



Epsilon

Pilot Freeze Dryer
Epsilon 2-10D LSC



CHRIST 
Freeze Dryers
Rotational-Vacuum-Concentrators



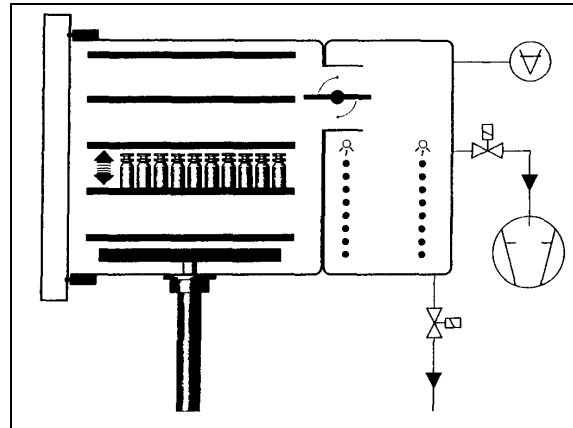
Pilot Freeze Dryer EPSILON 2-10D LSC

Advanced System Technology for Best Drying Results

The freeze dryer **EPSILON 2-10D LSC** is a high performance universal laboratory and pilot unit for freeze drying of solid or liquid products in ampoules, vials, glass flasks, plasma bottles or dishes. All operations are possible inside the unit:

- Pre-freezing of products on liquid-controlled shelves down to a shelf temperature of approx. -55°C according to preselected desired time and temperature limits.
- Freeze drying (sublimation) of products according to preselected desired time, temperature and pressure limits. Shelf temperature at the initial phase of the sublimation process is approx. -55°C
- Final drying of products with preselected desired time and temperature limits and high final vacuum to remove the capillary and molecular bounded water. Final vacuum is approx. 0.001 mbar (depending on pump performance)

The freeze dryer **EPSILON 2-10D LSC** is suitable for freeze drying of materials such as bacteria and virus cultures, blood plasma, serum fractions, antibodies, sera, vaccines, pharmaceutical products such as chloramphenicol, streptomycin, vitamins, ferments, plant extracts for biochemical test.



Double-chamber system:

- Ice condenser directly behind the drying chamber
- Large cross-section between drying- and ice condenser chamber
- Nearly no drop of pressure between both chambers
- Excellent drying rates for sensitive materials and products with low-eutectic points or low collapse temperatures
- High efficiency and economic operation of the freeze dryer
- Application-oriented process-control-system LSC ("Lyo-Screen-Control"), microprocessor-based
- Minimized space requirements

Design Features:

Large shelf area: max. 6+1 shelves 350 x 400 mm, shelf distance 45 mm, shelf area 0.84 m²

Vial stoppering: easy and safe with hydraulic system

Powerful shelf temperature control: Liquid cooled and heated shelves, control range -55 to +60 °C (freezing and main drying), shelf temperature accuracy +/-1K

Defrosting without water: heat transfer medium is used via specially designed double-coil ice condenser

Most efficient condenser design: volume 25 litres, performance 8 kg/24h, temperature -85 °C, CFC-free refrigerants

Optimal vapour transport: 120 mm diameter valve, ice condenser directly behind drying chamber (no pipe connection which results in a pressure drop)

Uncompromising Process Control: via intuitive, simple to control interface LSC (Lyo-Screen-Control). Can be combined with process visualization LPC, complying with the most current GMP/CFR-guidelines

Small and compact: outside dimensions: height 1295 mm, width 1190 mm, depth 850 mm



LSC-Controller



Drying chamber:
120 mm diameter valve
to ice condenser



Double stage (cascade) compressor plus
single stage compressor means maximum
reliability / process safety

Most Comprehensive Range of Customized Solutions:

With the Epsilon-Pilot-Range Martin Christ have set the standard for high quality and productive pilot systems. These freeze dryers look and function in a very similar way to the large production freeze dryers.

They provide the highest level of functions for successful research and process development. Pilot systems with customized configurations have been supplied to global acting pharmaceutical companies and Biotech start-ups. Modifications include:

- Clean Room-/Isolator Integration
- Process Optimization Tools (PAT - Process Analytical Technology)
 - Lyocontrol
 - Weighing System
 - Sample Thief / Manipulator
- H₂O₂-Decontamination
- LN₂-Booster
- Special Systems for Solvents
- Option: manifolds for flask drying



Example: sample thief/manipulator with camera monitoring



Example: isolator integration



Example: system for Clean-Room-integration, control via Touch-Screen

Technical Specification:

Air-cooled system with
2 independent refrigerator systems
(optional water-cooled system available):

Ice condenser volume:

Ice condenser dimensions :

Ice condenser performance:

Ice condenser temperature:

Shelf temperature:

Shelf temperature accuracy:

Drying chamber dimensions:

Dimensions of shelves:

Shelf capacities:

Ice condenser:

cascade system with 2
compressors 1,2 kW each

Shelf temperature control:

1 compressor 0,9 kW

approx. 25 litres

approx. 460 x 470 x 230 mm
(H x W x D)

max. 8kg / 24 h

approx. -85 °C

approx. -55 °C (freezing and
main drying up to +60°C

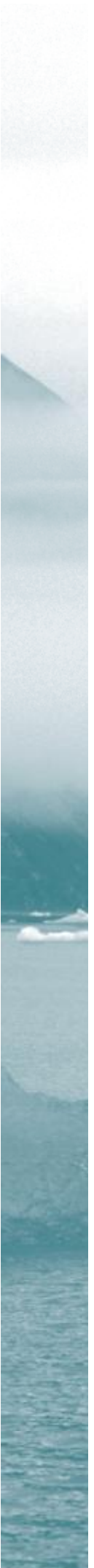
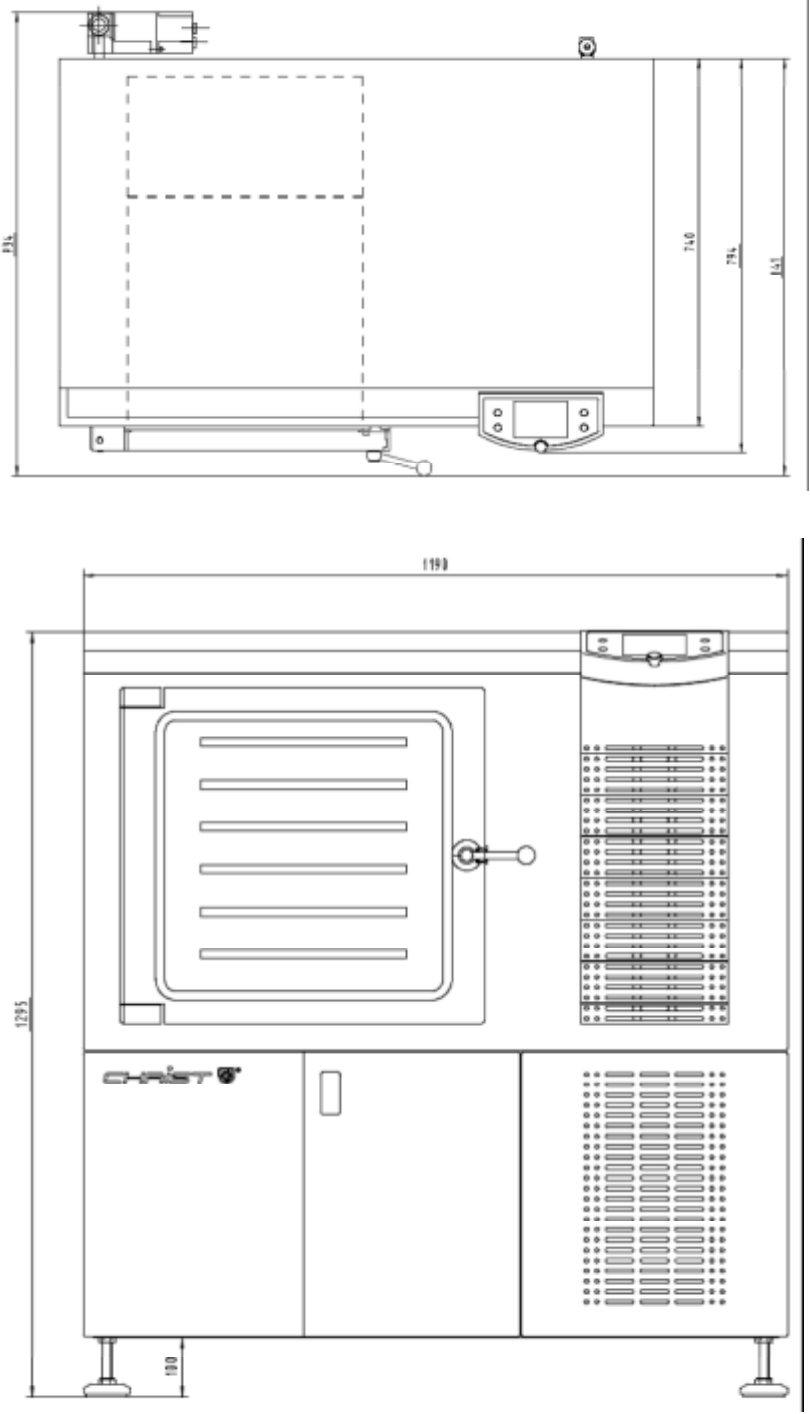
max. +-1 °C on shelf and from
shelf to shelf

approx. 460 x 470 x 470 mm
(H x W x D)

350 x 400 mm (W x D)

Shelf width :	350		R-Vials	2R	4R	6R	8R	10R	15R	20R	25R	30R	
Shelf length:	400		↓ mm	35	45	40	45	45	60	55	65	75	
Shelf ↓	15		Ø mm	16	16	22	22	24	24	30	30	30	
Qty of shelves	Area	Spacing		Numbers are max loading, subtract 10 % when using frames!									
1 + 1	0,14	345		613	613	326	326	266	266	165	165	165	
2 + 1	0,28	165		1226	1226	652	652	532	532	330	330	330	
3 + 1	0,42	105		1839	1839	978	978	798	798	495	495	495	
4 + 1	0,56	75		2452	2452	1304	1304	1064		660			
5 + 1	0,70	57	Standard	3065									
6 + 1	0,84	45	Tray only										
			H-Vials	5H	7H	8H	10H	15H	20H	25H	30H	50H	100H
			↓ mm	41	41	47	54	59	58	58	63	73	95
			Ø mm	21	22	23	25,5	27	32	36	36	43	52
Qty of shelves	Area	Spacing		Numbers are max loading, subtract 10 % when using frames!									
1 + 1	0,14	345		363	326	290	243	218	147	117	117	83	54
2 + 1	0,28	165		726	652	580	486	436	294	234	234	166	108
3 + 1	0,42	105		1089	978	870	729	654	441	351	351	249	
4 + 1	0,56	75		1452	1304	1160	972	872	588	468			
5 + 1	0,70	57	Standard										
6 + 1	0,84	45	Tray only										

Layout of standard unit EPSILON 2-10D LSC:



Contact address:

Martin Christ Gefriertrocknungsanlagen GmbH
P.O.B. 17 13
D-37507 Osterode am Harz
Phone +49 (0) 55 22 / 50 07-0
Fax +49 (0) 55 22 / 50 07-12
e-mail: info@martinchrist.de
Website: www.martinchrist.de

