ILSHIN BIOBASE has developed 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 shall be your reliable partner for your research and development with focus on convenience and easiness of users. Designed for efficient and fast freeze drying result, you will find ultimate comfort for freeze drying.

### Table Top Freeze Dryer

#### Table Top Freeze Dryer

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**
  

- **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 throughout, Dual mode supports high vacuum application.

### HOW TO USE: FLASK & AMPULE
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)

Table Top Freeze Dryer series (FD/FDS/MCFD/TFD)

FD
(Freeze dryer)

FDS
(Freeze dryer with shell freezer)

MCFD
(Freeze dryer with concentrator)

TFD
(Table Top Freeze dryer)
7" TFT LCD Touch Screen (Option)

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.

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.

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.

Easy Defrosting - Condenser

Condensed ice must be removed within 30 minutes for continuous operation and for preventing contamination. Condenser forms 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. PTFE coating is standard feature for protection from contamination or corrosion by acid or chemical substance.

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.
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)

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
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℃ to -40℃(1℃/min)
2. Shelf temperature uniformity: less than ±1.5℃
3. Vessel pressure standard: qualified chamber under vacuum gauge pressure lower than 5 x10⁻³ Torr

Cold Trap Chamber; Condenser
1. Cooling speed: within 30 minutes from 20℃ to -70℃
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 ~ 2.0㎡ various shelf area and distance (standard: 60mm)
- Selectable shelf application (Bulk or Vial stoppering)
- Shelf temperature range (-45℃ to +80℃)
- Selectable condenser temperature (-80℃/-120℃)
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 overheating, 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
PILOT SERIES

**DETAIL & FEATURES**

- Refrigeration room
- 7” TFT Touch Screen Control Panel
- Condenser Chamber (Defrost System)
- Drying Chamber (Stoppering system, SIP, CIP system)
- Manyfold Chamber
- Spiral oil path plate

**Condenser Chamber**
- Overlap door system for monitoring condensing process
- Surface treatment against chemical corrosion
- Cooling speed is within 30 minutes from 20°C to −70°C
- With defrosting system removing ice within 30 minutes

**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/㎠

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

Before
After

Before
After
**Visual window for vacuum oil level**

**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

**Certified Electric System**
- All parts and components are CE certified with reliability and supporting precise operation by PLC programming.

**SIP(Optional)**
- Sterilizing temperature at 122°C 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㎛
- Operating condition: +50 ~ +90°C, 2~5kgf/㎠
- 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

**Manifold Chamber**
Separated from drying chamber. Useful for various application. Independent from drying chamber operation.
## SPECIFICATIONS

### LABORATORY & PILOT SERIES

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

<table>
<thead>
<tr>
<th>Laboratory Series</th>
<th>MCFD 8508</th>
<th>MCFD 8512</th>
<th>MCFD 8518</th>
<th>FDS 8508</th>
<th>FDS 8512</th>
<th>FDS 8518</th>
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<tbody>
<tr>
<td>Ice capacity</td>
<td>5 liters</td>
<td>10 liters</td>
<td>12 liters</td>
<td>5 liters</td>
<td>10 liters</td>
<td>12 liters</td>
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<tr>
<td>Totally ice capacity</td>
<td>8 liters</td>
<td>12 liters</td>
<td>18 liters</td>
<td>8 liters</td>
<td>12 liters</td>
<td>18 liters</td>
</tr>
<tr>
<td>Condenser temperature</td>
<td>~70 to ~85°C</td>
<td>~70 to ~85°C/Shell freezer: ~40°C</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Ext. dimensions (Wx Dx H mm)</td>
<td>1005 x 750 x 885 mm</td>
<td>850 x 750 x 860 mm</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigeration</td>
<td>1 1/4 HP</td>
<td>1 1/4 HP + 3/8 HP</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical</td>
<td>220V 60Hz, 230V 50Hz</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Certification</td>
<td>ISO9001 / ISO14001 / CE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Option</td>
<td>Drying Chamber</td>
<td>MDC(Manifold 8 Port) or (H)DC1316 (**01/03 use to (H)DC1212)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Product shelf</td>
<td>PH1316</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum pump</td>
<td>ISL136 (196 LPM) / ISL201 (283 LPM)</td>
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<table>
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<tr>
<th>Pilot Series</th>
<th>LP 10</th>
<th>LP 20</th>
<th>LP 30</th>
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<tr>
<td>Ice capacity</td>
<td>8 liters</td>
<td>16 liters</td>
<td>24 liters</td>
</tr>
<tr>
<td>Totally ice capacity</td>
<td>10 liters</td>
<td>20 liters</td>
<td>30 liters</td>
</tr>
<tr>
<td>Condenser temperature</td>
<td>~50 to ~85°C (~120°C)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shelf temperature</td>
<td>~45 to +80°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shelf areas</td>
<td>0.6m² (0.2m²/EA)</td>
<td>1.2m² (0.2m²/EA)</td>
<td>2m² (0.4m²/EA)</td>
</tr>
<tr>
<td>Shelf quantity</td>
<td>3 + 1</td>
<td>6 + 1</td>
<td>5 + 1</td>
</tr>
<tr>
<td>Shelf dimensions (Wx Dx H mm)</td>
<td>400 x 500 x 18</td>
<td>500 x 800 x 20</td>
<td></td>
</tr>
<tr>
<td>Ext. dimensions (Wx Dx H mm)</td>
<td>1490 x 910 x 1700</td>
<td>1580 x 1085 x 1950</td>
<td>1810 x 1456 x 1995</td>
</tr>
<tr>
<td>Electrical</td>
<td>380/220V 3Ph 50/60Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigeration system</td>
<td>2HP x 2EA</td>
<td>3HP x 2EA</td>
<td>5HP x 2EA</td>
</tr>
<tr>
<td>Vacuum vol. (LPM)</td>
<td>417</td>
<td>648</td>
<td>841</td>
</tr>
<tr>
<td>Manifold service port</td>
<td>5EA</td>
<td>5EA</td>
<td>-</td>
</tr>
<tr>
<td>Serum Bottle &amp; Vial Capacity of the Stoppers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottle Size</td>
<td>5 ml</td>
<td>10 ml</td>
<td>30 ml</td>
</tr>
<tr>
<td>Shelf Capacity</td>
<td>500</td>
<td>413</td>
<td>222</td>
</tr>
<tr>
<td>No. of Shelf</td>
<td>3+1</td>
<td>3+1</td>
<td>3+1</td>
</tr>
<tr>
<td>Total Capacity</td>
<td>1,500</td>
<td>1,240</td>
<td>667</td>
</tr>
</tbody>
</table>

*( ) order made
CONFIGURATION

for FD SERIES

1. Multi Drying Chamber
2. Drying Chamber
3. Clear Drying Chamber
4. Heated Drying Chamber
5. Manifold Chamber
6. Product Heater
7. Complete Flask
8. Ampule
9. Serum Bottle
10. Vacuum Pump
11. Exhaust Filter
12. Soda Acid Trap
13. Vac. Oil
13-1. Vac. Grease
14. Seal Crimper
15. Vacuum Stoppering Adapter
16. MDC Tray
17. AA-12 Ampule Adapter
18. Sealing Torch
18-1. Micro Torch
19. Petri dish
20. Valves
Multi Drying Chamber

Multi-purpose MDC is specially designed by ILSIN 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 lifetime 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 | Description
--- | ---
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 | Description
--- | ---
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 | Description
--- | ---
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 | Description
--- | ---
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

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**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.

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MC 1224</td>
<td>12 x ½” Valves 275mm (H) x 230 mm (D) with Heater function</td>
</tr>
<tr>
<td>MC 3412</td>
<td>12 x ¾” Valves</td>
</tr>
<tr>
<td>MC 1324</td>
<td>12 x ½” and 12 x ¾” Valves</td>
</tr>
<tr>
<td>MC 1204</td>
<td>4 x ½” Valves</td>
</tr>
</tbody>
</table>

**Product Heater**
Heating device for HDC/CDC 3333. Control up to +40℃.

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PS1212</td>
<td>3 Shelves for DC 1212</td>
</tr>
<tr>
<td>PS1316</td>
<td>3 Shelves for DC 1316/1218</td>
</tr>
<tr>
<td>PHS1212</td>
<td>3 Heated Shelves for DC 1212</td>
</tr>
<tr>
<td>PH1316</td>
<td>3 Heated Shelves for DC 1316/1218</td>
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</table>

**Specifications of Flask**

<table>
<thead>
<tr>
<th>Size</th>
<th>Complete Diameter</th>
<th>Bottom Diameter</th>
<th>Top Diameter</th>
<th>Bottom H/L.D.</th>
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</thead>
<tbody>
<tr>
<td>40ml</td>
<td>CF0040</td>
<td>FB0040</td>
<td>FT0034</td>
<td>1/2” 76 x 34(mm)</td>
</tr>
<tr>
<td>80ml</td>
<td>CF0080</td>
<td>FB0080</td>
<td>FT0034</td>
<td>115 x 34(mm)</td>
</tr>
<tr>
<td>120ml</td>
<td>CF0120</td>
<td>FB0120</td>
<td>FT0059</td>
<td>3/4” 69 x 60(mm)</td>
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<tr>
<td>150ml</td>
<td>CF0150</td>
<td>FB0150</td>
<td>FT0059</td>
<td>85 x 60(mm)</td>
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<tr>
<td>300ml</td>
<td>CF0300</td>
<td>FB0300</td>
<td>FT0090</td>
<td>145 x 60(mm)</td>
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<td>600ml</td>
<td>CF0600</td>
<td>FB0600</td>
<td>FT0090</td>
<td>135 x 90(mm)</td>
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<tr>
<td>900ml</td>
<td>CF0900</td>
<td>FB0900</td>
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<td>190 x 90(mm)</td>
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<tr>
<td>1200ml</td>
<td>CF1200</td>
<td>FB1200</td>
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<td>240 x 90(mm)</td>
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**Adapter of Flask**

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<thead>
<tr>
<th>Material</th>
<th>Diameters</th>
<th>Straight</th>
<th>45 Bend</th>
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<tbody>
<tr>
<td>Borosilicate Glass</td>
<td>1/2’ Flask Top to 1/2’ Valve</td>
<td>SA0012</td>
<td>BA0012</td>
</tr>
<tr>
<td></td>
<td>3/4’ Flask Top to 3/4’ Valve</td>
<td>SA0034</td>
<td>BA0034</td>
</tr>
<tr>
<td></td>
<td>1/2’ Flask Top to 1/2’ Valve</td>
<td>SA1234</td>
<td>BA1234</td>
</tr>
<tr>
<td></td>
<td>3/4’ Flask Top to 1/2’ Valve</td>
<td>SA3412</td>
<td>BA3412</td>
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<tr>
<td>Stainless Steel</td>
<td>1/2’ Flask Top to 1/2’ Valve</td>
<td>SA0021</td>
<td>BA0021</td>
</tr>
<tr>
<td></td>
<td>3/4’ Flask Top to 3/4’ Valve</td>
<td>SA0043</td>
<td>BA0043</td>
</tr>
<tr>
<td>Multi Adapter</td>
<td>1/2’ 3-Way</td>
<td>SA0003</td>
<td></td>
</tr>
</tbody>
</table>

**Ampules**

<table>
<thead>
<tr>
<th>Size</th>
<th>Straight</th>
<th>Flat Bottom</th>
</tr>
</thead>
<tbody>
<tr>
<td>1ml</td>
<td>AST01</td>
<td>AFB01</td>
</tr>
<tr>
<td>2ml</td>
<td></td>
<td>AFB02</td>
</tr>
<tr>
<td>4ml</td>
<td>AST04</td>
<td></td>
</tr>
<tr>
<td>5ml</td>
<td></td>
<td>AFB05</td>
</tr>
<tr>
<td>10ml</td>
<td>AFB10</td>
<td></td>
</tr>
<tr>
<td>25ml</td>
<td>AFB20</td>
<td></td>
</tr>
<tr>
<td>50ml</td>
<td>AFB50</td>
<td></td>
</tr>
</tbody>
</table>

---
**ACCESSORIES & SELECTION GUIDE**

for FD SERIES

### Vacuum Pumps

<table>
<thead>
<tr>
<th>Model NO.</th>
<th>ISL-6</th>
<th>ISL-136</th>
<th>ISL-201</th>
<th>ISLA-045</th>
<th>ISLA-115</th>
<th>ISLA-165</th>
<th>ISLA-318</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>100L/Min</td>
<td>196L/Min</td>
<td>283L/Min</td>
<td>45L/Min</td>
<td>115L/Min</td>
<td>165L/Min</td>
<td>318L/Min</td>
</tr>
<tr>
<td>Type</td>
<td>Direct Driven</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ult-Pressure</td>
<td>1.5 x 10^{-3} Torr</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gas Ballast</td>
<td>Equipped with Vacuum Pumps</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 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

### Serum Bottles

<table>
<thead>
<tr>
<th>Size</th>
<th>Sleeve Stoppers</th>
<th>Aluminum Seals</th>
<th>Split Stopper</th>
<th>13mm Corkage</th>
<th>20mm Corkage</th>
</tr>
</thead>
<tbody>
<tr>
<td>2ml</td>
<td>ALS-13</td>
<td>SPS-13</td>
<td>S80002</td>
<td>S80003</td>
<td></td>
</tr>
<tr>
<td>5ml</td>
<td>SLS-20</td>
<td>ALS-20</td>
<td>S80005</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10ml</td>
<td>SLS-20</td>
<td>ALS-20</td>
<td>S80010</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20ml</td>
<td>SLS-20</td>
<td>ALS-20</td>
<td>S80020</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30ml</td>
<td>SLS-20</td>
<td>ALS-20</td>
<td>S80030</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50ml</td>
<td>SLS-20</td>
<td>ALS-20</td>
<td>S80050</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100ml</td>
<td>SLS-20</td>
<td>ALS-20</td>
<td>S80100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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.

**Replacement Soda Salt media for Acid Trap**

**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.

**High Vacuum Oil**

VO4000 4L/Pkg

**High Vacuum Grease**

VG5400 5.4 Oz/Ea

**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.

**OMF-FO Oil Mist Filter**

**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.

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

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

MDC Tray
<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TR-M165</td>
<td>STS304(Ss), 165(W) x 270(D) x 30(H) mm, 0.6T</td>
</tr>
<tr>
<td>TR-M235</td>
<td>STS304(Ss), 235(W) x 270(D) x 30(H) mm, 0.6T</td>
</tr>
</tbody>
</table>

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

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

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

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

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.

<table>
<thead>
<tr>
<th>Valve Size</th>
<th>Complete Valve</th>
<th>Polypropylene Stem Only</th>
<th>Neoprene Body Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2&quot;</td>
<td>CV0012</td>
<td>PS0012</td>
<td>NB0012</td>
</tr>
<tr>
<td>3/4&quot;</td>
<td>CV0034</td>
<td>PS0034</td>
<td>NB0034</td>
</tr>
</tbody>
</table>
### Product Inquiry

<table>
<thead>
<tr>
<th>Base</th>
<th>Address</th>
<th>Telephone</th>
<th>Fax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overseas Sales Department</td>
<td>Lee Jong Ho / Deputy General Manager – <a href="mailto:jhlee@1sbb.com">jhlee@1sbb.com</a> 84 Samyuksa-ro 548 Street, Dongduchon city, Kyungki do, Korea. ZIP 11341</td>
<td>+82-70-4354-3951</td>
<td>+82-70-7950-3951</td>
</tr>
</tbody>
</table>

### ilShinBioBase Locations

<table>
<thead>
<tr>
<th>Base</th>
<th>Address</th>
<th>Telephone</th>
<th>Fax</th>
</tr>
</thead>
<tbody>
<tr>
<td>본사 및 생산</td>
<td>경기도 동두천시 삼육사로 548번길 84</td>
<td>031-867-1384</td>
<td>070-7950-3911</td>
</tr>
<tr>
<td>서울/경기지사</td>
<td>서울특별시 중랑구 중랑천로 77</td>
<td>1577-4053</td>
<td>02-491-4073</td>
</tr>
<tr>
<td>수원지사</td>
<td>경기도 화성시 봉담읍 안당하리길 34</td>
<td>031-298-8147</td>
<td>031-298-8149</td>
</tr>
<tr>
<td>대전지사</td>
<td>대전시 유성구 테크노8로 58 1F</td>
<td>042-824-1145/6</td>
<td>042-824-1147</td>
</tr>
<tr>
<td>영남지사</td>
<td>대구광역시 동구 동호로 75, 4F</td>
<td>070-4354-3977/5000</td>
<td>070-7950-3941</td>
</tr>
<tr>
<td>호남지사</td>
<td>광주광역시 광산구 신가삼효로 20-15</td>
<td>062-951-8010</td>
<td>062-951-8011</td>
</tr>
</tbody>
</table>

**Global website:** [www.1sbb.com](http://www.1sbb.com)