

Vacuum Pump and Systems Catalog



WELCH-ILMVAC
APPLIED VACUUM TECHNOLOGY

Laboratory Vacuum Catalog

*Application
Specific
Designs*

The business of Welch-Illvac is providing you with products and expertise to address your application needs. The Welch product line offers a wide range of vacuum pumps – each expertly designed for optimum function in your application. Consult your Welch-Illvac representative to make vacuum work right for you.

*Application
Specific
Consulting*

APPLICATIONS

Chemistry Lab

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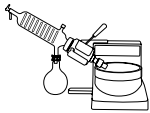

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Key Advantages of Application Specific Pumps and Systems

- Right pump ensures cost effectiveness
- Progressive design – Green and Safe
- Minimal maintenance
- Needed accessories & instructions included
- Application certified by Welch-Illvac

Pump Quick Selection Chart

For Common Lab Applications

APPLICATION	WELCH VACUUM PUMPS & SYSTEMS	FLOW RATE X VACUUM	UNIT PHOTO	MODEL	SEE PAGE
Rotovap Volatiles, Low B.P. B.P. <100°C Samples 0-5 Liter 	"Rotovap System" DRYFAST® System with regulator, gauge, condensate jars, self-cleaning auto-purge	35 l/min. 9torr (12mbar)		202501	2-5
Rotovap DMF, Toluene, other non-volatiles Samples 0-5 Liter 	"High Boiler System" DRYFAST ULTRA® System & Pump	35 l/min. 2torr (2.7mbar) 35 l/min. 2torr (2.7mbar)		202801 2042B-01	2-5
Concentrator Samples <2ml x 24, DNA Pelleting 	"Concentrator Pump" DRYFAST ULTRA Pump DRYFAST ULTRA System Compatible with: SpeedVac® & CentriVap®	35 l/min. 2torr (2.7mbar) 35 l/min. 9torr (12mbar)		2042B-01 2044B-01 202501	14 14 13
Vacuum Manifold Schlenk Line 	"Vacuum Manifold Pump" DUOSEAL® & CHEMSTAR® Pumps GEM® System	25 l/min. <1 millitorr (1.3x10 ³ mbar) 31 l/min. 100 millitorr (0.13mbar)		1400B-01 or 1400N-01 8890A-70	6
Freeze Dryer 	"Freeze Dryer Pump" Direct Drive pump with integral oil filtration system CHEMSTAR Low RPM Pump	173 l/min. 160 l/min.		8917A-80 1402N-01	9, 18
Filtration 	"Filtration Pump" Chemical Duty Standard Duty	25 l/min. 22 l/min.		2014B-01 2522B-01	7, 15
Aspiration/Automation Cell Harvester Plate Washer 	"Aspiration System" Standard Duty Chemical Duty	100 l/min. 27.6 in. Hg (80mbar) 70 l/min. 28.5 in. Hg (47mbar)	 (80mbar)	2567B-50 2047B-01	12
Cell Culture Aspiration 	"Cell Culture Station" With gauge, regulator, 1200 ml autoclavable trap with liquid blockade system	34 l/min. 27.2 in. Hg (93mbar)		2515B-75	16, 17
Vacuum Oven Drying Degassing 	"Vacuum Drying Pump" Standard Duty Dry Chemical Duty Dry DUOSEAL	100 l/min. 70 l/min. 160 l/min.		2581B-50 2047B-01 1402B-01	8, 15
Gel Dryer 	"GELMASTER™ System" Complete Gel Drying Vacuum System with hose, valve	>50 l/min. of Vapor @ 28 in. (66mbar)		142601	13

Rotary Evaporators

THE WELCH SELF-CLEANING FAMILY . . . COMPLETE VACUUM SYSTEMS FOR ROTARY EVAPORATORS



2028



2027



2025

Pump Model
Selector for
Rotovaps p. 4

- Anti-bumping / foaming feature with controlled evaporation rate
- Rugged corrosion resistant PTFE construction
- Self-cleaning for long life
- 2torr (2.7mbar) models strip DMF at 35° C bath temperature
9torr models (12mbar) models strip most common solvents
- Programmable 2028 features *walk away* automation

For Specifications &
Ordering Information,
See p. 22, 23

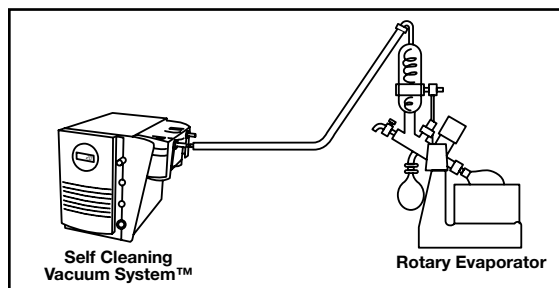
SELF-CLEANING DRY VACUUM SYSTEMS™ FOR ROTARY EVAPORATORS

are complete vacuum solutions for rotary evaporation. All three systems feature rugged corrosion resistant PTFE diaphragm pumps for low maintenance and long life. All models feature adjustable vacuum to optimize for a variety of solvents. Also included with all models: digital or analog vacuum read-out, inlet and outlet traps to protect the pump and exhaust line from liquids, gas ballast or no bumping/foaming key as an emergency "bump stop", and automatic self-cleaning purge at shutdown. The self-cleaning feature and patent pending vacuum control technology contribute to Self Cleaning pumps' long diaphragm life. All models are 35 l/min at 60Hz (29 l/min. at 50Hz).

Model 2028 programmable high vacuum. Five user entered programs with one or two solvents and times, keyboard or electronic dial vacuum selection, digital vacuum display with menu enabled programming, 2torr ultimate vacuum for fast stripping of DMF and other solvents with boiling point < 160° C.

Model 2027 digital adjustable high vacuum. Digital vacuum read-out, vacuum regulator, 2torr ultimate vacuum for fast stripping DMF and other solvents with boiling point < 160° C.

Model 2025 general usage meter vacuum read-out, vacuum regulator, 9torr ultimate vacuum for fast stripping of most common rotary evaporation solvents. Fast stripping of rotary evaporator solvents with boiling point < 100° C.



Typical Configuration

**Green
By Design**

CAPTURE™ vapor emissions from rotary evaporators with an integrated solvent recovery system - see p. 5



Rotary Evaporators

WELCH DRYFAST® CHEMICAL DUTY PUMPS

Pump Model Selector for Rotovaps p. 4

- Powerful and Tune-able
- Strip DMF Fast at 35° C



2034, 2044



2032, 2042

DRYFAST PUMPS FOR ROTARY EVAPORATORS provide the powerful vacuum needed for demanding evaporations without the use of oil pumps prone to solvent induced failure. Use DRYFAST ULTRA 2torr (2.7mbar) ultimate vacuum to strip DMF fast. Use the DRYFAST tune-able vacuum adjustment to optimize your evaporation. Choose from four DRYFAST models to fit your evaporation needs. All have PTFE heads, perfluoroelastomer valves, and fluorinated wetted surfaces.

For Specifications & Ordering Information, See p. 22, 23

Application Note:

Use tune-able vacuum adjustment to increase vacuum until bubbles form in the evaporation flask – then back off slightly. Reduce vacuum for fast reaction to bumping or foaming.

WELCH-ILMVAC LVS – LABORATORY VACUUM SYSTEMS

All-in-one dry vacuum pump, controller, traps and solvent recovery

- Automatic Distillation
- Green Modular Design
- Accurate 1.5torr Vacuum
- Very Quiet Running
- Compact Chemical Duty System



WELCH-ILMVAC LABORATORY VACUUM SYSTEM (LVS) provides optimal and trouble free solvent stripping. Automatic distillation can be achieved utilizing a reference solvent table and programmable vacuum control.

Able to handle aggressive chemicals, all wetted parts are made from high quality PTFE, PEEK, PVDP, PP materials and clear plastic coated glassware.

The Green modular design ergonomically incorporates an inlet trap as well as an efficient solvent recovery condenser combining ease of access with a commitment to protecting the environment.

The key advantage of the new LVS system comes from the Ecoflex control philosophy which continuously adjusts the pumping speed to match the vapor load produced by the evaporation process, regardless of changes in other parameters.

Specifications

Ilmvac Model

LVS 105 T-10 ef

Free Air Displacement,

l/min. 60/50Hz

20 / 17

Ultimate Vacuum Pressure, torr

1.5

Maximum Vacuum, in. Hg

29.86

Tubing needed, I.D. in.(mm)

1/4(7)

Weight, lbs.(kg)

21(9.5)

Power (Kw)

0.83

Input Voltage / Frequency

90V - 260V, 50/60 Hz

Programmable

Repeat Functions

Yes

Stored Programs

Yes

Solvent Table

Yes

Overall Dimensions,

L x W x H in.(cm)

10.2 x 9.8 x 17.1
(26 x 25 x 43.4)

Ship Weight, lbs.(kg)

33(15.0)

Shipping Carton Dimensions,

L x W x D in.(cm)

21.5 x 16.2 x 22.5
(54.6 x 41.1 x 57.2)

Catalog / Ordering Number

114184

Rotary Evaporators

LOW BOILING POINT SOLVENT PUMP



2014

- Effective evaporation for acetone, methylene chloride, etc.
- Corrosion resistant PTFE dry pump
- Most economical Welch PTFE dry pump for rotary evaporation use

MODEL 2014 is effective for rotary evaporation of low boiling point solvents such as acetone, methylene chloride, and ethanol. Model 2014 is the most economical Welch dry pump suitable for rotary evaporation. The rugged, low maintenance, low repair dry pump features PTFE heads, perfluoroelastomer valves and fluorinated plastic at all wetted surfaces. Model 2014 has the chemical resistance to handle aggressive vapors.

For Specifications & Ordering Information, See p. 22

VERY HIGH BOILING POINT SOLVENT PUMP



8890A-70

- Effective evaporation for DMSO and other very high boiling point solvents
- Adjustable vacuum to prevent bumping
- Gear pump mechanism is tolerant of vapors
- Exhaust mist eliminator prevents oil loss

The **GEM® MODEL 8890A-70 VACUUM SYSTEM** is ideal for rotary evaporations with very high boiling point solvents. The rugged gear pumping mechanism has a wide range of operating pressures. It has high efficiency for pumping vapors without condensing them into the pump. The complete system comes with a gauge, vacuum regulator for easy vacuum control and an exhaust mist eliminator for recycling oil back into the pump.

For Specifications & Ordering Information, See p. 31

MODEL SELECTOR

Welch pump models recommended for selected rotary evaporation solvents

Solvent	Methylene chloride Acetone Chloroform Ethanol	Trichloroethylene n-Propyl alcohol Hexane Water Toluene Acetic Acid	1,1,2,2-Tetrachloroethane DMF Pentachloroethane	DMSO Polymers
Boiling Pt.	80° C	110° C	160° C	195° C
Recommended Models	2014	2025 2044 2034	2028 2027 2042 2032 LVS 105 T-10 ef	8890A-70 1400 Standard Vessel Large Vessel

Rotary Evaporators

CAPTURE VAPOR RECOVERY SYSTEM . . . COMPLETE YOUR VACUUM SYSTEM FOR ROTARY EVAPORATORS

*Green
By Design*



DRYFAST® and DRYFAST ULTRA®

- Protects lab air quality
- Enables Cradle-to-Grave chemical handling
- Spatially efficient, easy to setup / clean-up



Self-Cleaning
Dry Vacuum System™

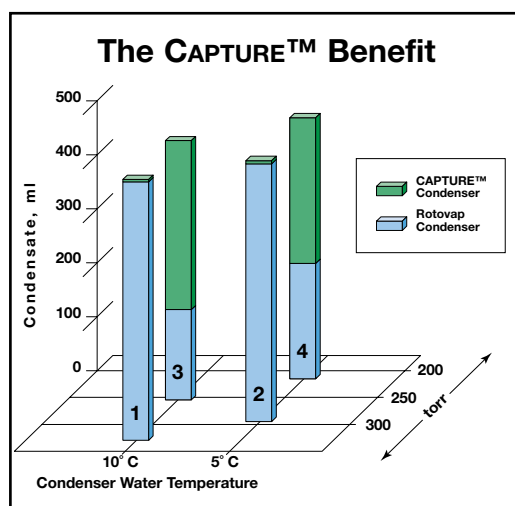


Figure 1: Methylene Chloride distillation, 500ml

Evaporating a solvent under less-than-ideal conditions? Now you can overcome evaporator setup and condenser cooling limitations to minimize vacuum pump solvent emissions. The Welch CAPTURE™ vapor recovery system can improve total solvent emission recovery efficiency to near 99%. The CAPTURE option is a highly efficient condenser and mounting system, cooled by tap or chilled water.

Even under good distillation conditions, volatile solvent vapors can be emitted from your vacuum pump. With stressed conditions, a high percentage of solvent vapors can be pulled through your vacuum pump – and discharged into the atmosphere. Use CAPTURE to maintain excellent solvent recovery for the most difficult distillations.

Figure 1 illustrates the importance of using a CAPTURE recovery system. Using a 35° C water bath and constant rotational speed, methylene chloride is distilled using two temperatures of cooling water for both the rotovap and CAPTURE condensers. The lower the condenser operating temperature, the more efficient the collection.

At properly moderated vacuum levels (Bars 1 & 2), the rotovap condenser contains a high portion of the condensate.

At full vacuum (Bars 3 & 4), vapors are pulled through the vacuum pump and released into the atmosphere – unless you use a CAPTURE recovery system!

Ordering Information

Description

Includes condenser, 1 liter round bottom flask, tubing, support and clamps.

Cat. No.

1420H-18

Application Note for Operating Solvent Emission Recovery Systems Effectively

More Vacuum is NOT always Better a Vacuum

Good emission control begins with proper balance of your vacuum application. If vapors are pulled through a foreline trap faster than they can condense, the downstream necessity for additional trapping is increased. Proper use of Tune-able pumps like the DRYFAST, DRYFAST ULTRA, and Self-Cleaning Dry Vacuum Systems will enable precise vacuum control and reduce emission potential. Rotary evaporation applications should always operate at vacuum levels below “bumping” potential. Use mass balance to verify that your cold trap is actually capturing all solvents/solids – not passing it through to the pump.

Vacuum Manifolds (Schlenk Line)

COMPACT VACUUM MANIFOLD PUMP



8890A-70

MOST DURABLE VACUUM MANIFOLD PUMP



1400/1400N

- “Right-sized” vacuum pump for vacuum manifolds
- Compact pump takes little space
- Rugged gear pump is tolerant of vapors
- Fully accessorized

GEM® 8890A-70 HIGH VACUUM SYSTEM is effective for vacuum manifold drying of large manifolds. With its 1.1 cfm (31 l/min.) flow and its ultimate vacuum of 0.1 torr (0.13 mbar), GEM dries 4 to 6 large sample vessels at once. When operated according to Welch recommendations, the system has the optimum flow and vacuum for long-term durability on vacuum manifolds. It also includes an exhaust oil recycler to capture oil mist (“smoke”) from the pump exhaust and return it to the pump. A foreline cold trap with temperature of -80° C or lower is always recommended with vacuum manifold systems.

See Application Note for Vacuum Manifolds

For Specifications & Ordering Information, See p. 31

- High contamination tolerance
- Best ultimate vacuum, <0.001torr
- Low RPM for lower friction and wear
- Fewer moving parts increase pump durability

DUOSEAL 1400 or CHEMSTAR 1400N HIGH VACUUM PUMPS are effective for drying using large vacuum manifolds. The <0.001 torr ultimate pressure results in superior drying performance for the most difficult samples. Belt-drive pumps are known for their durability. Low pump RPM reduces wear and minimizes temperature to reduce oil degradation. The large oil capacity dilutes contaminants for extended service life. For pumping corrosive gases, CHEMSTAR 1400N also incorporates corrosion-resistant components for superior performance. A foreline cold trap is always recommended when pumping on vacuum manifolds. Requires but does not include exhaust filter catalog number 1417 or 1416D.

See Application Note for Vacuum Manifolds
“Recommended pump capacity”.

For Specifications & Ordering Information, See p. 32, 33

Application Note for Vacuum Manifolds

Vacuum manifolds are commonly used for the final drying of samples removed from a rotary evaporator. Organic solvents and/or acids left behind during the distillation process are removed over several hours or more depending on the sample size. A foreline cold trap (see p. 40) is always recommended to minimize the ingestion of the solvents. An acid neutralization trap is also recommended between the cold trap and the pump when strong acids are present in the sample. When the drying is finished for the day, it is very important to either turn the pump off and remove/clean the trap or isolate the trap from pump using a valve. The reason for this is to prevent sublimation of condensed solids or vaporized liquids from the cold trap recondensing in the pump.

The use of large capacity pumps (greater than 40 l/min.) on vacuum manifolds shorten the oil change interval. This occurs because the larger pump will accelerate the sublimation process. When a large capacity pump is used, it is common to see at the end of a drying run that no condensables are in the trap because the chemicals have been drawn into the pump. There is a common misconception that a pump with a large pumping capacity will shorten the drying time. Due to tubing restrictions in the manifold and stopcock, this is not the case. Drying time differences between a large and a small pump occur only when the manifold system is leaky! Leaky vacuum systems should be repaired.

Filtration

ACIDIC OR BASIC SOLUTIONS / ORGANIC SOLVENTS



2014

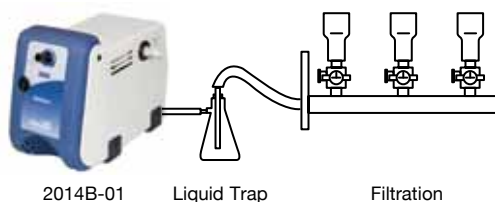
- Recommended for filtering acidic or basic solutions and organic solvents.
- Rugged corrosion-resistant PTFE construction
- Oil-free - no oil changes, no oil mess
- Compact, lightweight, portable

CHEMICAL DUTY DRY PUMPS FOR VACUUM FILTRATION are effective for filtering acidic or basic solutions and organic solvents. These rugged oil-free pumps are corrosion resistant with all fluoroplastic materials at wetted surfaces. Four models power filtration setups of 1 to 6 funnels and larger.

For Specifications & Ordering Information, See p. 22

MODEL SELECTOR	
FILTRATION FUNNELS	ACID/BASE/SOLVENT
1-2	2014B-01
1-6	2037B-01
6 Funnel manifold	2047B-01

*Note: For aqueous solution filtration pumps, see p. 15



2014B-01

Liquid Trap

Filtration

Vacuum Chamber

PORTABLE HIGH VACUUM ROUGHING PUMP

- High vacuum to < 0.003 torr
- Isolation device protects samples & system
- Portable, compact pump

DIRECT DRIVE HIGH VACUUM PUMP is effective for roughing vacuum chambers to < 0.003 torr. The pump is also effective for roughing annular spaces and transfer lines to a deep vacuum. Various models have flow from 73 to 320 l/min. Pumps are compact and transportable. The optional exhaust filter is recommended for elimination of oil mist during high vacuum roughing applications. See p. 43 for the correct exhaust filter for your model.



8912

For Specifications & Ordering Information, See p. 30

Application Note for Roughing Vacuum Chambers

Evacuation of chambers, annular spaces and transfer lines is common in material science, physics and physical chemistry labs. These vacuum tight spaces are evacuated to provide insulation, roughing out the volume prior to using a turbomolecular pump, cryopump regeneration, etc. The depth of vacuum and size of the space determines what type and size of pump is needed.

A dry pump with a pumping capacity of 100 l/min. can be used to evacuate 840 liters volume (0.84 cubic meters) in a reasonable time. High vacuum pumps based on oil sealed rotary vane technology use the rule of thumb of 1 to 1.5 times the volume of space to determine pumping capacity (300 liters volume needs a 300 to 350 l/min. pump). The reason for the differing rule on oil sealed pumps is that the evacuation needs to be below 10torr in less than 10-15 minutes to avoid poor lubrication and overheating the internal pumping mechanism. Oil-free piston pumps don't overheat while evacuating larger chambers, however the time to maximum vacuum takes longer the smaller the pumping capacity.

Glove Box

HIGH VACUUM FOR STAINLESS STEEL / GLASS GLOVE BOXES



1402

For oil free evacuations to 5torr, see model 2581, p. 27

- High vacuum to 0.0001torr
- High flow
- Very rugged and reliable

DuoSEAL® VACUUM PUMPS are effective for stainless steel and glass glove boxes with high vacuum requirements. The deep vacuum model 1402 vacuum pump provides high flow vacuum for the regeneration cycle of your glove box. The rugged DuoSEAL® pump effectively manages the contaminants that are evolved during regeneration. This makes for a very reliable vacuum system for your critical glove box applications.

NOTE: Optional exhaust filter catalog number 1417A is recommended for glove box applications to control exhaust oil mist (see p. 40).

For Specifications & Ordering Information, See p. 32

Application Note on Glove Boxes

Standard glove boxes and transfer chambers are not normally evacuated much below 25torr (29" Hg) due to plastic material limitations. Both acrylic and polycarbonate which are used in standard glove boxes are not suited for deep vacuum (1torr operation).

High end glove boxes capable of deeper vacuum normally are constructed of stainless steel & heavy glass plates. These glove boxes include continuous gas purification of the main glove box chamber using a circulating fan or pump. After about 6 months, the purifier canister is regenerated by passing inert gas over the unit while it is heated followed by a few hours of full vacuum. Glove box manufacturers vary in their recommendation of the depth of vacuum needed in this final step to regenerate their purification canister.

Vacuum Oven

ACIDIC OR BASIC SAMPLES, ORGANIC SOLVENTS

- Fast drying for vacuum oven samples
- Oil-free, no oil changes, no oil mess
- Rugged corrosion-resistant PTFE construction
- Compact, lightweight, portable

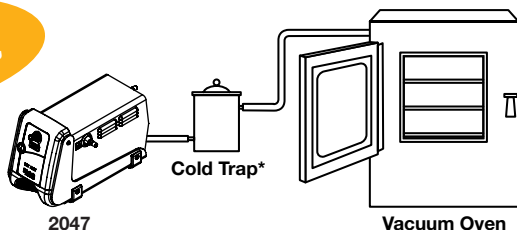
DryFast PTFE DRY PUMPS FOR VACUUM OVENS are effective for drying samples that contain organic solvents or are strongly acidic or basic. Recommended for work with corrosive fumes and the fluorinated contact surfaces are resistant to organic attack. Because the pumps are oil-free, there is no oil contamination of samples, no exhaust smoke, no oil leaks, and best of all, no oil changes. The pumps have tune-able vacuum adjustment knobs.



2042, 2047

Cold traps are recommended for high vapor loads. See CAPTURE™ recovery system, p. 5 or cold traps, p. 40.

For Specifications & Ordering Information, See p. 22



2047

Vacuum Oven

MODEL SELECTOR

VACUUM OVEN SIZE	ACIDIC / BASIC / ORGANIC SAMPLES
Less than 2 ft ³ (57L)	2042B-01
2 to 4.5 ft ³ (57 to 127L)	2047B-01

*Note: For aqueous solution drying pumps, see p. 15

Freeze Dryers

EXTENDED SERVICE INTERVAL IN A COMPACT PUMP



8917A-80

- Holds up to harsh chemicals used in proteomics and combinatorial chemistry
- System includes continuous acid neutralization and oil filtration
- Compact, quiet direct drive pump

THE Welch FREEZE DRYER VACUUM SYSTEM is effective for freeze drying or concentrating by freeze dryer of samples including harsh chemicals such as TFA, acetonitrile, HBr and others. These chemicals quickly attack the vacuum pump oil of unprotected vacuum pumps. The 8917A-80 system includes a powerful 173 l/min. (143 l/min. at 50Hz) vacuum pump that is protected by an integral oil filtration system. The oil filtration system neutralizes acids and removes solid reaction products from the oil. The system also has a large oil capacity of 1.3 liters that dilutes contaminants that mix with the pump oil during freeze drying runs. The system includes Welch Gold Oil (see p. 46) which has excellent resistance to chemical attack.

For Specifications & Ordering Information, See p. 31

RUGGED PUMP FOR CORROSIVE VAPORS



1402N

- Lower rotational speed for less wear and longer life
- Vital parts are corrosion resistant
- Large oil reservoir dilutes contaminants

CHEMSTAR® belt driven vacuum pumps are the most rugged Welch vacuum pumps for freeze drying applications. The design of these pumps makes them more tolerant of chemical contamination. The large 2.1 liters oil capacity dilutes contaminants. Lower belt drive RPM lowers operating temperature, thus reducing chemical activity. Lower RPM also results in less wear and longer operating life. Vital pump parts are corrosion resistant. The pump includes Welch Gold Oil (see p. 46) which has excellent resistance to chemical attack.

For Specifications & Ordering Information, See p. 34

Application Note for Freeze Drying

Drug discovery labs are using freeze dryers for the final drying step when samples isolated by HPLC and LC include heat sensitive proteins and peptides. These samples are typically dissolved in a water, acetonitrile, and 0.1% TFA solution. Acetonitrile and TFA and its by-products will cause rapid breakdown of pump oil, changing its viscosity and leading to pump failure—sometimes after only a few runs.

There is no way to prevent the ingestion of harsh chemicals into the pump. Three steps to minimize ingestion of harsh chemicals are:

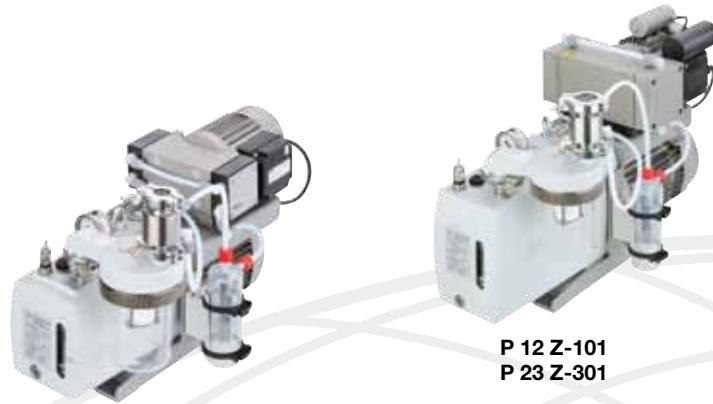
1. Clean the freeze dryer's condenser after each freeze drying run to prevent sublimation of the frozen chemicals into the pump.
2. Size the pump to the freeze dryer. Pumping speed that is too high will shorten residence time in the condenser, reducing its trapping efficiency.
3. Spread the drying of multiple samples over time to evenly distribute the vapor load on the condenser.

CAUTION: For high acetonitrile vapor loads, add a cold trap operating at -75°C or colder.

Freeze Dryers

Advantages

- Reliable vacuum for tough applications
- Long pump life
- Pump maintenance greatly reduced



P 6 Z-101

P 12 Z-101
P 23 Z-301

Specifications

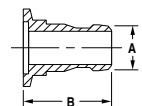
Ilmvac Model	P 6 Z - 101	P 12 Z - 101	P 23 Z - 301
Free Air Displacement			
cfm(l/min.)@60Hz	6.6(110)	13.2(220)	25.2(420)
m ³ /hr(l/min.)@50Hz	5.8(97)	11.0(183)	21.0(350)
Ultimate pressure, mbar(torr)	2x10 ⁻³ (0.0015)	2x10 ⁻³ (0.0015)	2x10 ⁻³ (0.0015)
Motor Power, watts(HP)	400(.54)	900(1.21)	900(1.21)
Gas Ballast	yes	yes	yes
Oil Capacity, Liters	0.55	1	0.82
Tubing Needed, ID mm(in.)	19(0.75)	19(0.75)	19(0.75)
Intake/Exhaust Fitting ¹	NW 16	NW 25	NW 25
Weight kg(lbs.)	25.5 kg	42.5 kg	46.0 kg
Overall Dimensions			
L cm(in.)	50(19.7)	59(23.2)	59(23.2)
W cm(in.)	33(13.0)	34.5(13.6)	34.5(13.6)
H cm(in.)	34(13.4)	42(16.5)	42(16.5)
Ship Weight, kg(lbs.)	45.3(100)	52.6(116)	56.1(124)
Shipping Carton Dimensions			
LxWxH cm(in.)	65x41x48 (25.6x16.1x19)	65x41x48 (25.6x16.1x19)	65x41x48 (25.6x16.1x19)

Eliminate the harmful vapors that destroy your pump in the most demanding vacuum applications. The Chemvac Pump draws a deep, high-flow vacuum – suitable for freeze dry applications – with a powerful Rotary Vane Pump. Harmful ingested fumes that would compromise the primary pump's oil are promptly degassed by Chemvac's secondary vacuum – a corrosion resistant PTFE diaphragm pump. Pumps shipped fully charged with synthetic oil.

Hose Conversion Accessories

Hose Adapter

- ISO NW to rubber vacuum hose
- Aluminum



ISO	Hose I.D.	A	B	CAT. No.
NW 16	7/16	0.625	1.65	501241
NW 16	5/8	0.750	1.65	501251
NW 25	13/16	0.875	1.73	501262

Dimensions are in inches.

For more conversion accessories and rubber hose see p. 38

Ordering Information

Wired for 115V, 50/60Hz, 1Ph with N. Amer. 115V Plug	109030-13	---	---
Wired for 230V, 50/60Hz, 1Ph with N. Amer. 230V Plug	109030-12	109024-12	109032

Repair Kits

Rotary Vane Pump repair kit	302076	302079	302080
Diaphragm Pump repair kit	402008-01	402008-01	402091-02

1. Pumps come with inlet flange adapter for 3/4" I.D. hose to fit most freeze-dryer systems.

Gold Vacuum Pump Oil

Specially formulated oil for challenging applications. This highly saturated synthetic oil is resistant to breakdown at higher temperature and is highly stable in chemical environments.

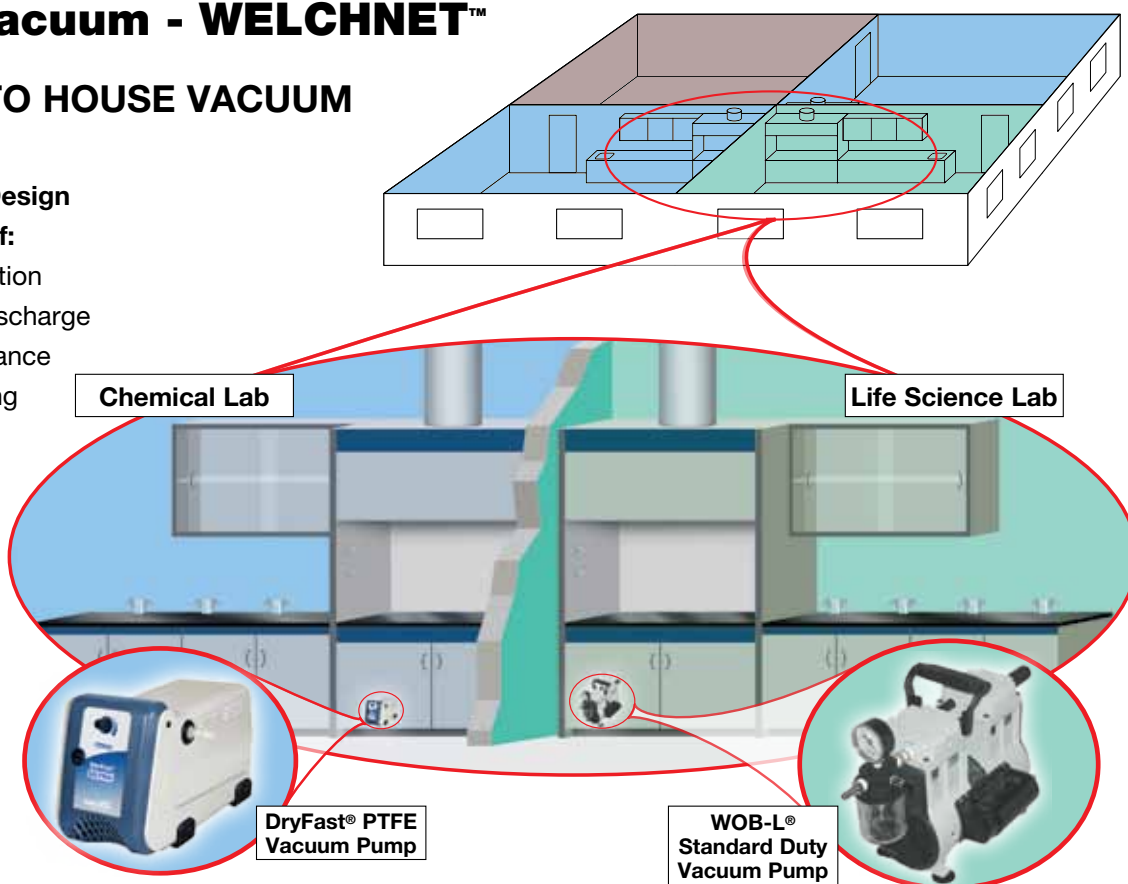
Size	CAT. No.
Liter	8995G-11
Gallon	8995G-15
5 Gallon	8995G-20



Multi-user Vacuum - WELCHNET™

ALTERNATIVE TO HOUSE VACUUM

- **Economical**
- **Flexible Modular Design**
- **Superior Control of:**
 - Cross-contamination
 - Environmental Discharge
 - Vacuum Performance
 - Chemical Handling



WELCHNET™ VACUUM SYSTEMS combine installation savings with a vacuum capability tailored to your Lab's work and material flow. Using standard lab fixtures, initial WelchNet costs are typically 30-50% lower than contractor-installed central vacuum systems. Install a Welch Application-Certified dry vacuum pump in your Lab to improve control of vapor commingling, vacuum line contaminants and atmospheric discharge.

Use WelchNet Vacuum Systems to enable common shared laboratory applications while benefiting from the advantages of a dedicated closed system. Achieve reliable control over your Lab's vacuum needs – the alternative to house vacuum operation uncertainties. Isolated WelchNet systems limit and control application cross contamination, eliminate building-wide vacuum line chemical accumulations, and enable the proper vacuum – as you need it.

Applications utilize high performance Welch dry vacuum pumps – oil-free for low maintenance. Using standard piping and outlet fixtures, configure your system to enable vacuum pump fume discharge to a hood or consult your Welch-Ilmvac representative for advanced solvent fume condensation options.

Application	Welch Vacuum Pump	Max # Outlet Fixtures ¹
Filtration	Standard Duty ²	
	2585B-50, 201 LPM, 27.6" Hg	20
	2567B-50, 100 LPM, 27.6" Hg	10
Chemical Duty	2546B-01, 45 LPM, 27.6" Hg	5
	2047B-01, 70 LPM, 27.6" Hg	8
Other Applications	2037B-01, 50 LPM, 27.6" Hg	5
	Consult your Welch-Ilmvac representative.	

1. Assumes all fixtures in use and vacuum supply lines. Note that vacuum line length, I.D. and number of bends effects conductance or flow rate of the vacuum pump.
 2. "Standard Duty" is for non-corrosive fumes – primarily aqueous.

Application Note for WelchNet™

Turn pumps on 1 minute prior to opening vacuum outlet valves. Keep unused vacuum outlet valves closed to maximize network vacuum. At shutdown, open 1 or more valves to air-clean volatiles from pump for 1 to 5 minutes. Switch off pumps, close all valves.

Lab Automation

HIGH FLOW FOR ASPIRATING 96 OR 384 WELL SYSTEMS



2567B-50

- Effective for use in automated systems
- Oil-free for low maintenance
- Liquid separator trap protects the pump
- Compact, lightweight, portable

STANDARD DUTY DRY PISTON PUMP FOR AUTOMATED SYSTEMS is effective for aspiration of aqueous or buffer samples. Designed for high throughput automated systems, Model 2567B-50 provides 100 l/min. flow at 60Hz (83 l/min. at 50Hz). This flow will provide aspiration power for 96 and 256 well systems. Because the pumps are oil-free there is no oil contamination of samples, no exhaust smoke, no oil leaks, and best of all, no oil changes. Pumps are complete with vacuum adjustment, dial vacuum gauge, and liquid separator trap.

Note:

1. Not recommended for aspirating acidic, basic, or organic vapors or gases.

For Specifications
See p. 26
Order below

HIGH FLOW FOR ASPIRATING HARSH CHEMICALS



2047

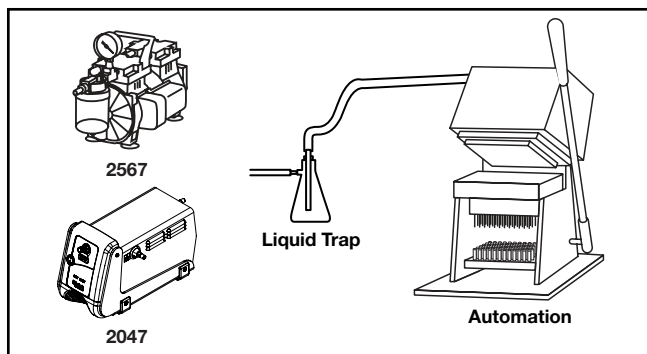
- Effective for use in automated systems
- PTFE dry diaphragm pump for aspirating acidic, basic, or organic liquids
- Compact, lightweight, portable

DryFast® PTFE DRY DIAPHRAGM PUMP FOR AUTOMATED ASPIRATION SYSTEMS is effective for aspirating liquids that are strongly acidic, basic or organic. Designed for high throughput automated systems, Model 2047 provides 70 l/min. flow at 60Hz (58 l/min. at 50Hz). This flow will provide aspiration power for 96 and 256 well systems. Because the pumps are oil-free there is no oil contamination of samples, no exhaust smoke, no oil leaks, and best of all, no oil changes.

For Specifications &
Ordering Information,
See p. 22

Ordering Information

Description	Cat. No.
Standard duty vacuum pump w/ filter, 115V, 60Hz, 1 Ph w/ N. American plug.	2567B-50
Chemical duty PTFE vacuum pump, 115V, 60Hz, 1 Ph w/ N. American plug.	2047B-01
Standard duty vacuum pump w/filter, 230V, 50Hz, 1 Ph w/ Cont. European plug.	2567C-50
Chemical duty PTFE vacuum pump, 230V, 50Hz, 1 Ph w/ Cont. European plug.	2047C-02



Application Note for Aspiration

The most common reason for vacuum pump failure is ingestion of liquid into the pump mechanism. Dry vacuum pumps are designed for pumping gases and vapors. Liquids ingested into the pump mechanism will either cause the valves to fail on Standard Duty Pumps or the diaphragm to rupture on Chemical Duty Pumps. Automation waste reservoirs should be sized at a minimum of 2X the daily collected volume. Welch recommends a liquid trap installation between the pump and aspiration system. At the end of each day, the automation reservoir and liquid trap need to be emptied.

Gel Dryer

NO HASSLE GEL DRYING

ONE PUMP FOR CONCENTRATOR AND GEL DRYER



142601



2025

- Fast results with crack-free gels
- No dry ice, no trap cleaning
- Drain condensate after 10-15 runs

- Saves valuable lab space
- Fast, high quality results
- Reliable PTFE dry pump

THE REVOLUTIONARY GELMASTER™ GEL DRYER VACUUM SYSTEM (>50 l/min. of Vapor@28 in. Hg) dries Acrylamide DNA or protein gels as fast as a high vacuum oil sealed pump with dry ice trap. However, it needs no dry ice and it eliminates cold trap cleaning. GELMASTER's unique design uses a patented room temperature vapor trap with a built-in dry vacuum pump. Condensate is collected in liquid form so there is no messy ice buildup and the tenth drying run is as fast as the first. When the collector reaches capacity, simply drain the contents and begin again. Does not require external cold trap.

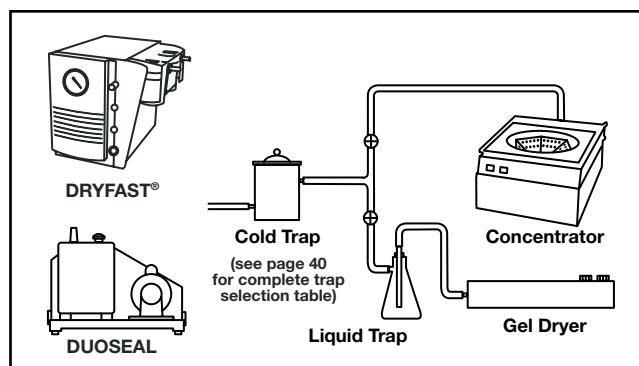
THE MODEL 2025 SELF-CLEANING DRY VACUUM SYSTEM™ with 35 l/min. (29 l/min. at 50Hz) of pumping capacity is effective for either a concentrator or gel dryer. Crowded laboratories find it convenient to use one vacuum pump for both devices. Simply assemble a basic manifold with tubing and two in-line valves. When the concentrator is in use, close the valve to the gel dryer, and vice versa. An in-line dry ice trap is recommended for this configuration.

GELMASTER comes complete and ready to use with 5 ft. (1.5m) of 3/8 in (10mm) ID PVC vacuum tubing, in-line stopcock, hose clamps, detachable line cord, and one liter of trapping fluid. An annual flushing of the collector with 8995C-70 Flushing Fluid is recommended for optimum performance.

For Specifications & Ordering Information, See p. 23

Ordering Information

Description	Cat. No.
115V, 60Hz, 1 Ph w/ N. American plug. Dmns: 14.25"L x 15.5"W x 14"H (36.2 x 39.4 x 35.6 cm). Weight: 33.5 lbs (15.2 kg)	142601
Same as 142601 w/ 220V, 50Hz with Continental Europe (Schuko) plug.	142602
Same as 142601 w/ 100V, 50/60Hz with US 115V plug (Japan)	142604
Same as 142601 w/ 220V, 50Hz with UK plug.	142606
Trapping fluid, 1 liter	8995C
Flushing fluid, 1 Gal (3.78 liter)	8995C-70



Works with all Gel Dryers Including:

Cat. No. (115V/60Hz)	Bio-rad	Hoefer	Fisher Biotech	Labconco
142601 or 202501	583	SE 1200,GD 2000	FB-GD-45-10	4330100, 4330150

Concentrator

DNA PELLETING



2044

OLIGONUCLEOTIDE PREP, BIOCHEMICAL / ORGANIC SAMPLES, LARGE SAMPLE VOLUME



2042

- Recommended for SpeedVac® and CentriVap® centrifugal concentrators
- Fast evaporation for ethanol and water
- Low maintenance – no oil changes
- Reliable chemical duty PTFE pump

DRYFAST® PUMP FOR VACUUM CONCENTRATORS is effective for DNA pelleting. DNA pelleting drying times are equivalent to oil-seal pumps without the oil changes, frequent repairs, and oil mess. Recommended for most centrifugal concentrators including Savant SpeedVac® and Labconco CentriVap®. Replace leaking, smoking oil-seal pumps with low maintenance, low repair PTFE dry pumps.

- Recommended for SpeedVac® and CentriVap® centrifugal concentrators
- Fast evaporation when used with a -50° C refrigerated trap
- Low maintenance – no oil changes
- Reliable chemical duty PTFE pump

DRYFAST® ULTRA DRY PUMP FOR VACUUM CONCENTRATORS is effective for oligonucleotide prep, biochemical and organic samples and large sample volumes when paired with a -50° C refrigerated trap. With this recommended configuration drying times are equivalent to those of oil-seal pumps. The PTFE dry pump eliminates oil changes, frequent repairs, and oil mess. Recommended for most centrifugal concentrators including Savant SpeedVac® and Labconco CentriVap®. Replace leaking, smoking oil-seal pumps with low maintenance, low repair dry pumps. DRYFAST® pumps have the chemical resistance to handle aggressive chemicals such as TFA, HCl, formic acid, and acetic acid.

For Specifications & Ordering Information, See p. 22

MODEL SELECTOR For Centrifugal Concentrator Pumps & Traps

DNA Pelleting (<1ml, 50/50 water/ethanol, up to 24 tubes/run)	Refrigerated trap optional	Welch 2044B-01, 9torr (12mbar)
Oligonucleotide Preps (2-4ml, buffers, up to 60 tubes/run)	-55° C Refrigerated trap highly recommended	Welch 2042B-01, 2torr (2.7mbar) Cold trap helps speed evaporation
Biochemical/Organic Samples up to 5ml x 60 tubes	-55° C Refrigerated trap required	Welch 2042B-01, 2torr
Biochemical or large samples up to 50ml/tube	-55° C Refrigerated trap required	Welch 2042B-01, 2torr

Filtration

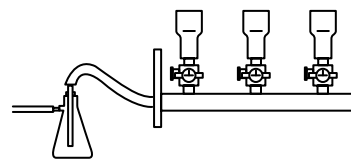
FOR AQUEOUS SOLUTIONS



2522



2546B-01



Filtration

- Ideal for filtering aqueous solutions/buffers
- Vacuum or pressure filtration
- Full featured for filtration
- Attractively priced

STANDARD DUTY DRY PISTON PUMPS FOR VACUUM FILTRATION are effective for filtering aqueous solutions that are not strongly acidic or basic. These attractively priced pumps are oil-free and loaded with powerful features for filtration; vacuum and pressure adjustments with gauges, liquid traps at inlet & outlet, liquid shutoff at inlet, and noise reduction. Two models power filtration setups of 1 to 6 funnels and larger.

MODEL SELECTOR	
FILTRATION FUNNELS	AQUEOUS SOLUTIONS
1-2	2522B-01
1-4	2534B-01
1-6	2546B-01
6 Funnel manifold	2567B-50

*Note: For corrosive solution or solvent filtration pumps, see p. 7

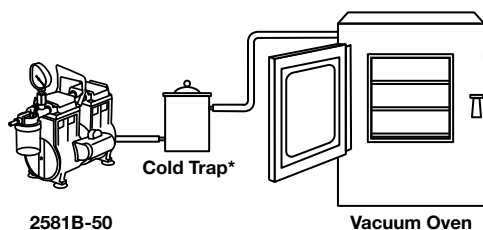
For Specifications & Ordering Information, See p. 26

Vacuum Oven

- Fast drying for vacuum oven samples
- Oil-free, no oil changes, no oil mess
- Attractively priced
- Compact, lightweight, portable

For Specifications & Ordering Information, See p. 26

STANDARD DRY PISTON PUMPS FOR VACUUM OVENS are effective for drying aqueous samples that are not strongly acidic or basic. These vacuum pumps were developed and tested for selected vacuum applications such as drying precipitates, food and soil samples, and glassware. Because the pumps are oil-free, there is no oil contamination of samples, no exhaust smoke, no oil leaks, and best of all, no oil changes. The pumps include a liquid trap at the inlet, vacuum adjustment, and gauge. Supplemental inlet cold traps are recommended for high water vapor loads.



2581B-50

Vacuum Oven

FOR AQUEOUS SAMPLES



2561B-50

MODEL SELECTOR	
VACUUM OVEN SIZE	AQUEOUS SAMPLES
Less than 2 ft ³ (57 liters)	2561B-50
2 to 4.5 ft ³ (57 to 127 liters)	2581B-50

*Note: For corrosive solution or solvent drying pumps, see p. 8

Aspiration/Filtration Stations

COMPACT STATION FOR ASPIRATION & PRESSURE TRANSFER



2511

- Pumping capacity 11 l/min. @60 Hz
- Pressure transfer capability to 33 PSIG (3.3 x 10⁵ Pascal)
- Automatic flow stop when 1.2 liter receiver full
- Lightweight, portable

VERSATILE MODEL 2511 standard duty, oil-free station is an economical, portable solution for aspirating, filtering or rinsing. Added accessories include 1.2 liter autoclavable, bleach resistant collection receiver, vacuum regulator & gauge, hydrophobic inline filter, automatic shut-off and vacuum regulator to simplify use. All wetted parts are treated for corrosion protection from moisture. Recommended for aspirating aqueous solutions including buffers, but not for acidic, basic or organic vapors or gases. See p.17 for hand held pipettor and other aspiration accessories.

For Specifications & Ordering Information, See p. 27

HIGH FLOW FOR CELL CULTURE ASPIRATION



2515

- High pumping capacity 34 l/min. @60Hz
- Bleach resistant
- Automatic flow stop when 1.2 liter receiver full
- Lightweight, portable

HIGH FLOW MODEL 2515 standard duty, oil-free station is an economical, portable solution for aspirating or filtering. Added accessories include 1.2 liter autoclavable, bleach resistant collection receiver, vacuum regulator & gauge, hydrophobic inline filter, automatic shut-off and vacuum regulator to simplify use. All wetted parts are treated for corrosion protection from moisture. Recommended for aspirating aqueous solutions including buffers, but not for acidic, basic or organic vapors or gases. See p.17 for hand held pipettor and other aspiration accessories.

For Specifications & Ordering Information, See p. 27

Application Note for Aspiration Stations

The most common reason for vacuum pump failure in aspiration applications is the ingestion of liquid into the pump mechanism. Liquids ingested into the pump mechanism will lead to the valves failing or a diaphragm rupturing. Welch Aspiration Stations integrate features that protect your pump and your application:

1. The Collection Receiver captures aspirated liquids and automatically shuts down the pump when full and
2. The hydrophobic inline filter further protects the pump from aerosol ingestion. Routinely empty the Collection Receiver to assure continuous aspiration for your application.

Cell Culture

HAND HELD PIPETTOR FOR ASPIRATION STATIONS



1475K-10

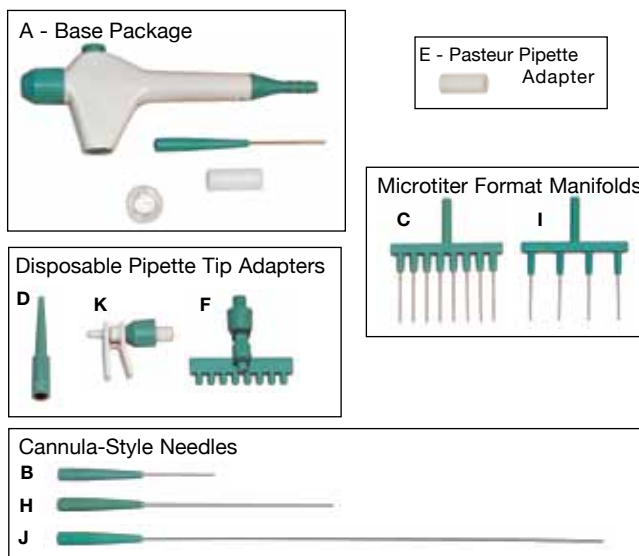
- Quick pipette / manifold adaptation
- Precise vacuum control button
- Ergonomic design lessens strain
- Solution contact surfaces autoclavable

CONTROL YOUR ASPIRATION APPLICATION WITH EASE.

The handheld pipettor system (1475K-10) provides pressure sensitive button control and enables quick conversion for aspiration from a tright residual suction to prevent drippage during pipette use; closing the adjustment screw stops all residual vacuum. Single channel and four and eight channel stainless steel manifold adapters work well with a wide range of liquid media. The single and eight channel disposable tip adapters include a convenient tip ejector. Also for use with standard volumetric pipettes. The entire unit is autoclavable and disassembles easily for cleaning.

Ordering Informaton

Description	Model	Image
Handheld pipettor with 1 channel stainless steel 40mm aspiration adapter and Pasteur pipette adapter	1475K-10	A
Adapter, stainless steel tip, 40mm	1475K-01	B
8-channel adapter, stainless steel	1475K-02	C
1-channel adapter for disposable tips, w/o ejector	1475K-03	D
Rubber adapter for Pasteur pipettes	1475K-04	E
8-channel adapter for disposable tips, with ejector	1475K-05	F
Adapter, stainless steel tip, 150mm	1475K-06	H
4-channel adapter, stainless steel tips, 40mm	1475K-07	I
Adapter, stainless steel tip, 280mm	1475K-08	J
1-channel adapter for disposable tips, with injector	1475K-09	K
Spare receiver kit-Includes: 6 ft. tubing, 1.2 liter autoclavable jar w/lid and two hydrophobic filters	1475K-20	L
Replacement hydrophobic filters (10)	1475K-21	M



ON/OFF FOOT SWITCH



- Hands free On / Off pump operations
- No adapters or special connections needed
- Plugs directly into the power source outlet

On/Off foot switches are compatible with selected dry vacuum pump models. Switches handle up to 15 amps. Cat. No. 1430A & 1430B come with a 3-prong U.S. Standard plug with 8 Ft. Cord, CSA, NEMA & UL Enclosure Type 1. CAT. No. 1430C comes with a male and female IEC connections, 8 Ft. Cord, CE and plugs directly into the IEC connection on the pump.

PUMP MODEL	CAT. NO.
2014, 2034, 2044, 2037, 2047, 2032 2042, 2511, 2515, 2522, 2534, 2546, 2561, 2567, 2581, 2585	1430A (115V/60Hz only, maintained On/Off)
	1430B (115V/60Hz only, momentary On/Off)
	1430C (90-230V with IEC connections, momentary On/Off)

Freeze Drying

EXTENDED SERVICE INTERVAL IN A COMPACT PUMP



For Severe
Chemical
Apps., See p. 9

8917A-80

- Holds up to harsh chemicals used in proteomics and combinatorial chemistry
- System includes continuous acid neutralization and oil filtration
- Compact, quiet direct drive pump

THE WELCH FREEZE DRYER VACUUM SYSTEM is effective for freeze drying or sample concentration by freeze drying using harsh chemicals such as TFA, acetonitrile, HBr and others. The 8917A-80 system includes a powerful 173 l/min. (143 l/min. at 50Hz) vacuum pump that is protected by an integral oil filtration system that neutralizes acids and removes solid reaction products from the oil. The system also has a large oil capacity of 1.3 liters that dilutes contaminants that mix with the pump oil during freeze drying runs. Includes chemical resistant Welch Gold Oil (see p. 46).

For Specifications &
Ordering Information,
See p. 31

Application Note for Freeze Drying

Drug discovery labs are using freeze dryers for the final drying step when samples isolated by HPLC and LC include heat sensitive proteins and peptides. These samples are typically dissolved in a water, acetonitrile, and 0.1%TFA solution. Acetonitrile and TFA and its by-products will cause rapid breakdown of pump oil, changing its viscosity and leading to pump failure – sometimes after only a few runs. There is no way to prevent the ingestion of harsh chemicals into the pump. Three steps to minimize ingestion of harsh chemicals are:

1. Clean the freeze dryer's condenser after each freeze drying run to prevent sublimation of the frozen chemicals into the pump.
2. Spread the drying of multiple samples over time to evenly distribute the vapor load on the condenser.

CAUTION: For high acetonitrile vapor loads, add a cold trap operating at -75°C or colder.

Glove Box

OIL-FREE EVACUATION OF GLOVE BOX AND TRANSFER STATION



2581B-50

- High flow to shorten the purge / fill cycle
- Oil-free, no contamination, no oil changes
- Compact, lightweight, portable

WOB-L® DRY PISTON PUMPS are effective for acrylic and polycarbonate glove boxes with vacuum requirements above 5torr (6.7mbar). The oil-free WOB-L piston vacuum pump provides continuous, reliable, high flow vacuum for your glove box. Model 2581 is suited for transfer chamber evacuation and purge/fill cycles for a glove box of up to 30ft³ (0.84 m³). The pump is complete with vacuum adjustment, vacuum gauge to monitor vacuum level, and muffler. See application note below regarding glove box vacuum limitations.

For Specifications &
Ordering Information,
See p. 26

Application Note on Glove Boxes

Glove boxes are commonly used for transferring air sensitive compounds, containment of hazardous materials, and performing experiments under controlled conditions. Standard glove boxes and transfer chambers aren't normally evacuated much below 25torr (29"Hg) due to plastic material limitations – both acrylic and polycarbonate which are used in standard glove boxes are not suited for deep vacuum (1torr operation).

High end glove boxes capable of deeper vacuum normally are constructed of stainless steel & heavy glass plates. These glove boxes include continuous gas purification of the main glove box chamber using a circulating fan or pump. After about 6 months, the purifier canister is regenerated by passing inert gas over the unit while it is heated followed by a few hours of full vacuum. Glove box manufacturers vary in their recommendation of the depth of vacuum needed in this final step to regenerate their purification canister.

Field Filtration / Sampling



GEMINI® DRY VACUUM PUMPS



Model 2050



Model 2060

- **Powerful, Portable, & Economical**
- **Lab or Field Usage**
- **Advanced Chemical Resistance**

Simplify your sampling and preparative procedure with Welch's GEMINI pump. Use the same powerful, light-weight vacuum pump in the lab, or in the field!

Quiet GEMINI pumps use DC motors, powered by an AC adapter unit in the lab or a 12 VDC adapter for your vehicle. Pump fumes up to 13 l/min/achieve vacuum to 190torr.

GEMINI gives you enhanced chemical resistance - tolerant beyond aqueous fumes for use with solvents and weak acids/bases. GEMINI's high performance components will not corrode. Chemical resistance is built in with polyarylamide heads and fluoropolymer elastomer diaphragms, tubing and valves. The oil-free dry pump design provides top performance in a portable durable package.

For convenient vacuum readout and regulation, order Model 2060. Not recommended for use with strongly acidic or basic fumes. For organic fume applications, check for chemical compatibility with fluoropolymer elastomer. Not recommended for rotary evaporator, concentrator, or vacuum oven applications. See PTFE dry vacuum pumps and systems (p. 22 & 23) for applications requiring higher vacuum/flow with harsh or aggressive chemicals.

Vacuum Versatility - Anywhere

- Sampling / Aspiration
- Filtration
- Degassing
- Desiccation

Note:

1. Models 2050B-01 and 2060B-01 include N. America, UK and Schuko power plug adapters for use in non-CE countries which require UK or Schuko plugs.
2. Model 2050C-02 and 2060C-02 are CE models

Specifications

Welch Model

Free Air Displacement
cfm(l/min.)
Ultimate Pressure, torr(mbar)
Vacuum Regulator and Gauge
Max Vacuum, in. Hg
Inlet thread NPT
Tubing, I.D. in.(mm)
Weight, lbs.(kg)
Dimensions
LxWxH, in.(cm)
Shipping weight, lbs.(kg)

GEMINI Pumps

	2050	2060
Free Air Displacement cfm(l/min.)	0.3(8.5)	0.46(13)
Ultimate Pressure, torr(mbar)	190(253)	200(266)
Vacuum Regulator and Gauge	No	Yes
Max Vacuum, in. Hg	22.4	22.0
Inlet thread NPT	----	1/8
Tubing, I.D. in.(mm)	3/8(10)	3/8(10)
Weight, lbs.(kg)	5.3(2.4)	11(5)
Dimensions LxWxH, in.(cm)	7.6x4.5x7.5 (19.4x11.4x19.1)	9.25x7.25x8.5 (23.5x18.4x21.6)
Shipping weight, lbs.(kg)	7(3.2)	13(5.9)

Ordering Information

Pump w/115V, 60Hz, 1 Ph power adapter w/ N. Amer. plug +12V DC auto adapter	2050B-01 ¹	2060B-01 ¹
Pump w/230V, 50Hz, 1 Ph power adapter with cont. Euro.(Schuko) Plug +12V DC auto adapter	2050C-02 ²	2060C-02 ²

Fluid Transfer

WELCH PERISTALTIC PUMPS

Analog



- Precise, continuous fluid delivery
- No fluid contact with pump
- Fast change tubing cartridge
- Pumps 3 to 300ml/min.



Digital



Model 3100



Model 3200

WELCH PERISTALTIC PUMPS SIMPLIFY YOUR CRITICAL SOLUTION TRANSFERS. Avoid fluid cross-contamination while benefitting from precision delivery, handling material compatibility, and quick solution change-overs. Choose cartridges from four different tubing materials at one of three inner diameters for precision fluid deliveries ranging from 3 to 300 l/min. Self-priming with easy adjustment of flow rate and pumping direction. For digital display of pump rotation speed, order Model 3200.

Complete system - pump head, tubing & drive

- Order with just one catalog number
- Ready out of the box

Lok-n-Flow tubing cartridges

- Economizes the use of expensive tubing
- Tubing waste dramatically reduced
- Reduce maintenance time with fast tubing changes

Bi-directional (reversible) flow control & max flow button

- Clean up and priming made easy

Variable speed

- Digital and analog flow control

Console drive

- Stackable & portable
- Power supply within housing

Fast, Easy Tubing Cartridge Changes



Innovative "S" clip pivots for quick release/locking

Starter Kit 3200K-01 included with every pump

Initial Tubing Cartridges

- 1.6mm silicone (2 each)
- 3.2mm silicone (2 each)
- 4.8mm silicone (2 each)

4.8mm PVC Tubing (25 feet)

Hose Clamps (4 each)



Fluid Transfer

WELCH PERISTALTIC PUMPS



Perfect for Transferring Solutions with

- Precise flow rate requirements
- Handling material sensitivity
- Moderate viscosity
- Suspended solids
- Mixed phase media

Specifications

	ANALOG	DIGITAL
Welch Model	3100	3200
Flow Range	3 - 300 ml/min.	3 - 300 ml/min.
RPM	20 to 200	20 to 200
Pump Speed Display	No	Yes
Motor	Reversible	Reversible
Weight, lb.(Kg)	6(2.7)	6(2.7)
Overall Dimensions		
L in.(cm)	7(17.8)	7(17.8)
W in.(cm)	7.5(19.0)	7.5(19.0)
H in.(cm)	5.5(14)	5.5(14)
Shipping Weight, lb.(Kg)	10(4.5)	10(4.5)
Shipping Carton	9 x 12 x 12	9 x 12 x 12
Dimensions L x W x H in.(cm)	(22.9 x 30.5 x 30.5)	(22.9 x 30.5 x 30.5)

Ordering Information

Wired for 115V, 60Hz, with N. American 115V Plug	3100B-01	3200B-01
Wired for 230V, 50Hz, with Cont. Euro. (Schuko) Plug	3100C-02	3200C-02

For Fittings & Tubing see www.welchvacuum.com



Ordering Information - Tubing Cartridges (5 each)

MATERIAL	APPLICATIONS	TUBING ID (FLOW RATE RANGE)		
		1.6mm (3-30 ml/min)	3.2mm (10-130 ml/min)	4.5mm (30-300 ml/min)
Silicone	Biofluids / Food	3432K-01	3432K-02	3432K-04
PVC	General Lab, Viscous Fluids	3434K-01	3434K-02	3434K-04

Note:

1. For materials chemical compatibility chart, see www.welchvacuum.com.

Chemical Duty PTFE Dry Vacuum Pumps

Chemical-Resistant, Oil-Free Pumps for



Component	Page
• Rotary Evaporation	2-5
• Vacuum Filtration	7
• Vacuum Oven / Desiccation	8
• Aspiration / Automation	12
• Gel Dryer	13
• Centrifugal Concentrators	13-14
• Distillation	4
• Degassing	



Specifications

DRYFAST Pumps

DRYFAST ULTRA Pumps

Welch Model

Free Air Displacement

cfm(l/min.)@60Hz

m³/hr(l/min.)@50Hz

Ultimate Pressure, torr(mbar)

Maximum Vacuum, in. Hg

Motor Horsepower(watts)

Adjustable Vac./Gas Ballast

Tubing Needed, I.D. in.(mm)

Intake(Exhaust) Thread NPT

Weight lbs.(kg)

Overall Dimensions

L in.(cm)

W in.(cm)

H in.(cm)

Ship Weight, lbs.(kg)

Shipping Carton Dimensions

L x W x H in.(cm)

	2014	2034	2044	2037	2047	2032	2042
Free Air Displacement							
cfm(l/min.)@60Hz	1.2(35)	0.9(25)	1.2(35)	1.8(50)	2.5(70)	0.9(25)	1.2(35)
m ³ /hr(l/min.)@50Hz	1.75(29)	1.25(21)	1.75(29)	2.5(42)	3.5(58)	1.25(21)	1.75(29)
Ultimate Pressure, torr(mbar)	40(53)	9(12)	9(12)	35(47)	35(47)	2(2.7)	2(2.7)
Maximum Vacuum, in. Hg	28.3	29.6	29.6	28.5	28.5	29.85	29.85
Motor Horsepower(watts)	1/5(150)	1/5(150)	1/5(150)	1/5(150)	1/5(150)	1/5(150)	1/5(150)
Adjustable Vac./Gas Ballast	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tubing Needed, I.D. in.(mm)	1/4(7)	1/4(7)	1/4(7)	1/4(7)	1/4(7)	1/4(7)	1/4(7)
Intake(Exhaust) Thread NPT	M14(1/8)	M14(1/8)	M14(1/8)	M14(1/8)	M14(1/8)	M14(1/8)	M14(1/8)
Weight lbs.(kg)	15.0(6.8)	21.25(9.6)	21.25(9.6)	21.25(9.6)	21.25(9.6)	21.25(9.6)	21.25(9.6)
Overall Dimensions							
L in.(cm)	12(30.5)	13.8(35.2)	13.8(35.2)	13.8(35.2)	13.8(35.2)	13.8(35.2)	13.8(35.2)
W in.(cm)	7.0(17.8)	6.8(17.2)	6.8(17.2)	6.8(17.2)	6.8(17.2)	6.8(17.2)	6.8(17.2)
H in.(cm)	8.3(21.1)	8.8(22.3)	8.8(22.3)	8.8(22.3)	8.8(22.3)	8.8(22.3)	8.8(22.3)
Ship Weight, lbs.(kg)	19(8.6)	25(11.3)	25(11.3)	25(11.3)	25(11.3)	25(11.3)	25(11.3)
Shipping Carton Dimensions							
L x W x H in.(cm)	21x14x15 (52x35x37)	21x14x15 (52x35x37)	21x14x15 (52x35x37)	21x14x15 (52x35x37)	21x14x15 (52x35x37)	21x14x15 (52x35x37)	21x14x15 (52x35x37)

Ordering Information

Wired for 115V, 60Hz, 1 Ph
with N. Amer. 115V Plug

Wired for 230V, 50/60Hz, 1Ph,
w/ UK and Schuko cord sets included

Wired for 100V, 50/60Hz
for Japan

2014B-01	2034B-01	2044B-01	2037B-01	2047B-01	2032B-01	2042B-01
2014C-02	2034C-02	2044C-02	2037C-02	2047C-02	2032C-02	2042C-02
2014C-05	2034C-05	2044C-05	---	---	2032C-05	2042C-05

All Pumps are constructed with PTFE heads, perfluoroelastomer valves, and a PTFE coated, molded diaphragm. Includes intake/exhaust hose barbs. DRYFAST and DRYFAST ULTRA models include Advanced Vapor Management (AVM) for adjustable vacuum control. General Purpose pumps include exhaust silencer.

Chemical Duty PTFE Dry Vacuum Pumps



For a Complete System

Component	Page
• Traps	40
• CAPTURE Recovery System	5, 23
• Inlet / Exhaust Separator	27
• Fittings / Hose	27, 37-39
• Gauges	41, 42
• Regulators	42
• Service Kits	44, 45

Self Cleaning Dry Vacuum Systems™			
w/Dial Gauge	w/Dial Gauge	w/Digital Gauge	Programmable w/Digital Gauge
2025	2026	2027	2028
1.2(35)	1.2(35)	1.2(35)	1.2(35)
1.7(29)	1.7(29)	1.7(29)	1.7(29)4
9(12)	2(2.7)	2(2.7)	2(2.7)
29.6	29.85	29.85	29.85
1/5(150)	1/5(150)	1/5(150)	1/5(150)
Yes	Yes	Yes	Yes
1/4(7)	1/4(7)	1/4(7)	1/4(7)
3/8	3/8	3/8	3/8
30(13.6)	30(13.6)	30(13.6)	30(13.6)
13.6(34.5)	13.6(34.5)	13.6(34.5)	13.6(34.5)
12(30.5)	12(30.5)	12(30.5)	12(30.5)
11.3(28.7)	11.3(28.7)	11.3(28.7)	11.3(28.7)
36(16.4)	36(16.4)	36(16.4)	36(16.4)
18x17x17 (46x42x43)	18x17x17 (46x42x43)	18x17x17 (46x42x43)	18x17x17 (46x42x43)
202501	202601	202701	202801
202503	---	202703	202803
202505	---	202705	202805

All Self Cleaning Dry Vacuum Systems are constructed with PTFE heads, perfluoroelastomer valves, and a PTFE coated, molded diaphragm. Advanced Vapor Management (AVM) for vacuum control, a vacuum readout, and instant-response bumping/foaming switching are standard on all models. Includes inlet/outlet separator traps and hose barsbs. Standard vacuum digital readout units: 115V: torr; 230V: mBar; 100V: Pa.



CAPTURE™ Harmful Vapors Prior to Intake

Protect your pump and lab atmosphere with an integrated CAPTURE recovery system. Connect this convenient condenser to your tap or chiller water to prevent pump fume ingestion and release into the environment.

Ordering Information

Description	CAT. No.
Complete condenser w/flask / support / clamps	1420H-18
Condenser w/fittings	1420H-19
Support / clamp kit	1420H-17

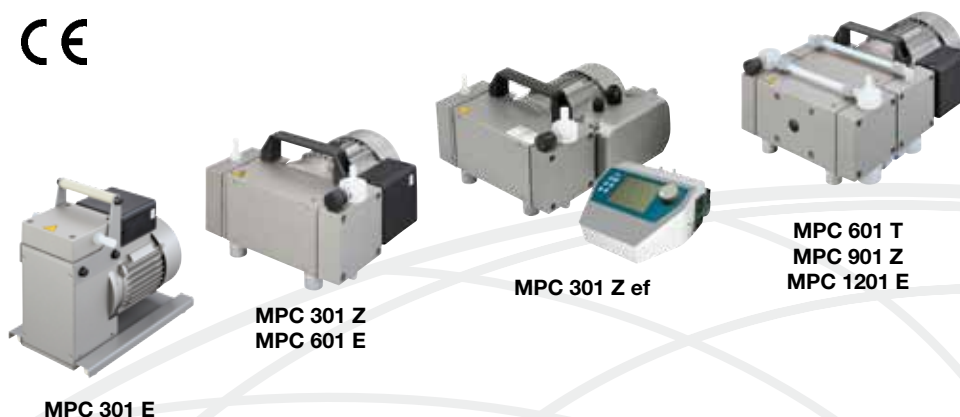


1420H-18

High-Flow PTFE Vacuum Pumps

Chemical Duty Dry (Oil-Free) Pumps for

- Rotary Evaporation
- Vacuum Filtration
- Vacuum Oven / Desiccation
- Aspiration / Automation
- Gel Dryer
- Centrifugal Concentrators
- Distillation
- Degassing



MPC 301 E

**MPC 301 Z
MPC 601 E**

MPC 301 Z ef

**MPC 601 T
MPC 901 Z
MPC 1201 E**

Aspiration/Filtration Systems include 6 ft. of tubing and two hydrophobic filters

Specifications

Iilmvac Model	MPC 301 E	MPC 301 Z	MPC 301 Z ef ecoflex	MPC 601 E	MPC 601 T	MPC 601 T ef	MPC 901 Z
Number of heads / stages	1 / 1	2 / 2	2 / 2	2 / 1	4 / 3	4 / 3	----
Free Air Displacement cfm(l/min.)@60Hz	1.45(41)	1.45(41)	1.52(43)	2.47(70)	2.86(81)	2.86(81)	4.42(125)
m ³ /h(l/min.)@50Hz	2.3(38)	2.3(38)	2.6(43)	3.8(63)	4.5(75)	4.9(81)	6.8(113)
Ultimate pressure, mbar(torr)	75(56.3)	8(6)	8(6)	75(56.3)	2(1.5)	2(1.5)	8(6)
Maximum Vacuum, in. Hg	27.7	29.7	29.7	27.7	29.9	29.9	29.7
Tubing Needed, ID in.(mm)	1/4(7)	1/4(7)	1/4(7)	1/4(7)	7/16(12)	1/4(7)	1/4(7)
Motor Power, watts(HP)	180(0.25)	180(0.25)	200(0.27)	180(0.25)	370(0.5)	390(0.53)	370(0.5)
Weight, kg(lbs.)	8.9(19.6)	11.2(24.7)	15.5(34.2)	11.2(24.7)	18.3(40.3)	22.6(49.8)	18.3(40.3)
Overall Dimensions							
L cm(in.)	26(10.2)	23(9.1)	26(10.2)	23(9.1)	23(9.1)	26(10.2)	23(9.1)
W cm(in.)	16.2(6.4)	26.5(10.4)	31(12.2)	26.5(10.4)	38(15)	42(16.5)	38(15)
H cm(in.)	25.2(9.9)	16.9(6.7)	19(7.5)	16.9(6.7)	16.9(6.7)	19(7.5)	16.9(6.7)
Ship Weight, kg(lbs.)	12(26.5)	14(30.9)	18(39.7)	14(30.9)	22(48.5)	29(63.9)	22(48.5)
Shipping Carton Dimensions							
LxWxH cm(in.)	35x25x30 (13.8x13.8x11.8)	48x32x30 (18.9x12.6x11.8)	48x32x30 (18.9x12.6x11.8)	48x32x30 (18.9x12.6x11.8)	48x32x30 (18.9x12.6x11.8)	60x40x56 (23.6x15.8x22.1)	48x32x30 (18.9x12.6x11.8)

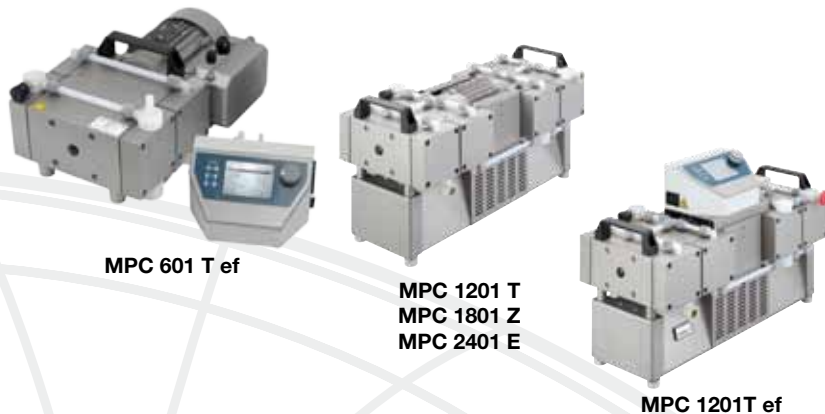
Ordering Information

230V, 50/60Hz, 1Ph ¹	412711	412722	412922	412721	412743	412943	412742
115V, 50/60Hz, 1Ph ²	----	412722-01	412922-01	412721-01	412743-01	412943-01	412742-01
115/230V, 50/60Hz ³	----	----	----	----	---	---	---
90-240V, 50/60Hz ⁴	----	----	----	----	---	---	---
100V, 50/60Hz, 1Ph ⁵	o.r. ⁸	412722-04	----	o.r. ⁸	o.r. ⁸	----	412742-04
230/400V, 50/60Hz, 3Ph ⁶	o.r. ⁸	412722-02 ⁷	----	412721-02 ⁷	412743-02	---	o.r. ⁸

Notes:

Every pump is supplied with ON/OFF switch and internal protective thermal switch for the motor, carry handle and vibration isolating feet

1. With Schuko and UK plug leads
2. With US plug leads
3. With Schuko, UK and US plug leads
4. With AC/DC adapter and Schuko, UK and US plug leads



MPC 601 T ef

MPC 1201 T
MPC 1801 Z
MPC 2401 E

MPC 1201T ef

Vacuum Control Box

Programmable vacuum controller for use with various vacuum pump type in the rough vacuum range. Easy to maintain vacuum level.



Type	Measuring Range	CAT. No.
VCB 521 cv	1100 - 1mbar	600053-US

Vacuum Regulator for MP/MPC Diaphragm Pumps

Wetted parts constructed of fluorinated plastic for chemical resistance. Dial gauge for continuous vacuum level monitoring and regulator bleed valve to control from slightly below atmospheric pressure to the maximum vacuum level of the pump.



Pump Model	CAT. No.
MP/MPC 301 Z, 601 E	700458

LVS - Laboratory Vacuum System

All-in-one dry vacuum system, pump, controller, traps and solvent recovery provides optimal and trouble free distillation. Automatic distillation can be achieved utilizing a reference solvent table and programmable vacuum control.



Type	CAT. No.
LVS 105 T-10 ef	114184

For more detailed information and other models please see p. 3.

Vacuum Hose

Thick walled hose for vacuum or or pressure applications. Hose clamp information available on p. 38.



Type	CAT. No.
MP/MPC 301, 601 E, 601 T ef, 901, 1201 E	331030-5

Particulate, Hydrophobic In-line Filters

The filters are an economical solution to protect your piston vacuum pump from fine particulates and aerosols to 0.2 microns in diameter.



1475K-21

Made of Polypropylene housing, CAT. No.1475K-21 fits 1/4" to 3/8" and CAT. No. 1475K-23 fits 1/4" ID hose.



1475K-22

Made of SBS resin housing, CAT. No. 1475K-22 fits 3/8" to 7/16" I.D. hose.



1475K-23

Pump Model	CAT. No.	Pore Size
MP/MPC 301, 601, 901, 1201 E	1475K-21	0.8 micron
MP/MPC 301, 601, 901, 1201 E	1475K-22	0.8 micron
MP/MPC 301, 601, 901, 1201 E	1475K-23	0.2 micron

MPC 1201 E	MPC 1201 T	MPC 1201 T ef	MPC 1801 Z	MPC 2401 E
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5.33(151)	5.33(151)	4.87(138)	7.84(222)	10(283)
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8.3(138)	8.3(135)	8.3(138)	12(201)	15.5(258)
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75(56.3)	2(1.5)	2(1.5)	8(6)	75(56.3)
----------	--------	--------	------	----------

27.7	29.9	29.9	29.7	27.7
------	------	------	------	------

1/4(7)	1/4(7) ⁹	1/4(7) ⁹	1/4(7) ⁹	1/4(7) ⁹
--------	---------------------	---------------------	---------------------	---------------------

370(0.5)	370 / 440(0.5/0.6)	370(0.5)	370 / 440(0.5/0.6)	370 / 440(0.5/0.6)
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18.3(40.3)	32.8(72.3)	34(75)	32.8(72.3)	32.8(72.3)
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23(9.1)	54(21.3)	54(21.3)	54(21.3)	54(21.3)
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38(15)	30(11.8)	30(11.8)	30(11.8)	30(11.8)
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16.9(6.7)	24(9.4)	32(12.6)	24(9.4)	24(9.4)
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22(48.5)	40.1(88.2)	41.5(91.3)	40.1(88.2)	40.1(88.2)
----------	------------	------------	------------	------------

48x32x30 (18.9x12.6x11.8)	60x40x41 (23.6x15.8x16.1)	60x40x41 (23.6x15.8x16.1)	60x40x41 (23.6x15.8x16.1)	60x40x41 (23.6x15.8x16.1)
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412741	412783	412982	412782	412781
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412741-01	412783-01	o.r. ⁸	412782-01	412781-01
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o.r. ⁸	o.r. ⁸	---	o.r. ⁸	o.r. ⁸
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412741-02	412783-02	---	412782-02	412781-02
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- With JP plug
- Requires hard wiring to switched supply
- With 3 phase 16ACEE plug
- These pumps can be delivered on request.
- Pump inlet fitting is NW16 flange, included is hose adapter for 1/4 ID hose.

Standard Duty Dry WOB-L® Vacuum Pumps¹

Standard Duty, Oil-Free Pumps for

Applications	Page
• Vacuum Filtration	15
• Vacuum Oven / Desiccation	15
• Aspiration / Automation	12
• Cell Culture	16
• Glove Box	18
• Vac. Chamber/Roughing	7



Specifications

Welch Model	Vacuum/Pressure Pumps				Standard Duty	
	2511	2522	2534	2546	2561	2567
Free Air Displacement						
cfm (l/min.)@60Hz	0.39(11)	0.76(22)	1.2(34)	1.6(45)	2.1(60)	3.5(100)
m3/hr (l/min.)@50Hz	0.55(9.2)	1.1(18)	1.7(28)	2.3(38)	3.0(50)	4.9(83)
Ultimate Pressure, torr(mbar)	219(292)	100(133)	70(93)	60(80)	5(6.7)	60(80)
Max Pressure PSIG(pascal)	33(3.3 x 10 ⁵)	100(10 ⁶)	50(5 x 10 ⁵)	100(10 ⁶)	---	---
Maximum Vacuum, in. Hg	21.3	26	27.2	27.6	29.8	27.6
Motor Horsepower(watts)	1/30(25)	1/8(93)	1/8(93)	1/4(190)	1/3(250)	1/3(250)
Tubing Needed, I.D. in.(mm)	3/16(5)	3/16(5)	3/16(5)	3/16(5)	1/4(7)	1/4(7)
Intake/Exhaust Thread NPT	3/16 in. Hose	1/4	1/4	1/4	1/4	1/4
Weight lbs.(kg)	5(2.3)	11.7(5.3)	11.7(5.3)	13.8(6.3)	16.5(7.5)	16.5(7.5)
Overall Dimensions						
L in.(cm)	7.6(19.4)	8.1(20.6)	8.1(20.6)	10(25.4)	17.3(43.9)	15.0(38.1)
W in.(cm)	4.5(11.4)	8.8(22.4)	8.8(22.4)	7.5(19.1)	6.5(16.5)	10(25.4)
H in.(cm)	7.5(19.1)	10(25.4)	10(25.4)	9(22.9)	10.5(26.7)	10(25.4)
Ship Weight, lbs.(kg)	6(2.7)	17(7.7)	17(7.7)	17(7.7)	24(10.9)	24(10.9)
Shipping Carton Dimensions						
L x W x H in.(cm)	11x7x8.3 (28x18x21)	15.3x12.3x12.7 (39x31x32)	15.3x12.3x12.7 (39x31x32)	15.3x12.3x12.7 (39x31x32)	21x12x15 (53x30x38)	21x12x15 (53x30x38)

Ordering Information^{1,2}

Wired for 115V, 60Hz, 1 Ph with N. American 115V Plug	2511B-01 ³	2522B-01 ⁴	2534B-01 ⁴	2546B-01 ⁴	2561B-50	2567B-50
Wired for 230V, 60Hz, 1 Ph with N. American 230V Plug	---	2522C-01 ⁴	2534C-01 ^{4,7}	2546C-01 ^{4,7}	---	---
Wired for 230V, 50Hz, 1 Ph ² with Cont. Euro.(Schuko) Plug	2511C-02 ³	2522C-02 ^{4,6}	2534C-02 ^{4,6,7}	2546C-02 ^{4,6,7}	2561C-50 ^{6,7}	2567C-50 ^{6,7}
Wired for 100V, 50/60Hz, 1 Ph with a plug	2511C-05 ^{3,5}	2522C-05 ^{4,5}	---	---	2561C-56	---

Notes:

1. All models are recommended for pumping vapors of aqueous solutions including buffers but not for acidic, basic or organic vapors or gases.
2. 50Hz units supplied with CE marking.
3. Model 2511 can deliver 33 PSIG (3.3 x 10⁵ pascal).

Standard Duty Piston Pumps



2585/2581



2511B-75



2515B-75

Aspiration / Filtration Systems include 6 ft. of tubing and two hydrophobic filters

Vacuum Pumps		Aspiration/Filtration Systems	
2581	2585	2511	2515
3.5(100)	7.1(201)	0.39(11)	1.2(34)
4.9(83)	10(168)	0.55(9.2)	1.7(28)
5(6.7)	60(80)	219(292)	70(93)
---	---	33(3.3 x 10 ⁵)	---
29.8	27.6	21.3	27.2
1/3(250)	1/3(250)	1/30(25)	1/8(93)
1/4(7)	1/4(7)	3/16(5)	3/16(5)
1/4	1/4	3/16 in. Hose	1/4
24.5(11.1)	24.5(11.1)	5.7(2.6)	13.2(6.0)
17(43.2)	17(43.2)	11.0(28)	14.8(37.5)
7.5(19.1)	7.5(19.1)	8.3(21)	8.3(21)
12(30.5)	12(30.5)	10.0(25.5)	10.0(25.5)
32(14.5)	32(14.5)	11.0(5)	14.8(6.7)
21x12x15 (53x30x38)	21x12x15 (53x30x38)	15.3x12.3x12.7 (39x31x32)	21x12x15 (53x30x38)
2581B-50	2585B-50	2511B-75	2515B-75
---	---	---	---
2581C-50 ^{6,7}	2585C-506, 7	2511C-75 ^{6,7}	2515C-75 ^{6,7}
---	---	2511C-76 ⁵	2515C-76

- Models 2522, 2534 and 2546 come with vacuum (and pressure) regulator, vacuum (and pressure) gauge, silencer and water trap. Models 2522 and 2546 can deliver 100 PSIG (10⁶ pascal). Model 2534 can deliver 50 PSIG (5 x 10⁵ pascal).
- Comes with PSE mark.
- Included is UK and Schuko cord sets.
- Motor can operate at 230V, 50/60Hz, 1Ph.

Accessories

Exhaust Silencer

Exhaust silencers are installed in the exhaust port of the pump to reduce pump noise.

Pump Model	CAT. No.
2565, 2585	1412C
2561	1412D
2581	1412E



1412C



1412D / 1412E

Inlet/Exhaust Separator Jars

230 ml glass jar assembly attaches to pump intake or exhaust to capture ingested liquids.

Pump Model	CAT. No.
2012, all models of DryFast	1423B
Replacement Jars Glass, for pumps w/1423B assembly, models 2561, 2565, 2581, 2585 and Self Cleaning dry pumps.	1415B
1415D is a polypropylene version of the 1415B glass jar.	1415D
Plastic vacuum jar, for pumps 2522, 2546, 2534	1415C



1423B



1415B



1415C

Vacuum Hose

Thick walled hose for vacuum or pressure applications. Hose clamp information available on p. 38.

Pump Model	CAT. No.
2561, 2567, 2581, 2585	331030-5
2511, 2522, 2534, 2546	331020-5



Replacement Jars for Aspiration Stations

Spare receiver kit (1475K-20) includes a 1.2 liter autoclavable jar, 6ft. of tubing and two hydrophobic filters.

Pump Model	CAT. No.
2511B-75, 2511C-75 2515B-75, 2515C-75	1475K-20



Particulate, Hydrophobic In-line Filters

The filters are an economical solution to protect your piston vacuum pump from fine particulates and aerosols to 0.2 microns in diameter.

Made of Polypropylene housing, CAT. No. 1475K-21 fits 1/4" to 3/8" and CAT. No. 1475K-23 fits 1/4" ID hose.

Made of SBS resin housing, CAT. No. 1475K-22 fits 3/8" to 7/16" ID hose.

Pump Model	CAT. No.	Pore Size
2511, 2515, 2522, 2534, 2546	1475K-21	0.8 micron
2561, 2581, 2562, 2567	1475K-22	0.8 micron
2562, 2567	1475K-23	0.2 micron



1475K-21



1475K-22



1475K-23

Standard Duty Dry Vacuum Pumps

Standard Duty, Oil-Free Pumps for

- Vacuum Filtration
- Vacuum Oven / Desiccation
- Aspiration / Automation
- Cell Culture
- Glove Box
- Vacuum Chamber / Roughing



MP 301 E



MP 301 V



MP 301 Z
MP 601 E

Aspiration / Filtration Systems include
6 ft. of tubing and two hydrophobic filters

Specifications

Ilmvac Model	MP 301 E	MP 301 Z	MP 301 V	MP 601 E	MP 601 T	MP 901 Z
Number of heads/stages	1 / 1	2 / 2	2 / 4	2 / 1	4 / 3	----
Free Air Displacement						
cfm(l/min.)@60Hz	1.45(41)	1.45(41)	1.45(41)	2.47(70)	2.86(81)	4.42(125)
m ³ /h(l/min.)@50Hz	2.3(38)	2.3(38)	2.3(38)	3.8(63)	4.5(75)	6.8(113)
Ultimate pressure, mbar(torr)	75(56.3)	8(6)	1(0.75)	75(56.3)	2(1.5)	8(6)
Maximum Vacuum, in. Hg	27.7	29.7	29.9	27.7	29.9	29.7
Tubing Needed, ID in.(mm)	1/4(7)	1/4(7)	1/4(7)	1/4(7)	1/4(7) ⁶	1/4(7) ⁶
Motor Power, watts(HP)	180(0.25)	180(0.25)	370(0.5)	180(0.25)	370(0.5)	370(0.5)
Weight, kg(lbs.)	8.9(19.6)	11.2(24.7)	18.3(40.3)	11.2(24.7)	18.3(40.3)	18.3(40.3)
Overall Dimensions						
L cm(in.)	26(10.2)	23(9.1)	23(9.1)	23(9.1)	23(9.1)	23(9.1)
W cm(in.)	16.2(6.4)	26.5(10.4)	38(15)	26.5(10.4)	38(15)	38(15)
H cm(in.)	25.2(9.9)	16.9(6.7)	16.9(6.7)	16.9(6.7)	16.9(6.7)	16.9(6.7)
Ship Weight, kg(lbs.)	12(26.5)	14(30.9)	22(48.5)	14(30.9)	22(48.5)	22(48.5)
Shipping Carton Dimensions						
LxWxH cm(in.)	35x25x30 (13.8x9.8x11.8)	48x32x30 (18.9x12.6x11.8)	48x32x30 (18.9x12.6x11.8)	48x32x30 (18.9x12.6x11.8)	48x32x30 (18.9x12.6x11.8)	48x32x30 (18.9x12.6x11.8)

Ordering Information

230V, 50/60Hz, 1Ph ¹	411711	411722	411744	411721	411743	411742
115V, 50/60Hz, 1Ph ²	----	411722-01	411744-01	411721-01	411743-01	411742-01
115/230V, 50/60Hz ³	----	----	----	----	----	----
90-260V, 50/60Hz ⁴	----	----	----	----	----	----
100V, 50/60Hz	----	----	----	----	----	----
230/400V, 50/60Hz, 3Ph ⁵	----	411722-02	411744-02	411721-02	411743-02	411742-02

Notes:

Every pump is supplied with ON/OFF switch and internal protective thermal switch for the motor, carry handle and vibration isolating feet

1. With Schuko and UK plug leads
2. With US plug leads
3. With Schuko, UK and US plug leads
4. With AC/DC adapter and Schuko, UK and US plug leads

High-Flow Diaphragm Pumps



**MP 601 T
MP 901 Z
MP 1201 E**



**MP 1201 T
MP 1801 Z
MP 2401 E**

MP 1201 E	MP 1201 T	MP 1801 Z	MP 2401 E
-----------	-----------	-----------	-----------

----	----	----	----
5.33(151)	5.33(151)	7.84(222)	10(283)
8.3(138)	8.3(135)	12(201)	15.5(258)
75(56.3)	2(1.5)	8(6)	75(56.3)
27.7	29.9	29.7	27.7
1/4(7) ⁶	1/4(7) ⁶	1/4(7) ⁶	1/4(7) ⁶
370(0.5)	370/440(0.5/0.6)	370/440(0.5/0.6)	370/440(0.5/0.6)
18.3(40.3)	32.8(72.3)	32.8(72.3)	32.8(72.3)
23(9.1)	54(21.3)	54(21.3)	54(21.3)
38(15)	30(11.8)	30(11.8)	30(11.8)
16.9(6.7)	24(9.4)	24(9.4)	24(9.4)
22(48.5)	----	----	----
48x32x30 (18.9x12.6x11.8)	----	----	----
411741	411783	411782	411781
411741-01	411783-01	411782-01	411781-01
----	----	----	----
----	----	----	----
----	----	----	----
411741-02	411783-02	411782-02	411781-02

5. Requires hard wiring to switched supply

6. Pump inlet fitting is NW16 flange, included is hose adapter for 1/4 ID hose.

Accessories

Vacuum Control Box

Programmable vacuum controller for use with various vacuum pump type in the rough vacuum range. Easy to maintain vacuum level.



Type	Measuring Range	CAT. No.
VCB 521 cv	1100 - 1mbar	600053-US

Vacuum Regulator for MP/MPC Diaphragm Pumps

Wetted parts constructed of fluorinated plastic for chemical resistance. Dial gauge for continuous vacuum level monitoring and regulator bleed valve to control from slightly below atmospheric pressure to the maximum vacuum level of the pump.

Pump Model	CAT. No.
MP/MPC 301 Z, 601 E	700458



Exhaust Silencer

Exhaust silencers are installed in the exhaust port of the pump to reduce pump noise.

Type	CAT. No.
MP 301 E	400941
MP 301 Z, MP 301 V	400956
MP 601 E	829901
MP 601 T, MP 901 Z, MP 1201 E	829901



Vacuum Hose

Thick walled hose for vacuum or pressure applications. Hose clamp information available on p. 38.

Type	CAT. No.
MP/MPC 301, 601, 901, 1201 E	331030-5

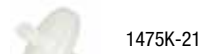


Particulate, Hydrophobic In-line Filters

The filters are an economical solution to protect your piston vacuum pump from fine particulates and aerosols to 0.2 microns in diameter.

Made of Polypropylene housing, CAT. No. 1475K-21 fits 1/4" to 3/8" and CAT. No. 1475K-23 fits 1/4" ID hose.

Made of SBS resin housing, CAT. No. 1475K-22 fits 3/8" to 7/16" ID hose.



1475K-21



1475K-22



1475K-23

Pump Model	CAT. No.	Pore Size
MP/MPC 301, 601, 901, 1201 E	1475K-21	0.8 micron
MP/MPC 301, 601, 901, 1201 E	1475K-22	0.8 micron
MP/MPC 301, 601, 901, 1201 E	1475K-23	0.2 micron

Lightweight, Compact, High Performance Pumps for

- General Vacuum Work
- Laboratory Applications
- OEM Instrumentation
- Replacement Pumps for Instruments and Equipment



8890³



8905



8907 / 8912 / 8917

Specifications

Two Stage Pumps

Welch Model	8890	8905	8907	8912	8917	8920
Free Air Displacement						
cfm (l/min.)@60 Hz	1.1(31)	1.8(51)	2.6(73)	3.8(108)	6.1(173)	7.7(218)
m ³ /hr (l/min.)@50 Hz	1.6(26)	2.6(43)	3.7(61)	5.4(90)	8.6(144)	10.9(182)
Ultimate Pressure, torr (mbar) ¹	1 x 10 ⁻¹ (0.133)	2 x 10 ⁻³ (0.0027)	1x10 ⁻⁴ (0.00013)	1x10 ⁻⁴ (0.00013)	1x10 ⁻⁴ (0.00013)	3 x 10 ⁻⁴ (0.0004)
Sound Level, dBA	58	52	50	50	50	54
Motor/Pump Speed (60 Hz)	3450	3450	1725	1725	1725	1725
Motor Horsepower (watts)	1/4(190)	1/4(190)	1/2(370)	1/2(370)	1/2(370)	3/4(560)
Oil Capacity, qt.(liters)	0.48(0.45)	0.42(0.4)	1.0(0.95)	0.9(0.86)	0.9(0.86)	1.3(1.2)
Tubing Needed, I.D. in.(mm)	3/8 (10)	3/16, 7/16 (5, 11)	7/16, 13/16 (11, 20)	7/16, 13/16 (11, 20)	7/16, 13/16 (11, 20)	9/16, 13/16 (14, 20)
Intake Connection ² (thread)	Barb (1/4 in NPT)	UNIBARB (3/4-20)	UNIBARB (1 1/8-20)	UNIBARB (1 1/8-20)	UNIBARB (1 1/8-20)	UNIBARB (1 1/8-20)
Exhaust Connection ³	3/4-20	3/4-20	1-20	1-20	1-20	1-20
Weight, lbs.(kg)	24.5(11.1)	24.5(11.1)	40(18)	41(18)	43(19.5)	58.5(26.6)
Overall Dimensions						
L in.(cm)	14.5(36.8)	14.1(35.9)	18.5(47.1)	18.5(47.1)	18.5(47.1)	20.5(52.1)
W in.(cm)	5.1(13)	5.1(13)	6.5(16.5)	6.5(16.5)	6.5(16.5)	7.1(17.9)
H in.(cm)	8.4(21.3)	8.4(21.3)	9.6(24.3)	9.6(24.3)	9.6(24.3)	10.7(27.2)
Ship Weight, lbs.(kg)	33(15)	33(15)	55(25)	55(25)	60(27.3)	71(32.3)
Shipping Carton Dimensions LxWxH in.(cm)	21.5x12.5x16 (54.6x31.8x40.6)	21.5x12.5x16 (54.6x31.8x40.6)	24x15.8x14 (61x40.1x35.6)	24x15.8x14 (61x40.1x35.6)	24x15.8x14 (61x40.1x35.6)	24x15.8x14 (61x40.1x35.6)

Ordering Information ^{4, 5, 6.}

Wired for 115V, 60Hz, 1 Ph with N. American 115V Plug	8890A ^{7, 8.}	8905A	8907A	8912A	8917A	8920A
Wired for 230V, 50Hz, 1 Ph with Cont. Euro. (Schuko) Plug	8890C-02 ^{7, 8.}	8905C-02	8907C-02	8912C-02	8917C-02	8920C-02
Wired for 230V, 60Hz ^{9.} with N. American 230V Plug	---	---	---	8912C-01	8917C-01	8920C-01
Expl. Proof Motor 115V, 60Hz	---	---	---	---	8917W	---

Notes:

1. Models 8905, 8907, 8912, 8917, 8920, and 8925 should not be operated continuously at pressures above 10 torr. Ultimate pressure measured with a trapped McCleod gauge.
2. UNIBARB™: Convenient inlet barb connection accepts two sets of tubing ID (see p. 37).
3. Model 8890 includes 1417 filter, it is not included with any other model.
4. All single phase motors have overload protection
5. 115V, 60Hz models are CSA approved.



8920



8925

Special Application Systems

8925	Rotovap Pump ⁶	Freeze Dryer Pump ⁹
11.3(320)	1.1(31)	6.1(173)
16(267)	1.6(26)	8.6(144)
4 x 10 ⁻⁴ (0.00053)	1x10 ⁻¹ (0.133)	1x10 ⁻⁴ (0.00013)
55	58	50
1725	3450	1725
3/4(560)	1/4(190)	1/2(370)
1.2(1.1)	0.48(0.45)	1.4(1.3)
9/16, 13/16 (14, 20)	3/8 (10)	7/16, 13/16 (11, 20)
UNIBARB (1 1/8-20)	Barb (1/4 in NPT)	UNIBARB (1 1/8-20)
1-20	3/4-20	1-20
69(31.3)	27.5(12.5)	55(25)
21.2(53.8)	14.5(36.8)	18.6(47.2)
7.1(17.9)	5.1(13)	11.5(29.2)
10.7(27.2)	14.3(36.3)	9.6(24.4)
74(33.6)	37(16.8)	70(31.8)
24x15.8x14 (61x40.1x35.6)	21.5x12.5x16 (54.6x31.8x40.6)	25x18.5x14 (63.5x47x35.6)
8925A	8890A-70	8917A-80 ¹⁰
8925C-02	8890C-72	8917C-80
8925C-01	---	---
8925W	---	---

6. 230V, 50Hz models which are provided with CE mark.
7. Cat No. 1416B Exhaust Oil Recycler is recommended when operating the GEM at pressures of 1torr or higher.
8. Rotovap/Vacuum manifold pump – see p. 4 & 6.
9. Freeze Dryer Pump – see p. 9 & 18.
10. Order 8917C-80 and cord set 8906M for 230V, 60Hz, 1 Ph.

Exhaust Filter

A replaceable filter element captures oil mist from the exhaust port of the pump and reduces pump noise.

Pump Model	CAT. No.
8890, 8905	1417
8907	1417P-7
8920, 8925, 8912, 8917	1417P-10



(See p. 43 for a complete list of filters)

Exhaust Oil Recycler

Use when pumping continuously above 1torr. Captures oil mist from the pump, and returns collected oil to the pump via a gas ballast connection.

Pump Model	CAT. No.	CFM
8890 (GEM)	1416B	3
8905	1416H	3
8907, 8912, 8917, 8920, 8925	1416C	9



(See p. 43 for a complete list of filters)

Dry Ice / Liquid Nitrogen Trap

Recommended to protect pump from condensable vapors. Use either dry ice slurry or LN2 in the 3 quart center well.

Pump Model	CAT. No.
8890, 8905, 8907, 8912, 8917, 8920, 8925	1420H-14



(See p. 40 for Trap Selection Table)

Premium Vacuum Pump Oil

Higher viscosity formula that resists breakdown at higher RPM and temperatures of direct drive vacuum pumps.

Size	CAT. No.
Quart	8995P-11
Gallon	8995P-15
5 Gallon	8995P-20



Gold Vacuum Pump Oil

Specially formulated oil for challenging applications. This highly saturated synthetic oil is resistant to breakdown at higher temperature and is highly stable in chemical environments.

Size	CAT. No.
Liter	8995G-11
Gallon	8995G-15
5 Gallon	8995G-20



Belt Driven Oil-Seal Design Lowers RPM and Maintenance

- Freeze Drying
- Concentrating
- Vacuum Manifold / Schlenk Line
- Degassing
- Vacuum Distillations
- Vacuum Drying



1399N



1400



1405/1402

Specifications

Two - Stage Vacuum Pumps¹

Welch Model	1400	1405	1402	1376	1397
Free Air Displacement					
cfm	0.9	3.2	5.6	10.6	17.7
l/min.	25	90	160	300	500
Ult. Pressure, torr(mbar) ¹	1 x 10 ⁻⁴ (0.00013)	1 x 10 ⁻⁴ (0.00013)	1 x 10 ⁻⁴ (0.00013)	1 x 10 ⁻⁴ (0.00013)	1 x 10 ⁻⁴ (0.00013)
Gas Ballast	Yes	Yes	Yes	Yes	Yes
Pump RPM	580	525	525	525	400
Motor Horsepower (watts)	1/3(250)	1/2(370)	1/2(370)	1(750)	1(750)
Oil Capacity, qt.(liters)	0.62(0.59)	2.25(2.1)	2.25(2.1)	2.5(2.4)	1.25(1.2)
Tubing Needed, I.D. in.	7/16(11)	7/16(11)	13/16(21)	13/16(21)	1-5/8(41)
Intake, Nipple Thread	3/4-20	1-20	1-20	1-20	1.75-20
Exhaust, Thread Type	3/4-20	1-20	1-20	1-20	1.75-20
Weight, lbs. (kg)	58(26)	112(51)	112(51)	156(71)	205(93)
Overall Dimensions					
L in.(cm)	17.8(45.1)	20(51)	20(51)	20(51)	26(66)
W in.(cm)	9(22.9)	12(30.5)	12(30.5)	14.1(35.9)	13.7(34.8)
H in.(cm)	12.6(32.1)	15(38.1)	15(38.1)	15.4(39)	18.8(47.6)
Ship Weight, lbs.(kg)	70(31.8)	132(60)	132(60)	180(81.8)	213(96.8)
Shipping Carton Dimensions LxWxH in.(cm)	20.5x13.8x14.5 (52.1x35.1x36.8)	22.5x15.5x19.5 (57.2x39.4x49.5)	22.5x15.5x19.5 (57.2x39.4x49.5)	22x18x19 (55.9x45.7x48.3)	27.3x18x22 (69.3x45.7x55.9)

Ordering Information^{4, 5, 6.}

Wired for 115V, 60Hz, 1 Ph with N. American 115V Plug	1400B-01 ^{6.}	1405B-01 ^{6.}	1402B-01 ^{6.}	1376B-01	1397B-01
Wired for 230V, 60Hz, 1 Ph with N. American 230V Plug	1400C-01	1405C-01	1402C-01	---	---
Wired for 220V, 50Hz, 1 Ph w/Cont. Euro. (Schuko) Plug	1400C-02	1405C-02	1402C-02	1376C-03	1397C-03
Explosion Proof Motor, 115V, 60 Hz	1400W-01 ^{5.}	1405W-01 ^{5.}	1402W-01 ^{5.}	---	---
3-Phase Motor 230V, 460V, 60Hz	---	---	1402M-01	1376M-01	1397M-01

Notes:

- Two-stage pumps should not be operated continuously at pressures above 10torr. Ultimate pressure measured with a trapped McCleod gauge.
- One-stage pumps should not be operated continuously at pressures above 50torr.

- All 115V and 230V single phase motors include thermal overload protection.
- Models 1400C-02, 1405C-02 and 1402C-02 provided with CE marking.



1376



1397/1374

	One - Stage Vacuum Pumps ⁵	
	w/o plate	w/bell jar plate
1374	1399	1399N
23	1.2	1.2
650	35	35
1 x 10 ⁻⁴ (0.00013)	1.5 x 10 ⁻² (0.019)	1.5 x 10 ⁻² (0.019)
Yes	No	No
510	750	750
1-1/2(1120)	1/3(250)	1/3(250)
1.25(1.2)	0.5(0.47)	0.5(0.47)
1-5/8(41)	7/16(11)	7/16(11)
1.75-20	3/4-20	3/4-20
1.75-20	3/4-20	3/4-20
220(100)	51(23)	63(28.6)
26(66)	17(43.2)	17(43.2)
13.7(34.8)	9(22.9)	9(22.9)
18.8(47.6)	10(25.4)	10(25.4)
215(97.7)	62(28.2)	74(33.6)
27.3x18x22 (69.3x45.7x55.9)	20.5x13.8x14.5 (52.1x35.1x36.8)	20.5x13.8x14.5 (52.1x35.1x36.8)
1374B-01 ⁵	1399B-01	1399N-01
---	---	---
---	1399C-02	---
---	---	---
1374M-01	---	---

5. Conduit wiring installation required. No cord, plug or switch provided.
6. CSA approved models are 1400B-80, 1405B-80 and 1402B-80.

Exhaust Filter

A replaceable filter element captures oil mist from the exhaust port of the pump and reduces pump noise.

Pump Model	CAT. No.
1399, 1400	1417
1376, 1402, 1405	1417P-10
1397, 1374	1417P-20



(See p. 43 for a complete list of filters)

Exhaust Oil Recycler

Use when pumping continuously above 1 torr. Captures oil mist from the pump, and returns collected oil to the pump via a gas ballast connection.

Pump Model	CAT. No.	CFM
1400	1416H-01	3
1376, 1402, 1405	1416C-01	8



(See p. 43 for a complete list of filters)

Dry Ice/Liquid Nitrogen Trap

Recommended to protect pump from condensable vapors. Use either dry ice slurry or LN₂ in the 3 quart center well.

Pump Model	CAT. No.
8890, 8905, 8907, 8912, 8917, 8920, 8925	1420H-14



(See p. 40 for Trap Selection Table)

DuoSEAL™ Vacuum Pump Oil

Tested to high vacuum levels, this oil meets rigid requirements for vapor pressure, stability and viscosity.

Size	CAT. No.
Quart	1407K-11
Gallon	1407K-15
5 Gallon	1407K-20



Gold Vacuum Pump Oil

Specially formulated oil for challenging applications. This highly saturated synthetic oil is resistant to breakdown at higher temperature and is highly stable in chemical environments.

Size	CAT. No.
Liter	8995G-11
Gallon	8995G-15
5 Gallon	8995G-20



CHEMSTAR VACUUM PUMPS

For Pumping Corrosive Gases

- HCl
- O₃
- H₂SO₄
- HBr
- HOAc
- SO_x
- Br₂
- F₃CCO₂H
- H₂S
- Cl₂
- CH₂O
- HNO₃
- SF₆, CF₄ Fragments and other gases



1402N

The Five Defining Features Needed For Pumping Corrosive Gases

- 1. High Contamination Tolerance**
 - Contaminants diluted
 - Fewer moving parts
 - Top oil feed for cleaner oil
- 2. Vital Parts Corrosion Resistant**
 - Fluoroelastomer seals and gaskets
 - Metal vanes
 - Stainless steel valves, etc.
 - PTFE coated oil case
- 3. Reduced Frictional Wear**
 - Less than 580 RPM vs. typical 1750 RPM direct drive
- 4. Nitrogen Purge Standard**
 - Degasses and cools oil
- 5. Easy Attachment of Accessories**
 - Complete accessory package for corrosive gases

Specifications

CHEMSTAR Vacuum Pumps

Welch Model	1400N	1402N	1376N
Free Air Displacement			
cfm	0.9	5.6	10.6
l/min.	25	160	300
Ultimate Pressure, torr(mbar) ¹	1 x 10 ⁻⁴ (0.00013)	1 x 10 ⁻⁴ (0.00013)	1 x 10 ⁻⁴ (0.00013)
Gas Ballast	Yes	Yes	Yes
Pump RPM	580	525	525
Motor Horsepower (watts)	1/3(250)	1/2(370)	1(750)
Oil Capacity, qt.(liters)	0.62(0.59)	2.25(2.1)	2.5(2.37)
Tubing Needed, I.D. in.	7/16(11)	13/16(21)	13/16(21)
ISO Exhaust & Intake Flange	NW 16	NW 25	NW 25
Dimensions LxWxH in.(cm)	17.8x9x12.6 (45.2x22.9x32)	19.3x14.1x15.4 (49x35.3x39.1)	19.3x12.3x15.6 (49x31.2x39.6)
Weight, lbs.(kg)	58(26)	112(51)	156(71)
Ship Weight, lbs.(kg)	71(32.3)	133(60.5)	181(82.3)
Shipping Carton Dimensions LxWxH in.(cm)	20.5x13.8x14.5 (52.1x35.1x36.8)	22.5x15.5x19.5 (57.2x39.4x49.5)	22x18x19 (59.5x45x48)

Ordering Information

Wired for 115V, 60Hz, 1 Ph with N. American 115V Plug	1400N-01	1402N-01	1376N-01
Explosion Proof Motor 115V, 60Hz, 1 Ph	1400N-90 ³	1402N-90 ³	---
Wired for 230V, 60Hz, 1 Ph w/ N. American Plug	---	1402N-60	1376N-60
Wired for 220V, 50Hz, 1 Ph w/ Cont. Euro. (Schuko) Plug.	1400N-50 ⁶	1402N-50 ⁶	1376N-49
Wired for 100V, 50/60Hz, 1 Ph for Japan	1400N-53	1402N-53	1376N-53

Notes:

1. CHEMSTAR pump should not be operated continuously at pressures above 10torr. Ultimate pressure measured with a trapped McCleod gauge.
2. All single phase motors have overload protection.
3. Conduit wiring installation required. No cord, plug or switch provided.
4. Hinged clamp, centering ring assembly and hose adapter are included with all CHEMSTAR Pumps.
5. Standard filter option possible if the exhaust flange is removed, but not chemically resistant.
6. Units supplied with CE marking.

Protective Accessories For Corrosive Gases

Protective Accessories For CHEMSTAR® Pumps

- Heavy Corrosive Gas Loads
- Contaminated Exhaust Oil Mist
- Particulates In Gas Streams



- 1 Acid Neutralization Trap
- 2 Hermetically Sealed Oil Mist Eliminator
- 3 Make The Clear Choice



ACID NEUTRALIZATION TRAPS



The Acid Neutralization Trap contains a large alkaline element cartridge to neutralize hydrous acids before they enter the vacuum pump. The element changes from white to bluish-transparent when spent and can be observed through the transparent trap body. Dimensions: 1420H-21, 8"Wx9"H; 1420H-20, 8"Wx13"H. (See CHEMSTAR application booklet for specific recommendations for use.)

ISO Size	Capacity	Catalog Number		
		Trap	Pump Connector Kit For Trap ¹	Replacement Element
NW 16	To 2 CFM	1420H-21	1420K-16	1420E-02
NW 25	To 12 CFM	1420H-20	1420K-25	1420E-01

1. Includes hinge clamp, centering ring and elbow. Use with CHEMSTAR vacuum pumps.

HERMETICALLY SEALED OIL MIST ELIMINATORS



When attached to an effective exhaust line, the hermetically sealed oil mist eliminator prevents corrosive vacuum pump exhaust gases from escaping into the room. It also coalesces oil mist from the pump exhaust and allows it to drain back into the pump. Coalescing the oil mist prevents loss of oil and the frequent need to add expensive vacuum fluids. Stainless steel construction with borosilicate microfiber element and fluoroelastomer gaskets. Requires but does not include pump adapter kit. Dimensions of cat no. 1416D: 5"Wx7-3/4"H; 1416F, 5"Wx13-3/8"H. 1416D exhaust port accepts 13/16" I.D. hose.

Use With Pump Model	Catalog Number		
	Mist Eliminator	Pump Adaptor Kit	Replacement Element
1400N	1416D	1416E-01	1417Y-05
1402N, 1376N	1416D	1416E-02	1417Y-05

MAKE THE CLEAR CHOICE



8995G-11

Pump oil Condition Color



Good



Bad(Possible Pump Damage)

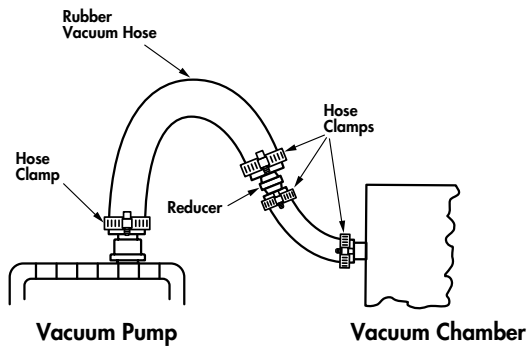


The choice is clear. Pump oil can become contaminated with ingested fluids and vapors. Use recommended pump oil and change your pump oil regularly. Cloudy and discolored oil will lead to premature pump failure.

Make the clear choice and change your oil regularly.

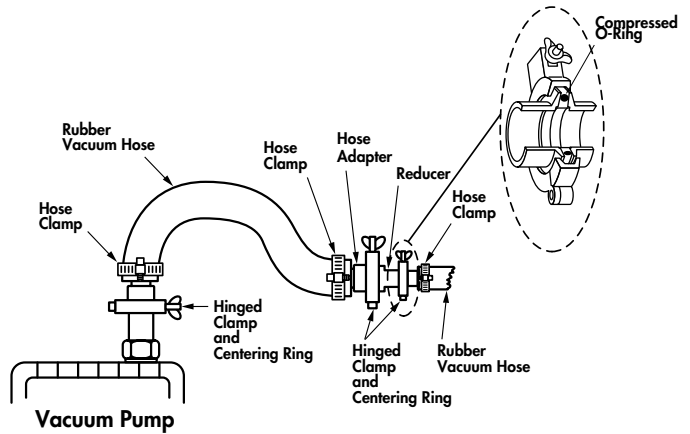
For Vacuum Pump Oils
See p. 46

VACUUM HOSE & CONNECTORS



Hose Nipple Connections

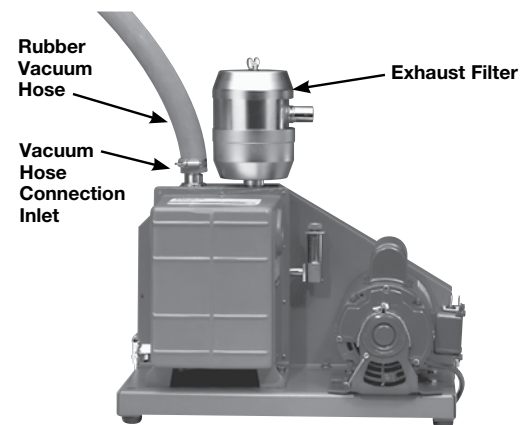
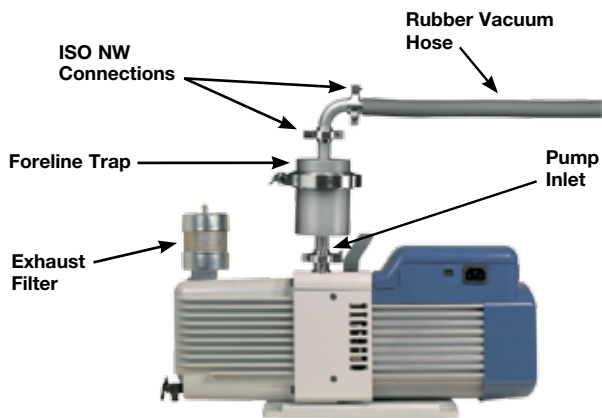
- Inexpensive
- Flexible
- For vacuum systems where the need for disassembly is infrequent
- Recommended for vacuum to 10^{-3} torr



Hose To ISO Connections

- Combines flexibility and frequent detachment ability
- Recommended for vacuum to 10^{-3} torr

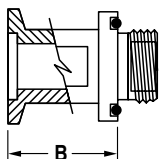
VACUUM ACCESSORIES



- **Exhaust Filter** - Connects to pump's outlet. Filters oil mist from the pump's exhaust to keep your working area clean and air quality healthful. A second option is an exhaust line to a vapor hood or other outside exhaust vent. This requires an adapter and air tight connections (see p. 37-39, 43).
- **Vacuum Oil** - Use of high quality vacuum oil is necessary for both vacuum performance and pump lifetime. With lesser quality oil the vacuum is degraded and pump lifetime is shortened. Welch offers three grades of vacuum oil designed especially for use in DUOSEAL and Direct-Drive vacuum pumps (see p. 46).
- **Foreline Trap** - Protects the vacuum pump from harmful substances present in the vacuum system and/or formed during the vacuum process. Can also block vacuum pump oil from back streaming into the system and contaminating samples (see p. 40 for Trap Selection chart)*. Failure to use a foreline trap, when recommended, can result in serious damage to the vacuum pump. For trap selection advice, see your Welch-Illvac representative at www.welchvacuum.com.
* Dry ice/Isopropanol - Liquid Nitrogen trap recommended to protect pump from condensable vapors.

For more information, see Vacuum Gauges, p. 41.

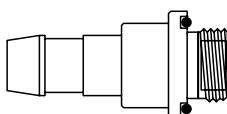
ISO NW INLET CONNECTORS FOR HIGH VACUUM PUMPS



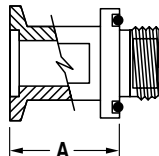
- Aluminum with o-ring
- No sealant required for installation
- For pumps above listed serial number

ISO	Thread Size	Pump Model	Serial No.	B	CAT. No.
NW 16	3/4-20"	1399	>26461	1.12	1393F
NW 16	3/4-20"	1400, 1400N	>18069	1.12	1393F
NW 25	1-20"	1405	>77703	1.2	1393G
NW 25	1-20"	1380	>2114	1.2	1393G
NW 25	1-20"	1402, 1402N	>133218	1.2	1393G
NW 25	1-20"	1376, 1376N	>14594	1.2	1393G
NW 40	1.75-20"	1374	>73519	1.4	1393H
NW 40	1.75-20"	1397	>51217	1.4	1393H
NW 16	3/4-20"	8905	All	1.12	8905K-05
NW 25	1 1/8-20"	8907, 8912, 8917, 8920, 8925	All	1.4	8907K-05

EXHAUST CONNECTORS FOR HIGH VACUUM PUMPS



Hose Connector



ISO Connector

- For adding an exhaust line to a pump
- Connectors for vacuum hose and ISO NW

Pump Models	Hose Connector		ISO Connector			
	Hose I.D.	CAT. No.	Thread Size	ISO NW	A	CAT. No.
1399, 1400, 8905, 8890	7/16"	1393J	3/4-20"	NW 16	1.12	1393F
1402, 1380, 1376, 8920, 8925, 8907, 8912, 8917, 1405	13/16"	1393K	1-20"	NW 25	1.2	1393G
1374, 1397	1-5/8"	1393L	1 3/4-20"	NW 40	1.4	1393H
1405, 1402	7/16"	1393M	1-20"	NW 25	1.2	1393G

UNIBARB™ INLET CONNECTORS FOR HIGH VACUUM PUMPS



- Accepts two sets of tubing ID
- Aluminum
- With inlet screen

Thread Size	Pump Model	Hose I.D.	CAT. No.
3/4-20"	1400, 1399, 8905	3/16" & 7/16"	8905K-06
1 1/8-20"	8907, 8912, 8917	7/16" & 13/16"	8907K-06
1 1/8-20"	8920, 8925, 8917	9/16" & 13/16"	8920K-06

BRASS HOSE BARB



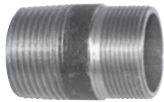
1393X

- Brass
- For use with ISO to female pipe adaptors

Hose Barb	Thread	Hose I.D.	CAT. No.
1/4"	1/4" NPT	3/16" and 3/8"	1393X

Dimensions are in inches

MALE NPT PIPE INLET AND EXHAUST ADAPTERS



- Black Pipe
- Adapt inlet and exhaust to NPT Thread

Pump Model	Machine Thread	NPT Male Thread	CAT. No.
1400, 1399	3/4-20"	1/2"	1393N
1380, 1402, 1376, 1405	1-20"	3/4"	1393P

RED VACUUM HOSE • HOSE CLAMPS

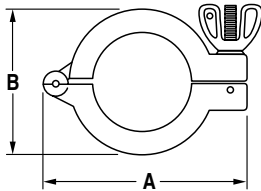


- Very thick walled hose for vacuum or pressure applications
- Quick-acting clamp tightened by a thumbscrew actuated worm screw
- Hose comes in 5 ft. lengths (1.5m)

Specifications			Hose Kit CAT. No.				Clamps CAT. No.
I.D.	Wall Thickness	O.D.	5ft. Only	10 ft. Only	15 ft. Only	20 ft. Only	10/Pkg.
3/16"	5/16"	13/16"	331020-5	331020-10	-	-	305320
1/4"*	1/4"	3/4"	331030-5	-	-	-	305320
7/16"	5/16"	1-1/16"	331040-5	331040-10	-	-	305340
5/8"	3/8"	1-3/8"	331050-5	331050-10	-	-	305350
13/16"	3/8"	1-9/16"	331060-5	331060-10	331060-15	305360-20	305360
1 5/8"	11/16"	3"	331080-5	331080-10	-	-	305380

*Hose works with pumps that accept 3/8 in. I.D. hose.

HINGED CLAMPS



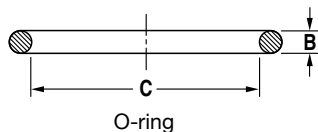
- Aluminum
- Closure by wing and nut bolt

ISO	A	B	Clamp Width	CAT. No.
NW 16	2.612	1.625	0.612	302201
NW 25	2.965	1.950	0.612	302202
NW 40	3.735	2.600	0.625	302203

CENTERING ASSEMBLIES • REPLACEMENT O-RINGS



Centering Ring Assembly

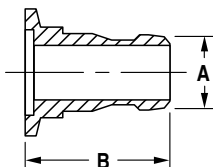


O-ring

- Stainless steel centering ring with o-ring
- Replaceable fluoropolymer elastomer o-ring seal

ISO	Centering Ring Assembly		Replacement O-Ring		
	A	CAT. No.	B	C	CAT. No.
NW 16	0.630	303101	0.210	0.725	304801
NW 25	0.984	303102	0.210	1.100	304802
NW 40	1.575	303103	0.210	1.600	304803

RUBBER HOSE ADAPTERS



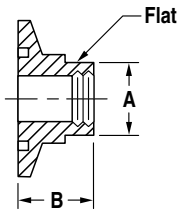
- ISO NW to rubber vacuum hose
- Aluminum

ISO	Hose I.D.	A	B	CAT. No.
NW 16	7/16"	0.625	1.65	501241
NW 16	5/8"	0.750	1.65	501251
NW 25	13/16"	0.875	1.73	501262
NW 40	1-5/8"	1.63	2.17	501283

Dimensions are in inches

Vacuum System Connectors & Tubing

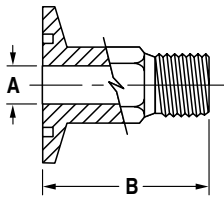
FEMALE PIPE ADAPTERS



- Female threads have 1/4 in. to 1/2 in. NPT
- Stainless steel
- Can be used with brass hose barbs (see p. 36)

ISO	NPT	A	B	CAT. No.
NW 16	1/4"	0.62	0.50	506121
NW 25	1/4"	0.88	0.50	506122
NW 25	1/2"	0.88	0.50	506142

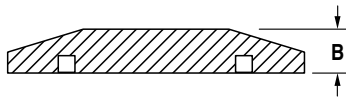
MALE PIPE ADAPTERS



- Male stubs have 1/4 – 18 NPT
- Hex shank
- Stainless steel

ISO	NPT	A	B	CAT. No.
NW 16	1/4"	0.281	1.6	505121

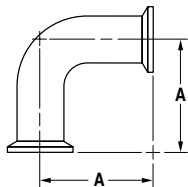
BLANK-OFF FLANGES



- Stainless steel
- To close off unused parts

ISO	B	CAT. No.
NW 16	0.20	388101
NW 25	0.20	388102

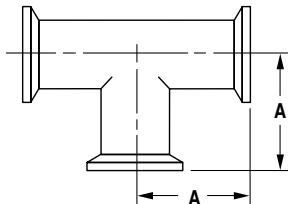
90° ELBOWS



- Stainless steel
- Same size flange on both ports

ISO	A	CAT. No.
NW 16	1.50	383101
NW 25	2.04	383102

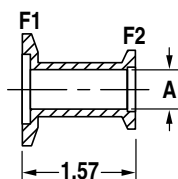
TEES



- Stainless steel
- Same size flanges on all ports

ISO	A	CAT. No.
NW 16	1.50	384101
NW 25	2.04	384102

REDUCERS



- Makes differing sizes of ISO flanges
- Stainless steel

ISO F1	ISO F2	A	CAT. No.
NW 25	NW 16	0.555	387121
NW 40	NW 25	0.900	387132

Dimensions are in inches

PROTECT YOUR VACUUM SYSTEM

Foreline traps are used to prevent harmful substances generated or resident in vacuum systems from damaging vacuum pumps and/or your work:

Pump Damage

Liquid, water, solvents, and acids can cause serious damage to a vacuum pump:

- Vapors can condense to liquids within vacuum pump as a natural result of gas compression
- Liquid can be accidentally aspirated into the pump
- Particulates can become lodged in a pump mechanism

TRAP SELECTION TABLE			
Potential Pump Contaminants	Acid Neutralization Trap ¹	Cold Traps	
		Dry Ice Slurry (-79°C)	Liquid Nitrogen (-198°C)
Water	Excellent	Excellent	Excellent
Organics	Excellent	Excellent	Excellent
Acidic	Excellent	Fair	Excellent
Oil Backstreaming ²	Not Recommended	Excellent	Excellent

Key

Excellent
Fair
Not Recommended

Notes:

1. Limits Pressure to 10⁻² torr
2. Prevents pump oil from contaminating Application during prolonged deep vacuum or pump shutoff.

PROTECT, IMPROVE YOUR VACUUM APPLICATION

Oil Back streaming

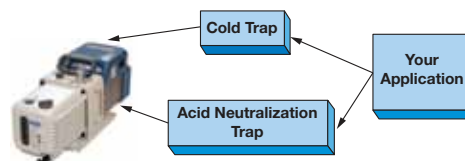
Oil molecules can migrate from an oil lubricated vacuum pump back into the vacuum system when operated at sustained vacuum levels of 1x10⁻²torr (1.33x10⁻² mbar) or deeper for long periods.

Pump Shutoff Back Migration

When a vacuum pump is shut off, contamination (oil, line substances) can back up into your work if unprotected by pump/system anti-suckback devices and traps.

Pump Efficiency

Cold traps lower vapor pressure, enabling higher vacuum with the same work from the pump.



DRY ICE / ISOPROPANOL TRAP (-79°C)



1420H-14

- Recommended for freeze dryers, vacuum manifolds, concentrators, etc.
- Uses dry ice or liquid nitrogen as refrigerant
- Removable center make trapping surface easy to clean

DRY ICE/LIQUID NITROGEN COLD TRAP is an effective foreline cold trap for vacuum manifolds or Schlenk Lines. The trap has a large 3 quart (2.8 liters) center well for the dry ice/isopropyl alcohol slurry or liquid nitrogen; traps up to 1.5 liter condensate. With dry ice cold temperature may be maintained for up to 12 hours depending upon the vapor load. With liquid nitrogen cold temperature can be maintained for up to 2 hours depending upon the vapor load. See Applications Notes, p. 36 & 40 for configuration and usage information.

Tubing Needed	Diam.	Height	Diameter	In/Out Offset	Trap CAT. No.
7/16" I.D.	10	8.25	10.75	3.5	1420H-14

Tubing CAT. No. 331040-5

ACID NEUTRALIZATION TRAP



- ISO NW flange connection
- Calcium Hydroxide element
- Element changes from white to bluish-transparent when spent
- Configure with prior cold trap to reduce loading

ISO Size	Capacity	Catalog Number		
		Trap	Replacement Element	Pump Connector Kit For Trap ¹
NW 16	To 2 cfm (57 l/min.)	1420H-21	1420E-02	1420K-16
NW 25	To 12 cfm (340 l/min.)	1420H-20	1420E-01	1420K-25

Note: 1. Includes hinge clamp, centering ring and elbow. Use with CHEMSTAR® vacuum pumps.

Application Note for Cold Traps

Cold traps employing a dry ice slurry or liquid nitrogen are effective as long as the refrigerant level is maintained. If the trap warms up while the pump is running, all of the trapped condensables will be ingested by the vacuum pump, contaminating the oil.

Cold traps must be cleaned out at the end of each day. If the pump is run overnight, the trapped condensables will ultimately be ingested by the pump as the trap warms up. Cleaning a Dry Ice Slurry/Liquid Nitrogen trap is easy. The steps are: 1. Turn off the pump. 2. Leak air into the trap from the application side. 3. Remove the center well and polypropylene ring to a hood. The center well can be washed off into a beaker or the condensables can be allowed to evaporate in the hood or added to the laboratory waste.

HANDHELD GENERAL RANGE VACUUM GAUGE



Model 1520 in optional frame case

Kit 1520K-10

- Accurate vacuum measurement from 1 to 760torr
- Portable unit connects quickly to any vacuum source



Take fast, easy vacuum measurements at multiple locations with this portable vacuum gauge. The internal piezoelectric sensor reads results to a large LCD. Stands upright using optional protective frame case. Use standard 3/8" ID vacuum hosing to connect to vacuum source. Operates on standard 9V battery or using AC adapter. Meter dimensions: 3-5/8"Wx1-1/4"Dx5-3/4"H. Available as standalone unit or in convenient carrying case kit with frame case/stand, battery, AC adapter, and vacuum hosing length.

CAT. No.		Range	Description
Meter	Meter W/ Kit		
1520B-01	1520K-10 ¹	1 to 760torr	Handheld Vacuum Gauge, 9V, torr
1520C-02	1520K-11 ²	1 to 1013mBar	Handheld Vacuum Gauge, 9V, mBar

Notes: 1. 120 VAC adapter
2. 220 VAC Euro adapter

HANDHELD MID-HIGH VACUUM GAUGE



- Accurate vacuum measurement from 0.1 to 1999millitorr
- Portable unit connects quickly to any vacuum source



Take accurate vacuum readings at multiple sites using this portable vacuum gauge. The external thermocouple sensor reads results to a large LCD. Stands upright using optional protective frame case. Sensor coil cord extends from 1 to 4 feet to connect vacuum source using 1/8" NPT fitting. Operates on standard 9V battery or using AC adapter. Meter dimensions: 3-5/8"Wx1-1/4"Dx5-3/4"H. Available as standalone unit with thermocouple tube sensor or in convenient carrying case kit with frame case/stand, battery, AC adapter, and thermocouple tube sensor¹.

CAT. No.		Range	Display	Description
Meter	Meter w/Kit			
1525B-01	1525K-10 ²	0.001 to 1.0torr	1 to 1000 x 10 ⁻³ torr	Handheld Vacuum Gauge
1525C-02	1525K-11 ³	0.001 to 1.3mbar	1 to 1300 x 10 ⁻³ mbar	Handheld Vacuum Gauge

Notes: 1. For replacement sensor, order 1516A
2. 120 VAC adapter.
3. 220 VAC Euro adapter

THERMOCOUPLE VACUUM GAUGE



- Vacuum measurement to low millitorr (micron) range
- Rugged, reliable thermocouple gauge sensor tube



Gauges provide an accurate, reliable measurement of vacuum. Self-contained gauges with solid-state electronics for rapid response time, long life and low maintenance. Comes with a 0 to 10 VDC recorder output. The gauge sensor tubes are designed to assure maximum sensitivity over the entire vacuum range. Gauge sensor tube connected to system via 1/8" NPT thread. Each gauge comes with one sensor tube and one cable. Dimensions of 7"Lx5"Dx5.6"H (17.8x12.7x14.1); Weight 2 lbs.(0.9kg).

Gauge CAT. No.	Range (millitorr)	Voltage	Protective Trap CAT. No.	Replacement Sensor Tube CAT. No.
1515	0 to 5000	115V, 60Hz 1 Ph	1515B	1515A

VACUUM REGULATOR WITH INLET SEPARATOR JAR



2585K-50, 2565K-50

The 2585K-50 and 2565K-50 include an inlet trap to help prevent ingestion of fluids into the pump, a dial gauge for continuous vacuum level monitoring and a regulator bleed valve to adjust vacuum levels. Both models have 3/8" inlet hose barb, 2585 has 3/8" NPT male mount and 2565 has 1/4" NPT male mount.

Pump Model	Connection	CAT. No.
2585, 2581, 2580	3/8" inlet hose barb, 3/8" NPT male mount	2585K-50
2567, 2563, 2562, 2561	3/8" inlet hose barb, 1/4" NPT male mount	2565K-50

VACUUM AND PRESSURE REGULATOR FOR WOB-L® VACUUM PRESSURE STATIONS



2522K-05



2522K-06

The 2522K-05 vacuum regulator is designed to run from slightly below atmospheric to the maximum vacuum level of the pump.

The 2522K-06 pressure regulator is designed to control from atmospheric to the maximum rated pressure of the pump.

Pump Model	Connection	CAT. No.
2522, 2534, 2546	1/4" male NPT, to vacuum inlet	2522K-05
2522, 2534, 2546	1/4" male NPT, to pressure inlet	2522K-06

VACUUM REGULATOR



1421



1421D

Model 1421 replaces inlet barb on pump model 8890 and allows easy regulation of vacuum level. Includes an easy to read dial gauge. CAT. No. 1421D all stainless steel construction.

Pump Model	CAT. No.
8890, 1/4" NPT male mount	1421
Generic, 1/4" NPT male Mount	1421D

Caution: Do not use with DUOSEAL®, CHEMSTAR® or Direct-Drive pumps.

VACUUM GAUGE



Inexpensive gauge for measuring vacuum level. Not an absolute pressure gauge. Gauge uses atmospheric pressure as reference.

Dial Diameter	Units of Measure	Connection	CAT.No.
2" O.D.	in. Hg, cm Hg (Brass)	1/8" male NPT	726021
2.5" O.D.	in. Hg, mm Hg (Brass)	1/4" male NPT	726020
2" O.D.	in. Hg (Stainless)	1/8" male NPT	726023
2" O.D.	mbar/kPa (Brass)	1/8" male NPT	726024
2" O.D.	psi/kgsm	1/8" male NPT	726025

OIL DRAIN VALVE



726130

Drain valve 1/4" NPT male, black zinc coated brass.

Pump Model	CAT. No.
8907, 8912, 8917, 1399, 1400, 1402, 1405, 1376, 1374, 1397, 142601, 142602, 142604, 142606	726130

STANDARD EXHAUST FILTERS & DIRECTIONAL EXHAUST FILTERS

- Filters oil mist from pump exhaust
- Easy replacement of element
- Reduces pump noise
- Filters to 0.3 micron particle size
- Screw-in type



1417

Standard Exhaust Filters				
Use With Pump Model	Dimensions, Inches		Catalog Number	
	Diameter	Height	Filter	Replacement Element
8890, 8905, 1399, 1400, 1400N	2.5"	2.5"	1417	1417L
8907, 8912, 8917	2.5"	4.5"	1417P-7	1417R
8920, 8925, 1376, 1402, 1405, 1402N, 1376N	5.0"	6.25"	1417P-10	1417G
1397, 1374	5.0"	9.0"	1417P-20	1417H-01
8917A-80, 8947C-80	2.5"	4.5"	1417P-7	1417R

Note: 1. GEM® (8890) includes 1417 as standard equipment.

- Large, high capacity
- 360° Swivel outlet with tubing connector
- Screw-in type
- Continuously separates oil mist from the vacuum pump exhaust and by gravity returns the oil to the pump



1417A

Directional Exhaust Filters						
Use With Pump Model	Dimensions, Inches			Catalog Number		
	Diameter	Height	Outlet Tube O.D.	Filter	Element	Gasket Replacement
8907, 8912, 8917, 8920, 8925, 1376, 1380, 1402, 1405, 1402N, 1376N	5.0"	7.5"	1.0"	1417A	1417G	1417A-01
1374, 1397	6.5"	10.0"	2.0"	1417B	1417H	1417B-01

EXHAUST OIL RECYCLER



Exhaust Mist Eliminator shown installed on pump with oil return line.

Exhaust oil recyclers are recommended for vacuum systems with continuous pressure of 1 torr (1 mm Hg) or higher.¹ At these pressures, conventional exhaust filters quickly saturate. The Mist Eliminator System continuously separates oil mist from the vacuum pump exhaust and actively returns the oil to the pump.

CAT. No.	Vacuum Pemp Model No.
1416B	8890 (GEM)
1416H	8905
1416C	8907, 8912, 8917, 8920, 8925
1416H-01	1400, 1400N
1416C-01	1376, 1376N, 1402, 1402N, 1405

Note: 1. CAUTION: Two stage vane vacuum pumps such as models 8905, 8907, 8912, 8920, 8917, 8925, 1400, 1402, 1376, 1405, 1400N, 1402N and 1376N should not be operated continuously at pressures above 10torr.

HERMETICALLY SEALED OIL MIST ELIMINATORS



When attached to an effective exhaust line, the hermetically sealed oil mist eliminator prevents corrosive vacuum pump exhaust gases from escaping into the room. It also coalesces oil mist from the pump exhaust and allows it to drain back into the pump. Coalescing the oil mist prevents loss of oil and the frequent need to add expensive vacuum fluids. Stainless steel construction with borosilicate microfiber element and fluoroelastomer gaskets. Requires, but does not include pump adapter kit. Dimensions of CAT. No. 1416D: 5"Wx7-3/4"H; 1416F, 5"Wx13-3/8"H. 1416D exhaust port accepts 13/16" I.D. hose.

Use With Pump Model	CAT. No.		
	Mist Eliminator	Pump Adapter Kit	Replacement Element
1400N	1416D	1416E-01	1417Y-05
1402N, 1376N	1416D	1416E-02	1417Y-05

CHEMICAL DUTY DRY PTFE DIAPHRAGM PUMPS - DRYFAST & DRYFAST ULTRA



Pump Model	Kit No.	Description
2014	2047K-01	One head service kit
2032	2047K-01	One head service kit
2034	2037K-01	One head service kit
2037	2037K-01	One head service kit
2042	2047K-01	One head service kit
2044	2037K-01	One head service kit
2047	2047K-01	One head service kit

SELF CLEANING CHEMICAL DUTY DRY VACUUM SYSTEM



Pump Model	Kit No.	Description
2025	2025K-01	One head service kit
2026	2027K-01	One head service kit
2027	2027K-01	One head service kit
2028	2047K-01	One head service kit

STANDARD DUTY DRY PISTON PUMP KITS



Pump Model	Kit No.	Description
2522	2522K-03	Complete Rebuild Kit
2534	2534K-03	Complete Rebuild Kit
2546	2546K-03	Complete Rebuild Kit
2580, 2585	2585K-03 2585K-04	Two Head Service Kit, 2585 Seal Service Kit, 2585
2562/2567	2567K-03 2567K-04	Two Head Service Kit, 2562/67 Seal Service Kit, 2562/67
2561 <small>Note: Models older than and including Dec. 2007, date code 1207xxxx.</small>	2561K-03 2561K-04	Two Head Service Kit, 2561 Seal Service Kit, 2561
2561 <small>Note: Models newer than and including Jan 2008, date code 0108xxxx.</small>	2563K-03	Two Head Service Kit, 2567 Seal Service Kit, 2567
2563	2563K-03	Two Head Service Kit, 2563
2581	2581K-03 2581K-04	Two Head Service Kit, 2581 Seal Service Kit, 2581
All Models WOB-L® Dry Pump	2500K-04	Service Kit for Feet

MP / MPC KITS



Pump Model (MP/MPC)	Kit No.	Description
301 E	402046-US	Complete diaphragm, valve and o-ring replacement kit
601 E, 301 Z, 301 Z ef	402041-US	Complete diaphragm, valve and o-ring replacement kit
1201 E, 901 Z, 601 T, 601 T ef, 301 V	402042-US	Complete diaphragm, valve and o-ring replacement kit
2401 E, 1801 Z, 1201 T, 1201 T ef	402043-US	Complete diaphragm, valve and o-ring replacement kit
301 E, 301 Z ef, 601 E, 601 T ef, 901 Z, 1201 E, 1201 T ef, 2401 E	402106-US	MP/MPC Tool Kit, 19mm wrench, Allen key and adjustable spanner wrench.

DuoSEAL® VACUUM PUMPS



Pump Model	Kit No.	Description
1400	1400K-03 1400K-04	Minor repair kit, 1400 Major repair kit, 1400
1402, 1405	1402K-05 1402K-06	Minor repair kit, 1402 & 1405 Major repair kit, 1402 & 1405
1376	1376K-05 1376K-06	Minor repair kit, 1376 Major repair kit, 1376
1397, 1374	1397K-07 1397K-08	Minor repair kit, 1397 & 1374 Major repair kit, 1397 & 1374
1399	1399K-03 1399K-04	Minor repair kit, 1399 Major repair kit, 1399
1373	1373K-05 1373K-06	Minor repair kit, 1373 Major repair kit, 1373

CHEMSTAR® VACUUM PUMPS



Pump Model	Kit No.	Description
1400N	1400K-09 1400K-10	Minor repair kit, CHEMSTAR 1400N Major repair kit, CHEMSTAR 1400N
1402N	1402K-09 1402K-10	Minor repair kit, CHEMSTAR 1402N Major repair kit, CHEMSTAR 1402N
1376N	1376K-09 1376K-10	Minor repair kit, CHEMSTAR 1376N Major repair kit, CHEMSTAR 1376N

DIRECT-DRIVE VACUUM PUMPS



Pump Model	Kit No.	Description
8890	8890K-02	Minor repair kit, 8890
8905	8905K-02 8905K-03	Minor repair kit, 8905 Shaft seal repair kit, 8905
8907, 8912, 8917	8917K-04 8917K-05	Minor repair kit, 8907, 8912, 8917 Shaft seal repair kit, 8917
8920	8915K-02	Minor repair kit, 8920
8925	8925K-02	Minor repair kit 8925
8917A-80, 8917C-80	1420E-03	Replacement element oil sump

GOLD VACUUM PUMP OIL



- Exceptionally low vapor pressure
- High stability in chemical environments
- No additives or inhibitors
- Recommended for Welch belt-drive and direct-drive pumps

A double distilled synthetic hydrocarbon oil designed for excellent resistance when pumping corrosive gases or vapors. A synthetic base stock that has no aromatic compounds or sulfur which accelerate varnishing, sludging and carbon build-up when pumps are used to pump corrosives. Gold oil will give a longer service life and superior protection for the internal metal components of a pump in corrosive pumping applications compared to DuoSEAL and Premium Oil. Gold Oil offers excellent vacuum pressure in both belt-driven and direct-driven vacuum pumps over time. Gold Oil is miscible with conventional hydrocarbon oils and can be used without rebuilding the pump. The oil is clear and colorless.

CAT. No.	8995G-11	8995G-15	8995G-20
Size	Liter	Gallon	5 Gallon

PREMIUM VACUUM PUMP OIL



- Low vapor pressure
- Designated for high RPM direct drive vacuum pumps
- No additives or inhibitors
- Recommended for Welch direct-drive vacuum pumps

A triple-distilled hydrocarbon oil using severely hydrotreated base stock is designed to resist breakdown at higher RPMs and operating temperatures of direct-drive vacuum pumps. The hydrotreating virtually eliminates aromatics and sulfur to give good resistance to sludge and varnish formation overtime in corrosive environments. Premium enables direct-drive vacuum pumps to maintain the highest vacuum performance over time. The oil is light yellow.

CAT. No.	8995P-11	8995P-15	8995P-20
Size	Quart	Gallon	5 Gallon

DuoSEAL® VACUUM OIL



- Low vapor pressure
- Ideal viscosity for belt-drive vacuum pumps
- High consistency
- Recommended for DuoSEAL belt-drive pumps

A specially fractionated oil for DuoSEAL belt-driven pumps is designed to ensure the highest vacuum performance. The oil is tested to high vacuum levels to meet rigid requirements for vapor pressure, vacuum level stability, and viscosity. DuoSEAL oil is famous for its quality and consistency.

CAT. No.	1407K-11	1407K-15	1407K-20
Size	Quart	Gallon	5 Gallon

HOSE ADAPTER KITS

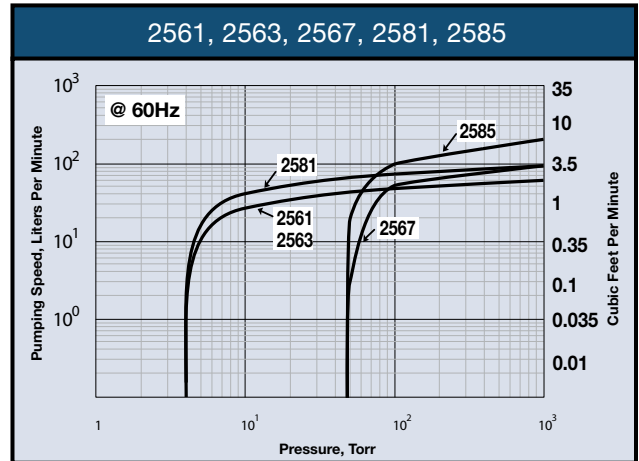
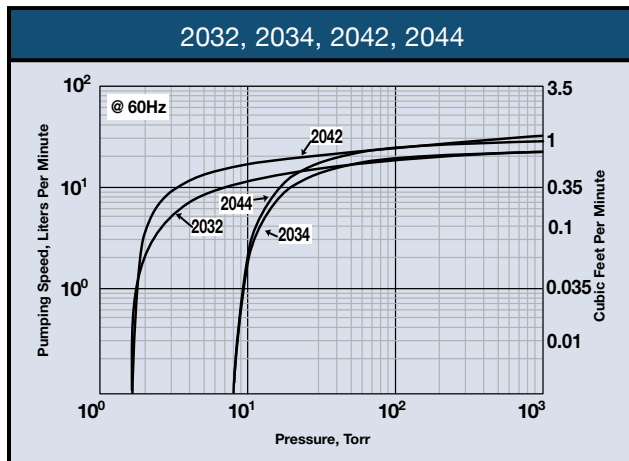
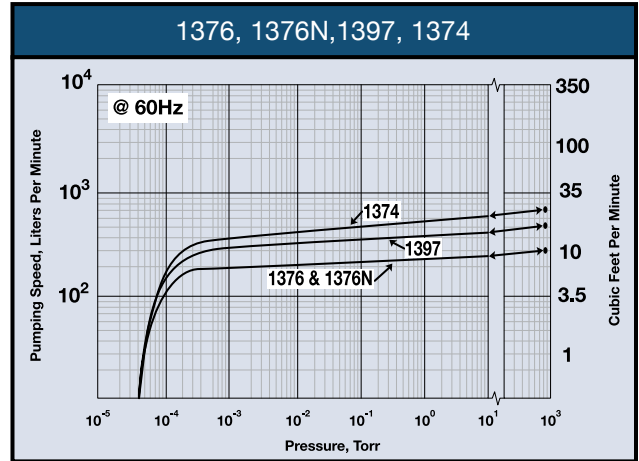
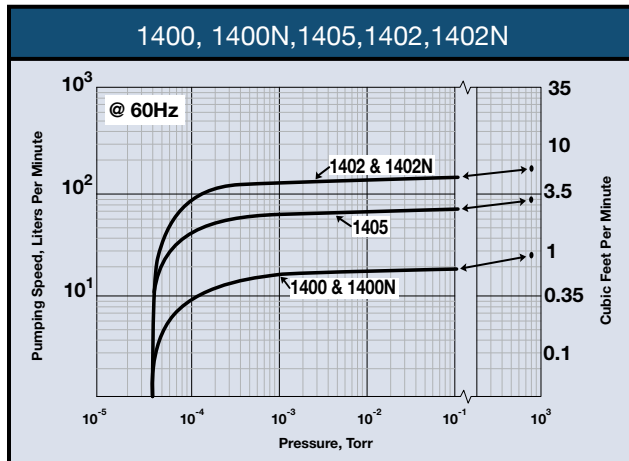
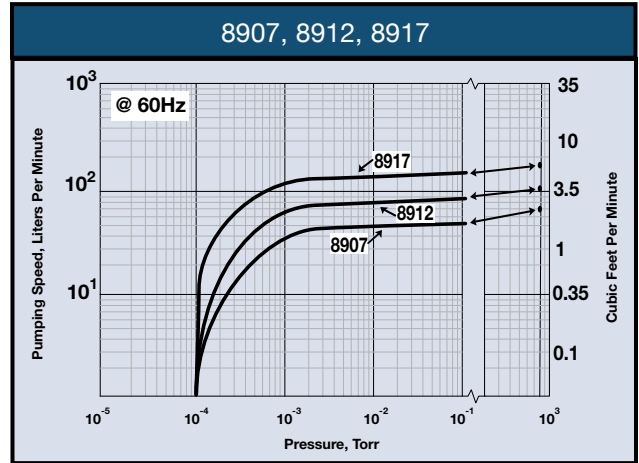
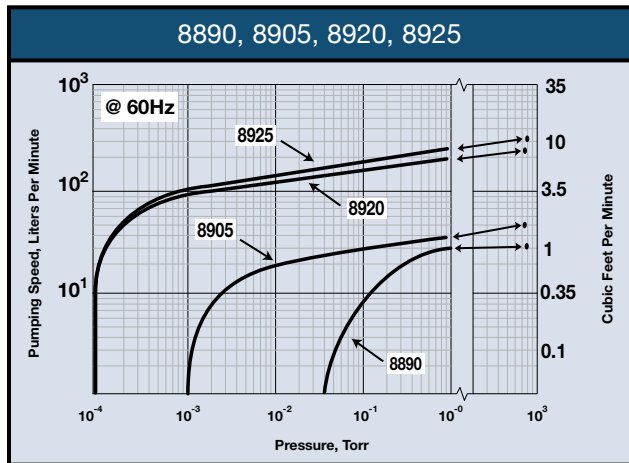


1420H-01

- Kits ensure proper sized tubing adaptors, and clamps for vacuum tight connections
- Kits include at least 5 ft.(1.5m) of thick walled rubber vacuum hose

Adapter Kits For Pump Models	Pump Inlet O.D.	Appliance Connector O.D.	CAT. No.
8890 (GEM)	3/8"	7/16" and 1/2"	1420H-01
1400, 1405, 1399, 8905	7/16"	1/4" and 3/8"	1420H-01
1402, 1380, 8907, 8912, 8917, 8920, 8925	13/16"	1/4" and 3/8"	1420H-02

Pumping Speed Curves



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HOW TO ORDER FOR U.S. CUSTOMERS

From Welch® Dealers:

Welch Vacuum Technology products can be ordered from authorized laboratory dealers. Please check the Welch web site at www.welchvacuum.com or call (847-676-8800) or fax for a list of Welch dealers in the United States, Canada, and other locations.

Mail:

Welch-Ilmvac
5621 W. Howard St.
Niles, IL 60714

Payment Terms:

Net 30 days with approved credit; Mastercard, Visa or American Express are accepted for your convenience.

Minimum Order: \$50.00

From Welch in the U.S.A and Canada:

To order your vacuum pumps, parts and accessories:

Order:

Online @ www.welchvacuum.com

E-mail: gdwelchvacuum@gardnerdenver.com

Fax: 847-677-8606

Technical Assistance:

Call: (847) 676-8800

Fax: (847) 677-8606

Business Hours: 8:00 a.m. to 4:30 p.m. Central Time



WELCH REPAIR SERVICE

All Returns - Warranty and Non-Warranty

A Return Authorization (RA) number is required for all returns. Product returns without an RA will be refused at dock.

1. Go to www.welchvacuum.com to fill out and submit a Safety Service form online. This form lists chemicals that could be equipment contaminants and is required for the safety of repair personnel.
2. After reviewing your Safety Service form, the Welch Repair Department will provide you with the RA number and shipping instructions.
3. Decontaminate the equipment as needed and package properly. Damage caused by improper equipment packaging is the Customer's responsibility. Insure the equipment against loss or damage. Prominently write the RA number on the outside of the packaging and again on the packing slip inside. Ship the equipment to the address provided by the Repair Department. Contact the Repair Department at 847-676-8800 with any questions you may have.

Non-Warranty Returns and Repairs

The Customer pays for freight charges to and from Welch; freight charges to Welch must be prepaid. In addition to an RA, all paid repairs must come with a purchase order (P.O.) or a credit card number. All paid repairs come with a 90 day warranty. A nominal fee is assessed for equipment that is inspected but not repaired at the Customer's discretion.

Warranty Returns and Repairs

Freight charges to Welch are prepaid by the Customer; Welch pays for return freight charges.

For Repair Service Inquiry:

Email: gdwelchvacuum@gardnerdenver.com

Fax: 847-677-8606

Call: 847-676-8800

Business Hours: 8:00 a.m. to 4:30 p.m. Central Time

WARRANTY

This Welch product is warranted to be free from defects in material and workmanship. The liability of Gardner Denver Thomas, Inc. under this warranty is limited to servicing, adjusting, repairing or replacing any unit or component part which in the judgment of Gardner Denver Thomas, Inc. has not been misused, abused or altered in any way causing impaired performance or rendering it inoperative. No other warranties are expressed or implied. The method of executing this warranty: servicing, adjusting, repairing or replacing shall be at the discretion of Gardner Denver Thomas, Inc. Vacuum pumps that have been used for any period, however short, will be repaired under this warranty rather than replaced.

The warranty is effective for one year from the date of original purchase when:

1. The warranty card has been completed and returned.
2. The product is returned to the factory or other designated service centers, freight prepaid.
3. The product in our judgment is defective through no action or fault of the user.

If the product has become defective through misuse, abuse, or alteration, repairs will be billed regardless of the age of the product. In this event, an estimate of the repair costs will be submitted and authorization of these charges will be required before the product is repaired and returned. To reduce additional charges and delays either within or outside of the warranty period, contact Welch @ (847) 676-8800 for a return authorization number. Products without a return authorization number will be refused by our receiving department. Before shipping, properly pack the pump, insure it against loss or damage, and on the outside of the pump packaging and the packing slip write in the return authorization number. Pumps damaged due to improper packaging are the customer's responsibility.

For Complete Welch Terms and Conditions see:
www.welchvacuum.com

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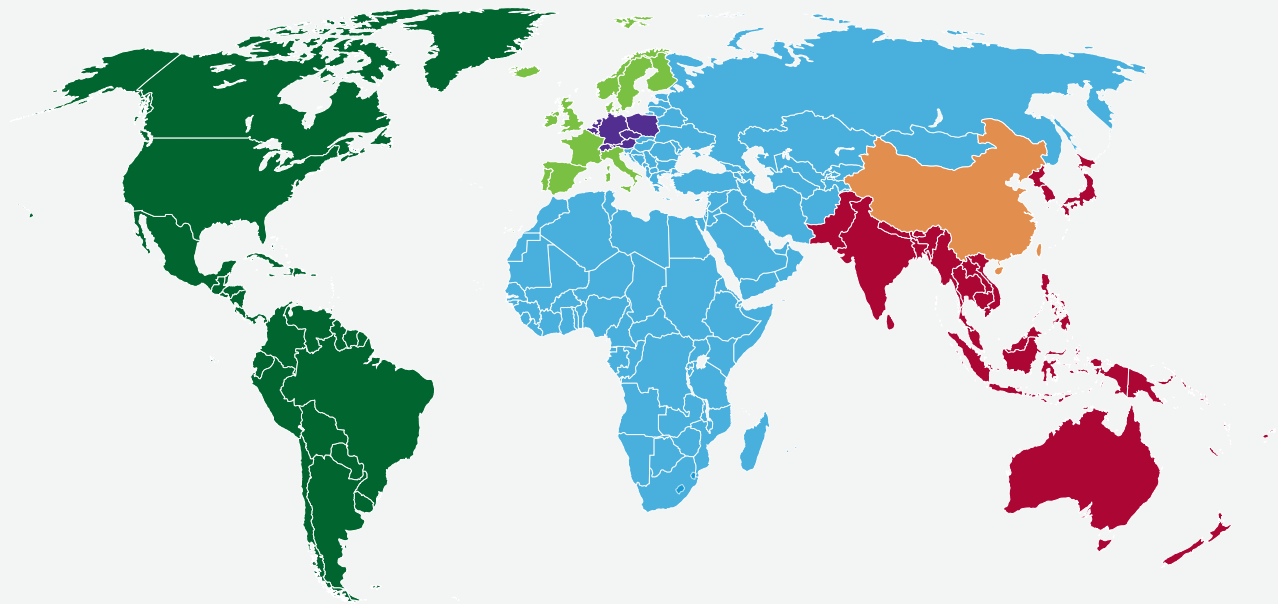
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