

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" W x 9" H; 1420H-20, 8" W x 13" 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" W x 7-3/4" H; 1416F, 5" W x 13-3/8" H. 1416D exhaust port accepts 13/16" I.D. hose.

USE WITH PUMP MODEL	CATALOG NUMBER		
	MIST ELIMINATOR	PUMP ADAPTER 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)

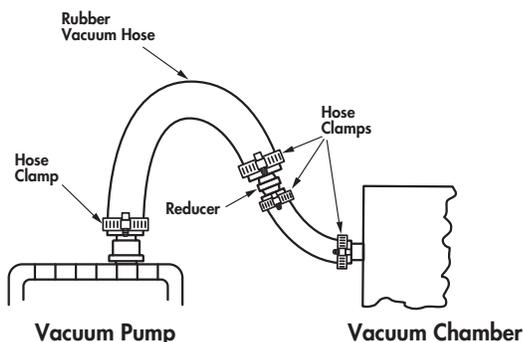


The choice is clear. Pump oil can become contaminated with ingested fluids and vapors. Use recommended pump oil and change your pump oil regularly. Cloudy and discolored oil will lead to premature pump failure.

Make the clear choice and change your oil regularly.

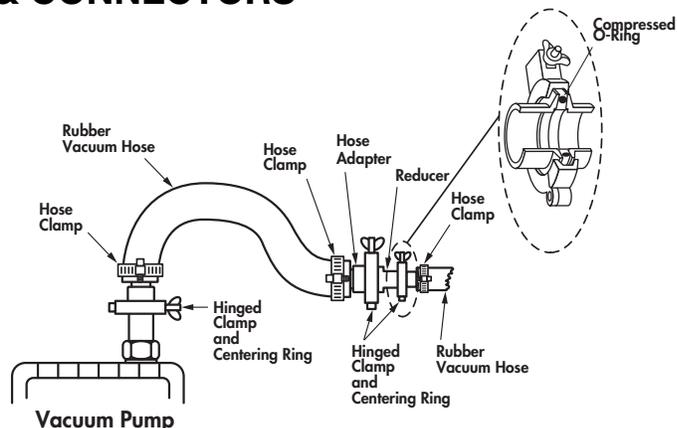
For Vacuum Pump Oils
See p. 42

VACUUM HOSE & CONNECTORS



Hose Nipple Connections

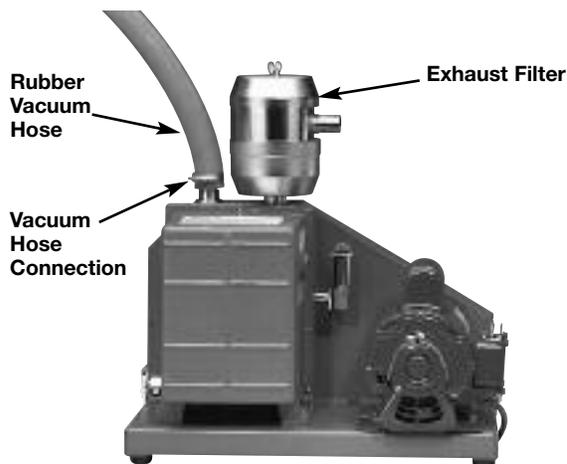
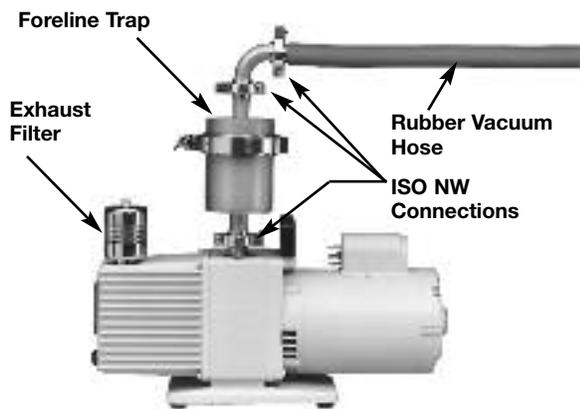
- Inexpensive
- Flexible
- For vacuum systems where the need for disassembly is infrequent
- Recommended for vacuum to 10^{-3} Torr



Hose To ISO Connections

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

VACUUM ACCESSORIES



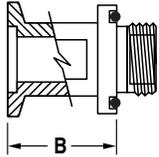
- **Exhaust Filter** - Connects to pump's outlet. Filters oil mist from the pump's exhaust to keep your working area clean and air quality healthful. A second option is an exhaust line to a vapor hood or other outside exhaust vent. This requires an adapter and air tight connections (see pages 33-35, 38, 42).
- **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 pages 42).
- **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 backstreaming into the system and contaminating samples (see page 36 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 representative at www.welchvacuum.com.

See also Vacuum Gauges, page 41 and Vacuum Regulators, pages 40.

Vacuum System Connectors & Tubing

ISO NW INLET CONNECTORS FOR HIGH VACUUM PUMPS

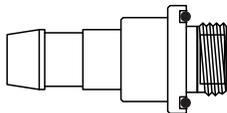
- Aluminum with o-ring
- No sealant required for installation
- For pumps above listed serial number



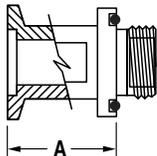
ISO	THREAD SIZE	PUMP MODEL	SERIAL NO.	B	CAT. NO.
NW 16	3/4-20	1399	>26461	1.12	1393F
NW 16	3/4-20	1400, 1400N	>18069	1.12	1393F
NW 25	1-20	1405	>77703	1.2	1393G
NW 25	1-20	1380	>2114	1.2	1393G
NW 25	1-20	1402, 1402N	>133218	1.2	1393G
NW 25	1-20	1376, 1376N	>14594	1.2	1393G
NW 40	1-20	1374	>73519	1.4	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

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



Hose Connector



ISO Connector

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

- Brass
- For use with ISO to female pipe adaptors



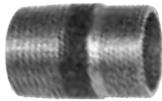
1393X

HOSE BARB	THREAD	HOSE I.D.	CAT. NO.
1/4	1/4 NPT	3/16 and 3/8	1393X

Dimensions are in inches

Vacuum System Connectors & Tubing

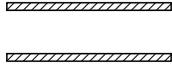
MALE NPT PIPE INLET AND EXHAUST ADAPTERS



- 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

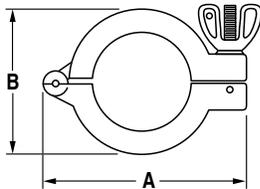


- Very thick walled hose for vacuum or pressure applications
- Quick-acting clamp tightened by a thumbscrew actuated worm screw
- Hose comes in 5 ft. lengths (1.5m)

SPECIFICATIONS			HOSE KIT CAT. NO.				CLAMPS CAT. NO.
I.D.	WALL THICKNESS	O.D.	5FT ONLY	10FT ONLY	15FT ONLY	20FT 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.

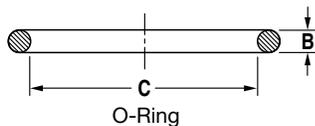
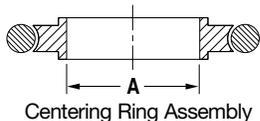
HINGED CLAMPS



- 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

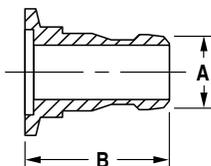
CENTERING ASSEMBLIES • REPLACEMENT O-RINGS



- Stainless steel centering ring with o-ring
- Replaceable Viton® 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



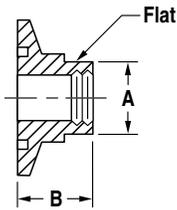
- ISO NW to rubber vacuum hose
- Aluminum

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

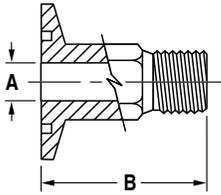
FEMALE PIPE ADAPTERS



- Female stubs have 1/8 in. to 3/4 in. NPT
- Stainless steel
- Can be used with many gauge probes including Welch No. 1515A and 1600B-01 (see pages 41, 42)
- Can be used with brass hose barbs (see page 34)

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

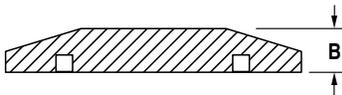
MALE PIPE ADAPTERS



- Male stubs have 1/8 in. to 3/4 in. NPT
- Hex shank
- Stainless steel

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

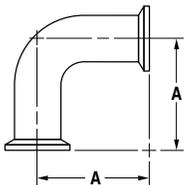
BLANK-OFF FLANGES



- Stainless steel
- To close off unused parts

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

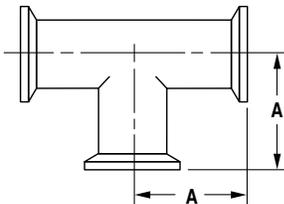
90° ELBOWS



- Stainless steel
- Same size flange on both ports

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

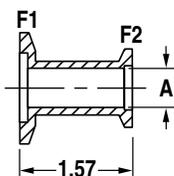
TEES



- 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

Foreline Traps

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

PROTECT YOUR VACUUM SYSTEM

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

PROTECT, IMPROVE YOUR VACUUM APPLICATION

Oil Backstreaming

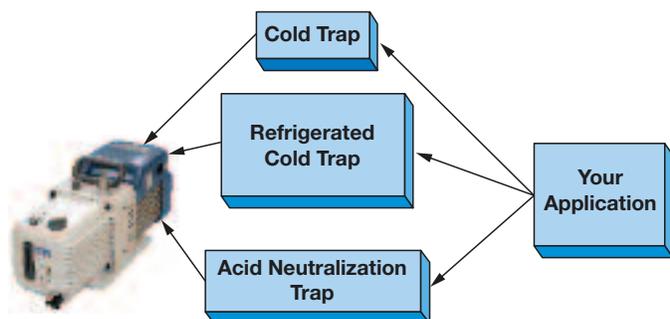
Oil molecules can migrate from an oil lubricated vacuum pump back into the vacuum system when operated at sustained vacuum levels of 1×10^{-2} Torr (1.33×10^{-2} mbar) or deeper for long periods.

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.



TRAP SELECTION TABLE				
Potential Pump Contaminants	Acid Neutralization Trap ¹	Cold Traps		
		Ultra Low Refrigerated (-100°C)	Dry Ice Slurry (-79°C)	Liquid Nitrogen (-198°C)
Water	Not Recommended	Excellent	Excellent	Excellent
Organics	Not Recommended	Excellent	Excellent	Excellent
Acidic	Excellent	Fair	Fair	Excellent
Oil Backstreaming ²	Not Recommended	Excellent	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.

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.
7/16 I.D.	10	8.25	10.75	3.5	1420H-14

Tubing cat. no. 331040-5

Foreline Traps

ULTRA COLD REFRIGERATED TRAP (-100°C)



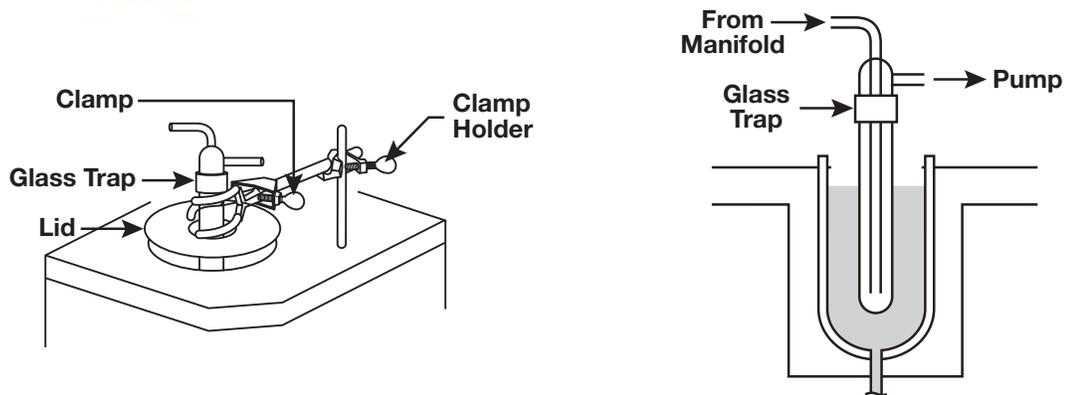
- Saves the labor and expense of recharging dry ice/LN2 traps
- Reduces the risk of pump failure caused by neglect of recharging dry ice/LN2 trap
- Protects oil-sealed high vacuum pumps from corrosive organic vapors

SPECIFICATIONS	CATALOG NO. 1440H-01 ¹
Maximum low temperature	-100°C ¹
Solvent trapping capacity	300 ml
Bath volume	1.3 L
Power	115V, 60 Hz, 500 watts
Dimensions LxWxH in.(cm)	16.5 x 20 x 18.8(42 x 51 x 47.5)
Weight, lbs(kg)	103.4(47)

Includes arbor, post, lid, and support/clamp set for glass trap (glass trap not included).

Note:

1. Ambient temperature at 23° C & no vapor load.



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 (57L/min)	1420H-21	1420E-02	1420K-16
NW 25	To 12 CFM (340L/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. 3. Remove the center well and plexiglass 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.

Exhaust Filters

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 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.



1417A

- 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

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 PUMP 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 10 Torr.

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" W x 7-3/4" H; 1416F, 5" W x 13-3/8" H. 1416D exhaust port accepts 13/16" I.D. hose.

USE WITH PUMP MODEL	CATALOG NUMBER		
	MIST ELIMINATOR	PUMP ADAPTER KIT	REPLACEMENT ELEMENT
1400N	1416D	1416E-01	1417Y-05
1402N, 1376N	1416D	1416E-02	1417Y-05

Vacuum Controllers

LABAID™ - PROGRAMMABLE VACUUM CONTROLLER FOR WALKAWAY AUTOMATION



- Frees up hood space
- Works with most PTFE dry pumps
- Easy to program and operate
- Self-Cleaning maintains pump efficiency

New LabAid™ Programmable Controller automates Welch DRYFAST® PTFE dry pumps or any brand dry pump with flow up to 70 L/min for vacuum within the range 1 Torr (1.3 mbar) to Atmosphere. The controller and pump combination creates an effective system for rotary evaporation, distillation, and other solvent evaporation procedures.

- Enter evaporation control parameters via the keypad or call up one of the five user stored programs and walk away. Stored programs can have one or two vacuum levels with different run times. One-touch function keys stop bumping/foaming, go to maximum vacuum, and vent to atmosphere.
- Avoid the “sawtooth” control profile of “vacuum on – vacuum off” controllers. LabAid responds to changes in application vacuum instantly with variable air bleed or vacuum to hold pressure levels absolutely steady. Patent pending.
- The Self-Cleaning function provides an automated fresh air purge for your pump at the conclusion of your programmed procedure. This removes residual vapor that could condense in the pump, damaging pump surfaces and impairing pump efficiency. Self-Cleaning and precision vacuum control reduce repairs by extending the life of diaphragms and valves. Pump shuts off at conclusion of cleaning cycle.

For Rotary
Evaporator Applications,
See p. 5

Ordering Information

DESCRIPTION ¹	CAT. NO.
LabAid Programmable Controller, 115V, 60Hz	1640B-01
LabAid Programmable Controller 230V, 50 Hz	1640C-02

Note: 1. Includes liquid separator w/easy access jar.

To select a pump, see
Rotary Evaporators
application pages 2 to 5
and DRYFAST pumps on
page 22.



2032, 2042



Vacuum Regulators & Operators

VACUUM REGULATORS



1422A Bench Mount



1421, 1421C & 1421D Pump Mount

PUMP MODEL	CAT. NO.
2010, 2012, 2022, 2030, 2015, 2017 2021, 2031, 2561, 2567, 2581, 2585	1422A
2022, 2030, 2015 2017, 2010, 2021, 2031	1421D
8890	1421

Model 1422A connects to pump intake via hose for easy regulation of vacuum level. Position on bench top. Corrosion resistant construction. Requires 1/4 in. (7 mm) ID hose (cat. no. 331030-5).

Model 1421 & 1421D replaces inlet barb and allows easy regulation of vacuum level. Includes an easy to read dial gauge. Cat. No. 1421C-stainless steel-brass construction.

Cat. No. 1421D-all stainless steel construction. Cat. No. 1421-brass construction.

CAUTION: Do not use with DuoSEAL®, CHEMSTAR® or Direct-Drive pumps.

ON/OFF FOOT SWITCH



1430A



1430B



1430C

- 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 male and female IEC connections, 8 ft. cord, CE and plugs directly into the IEC connection on the pump.

PUMP MODEL	CAT. NO.
2010, 2012, 2022, 2030, 2015, 2017, 2021, 2031, 2511, 2515, 2522, 2534,	1430A (115V/60 Hz only, maintained On/Off)
2546, 2561, 2567, 2581, 2585	1430B (115V/60 Hz only, momentary On/Off)
	1430C (90-230V with IEC connections, momentary On/Off)

HAND HELD PIPETTOR FOR ASPIRATION STATIONS



1475K-10

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

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 variety of vessel formats. An adjustment screw allows you to set the right 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 autoclaveable and disassembles easily for cleaning.

**For more adapters
& Ordering Information,
See p. 15**



Disposable Pipette Tip Adapters



Microtiter Format Manifolds

Vacuum Gauges

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 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" L x 5" D x 5.6" H (17.8 x 12.7 x 14.1); Weight 2 lbs(0.9 kg).

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

DIAL PRESSURE & VACUUM GAUGE



DIAL DIAMETER	UNITS OF MEASURE	CONNECTION	CAT. NO.
2 in. O.D.	in. Hg, cm Hg (Brass)	1/8" male NPT	726021
2.5 in. O.D.	in. Hg, mm Hg (Brass)	1/4" male NPT	726020
2 in. O.D.	in. Hg (Stainless)	1/8" male NPT	726023
2 in. O.D.	mbar/kPa (Brass)	1/8" male NPT	726024
2 in. O.D.	psi/kgsm	1/8" male NPT	726025

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

Vacuum Pump Oils & Hose Adapter Kits

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

Service Kits

CHEMICAL DUTY DRY PTFE DIAPHRAGM PUMPS - DRYFAST & DRYFAST ULTRA



PUMP MODEL	KIT NO.	DESCRIPTION
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
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 Seal Service Kit, 2562
2561	2561K-03 2561K-04	Two Head Service Kit, 2561 Seal Service Kit, 2561
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

Service Kits

CHEMICAL DUTY DRY PTFE DIAPHRAGM PUMPS



PUMP MODEL	KIT NO.	DESCRIPTION
2010	2010K-01	One head service kit
2012, 2015, 2022	2022K-01 2025K-01	One head service kit, S/N <EG040000 One head service kit, S/N >EG050000
2016, 2024, 2030	2025K-01	One head service kit
202501	2025K-01 2025K-02 2025K-06	One head service kit Tubing service kit for 202501, S/N <EC091299 Tubing service kit for 202501, S/N >EC091300
2021, 2031	2027K-01	One head service kit
202601, 202701	2027K-01 2025K-06	One head service kit Tubing service kit

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

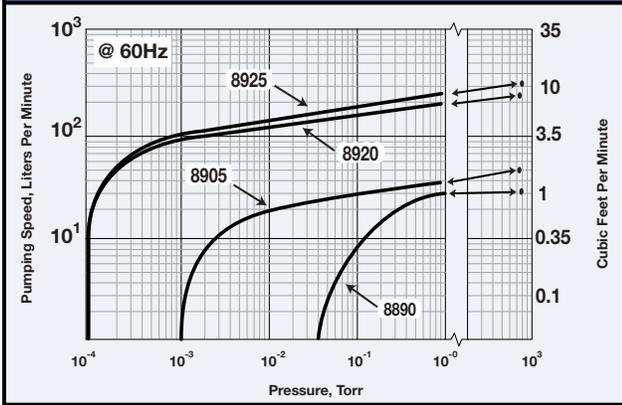
DIRECT-DRIVE VACUUM PUMPS



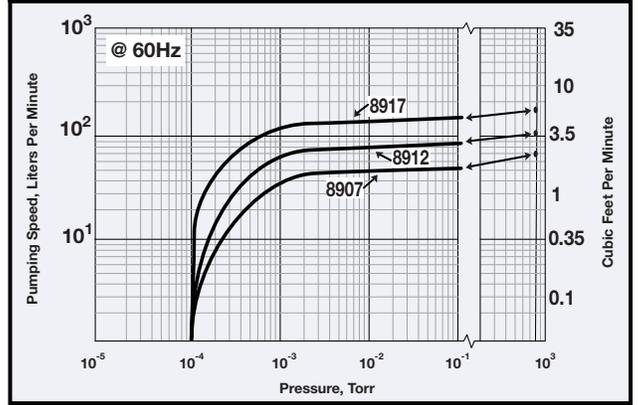
PUMP MODEL	KIT NO.	DESCRIPTION
8890	8890K-02	Minor repair kit, 8890
8905	8905K-02 8905K-03	Minor repair kit, 8905 Shaft seal repair kit, 8905
8907, 8912, 8917	8917K-04 8917K-05	Minor repair kit, 8907, 8912, 8917 Shaft seal repair kit, 8917
8920	8915K-02	Minor repair kit, 8920
8925	8925K-02	Minor repair kit 8925

Pumping Speed Curves

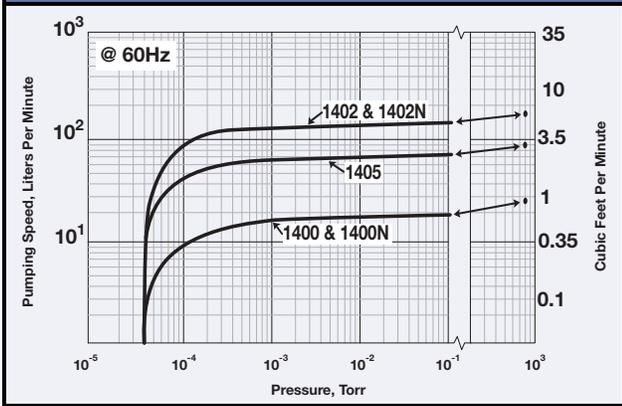
8890, 8905, 8920, 8925



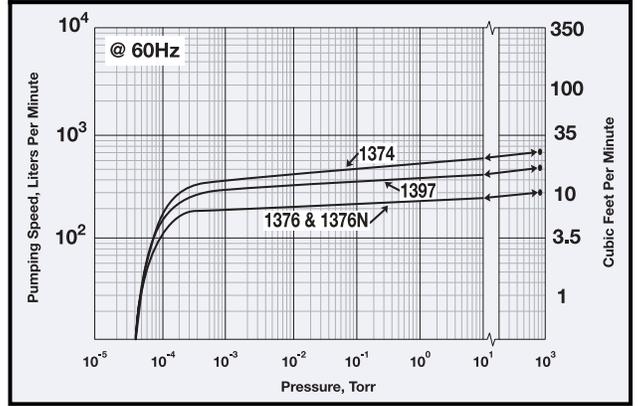
8907, 8912, 8917



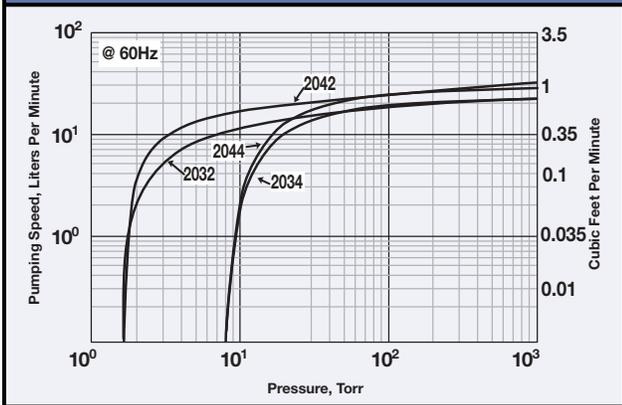
1400, 1400N, 1405, 1402, 1402N



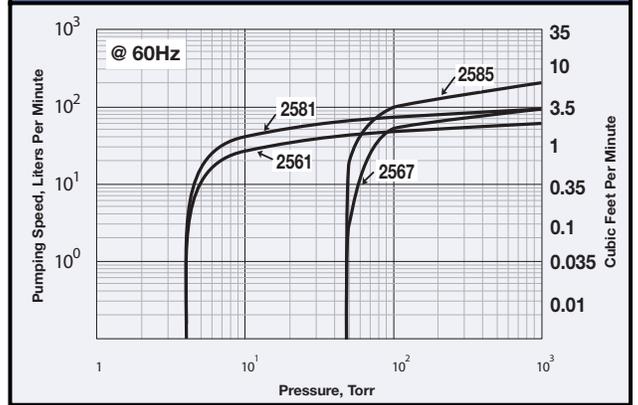
1376, 1376N, 1397, 1374



2032, 2034, 2042, 2044



2561, 2567, 2581, 2585



Product Directory by Type, Flow & Vacuum

CHEMICAL DUTY DRY VACUUM PUMPS & SYSTEMS

MODEL	FREE AIR DISPLACEMENT CFM (L/MIN) @ 60HZ	ULTIMATE PRESSURE, TORR (MBAR)	PAGE (TYPE)
2010	0.45(12.7)	110(146)	22 (Pump)
2014	0.88(25)	40(53)	22 (Pump)
2034	0.9(25)	9(12)	22 (Pump)
2032	0.9(25)	2(2.7)	22 (Pump)
2044	1.2(35)	9(12)	22 (pump)
2042	1.2(35)	2(2.7)	22 (pump)
2025	1.2(35)	9(12)	23 (Dial Vacuum Read-out System)
2026	1.2(35)	2(2.7)	23 (Dial Vacuum Read-out System)
2027	1.2(35)	2(2.7)	23 (Digital Absolute Vacuum Read-out System)
2028	1.2(35)	2(2.7)	23 (Programmable w/ Digital Vacuum Read-out System)
2037	1.8(50)	50(67)	22 (pump)
2047	2.5(70)	35(47)	22 (pump)

STANDARD DUTY DRY VACUUM PUMPS

MODEL	FREE AIR DISPLACEMENT CFM (L/MIN) @ 60HZ	ULTIMATE PRESSURE, TORR (MBAR)	MAXIMUM DELIVER PRESSURE, PSIG (PASCAL)	PAGE (TYPE)
2511	0.39(11)	219(292)	33(3.3 x 10 ⁵)	24, 25 (Pump, aspiration/filtration systems)
2515	1.2(34)	70(93)	0	25 (Aspiration/filtration systems)
2522	0.76(22)	100(133)	100(10 ⁶)	24 (Pump w/liquid trap, silencer, pressure & vacuum regulators)
2534	1.2(34)	70(93)	50(5 x 10 ⁵)	24 (Pump w/liquid trap, silencer, pressure & vacuum regulators)
2546	1.6(45)	60(80)	100(10 ⁶)	24 (Pump w/liquid trap, silencer, pressure & vacuum regulators)
2561	2.1(60)	5(6.7)	0	24 (Pump w/liquid trap, silencer, vacuum regulator)
2581	3.5(100)	5(6.7)	0	24 (Pump w/liquid trap, silencer, vacuum regulator)
2567	3.5(100)	60(80)	0	24 (Pump w/liquid trap, silencer, vacuum regulator)
2585	7.1(201)	60(80)	0	25 (Pump w/liquid trap, silencer, vacuum regulator)

COMPACT DIRECT-DRIVE HIGH VACUUM PUMPS

MODEL	FREE AIR DISPLACEMENT CFM(L/MIN) @ 60HZ	ULTIMATE PRESSURE, TORR (MBAR)	PAGE (TYPE)
8890	1.1(31)	1x10 ⁻¹ (1.33x10 ⁻¹)	26
8905	1.8(51)	2x10 ⁻³ (2.7x10 ⁻³)	26
8907	2.6(73)	1x10 ⁻² (1.3x10 ⁻²)	26
8912	3.8(108)	1x10 ⁻² (1.3x10 ⁻²)	26
8917	6.1(173)	1x10 ⁻² (1.3x10 ⁻²)	26
8920	7.7(218)	3x10 ⁻² (4x10 ⁻²)	26
8925	11.3(320)	4x10 ⁻² (5.3x10 ⁻²)	27
Rotovap Pump	1.1(31)	1x10 ⁻¹ (1.33x10 ⁻¹)	27
Freeze Dryer Pump	6.1(173)	1x10 ⁻² (1.3x10 ⁻²)	27

RUGGED DUOSEAL® BELT-DRIVE HIGH VACUUM PUMPS

MODEL	FREE AIR DISPLACEMENT CFM(L/MIN) @ 60HZ	ULTIMATE PRESSURE, TORR (MBAR)	PAGE (TYPE)
1400	0.9(25)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	28
1399	1.2(35)	1.5x10 ⁻² (1.9x10 ⁻³)	29
1399N	1.2(35)	1.5x10 ⁻² (1.9x10 ⁻³)	29 (w/bell jar plate)
1405	3.2(90)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	28
1402	5.6(160)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	28
1376	10.6(300)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	28
1397	17.7(500)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	28
1374	23(650)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	29

Product Directory by Type, Flow & Vacuum

CHEMSTAR® PUMPS FOR CORROSIVE GASES

- High contamination tolerance
- Vital parts corrosion resistant
- Oil-lubricated rotary vane belt-drive mechanism

MODEL	FREE AIR DISPLACEMENT CFM(L/MIN) @ 60HZ & 50HZ	ULTIMATE PRESSURE, TORR (MBAR)	PAGE
1400N	0.9(25)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	30
1402N	5.6(160)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	30
1376N	10.6(300)	1x10 ⁻⁴ (1.3x10 ⁻⁴)	30

GEMINI ENHANCED DUTY DRY VACUUM PUMPS

MODEL	FREE AIR DISPLACEMENT CFM(L/MIN) @ 60HZ	ULTIMATE PRESSURE, TORR (MBAR)	PAGE
2050	0.3(8.5)	190(253)	19
2060	0.46(13)	200(266)	19

MODULAR VACUUM CONTROL INSTALLATIONS

Integrate localized vacuum for multiple applications into your laboratory design. Consult with Welch to create efficient vacuum stations with capabilities far beyond house vacuum installations. Features include:

- Pumps with the specific flow, vacuum levels, and chemical resistance for all of your needs.
- Professionally configured trapping to protect your pumps and environment.
- Short vacuum runs to minimize contaminant accumulation and enable easy vacuum leak detection.
- Welch LabAid vacuum controller available at any station. Turn of a valve enables instant vacuum level readouts and precise control of your application - without Mercury!

In U.S.A. and Canada, please call **847-676-8800** or email gdwelchvacuum@gardnerdenver.com Welch technical service with your needs and we will get back to you with advice and followup with a proposal. For other countries, contact your nearest Gardner Denver sales office (See listing of offices on back cover).



Index of Catalog Numbers

CAT. NO.	PAGE NO.
1374	29
1374B-01	29
1374M-01	29
1376	28
1376B-01	28
1376C-03	28
1376K-05,-06	44
1376K-09,-10	44
1376M-01	29
1376N	30
1376N-01,-49,-53,-60	30
1393F,G,H	33
1393J,K,L,M	33
1393N,P	34
1393X	33
1397	28
1397B-01	28
1397C-02	28
1397K-07,-08	44
1397M-01	28
1399	29
1399B-01	29
1399C-02	29
1399K-03,-04	44
1399N-01	29
1400	6,28
1400B-01	28
1400C-01	28
1400C-02	28
1400K-03,-04,-09,-10	44
1400N	6,30
1400N-01,-50,-53,-90	30
1400W-01	28
1402	9,28
1402B-01	28
1402C-01,-02	28
1402K-05,-06,-09,-10	44
1402M-01	28
1402N	30
1402N-01	10,30
1402N-50	30
1402N-53,-60,-90	30
1402W-01	28
1405	28
1405B-01	28
1405C-02	28
1405W-01	28
1407K-11,-15,-20,-25	29,42
1412B,C,D,E	25
1415B,C	25
1416B,C,H	38
1416C-01	38
1416D	31
1416E-01,-02	31
1416H-01	38
1417	29,38
1417A,B,G,H,L,R	38
1417A-01	38
1417B-01	38
1417H-01	29,38
1417P	38
1417P-10,-20	29,38
1417P-7	38
1417Y-05	31
1420E-01,-02	31
1420H-01,-02	42
1420H-14	29,36
1420H-17,-18,-19,	5,23
1420H-20,-21	37
1420K-16,-25	37
1421	40
1421D	40
1422A	40
1423B	25
142601	12
142602	12
142603	12

CAT. NO.	PAGE NO.
142604	12
142606	12
1430A,B,C	15,40
1440H-01	7,37
1475K-01,-02,-03,-04	15
1475K-05,-06,-07,-08	15
1475K-09,-10,-20,-21	15
1515	41
1515A,B	41
1520	41
1520B-01	41
1520C-02	41
1525	41
1525B-01	41
1525C-01	41
1640	3,39
1640B-01	39
1640C-02	39
2010B-01	8,22
2010C-02	8,22
2010K-01	44
2014B-01	4,8,22
2014C-02	4,8,22
2015	44
2022K-01	44
2024	44
202501	2,12,23
202503	2,12,23
202505	2,12,23
2025K-01,-02	43,44
2025K-06	44
202601	23
202701	2,4,23
202703	2,4,23
202705	2,4,23
2027K-01	44
2028	2,4,23
202801	2,4,23
202803	2,4,23
202805	2,4,23
2030	44
2031	44
2032	3,4,22
2032B-01	22
2032C-02	22
2032C-05	22
2034	3,4,22
2034B-01	22
2034C-02	22
2034C-05	22
2037	8,22
2037B-01	8,22
2037C-02	8,22
2037C-05	8,22
2037K-01	43
2042	3,4,9,13,22
2042B-01	3,4,9,13,22
2042C-02	3,4,9,13,22
2042C-05	3,4,9,13,22
2044	3,4,13,22
2044B-01	3,4,13,22
2044C-02	3,4,13,22
2044C-05	3,4,13,22
2047	8,9,11,22
2047B-01	8,9,11,22
2047C-02	8,9,11,22
2047C-05	8,9,11,22
2047K-01	43
2050	19
2050B-01	19
2050C-02	19
2060	19
2060B-01	19
2060C-02	19
2420	16
2420B-01	16
2420C-02	16

CAT. NO.	PAGE NO.
2430	16
2430B-01	16
2430C-02	16
2460	16
2460B-01	16
2460C-02	16
2478	16
2478B-01	16
2478C-02	16
2500K-04	43
2511B-01	24
2511B-75	14,25
2511C-02	24
2511C-05	24
2511C-75	14,25
2511C-76	14,25
2515B-75	14,25
2515C-75	14,25
2515C-76	14,25
2522B-01	17,24
2522C-01	17,24
2522C-02	17,24
2522C-05	17,24
2534B-01	17,24
2534C-01,-02	24
2546B-01	17,24
2546C-01	17,24
2546C-02	17,24
2561B-50	24
2561C-50	24
2561C-56	24
2561K-03,-04	43
2567B-50	17,24
2567C-50	17,24
2567K-03,-04	43
2581B-50	17,24
2581C-50	17,24
2581C-56	17,24
2581K-03,-04	43
2585B-50	25
2585C-50	25
2585K-03,-04	43
302201	34
302202	34
302203	34
304801	34
304802	34
304803	34
305320	34
305340	34
305350	34
305360	34
305380	34
3100	20,21
3100B-01	21
3100C-02	21
3200	20,21
3200B-01	21
3200C-02	21
3200K-01	20
331020-10	34
331020-5	34
331030-5	34
331040-10	34
331040-5	34
331050-10	34
331050-5	34
331060-10	34
331060-15	34
331060-20	34
331060-5	34
331080-10	34
331080-5	34
3432K-01,-02,-04	21
3433K-01,-02,-04	21
3434K-01,-02,-04	21
3435K-01,-02,-04	21

CAT. NO.	PAGE NO.
383101	35
383102	35
384101	35
384102	35
387121	35
387132	35
388101	35
388102	35
4050	16
4050B-01	16
4050C-02	16
501241	34
501251	34
501262	34
501283	34
505121	35
506121	35
506122	35
506142	35
726020	42
726021	42
726023	42
726024	42
726025	42
8890A	26
8890A-70	4,6,26
8890C-02	26
8890C-72	4,6,26
8890K-02	44
8905A	26
8905C-02	26
8905K-02,-03	44
8907A	26
8907C-02	26
8912A	26
8912C-02	26
8915K-02	44
8917A	26
8917A-80	10,27
8917C-02	26
8917C-80	10,27
8917K-04,-05	44
8917W	26
8920A	26
8920C-02	26
8925A	27
8925C-02	27
8925K-02	44
8925W	27
8995C	12
8995C-70	12
8995G-11	27,42
8995G-15	27,42
8995G-20	27,42
8995G-25	27,42
8995P-11	27,42
8995P-15	27,42
8995P-20	27,42
8995P-25	27,42

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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WELCH® PRODUCTS FOR CHEMISTRY AND LIFE SCIENCE LABORATORIES

	Page
Dry Vacuum Pumps	
- Chemical Duty (DRYFAST®)	22-23
- Standard Duty (WOB-L®)	24-25
- Field Duty (GEMINI™)	19
Oil Sealed Rotary Vane Pumps	
- Belt Driven (DUOSEAL®)	28-29
- Belt Driven Corrosive Gases (CHEMSTAR®)	30
- Direct Drive	26-27
Vacuum System Needs	
- Controllers (LABAID™)	39
- Gauges	40-41
- Traps	36-37
- Exhaust Filters	38
- Components	32-35
- Oil	42
Modular Vacuum System Installations	47
Aeration Compressors	16
Peristaltic Pumps	20-21

See Table of Contents (inside cover) for typical applications for Chemistry and Life Science Laboratories

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.