



## **Pilot Freeze Dryer** *For Pharmacy, Food, Bio sample*









## MAIN CHARACTERISTICS

### FD-10F Series

FD-10F Series	Model	FD-10F-R (Silicon oil heating)	FD-10F-TP (Silicon oil heating)
		FD-10-RE (Electric heating)	FD-10F-TPE (Electric heating)
	Specification	Normal	With stoppering
	Picture		
Drying chamber	Shelf area	0.2 m <sup>2</sup>	0.1 m <sup>2</sup>
	Shelf quantity	2 pcs	1pc
	Shelf temp. range	-70°C ~ +65°C (Silicon oil heating) -50°C ~ 70°C (Electric heating)	
	Shelf space height	70 mm	
	Shelf dimension	400×270 mm	
	Tray dimensions	395×265 mm	395×265 mm
	Tray quantity (pcs)	2	1
	Sample loaded capacity	2L (thickness 10mm)	1L (thickness 10mm)
	Stoppering device	-	Manual
	Material	SS304 (chamber, shelves, trays)	
Vials load capacity (pcs)	Φ22 vials	440	220
	Φ16 vials	868	434
	Φ12 vials	1554	777
Condenser	Max temp.	≤ -80°C ≤ -60°C (-80°C is optional)	
	Ice capture capacity	6Kg/24hs	
	Defrost	Natural (Electric heating is optional)	
	Material	SS304	
Vacuum	Vacuum pump	Included	
	Vacuum rate	4L/S	
	Vacuum degree	≤ 5 Pa	
Basic parameters	Style of cooling	Air-cooled	
	Dimension(L*W*H)	655×640×1200mm	655×640×1200mm
	Weight	210kg	210kg
	Control method	PLC auto + manual	
	Installation power	2 Kw	
	Voltage	220V/50Hz (can be change to 110V/60Hz)	

## FD-20F Series

FD-20F Series	Model	FD-20F-R	FD-20F-TP
	Specification	Normal	With stoppering
	Pictures		
Drying chamber	Freeze-drying area	0.3 m <sup>2</sup>	0.2 m <sup>2</sup>
	Heating method	Circulation oil heating	Circulation oil heating
	Shelf's quantity	3 pcs	2+1 pcs
	Shelves temp. range	-50°C ~70°C	-50°C ~70°C
	Temp. difference	1°C	1°C
	Shelf's distance	70mm	70mm
	Dimensions of shelves	400*270 mm	400*270 mm
	Size of tray	395*265mm * 3 pcs	395*265mm * 2 pcs
	Sample loaded capacity	3L	3L
	Stoppering device	-	Manual
	Material	SS304 (chamber, shelves, trays)	SS304 (chamber, shelves, trays)
Vials load capacity (pcs)	Φ22 vials	440	440
	Φ16 vials	868	868
	Φ12 vials	1554	1554
Cold trap	Lowest temperature	≤ -85°C	≤ -85°C
	Water-capture capability	6 Kg/24h	6 Kg/24h
	Material	SS304	SS304
	Condenser size (D*H)	Φ195×470mm	Φ195×470mm
	Volume	40L	40L
Basic parameters	Ultimate Vacuum	≤ 5 Pa	≤ 5 Pa
	Vacuum pump	2XZ-4	2XZ-4
	Pump rate	4L/s	4L/s
	Cooling method	Air cooled	Air cooled
	Power supply	220V/50Hz or 110V/60Hz	220V/50Hz or 110V/60Hz
	Power	3000W	3000W
	Weight	300kg	310kg
	Dimension	770x750x1520 mm	770x750x1650 mm
Control method	PLC auto + manual	PLC auto + manual	



## FD-30F Series

FD-30F Series	Model	FD-30F-RE	FD-30F-R	FD-30F-TP
	Heating type	Electric heating	Silicon oil circulation heating	Silicon oil circulation heating
	Picture			
Drying chamber	Freeze-drying area	0.4 m <sup>2</sup>	0.4 m <sup>2</sup>	0.306 m <sup>2</sup>
	Shelf quantity	4+1 pcs	4+1 pcs	3+1 pcs
	Shelf temp. range	-50 ~ 70°C	-50 ~ 70°C	-50~70°C
	Temp. Difference	+/-1°C (balance)	+/-1°C (balance)	+/-1°C (balance)
	Shelf size	300×340mm	300×340mm	300×340mm
	Sample loaded capacity	4L	4L	3L
	Shelf spacing	50mm	50mm	70mm
	Tray size	295×335mm	295×335mm	295×335mm
	Tray quantity	4 pcs	4 pcs	3 pcs
	Material of chamber	Polish SS304	Polish SS304	Polish SS304
	Material of Shelves	Polish SS304	Polish SS304	Polish SS304
	Material of trays	SS304	SS304	SS304
Vial load capacity (pcs)	Φ22 vials	728	728	546
	Φ16 vials	1440	1440	1080
	Φ12vials	2600	2600	1950
Cold trap	Lowest temperature	≤ -60°C	≤ -85°C	≤ -85°C
	Ice capture capability	8 Kg/24h	8 Kg/24h	8 Kg/24h
	Defrost	Nature	Nature	Electric
	Cold type	Air-cooled	Air-cooled	Air-cooled
	Material	SS304	SS304	SS304
Basic parameters	Style of stoppering	-	-	Hydraulic pressure
	Ultimate vacuum	≤ 5 Pa	≤ 5 Pa	≤ 5 Pa
	Vacuum rate	6L/S	6L/S	6L/S
	Dimension (mm)	890×660×1210	920×780×1350	1280×900×1630
	Weight	280 kg	400 kg	450 kg
	Voltage Freeze dryer	220V/50Hz 110V/60HZ	220V/50Hz 110V/60HZ	220V/50Hz 110V/60HZ
	Power	2700W	4500W	5500W
Control method	PLC auto + manual			

## FD-50F Series

FD-50F Series	Model	FD-50F-RE	FD-50F-R	FD-50F-TP
	Heating type	Electric heating	Silicone oil circulation	Silicone oil circulation
	Picture			
Drying chamber	Freeze-drying area	0.6 m <sup>2</sup>	0.7 m <sup>2</sup>	0.5 m <sup>2</sup>
	Shelf quantity	6 pcs	4+1 pcs	3+1 pcs
	Shelf temp. range	-50°C ~70°C	-50°C ~70°C	-50~70°C
	Temp. Difference	+/-1°C (balance)	+/-1°C (balance)	+/-1°C (balance)
	Shelf size	300×340mm	480×360mm	410×410mm
	Shelf spacing	50mm	50mm	70mm
	Sample load capacity	6L	7L	5L
	Tray quantity	6 pcs	4 pcs	3 pcs
	Tray size	295×335mm	475×355mm	405×405mm
	Chamber Material	Polish SS304	Polish SS304	Polish SS304
	Material of Shelves	Polish SS304	Polish SS304	Polish SS304
	Material of trays	SS304	SS304	SS304
Vial load capacity	Φ22 vials (piece)	1408	1408	1050
	Φ16 vials (piece)	2728	2728	2058
	Φ12vials (piece)	4920	4920	3705
Cold trap	Lowest temp.	≤ -60°C	≤ -85°C	≤ -85°C
	Ice remove capacity	10 Kg/24h	10 Kg/24h	10 Kg/24h
	Electric defrost	Nature	Nature	Electric or hot gas
	Cool type	Air cooled	Air cooled	Air cooled
	Material	SS304	SS304	SS304
Basic parameters	Style of stoppering	-	-	Hydraulic pressure
	Ultimate vacuum	≤5Pa	≤5Pa	≤5Pa
	Vacuum pump	Included	Included	Included
	Pump rate	8L/S	8L/S	8L/S
	Dimension (mm)	890×670×1410	1000×785×1420	1490×850×1620+240
	Weight	450kg	600kg	800 kg
	Voltage Freeze dryer	380V±10%50Hz/60Hz	380V±10%50Hz/60Hz	380V±10%50Hz/60Hz
	Power	4500W	5500W	6500W





*FD-200F Series*

FD-200F	Model	FD-200F-R	FD-200F-TP
Series	Heating type	Silicone oil circulation	Silicone oil circulation
	Picture		
Drying chamber	Freeze-drying area	2.25 m <sup>2</sup>	1.98 m <sup>2</sup>
	Shelves quantity	5+1pcs	4+1pcs
	Shelf Temperature	-50°C ~70°C	-50°C ~70°C
	Shelf Temp. Accuracy	± 1°C (when stable)	± 1°C (when stable)
	Shelf spacing	80mm	100mm
	Size of shelves	500*900*20 mm	610*810*20 mm
	Raw material load capacity (be better)	22L (when thickness 10mm)	20L (when thickness 10mm)
	Material of chamber	Polish SS304	Polish SS304
	Material of Shelves	Polish SS304	Polish SS304
	Material of trays	SS304	SS304
	Tray quantity	10 pcs	16 pcs
	Stoppering device	-	Hydraulic pressure
Vials load capacity	Φ22 vials (PCS)	4100	3600
	Φ16 vials (PCS)	7800	6800
	Φ12 vials (PCS)	14400	12600
Condenser	Max temperature	≤ -85°C (Empty load)	≤ -85°C (Empty load)
	Water-capture capability	30 Kg/24h	30 Kg/24h
	Defrost	water soaking	water soaking
	Material	SS304 or SS316 (Optional)	SS304 or SS316 (Optional)
Basic parameters	Vacuum degree	≤ 5 Pa	≤ 5 Pa (Range:1-300Pa)
	Dimension	1200*2100*1700 (mm)	2100x1400x2400 (mm)
	Max Power	13.5kw	15.5kw
	Weight	1200 kg	1500 kg
	Data Process	RS232 Interface or USB	
	Control method	PLC auto + manual	
Refrigeration unit	Compressor	Bitzer or TECUMSEH, 2 set	
	Power	7 Kw	
	Refrigerant	R507 & R23	
	Cooling type	Air cooled	
	Pressure controller	DANFOSS	
	Expansion valve	DANFOSS	

PILOT FREEZE DRYER / VIOPILOTIZER

**MAIN SPARE PARTS**

NO.	DESCRIPTION	BRAND
1	Compressor	TECUMSEH (France) or DANFOSS (Sweden)
2	Vacuum Pump	2XZ series high efficiency (China), Leybold (Germany) or Ulvac (Japan) is optional
3	Circulation Pump	WILO (Germany) or Grundfos (Denmark)
4	Expansion Valve	DANFOSS (Sweden)
5	Solenoid valve	DANFOSS (Sweden)
6	High pressure controller	DANFOSS (Sweden)
7	Oil separator	ZOER
8	Vacuum Sensor	Reborn (China)
9	Pressure gauge	REFCO (Swiss)
10	Temperature sensor	PT-100
11	PLC	FATEK (Taiwan), Siemens (Germany) is optional
12	Dry filter	DANFOSS (Sweden)
13	Touch screen	MCGS (Beijing), Siemens (Germany) is optional
14	Hydraulic	Huade hydraulic (China)
15	Silicone Oil	Low viscosity silicon oil (China)
16	Pipe	SS304, SS316 is optional
17	Condenser	SS304, SS316 is optional
18	Chamber	Polish SS304, SS316 is optional
19	Shelves	Polish SS304, SS316 is optional
20	Trays	SS304, SS316 is optional
21	Refrigerant	CFC-FREE, R134a, R404a, R23, R508

**OPTIONAL ITEMS FOR FD PILOT FREEZE DRYER**

ITEM NO.	ITEM NAME
FDF1001	Rotary Device
FDF1002	Control computer software
FDF1003	Laptop
FDF1004	Eutectic point tester
FDF1005	Ulvac(Japan) Vacuum Pump/ Leybold(Germany)
FDF1006	Condenser defrost device (for FD-10F, FD-20F, FD-30F-RE, FD-30F-R, FD-50F-RE, FD-50F-R)
FDF1007	Air compressor (for Pneumatic door opening)
FDF1008	Vacuum pump solenoid control valve
FDF1009	External material change to SS304
FDF1010	Condenser, trays, shelves change to SS316
FDF1011	4 port manifold system (extra port customizable)
FDF1012	6 port manifold system (extra port customizable)
FDF1013	Extra set of trays
FDF1014	Chamber condenser isolation valve
FDF1015	Oil mist filter for vacuum pump
FDF1017	Oil anti-back valve for vacuum pump

**VACUUM PUMP FOR FD SERIES FREEZE DRYER (STANDARD)**



**2XZ Series Vacuum Pump (Brand from China)**

Model	2XZ-2	2XZ-4	2XZ-6B	2XZ-8B	2XZ-15B
		2XZ-2B	2XZ-4B		
Pump rate (L/S) m3/h	2	4 / 14.4	6	8	15
Ultimate pressure (Pa)	Partial	≤6×10 <sup>-2</sup>	≤6×10 <sup>-2</sup>	≤6×10 <sup>-2</sup>	≤6×10 <sup>-2</sup>
	Full	≤1.33	≤1.33	≤1.33	≤1.33
Rotary speed (r/min)	1400	1400	1400	1400	1400
Working voltage(V)	110/220/380	110/220/380	110/220/380	110/220/380	110/220/380
Motor power(Kw)	0.37	0.55	0.75	1.1	1.5
Inlet port diameter (OD) (mm)	Φ30	Φ30	Φ40	Φ40	Φ40
	KF-25	KF-25	KF-25	KF-25	KF-25
Noise(dBA)	62	66	66	66	66
Oil capacity (L)	1	1	2	3	4
Oil temp. rising (°C)	45	≥45	≥45	≥45	≥45
Dimensions(mm)	480×140×240	520×140×250	565×200×342	650×240×430	770×240×430
GW/NW(Kg)	22/20	24/22	45/40	65/60	65/60



**Vacuum Pump(Germany Leybold, Japan Ulvac) (Optional)**

TRIVAC® C		D8C	D16C	D30C	D40C	D60C
Pumping speed (50Hz) (according to PNEUROP)	m <sup>3</sup> ·h <sup>-1</sup>	8.11	17.01	32.24	42.99	64.37
Pumping speed (60Hz) (according to PNEUROP)	m <sup>3</sup> ·h <sup>-1</sup>	9.65	20.33	36.64	51.78	72.23
Ultimate partial pressure without gas ballast	mbar	4·10 <sup>-4</sup>				
Ultimate total pressure <sup>1)</sup> without gas ballast	mbar	3·10 <sup>-3</sup>				
Ultimate total pressure <sup>1)</sup> with gas ballast	mbar	6·10 <sup>-3</sup>				
Water vapour tolerance	mbar	30	20	40	20	25
Connecting ports (Inlet and exhaust)	DN (mm)	25KF	25KF	40KF	40KF	40KF
Noise <sup>2)</sup> (sound pressure level at 1 m with gas ballast closed / open (50Hz))	dB (A)	54/56	56/58	58/60	58/60	58/60
Oil filling (Capacity) Max / Min	L	1.1/0.7	1.5/1.0	3.7/3.2	5.0/4.5	5.0/4.5
Weight (without oil filling)	Kg	27	31	69	83	84
Ambient temperature (Max / Min)	°c	40/10	40/10	40/10	40/10	40/10
Motor power 220V / 50Hz, Single-Phase	W	550	750			
Overall length a <sup>3)</sup>	mm	471	560			
<b>Cat. No.</b>		<b>310 46</b>	<b>310 50</b>			



## PILOT-F Series Small Pilot Freeze Dryer



### MAIN FEATURES

- The transparent door of the drying chamber adopts aerospace acrylic, high strength and no leakage.
  - The partition pre-freezing function.
  - Compressor, high efficiency and stability, low noise.
  - South Korean brand vacuum pump has high pumping speed and low noise.
  - It can be filled with nitrogen or inert gas for storage after drying.
  - Freeze-drying automatic control system: programmable, programmable control from freeze-drying to defrosting.
  - Layer heating control system: independent temperature control for each layer, thermal cycle monitoring and protection, special heating materials, fuzzy PID control algorithm.
- Cold trap defrosting system: non-electric heating defrosting method, high safety performance; fast defrosting speed, which solves the inconvenience caused by traditional immersion defrosting (optional).
- Freeze-drying end-point test system: It can automatically perform freeze-drying end-point test after the analysis and drying stage is over to ensure that the moisture content of the substance reaches the standard requirements (optional).
- Vacuum adjustment system: adjust the degree of vacuum during the sublimation and analysis drying process to avoid the problems of special material foaming, bottle blowing and speeding up the efficiency of freeze-drying (optional).
- Pulse backfilling system: three backfilling modes can be selected: slow, medium, and fast, which avoids the problem of effective substances being blown off and lost due to aeration of granular and flocculent substances after freeze-drying is completed (optional).

- Automatic drain system: After draining, it is interlocked with the vacuum system to avoid vacuum system failure (optional) caused by forgetting to close the drain valve when used again.
- It adopts industrial touch screen, which has good human-computer interaction, easy to understand, and can be operated easily without manual.
- Manual automatic mode selection: manual mode is used to explore the process parameters (strong human intervention), automatic mode is used in the mature stage of the process, one-key operation, simple and

convenient.

- Data recording system: Multiple choices of data recording system. 1. The machine's memory storage can be stored for up to 3 months. 2. External storage (U disk), the amount of stored data is related to the capacity of the U disk (optional). 3. PC database storage, the amount of stored data is related to the usable capacity of the computer hard disk (optional).
- Monitoring system: real-time monitoring system temperature, vacuum degree, acquisition frequency 50ms/time.
- Freeze-drying recipe storage function: 500 groups of fixed or user-defined freeze-drying recipes can be stored.
- PC remote monitoring system: It can remotely monitor the operation status of the equipment, and the maximum monitoring distance is 1.5KM (optional).
- Eutectic point test function (optional).
- Calibration function: temperature and vacuum calibration can be performed to ensure the accuracy of long-term use of the measured value.
- Freeze-drying curve query function (can query temperature and vacuum curve to facilitate process optimization and freeze-drying effect verification).

### SAFETY

- Overcurrent protection
- Overload protection
- 36V safety voltage of heating system
- Heating over-temperature protection
- Vacuum protection during product freeze-drying
- Vacuum pump protection

### SELECTION GUIDE

- Pilot-10F-2/Pilot-20F-4 loading: suitable for loading bulk materials, bottled materials that need to be stoppered, and external bottled materials.
- Pilot-10F-2 type is suitable for drying water-soluble solutions, suspensions or pasty substances, and its eutectic point temperature is higher than -20°C.
- Pilot-20F-4 type is suitable for drying water-soluble solutions, suspensions or pasty substances, and its eutectic point temperature is higher than -40°C.

### SPECIFICATIONS

Model	Pilot-10F-2E	Pilot-20F-4E
Shelves area	0.1	0.2
Shelves number	1 pc	2 pcs
Cold trap temperature (no load)	-55°C	-85°C
Vacuum degree (no load)	<8Pa	<8Pa
Board temperature (no load)	-40	-55
Layer cooling method	directly cooling	directly cooling
Water catching capacity	3L	4L
Freeze drying efficiency	2L/24H	2L/24H
Interlayer spacing	80mm	77mm
Tamponade	Manual	N/A
Compressor power	7/8HP	2*7/8HP
Vacuum pump	2L/S	4L/S
Overall size (approximately)	W750*D730*H600	W740*D800*H1330

## OPTIONAL

Item No.	Item name
LYOPI001	Eutectic point tester
LYOPI002	U disk data recording system
LYOPI003	PC database storage system
LYOPI004	Remote monitoring system
LYOPI005	Freeze-drying end point test system
LYOPI006	Organic solvent trap
LYOPI007	Cold trap defrosting system
LYOPI008	Vacuum regulating system
LYOPI009	Pulse backfill system
LYOPI010	Automatic drainage system
LYOPI011	Oil mist filter
LYOPI012	T-type freeze-drying warehouse
LYOPI013	Anti-return oil device for vacuum pump
LYOPI014	Backfill filter

## FD-CE Series Food Freeze Dryer Pilot Type



Pilot-scale food type desktop freeze dryer, humanized design, small size, compact structure, high degree of automation, only one button can complete the whole process of freeze-drying. Suitable for personal and corporate use.

### APPLICATION FIELDS OF SMALL FOOD FREEZE DRYER

- Vegetables: edible mushrooms, garlic slices, chives, spring onions, green beans, peas, cucumbers, sweet corn, carrot slices, spinach, asparagus, wild vegetables, etc.
- Aquatic products and meat: shellfish, shrimp, fish sticks, beef, pork, chicken, diced lamb, etc.
- Seasoning: garlic powder, ginger powder, spring onion powder, tomatoes, pepper.
- Instant beverages: coffee, tea, soup, soy milk, milk, etc.
- Convenience food: children's food, snack food, camp food.
- Pharmaceutical field: Western tablets, reagents, powder injections, fresh Chinese herbal medicine, ginseng, antler wolfberry, Panax notoginseng, etc.
- Material field: freeze-drying of new graphene materials;
- Biological field: freeze-dried flowers, placenta, cells, etc.

### FEATURES OF SMALL FOOD FREEZE DRYER

- Humanized design of the whole machine, plug and play, beautiful appearance, compact structure and high cost performance.
- The integrated design of the tank and trap makes the sublimation channel shorter, which is conducive to the rapid sublimation of a large amount of water vapor.
- The original imported refrigeration compressor has large refrigeration capacity, high efficiency and energy saving, long service life and low noise.
- Using aerospace-grade high-transmittance plexiglass door, you can observe the whole process of sample freeze-drying changes in real time.
- The operation is simple and the degree of automation is high, and the whole process of freeze-drying can be completed with only one button.
- Preset standard freeze-drying process, no need to deeply understand the tedious freeze-drying principle and freeze-drying process, one-key process introduction.
- Intelligent fault diagnosis technology, which displays fault information in text form, which greatly facilitates equipment maintenance and fault repair.
- Safety lock function. Prevent misoperation from modifying the system status and process parameters, causing freeze-drying failure or instrument damage.
- The clapboard intelligent energy-saving temperature control technology has high temperature control accuracy, significant energy-saving effect, and the system is stable and reliable.
- One-key quick defrost technology, safe and efficient.

**SPECIFICATIONS**

Model	FD-10F-CE	FD-20F-CE	FD-30F-CE	FD-60F-CE	FD-70F-C	FD-100F-C
Picture						
Type	Pilot	Pilot	Pilot	Pilot	Pilot	Pilot
Heating method	Electric	Electric	Electric	Electric	Silicone oil circulation	Silicone oil circulation
Shelf area (m <sup>2</sup> )	0.1	0.27	0.4	0.6	0.7	1
Process capacity (KG/bath)	1~2	4~6	4~6	6L	7~9	10~12
Tray size (W*L)	140*278	200*450	200*540	300*400	360*480	360*480
Shelves qty	3+1	3+1	4+1	6	4+1	6+1
Shelf distance (mm)	45	45	40-50	40-50	50	70
Shelf material	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum	Aluminum
Chamber material	SS304	SS304	SS304	SS304	SS304	SS304
Chamber shape	Cylinder	Cylinder	Cylinder	Cylinder	Cylinder	Cylinder
Condenser temp. (°C)	-40	-40	-45	-45	-40	-40
Ultimate vacuum (Pa)	15	15	10	10	15	15
Cold method	Air cooled	Air cooled				
Voltage	220V 50HZ	220V 50HZ	220V 50HZ	220V 50HZ	380V 50HZ	380V 50HZ
Power(W)	750W	1100W	2000W	2700W	4500W	7000W
Weight (KG)	50	80	80	280	550	750
Dimensions W*D*H(cm)	40*55*70	51*70*85	51*70*67	70*85*150	120*100*170	160*125*180



PILOT FREEZE DRYER / VIOPILOTIZER



**LABFREEZ**  
I N S T R U M E N T S

