with a cold trap with glass insert.



### Product features

- Intuitive operation
- Compact, space-saving benchtop unit
- Individually configurable with vacuum pump and cold trap
- Easy installation
- Suitable for various capacities, such as 48 x 1.5/2.0 ml Eppendorf Caps or 6 x 50 ml Falcon tubes

### Additional features

- Special enamel drum coating
- Ceramic magnet drive
- Materials resistant to sulphuric acid
- Long-life rotors made of special resistant material (PDVF)

### Recommended solvents

Hydrochloric acid

Sulphuric acid 5%

Trichloro acetic acid 0.5%

Acetonitrile

Methanol

Ethanol

Toluene

Isopropanol

Methylene chloride (DCM)

Acetone

Ethyl acetate



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# Midi concentrator

## RVC 2-25 CDplus

The midi concentrator is a general-purpose benchtop device for routine concentration tasks. Compact and efficient, it fits on every laboratory bench despite its high capacity. This device is suitable for gentle handling of DNA/RNA, proteins and other liquid specimens. The composite stainless steel / glass lid with view window is made of corrosion-resistant materials.

The rotor capacity is impressive, extending from 108 x 1.5/2.2 ml Eppendorf Caps to 2 microtiter plates. The compatible standard diaphragm pump has a suction capacity of 2 m<sup>3</sup>/h and an final vacuum of 7 mbar. On request, the midi concentrator can also be provided with a vacuum system with higher final vacuum. If even more evaporation capacity is desired, the RVC 2-25 CDplus can be configured with cold traps (capacity 2 or 4 litres).



### Product features

- Intuitive operation
- Compact, space-saving benchtop unit
- Individually configurable with vacuum pump and cold trap
- Easy installation
- Automatic venting valve
- Vacuum measurement and control
- Suitable for various capacities, such as 108 x 1.5/2.0 ml Eppendorf Caps, 6 x 100 ml centrifuge tubes, or microtiter plates.

### Recommended solvents

Acetonitrile

Methanol

Ethanol

Toluene

Isopropanol

Methylene chloride (DCM)

Acetone

Ethyl acetate



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# Maxi concentrator

## RVC 2-33 CDplus

The maxi concentrator is highly versatile and ideally suited to large specimen volumes. Virtually all commonly used solvents can be handled perfectly with this device. The CDplus controller provides simple operation and an outstanding process overview. The high-performance 1,550 rpm drive system reliably prevents specimen splashing.

The materials ensure long service life. The glass/steel composite lid with view window is corrosion resistant. The RVC 2-33 CDplus can be configured as standard with a chemical-resistant diaphragm pump with 4 m<sup>3</sup>/h suction capacity and an final vacuum of 1.5 mbar. A diaphragm pump with higher final vacuum is optionally available. The chemistry hybrid pump is also suitable for solvents with high boiling points, such as DMSO or DMF. Due to the high evaporation volume, we recommend using the maxi concentrator with a Christ 4 liter cold trap.



### Product features

- Intuitive operation
- Individually configurable with vacuum pump and cold trap
- Easy installation
- Automatic venting valve
- Vacuum measurement and control
- Programmable pressure and temperature (up to 16 individual programs)
- Variable speed
- Suitable for various capacities, such as 216 x 1.5/2.0 ml Eppendorf Caps, 12 x 100 ml centrifuge tubes, 12 microtiter plates, or 4 deep well plates.

### Recommended solvents

Acetonitrile

Methanol

Ethanol

Toluene

Isopropanol

Methylene chloride (DCM)

Acetone

Ethyl acetate



See the respective  
RVC product page  
for our rotor lists:  
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# High-speed maxi concentrator

## RVC 2-33 CDplus Infrared Version

This Christ vacuum concentrator is especially suitable for effective concentration of solvents with high boiling points. The wide variety of available rotors ensures high specimen capacity. Thanks to efficient energy input with halogen IR lamps, large specimen volumes (e.g. 100 ml tubes) can be processed quickly for active ingredient screening.

The innovative drive concept is especially noteworthy. The powerful external-rotor motor, contactless central rotary coupling and direct force transfer ensure safe operation. The vacuum level can be preset anywhere within the operating range of the vacuum pump, and the device can be combined with a freeze dryer system.



### Product features

- Intuitive operation
- Individually configurable with vacuum pump and cold trap
- Easy installation
- Automatic venting valve
- Vacuum measurement and control
- Programmable pressure and temperature (up to 16 individual programs)
- Variable speed
- Suitable for various capacities, such as 216 x 1.5/2.0 ml Eppendorf Caps, 4 x 500 ml round-bottom flasks, 12 microtiter plates, or 4 deep well plates.

### Additional features

- Four infrared lamps accelerate specimen evaporation by a factor of 2 to 3
- Product temperature measurement inside the specimen
- High-performance vacuum pumps with final vacuum under 0.1 mbar enable two-stage operation with concentration followed by freeze drying:
  - Concentration by rapid volume reduction
  - Freeze drying with low solvent content leads to better product quality

See the respective RVC product page for our rotor lists: [martinchrist.de/RVC](http://martinchrist.de/RVC)



### Recommended solvents

Acetonitrile

Methanol

Ethanol

Toluene

Isopropanol

Methylene chloride (DCM)

Acetone

Ethyl acetate

DMSO

TFA

# Efficient and powerful

## Cold traps reduce process times

The evaporation rate is limited by two factors: energy input (heating temperature and vacuum) and the suction capacity of the vacuum pump. It is much more reasonable to use a cold trap as a cryogenic pump instead of a larger vacuum pump. Cold traps accelerate the process, especially with aqueous solutions.

### Cold traps

- Capacity 2 l or 4 l
- Condenser temperature  $-50\text{ }^{\circ}\text{C}$
- Easy emptying through bottom drain valve

CT02-50



2 l ❄️  $-50\text{ }^{\circ}\text{C}$

CT04-50



4 l ❄️  $-50\text{ }^{\circ}\text{C}$

### Using a freeze dryer as a cold trap

- Capacity  
2 l (Alpha 1-2 LDplus) or  
4 l (Alpha 2-4 LSCbasic)
- Condenser temperature  
 $-55\text{ }^{\circ}\text{C}$  (Alpha 1-2 LDplus) or  
 $-85\text{ }^{\circ}\text{C}$  (Alpha 2-4 LSCbasic)

Alpha 1-2 LDplus



2 l ❄️  $-55\text{ }^{\circ}\text{C}$

Alpha 2-4 LSCbasic



4 l ❄️  $-85\text{ }^{\circ}\text{C}$

Cold traps considerably reduce process times with large specimen volumes greater than 100 ml.

## A good combination

### Impressive package solutions

#### Routine package – for everyday tasks

This package is a high-capacity all-in-one solution. This combination consists of an RVC 2-25 CDplus, a CT 02-50 cold trap and an MZ 2C diaphragm pump. This system is designed for the most common applications and for efficient processing of a very wide variety of specimens.



#### Tandem system – for many specimens containing hydrochloric acid

This economical tandem system consists of a CT 02-50 cold trap with glass insert and an MZ 2C diaphragm pump together with two RVC 2-18 CDplus units in the HCL version. This combination is reliable and versatile.



#### Universal combination – RVC with freeze dryer as a cold trap

An especially noteworthy feature of this package is the combination of a suitable freeze dryer with a rotational vacuum evaporator. This combination is ideal for efficient evaporation.



## Technical data

Technical data	RVC 2-18 CDplus		RVC 2-25 CDplus	RVC 2-33 CDplus	
	Standard	HCL Version		Standard	Infrared Version
<b>Rotor speed [rpm], max.</b>	1.500	1.500	1.550	1.550	1.750
<b>Relative centrifugal force (RCF), max.</b>	210	210	235	415	530
<b>Maximum permissible imbalance [g]</b>	30	30	30	50	50
<b>Temperature control range [°C]</b>	+30 to +60	+30 to +60	+30 to +80	+30 to +80	+30 to +80
<b>Operating vacuum,</b> max. depending on pump system		7 mbar, MZ 2C		2 mbar, MZ 4C	<0.1 mbar, RC 6
<b>Dimensions of base unit [W x H x D, mm]</b>	240 x 240 x 355	240 x 240 x 355	315 x 255 x 460	390 x 315 x 536	550 x 315 x 536
<b>Weight of base unit [kg]</b>	14	14	24	44	49
<b>Electrical connection*</b>	230 V / 50–60 Hz				
<b>Noise level as per DIN 45635 [dB(A)]</b>	40	40	44	49	49
<b>Vacuum connector</b>	DN 16 KF	DN 16 KF	DN 16 KF	DN 25 KF	DN 25 KF

The data provided refers to the base unit with ambient conditions of +10 °C to +25 °C.

Subject to change without prior notice.

\* Other voltages available upon request.

## Our product range

With a unique and broad graduated range of devices and accessories, we can supply freeze drying systems and vacuum concentrators for every application. Let us show what we can do!



- 1 Freeze drying systems for industrial production with ice condenser capacity from 20 to 500 kg; custom system design including LyoShuttle loading and unloading system.
- 2 Pilot freeze drying systems for process development and/or optimization with ice condenser capacity from 4 to 16 kg.
- 3 Freeze drying systems for routine applications or research and development with ice condenser capacity from 2 to 24 kg.
- 4 Rotational vacuum concentrators for applications ranging from routine to evaporation concentration in the high-end range of pharmaceutical research.



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