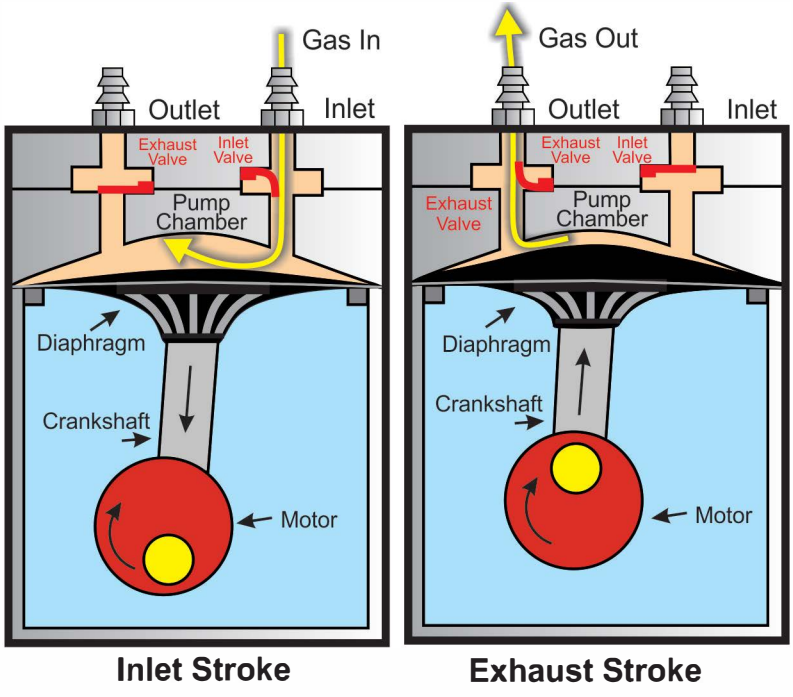
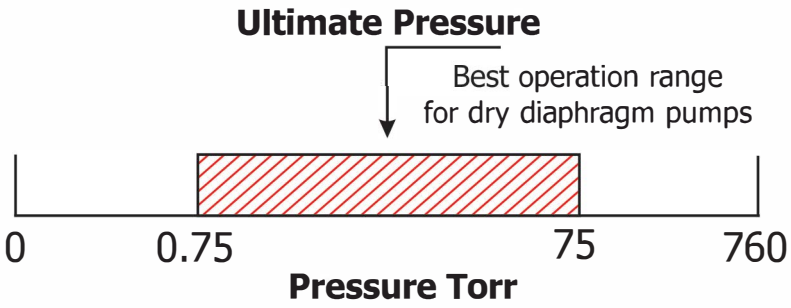
Dry Diaphragm Pump Introduction

Diaphragm vacuum pumps are popular because they're dry "oil-free" and cost effective when compared to other vacuum pumping technologies. They are compact in size, often being portable, and typically require no user's maintenance between diaphragm replacement periods. Since diaphragm pumps are dry, the vacuum system user does not have to change and dispose of waste vacuum pump oils, which makes them a more environmentally-friendly pump when compared to oil-sealed pumps. Diaphragm vacuum pumps are typically used to evacuate small applications where low gas loads are present. Diaphragm vacuum pumps are hermetic seal providing oil and particulate free vacuum which is often desirable for clean dry analytical applications.

The operating principle of the diaphragm vacuum pump is quite simple, a tensioned diaphragm is driven using a crankshaft arrangement and non-return valves for unidirectional flow of gas through the inlet to the exhaust. Their mechanical design often limits their pumping speed (typically 2 CFM or smaller) and does not generate as deep of vacuum as compared to oil-sealed vacuum pumps, typical ultimate vacuum pressure ranges from 0.5 to 70 Torr. Lower pressures are difficult to achieve, after a point the mechanism cannot generate differential pressure to force open the inlet valve. To help generate a lower ultimate vacuum, some models of diaphragm vacuum pumps are available in dual or triple stage operation, where the evacuated gases are compressed through multiple stages before being exhausted to atmosphere. A major benefit of diaphragm vacuum pumps are that they can often be used in corrosive applications where the process requires evacuation of condensable and corrosive vapors. For pumping of condensable vapors the design usually include a gas ballast burst or air driven pulsed purge to force out condensate liquids that would condense on the diaphragm mechanism. Diaphragm vacuum pumps designed for corrosive applications are typically built with Teflon "PTFE" diaphragms and PTFE coated head components. Diaphragm pumps are commonly used in applications such as, vacuum filtration, vacuum drying, vacuum distillation, medical applications, and backing high vacuum pumps for turbo pumping systems.



Diaphragm Vacuum Pump



KNF NEUBERGER, INC. LABOPORT

The chemically-resistant series N810 and N820 LABOPORT diaphragm pumps come in single or two stage head configurations and are oil-free pumps used in a wide range of laboratory applications. They transfer and pump down without contamination. The heart of these very compact pumps is a KNF structured diaphragm. This patented diaphragm was stress-optimized using the Finite Elements method. As a result, KNF was able to make the pumps smaller while increasing the service life of the diaphragm. Compatible with all brand Rotary Evaporators.

Also listed is the **N820.3FT.40P for Saturated Vapors with The KNF PowerDry System.** This allows condensed liquid to be blown out of the pump heads at high speed during evacuation. The vacuum in the vessel is not disturbed. The drying cycle can be adjusted to the requirements of the individual process using three variables. After drying, the pump reaches a better vacuum and is able to evacuate significantly faster compared with pumps without a drying system.

N810.FTP
1-Stage

N810.3FTP
2-Stage

Diaphragm Repair Kits available for these pumps - Call 505-872-0037

KNF LABOPORT Diaphragm Pump SPECIFICATIONS

Technical Data:	N810.FTP	N810.3FTP	N820.FTP	N820.3FTP	N820.3 FT.40P
Head Configuration	1-stage	2-stage	1-stage	2-stage	2-stage
Flow Rate l/min (cfm) at atmosphere	10 (0.35)	10 (0.35)	20 (0.71)	20 (0.71)	20 (0.71)
Ultimate Vacuum (Torr)	75	6	75	6	8
Operating Pressure (psi)	15	15	15	15	15
Connectors for tube (in.)	ID 3/8"	ID 3/8"	ID 3/8"	ID 3/8"	ID 3/8"
Permissible Gas & Ambient Temp.	+5...+40 C	+5...+40 C	+5...+40 C	+5...+40 C	+5...+40 C
Voltage/Frequency	115V/60hz	115V/60hz	115V/60hz	115V/60hz	115V/60hz
Motor Protection	IP44	IP44	IP44	IP44	IP44
Power / Current	110W / 1.3A	110W / 1.3A	145W / 1.9A	130W / 1.2A	130W / 1.2A
Weight	2.7 lbs.	3.1 lbs.	15.6 lbs.	20.5 lbs.	21.2 lbs.
Dimensions LxHxW (in.)	10.1/7.5/5.5	11.1/7.5/5.5	10.6/8.2/6.3	12.3/8.2/6.3	12.3/8.7/7.0
Part Number Ideal Vac	**P103380**	**P103376**	**P103379**	**P103378**	**P103381**
Part Number KNF	N810.FTP	N810.3FTP	N820.FTP	N820.3FTP	N820.3 FT.40P
Price*	**$1,270.00**	**$1,850.00**	**$1,515.00**	**$1,930.00**	**$2,995.00**

* Catalog Pricing Subject to Change

KNF NEUBERGER, INC. N940.5 APE-W

With Adjustable Pumping Speed

The powerful KNF N940 series diaphragm vacuum pumps are especially well suited for all applications requiring excellent suction speed with low absolute pressures. The KNF N940.5 APE-W pumps include a diaphragm stabilization system which allows for high suction, especially in the low-vacuum range. The KNF N940.5APE-W pumps are available with optional adjustable flow rate; in this case, either an potentiometer or an external controller with an analog signal input will alter the motor speed. These pump versions make it possible to adapt the flow rate to the requirements of a specific applications process.

These KNF Neuberger N940.5 APE-W diaphragm vacuum pumps are excellent for transferring and evacuation of air and gas applications. They are dry oil-free operating diaphragm pumps so they will not add contamination to the vacuum media. The improved KNF stabilization system and efficient brushless motor allows these pumps to run quiet and cool. These KNF Neuberger N940.5 APE-W diaphragm vacuum pumps automatically adapt to any input power supplied between the range of 90 to 264 VAC.

The KNF Neuberger N940 series of diaphragm vacuum pumps offer a high level of performance in a compact unit size. Typical applications are in the fields of analysis, chemistry, medicine, production technologies, and also support turbomolecular systems as roughing pumps.

KNF N940.5 APE-W SPECIFICATIONS

Technical Data:

Flow Rate l/min (cfm)	50 (1.7)
Ultimate Vacuum mBar (mTorr)	1.5 (1100)
Voltage/Frequency	90-264V/60hz
Motor Protection	IP20
Power / Current	180W / 1.85A
Weight	37 lbs.
Dimensions LxHxW (in.)	10.75/7.5/9.75
Part Number Ideal Vac	P105841
Part Number KNF	112369/112425
Price*	$5,523.00

* Catalog Pricing Subject to Change

Oerlikon Leybold
DIVAC L

This DIVAC L range of diaphragm vacuum pumps was developed especially for laboratory operations. It satisfies the highest expectations in terms of precision, reliability and ease of use. DIVAC L diaphragm pumps are suited for almost all requirements in the chemistry lab. They are basically corrosion and solvent resistant since their parts in contact with the pumped medium are made of PTFE (Teflon), FFPM (Kalrez) and PVDF (Solef).

Also listed is the **1.2 and 2.2 LAD for Saturated Vapors with The Automatic Drying System.** This is used in all applications where very moist and wet gases need to be pumped over extended periods of time. Here the pumping speed remains constant and the service life of the pumps is not impaired by the liquid.

2.2 L
2-Stage

2.2 LAD
2-Stage

Diaphragm Repair Kits available for these pumps - Call 505-872-0037

Oerlikon Leybold DIVAC Diaphragm Pump SPECIFICATIONS

Technical Data:	0.6 L	1.2 L	2.2 L	1.2 L AD	2.2 L AD
Head Configuration	2-stage	2-stage	2-stage	2-stage	2-stage
Flow Rate l/min (cfm) at atmosphere	11.3 (0.4)	19.8 (0.70)	34 (1.2)	19.8 (0.70)	34 (1.2)
Ultimate Vacuum (Torr)	6	6	6	7.5	7.5
Operating Pressure (psi)	15	15	15	15	15
Connectors for tube (in.)	G 1/8"	G 1/4"	G 1/4"	G 1/4"	G 1/4"
Permissible Gas & Ambient Temp.	+5...+40 C	+5...+40 C	+5...+40 C	+5...+40 C	+5...+40 C
Voltage/Frequency	115V/60hz	115V/60hz	115V/60hz	115V/60hz	115V/60hz
Motor Protection	IP44	IP44	IP44	IP44	IP44
Power / Current	110W / 1.3A	110W / 1.3A	145W / 1.9A	130W / 1.2A	130W / 1.2A
Weight	6.9 lbs.	9.3 lbs.	12.6 lbs.	20.5 lbs.	21.2 lbs.
Dimensions LxHxW (in.)	11/5.5/7.4	12.3/6.0/8.2	13.4/6.5/9.0	12.3/7.0/8.6	13.4/7.5/9.5
Part Number Ideal Vac	P103112	P103111	P103113	P103114	P103115
Part Number Leybold	13503	13509	13515	500752	500757
Price*	$1,475.00	$1,655.00	$1,995.00	$1,650.00	$2,350.00

* Catalog Pricing Subject to Change

PFEIFFER Diaphragm Pumps

MVP 020-3AC Pfeiffer P/N PKT01100 Ideal Vacuum P/N P103351

These MVP 020-3AC pumps run extremely quite. The inlet includes a 1 meter foreline hose and G1/4 connector for connection to turbo or other vacuum applications. These pumps include and on/off switch and can operate on dual voltage/dual frequency (voltage selector switch will need to be set for appropriate voltage operation). They are ideally suited for employment as backing pumps for Pfeiffer Vacuum Turbopumps and for integration into compact systems. A 3-stage diaphragm pump with optimized pumping speed and ultimate pressure. **1.2 m3/hr (0.7 cfm). Ultimate Pressure of 1.5 Torr. 1-Phase 90-126/180-254 VAC 50/60 HZ.**

P/N P103351 $2,295.00


MVP 020-3AC
3-Stage

Diaphragm Repair Kits available for these pumps - Call 505-872-0037

MVP 040-2
2-Stage

MVP 040-2 Pfeiffer Ideal Vacuum P/N PKT01210 P/N P103354

These New Pfeiffer MVP 040-2 two stage diaphragm pumps are optimized for pumping speed. They can be used for pumping of dry and non-corrosive gasses. The inlet and exhaust of these Pfeiffer MVP40-2 diaphragm pumps are G 1/4 (1/4 Inch "G" BSPP thread). This thread size is primarily used in Europe and Great Britain. We sell adapters on this web site to converts "G" BSPP thread to a KF 16 flange more commonly used in the universal world wide vacuum market. The outlet is provided with a G 1/4 silencer and these pumps have UL/CSA approval (voltage selector switch that needs to be set for appropriate voltage operation)
2.4 m^3/hr (1.4 cfm). Ultimate Pressure of 3.0 Torr. 1-Phase 100-115/200-230 VAC 50/60 HZ.

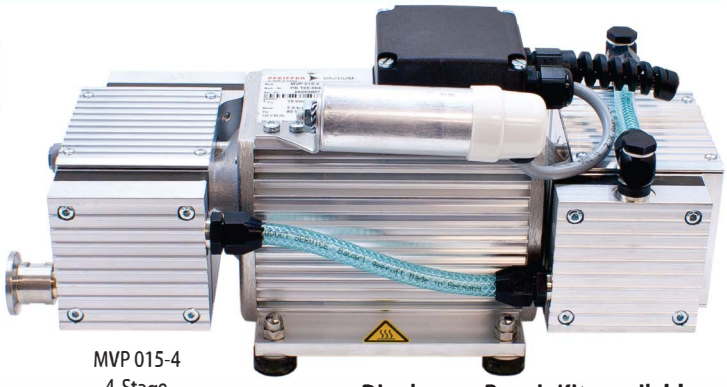
P/N P103354 $2,495.00

Diaphragm Repair Kits available for these pumps - Call 505-872-0037

MVP 015-4 Pfeiffer Ideal Vacuum P/N PKT05064 P/N P103411

This New Pfeiffer MVP 015-4 Diaphragm Membrane Pump runs extremely quite. The inlet has a KF16 flange connector for connection to turbo or other vacuum applications. It is ideally suited for employment as a backing pump for the Pfeiffer Vacuum Turbo pumps and for integration into compact systems. This is a 4 stage pump. **1.1 m^3/hr (0.6 cfm). Ultimate Pressure of 0.40 Torr. 1-Phase 100-115/200-230 VAC 50/60 HZ.**

P/N P103411 $1,995.00


MVP 015-4
4-Stage

Diaphragm Repair Kits available for these pumps - Call 505-872-0037

* Catalog Pricing Subject to Change

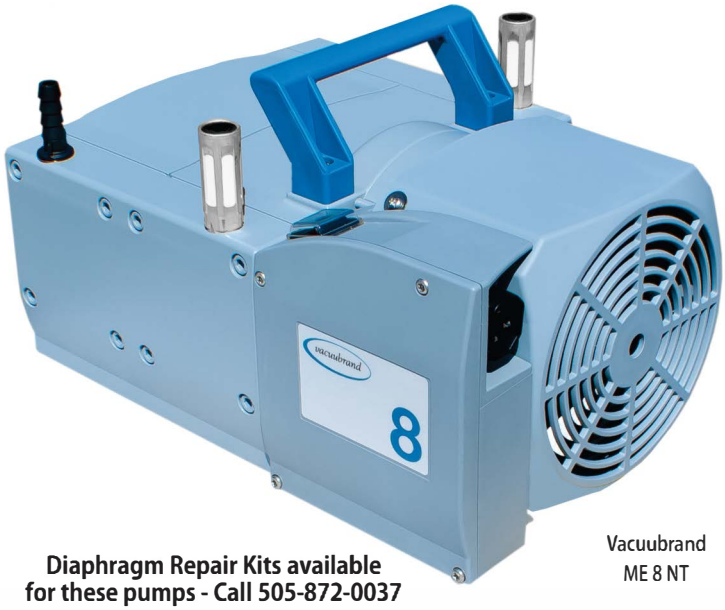
Vacuubrand

ME 8 NT

Vacuubrand P/N 734003
Ideal Vacuum P/N P103740

The Vacuubrand ME 8 NT pump is an excellent solution for continuous, oil-free evacuation and pumping of gases. All parts in contact with pumped media are made of aluminum and selected plastics, and allow a wide range of applications for non-corrosive gases. The highly flexible, fabric-reinforced double diaphragm made of FPM is ideal for extended operating life. These pumps with four heads provide very high pumping speed. The new NT-series features improved performance and is easy to use and maintain. They are lightweight, portable and enable you to move them to wherever and whenever you need vacuum. Connect the pump to your system with a vacuum hose and setup is complete. Hose connections are 3/8 inch ID barb (10mm) style connectors. Outlets are G 1/4" - with 2 Silencers. **8.1 m^3/hr (4.8 cfm). Ultimate Pressure of 52 Torr. 1-Phase 115 VAC 60 HZ.**

P/N P103740 $3,881.00



Vacuubrand
ME 8 NT

Diaphragm Repair Kits available for these pumps - Call 505-872-0037

Welch DryFast

2014	Welch	P/N 2014B-01
	Ideal Vacuum	P/N P105076
2034	Welch	P/N 2034B-01
	Ideal Vacuum	P/N P105075

Preserve your budget while enjoying the advantages of a Welch DRYFAST vacuum pump. Chemical resistant Collegiate **Model 2014 or 2034** pump is perfect for MeCl2 and other volatile solvent rotary evaporations. Achieve precise vacuum control down to 9-40 torr using convenient adjustment knob. 25 lpm flow enables multi-user use for organic solvent filtrations and other routine chemistry lab operations – while enabling fume discharge to your hood. Modern, compact design and weighs between 15-21 lbs. depending on model.

2014

1.5 m^3/hr (0.9 cfm). Ultimate Pressure of 40 Torr.
1-Phase 115 VAC 60 HZ. - 15 lbs.

P/N P105076 $1,345.00

2034

1.5 m^3/hr (0.9 cfm). Ultimate Pressure of 9 Torr.
1-Phase 115 VAC 60 HZ. - 21.3 lbs.

P/N P105075 $1,875.00

WELCH
2014

Diaphragm Repair Kits available for these pumps - Call 505-872-0037

* Catalog Pricing Subject to Change

Welch Vacuum / Pressure Diaphragm Pumps WOB-L Piston 2522 / 2534

The Welch 2522 and 2534 are a vacuum and pressure pump all-in-one and are perfect for many common laboratory vacuum applications. They include dial pressure gauges, regulators, and moisture traps on both the vacuum low pressure and positive pressure sides of the pump. They produce vacuum on the suction side and pressurizes those evacuated gases to positive pressure one the other side. The Welch 2522 and 2534 includes both vacuum and positive pressure side regulators, dial gauges, and moisture traps. The two regulators and two gauges make it easy to meet your vacuum and pressure requirements. The vacuum regulator and vacuum dial gauge are attached to the intake port. The vacuum regulator allows the vacuum level to be set between roughly atmospheric pressure and the maximum vacuum allowed for the pump model. A moisture trap keeps water from accidentally being drawn into the unit. The pressure regulator and pressure dial gauges are attached to the discharge port. The pressure regulator allows discharge pressure to be set between atmospheric and the maximum possible for the pump model. Discharge air is filtered and noise is muffled with a filter.

The Welch 2522 and 2534 pressure and vacuum pump come with intake and discharge hose barbs which accept 1/4" ID rubber pressure and vacuum hose. Hose clamps should be used to hold the hose in place. Since the vacuum side operates in the viscous flow regime, the small diameter of the hose will generate minimal conductance loss. For best results, we recommend the length of the tubing between the chamber and the pump be kept as small as possible.

The Welch 2522 and 2534 pressure and vacuum pump come with dial gauges mounted on the regulator assemblies. The vacuum gauge gives negative pressure - that is pressure below atmospheric. The reference point for the vacuum gauge is atmospheric pressure. The pressure gauge gives pressure above atmospheric. The reference point for the pressure gauge is atmospheric pressure. Please keep in mind that atmospheric pressure tends to vary from day to day. As a result of this variability, the dial vacuum gauge will indicate slightly different maximum vacuum readings from day to day.

The pumps will handle humid air and all wetted aluminum pump parts are treated for corrosion protection from moisture. All other wetted parts are stainless steel. A plastic trap with a ball check valve is attached to the regulator assembly to prevent water condensate from accidentally being ingested into the pump. If there is a chance liquid may be drawn from the process under evacuation, we recommend and additional liquid trap be placed between the process and the pump. A simple liquid trap is a filtering flask. When a heavy load of water vapor is evolved from the vacuum process, a cold trap is recommended to help prevent damage to the pump mechanism.

2522 / 2534

Welch Vacuum / Pressure Diaphragm SPECIFICATIONS

Technical Data	Models: 2522	2534
Free Air Displacement		
CFM (l/m) 60hz.	.76(22)	1.2 (34)
Ultimate Pressure torr(mbar)	100(133)	70(93)
Motor HP (watts)	1/8 (93)	1/8 (93)
Tubing ID in.(mm)	1/4 (5)	1/4 (5)
Intake/exhaust Thread NPT	1/4	1/4
Weight lbs. (kg)	17 (7.7)	17 (7.7)
Dimensions LxWxH (in.)	8.1x8.8x10	8.1x8.8x10
Voltage	115 VAC	115 VAC
Part Number Ideal Vac	P105864	P105865
Part Number WELCH	2522B-01	2534B-01
Price*	$695.00	$880.00

* Catalog Pricing Subject to Change

Welch Standard Duty Diaphragm Pumps WOB-L Piston 2561 / 2562

These Welch 2561and 2562 laboratory duty dry oil-free dual stage diaphragm vacuum pumps are perfect for many common laboratory vacuum applications. They produce and ultimate vacuum pressure of 5 Torr and 7.5 Torr respectively. The 2561 includes a vacuum regulator with a built in vacuum gauge which is simple to adjust & monitor the vacuum level. The *2561 pump includes an inlet water trap with float ball that rises to seal off the vacuum pump in case of accidental ingestion of water and a muffler which quiets the pump and filters discharge air. These Welch diaphragm pumps operate on 1-Phase 110 to 120 VAC at 50/60 Hz and are designed for use with dry or containing water vapor applications only.

*The Welch 2562 does not include vacuum regulator, pressure gauge, or vapor trap

2561

Welch Standard Dry Vacuum Pump SPECIFICATIONS

Technical Data	Models: 2561	2562
Free Air Displacement		
CFM (l/m)	2.3 (65)	2.3 (65)
Ultimate Pressure torr(mbar)	5 (6.7)	7.5 (10)
Max. Pressure in Hg	29.8	29.6
Motor HP (watts)	1/3 (250)	1/3 (250)
Tubing ID in.(mm)	1/4 (7)	3/8 (10)
Intake/exhaust Thread NPT	1/4	3/8
Weight lbs. (kg)	16.5 (7.5)	16.5(7.5)
Dimensions LxWxH (in.)	17.3x6.5x10.5	17x7.5x12
Voltage	115 VAC	115 VAC
Part Number Ideal Vac	P105861	P105862
Part Number WELCH	2561B-50	2562B-01
Price*	$1,620.00	$1,050.00

2562

* Catalog Pricing Subject to Change

Welch Standard Duty Diaphragm Pumps WOB-L Piston 2585

These Welch 2585 laboratory duty dry oil-free dual stage diaphragm vacuum pumps are perfect for many common laboratory vacuum applications. The 2585 produces and ultimate vacuum pressure of 60 Torr 27.6 inches of Hg and includes a vacuum regulator with a built in vacuum gauge which is simple to adjust & monitor the vacuum level. The 2585 WOB-L pump includes an inlet water trap with float ball that rises to seal off the vacuum pump in case of accidental ingestion of water and a muffler which quiets the pump and filters discharge air. These Welch 2585 WOB-L diaphragm pumps operate on 1-Phase 110 to 120 VAC at 50/60 Hz and are designed for use with dry or containing water vapor applications only.

Welch Standard Dry Vacuum Pump SPECIFICATIONS

Technical Data	Models: 2585
Free Air Displacement	
CFM (l/m)	7.1 (201)
Ultimate Pressure torr(mbar)	60 (80)
Max. Pressure in Hg	27.6
Motor HP (watts)	1/3 (250)
Tubing ID in.(mm)	1/4 (7)
Intake/exhaust Thread NPT	1/4
Weight lbs. (kg)	24.5(11.1)
Dimensions LxWxH (in.)	17x7.5x12
Voltage	115 VAC
Part Number Ideal Vac	P105904
Part Number WELCH	2585B-50
Price*	$1,998.00

2585

* Catalog Pricing Subject to Change

Welch ChemStar DRY 2070/2080

For Corrosive Gases

FEATURES

- For Corrosive Gases & Vapors
- 50-millitor with High Flow
- Oil Free, No Cold Trapping
- PTFE Coated Oil Case
- Chemical Resistant System
- Compact & Low Maintenance

APPLICATIONS

- Drying Manifolds
- Small Freeze Dryers
- Small to Medium Vacuum Ovens
- Glove Boxes
- Concentrators / Evaporators
- Light Industrial

ChemStar DRY

WELCH CHEMSTAR DRY 2070/2080 Is a new dry vacuum system for demanding deep vacuum chemical process needs. This automated system easily handles the most challenging chemical vacuum applications. Pump corrosive gases with the ChemStar Dry and do away with messy oil changes and the use of cold trapping for corrosive chemicals. The New ChemStar Dry is a multistage diaphragm pump. It is software driven and fully chemical resistant. Vapor load optimization and system self cleaning are electronically controlled. High gas flow and deep vacuum for demanding processes is now available in a compact unit, about the size of a free standing tower computer.

Model	IDEAL VACUUM P/N	WELCH P/N	Voltage	Price*
2070	P105751	2070B-01	115VAC 1Ø	$7,695.00
2080	P105752	2080B-01	115VAC 1Ø	$9,695.00

Welch ChemStar DRY SPECIFICATIONS

Model	Weight (lbs.)	L x W x H	Inlet & Outlet	Free Air Displacement Diaphragm Pump LPM	Max. Flow LPM (m3/hr.)	Ultimate Pressure(torr)
2070	50	18.1x8.5x18.4	KF NW25	35 (1.24CFM)	150 (9) (5.3 cfm)	0.05
2080	88	22.5x10.5x17.8	KF NW25	120 (4.24CFM)	300 (18) (10.6 cfm)	0.05

* Catalog Pricing Subject to Change