

Welch®

**Applied
Vacuum
Technology**

- **Industrial**
- **OEM**
- **Refrigeration**



Vacuum Solutions

WELCH
A Gardner Denver Product



WELCH VACUUM SOLUTIONS - CONTENTS



With over 100 years in the vacuum business, Welch combines innovative engineering with durable designs to produce the best vacuum solution for your need. Whether you need an integrated OEM vacuum component, a robust pump to enable your process or utility application, or a specialized pump adaptation, Welch provides affordable solutions and expert consultation.

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See our online catalog for additional information, U.S.A. list prices, and repair part information.

www.welchvacuum.com

**STANDARD DUTY
DRY VACUUM
PRESSURE
PUMPS**

Air/Water Vapor AC Power

MODEL	CFM (L/MIN)	TORR (MBAR)	PSIG	PAGE
2511	0.39(11)	219(292)	33	8
2515	1.2(34)	70(93)	—	9
2522	0.76(22)	100(133)	100	8
2534	1.2(34)	70(93)	50	8
2546	1.6(45)	60(80)	100	8
2561	2.1(60)	5(6.7)	—	8
2562	2.3(65)	9(12)	—	7
2563	2.1(60)	4(5)	—	6
2567	3.5(100)	60(80)	—	7, 8
2580	3.5(99)	9(12)	—	7
2581	3.5(100)	5(6.7)	—	7, 8
2585	7.1(201)	60(80)	—	7, 9
8111	1.3(36)	1.5(2)	—	7
8115	1.1(32)	2(2.7)	—	6
8113	1.3(36)	1.5(2)	—	7
8111D-25	1.8(51)	1.5(2)	—	5
8113D-25	1.8(51)	1.5(2)	—	5

Air/Water Vapor DC Power

**CHEMICAL DUTY
DRY VACUUM
PUMPS &
SYSTEMS**

Harsh Chemicals AC Power

MODEL	CFM (L/MIN) ¹	TORR (MBAR)	PAGE
2010	0.45(12.7)	110(146)	10
2014	0.88(25)	40(133)	10
2034	0.9(25)	9(12)	10
2032	0.9(25)	2(2.7)	10
2044	1.2(35)	9(12)	10
2042	1.2(35)	2(2.7)	10
2037	1.8(50)	50(67)	10
2047	2.5(70)	35(47)	10
8115D-20	1.8(51)	2(2.7)	5
2042D-20	1.8(51)	2(2.7)	5
2050	0.3(8.5)	190(253)	11
2060	0.46(13)	200(266)	11

Harsh Chemicals DC Power

Mild Chemicals AC/DC

**HIGH VACUUM
OIL-SEAL PUMPS**







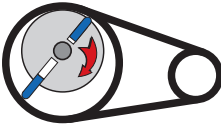

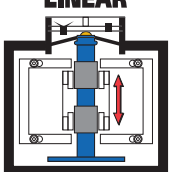



General Purpose Belt Drive

MODEL	FREE AIR DISPL. CFM(L/MIN) @ 60HZ	ULT. PRESSURE, TORR (MBAR)	PAGE (TYPE)
1400	0.9(25)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	14
1399	1.2(35)	1.5x10 ⁻² (1.9x10 ⁻³)	15
1399N	1.2(35)	1.5x10 ⁻² (1.9x10 ⁻³)	15
1405	3.2(90)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	14
1402	5.6(160)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	14,18
1376	10.6(300)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	14,18
1397	17.7(500)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	14,18
1374	23(650)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	15
8890	1.1(31)	1x10 ⁻¹ (1.33x10 ⁻¹)	12
8905	1.8(51)	2x10 ⁻³ (2.7x10 ⁻³)	12
8907	2.6(73)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	12
8912	3.8(108)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	12
8917	6.1(173)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	12
8920	7.7(218)	3x10 ⁻⁴ (4x10 ⁻⁴)	12
8925	11.3(320)	4x10 ⁻⁴ (5.3x10 ⁻⁴)	13
Rotovap Pump	1.1(31)	1x10 ⁻¹ (1.33x10 ⁻¹)	13
Freeze Dryer Pump	6.1(173)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	13
1400N	0.9(25)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	16,18
1402N	5.6(160)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	16,18
1376N	10.6(300)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	16,18

General Purpose Direct Drive

Corrosive Vapors Belt Drive

WELCH PUMP DESIGNS

<p>DIAPHRAGM</p> 	<p>Diaphragm</p> <ul style="list-style-type: none"> • Chemical Resistant • Vacuum to 1.5 Torr • Oil-Free • DC Motor Option 	
<p>WOB-L[®] PISTON</p> 	<p>WOB-L Piston</p> <ul style="list-style-type: none"> • Moderate Vacuum/Pressure • Wide Flow Range • General Vacuum Usage • Oil-Free 	
<p>ROTARY VANE</p> 	<p>Direct Drive Rotary Vane</p> <ul style="list-style-type: none"> • Compact Oil-Seal Design • Deep Vacuum • Quiet • Portable 	
<p>BELT DRIVE ROTARY VANE</p> 	<p>Belt Drive Rotary Vane</p> <ul style="list-style-type: none"> • Deep Vacuum • Rugged Oil-Seal Design • Good Chemical Tolerance • Advanced Chemical Resistance Options 	
<p>LINEAR</p> 	<p>Linear (Armature)</p> <ul style="list-style-type: none"> • Low Vacuum/Pressure • Continuous Service • Quiet • Oil-Free 	
<p>ROTARY VANE</p> 	<p>Graphite Rotary Vane</p> <ul style="list-style-type: none"> • Moderate Vacuum • Ballast Tank Design Options • Oil-Free 	

Basic Pump Models

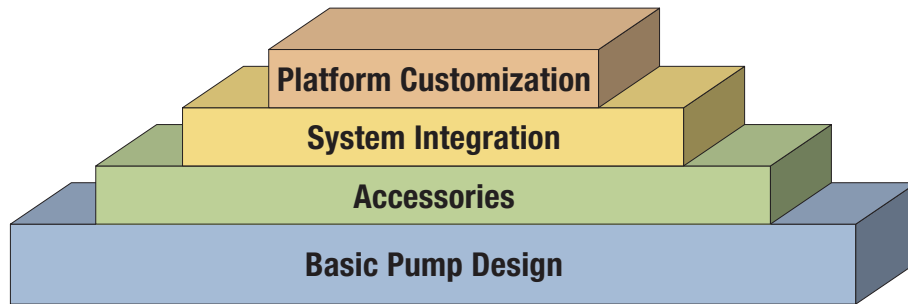


Renowned for high performance and high quality standards, Welch basic pump models also address many of the secondary needs of your vacuum system environment. Order standard models to maximize the utility of your system:

- **ISO fitting models**
- **Separator jar models - for condensable fume applications**
- **Shrouded pumps - reduce noise, vibration and surface heat**
- **Specialized handles - better ergonomic pump transport**
- **Regulator valve and gauge models**

LEVELS OF OEM SUPPORT

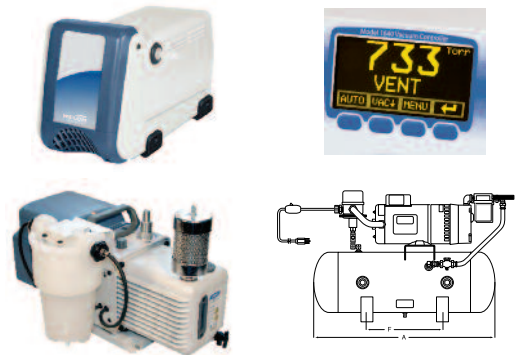
Beyond basic models, Welch can provide the custom level of support and expertise needed to make vacuum work perfectly in you system



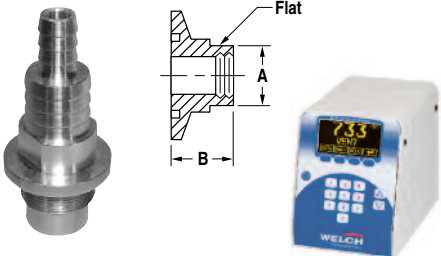
Platform Customization

Welch engineering and application acumen can help you produce the right vacuum in the context of your system design. Custom solutions include:

- Shrouds
- Sensors
- Specialized vapor accessories
- Control integration
- Custom mounting brackets



System Integration



Welch provides the design support, hardware and documentation necessary to assemble and operate your system

- Valves and fittings
- Vacuum controllers
- Multi-station vacuum modules
- Custom manuals
- Mounted stock accessories

Bundled Accessories

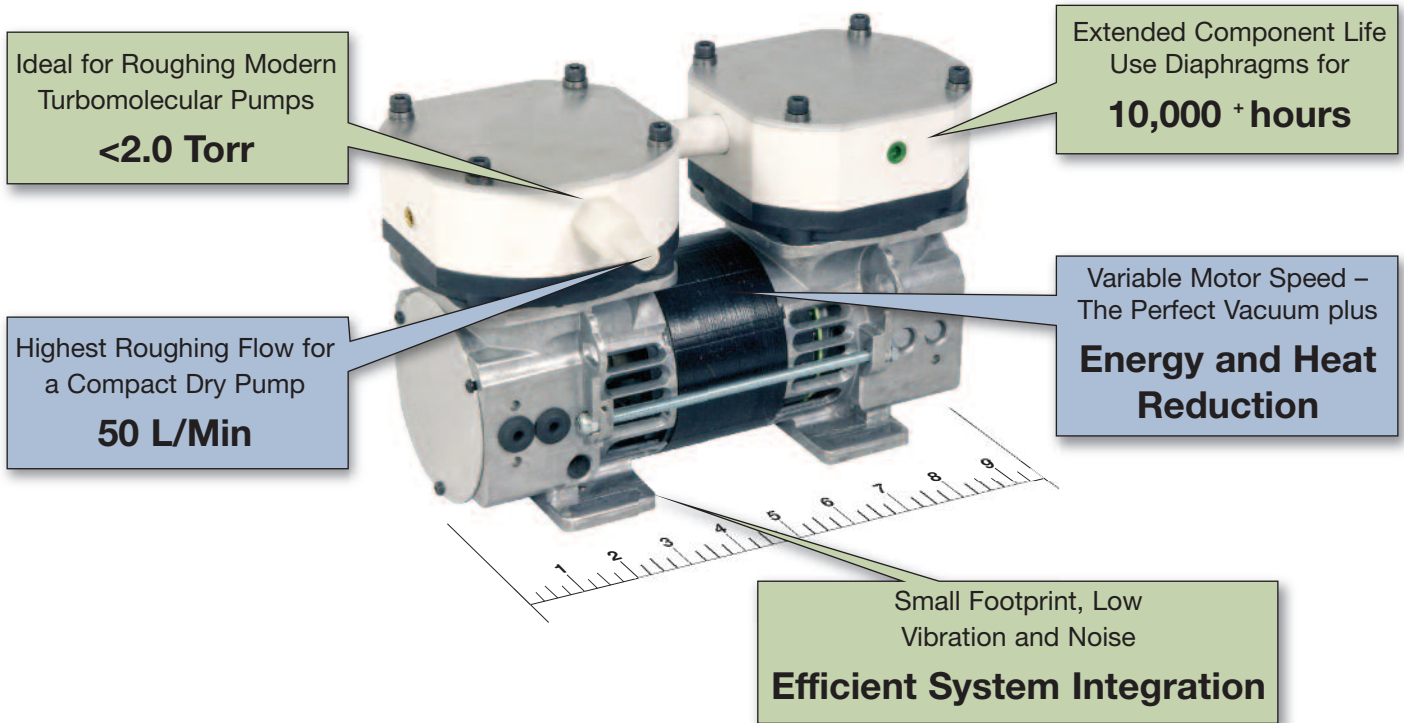
Get the right accessories for your needs with every Welch pump

- Filters, mufflers and tubing
- Oil - application specific
- Vendor warranty card
- Vendor information cards



For more information on pump design and selection, contact your Welch representative at www.welchvacuum.com or call 847-676-8800

Superior Oil-Free Solution for Instrumentation



VARIFLOW DC Dry Vacuum Pumps

VARIFLOW DC 2-stage pumps employ patented tangential diaphragm technology that offers the performance of a 3-stage, 4-diaphragm pump - with only 2 diaphragms and pump heads. Welch's efficient design creates more flow in a smaller pump volume and fewer wear parts compared to competitive technology. Benefits of this unique technology include: smaller instruments, lower energy consumption leading to less waste heat, lower sound levels/vibration, and lower maintenance cost.

The brushless 24V DC drive mechanism makes it straightforward to integrate VARIFLOW pumps into your overall vacuum system. Use your existing power supply and vacuum control technology to control the variable speed drive mechanism.

In turbo backing applications, variable speed capability allows the designer/user to shorten the roughing time of a chamber by running the pump at high speed initially. After roughing is completed, the speed of the VARIFLOW pump is reduced, resulting in less waste heat, longer diaphragm/valve life, reduced vibration and lower noise levels.

In flow applications, such as gas analyzers, the pump speed can be fixed or controlled via an external signal from a vacuum controller. The speed control feature allows the regulation of vacuum parameters to optimize the overall efficiency and detection capabilities of the instrument.

**Applied
Vacuum
Technology**

DC MOTOR VACUUM PUMPS

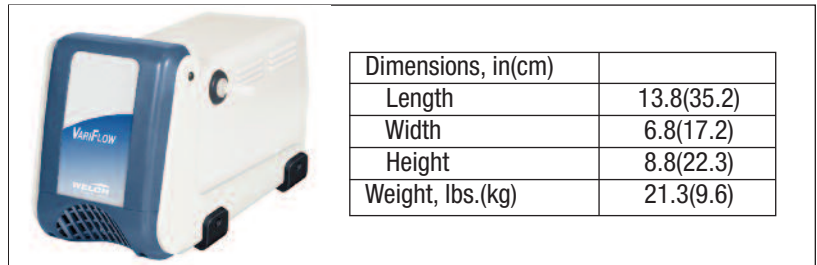
Specifications & Ordering

	Chemical Duty	Standard Duty
Free Air Displ., l/min		
@2200 rpm ¹	51	51
@1700 rpm ²	43	43
@700 rpm ²	17	17
Vacuum, Torr	2.0	1.5
Rated Motor Power, kW	0.085	0.085
Amps @1700 rpm, 2 Torr	2	2
Amps @2200 rpm, 2 Torr	4	4
Amps @1700 rpm, 760 Torr	4	4
Amps @2200 rpm, 760 Torr	7	7
Tubing needed, ID	1/4 in.	1/4 in.
OEM style cat. no.	8115D-20	8111D-25
Standalone cat. no.	2042D-20	8113D-25

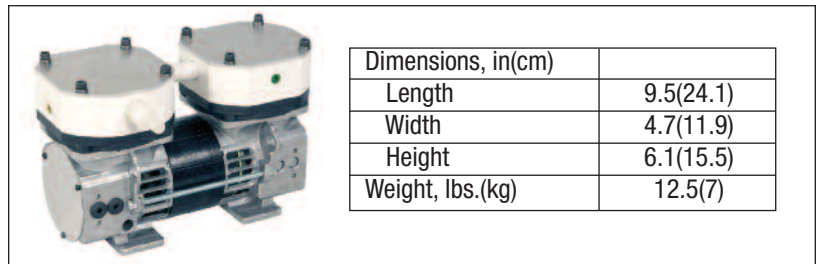
Notes:

- Intermittent duty operation - startup/restart.
- Continuous duty operation.

Stand-Alone VARIFlow DC

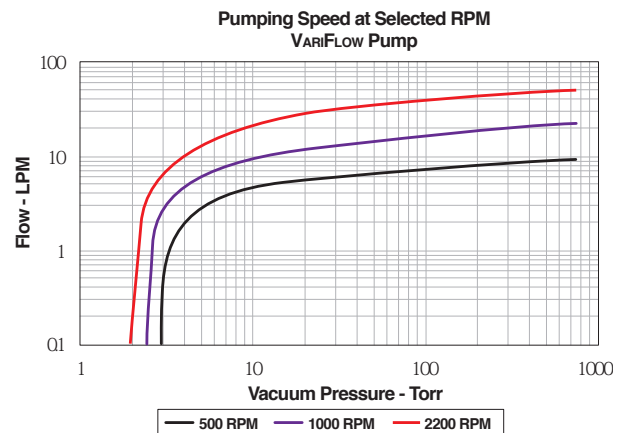
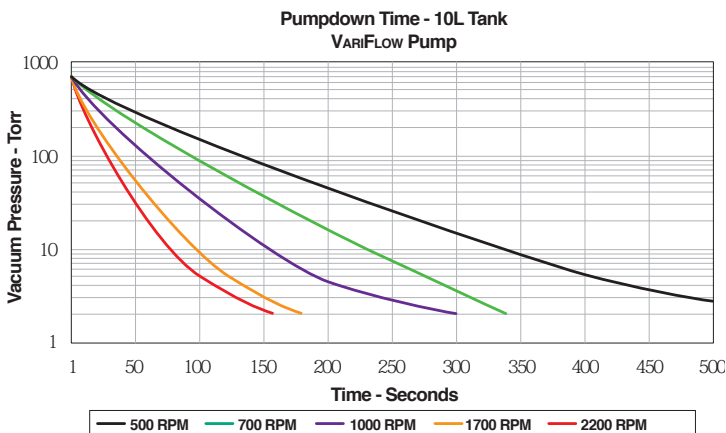


OEM VARIFlow DC



Two basic VARIFlow DC configurations with integrated controller are available: OEM style or Stand-Alone. The OEM VARIFlow DC is mountable in any position. The stand-alone VARIFlow DC is enclosed in a stylized casing, with standard rubber feet and an ergonomic recessed handle for easy transport.

Select VARIFlow DC pump chemical resistance based on the nature of pumped gases/vapors. Both OEM and Stand-Alone versions include a motor controller (analog 0-5V or PWM control), operate on 24 VDC power, and are available with chemical duty or standard duty construction. Mounting dimensions for chemical or standard duty pumps are identical. Custom configurations are available to optimize system pump usage or extend free air displacement to 85 l/min @ 40 Torr – contact Welch for more information.



Perfect for:

- Turbo Backing
- Gas Transfer
- Gas Analyzers

Dry Diaphragm and WOB-L® Piston Vacuum Pumps^{1,2,3.}

Compact, Economical Oil-Free Pumps

Suited For:

- Gas Analyzers
- Backing Hybrid Turbos
- Centrifuges
- Drying
- Degassing
- Distillation

CE



8115B-01



8111B-01/8113B-01



2563B-24

SPECIFICATIONS

CHEMICAL DUTY PUMPS

Welch Model	8115 ¹	8111/8113 ⁴	2563 ²
Free Air Displacement			
CFM (L/min) @ 60Hz	1.1(32)	1.3(36)	2.1(60)
m ³ /hr (L/min) @ 50Hz	1.6(27)	1.8(30)	36(50)
Ultimate Pressure, Torr (mbar)	2(2.7)	1.5(2)	4(5)
Maximum Vacuum, in. Hg	29.85	29.9	29.8
Mechanism	Diaphragm	Diaphragm	Piston
Type of Duty ²	Chemical	Standard	Standard
Motor Horsepower (watts)	1/5(150)	1/5(150)	1/3(250)
Tubing Needed, I.D. in. (mm)	1/4(7)	NW25 Flange	1/4(7) ⁴
Intake/Exhaust Thread NPT	1/4	1/6	1/4
Weight (lbs.)	13(5.9)	13(5.9)	16.5(7.5)
Overall Dimensions			
L in. (cm)	10.25(261)	10.25(261)	11.7(297)
W in. (cm)	5(27)	5(27)	7.2(183)
H in. (cm)	7.25(189)	7.25(189)	9.5(241)
Ship Weight, lbs (kg)	17(7.7)	17(7.7)	18(8.2)
Shipping Carton Dimensions	14 x 14 x 14	14 x 14 x 14	21.5 x 12.5 x 16
L x W x H in. (cm)	(35.6 x 35.6 x 35.6)	(35.6 x 35.6 x 35.6)	(54.6 x 31.8 x 40.6)

ORDERING INFORMATION^{1,2,3.}

Wired for 115V, 60Hz, 1 Ph with N. American 115V Plug	8115B-01	8111B-01/8113B-01	2563B-24
Wired for 230V, 50Hz, 1 Ph with IEC connection includes UK & Schuko Line Cords	8115C-02	8111C-02/8113C-02	2563C-24
Wired for 100V, 50/60Hz, 1 Ph with a plug	8115C-05	-----	2563C-25

Notes:

1. Models 8115 and 8111 are designed for placement within a system enclosure. Model 8115 handles harsh chemical vapors since designed with heads, diaphragms and valves made of fluorinated plastics.

2. Standard duty WOB-L piston vacuum pumps handle vapors of aqueous solutions including buffers, but are not recommended for pumping organic, acidic, and basic vapors.

E) VACUUM PUMPS



2562B-01/
2567B-01



2580B-01/
2585B-01



2581B-24

STANDARD DUTY PUMPS

2562 ²	2567 ²	2580 ²	2581 ²	2585 ²
2.3(65)	3.5(100)	3.5(99)	3.5(100)	7.1(201)
3.4(57)	4.9(83)	4.9(83)	5.0(83)	10(168)
9(12)	60(80)	9(12)	4(5)	60(80)
29.6	27.6	29.6	29.8	27.6
Piston Standard	Piston Standard	Piston Standard	Piston Standard	Piston Standard
1/3(250)	1/3(250)	1/3(250)	1/3(250)	1/3(250)
1/4(7)	1/4(7)	3/8(10)	3/8(10) ⁵	3/8(10)
1/4	1/4	3/8	3/8	3/8
16.5(7.5)	16.5(7.5)	22.5(10.3)	22.5(10.3)	22.5(10.3)
11.7(297)	11.7(297)	13.25(336)	13.25(336)	13.25(336)
7.2(183)	7.2(183)	7.6(193)	7.6(193)	7.6(193)
9.5(241)	9.5(241)	11.7(297)	11.7(297)	11.7(297)
18(8.2)	18(8.2)	28(12.7)	30(13.6)	28(12.7)
21.5 x 12.5 x 16 (38.1 x 26.7 x 30.5)	21.5 x 12.5 x 16 (38.1 x 26.7 x 30.5)	17 x 10.5 x 13 (43.2 x 26.7 x 33)	21.5 x 16.3 x 17.5 (54.6 x 41.4 x 44.5)	17 x 10.5 x 13 (43.2 x 26.7 x 33.)

2562B-01	2567B-01	2580B-01	2581B-24	2585B-01
2562C-02	2567C-02	2580C-02	2581C-24	2585C-02
2562C-05	2567C-05	2580C-05	2581C-25	2585C-05

3. Dual inlet flange ISO NW16 with 1/4 in.(7mm) hose barb supplied which will thread into NW16.

4. Dual inlet flange ISO NW25 with 1/4 in.(7mm) hose barb supplied which will thread into NW25.

DRY WOB-L® PISTON VACUUM PUMPS¹

Standard Duty, Oil-Free Pumps

Use these versatile piston pumps for a wide range of general vacuum applications. Recommended for non-chemical applications where potential fumes are air or water vapor. All models except 2511 include convenient gauge readout, pressure adjustment valve, and protective separator jar.

Applications

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

CE



2511



2522/2534



2546



2567/2561

SPECIFICATIONS

	Vacuum/Pressure Pumps				Standard Duty Vacuum Pumps		
Welch Model	2511	2522	2534	2546	2561	2567	2581
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)	3.5(100)
m ³ /hr (L/min) @ 50Hz	0.55(9.2)	1.1(18)	1.7(28)	2.3(38)	3.0(50)	4.9(83)	4.9(83)
Ultimate Pressure, Torr (mbar)	219(292)	100(133)	70(93)	60(80)	5(6.7)	60(80)	5(6.7)
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	29.8
Motor Horsepower (watts)	1/30(25)	1/8(93)	1/8(93)	1/4(190)	1/3(250)	1/3(250)	1/3(250)
Tubing Needed, I.D. in. (mm)	3/16(5)	1/4(7)	1/4(7)	1/4(7)	3/8(10)	3/8(10)	3/8(10)
Intake/Exhaust Thread NPT	3/16 in. Hose	1/4	1/4	1/4	1/4	1/4	1/4
Weight (lbs.)	5	11.7	11.7	13.8	16.5	16.5	24.5
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)	17(43.2)
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)	7.5(19.1)
H in. (cm)	7.5(19.1)	10(25.4)	10(25.4)	9(22.9)	10.5(26.7)	10(25.4)	12(30.5)
Ship Weight, lbs (kg)	6(2.7)	17(7.7)	17(7.7)	17(7.7)	24(10.9)	24(10.9)	32(14.5)
Shipping Carton Dimensions							
L x W x H in. (cm)	13 x 9 x 9.5 (33 x 23 x 24)	15 x 10.5 x 12 (38 x 27 x 31)	15 x 10.5 x 12 (38 x 27 x 31)	15 x 10.5 x 12 (38 x 27 x 31)	21.5 x 12.5 x 16 (55 x 32 x 41)	21.5 x 12.5 x 16 (55 x 32 x 41)	21.5 x 12.5 x 16 (55 x 32 x 41)

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	2581B-50
Wired for 230V, 60Hz, 1 Ph with N. American 230V Plug	—————	2522C-01 ⁴	2534C-01 ⁴	2546C-01 ⁴	—————	—————	—————
Wired for 230V, 50Hz, 1 Ph ² with Cont. Euro.(Schuko) Plug	2511C-02 ³	2522C-02 ⁴	2534C-02 ⁴	2546C-02 ⁴	2561C-50	2567C-50	2581C-50
Wired for 100V, 50/60Hz, 1 Ph with a plug	2511C-05 ^{3,5}	2522C-05 ^{4,5}	—————	—————	2561C-56	—————	2581C-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.

Accessories



2585/2581



2511B-75



2515B-75

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

	Aspiration/Filtration Systems	
2585	2511	2515
7.1(201)	0.39(11)	1.2(34)
10(168)	0.55(9.2)	1.7(28)
60(80)	219(292)	70(93)
_____	33(3.3 x 10 ⁵)	_____
27.6	21.3	27.2
1/3(250)	1/30(25)	1/8(93)
3/8(10)	3/16(5)	1/4(7)
1/4	3/16 in. Hose	1/4
24.5	5.7	13.2
17(43.2)	11.0(28)	14.8(37.5)
7.5(19.1)	8.3(21)	8.3(21)
12(30.5)	10.0(25.5)	10.0(25.5)
32(14.5)	11.0(5)	14.8(6.7)
21.5 x 12.5 x 16	21.5 x 12.5 x 16	21.5 x 12.5 x 16
(55 x 32 x 41)	(55 x 32 x 41)	(55 x 32 x 41)

2585B-50	2511B-75	2515B-75
_____	_____	_____
2585C-50	2511C-75	2515C-75
_____	2511C-76 ⁵	2515C-76

- Model 2511 can deliver 33 PSIG (3.3 x 10⁵ pascal).
- 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.

Vacuum Hose

Thick walled hose for vacuum or or pressure applications. Hose clamp information available on page 34.

PUMP MODEL	CAT. NO.
2522, 2534, 2545, 2561, 2565, 2581, 2585	331030-5
2511	331020-5



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
2012, 2022, 2030, 2015, 2017	1412B



Inlet/Exhaust Separator/Jars

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

PUMP MODEL	CAT. NO.
2010, 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
Plastic, for pumps 2522, 2546, 2534	1415C



Replacement Jars for Aspiration Stations

Spare receiver kit (1475K-20) includes a 1.2 L autoclaveable 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" I.D. hose.

Made of SBS resin housing, model 1475K-22 fits 3/8" to 7/16" I.D. 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



CHEMICAL DUTY DRY VACUUM PUMPS

Dry Diaphragm PTFE Vacuum Pumps

Chemical-Resistant, Oil-Free Pumps

Welch PTFE diaphragm pumps combine vacuum versatility with excellent resistance to harsh chemical fumes. DryFast and DryFast Ultra models include precision valve with adjustment knob to fine-tune vacuum to perfect level.

Applications

- Evaporations
- Vacuum Filtration
- Vacuum Oven/Desiccation
- Aspiration/Automation
- Distillation
- Degassing



2014



2034, 2044, 2037, 2047
DRYFAST®



2032, 2042
DRYFAST ULTRA®

SPECIFICATIONS

BASIC

DRYFAST PUMPS

DRYFAST ULTRA PUMPS

Welch Model	2010	2014	2034	2044	2037	2047	2032	2042
Free Air Displacement								
CFM(L/min) @ 60Hz	0.45(12.7)	0.88(25)	0.9(25)	1.2(35)	1.8(50)	2.5(70)	0.9(25)	1.2(35)
m ³ /hr(L/min) @ 50Hz	0.63(10.6)	1.2(21)	1.25(21)	1.75(29)	2.5(42)	3.5(58)	1.25(21)	1.75(29)
Ultimate Pressure, Torr(mbar)	110(146)	40(53.2)	9(12)	9(12)	50(67)	35(47)	2(3)	2(3)
Maximum Vacuum, in. Hg	25.5	28.3	29.6	29.6	28.5	28.5	29.85	29.85
Motor Horsepower (watts)	1/12(62)	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	No	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)	1/4(7)
Intake(Exhaust) Thread NPT	1/4	M14(1/8)	M14(1/8)	M14(1/8)	M14(1/8)	M14(1/8)	M14(1/8)	M14(1/8)
Weight, lbs. (kg)	5.25(2.4)	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)	6.3(16.0)	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)	5.5(14.0)	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)	7.5(19.0)	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)	8(3.6)	17(7.7)	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)	16x13x13 (41x32x33)	16x12x13 (41x30x33)	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	2010B-01	2014B-01	2034B-01	2044B-01	2037B-01	2047B-01	2032B-01	2042B-01
Wired for 230V, 50Hz, 1 Ph w/Cont. Euro. (Schuko) Plug	2010C-02	2014C-02	2034C-02	2044C-02	2037C-02	2047C-02	2032C-02	2042C-02
Wired for 100V 50/60Hz for Japan	—————	—————	2034C-05	2044C-05	2037C-05	2047C-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.

GEMINI DRY VACUUM PUMPS

Portable Utility Vacuum Pumps



Model 2050



Model 2060

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

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 13L/min/achieve vacuum to 190 Torr.

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 Viton 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.

VACUUM VERSATILITY - ANYWHERE

- Sampling/Aspiration
- Filtration
- Degassing
- Desiccation

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)	

Ordering Information

Pump w/115V, 60Hz, 1 Ph power adapter w/ N. Amer. plug +12 VDC auto adapter

Pump w/230V, 50Hz, 1 Ph power adapter with cont. Euro.(Schuko) Plug +12 VDC auto adapter

GEMINI Pumps

2050	2060
0.3(8.5)	0.46(13)
190(253)	200(266)
No	Yes
22.4	22.0
—	1/8
3/8(10)	3/8(10)
5.3	11
7.6x4.5x7.5	9.25x7.25x8.5
19.4x11.4x19.1	23.5x18.4x21.6
7(3.2)	13(5.9)
2050B-01	2060B-01
2050C-02	2060C-02

Note:

1. Not recommended for use with strongly acidic or basic fumes. For organic fume applications, check for chemical compatibility with Viton®. 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.

Applied Vacuum Technology

Welch® Vacuum Pumps

Lightweight, Compact, High Performance Pumps

Suited For:

- Gas Analyzers
- Backing Hybrid Turbos
- Centrifuges
- Drying
- Degassing
- Distillation



8890³



8905



8907/8912/8917

SPECIFICATIONS

Two Stage Pumps

Welch Model	8890	8905	8907	8912	8917	8920
Free Air Displacement						
CFM (L/min) @ 60Hz	1.1(31)	1.8(51)	2.6(73)	3.8(108)	6.1(173)	7.7(218)
m ³ /hr (L/min) @ 50Hz	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 (60Hz)	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						
L x W x H in. (cm)	21.5 x 12.5 x 16 (54.6 x 31.8 x 40.6)	21.5 x 12.5 x 16 (54.6 x 31.8 x 40.6)	24 x 15.8 x 14 (61 x 40.1 x 35.6)	24 x 15.8 x 14 (61 x 40.1 x 35.6)	24 x 15.8 x 14 (61 x 40.1 x 35.6)	24 x 15.8 x 14 (61 x 40.1 x 35.6)

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 ^{8.} with N. American 230V Plug	_____	_____	_____	8912C-01	8917C-01	8920C-01
Expl. Proof Motor 115V, 60Hz	_____	_____	_____	_____	8917W	_____

Notes:

- 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.
- UNIBARB™: Convenient inlet barb connection accepts two sets of tubing ID (see page 34).
- Model 8890 includes 1417 filter, it is not included with any other model.
- All single phase motors have overload protection
- 115V, 60Hz models are CSA approved.

Accessories and Oil



8920



8925

	Special Application Systems	
8925	Rotovap Pump ⁸	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)
24 x 15.8 x 14 (61 x 40.1 x 35.6)	21.5 x 12.5 x 16 (54.6 x 31.8 x 40.6)	25 x 18.5 x 14 (63.5 x 47 x 35.6)
8925A	8890A-70	8917A-80 ¹⁰
8925C-02	8890C-72	8917C-80
8925C-01	_____	_____
8925W	_____	_____

- 230V, 50 Hz models which are provided with CE mark.
- Cat No. 1416B Exhaust Oil Recycler is recommended when operating the GEM at pressures of 1 Torr or higher.
- Rotovap/Vacuum manifold pump – see page 8, 12.
- Freeze Dryer Pump – see page 15.
- 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 page 38 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
8890 (GEM)	1416B	3
8905	1416H	3
8907, 8912, 8917, 8920, 8925	1416C	9

(See page 38 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 page 36 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

DuoSEAL® Vacuum Pumps



Long Service Life Due To Low Pump RPM

In Demanding Applications Such As:

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



1399N



1400



1405/1402

SPECIFICATIONS

Two-Stage Vacuum Pumps¹

	1400	1405	1402	1376	1397
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	$1 \times 10^{-4}(0.00013)$	$1 \times 10^{-4}(0.00013)$	$1 \times 10^{-4}(0.00013)$	$1 \times 10^{-4}(0.00013)$	$1 \times 10^{-4}(0.00013)$
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 L x W x H in. (cm)	20.5 x 13.8 x 14.5 (52.1 x 35.1 x 36.8)	22.5 x 15.5 x 19.5 (57.2 x 39.4 x 49.5)	22.5 x 15.5 x 19.5 (57.2 x 39.4 x 49.5)	22 x 18 x 19 (55.9 x 45.7 x 48.3)	27.3 x 18 x 22 (69.3 x 45.7 x 55.9)

ORDERING INFORMATION^{3,4}

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, 60Hz	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 10 Torr. Ultimate pressure measured with a trapped McCleod gauge.
- One-stage pumps should not be operated continuously at pressures above 50 Torr.
- All 115V and 230V single phase motors include thermal overload protection.
- Models 1400C-02, 1405C-02 and 1402C-02 provided with CE marking.

Accessories and Oil



1376



1397/1374

	One-Stage Vacuum Pumps ²	
	w/o plate	w/bell jar plate
1374	1399	1399N
23	1.2	1.2
650	35	35
$1 \times 10^{-4}(0.00013)$	$1.5 \times 10^{-2}(0.019)$	$1.5 \times 10^{-2}(0.019)$
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)
27.3 x 18 x 22 (69.3 x 45.7 x 55.9)	20.5 x 13.8 x 14.5 (52.1 x 35.1 x 36.8)	20.5 x 13.8 x 14.5 (52.1 x 35.1 x 36.8)
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 page 38 for a complete list of filters)

Exhaust Oil Recycler

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



PUMP MODEL	CAT. NO.	CFM
1400	1416H-01	3
1376, 1402, 1405	1416C-01	8

(See page 38 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. Accepts 7/16" I.D. Hose.



PUMP MODEL	CAT. NO.
1400, 1405, 1402, 1376, 1399	1420H-14

(See page 36 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
55 Gallon	1407K-25

Gold Vacuum Pump Oil

Specially formulated oil for challenging applications. This highly saturated hydrocarbon 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
55 Gallon	8995G-25

CHEMSTAR BELT DRIVE VACUUM PUMPS

Durable Pumps for Corrosive Gases

For Pumping Corrosive Gases

Gases	Example
Mineral Acids	Hydrochloric/Muriatic Acid
Organic Acids	Acetic Acid, TFA
Oxidizers	Chlorine, Ozone
Sulfur Fumes	SO _x



**Applied
Vacuum
Technology**

1402N

The Five Defining Features Needed For Pumping Corrosive Gases

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

SPECIFICATIONS¹

	CHEMSTAR Vacuum Pumps		
	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 L x W x H in. (cm)	17.8 x 9 x 12.6 (45.2 x 22.9 x 32)	19.3 x 14.1 x 15.4 (49 x 35.3 x 39.1)	19.3 x 12.3 x 15.6 (49 x 31.2 x 39.6)
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 L x W x H in. (cm)	20.5 x 13.8 x 14.5 (52.1 x 35.1 x 36.8)	22.5 x 15.5 x 19.5 (57.2 x 39.4 x 49.5)	22 x 18 x 19 (59.5 x 45 x 48)

ORDERING INFORMATION^{2,4,5}

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 with N. American Plug	—————	1402N-60	1376N-60
Wired for 220V, 50Hz, 1 Ph with 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:

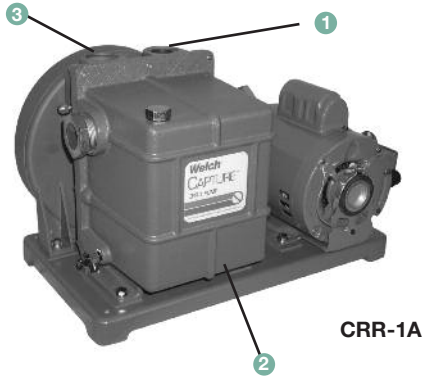
- CHEMSTAR pump should not be operated continuously at pressures above 10 Torr. Ultimate pressure measured with a trapped McCleod gauge.
- All single phase motors have overload protection.
- Conduit wiring installation required. No cord, plug or switch provided.

- Hinged clamp, centering ring assembly and hose adapter are included with all CHEMSTAR Pumps.
- Standard filter option possible if the exhaust flange is removed, but not chemically resistant.

- Units supplied with CE marking.

REFRIGERATION RECOVERY PUMP

Refrigerant Recovery Efficiency Of 99.8%



- 1 Continuous discharge pressure to 30 PSIG (3.1 x 10⁵ Pascal)
- 2 Pump shell rated to 100 PSIG (7.9 x 10⁵ Pascal)
- 3 Minimal loss of pumping efficiency below 29.9 inches Hg, (1,000 microns Hg, 1 Torr, 1 mbar)

CRR-1A

CAPTURE® Pump

The CAPTURE pump has been specifically designed for recovery and recycling systems that evacuate refrigerant systems to greater than 29.9 inches Hg(1 Torr, 1 mbar) and boost refrigerant vapor to a holding tank. The recovery and recycling systems employing a CAPTURE pump are built for evacuation of R-11, R-113 and R-123 chillers. The pump design has been in use in recovery and recycling systems for over 15 years.

Pump oil separation and return is accomplished by attaching a standard float actuated oil return found in refrigerators. The oil separator is a proven technology that minimizes pump oil loss even for very large refrigerant systems. DUOSEAL pump oil, cat. no. 1407K-11, is recommended fluid to operate the CAPTURE pump.

SPECIFICATIONS

Welch Model	CRR-1
Vapor Pumping Rate at atmospheric pressure	
CFM	10.6
L/min	300
Ultimate Pressure	
microns Hg	30
inch of Hg	29.9+
Torr(mbar)	0.03(0.04)
Maximum Discharge Pressure, PSIG(Pascal)	30(7.9 x 10 ⁵)
Pressure Rating of Pump Shell, PSIG(Pascal)	100(10 ⁶)
Suction Connection, Female NPT	1
Discharge Connection, Female NPT	1
Oil Return Connection, in. 45° Flare Fitting Size	1/4
Minimum Size of System Piping, NPT	1
Oil Capacity, qts(l)	2.5(2.4)
Motor RPM	1725
Pump RPM	525
Full Load(amps, 115/230V)	13.8/6.9
Locked Rotor(amps, 115/230V)	70/35
Overall Dimensions, LxWxH in.(cm)	19.25 x 12.3 x 11.1 (48.9 x 31.3 x 28.1)
Weight, lbs.(kg)	122(55.4)
Shipping Weight, lbs.(kg)	136(61.8)
Shipping Carton Dimensions	22 x 14.8 x 18
L x W x H in.(cm)	(55.9 x 37.6 x 45.7)

**Applied
Vacuum
Technology**

ORDERING INFORMATION

Wired for 115V, 60Hz, 1 Ph with N. Amer. 115V Plug	CRR-1A
Wired for 230V, 50Hz, 1 Ph w/Cont. Euro. (Schuko) Plug	CRR-1B

Notes:

1. For pump only, use cat. no. CRR-1.

REFRIGERATION SERVICING VACUUM PUMPS

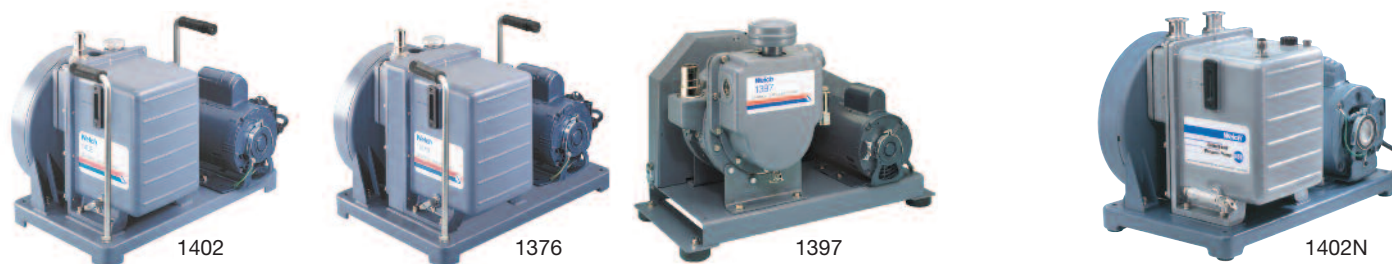
For Evacuation of Refrigeration and HVAC Systems

- All common commercial refrigerants
- Lithium Bromide / Ammonia Chillers

Welch vacuum pumps are known worldwide for Ruggedness and Dependability. High capacity, two stage rotary vacuum pumps get you on and off the job fast.

- Deep vacuum for fast evacuation and dehydration
- Precision machined from the most durable materials
- Gas ballast for high vapor loads

Select from DuoSeal and ChemStar models for top performance and minimum maintenance or DirectTorr models for portable vacuum power. 3-Phase models also available. See opposite page for pump selection by refrigeration application or consult your Welch representative at www.welchvacuum.com.



Model	Type	Free Air Displ. (CFM)	Ultimate Pressure (Torr)	Motor HP	Pump RPM	Intake Male Flare (in.)	Oil Capacity (Qt.)	Wt. (Lbs.)	Electrical Requirements			Dimensions L x W x H (in.)
									Voltage	Frequency	Phases	
1402B-46	DuoSeal	5.6	1x10 ⁻⁴	1/2	525	3/4	2-1/4	112.0	115/230V	60 Hz	1 Ph	20 x 12 x 15
1402N-01	ChemStar	5.6	1x10 ⁻⁴	1/2	525	3/4	2-1/4	112.0	115/230V	60 Hz	1 Ph	20 x 12 x 15
1376B-46	DuoSeal	10.6	1x10 ⁻⁴	1	525	3/4	2-1/2	156.0	115/230V	60 Hz	1 Ph	20 x 14.1 x 15.4
1376N-01	ChemStar	10.6	1x10 ⁻⁴	1	525	3/4	2-1/2	156.0	115/230V	60 Hz	1 Ph	20 x 14.1 x 15.4
1397B-46	DuoSeal	17.7	1x10 ⁻⁴	1	400	See Note 1	1-1/4	205.0	115/230V	60 Hz	1 Ph	26 x 13.7 x 18.8

Note 1: Female 1-1/2" NPT Fitting



**Applied
Vacuum
Technology**

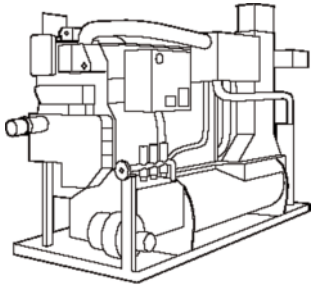
Two-Stage Rotary Vane Pumps

Model	Type	Free Air Displ. (CFM)	Ultimate Pressure (Torr)	Motor HP	Pump RPM	Intake Male Flare (in.)	Oil Capacity (Qt.)	Wt. (Lbs.)	Electrical Requirements			Dimensions L x W x H (in.)
									Voltage	Frequency	Phases	
8920A-46	Direct Drive	7.7	3x10 ⁻⁴	1/2	1725	3/4	1-1/2	58.5	115/230V	50/60 Hz	1 Ph	20.5 x 7.1 x 10.7
8925A-46	Direct Drive	11.5	4x10 ⁻⁴	3/4	1725	3/4	1-1/4	69.0	115/230V	50/60 Hz	1 Ph	21.2 x 7.1 x 10.7

Note 1: Female 1-1/2" NPT Fitting

REFRIGERATION SERVICING PUMP SELECTION

Lithium Bromide Absorption Chiller

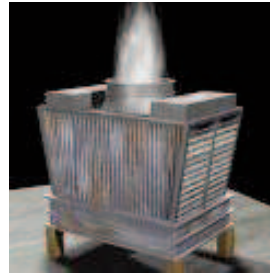


Pump Requirements

- Handles harsh salt-laden water vapor
- Withstands accidental ingestion of salt solution
- Recirculates clean fraction of vacuum oil

Tonnage	Welch Model
100-500	1402B-46
500-1000	1402B-46, 1376B-46
1000-1500	1376B-46, 1397B-46

Rooftop/RTU's

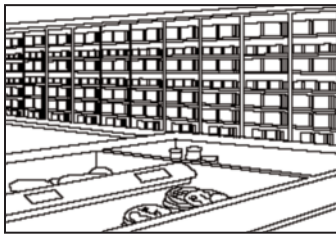


Pump Requirements

- Portable and powerful
- Draws a very deep vacuum

Tonnage	Welch Model
1-50	8920A-46
50-100	8925A-46

Cold Storage

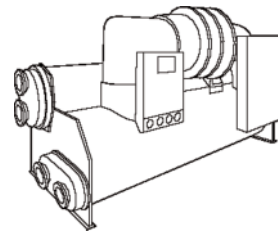


Pump Requirements

- Handles long pumpdown time effectively
- Handles high water vapor loads
- Draws a very deep vacuum

Tonnage	Welch Model
10-50	1402B-46
50-500	1402B-46, 1376B-46,
500-1000	1397B-46

HCFC, CFC or Ammonia Chillers



Pump Requirements

- Seals and gaskets won't break down in the presence of R-11, R-12, R-13, R-22, R-113, R-123, R-114, R-502, R-503 or ammonia
- Draws a very deep vacuum
- Order ChemStar pump for highly corrosive systems

Tonnage	DuoSeal	ChemStar
10-50	1402B-46	1402N-01
50-500	1402B-46, 1376B-46	1376N-01
500-1000	1397B-46	1376N-01

The A,B,C's of Vacuum Pump Selection			
	A Coil Size	+ B Desired Vacuum	= C Flow Needed
Units	Ton	micron Hg(mbar)	L/min
Residential AC	1.5	50(0.07)	160 to 450
	3	50(0.07)	250 to 340
Commercial Air Handling	5-10	500(0.7)	225 to 340
Appliance	0.5	300(0.4)	165 to 310
Leak Testing	1.5	500(0.7)	30 to 170

CONTINUOUS DUTY PRESSURE/VACUUM PUMPS



2415



2440

- Linear diaphragm mechanism
- Continuous pressure to 4 PSI
- Quiet, Oil-free

LINEAR DIAPHRAGM COMPRESSORS employ a linear/vibrating armature to move a diaphragm to generate compressed air for aeration in life science and environmental applications. The unit is low in vibration, generates little heat, low power consumption, and is low in noise. The mechanism is continuous duty. 3/8"(10mm) I.D. tubing connections.

SPECIFICATIONS

	Vacuum Pumps/Compressors		Compressors		
Welch Model	2415	2425	2420	2440	2478
Free Air Displacement					
CFM(L/min) @ 60Hz			1.24(35)	2.0(56)	3.6(102)
m ³ /hr(L/min) @ 50Hz			1.45(29)	2.4(47)	4.4(85)
Max Pressure, PSIG	2.0	4.0	3(3x10 ⁴)	3(3x10 ⁴)	3(3x10 ⁴)
Vacuum Pressure, Torr					
Inlet thread NPT, in.	1/8	1/8	1/8	3/8	3/16
Weight, pump only, lbs.(kg)			5.3	11	18.3
Dimensions of pump only LxWxH, in.	4.5x5x3.3	4.5x5x3.3	5.8x5.0x4.4	4.8x6.8x7.8	10.0x8.9x8.6
cm.	11.4x12.7x8.4	11.4x12.7x8.4	14.8x12.8x11.1	12.3x17.4x19.8	25.4x22.7x21.8
Shipping weight, lbs.(kg)			7(3.2)	13(5.9)	21.3(9.5)

ORDERING INFORMATION

115V (N. Amer. plug), 60Hz, 1 Ph	2415B-01	2425B-01	2420B-01	2430B-01	2478B-01
230V (Euro plug), 50Hz, 1 Ph	2415C-02	2425C-02	2420C-02	2430C-02	2478C-02

EVAPORATION/DISTILLATION CONTROLLER

LabAid 1640 - Intelligent Vacuum Control from Welch



LabAid™

- Frees up hood space
- Works with most PTFE dry pumps
- Self-cleaning maintains pump efficiency

MAKE YOUR EVAPORATIONS EASY, EFFICIENT, & CONSISTENT

Welch's LabAid responds to changes in application vacuum instantly - software driven variable valve holds pressure levels absolutely steady. Mount LabAid on your rack and locate your pump remotely - out of the hood.

Enter evaporation control parameters via the keypad or call up one of five user stored programs. Stored programs can have one or two vacuum levels with different run times. One touch function keys stop bumping/foaming or quickly access maximum vacuum. Self-cleaning automates pump air purge to remove harmful condensates - improves pump efficiency, extends life of pump components.

**Applied
Vacuum
Technology**

VACUUM PROCESS PUMPS & SYSTEMS (OIL-FREE)

Extended Life - Dry - Graphite Vane Design

Economical, lightweight design

Suited For:

- Parts Handling
- Pick and Place Conveyor Lines
- Vacuum Chucking
- Case Set-Up
- Palletizers



8120B-01/8140B-01
Stand-alone Pump



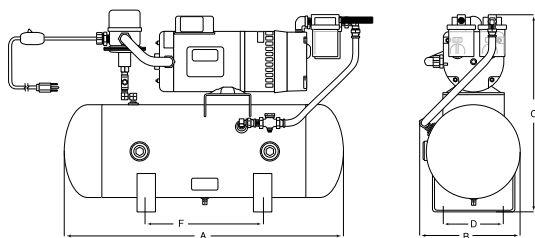
8140B-30/8170B-30
Tank Mounted Pump

Oil-free graphite vane pumps provide high volume air displacement for industrial processes. Available as economical standalone pumps or 10 gallon vacuum tank systems to ensure vacuum availability on demand.

Option A: Stand-alone pump comes ready to use out of the box with handle, hose barb, inlet trap, external exhaust muffler, line cord and switch.

Cat. No.	HP	Free Air Flow (SCFM) @ in. Hg, 60 Hz					
		0	5	10	15	20	25
8121B-01	1/3	3.2	2.6	2	1.4	0.8	0.2
8140B-01	1/3	4.6	3.8	2.9	2	1.2	0.3
8170B-01	3/4	10	8.1	6.2	4.4	2.5	0.8

Option B: Simplex tank mounted pump comes with ASME code receiver, vacuum gauge, exhaust muffler, built-in inlet and exhaust filter and manual shut-off valve. A three position switch allows for on/off continuous duty or automatic on/off at a set vacuum level.



Cat. No.	Dimensions, in. (cm)					Wt., Lbs (kg)
	A	B	C	D	F	
8140B-30	30(76.2)	10.8(27.4)	20.5(52.1)	6.75(17.1)	12.5(31.8)	79(35.9)
8170B-30	30(76.2)	10.8(27.4)	21.5(54.6)	6.75(17.1)	12.5(31.8)	100(45.5)

SPECIFICATIONS

Welch Model	8120	8140	8170
Free Air Displacement, CFM(L/min)	3.2(91)	4.6(130)	10.0(283)
Ultimate Pressure, Torr (mbar)	125(167)	100(133)	100(133)
Maximum Vacuum, in. Hg	25	26	26
Motor HP	1/3	1/3	3/4
Tubing, I.D. inch	1/4	1/4	7/16
Inlet Connection, in. FNPT	1/4	1/4	3/8
Outlet Connection, in. FNPT	1/4	1/4	3/8
Tank on Simplex, gal.	N/A	10	10
Weight, pump only, lbs.(kg)	34(15.4)	34(15.5)	54(24.5)
Dimensions of pump only LxWxH, in.	21.5 x 6.5 x 7	21.5 x 6.5 x 7	19.3 x 6.75 x 8.5
,cm	54.6 x 16.5 x 17.8	54.6 x 16.5 x 17.8	49 x 17.1 x 21.6
Shipping weight, pump only lbs.(kg)	42(19.1)	42(19.1)	60(27.3)

ORDERING INFORMATION^{1.. 2.}

Stand-alone Pump, 115V, 60Hz, 1 Ph	8120B-01	8140B-01	8170B-01
Tank Mounted Pump, 115V, 60Hz, 1 Ph	—————	8140B-30	8170B-30

Notes:

1. Supplied with 115V N. American plug. 2. Not recommended for use with corrosive or solvent fumes.

VACUUM PUMP OILS & EXHAUST FILTERS

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

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



1417A

STANDARD EXHAUST FILTERS				
USE WITH PUMP MODEL	DIMENSIONS, INCHES		CATALOG NUMBER	
	DIAMETER	HEIGHT	FILTER	REPLACEMENT ELEMENT
8890 ¹ , 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

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

VACUUM GAUGES & TRAPS

HANDHELD GENERAL RANGE VACUUM GAUGE



Model 1520 in optional frame case



Kit 1520K-10

- Accurate vacuum measurement from 1 to 760 Torr
- 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" W x 1-1/4" D x 5-3/4" 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 760 Torr	Handheld Vacuum Gauge, 9 V, Torr
1520C-02	1520K-11 ²	1 to 1013 mBar	Handheld Vacuum Gauge, 9 V, mBar

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

HANDHELD MID-HIGH VACUUM GAUGE



- Accurate vacuum measurement from 0.1 to 1999 millitorr
- 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" W x 1-1/4" D x 5-3/4" 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	DESCRIPTION
METER	METER W/ KIT		
1525B-01	1525K-10 ²	0.1 to 1999 millitorr	Handheld Torr Vacuum Gauge
1525C-02	1525K-11 ³	0.001 to 2.665 mBar	Handheld Vacuum Gauge

Notes: 1. For replacement sensor, order 1525A
2. 120 VAC adapter.
3. 220 VAC Euro adapter

DRY ICE/LIQUID NITROGEN COLD TRAP



- Recommended for freeze dryers, vacuum manifolds, concentrators, etc.
- Dry ice slurry cold temperature maintained for up to 12 hours¹
- Liquid nitrogen cold temperature maintained up to 2 hours¹
- Easy to maintain

DRY ICE/LIQUID NITROGEN COLD TRAP has a large 3qt refrigerant well to extend effective cold trapping time. Flow-through design captures up to 1.5L condensate. The transparent ring allows visual monitoring of the trapping surface while the system is operating.

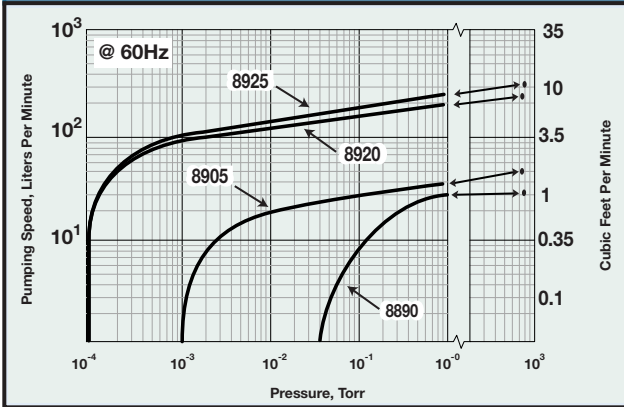
Note: 1. Trap's cold temperature time will be less with a high vapor load.

TUBING NEEDED	DIAM.	HEIGHT	DIAMETER	IN/OUT OFFSET	TRAP CAT. NO.	REPL. SEAL CAT. NO.
7/16 I.D.	10	8.25	10.75	3.5	1420H-14	545210

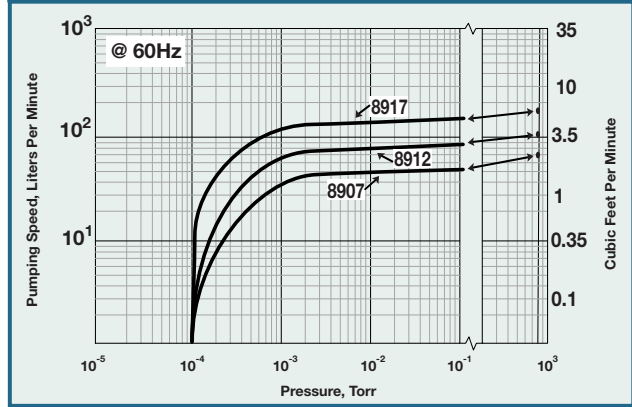
Tubing cat. no. 331040-5

PUMPING SPEED CURVES

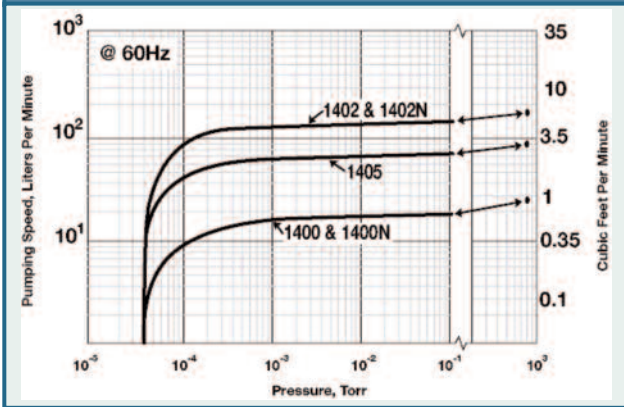
8890, 8905, 8920, 8925



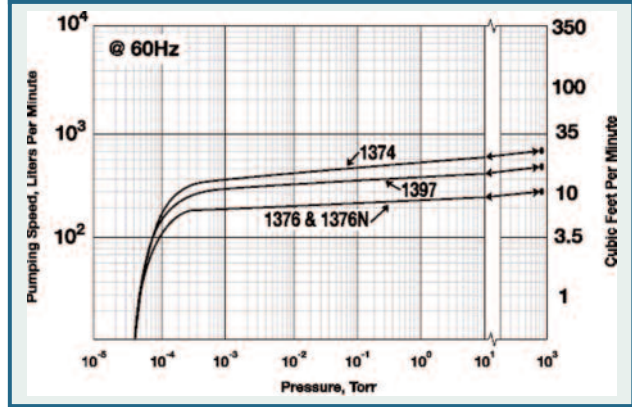
8907, 8912, 8917



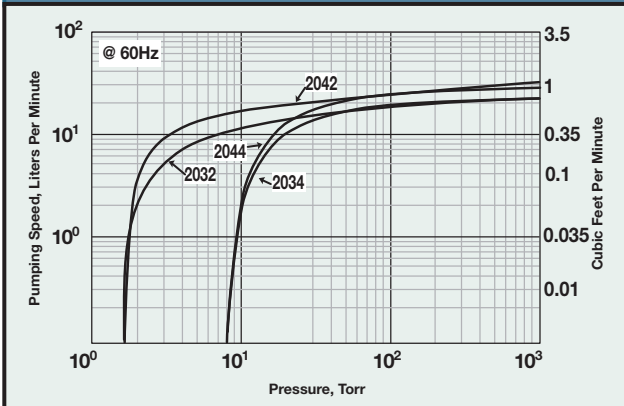
1400, 1400N, 1405, 1402, 1402N



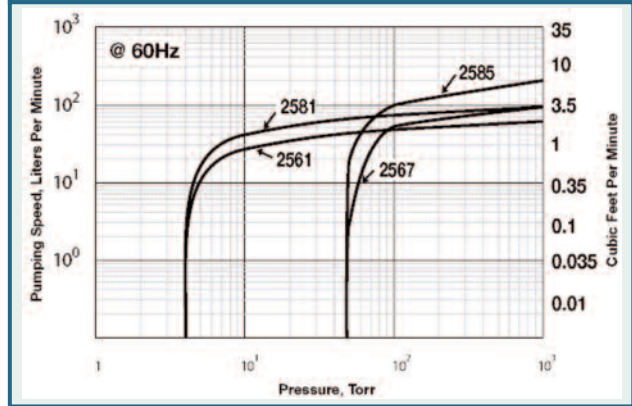
1376, 1376N, 1397, 1374



2032, 2034, 2042, 2044



2561, 2567, 2581, 2585



Ordering, Service & Trademarks

HOW TO ORDER

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:

Gardner Denver Thomas, Inc.,
Welch Vacuum Technology
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

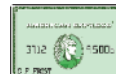
Fax: 847-677-8606

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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For expert pump selection and system configuration, contact your Welch representative at www.welchvacuum.com



Welch products are manufactured at ISO9001 registered plants in Sheboygan, WI and Monroe, LA.