

ilShinBioBase
e u r o p e

FREEZE DRYER

LABORATORY & PILOT SERIES



FREEZE DRYER TFD/FD/FDS/MCFD

LABORATORY SERIES

Table Top Freeze Dryer

ILSHIN BIOBASE has developed a Table Top Freeze Dryer by combination of ultra low temperature freezing technology and vacuum drying technology since 1988.

ILSHIN BIOBASE's Table Top Freeze Dryer will be your reliable partner for your research and development with focus on convenience and easiness of users. Designed for efficient and fast freeze drying results, you will find the ultimate comfort for freeze drying.



SPECIFICATION

LABORATORY SERIES

Table Top Freeze Dryer is designed for small scale research at laboratory. Easy handling by one touch control and maintenance without complexity.

Automatic control

Automatic freeze drying process is executed while condenser freezes below -80°C , preventing vacuum pump from any chance of moisture mixing.

Manual control

For specific material, manual control allows in depth monitoring and observation through the freeze drying process. Equipped with Power On-Off S/W, Mode select S/W between automatic and manual, Condenser freezing S/W, Vacuum pump S/W, Purge S/W, Pre-freezing S/W and Concentration System S/W.

Auto cascade cycle refrigeration system

With accumulated experience and expertise, single compressor auto cascade refrigeration system provides fast pull down and strong performance without any trouble from user environment.

Condenser

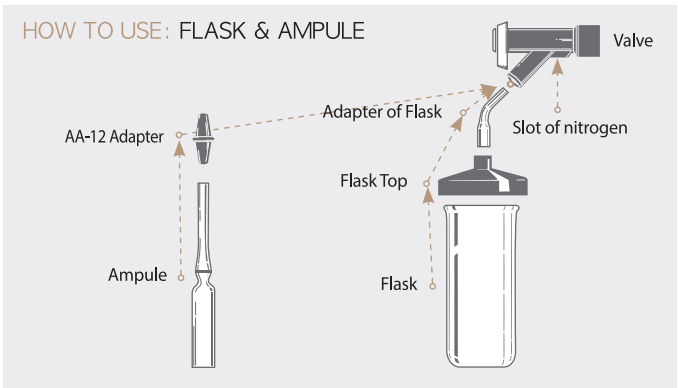
STS(Stainless steel) drum type condenser keeps cold trap temperature below -80°C and collects moisture with uniformity. Condensing process is visually monitored. Even acid containing material is safe from corrosion. (Acid resistant pump is recommended)

Defrost

Hot gas defrosts condensed ice on the trap within 30 minutes and drains. Cleaning is easy with soft fabric.

Vacuum Pump

With 2 stage controllable gas ballast valve, oil back flow is prevented. Suitable for high throughput, Dual mode supports high vacuum application.



CONTROL SYSTEM

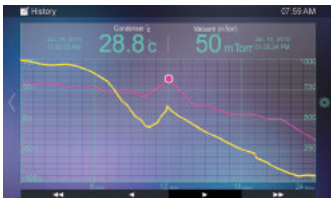
7" TFT LCD TOUCH SCREEN - LABORATORY SERIES



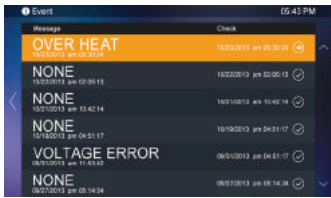
Operation monitoring window
Menu window for parameter set up, manager information, operation status and alarm events. Security control by password is available.



Operation set up window
Automatic/manual selection and all parameter value can be controlled. Drying process and lead time are displayed. Engineering parameter set up is available by authorized manager password.



Trend window
Graphic display of condenser temperature and vacuum level is provided. USB data download is available.



Event window
All events during process are reported. Any alarm, malfunction history are recorded.

Control function

- Operation status can be monitored by PC through RS/232(485) communication port.
- Data management by USB (Touch optional) Drying time record is stored. Vacuum pump usage time is recorded for timely maintenance.
- Parameter unit is convertible for user's convenience. (°C ↔ °F, mTorr ↔ mBar)
- Line voltage is displayed for protection of machine. (Low/high voltage)

Laboratory Freeze Dryer series (FD/FDS/MCFD/TFD)



DETAIL & FEATURES

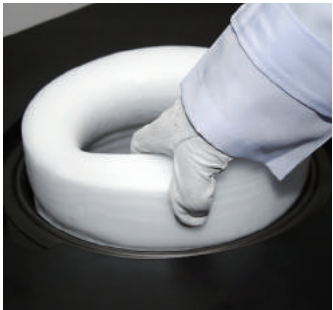
LABORATORY SERIES



7" TFT LCD Touch Screen(Optional)
7" touch panel allows easy and convenient control. With data analysis by graphic trend, artificial intelligence generates event record for automatic monitoring.



Micro Processor LED Controller
LED display provides condenser temperature and vacuum level. Switches for Power On-Off, Selection of Automatic-Manual, Condenser cooling, Vacuum pump, Purge, Pre-freezing and concentration.



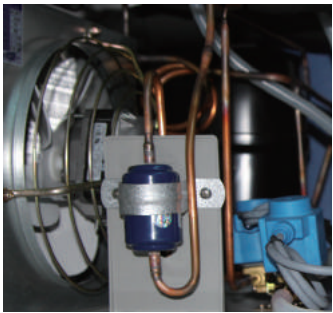
Easy Defrosting - Condenser
Condensed ice must be removed within 30 minutes for continuous operation and for preventing contamination. Condenser foams round type ice at below -80°C, easy to be removed from condenser chamber even under process of defrosting so next operation is promptly ready.
Coating is standard feature for protection from contamination or corrosion by acid or chemical substance.



MDC (Multi Drying Chamber)
Multi-purpose MDC is specially designed by ILSHIN BIOBASE for drying application with Ampoule, Bottle, Bulk-Tray, Vial, Flask and Petri dish upon customer's need. User friendly design with 20° ~ 40° observation lid and sample loading device allow full time observation of drying process. Chamber provides complete sealing and vacuum condition without locking device. User can enjoy comfortable loading environment with bottle, bulk-tray and vials by horizontal loading into the chamber.



- FD MODEL



Auto cascade system
Single compressor technology overcoming various vulnerability of conventional cascade system provides fast pull down by reaching -80°C less than 30 minutes. Drying efficiency is maximized and maintenance is simplified without components such as oil separator.



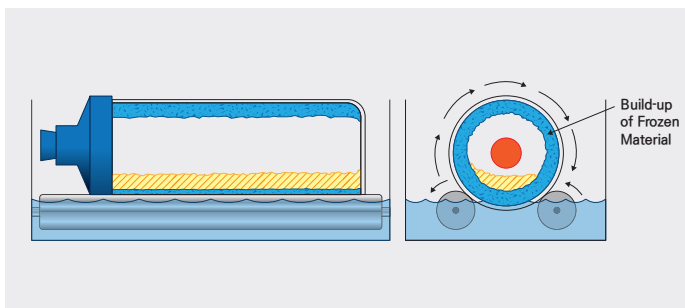
Vacuum Pump
Chemical resistant oil rotary pump is optimized for drying process of corrosive solvent. With low noise level, compact design and gas ballast, super performance is guaranteed for air exhaustion. (Acid resistant pump is recommended for drying acid containing material)

Remote Access
Connectable with PC by serial port. Available for monitoring temperature, vacuum level and operation status.

Observation Window
Cloudiness of vacuum oil can be observed through the window for timely maintenance and for long term use.



SHELL & CONCENTRATOR



Freeze Dryer with Shell Freezer - FDS

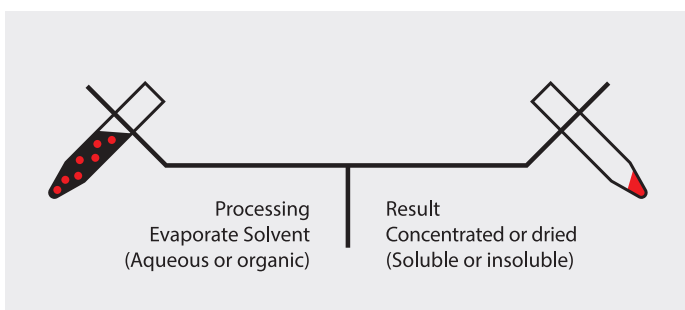
Shell freezer provides fast refrigeration down to -40°C by powerful cooling system. Specially designed rotary system disperses the sample with uniformity for efficient drying result and shortest process lead time.

Specification of shell Freezer

- A) 8/12/18 liter
- B) Freezing system for flask/rack (Flask 40ml ~ 900ml)
- C) Temperature: lower than -40°C (Empty state, less than 1Hr)
(Bath Dimension: 150(W) x 300(D) x 145(H) mm)



- FDS MODEL



Freeze Dryer with Micro Concentrator - MCFD

High speed centrifuge provides concentration under vacuum at limited space. Fast and efficient drying process is guaranteed by heating device as standard feature.

Specification of Concentrator

- A) Dimension: (W) 250 x (D) 285 x (H) 230 mm
- B) Rotor Speed: 2,000 RPM / Material: STS
- C) MPB (Multi phase bipolar) DC MOTOR DRIVE TYPE
- D) Rotor: 1.5ml x 60 tube, 15ml x 24 tube, 50ml x 8 tube
- E) Power Requirements: 220V / 60Hz / 1PH / 1.8A
- F) Include Tube Heater



- MCFD MODEL

FREEZE DRYER 10 to 30 Liter/Bach

PHARMACEUTICAL & BIO SCIENCE/FOOD INDUSTRY

PILOT SCALE FREEZE DRYER

Pilot scale freeze dryer is optimal solution for scale up operation prior to industrial scale production. With various application and assessment of efficiency, pilot scale freeze dryer helps customer to find desirable condition and parameter for perfect drying result.



SPECIFICATION

LP10-30 SERIES

◆ Process Control

1. Freeze Drying Process
Loading → Primary Freezing → 1st Drying Process → 2nd Drying Sublimation process
2. Manual Control
Make input of condition and parameter for the process from Freeze to 1st/2nd Drying Process. Process is finished after checking completion of drying.
3. Automatic Control
Select recipe. Parameters of Pre-Freeze ~1st/2nd Drying process are automatically setup. Process is completed by P-rise test system inside of chamber after whole process is finished.

◆ Recorder

Sample temperature ①, ②, ③/shelf temperature/Condenser temperature/Vacuum level

◆ Drying Chamber

1. Cooling speed: within 60 minutes from 20°C to -40°C (1°C/min)
2. Shelf temperature uniformity: less than ±1.5°C
3. Vessel pressure standard: Qualified chamber under vacuum gauge pressure lower than 5×10^{-3} Torr

◆ Cold Trap Chamber; Condenser

1. Cooling speed: within 30 minutes from 20°C to -70°C
2. Defrosting System
Hot gas solenoid method. Fast defrosting by steam and hot water. Removing ice less than 30 minutes.

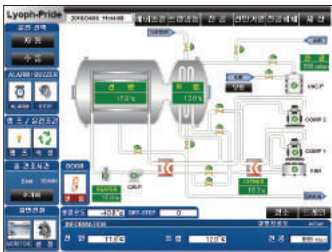
◆ Vacuum System

- Pull down time: Within 45 minutes from 760Torr to 100mTorr. Lower than 20mTorr eventually.

- All in one type, available at small space
- Pilot scale condenser capacity: 10~30 liters/batch
- 0.6 ~ 2.0m² various shelf area and distance (standard: 60mm)
- Selectable shelf application (Bulk or Vial stoppering)
- Shelf temperature range (-45°C to +80°C)
- Selectable condenser temperature (-80°C/-120°C)

CONTROL SYSTEM

7" TFT LCD TOUCH SCREEN - PLANT SERIES



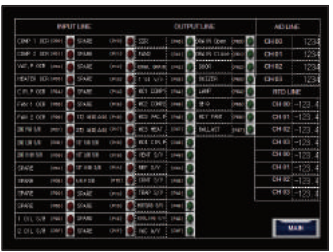
Main
Selection between Auto and Manual mode. Alarms, Lamp, Temperature set up are displayed. Entire process time, shelf temperature, cold trap temperature, vacuum level is monitored. The whole progress is visually monitored.



Progress
Current status is being monitored. Any event must be recorded and reported. Program status is displayed.



Setting
User can set up its own recipe step by step with each parameter along with duration of time. Programs can be saved so each recipe can be chosen by user anytime.



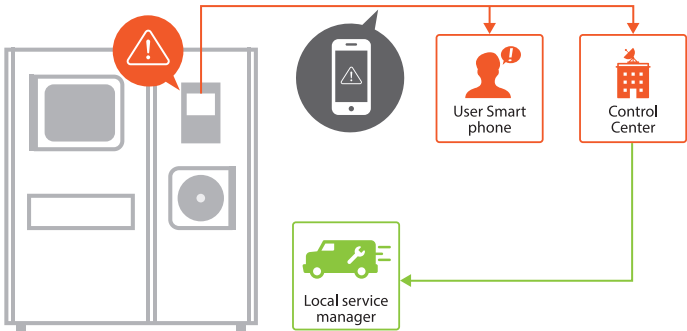
IO test
Each compartment of equipment is tested by sending electric signal for monitoring the process and functionality.

BLACK BOX

GLOBAL REAL TIME CARE SERVICE



- ◆ **IoT remote monitoring service**
Internet of things technology. 24/7 monitoring service by manufacturer's server as well as user's smart phone. Real time diagnosis and data keeping.
- ◆ **Proactive service**
Process data can be monitored all the time by smart phone application. Any incident shall be reported to authorized manager and service action can be instructed without visiting installation site.
*App. OS: Android 2.3 (Gingerbread or latter), IOS 9.2 or latter.
- ◆ **Command room data monitoring**
 - Temperature: sample, shelves, condenser, refrigeration system
 - Pressure: vacuum, chamber
 - Alarms: sensor failure, condenser overheat, over current, oil circulation failure, motor overheat, heater malfunction, condenser temperature error, vacuum failure, heat media circulation problem
 - General data: Process status including pre-freezing, vacuum status, 1st or 2nd drying process

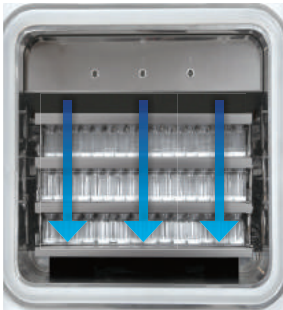


DETAIL & FEATURES

PILOT SERIES



Before

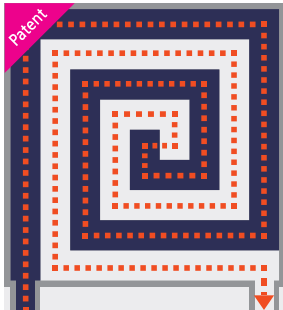


After

Stoppering(Optional)

Sealing is completed under vacuum condition (0.3mBar) automatically.

- Stoppering devices are hydraulic cylinder and bellows type (anti-contamination)
- Hydraulic pressure: 70~110kgf/cm²



41℃

40.5℃

Spiral oil path plate

Less than RA 0.4 μ m surface roughness spiral design plate shelves provide the best efficiency and uniformity of temperature by internal heat exchange. Cooling from 20℃ to -40℃ less than 60 minutes by degree of 1℃. Uniformity of shelf temperature convinces reliable drying quality of samples.

<Lab & Upscale>
PILOT SCALE FREEZE DRYER LP10

Drying Chamber
(Stoppering system,
SIP, CIP system)

Manyfold Chamber

Refrigeration room

7" TFT Touch Screen
Control Panel

Condenser Chamber
(Defrost System)



Before



After

Condenser Chamber

- Overlap door system for monitoring condensing process
- Surface treatment against chemical corrosion
- Cooling speed is within 30 minutes from 20℃ to -70℃
- With defrosting system removing ice within 30 minutes

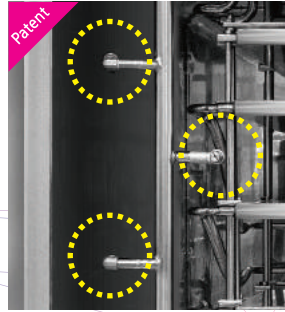
Defrosting System

Removal of condensed ice is necessary for continuous operation and for protection from contamination. Condenser foams round type ice below at -80℃ and makes ice removed at once. PTFE coating is standard feature for protection from contamination or corrosion by acid and other chemical substances.



SIP(Optional)

- Sterilizing temperature at 122℃ with more than 20 minutes duration by steam from PSG (Pure Steam Generation)
- Air Pocket Exhaust more than 3 times
- Initial ventilation completes within 1 hour

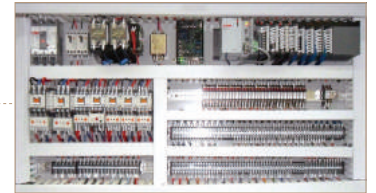


CIP(Optional)

- RO water: 0.001~0.0001 μm
- Operating condition: +50 ~ +90℃, 2~5kgf/cm²
- Automatic rotating spray nozzle method by water pressure
- Spray by Riboflavin solution (10g/L). After CIP process, no residue must be found by Ultra Violet device



<Lab & Upscale>
PILOT SCALE FREEZE DRYER LP20-30



Certified Electric System

All parts and components are CE certified with reliability and supporting precise operation by PLC programming.

Visual window for vacuum oil level



Manifold Chamber

Separated from drying chamber. Useful for various application. Independent from drying chamber operation.



Vacuum system

- Primary Vacuum Tester is equipped for automatic testing on vacuum status before freeze drying process.
- Automatic gas ballast system for protection from moisture condensing and oil contamination
- Pull down time: within 45 minutes from 760Torr to 100mTorr. Eventually maintained lower than 20mTorr

SPECIFICATIONS

LABORATORY & PILOT SERIES

Laboratory Series		TFD 8501	TFD 8503	FD 8508	FD 8512	FD 8518	FD 12008
Ice capacity		1 liters	2 liters	5 liters	10 liters	12 liters	5 liters
Totally ice capacity		2 liters	3 liters	8 liters	12 liters	18 liters	8 liters
Condenser temperature		-70 to -85℃					-100 to -120℃
Ext. dimensions (WxDxH mm)		450 x 525 x 500 mm	800 x 650 x 400 mm	800 x 705 x 860 mm			850 x 750 x 885 mm
Refrigeration		3/8 HP		1 1/4 HP			2 x 1 1/2 HP
Electrical		220V 60Hz, 230V 50Hz					
Certification		ISO9001 / ISO 14001 / CE					
Option	Drying Chamber	Multi Drying Chamber / Drying Chamber / Clear Drying Chamber / Heated Drying Chamber / Manifold Chamber					
	Product shelf	PH1212		PH1316			
	Vacuum pump	ISL6 (100 LPM)	ISL136 (196 LPM)	ISL136 (196 LPM) / ISL201 (283 LPM)			

Laboratory Series		MCFD 8508	MCFD 8512	MCFD 8518	FDS 8508	FDS 8512	FDS 8518
Ice capacity		5 liters	10 liters	12 liters	5 liters	10 liters	12 liters
Totally ice capacity		8 liters	12 liters	18 liters	8 liters	12 liters	18 liters
Condenser temperature		-70 to -85℃			-70 to -85℃/Shell freezer: -40℃		
Ext. dimensions (WxDxH mm)		1005 x 750 x 885 mm			850 x 750 x 860 mm		
Refrigeration		1 1/4 HP			1 1/4 HP + 3/8 HP		
Electrical		220V 60Hz, 230V 50Hz					
Certification		ISO9001 / ISO14001 / CE					
Option	Drying Chamber	MDC(Manifold 8 Port) or (H)DC1316 (**01/03 use to (H)DC1212)					
	Product shelf	PH1316					
	Vacuum pump	ISL136 (196 LPM) / ISL201 (283 LPM)					

Pilot Series		LP 10			LP 20			LP 30		
Ice capacity		8 liters			16 liters			24 liters		
Totally ice capacity		10 liters			20 liters			30 liters		
Condenser temperature		-50 to -85℃ (-120℃)								
Shelf temperature		-45 to +80℃								
Shelf areas		0.6m ² (0.2m ² /EA)			1.2m ² (0.2m ² /EA)			2m ² (0.4m ² /EA)		
Shelf quantity		3 + 1			6 + 1			5 + 1		
Shelf dimensions (WxDxH mm)		400 x 500 x 18						500 x 800 x 20		
Ext. dimensions (WxDxH mm)		1490 x 910 x 1700			1580 x 1085 x 1950			1810 x 1456 x 1995		
Electrical		380/220V 3Ph 50/60Hz								
Refrigeration system		2HP x 2EA			3HP x 2EA			5HP x 2EA		
Vacuum vol. (LPM)		417			648			841		
Manifold service port		5EA			5EA			-		
Serum Bottle & Vial Capacity of the Stoppering LP10 to 30	Bottle Size	5 ml	10 ml	30 ml	5 ml	10 ml	30 ml	5 ml	10 ml	30 ml
	Shelf Capacity	500	413	222	500	413	222	1,000	826	444
	No. of Shelf	3+1	3+1	3+1	6+1	6+1	6+1	5+1	5+1	5+1
	Total Capacity	1,500	1,240	667	3,000	2,479	1,333	5,000	4,132	2,222

*() order made

CONFIGURATION

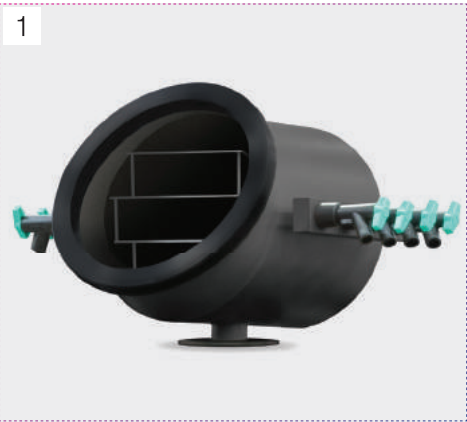
for FD SERIES



MDC

MULTI DRYING CHAMBER

NEW PATENT



Multi Drying Chamber

Multi-purpose MDC is specially designed by ILSHIN BIOBASE for drying application with Ampoule, Bottle, Bulk-Tray, Vial, Flask and Petri dish upon customer's need. User friendly design with 20° ~ 40° observation lid and sample loading device allow full time observation of drying process. Chamber provides complete sealing and vacuum condition without locking device. User can enjoy comfortable loading environment with bottle, bulk-tray and vials by horizontal loading into the chamber. PTFE coating guarantees life time protection against corrosion by acid or chemical substances. More than 50mm length of conduit line for evaporated steam via condenser improves efficiency of sublimation for faster process and better quality on drying result.

Model	Discription
MDC 1208	8 x ½" Valves, 275(H) x 230mm(D), 304 Stainless steel, 4 Shelves
MDC 1208 H	MDC 1208 with heating shelves (+40℃ at ambient Temp.)
MDC 1208 HS	MDC 1208 H with stoppering system



Drying Chamber

DC series supports both product shelf and flask. PTFE coating protects chamber from corrosion by acid or chemical substances. Anti acid vacuum pump is recommended for drying acid containing samples.

Model	Discription
DC 1212	12 x ½" Valves 275mm(H) x 230mm(D)
DC 1316	8 x ½" and 8 x ¾" Valves 320mm(H) x 300mm(D)
DC 1218	18 x ½" Valves 320mm(H) x 300mm(D)



Clear Drying Chamber

CDC series are optimal for bulk type shelf (3332) and available with serum bottle stoppering (3333). Acryl chamber is transparent for visual monitoring on entire drying process.

Model	Discription
CDC 3332	2heated shelves 330mm(H) x 330mm Dia
CDC 3333	Stoppering and 2heated shelves 330mm(H) x 330mm Dia



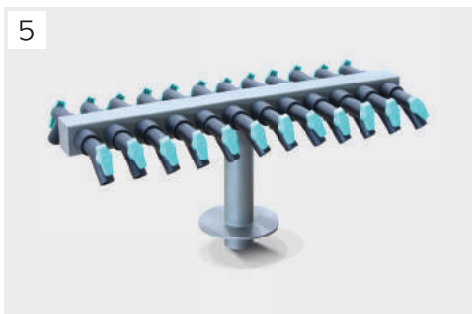
Heated Drying Chamber

By use of heater plate, drying process is controlled with +40℃ temperature range. Flask drying is also available. PTFE coating protects chamber from corrosion by acid or chemical substances. Anti acid vacuum pump is recommended for drying acid containing samples.

Model	Discription
HDC 1212	12 x ½" Valves, 275(H) x 230mm(D), 304 Stainless steel
HDC 1316	8 x ½" and 8 x ¾" Valves 320mm(H) x 300mm(D) with Heater function
HDC 1218	18 x ½" Valves 320mm(H) x 300mm(D) with Heater function

ACCESSORIES & SELECTION GUIDE

for FD SERIES



Manifold Chamber
Optimal for ampoule drying. PTFE coating protects chamber from corrosion by acid or chemical substances. Anti acid vacuum pump is recommended for drying acid containing samples.

Model	Discription
MC 3412	12 x ¾" Valves
MC 1324	12 x ½" and 12 x ¾" Valves
MC 1204	4 x ½" Valves



Product Heater
Heating device for HDC/CDC 3333. Control up to +40°C.

Model	Discription
PS1212	3 Shelves for DC 1212
PS1316	3 Shelves for DC 1316/ 1218
PHS1212	3 Heated Shelves for DC 1212
PH1316	3 Heated Shelves for DC 1316/ 1218



Specifications of Flask					
Size	Complete	Bottom	Top	Diameter	Bottom H/I.D.
40ml	CF0040	FB0040	FT0034	1/2"	76 x 34(mm)
80ml	CF0080	FB0080			115 x 34(mm)
120ml	CF0120	FB0120	FT0059	3/4"	69 x 60(mm)
150ml	CF0150	FB0150			85 x 60(mm)
300ml	CF0300	FB0300			145 x 60(mm)
600ml	CF0600	FB0600	FT0090		135 x 90(mm)
900ml	CF0900	FB0900			190 x 90(mm)
1200ml	CF1200	FB1200			240 x 90(mm)



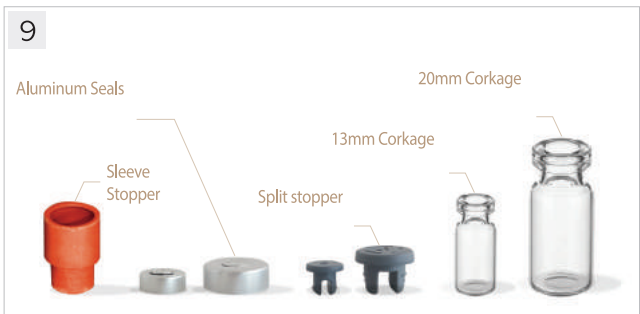
Adapter of Flask			
Material	Diameters	Straight	45 Bend
Borosilicate Glass	1/2" Flask Top to 1/2" Valve	SA0012	BA0012
	3/4" Flask Top to 3/4" Valve	SA0034	BA0034
	1/2" Flask Top to 3/4" Valve	SA1234	BA1234
	3/4" Flask Top to 1/2" Valve	SA3412	BA3412
Stainless Steel	1/2" Flask Top to 1/2" Valve	SA0021	BA0021
	3/4" Flask Top to 3/4" Valve	SA0043	BA0043
Multi Adapter	1/2" 3-Way	SA0003	



Ampules		
Size	Straight	Flat Bottom
1ml	AST01	AFB01
2ml		AFB02
4ml	AST04	
5ml		AFB05
10ml		AFB10
25ml		AFB20
50ml		AFB50

ACCESSORIES & SELECTION GUIDE

for FD SERIES



Serum Bottles

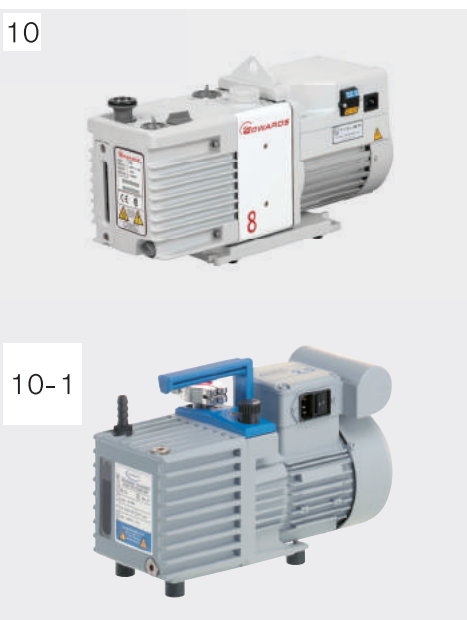
Size	Sleeve Stoppers	Aluminum Seals	Split Stopper	13mm Corkage	20mm Corkage
2ml		ALS- 13	SPS- 13	SB0002	
3ml				SB0003	
5ml					SB0005
10ml					SB0010
20ml					SB0020
30ml					SB0030
50ml					SB0050
100ml					SB0100

Vacuum Pumps

Model NO.	Super Deluxe			Anti-Corrosion			
	ISL-6	ISL-136	ISL-201	ISLA-045	ISLA-115	ISLA-165	ISLA-318
Capacity	100L/Min	196L/Min	283L/Min	45L/Min	115L/Min	165L/Min	318L/Min
Type	Direct Driven						
Ult-Pressure	1.5 x 10 ⁻³ Torr			4 x 10 ⁻⁴ mbar			
Gas Ballast	Equipped with Vacuum Pumps						

High quality, corrosion resistant materials
Advanced oil lubrication-ensures reliable running even at high gas loads
Proven oil and air suck-back protection
Complete range of easy-to-fit accessories to protect both pumps and the environment
Low noise levels and minimum vibration
Direct drive-built to exacting safety standards
Opposed two-vane design helps prevent blades sticking
Easy maintenance with effective international service back-up

High Vacuum Oil	VO4000	4L/Pkg
High Vacuum Grease	VG5400	5.4 Oz/Ea



SAT 0001 Soda Acid Trap
Secondary trap connects in series with freeze dry system and vacuum pump to prevent migration of corrosive chemicals into pump interior. Clear acrylonitrile body allows visual check of color indicating media.

SAT 0002 Replacement Soda Salt media for Acid Trap



EF2561 Pump Exhaust Filter
Disposable filter removes all visible oil mist from vacuum pump exhaust. May be exhausted into work area without duct. Includes filter assembly, one set of filter tubes mesh pad and back pressure gauge, 0- 15 psig. Life approximately 2500 hours at 10 microns vacuum.

EF2560 Exhaust Element



OMF-FO Oil Mist Filter
The oil mist filter can filtrate oil mist effectively which discharged by vacuum pumps. Reducing environment pollution significantly and reducing the oil consumption effectively.



VO4000 Vacuum Oil
a low vapor pressure and high lubricity. Assures high vacuum pump performance in standard rotary vane vacuum pumps.



VG5400 Vacuum Grease
Silicone-based compound used as sealant & lubricant for vacuum systems. VG5400 Grease is recommended for vacuums reaching between 1 x 10⁻⁵ and 1 x 10⁻⁶ mm Hg. It is recommended that the grease be preconditioned under vacuum and temperature until these limits are reached.



Seal Crimper
SC-13: For 13mm Corkage.
SC-20: For 20mm Corkage.



Vacuum Stoppering Adapter
VSA-13 13mm
VSA-20 20mm



MDC Tray	
Model	Discription
TR-M165	STS304 (Stainless steel), 165(W) x 270(D) x 30(H) mm, 0.6T
TR-M235	STS304 (Stainless steel), 235(W) x 270(D) x 30(H) mm, 0.6T



AA-12 Ampule Adapter
Connects Ampules to 1/2" Valves: 10EA/Pkg.



STK 0001 Sealing Torch
Specifically designed for flame sealing Freeze Dry Ampoules.



GT-3000S Micro Torch
Type: Gas Charge Type
Burn Time: 20~25min
Weight: 154g



PD9015 Petri dish
Size: 90(ø) x 15(H) mm
Material: PVC
Unit : 10EA/PACK



Valves
iShinBioBase valve specially designed considering safety of sample itself after drying. It is consisted of "backfilling system" which protects sample from air pollution through vent input in Neoprene body. Valve body is made of Neoprene which does not change with heat in case of ampoule sealing with sealing torch, so it can be used for a long time with safety. There are 1/2" and 3/4" standards and ampoule valve without ampoule adapter is prepared.

Valve Size	Complete Valve	Polypropylene Stem Only	Neoprene Body Only
1/2"	CV0012	PS0012	NB0012
3/4"	CV0034	PS0034	NB0034

ilShinBioBase

e u r o p e

European headquarter - The Netherlands



Factory



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