

Constant
temperature
incubator/shaker
OD Monitor

For cell culture
related products

Shaker

Mixer
Rotator
Stirrer

Bead beater
Ultrasonic
homogenizer

Aluminum
block Bath
Mini-size Bath

Water bath
Shaking Water bath
Immersion cooler

Hybridization
Incubator
Constant temperature
Chambers

Centrifugal
Concentrators
Cold Trap

Freeze dryers

Submarine
Electrophoresis apparatus
Blotting device for
hybridization

Constant-temperature
water circulating
system [Chiller]

Appendix

Freeze dryers

■ Model selection guide.....	170
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Freeze Dryer VD-250R/550R/800R.....	172
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Drying Chamber DC-280.....	175
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Oil-sealed Rotary Vacuum pump GLD-051/137CC.....	176
Oil-sealed Rotary Vacuum pump GCD-051XA/136XA.....	176

These Freeze dryers are for R&D and can be used with a power supply in a laboratory. A wide variety of options are available to correspond to various vessels. Cold-trapped water can be defrosted quickly and removed easily.

Freeze Dryer VD-250R



Freeze Dryer VD-550R



Freeze Dryer VD-800R



Drying Chamber DC-280



Oil-sealed Rotary Vacuum pumps (for Freeze dryers/Vacuum dryers)



Page	Model	Applications
P.172	VD-250R	<ul style="list-style-type: none"> •Drying of samples such as Proteins, etc. •Drying of Testing samples such as Foods, etc.
P.172	VD-550R	
P.172	VD-800R	



Standardly equipped with a high accuracy vacuum gauge (except for VD-250R)

Digital Pirani vacuum gauge of VD-550R/800R displays 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 is complete. The ultimate vacuum is displayed with LED by dividing into three levels.



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

Page	Model	Applications
P.175	DC-280	<ul style="list-style-type: none"> •Drying of Biological samples •Drying of Testing samples such as Foods, etc. •As a Storage for reagents and samples that are weak to moisture

These Vacuum pumps are essential for Freeze drying and Vacuum drying. Select the optimum model based on the chemical resistance, displacement, and ultimate pressure.

Page	Model	Chemical resistance	Displacement	Ultimate pressure
P.176	GLD-051	•Water	•50 L/min	•0.067 Pa
	GLD-137CC		•135 L/min	
	GCD-051XA	•Water •Organic solvent	•50 L/min	
	GCD-136XA		•135 L/min	

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

Features	Cooling temperature	Trapping volume	Vacuum gauge	Chemical resistance	Page
<ul style="list-style-type: none"> •Cold Traps the water that is sublimated into the cooling coil part •Trapped water = Easy to remove Ice by rapid thawing 	•-45°C	•500 mL/time	-	-	P.172
<ul style="list-style-type: none"> •Cold Traps the water that is sublimated into the cooling coil part •Trapped water = Easy to remove Ice by rapid thawing •Ultimate Vacuum range display 	•-75°C	•1 L/time	•Pirani vacuum gauge (Digital)	-	P.172
		•2 L/time	•Pirani vacuum gauge (Digital)		P.172

Output for recorder of vacuum degree. Nitrogen purge leak combined use nozzle.



VD-550R/800R are equipped with output terminals for the recorder of vacuum degree. Also, all three models are equipped with a leak port on the side of the body and enables nitrogen purge from here.

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

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



Multiple tubes, Chambers, etc. are available as options.

Abundant Options for freeze drying for a variety of vessels. The power supply for the chamber heater can be taken from the service outlet in VD main unit.



Features	Number of Shelves	Vacuum gauge	Page
<ul style="list-style-type: none"> •Easy for Vacuum drying by connecting the vacuum pump •Becomes a Freeze drying chamber by connecting it to the Lyophilizer •Equipped with an Outlet inside the chamber and Leak nozzle 	•3 levels	•Bourdon tube	P.175

Vacuum pumps suitable for freeze drying

Oil-sealed vacuum pumps are generally used for freeze drying. This is because of the requirements for obtaining the required vacuum degree and the above 10 L/min of displacement to properly feed the dehumidifying volume of the 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 the appropriate maintenance. First, it is necessary to attach a filter because oil mist is scattered from the exhaust port. For this reason, our pumps are equipped with an oil mist trap (Replacement is required as necessary). Also, change the oil as necessary.

If solvents flow into the pump, it may cause failure. In case of solvents that erode metals in particular, they may be usable for only one time. Even with models that are resistant to chemicals, they are not 100% safe. Thus, is it 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). Also, 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.



NEW

Constant temperature incubator/shaker OD Monitor

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Shaker

Mixer Rotator Stirrer

Bead beater homogenizer Ultrasonic homogenizer

Aluminum block Bath Mini-size Bath

Water bath Spiking Water bath Immersion cooler

Hybridization Incubator Constant temperature Chambers

Centrifugal Concentrators Cold Trap

Freeze dryers

Substrate Electroporation apparatus Blotting device for hybridization

Constant-temperature water circulating system [Chilled]

Appendix

Freeze Dryer VD-250R/550R/800R

*These Freeze dryers are designed for easy combinations.
Wide variety of options are available to correspond to various vessels.*

•Vacuum Pumps for Freeze Dryers (Lyophilizers) --> P.176



VD-550R
with Drying Chamber

VD-250R
with 2-port multiple tube

VD-800R
with 8-port multiple tube

Above combinations are examples.
Each Chamber and Multiple tube are sale separately.

Simple operation



Turn on the power. When the blue button lights up, the unit is ready for use. Pressing the yellow VAC START button will turn on the pump that is connected to the vacuum pump interlocking outlet on the back of the unit, and then vacuuming starts.

Secure cold trap for the sublimated water

Because of the direct cooling system in which water vapor is directly coagulated and collected on the surface of the cooling coil in the trap chamber, the cooling temperature becomes almost the same as the trap temperature.

Trapped water is quickly defrosted by hot gas. When the DEFROST button is pressed, hot gas will flow into the coil of the cold trap, and ice equivalent to the dehumidification capacity can be defrosted in about 30 minutes.

Features

- Ensures reliable moisture collection with direct cooling system of cooling pipes
- Simple operation and reliable drying
- Ultimate Vacuum display function [except for VD-250R]

Applications

- Drying of samples such as Proteins, etc.
- Freeze drying of samples for analytical applications

Setting and display function of Ultimate vacuum range [550R/800R]



Displays Atmospheric pressure range/ Vacuum drying range/Lyophilization range in order with the LED when decompression starts to notify the progress of decompression. The setting can be changed according to the application. It can also be used for pump maintenance.

Signal output [550R/800R], leak port



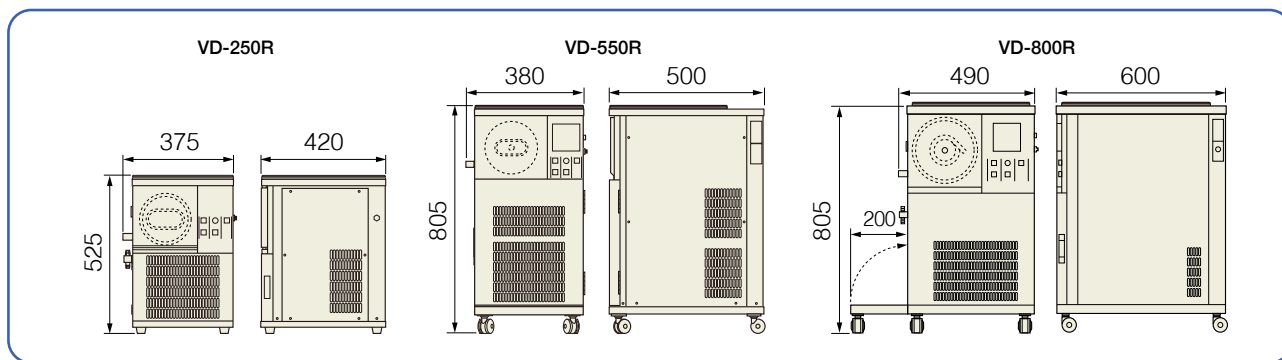
The VD-550R and 800R can record the vacuum degree. For samples that are resistant to oxidation, a nitrogen gas purge can be performed from the leak port on the back of the main body (equipped on the 250R/550R/800R) when the vacuum is released to minimize the effects of oxidation.

Model	VD-250R	VD-550R	VD-800R
Cooling temperature	-45°C (at no load) (*)	-75°C (at no load) (*)	
Trapping volume	Approx. 500 mL/time	Approx. 1000 mL/time	Approx. 2000 mL/time
Volume inside chamber	Approx. 4 L (Inner dia. 160 × 205 mm)	Approx. 4 L (Inner dia. 160 × 205 mm)	Approx. 11.7 L (Inner dia. 210 × 345 mm)
Vacuum gauge	-	Pirani vacuum gauge (Digital display)	
Compressor	250 W	250 W × 2 (Cascade refrigerating system)	400 W × 2 (Cascade refrigerating system)
Recommended vacuum pump	Oil-sealed Rotary Vacuum pump (Ultimate pressure below 50 Pa, Displacement above 100 L/min)		
Vacuum hose connection port	For outer dia. φ22 mm (Rc 3/8 Thread on inner surface, Convertible to different dia.), a hose with an inner diameter of φ18 mm is basically used.		
Vacuum release	Leakage port with filter on the side of the body (N ₂ Gas purge combined use, Hose attachment port, Pisco φ6 mm), automatically released by halting the vacuum pump.		
Other functions	Hot gas defrosting (thawing in approx. 30 minutes, outlet for the vacuum pump interlocking (Max. 3 sockets, 9 A, with operation switch), service outlet (up to 2 sockets, 3 A) Ultimate pressure display function (VD-550R/800R), Recorder output for the degree of vacuum pressure (0 to 5 V, VD-550R/800R)		
Dimensions (W×D×H)/Weight	375 × 420 × 525 mm, Approx. 34 kg	380 × 500 × 805 mm, Approx. 75 kg	490 × 600 × 805 mm, Approx. 97 kg
Power supply	AC100V/6A /Max.15A (Need a step-down transformer)	AC100V/9A /Max.19A (Need a step-down transformer)	AC100V/13A /Max.30A (Need a step-down transformer)
Standard accessories	Table mat × 1 pc	Power plug (20 A) × 1 pc, Table mat × 1 pc	Power plug (30 A) × 1 pc, Table mat × 1 pc

(*)The value under ambient temperature 5°C to 35°C.

•The Vacuum gauge and Solenoid valve are not operated unless the operation switch of service outlet for pump turned on. The power supply from the switchboard is recommended at the interlocking.
•See pages 173-174 for optional accessories such as various chambers, multiple tubes, vessel adapters, etc. See page 176 for vacuum pumps.

Dimensions



System example in the photos on the left page

Model	combined with	Features
VD-250R	2-Port multiple tube MP-020, Vacuum pump GCD-051XA, Freeze-dried Bottle FB-4015 × 2 pcs	For the connection of the Freeze-dried Bottle to Multiple tubes, it is used by placing Microtubes or other vessels inside the bottle. -45°C, approx. 500 mL/time.
VD-550R	2-Port multiple tube MP-020, Drying Chamber DC-280, Vacuum pump GCD-051, System stand C-type	It enables Vacuum/Lyophilize sample slices with multiple dishes by connecting the Drying Chamber to Multiple tubes. Eggplant-shaped flasks, etc. can be connected to Multiple tubes. -75°C, approx. 1000 mL/time.
VD-800R	8-Port multiple tube MP-080, Vacuum pump GCD-136XA	Large capacity enables Mass processing with Eggplant-shaped flasks. -75°C, approx. 2000 mL/time.

Optional accessories

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

Enables drying processing for plural Egg-plant shaped flasks/Test tubes (Adapter is required)/Drying vials.

Model	MP-020	MP-060	MP-080
Number of ports	2	6	8
Applicable vessels (*)	Egg-plant shaped flasks (Optional AD-0181 is required in § 29 and § 24), Test tubes, Drying vials		
Mounting cock interval	-	75 mm	
Dimensions (WxDxH)	300 × 50 × 250 mm	300 × 230 × 310 mm	300 × 305 × 310 mm
Standard accessories	Adapter for Egg-plant shaped flasks (AD-0180, § 29)		

(*) Test tubes require Optional adapters (below). Ask us when using for ampule filling, etc.

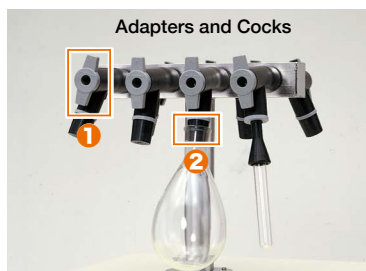


MP-080 with Egg-plant shaped flasks



With Egg-plant shaped flasks

Adapters / Cocks For Multiple tubes MP-020/060/080



1 Sample mounting Cock

AD-0550

For exchange when rubber deteriorates.



2 Adapter for Eggplant shaped flasks

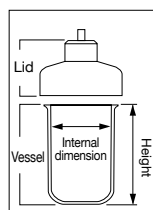
AD-0180 (§29)

AD-0181 (§24)

AD-0180 is for exchange in case of deterioration.

AD-0181 is mainly required for small diameter flasks of 300 mL or less.

Freeze-dried Bottle



Example of Freeze-dried bottle installation

• Place a Centrifuge tube or other vessel in the bottle for Lyophilization.

• If you want to use a filter, a $\phi 38$ mm filter can be attached. The sublimation speed will be reduced, so please be careful about the number of samples, etc.

Model	Dimensions		Volume
	Internal dimension	Height	
FB-4007	40 mm	80 mm	75 mL
FB-4010		100 mm	100 mL
FB-4015		140 mm	150 mL
FB-6020	60 mm	100 mm	200 mL
FB-6030		130 mm	300 mL
FB-6050		200 mm	500 mL
FB-9075	90 mm	140 mm	750 mL
FB-9100		180 mm	1000 mL
FB-9120 (*)		220 mm	1200 mL

(*) Enables 2 pcs in MP-020, 4 pcs in MP-060 and 4 pcs in MP-080 mounted.

NEW

Constant temperature incubator/shaker
OD Monitor

For cell culture related products

Shaker

Mixer
Rotator
StirrerBead beater
Ultrasonic homogenizerAluminum block Bath
Mini-size BathWater bath
Shaking Water bath
Immersion coolerHybridization incubator
Constant temperature ChambersCentrifugal Concentrators
Cold Trap

Freeze dryers

Substrate Electrophoresis apparatus
Blotting device for hybridization

Constant-temperature water circulating system [Chiller]

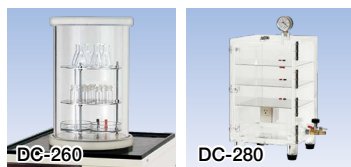
Appendix

VD series Optional accessories (continued)

•Vacuum Pumps for Freeze Dryers (Lyophilizers) --> P.176

Drying Chamber

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

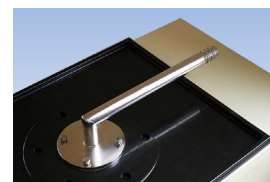


Model	DC-120	DC-260	DC-280
Applicable models	VD-250R/550R/800R		
Temperature range	30°C Only		
Number of Shelves	1 level	3 levels	
Heater	70 W x 1	100 W x 3	
Shelf size	φ180 mm	φ185 mm	258 x 250 mm
Dimensions	φ225 x 200H mm	φ225 x 380H mm	430 x 400 x 615H mm
Power supply	AC 100V/0.7 A~240V	AC 100 V/3 A~240V	



MP-010 (for DC-280)

Attached to VD series



In the DC-280, it can be used singly. It is easy to remove large vessels that can obtain sublimation areas such as petri dishes and plates. It can be done while adjusting the speed of the vacuum release by oneself. When connecting to the VD series, it enables to place it on the VD unit and use it by using the Optional MP-010 (see the right page for details on DC-280).

- When a frozen sample (beforehand) is thawed using the dry chamber, it can be considered that the sample volume (sublimation amount) might be too large to the displacement of the vacuum pump or sublimation does not progress well as resistance may occur due to the chemical filter placed before the pump. Instead of a large amount of samples at one time, put a small amount of samples that can obtain the surface area to solve the problem. If there is no improvement, review the pump displacement.

- Ask us when lyophilizing (e.g., L-drying) ampule tubes with our/TAITEC equipment.

How to do freeze drying well

●Cautions on pre-freezing samples beforehand

The time required for drying differs depending on the manner of freezing. It is ideal to freeze the sample as thin as possible considering the receding and area of sublimation surface as shown below. It is recommended to slice as thin as possible for solid samples.

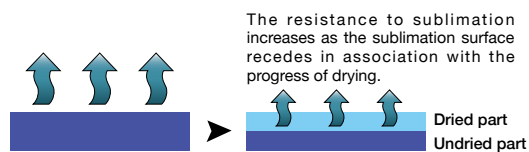
●The importance on displacement of the vacuum pump

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

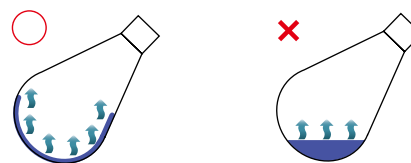
●The necessity of heating

Please use the Drying Chamber DC-280 to heat vessels such as vials, etc. (except for egg-plant shaped flask).

Receding of sublimation surface



Sublimation surface area



Reference: Use the Centrifugal Concentrator as a chamber for Lyophilization



TAITEC's VC-36R/96R Centrifugal Concentrators (page 162) are equipped with a "Freeze Dryer" mode that allows the unit to be used as a vessel drying chamber for Lyophilization. In the "Freeze Dryer" mode, after the preset time has elapsed, the vacuum pump remains running (vacuum is maintained), the centrifugation stops, and the heater turns off.

*It can be used while the rotor is removed and the rotation speed is set to zero, so it can be combined as a chamber with temperature control.

Drying Chamber DC-280

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

•Freeze dryer (Lyophilizer) "Freeze Dryer VD-250R/550R/800R" --> P.172 •Vacuum Pumps --> P.176

Features

- Easy for Vacuum drying by connecting the vacuum pump
- Becomes a Freeze drying chamber by connecting it to the Lyophilizer
- Equipped with an Outlet inside the 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

Built-in Heater on each shelf promotes Drying efficiency

Enables valued samples to be dried efficiently. It can be turned ON/OFF from each shelf (cannot be changed during decompression).

Easy to store wide thin containers that can increase drying efficiency

Because the back side of each large shelf Heater is provided, it promotes drying efficiency thanks to the large surface area of heating. Effective to use thin and wide containers such as Petri dishes to dry paste samples.

Outlet inside the chamber and Two nozzles

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

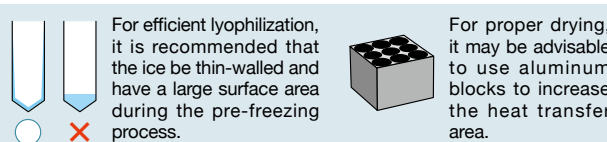
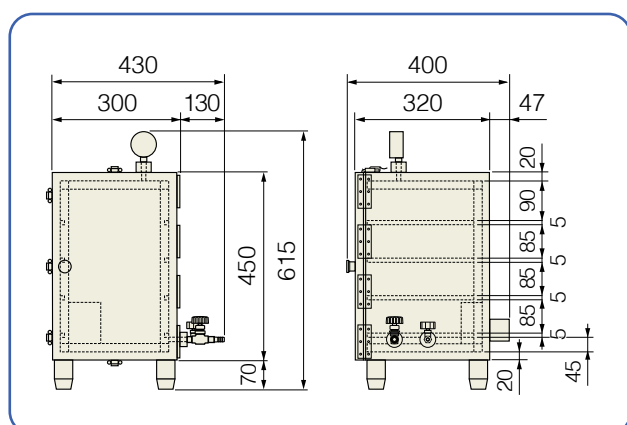


Outlet inside the chamber



Leak/Gas purge combined use nozzle
Suction nozzle

Dimensions



Model	DC-280
Number of Shelves/Size	Three shelves (aluminum made), 258 × 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.	φ14 mm
Vacuum release	Manually operated, by outer dia. φ9 mm Needle valve (gas purge combined use)
Outlet inside chamber	Max. AC 100 V/3 A
Dimensions (W×D×H)	430 × 400 × 615 mm
Weight	Approx. 21 kg
Power supply	AC100V/3A /Max.7A (Need a step-down transformer)
Standard accessories	Acrylic shelf without heater × 3 pcs

•Use a vacuum pump with displacement 50 to 100 L/min. It may be distorted or broken if using a pump that is larger than 100 L/min. Suction works slowly when using a valve. Vacuum pumps are listed on page 176.

Combined with Freeze Dryer/Lyophilizer (VD series)

Enables to put the trapping for multiple dryers together into one by using the "Freeze Dryer VD-250R/550R/800R" (See page 172) with Multiple tubes mounted as a cold trap. Although each dryer is switched and used, when they are not used simultaneously, a number of Multiple tubes and dryers such as DC-280 can be connected (Max. 8 ports in Multiple tubes of VD series). The VD-250R and DC-280 2-port multiple tubes (MP-020) in combination are shown in right for reference. The DC-280 is connected to Multiple tubes with the vacuum hose.



Combined example with VD-550R

DC-280 (Vacuum dryer)

VD-550R (Freeze Dryer --> P.172)

MP-020 (2-port multiple tubes --> P.173)

GLD-051 (Oil-sealed Rotary Vacuum pump --> P.176)

System stand (C-type --> P.165)

NEW

Constant temperature incubator/shaker OD Monitor

For cell culture related products

Shaker

Mixer Rotator Stirrer

Bead beater homogenizer Ultrasonic homogenizer

Aluminum block Bath Mini-size Bath

Water bath Spiking Water bath Immersion cooler

Hybridization Incubator Constant temperature Chambers

Centrifugal Concentrators Cold Trap

Freeze dryers

Substrate Electrophoresis apparatus Blotting device for hybridization

Constant temperature water circulating system (Chilled)

Appendix

NEW

Vacuum pumps

Vacuum pumps that are essential for Freeze drying and Vacuum drying. Select the optimum model based on the chemical resistance, displacement, and ultimate pressure.

•Freeze dryer (Lyophilizer) "Freeze Dryer VD-250R/550R/800R" --> P.172, Vacuum dryer "Drying Chamber DC-280" --> P.175



GLD-051



GCD-136XA

Oil-sealed Rotary Vacuum pumps (for Freeze dryers/Vacuum dryers)

This is an oil rotary vacuum pump with the optimal displacement and vacuum for Freeze drying. The low-cost oil rotary type is the best choice for introducing lyophilization, given its high ultimate pressure and high displacement. Each set comes with a vacuum hose, nozzle, and oil mist trap, so it can be used immediately after purchase.

Model (*1)	Chemical resistance (*2)	Displacement	Ultimate pressure (*3)
GLD-051	Water	50 L/min	0.67 Pa
GLD-137CC	Water	135 L/min	
GCD-051XA	Water, Organic solvent	50 L/min	
GCD-136XA	Water, Organic solvent	135 L/min	

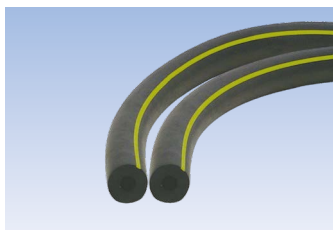
(*1)GLD-051/GCD-051XA are for vacuum dryers. (*2)Pump resistance and either Solvent release to the environment and Oil deterioration are irrelevant. Oil change required if solvent is inhaled. (*3)The value will decrease due to the piping resistance when in use. Also, the value may change by one digit depending on the vacuum gauge to be measured.



Example of optional filter installation

When combined with a centrifugal concentrator, an optional chemical filter (P.165) can be installed to reduce the solvent release to the environment. Exhaust aeration should also be performed during centrifugal concentration.

Vacuum hose (Recommended product in Japan)



Compared to natural rubber and silicone rubber, this vacuum hose has superior resistance to oil, chemicals, and oxidation, and does not expand, harden, or crack easily. The material is thermoplastic elastomer, which has the flexibility of natural rubber. It is also less likely to deteriorate and produce no dust, so there is no risk of damaging the vacuum pump.

When combined with a centrifugal concentrator, one hose set of inner diameter $\phi 12$ mm (outer diameter $\phi 30$ mm) \times 2 m is required.

When combined with a freeze dryer, one hose set with inner diameter of $\phi 18$ mm (outer diameter $\phi 42$ mm) \times 1 m is required.

If installation conditions require longer lengths, they are also available per metric unit.

System stand

When combined with the VD-250R, which is lower in height, or combined with a box-shaped chamber such as the DC-280 and moved as a single unit, we recommend the System stand G-type (see P.165).

For VD-550R or VD-800R, we recommend the System stand C-type.

Example of use of ►
System stand C-type

