Simply the Best

The ultimate plus in freeze drying

Laboratory Freeze Dryers
Advanced Processes

CHRIST®

Freeze Dryers
Rotational Vacuum Concentrators


Optimum process control
for first-class products
Manual
Program
Options
Run Main drying
Set values: View/edit
Set
Actual
Main drying
Section time
Shelf
Vacuum
Safety press.
25.0 °C
0.200 mbar
1.00 mbar
-85.3 °C
Ice cond.
0.208 mbar
Vacuum
25.0 °C
Shelf 1
25.1 °C
Shelf 2
24.7 °C
Product 1
Operating mode: select/start
Stop
CHRIST
LSC plus

Reproducible safe and quick freeze drying

With 65 years of applications and manufacturing experience, we are proud to be considered as the leader in freeze dryer technology.

Our solutions offer outstanding craftsmanship and unparalleled innovation in refrigeration and vacuum technology.

We understand your samples and application are unique and offer a broad range of modular accessories to reliably deliver a specific solution for your process requirements.

Excellent products based on superior technology and extensive service

To bring further value to our range the popular LSCplus control system is now standard and offers dramatically improved process design, management and control.

A selection of PAT tools are integrated for optimum methods development and automatic control of the process sequence.

The resulting processes can be documented in a secure manner to fulfil GAMP requirements for critical processes such as pharmaceutical research and production

An application-centred system configuration is an important prerequisite for ideal process results.
We will gladly advise you and perform tests in our application laboratory if desired.

Laboratory systems for advanced applications

Delta 1-24 / 2-24

Gamma 1-16 / 2-16

Laboratory systems

Alpha 1-4 / 2-4

Designed for advanced applications

- Innovative colour LSCplus control with convenient touchscreen
- Allows manual or automatic process control
- Reduce your set up time thanks to wireless shelves (WST – Wireless Shelf Technology)
- Homogeneous temperature distribution across all shelves
- Drying chamber above the ice condenser chamber – for high sublimation performance and short process times
- Chemistry-grade, stainless steel ice condenser chamber with internal condenser coils to deliver efficient and reliable condensate trapping over years of continuous usage
- Quick cycle turn-around with rapid integrated hot gas defrost function
- Modular design and extensive accessories and options to deliver a solution designed specifically for your applications

Beta 1-8 / 2-8

Saving your time – go wireless
with our technology

WST – Wireless Shelf Technology

Unique, wireless technology and separate handling of individual shelves

With the unique and innovative WST – Wireless Shelf Technology (patent pending), cables between the freeze dryer and the heated shelves are no longer required. Every shelf is equipped with a LyoBus module that can be removed easily. At the same time we deliver you flexibility and control with easy monitoring of freeze drying processes.

- Save valuable time with heatable shelves and gain control of your freeze drying processes
- The system leads to a temperature distribution on the shelves of ± 1K thanks to the individual temperature control of every single shelf, thereby ensuring an even freeze drying process
- Easy shelf handling. Our shelves include convenient side handles to enable easy removal and installation
- A temperature sensor or a LyoRx sensor (for the freezing point determination and process control) can be connected to every LyoBus module

WST – Wireless Shelf Technology

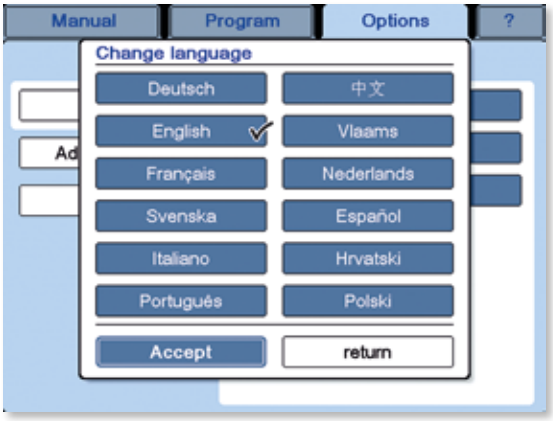
Rack with 5 WST shelves and one temperature sensor

Innovative, unique user interface

LSCplus – colour touchscreen and intuitive operation

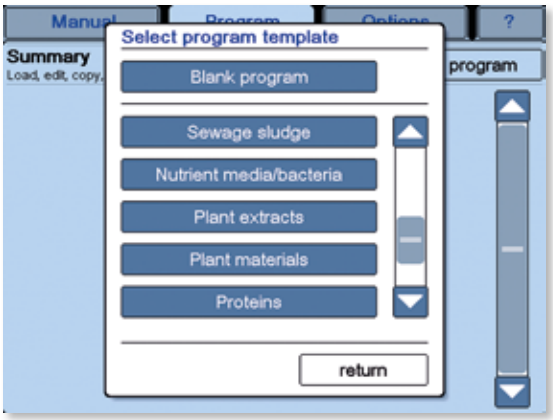
To aid in designing your process run we have integrated our highly regarded production optimised interface – the LSCplus control system into every model. All of our accessories are plug and play and the integrated automatic process sequences ensure reproducible results.

- Picture driven touchscreen control
- Automatic or manual sequence of freeze drying processes
- Intuitive input of programs based on different freeze drying sequences/recipes
- Graphical diagram of the freeze drying process
- Selection of different switching conditions, depending on the system configuration
- Storage memory for up to 32 user-defined programs
- Detailed messages
- Wide selection of languages already integrated
- Definable measure for the temperature (°C/°F) and pressure (mbar/hPa/Torr)
- Password protection possible (up to 3 levels)
- Process data acquisition and convenient data exchange via USB or Ethernet



Overview of the language selection

Graphical diagram of a freeze drying process

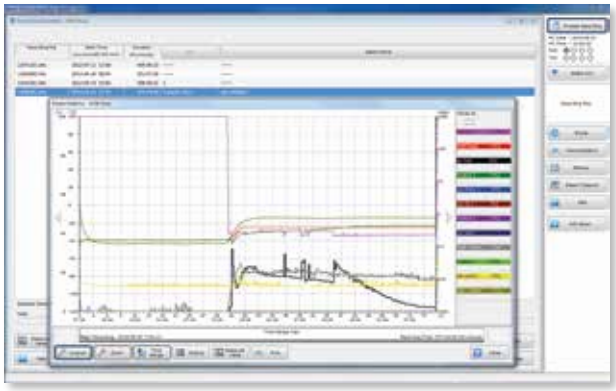


Program templates for typical applications

Process monitoring and documentation

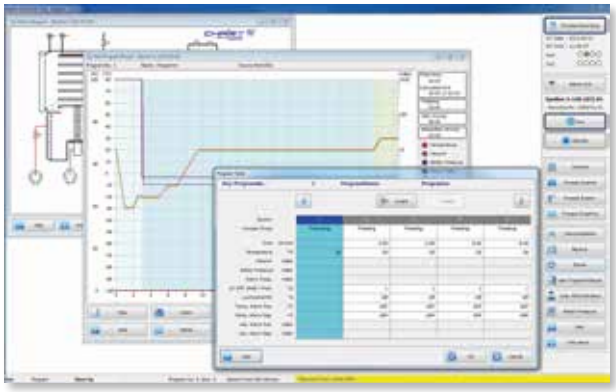
We understand process monitoring and documentation is crucial to the validation of many applications regardless of the run and the run size.

Therefore process data collected during a run on our system can be documented and archived with the aid of the LyoLogplus software available for installation on an external PC. Complete run data and settings can be transferred from the freeze dryer via USB or Ethernet.
LyoLogplus enables the subsequent analysis of the processes by way of an intuitive user interface.



LyoLogplus

For further versatility it is also possible to use LPCplus to develop your freeze drying process. LPCplus delivers an online view of the processes data in a graphical format.
Need to scale up?
Enjoy easy platform migration from pilot through to production scale with uniform interface and software solutions.



LPCplus

- Data storage on a USB memory stick
- Easy process documentation with LyoLogplus
- LPCplus (Lyophilisation Process Control) for process control and documentation
- Avoid unwanted thawing thanks to our reliable process monitoring and innovative LyoRx sensor
- Automatic determination of the freezing point with LyoControl for secure process control
- LyoLogplus and LPCplus with a multilingual user surface

We design and craft our freeze dryer to follow the published cGMP/GLP guidelines. The optional LPCplus software complies with the current GAMP standard guidelines.

System qualification (IQ/OQ) is therefore possible upon request.

Process optimisation

The LSCplus series offers a variety of options to optimise your freeze drying processes. In addition to documentation and key parameter analysis, the automatic determination of critical product data is also available.
Our intelligent systems even offer the option of automatic tuning for set values based on current process conditions.
As a result, these laboratory freeze dryers offer numerous options for supporting process development and optimisation, which can provide important findings designed to enable confidence in scale-up conditions.

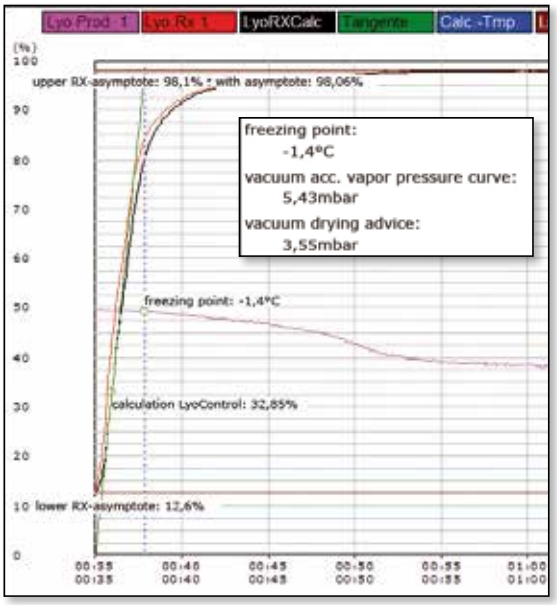
Freezing point
Our LyoRx sensor monitors electrical resistance as well as the product temperature. The resulting profile data can be utilised by our LyoControl software for the automatic determination of your product freezing point.
The benefit to your process is a reliable estimation of the critical product temperature tolerances during the main drying phase to prevent product melting.

Product resistance
The LyoRx sensor enables the automatic control of the energy supply of the individual shelves during the main drying phase, which makes it possible to limit the thawing effects of the product, for example. The integration is realised via the LyoBus module.

Product temperature
In order to measure the product temperature, every shelf can be equipped with a PT-100 sensor. The product temperatures on the various shelves can be viewed in the LSCplus control system. The integration is realised via the LyoBus module.

Pressure increase test
The transition from the main drying phase to the secondary drying phase can be initiated with our automatic pressure increase test. Christ solutions include an integrated valve between the product chamber and the ice condenser. This valve is briefly oscillated during the main drying phase. If the pressure increase within the product chamber remains below set limits whilst the valve is closed our system can determine, no further sublimation water left in the product and the secondary drying phase can be initiated.

Comparative pressure measurement
The use of two different vacuum sensors (Pirani and capacitive principle of measurement) enables conclusions to be made concerning the end of the main drying phase. When the difference of the pressure measurement falls below a predefined limit, the secondary drying phase will be started automatically.



LyoControl


LyoBus module with LyoRx-Sensor

Selection criteria

Graduated condenser power and freeze drying capacities

Depending on the area of application, the laboratory freeze dryers of the LSCplus series are available in different sizes and with a wide range of accessories.
Laboratory freeze dryers are available with two different ice condenser temperatures:

Temperature	Typical area of application
–55 °C (single-stage compressor)	aqueous products
–85 °C (double-stage compressor)	products containing solvents or products with a low freezing point

The different basic units have various maximum ice capacities:

System type	Alpha	Beta	Gamma	Delta
Max. ice capacity	4 kg	8 kg	16 kg	24 kg

The information concerning the ice condenser temperature and maximum ice capacity is part of the name of the laboratory freeze dryers. A Beta 2-8 LSCplus freeze dryer, for example, is a double-stage system with an ice condenser temperature of -85°C and a maximum ice capacity of 8 kg.

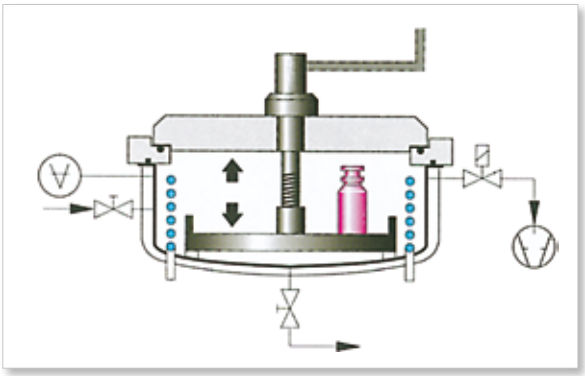
The illustrations on the following pages show examples of possible system configurations.

Please describe your particular application. We will gladly advise you without any obligation on your part!

Freeze drying methods for laboratory systems

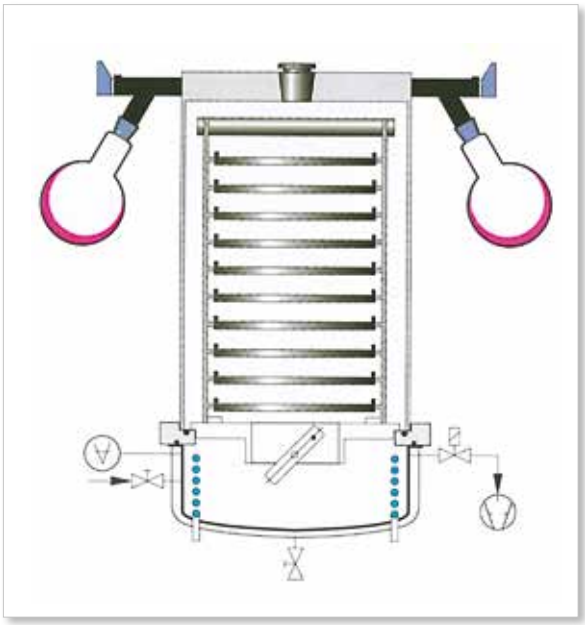
The new freeze dryers with an LSCplus control system set a new benchmark in terms of their application versatility and process control. The modular range of accessories enables application-configured systems that fulfil all of the requirements. Nearly any application problem can be solved thanks to two different freeze drying methods.

Single-chamber method (inside)
In the case of this unique configuration, the product is frozen and then dried inside the ice condenser chamber. This method is particularly suitable for substances with a low freezing point or for thermolabile substances.
In this case, the shelves are positioned directly in the ice condenser chamber. The freezing process can be assisted by a fan. As an option, a vial stoppering system can be used.



Single-chamber method
Also possible for the large ice condenser chamber of the Delta freeze dryer.

Double-chamber method (outside)
In the case of this configuration, the product is prefrozen separately and then dried above the ice condenser chamber. This method enables the use of a large variety of accessories. An intermediate valve can be used to seal the product chamber against the ice condenser chamber for a pressure increase test.



Double-chamber method

Alpha 1-4 / 2-4 configuration options

1 Freezing and drying inside the ice condenser (single-chamber method) on a heatable shelf (ø 200 mm, total shelf area 0.031 m^2), optionally with a fan

2 Freezing and drying inside the ice condenser (single-chamber method) on a heatable shelf with a vial stoppering system (ø 200 mm, total shelf area 0.031 m^2) , optionally with a fan

3 2 drying chambers with a total of 24 connectors for round-bottom flasks, wide-neck filter bottles, or distributors for ampoules

4 Manifold for 8 round-bottom flasks, wide-neck filter bottles, or distributors for ampoules, especially suitable for freeze-drying products containing solvents

5 5 heatable shelves (ø 200 mm, total shelf area 0.155 m^2, distance between the shelves 25 mm – can be varied by removing individual shelves) with additional optional connectors for 12 round-bottom flasks, wide-neck filter bottles, or distributors for ampoules

6 10 heatable shelves (ø 200 mm, total shelf area 0.31 m^2, distance between the shelves 25 mm – can be varied by removing individual shelves)

7 5 heatable shelves (ø 200 mm, total shelf area 0.155 m^2, distance between the shelves 66 mm – can be varied by removing individual shelves) with additional connectors for 12 round-bottom flasks, wide-neck filter bottles, or distributors for ampoules

8 2 heatable shelves with a stoppering system (ø 250 mm, total shelf area 0.09 m^2, distance between the shelves 45 mm – can be extended to 110 mm by removing individual shelves) and additional connectors for 12 round-bottom flasks, wide-neck filter bottles, or distributors for ampoules

9 4 heatable shelves with a stoppering system (ø 250 mm, total shelf area 0.18 m^2, distance between the shelves 50 mm – can be varied by removing individual shelves)

10 LyoCube with 5 heatable shelves 256 x 300 mm, total shelf area 0.38 m^2, distance between the shelves 55 mm – can be varied by removing individual shelves

11 Manifold for 20 round-bottom flasks, wide-neck filter bottles, or distributors for ampoules, especially suitable for freeze drying products containing solvents

Alpha	
Max. ice capacity	4 kg
Max. number of product shelves inside the ice condenser (single-chamber method), see picture 1	1 shelf ø = 200 mm, ≙ 0.031 m^2
Max. number of shelves for vials inside the ice condenser and with stoppering under vacuum or inert gas (single-chamber method), see picture 2	1 shelf ø = 200 mm, ≙ 0.031 m^2
Max. number of product shelves outside the ice condenser (double-chamber method), see picture 6	10 shelves ø = 200 mm, ≙ 0.31 m^2
Max. number of product shelves outside the ice condenser (double-chamber method)	5 shelves ø = 375 mm, ≙ 0.55 m^2
Max. number of shelves for vials outside the ice condenser and with stoppering under vacuum or inert gas (double-chamber method), see picture 9	4 shelves ø = 250 mm, ≙ 0.18 m^2
Drying in round-bottom flasks or wide-neck filter bottles	12/24 pieces

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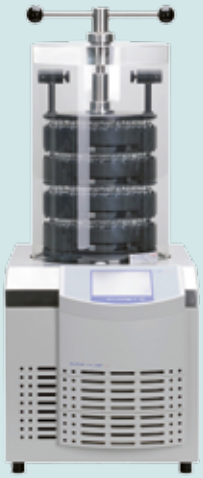

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Beta 1-8 / 2-8 configuration options

1 Freezing and drying inside the ice condenser (single-chamber method) on a heatable shelf (ø 200 mm, total shelf area 0.031 m^2), optionally with a fan

2 Freezing and drying inside the ice condenser (single-chamber method) on a heatable shelf with a stoppering system (ø 200 mm, total shelf area 0.031m^2), optionally with a fan

3 2 drying chambers with a total of 24 connectors for round-bottom flasks, wide-neck filter bottles, or distributors for ampoules

4 Manifold for 8 round-bottom flasks, wide-neck filter bottles, or distributors for ampoules, especially suitable for freeze-drying products containing solvents

5 5 heatable shelves (ø 200 mm, total shelf area 0.155 m^2, distance between the shelves 25 mm – can be varied by removing individual shelves) with additional connectors for 12 round-bottom flasks, wide-neck filter bottles, or distributors for ampoules

6 10 heatable shelves (ø 200 mm, total shelf area 0.31 m^2, distance between the shelves 25 mm – can be varied by removing individual shelves) with additional connectors for 12 round-bottom flasks, wide-neck filter bottles, or distributors for ampoules

7 2 heatable shelves with a stoppering system (ø 250 mm, total shelf area 0.09 m2, distance between the shelves 45 mm – can be extended to 110 mm by removing individual shelves) and additional connectors for 12 round-bottom flasks, wide-neck filter bottles, or distributors for ampoules

8 LyoCube with 5 heatable shelves 256 x 300 mm, total shelf area 0.38 m^2, distance between the shelves 55 mm – can be varied by removing individual shelves

9 Manifold for 20 round-bottom flasks, wide-neck filter bottles, or distributors for ampoules, especially suitable for freeze-drying products containing solvents

Beta	
Max. ice capacity	8 kg
Max. number of product shelves inside the ice condenser (single-chamber method), see picture 1	1 shelf ø = 200 mm, ≙ 0.031 m^2
Max. number of shelves for vials inside the ice condenser and with stoppering under vacuum or inert gas (single-chamber method), see picture 2	1 shelf ø = 200 mm, ≙ 0.031 m^2
Max. number of product shelves outside the ice condenser (double-chamber method), see picture 6	10 shelves ø = 200 mm, ≙ 0.31 m^2
Max. number of product shelves outside the ice condenser (double-chamber method)	5 shelves ø = 375 mm, ≙ 0.55 m^2
Max. number of shelves for vials outside the ice condenser and with stoppering under vacuum or inert gas (double-chamber method), see picture 7	4 shelves ø = 250 mm, ≙ 0.18 m^2
Drying in round-bottom flasks or wide-neck filter bottles	12/24 pieces


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Gamma 1-16 / 2-16 configuration options

1 Freezing and drying inside the ice condenser (single-chamber method) on 5 heatable shelves (ø 200 mm, total shelf area 0.155 m^2, distance between the shelves 25 mm – can be varied by removing individual shelves), optionally with a fan

2 Freezing and drying inside the ice condenser (single-chamber method) on 2 heatable shelves with a stoppering system (ø 250 mm, total shelf area 0.09 m^2, distance between the shelves 45 mm – can be extended to 110 mm by removing a shelf), optionally with a fan

3 2 drying chambers with a total of 24 connectors for round-bottom flasks, wide-neck filter bottles, or distributors for ampoules

4 Manifold for 8 round-bottom flasks, wide-neck filter bottles, or distributors for ampoules, especially suitable for freeze-drying products containing solvents

5 5 heatable shelves (ø 200 mm, total shelf area 0.155 m^2, distance between the shelves 25 mm – can be varied by removing individual shelves) with additional connectors for 12 round-bottom flasks, wide-neck filter bottles, or distributors for ampoules

6 10 heatable shelves (ø 200 mm, total shelf area 0.31 m^2, distance between the shelves 25 mm – can be varied by removing individual shelves)

7 2 heatable shelves with a stoppering system (ø 250 mm, total shelf area 0.09 m^2, distance between the shelves 45 mm – can be extended to 110 mm by removing a shelf) and additional connectors for 12 round-bottom flasks, wide-neck filter bottles, or distributors for ampoules

8 4 heatable shelves with a stoppering system (ø 250 mm, total shelf area 0.18 m^2, distance between the shelves 50 mm – can be varied by removing individual shelves)

9 8 heatable shelves (ø 375 mm, total shelf area 0.88 m^2, distance between the shelves 48 mm – wider distances are available upon request), optionally with a lifting device for the drying chamber

Gamma	
Max. ice capacity	16 kg
Max. number of product shelves inside the ice condenser (single-chamber method), see picture 1	5 shelves ø = 200 mm, ≙ 0.155 m^2
Max. number of shelves for vials inside the ice condenser and with stoppering under vacuum or inert gas (single-chamber method), see picture 2	2 shelves ø = 200 mm, ≙ 0.09 m^2
Max. number of product shelves outside the ice condenser (double-chamber method), see picture 6	10 shelves ø = 200 mm, ≙ 0.31 m^2
Max. number of product shelves outside the ice condenser (double-chamber method), see picture 9	8 shelves ø = 375 mm, ≙ 0.88 m^2
Max. number of shelves for vials outside the ice condenser and with stoppering under vacuum or inert gas (double-chamber method), see picture 8	4 shelves ø = 250 mm, ≙ 0.18 m^2
Drying in round-bottom flasks or wide-neck filter bottles	12/24 pieces


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CHRIST

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Delta 1-24 / 2-24 configuration options

1 Freezing and drying inside the ice condenser (single-chamber method) on 10 heatable shelves (ø 200 mm, total shelf area 0.31 m^2, distance between the shelves 25 mm – can be varied by removing individual shelves), optionally with a fan

2 Freezing and drying inside the ice condenser (single-chamber method) on 4 heatable shelves with a stoppering system (ø 250 mm, total shelf area 0.18 m^2, distance between the shelves 45 mm – can be extended to 110 mm by removing a shelf), optionally with a fan

3 2 drying chambers with a total of 24 connectors for round-bottom flasks, wide-neck filter bottles, or distributors for ampoules

4 10 heatable shelves (ø 200 mm, total shelf area 0.31 m^2, distance between the shelves 25 mm – can be varied by removing individual shelves) with additional connectors for 12 round-bottom flasks, wide-neck filter bottles, or distributors for ampoules

5 4 heatable shelves with a stoppering system (ø 250 mm, total shelf area 0.18 m^2, distance between the shelves 50 mm – can be varied by removing individual shelves) and additional connectors for 12 round-bottom flasks, wide-neck filter bottles, or distributors for ampoules

6 8 heatable shelves (ø 375 mm, total shelf area 0.88 m^2, distance between the shelves 48 mm – wider distances are available upon request), optionally with a lifting device for the drying chamber

Delta	
Max. ice capacity	24 kg
Max. number of product shelves inside the ice condenser (single-chamber method), see picture 1	10 shelves ø = 200 mm, ≙ 0.031 m^2
Max. number of shelves for vials inside the ice condenser and with stoppering under vacuum or inert gas (single-chamber method), see picture 2	4 shelves ø = 250 mm, ≙ 0.18 m^2
Max. number of product shelves outside the ice condenser (double-chamber method), see picture 4	10 shelves ø = 200 mm, ≙ 0.31 m^2
Max. number of product shelves outside the ice condenser (double-chamber method), see picture 6	8 shelves ø = 375 mm, ≙ 1.1 m^2
Max. number of shelves for vials outside the ice condenser and with stoppering under vacuum or inert gas (double-chamber method), see picture 5	4 shelves ø = 250 mm, ≙ 0.18 m^2
Drying in round-bottom flasks or wide-neck filter bottles	12/24/36 Stück

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Technical data

	Alpha 1-4	Alpha 2-4	Beta 1-8	Beta 2-8
Ice condenser – Max. capacity – Performance – Temperature – Chamber volume	 4 kg 4 kg/24h approx. –55 °C approx. 6.5 l	 4 kg 4 kg/24h approx. –85 °C approx. 6.5 l	 8 kg 6 kg/24h approx. –55 °C approx. 11 l	 8 kg 6 kg/24h approx. –85 °C approx. 11 l
Shelf or product temperature (freezing inside the ice condenser with a fan)	approx. –25 °C	approx. –35 °C	approx. –25 °C	approx. –35 °C
Refrigeration unit	0.51 kW	2 x 0.51 kW	0.51 kW	2 x 0.51 kW
Dimensions (W x H x D) of the basic unit	390 x 415 x 555 mm	390 x 415 x 555 mm	780 x 415 x 540 mm	780 x 415 x 540 mm
Weight	approx. 48 kg	approx. 60 kg	approx. 63 kg	approx. 78 kg
Power supply (other voltages upon request)	230 V/50 Hz 220 V/60 Hz 208 V/60 Hz	230 V/50 Hz 220 V/60 Hz 208 V/60 Hz	230 V/50 Hz 220 V/60 Hz 208 V/60 Hz	230 V/50 Hz 220 V/60 Hz 208 V/60 Hz
Nominal power of the basic unit	0.53 kW	0.95 kW	0.58 kW	1 kW
Ambient temperature (the systems are air-cooled, higher temperatures/water cooling upon request)	+10°C to +25°C	+10°C to +25°C	+10°C to +25°C	+10°C to +25°C
Communication interface	Ethernet	Ethernet	Ethernet	Ethernet
Refrigerant	CFC-free	CFC-free	CFC-free	CFC-free
Noise level as per DIN 45635	54 dB(A)	54 dB(A)	54 dB(A)	54 dB(A)
Defrosting function	Hot gas	Hot gas	Hot gas	Hot gas
Vacuum indicator	✓	✓	✓	✓
Vacuum control	✓	✓	✓	✓
Temperature – Ice condenser (indication) – Shelf (indication and control) – Product (indication of 10 sensors max.)	 ✓ ✓ ✓	 ✓ ✓ ✓	 ✓ ✓ ✓	 ✓ ✓ ✓
End point determination – Product temperature measurement – Pressure increase test – Capacitive pressure measurement	 ✓ • •	 ✓ • •	 ✓ • •	 ✓ • •
Programmer module	•	•	•	•
USB	•	•	•	•
LyoControl	•	•	•	•
LyoLogplus	•	•	•	•
LPCplus	•	•	•	•

• = option ✓ = standard

Subject to technical changes

Technical data

	Gamma 1-16	Gamma 2-16	Delta 1-24	Delta 2-24
Ice condenser – Max. capacity – Performance – Temperature – Chamber volume	16 kg 12 kg/24h approx. –55 °C approx. 30 l	16 kg 12 kg/24h approx. –85 °C approx. 30 l	24 kg 18 kg/24h approx. –55 °C approx. 45 l	24 kg 18 kg/24h approx. –85 °C approx. 45 l
Shelf or product temperature (freezing inside the ice condenser with a fan)	approx. –40 °C	approx. –50 °C	approx. –40 °C	approx. –50 °C
Refrigeration unit	0.6 kW	2 x 0.6 kW	0.88 kW	2 x 0.88 kW
Dimensions (W x H x D) of the basic unit	860 x 485 x 650 mm	860 x 485 x 650 mm	860 x 1050 x 650 mm	860 x 1050 x 650 mm
Weight	approx. 135 kg	approx. 160 kg	approx. 215 kg	approx. 250 kg
Power supply (other voltages upon request)	230 V/50 Hz 220 V/60 Hz 208 V/60 Hz	230 V/50 Hz 220 V/60 Hz 208 V/60 Hz	3 x 400 V/50 Hz	3 x 400 V/50 Hz
Nominal power of the basic unit	0.83 kW	1 kW	0.63 kW	1.3 kW
Ambient temperature (the systems are air-cooled, higher temperatures/water cooling upon request)	+10°C to +25°C	+10°C to +25°C	+10°C to +25°C	+10°C to +25°C
Communication interface	Ethernet	Ethernet	Ethernet	Ethernet
Refrigerant	CFC-free	CFC-free	CFC-free	CFC-free
Noise level as per DIN 45635	54 dB(A)	54 dB(A)	54 dB(A)	54 dB(A)
Defrosting function	Hot gas	Hot gas	Hot gas	Hot gas
Vacuum indicator	✓	✓	✓	✓
Vacuum control	✓	✓	✓	✓
Temperature – Ice condenser (indication) – Shelf (indication and control) – Product (indication of 10 sensors max.)	 ✓ ✓ ✓	 ✓ ✓ ✓	 ✓ ✓ ✓	 ✓ ✓ ✓
End point determination – Product temperature measurement – Pressure increase test – Capacitive pressure measurement	 ✓ • •	 ✓ • •	 ✓ • •	 ✓ • •
Programmer module	•	•	•	•
USB	•	•	•	•
LyoControl	•	•	•	•
LyoLogplus	•	•	•	•
LPCplus	•	•	•	•

• = option ✓ = standard

Subject to technical changes

LyoCube 4-8

Front loader for easy operation and large capacities

The LyoCube is the optimum solution if the focus is put on the quick and comfortable loading of the freeze dryer or if products with a large volume must be freeze dried.

- Can be combined with any type of laboratory freeze dryer
- Rectangular geometry with a swing door for comfortable handling
- Equipped with our Wireless Shelf Technology WST, i.e. no cable connections between the shelves and the basic unit
- One temperature or LyoRx sensor per shelf for optimum process control
- Easy removal of the shelves and rack, e.g. for taller vessels
- Standard version with 5 shelves (0.38 m^2)
- 8 shelves maximum for optimum use in combination with MTP or deep-well plates
- Solvent-resistant version with a stainless steel door (option)
- Also available with 6 connectors for flask drying
- Extensive accessories, e.g. thermoblocks, product trays, and sieves

Possible number of shelves

Dimensions (W x D): 256 x 300 mm

Usable shelf are:	Total shelf area	Distance between the shelves
1 shelf	0.08 m^2	348.0 mm
2 shelves	0.15 m^2	165.0 mm
3 shelves	0.23 m^2	104.0 mm
4 shelves	0.31 m^2	73.5 mm
5 shelves	0.38 m^2	55.2 mm
6 shelves	0.46 m^2	43.0 mm
7 shelves	0.54 m^2	34.2 mm
8 shelves	0.61 m^2	27.7 mm

Useful accessories for your freeze dryer

Stoppering system for drying and sealing of vials inside the ice condenser

Single shelf for drying inside the ice condenser with a fan

Intermediate valve for pressure increase test
The valve is installed between the product chamber and ice condenser in order to determine the pressure increase.

Intermediate valve

Product dishes, thermoblocks
Dishes made of stainless steel or aluminium are available with different diameters.
Product sieves prevent the release of the product during the freeze-drying process.
Aluminium thermoblocks avoid melting effects, mainly with small volumes, e.g. in 1.5/2.0 ml reaction vials.

Product sieve

Stainless steel product tray

Thermoblock for 1.5/2.0 ml reaction tubes

You can find a complete overview in our extensive catalogue of accessories.

Service and Representatives

Systems made by CHRIST are successfully used in more then 70 countries worldwide. An international network of representatives exists to provide required services. Specialists directly from our company are available for assistance as well.

We are at your service at all times!

Selected CHRIST agencies abroad

You can find an overview of our representatives abroad together with a list of contact persons at www.martinchrist.de

Our product range

With a unique and highly diversified range of equipment and accessories, we offer freeze dryers and vacuum concentrators for every area of application. Challenge us!

Freeze dryers for industrial production with ice condenser capacities between 20 and 500 kg and individual system customisation, including loading and unloading systems

Pilot freeze dryers for development and optimisation of processes with ice condenser capacities between 4 and 12 kg

Freeze dryers for routine applications and the field of research and development with ice condenser capacities between 2 and 24 kg

Rotational vacuum concentrators for routine applications up to high-end concentration tasks in the field of pharmaceutical research

CHRIST

Freeze Dryers
Rotational Vacuum Concentrators

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