Freeze dryers

- Model selection guide: 154
- Freeze dryers
  - Freeze dryer VD-250R/550R/800R: 156
- Drying Chamber
  - Drying Chamber DC-280: 158
**Model selection guide**

**Freeze dries the sample by sublimating the water with depressurization.** TAITEC Freeze dryers for R&D labs etc.

Wide variety options are available to correspond various vessels. Cold trapped water can be easily removed by rapid thawing.

<table>
<thead>
<tr>
<th>Page</th>
<th>Model</th>
<th>Applications</th>
</tr>
</thead>
</table>
| P.156 | VD-250R | - Drying of samples such as Proteins etc.  
- Drying of Testing samples such as Foods etc. |
| P.156 | VD-550R | - Drying of Biological samples  
- Drying of Testing samples such as Foods etc.  
- As a Storage for reagents and samples weak to moisture |
| P.156 | VD-800R | - Drying of Biological samples  
- Drying of Testing samples such as Foods etc.  
- As a Storage for reagents and samples weak to moisture |

Equipped with high accuracy vacuum gauge standardly (except for VD-250R)

Digital Pirani vacuum gauge of VD-550R/800R tells the degree of vacuum during drying. For example, the degree of vacuum drops slightly when sublimation begins and the degree of vacuum rises again when drying complete. The ultimate vacuum displayed with LED by dividing into three levels.

The transparent door to see the trap status. Functional horizontal trap.

As the cold trap installed horizontal in the body, easy to remove trapped ice and clean it easily. Besides, as the door of trapping room is transparent, the inside can be always observed.

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**Open compartment for Vacuum drying and Freeze drying.**

Bench-top Desiccator optimized for Vacuum drying and Freeze drying.

<table>
<thead>
<tr>
<th>Page</th>
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<th>Applications</th>
</tr>
</thead>
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| P.158 | DC-280 | - Drying of Biological samples  
- Drying of Testing samples such as Foods etc.  
- As a Storage for reagents and samples weak to moisture |

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**Vacuum pumps**

- Oil-sealed Rotary Vacuum pumps (for Freeze dryers/Vacuum dryers)  
  -->P.151

- Dry scroll type Pumps (for Vacuum dryers)  
  -->P.151

**Vacuum pumps suitable for freeze drying**

Oil-sealed vacuum pumps generally used for for freeze drying. This is because for obtaining the required vacuum degree and needing above 10L/min of displacement to properly feed the dehumidifying volume of freeze dryer into the trap room.

Oil-less vacuum pumps (Diaphragm type etc.) are suitable for Centrifugal concentration while not suitable for Freeze drying.

Oil-sealed vacuum pumps require appropriate maintenance. First, necessary to attach a filter as oil mist is scattered from the exhaust port. For this reason, our pumps equipped with oil mist trap (Replacement required as necessary). Also, change the oil as necessary.

If solvent flows into the pump, it may cause failure. In case of solvents that erode metals in particular, they may be usable at only one time. Even with models that are resistant to chemicals, not 100% safe. Thus, safe to use a centrifugal concentrator for samples mixed with organic solvents and weak acids (Freeze drying is the drying technique based on the premise of water). Plus, even if water is left without changing the oil as it flows in, it will lead to failure and a decrease in vacuum. Change the oil as necessary and dry it following the dehumidified capacity.
Output for recorder of vacuum degree.
Nitrogen purge leak combined use nozzle.

VD-500R/800R are equipped with output terminals for recorder of vacuum degree. Plus, all three models equipped with leak port on the side of body and enables nitrogen purge from here.

Multiple tubes, Chambers etc. available as an option.
Abundant Options for freeze drying of variety of vessels. The power supply for chamber heater can be taken from the service outlet in VD main unit.

Promotes drying by heating sample with Built-in Heater on each shelf in addition to decompression.

- Easy Vacuum drying by connecting vacuum pump
- Be a Freeze drying chamber by connecting it to Lyophilizer
- Equipped with Outlet inside chamber and Leak nozzle

<table>
<thead>
<tr>
<th>Features</th>
<th>Number of Shelves</th>
<th>Vacuum gauge</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3 level</td>
<td>Bourdon tube</td>
<td>P.158</td>
</tr>
</tbody>
</table>

| How to do freeze drying well

Cautions on pre-freezing samples beforehand
The time required for drying differs depending the manner of freezing. Ideal to freeze the sample as thin as possible considering the receding and area of sublimation surface as shown below. Recommended to slice as thin as possible for solid samples.

The importance on displacement of vacuum pump
The degree of vacuum is reduced inside vessels with the vapor of solvent when sublimation starts. As pumps with displacement of below 50L/min cannot discharge the steam efficiently, the sample may melt along the way (dissolved easily when the salt concentration of samples too high). Each freeze dryer has "dehumidifying capacity" limited. If the capacity of sample dried exceeds the limitation, the degree of vacuum decreases because aggregation and coagulation of steam cannot catch up it.

The necessity of heating
Please use Drying Chamber DC-280 to heat vessels such as vials etc. (except for egg-plant shaped flask).

- Receding of sublimation surface
- The resistance to sublimation increases as the sublimation surface recedes in association with the progress of drying.

Sublimation surface area
Freeze Dryer VD-250R/550R/800R

Suitable to use at Laboratories for R&D. Wide variety options are available to correspond various vessels. Cold water can be easily removed by rapid thawing.

Vacuum Pumps for Freeze Dryers (Lyophilizers) -> P.151

Features
- Traps coldly the water sublimated into the cooling coil part
- Trapped water = Easy to remove ice by rapid thawing
- Ultimate Vacuum range display [VD-250R/550R]

Applications
- Drying of samples such as Proteins etc.
- Drying of Testing samples such as Foods etc.

System example

<table>
<thead>
<tr>
<th>Model</th>
<th>combined with</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>VD-250R</td>
<td>2-Port multiple tube MP-020, Drying Chamber DC-120, Vacuum pump GCD-051XA, System stand C-type</td>
<td>Enables to Vacuum-Lyophilize sample slices with multiple dishes by connecting Drying Chamber to Multiple tube. Eggplant-shaped flask etc. can be connected to Multiple tube. 45℃, approx. 500mL/time.</td>
</tr>
<tr>
<td>VD-550R</td>
<td>Sealed Chamber SC-180, Vacuum pump GCD-061XA</td>
<td>Enables to seal without opening the chamber after drying with samples. -75℃, approx. 1000mL/time.</td>
</tr>
<tr>
<td>VD-800R</td>
<td>8-Port multiple tube MP-080, Vacuum pump GCD-138XA</td>
<td>Large capacity enables Mass processing with Eggplant-shaped flask. -75℃, approx. 2000mL/time.</td>
</tr>
</tbody>
</table>

Ultimate vacuum range display function
Displays Atmospheric pressure range/Vacuum drying range/Lyophilization range in order with LED when decompression is started to notify the progress of decompression. When pump is changed, the setting can be changed according to the pump capacity.

Model | VD-250R | VD-550R | VD-800R |
---|---|---|---|
Cooling temperature | -45℃ (at no load) (*) | -75℃ (at no load) (*) | |
Trapping volume | Approx. 500mL/time | Approx. 1000mL/time | Approx. 2000mL/time |
Volume inside chamber | Approx. 4L (Inner dia. 160 x 205mm) | Approx. 4L (Inner dia. 160 x 205mm) | Approx. 11.7L (Inner dia. 210 x 345mm) |
Vacuum gauge | - | Pirani gauge | |
Compressor | 250W | 2 x 250W (Cascade refrigerating system) | 2 x 400W (Cascade refrigerating system) |
Recommended vacuum pump | Oil-sealed Rotary Vacuum pump (Ultimate pressure below 50Pa, Displacement above 100L/min) | | |
Vacuum hose connection port | Outer dia. φ22mm (Rc 3/8 Thread on inner surface, Convertible to different dia.) | | |
Vacuum release | Leakage port with fine on the side of body (N2 Gas purge combined use, Hose attachment port, Pisco φ6mm), automatically released by halting vacuum pump. | | |
Other functions | Hot gas defrosting (thawing in approx. 30 minutes, outlet for vacuum pump interlocking (Max. 3 sockets, 3A, with operation switch), outlet for chamber interlocking (Up to 2 sockets, 3A), Ultimate pressure display function (VD-550R/800R), Recorder output for degree of vacuum pressure (0 to 5V, VD-550R/800R) | | |
Dimensions/Weight | 375(W) x 420(D) x 525(H)mm, Approx. 34kg | 380(W) x 500(D) x 805(H)mm, Approx. 75kg | 490(W) x 600(D) x 805(H)mm, Approx. 97kg |
Power supply | AC100V/6A (Main unit only) | 2 x 100V/15A (at Max. use of outlet for interlocking) | 2 x 100V/19A (at Max. use of outlet for interlocking) |
Standard accessories | 1 x Table mat, 1 x Power plug (20A), 1 x Table mat | 1 x Power plug (30A), 1 x Table mat | |

(*) The value under ambient temperature 5℃ to 35℃ and Solenoid valve not operated unless the operation switch of service outlet for pump turned on. The power supply from the switchboard recommended at the interlocking.

See right page for optional accessories such as various chambers, multiple tubes, vessel adaptors etc. See page 151 for vacuum pumps.

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Protuberances not included in Dimensions. Vessels of photo not included.
Optional accessories

● Vacuum pumps for Freeze dryers --> P.151

Multiple tubes (for Egg-plant shaped flasks/Test tubes/Drying vials)

<table>
<thead>
<tr>
<th>Model</th>
<th>MP-020</th>
<th>MP-060</th>
<th>MP-080</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of ports</td>
<td>2</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Applicable vessels(*)</td>
<td>Egg plant shaped flasks/Optional AD-0180 required</td>
<td>Test tubes, Drying vials</td>
<td>—</td>
</tr>
<tr>
<td>Mounting cock interval</td>
<td>—</td>
<td>75mm</td>
<td>—</td>
</tr>
<tr>
<td>Dimensions</td>
<td>φ225×200Hmmm</td>
<td>φ225×310Hmmm</td>
<td>φ300×310Hmmm</td>
</tr>
<tr>
<td>Standard accessories</td>
<td>Adapter for Egg plant shaped flasks (AD-0180, $29)</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

(*) Test tubes require Optional adapter (below). Ask us when using for Ampoule filling etc.

Freeze-dried Bottle

● Put vessels into bottle and use it. Be careful as frozen samples thawed when the amount of evaporation is large.
● When Microtubes used secure the sublimation drying path using vessel holder (commercial item).

Drying Chamber

Dries samples in various small vessels as they are. Built-in Silicone rubber heater on each shelf promotes drying samples.

<table>
<thead>
<tr>
<th>Model</th>
<th>DC-120</th>
<th>DC-260</th>
<th>DC-280</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicable models</td>
<td>VD-250R/550R/800R</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Temperature range</td>
<td>30℃ Only</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Number of Shelves</td>
<td>1 level</td>
<td>3 levels</td>
<td>3 levels</td>
</tr>
<tr>
<td>Heater</td>
<td>70W×1</td>
<td>100W×3</td>
<td>2×100W</td>
</tr>
<tr>
<td>Shelf size</td>
<td>φ185mm</td>
<td>φ185mm</td>
<td>φ250×250mm</td>
</tr>
<tr>
<td>Dimensions</td>
<td>φ225×200Hmmm</td>
<td>φ225×300Hmmm</td>
<td>430×400×615Hmmm</td>
</tr>
<tr>
<td>Power supply</td>
<td>AC100V×0.7A</td>
<td>AC100V×3A</td>
<td>—</td>
</tr>
</tbody>
</table>

Sealed Chamber

Enables to dry samples and seal the vessel caps of samples by making vacuum state. Built-in Silicone rubber heater promotes drying samples.

<table>
<thead>
<tr>
<th>Model</th>
<th>SC-180</th>
<th>SC-305</th>
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<tbody>
<tr>
<td>Applicable models</td>
<td>VD-250R/550R</td>
<td>VD-800R</td>
</tr>
<tr>
<td>Temperature range</td>
<td>Fixed at 30℃</td>
<td>—</td>
</tr>
<tr>
<td>Number of Shelves</td>
<td>1 level</td>
<td>2 levels (Sealed is only the upper level)</td>
</tr>
<tr>
<td>Heater</td>
<td>70W×1</td>
<td>100W×2</td>
</tr>
<tr>
<td>Cap pushing distance</td>
<td>25mm</td>
<td>—</td>
</tr>
<tr>
<td>Dimensions</td>
<td>φ225×300Hmmm</td>
<td>φ225×450Hmmm</td>
</tr>
<tr>
<td>Power supply</td>
<td>AC100V×0.7A</td>
<td>AC100V×2A</td>
</tr>
</tbody>
</table>

● When frozen sample (beforehand) thawed using dry chamber, it can be considered that the sample volume (sublimation amount) might be large to the displacement of vacuum pump or sublimation does not progress well as resistance might be occurred due to chemical filter placed before pump. Put small amount samples that can obtain the surface area but not large amount samples in one time to solve the problem. In case even not improved review the pump displacement.
● Ask us when lyophilizing ampule tubes with our TAITEC equipment.

Adapters / Cocks

For Multiple tubes MP-020/060/08

1. Sample mounting Cock
2. Adaptor for Egg-plant shaped flasks
3. Adapter for Test tube

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● Ask us when lyophilizing ampule tubes with our TAITEC equipment.
Drying Chamber DC-280

**Bench-top Desiccator optimized for Vacuum drying and Freeze drying. Promotes drying by heating sample with Built-in Heater on each shelf in addition to decompression.**

Freeze dryer (Lyophilizer) *Freeze Dryer VD-250R/550R/800R* → P.156  Vacuum Pumps → P.151

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### Features

- Easily Vacuum drying by connecting vacuum pump
- Be a Freeze drying chamber by connecting it to Lyophilizer
- Equipped with Outlet inside chamber and Leak nozzle

### Applications

- Drying of Biological samples
- Drying of Testing samples such as Foods etc.
- As a Storage for reagents and samples weak to moisture

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**Built-in Heater on each shelf promotes Drying efficiency.**

Enables valued samples dried efficiently. It can be turned ON/OFF by each shelf (cannot be changed during decompression). Effective to use thin and wide containers such as Petri dishes to dry paste samples.

**Easy to store wide thin containers that raise drying efficiency.**

AS back side of each large shelf Heater provided, promotes the drying efficiency thanks to the large surface area of heating.

**Outlet inside chamber and Two nozzles**

Equipped with Outlet inside chamber and Two nozzles (for suction and leak/gas purge combined use). Suction and Gas replacement can be done delicately from here.

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**Combined with Freeze Dryer/Lyophilizer (VD series)**

Enables to put the trapping for plural dryers together into one by using "Freeze Dryer VD-250R/550R/800R" (See page 156) with Multiple tubes mounted as a cold trap. Although each dryer is switched and used while not used simultaneously the number of Multiple tubes and dryers such as DC-280 can be connected (Max. 8 ports in Multiple tubes of VD series). VD-250R and DC-280 2-port multiple tubes (MP-020) in combination shown in right for reference. DC-280 is connected to Multiple tubes with vacuum hose.

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### Specifications

**Model** DC-280

**Number of shelves/size** Three shelves (aluminum made), 258 x 250 mm

**Heater** On the back of each shelf, can be turned ON/OFF by each shelf. Shelf surface approx. 30°C when ON turned (under reduced pressure)

**Vacuum gauge** Bourdon tube Vacuum gauge

**Suction nozzle** Outer dia. φ14mm

**Vacuum release** Manually operated, by outer dia. φ 9 mm Needle valve (gas purge combined use)

**Outlet inside chamber** Max. AC100V/3A

**Dimensions** 430(W) x 400(D) x 615(H)mm

**Weight** Approx. 21kg

**Power supply** AC100V/3A (Main unit only) AC100V/7A (at Max. use of outlet for interlocking)

**Standard accessories** 3 x Acrylic shelf without heater

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**DC-280** (Vacuum dryer)

**VD-250R** (Freeze Dryer → P.156)

**MP-020** (2-port multiple tubes → P.157)

**GCD-051XA** (Oil-sealed Rotary pump → P.151)

**System stand** (C-type → P.151)

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