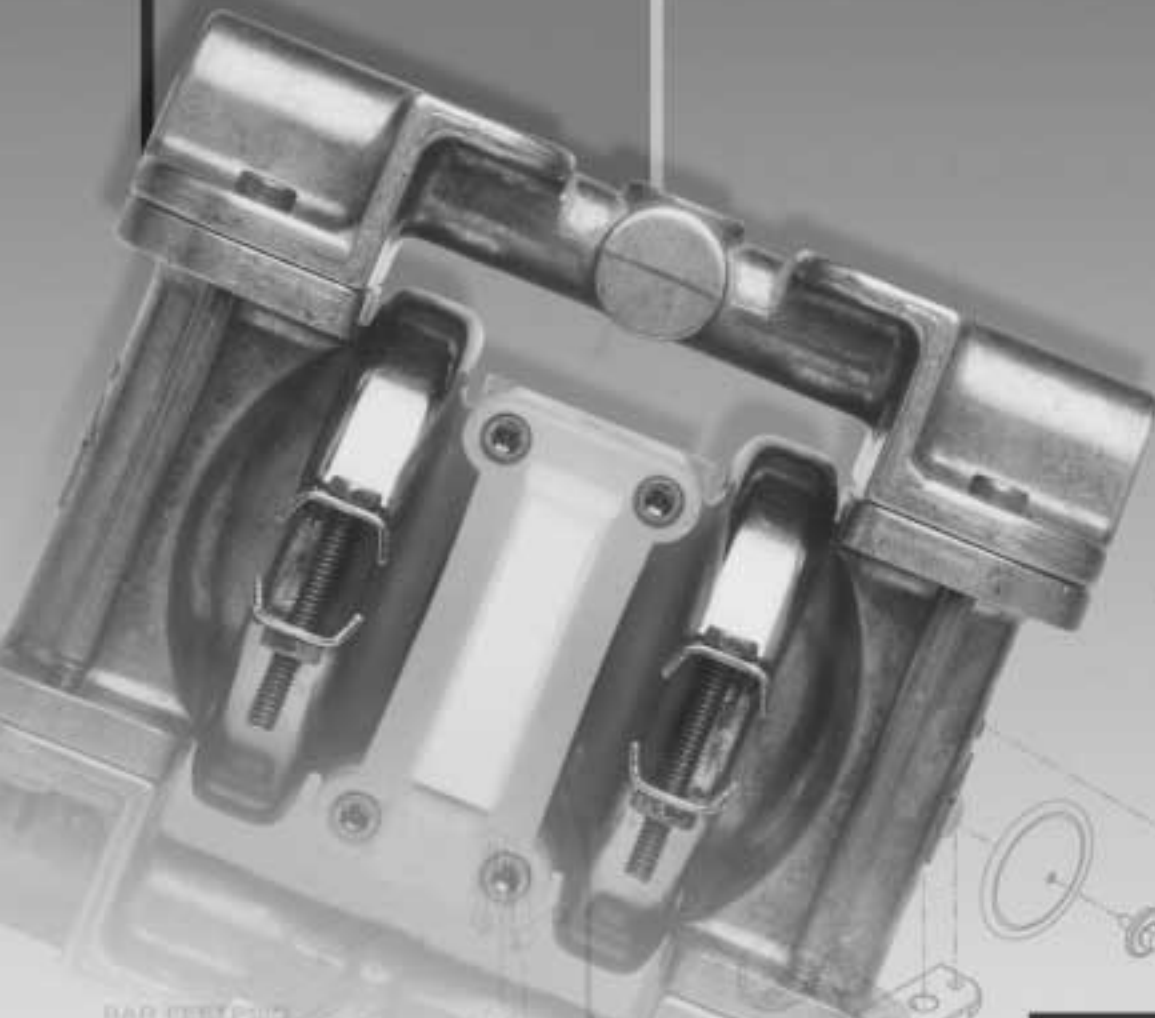


# P.025

# Engineering Operation & Maintenance

# CE



# WILDEN®

A **DOVER** RESOURCES COMPANY

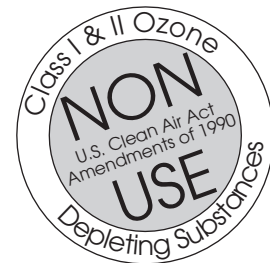
## PROFLO™

PROGRESSIVE PUMP TECHNOLOGY

## Metal Pumps

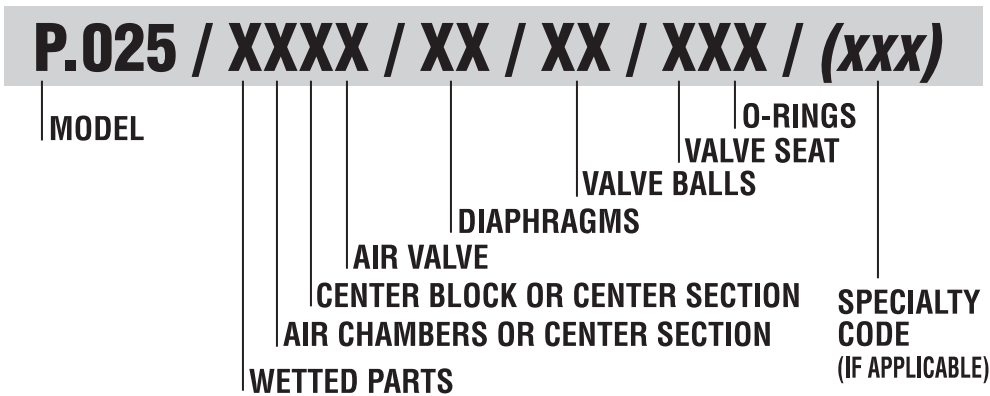
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# SECTION 1

# WILDEN PUMP DESIGNATION SYSTEM



## MODEL P.025 METAL MATERIAL CODES

### WETTED PARTS

- A = ALUMINUM
- S = STAINLESS STEEL
- H = HASTELLOY®

### AIR CHAMBERS

- L = ACETAL
- P = POLYPROPYLENE

### CENTER SECTION

- L = ACETAL
- P = POLYPROPYLENE

### AIR VALVE

- L = ACETAL
- P = POLYPROPYLENE

### DIAPHRAGMS

- BN = BUNA-N® (Red Dot)
- TX = TEFLON® PTFE with integral outer piston (White)
- WF = WIL-FLEX™ (Orange)

### VALVE BALL

- TF = TEFLON® PTFE (White)

### VALVE SEAT

- A = ALUMINUM
- S = STAINLESS STEEL
- H = HASTELLOY®

### VALVE SEAT O-RING

- BN = BUNA-N®
- TV = TEFLON® ENCAP. VITON®
- WF = WIL-FLEX™
- TF = TEFLON® PTFE

### MANIFOLD O-RING

- BN = BUNA-N®
- TF = TEFLON® PTFE

**NOTE:** ELASTOMERIC MATERIALS USE COLORED DOTS FOR IDENTIFICATION.

Buna-N® and Viton® are registered trademarks of DuPont Dow Elastomers.  
Teflon® is a registered trademark of DuPont.  
Hastelloy® is a registered trademark of Hanes International Incorporated.

## SECTION 2

# THE WILDEN PUMP — HOW IT WORKS

The Wilden diaphragm pump is an air-operated, positive displacement, self-priming pump. These drawings show flow pattern through the pump upon its initial stroke. It is assumed the pump has no fluid in it prior to its initial stroke.

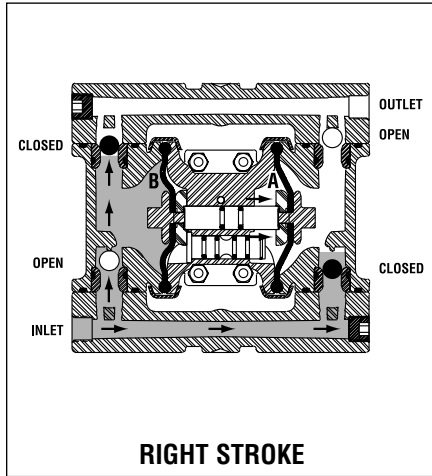


FIGURE 1 The air valve directs pressurized air to the back side of diaphragm A. The compressed air is applied directly to the liquid column separated by elastomeric diaphragms. The diaphragm acts as a separation membrane between the compressed air and liquid, balancing the load and removing mechanical stress from the diaphragm. The compressed air moves the diaphragm away from the center block of the pump. The opposite diaphragm is pulled in by the shaft connected to the pressurized diaphragm. Diaphragm B is on its suction stroke; air behind the diaphragm has been forced out to the atmosphere through the exhaust port of the pump. The movement of diaphragm B toward the center block of the pump creates a vacuum within chamber B. Atmospheric pressure forces fluid into the inlet manifold forcing the inlet valve ball off its seat. Liquid is free to move past the inlet valve ball and fill the liquid chamber (see shaded area).

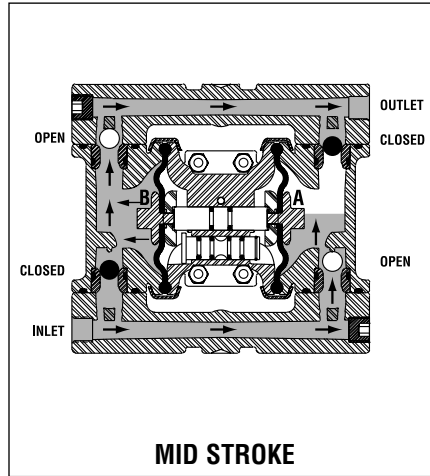


FIGURE 2 When the pressurized diaphragm, diaphragm A, reaches the limit of its discharge stroke, the air valve redirects pressurized air to the back side of diaphragm B. The pressurized air forces diaphragm B away from the center block while pulling diaphragm A to the center block. Diaphragm B is now on its discharge stroke. Diaphragm B forces the inlet valve ball onto its seat due to the hydraulic forces developed in the liquid chamber and manifold of the pump. These same hydraulic forces lift the discharge valve ball off its seat, while the opposite discharge valve ball is forced onto its seat, forcing fluid to flow through the pump discharge. The movement of diaphragm A toward the center block of the pump creates a vacuum within liquid chamber A. Atmospheric pressure forces fluid into the inlet manifold of the pump. The inlet valve ball is forced off its seat allowing the fluid being pumped to fill the liquid chamber.

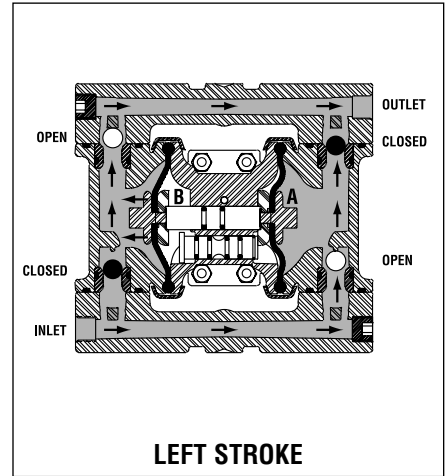


FIGURE 3 At completion of the stroke, the air valve again redirects air to the back side of diaphragm A, which starts diaphragm B on its exhaust stroke. As the pump reaches its original starting point, each diaphragm has gone through one exhaust and one discharge stroke. This constitutes one complete pumping cycle. The pump may take several cycles to completely prime depending on the conditions of the application.

## PRO-FLO™ AIR DISTRIBUTION SYSTEM OPERATION — HOW IT WORKS

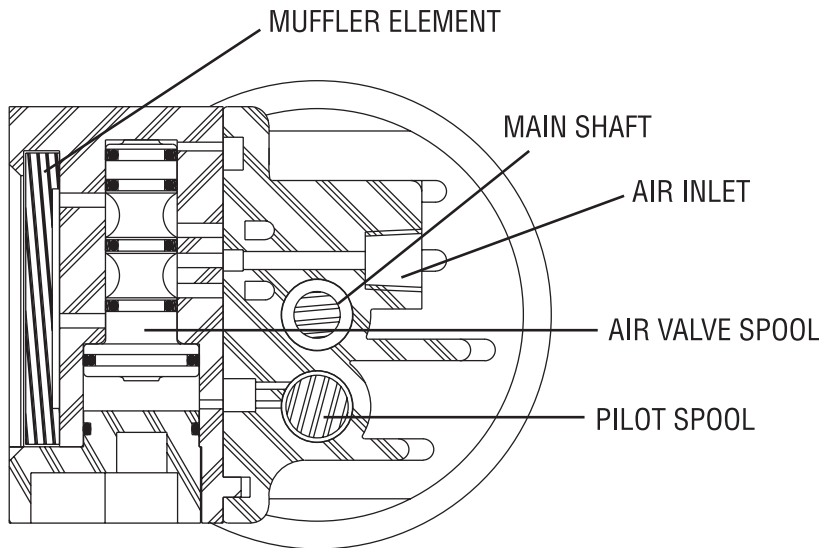


Figure 1

The Pro-Flo™ patented air distribution system incorporates three moving parts: the air valve spool, the pilot spool, and the main shaft/diaphragm assembly. The heart of the system is the air valve spool and air valve. As shown in Figure 1, this valve design incorporates an unbalanced spool. The smaller end of the spool is pressurized continuously, while the large end is alternately pressurized and exhausted to move the spool. The spool directs pressurized air to one chamber while exhausting the other. The air causes the main shaft/diaphragm assembly to shift to one side — discharging liquid on one side and pulling liquid in on the other side. When the shaft reaches the end of its stroke, it actuates the pilot spool, which pressurizes and exhausts the large end of the air valve spool. The pump then changes direction and the same process occurs in the opposite direction, thus reciprocating the pump.

## SECTION 3

# WILDEN MODEL P.025 METAL CAUTIONS – READ FIRST!

---



### TEMPERATURE LIMITS:

Polypropylene	0°C to 79°C	+32°F to 175°F
Teflon® Encap.	+5°C to 149°C	+40°F to 300°F
Viton®		
Acetal	-28.9°C to 65.6°C	-20°F to 150°F
Buna-N®	-12.2°C to 82.2°C	+10°F to +180°F
Wil-Flex™	-40°C to 107.2°C	-40°F to +225°F
Teflon® PTFE	+4.4°C to 104.4°C	+40°F to +220°F



**CAUTION:** When choosing pump materials, be sure to check the temperature limits for all wetted components.



**CAUTION:** Maximum temperature limits are based upon mechanical stress only. Certain chemicals will significantly reduce maximum safe operating temperatures. Consult engineering guide for chemical compatibility and temperature limits.



**CAUTION:** Always wear safety glasses when operating pump. If diaphragm rupture occurs, material being pumped may be forced out air exhaust.



**WARNING:** Prevention of static sparking — If static sparking occurs, fire or explosion could result. Pump, valves, and containers must be properly grounded when handling flammable fluids and whenever discharge of static electricity is a hazard.



**CAUTION:** Do not exceed 8.6 Bar (125 psig) air supply pressure.



**CAUTION:** Before any maintenance or repair is attempted, the compressed air line to the pump should be disconnected and all air pressure allowed to bleed from pump. Disconnect all intake, discharge and air lines. Drain the pump by turning it upside down and allowing any fluid to flow into a suitable container.



**CAUTION:** Blow out air line for 10 to 20 seconds before attaching to pump to make sure all pipe line debris is clear. Use an in-line air filter. **A 5μ (micron) air filter is recommended.**



**NOTE:** Tighten clamp bands and manifold bolts prior to installation. Fittings may loosen during transportation.



**NOTE:** Before starting disassembly, mark a line from each liquid chamber to its corresponding air chamber. This line will assist in proper alignment during reassembly.



**CAUTION:** Verify the chemical compatibility of the process and cleaning fluid to the pump's component materials in the Chemical Resistance Guide. (see E4).



**CAUTION:** The P.025 pump is not submersible.

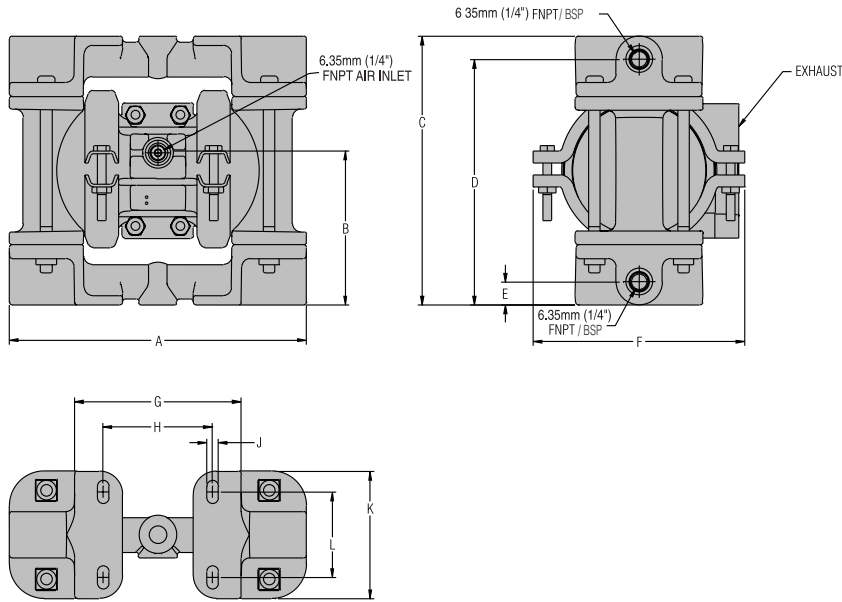


**CAUTION:** Pump performance will be seriously hampered if pump is installed upside down.

# SECTION 4

## DIMENSIONAL DRAWING

### WILDEN MODEL P.025 METAL



DIMENSIONS – P.025 Pro-Flo™		
ITEM	METRIC (mm)	STANDARD (inch)
A	165.1	6 1/2
B	84.1	3 5/16
C	148.4	5 27/32
D	135.7	5 11/32
E	12.7	1/2
F	114.3	4 1/2
G	92.1	3 5/8
H	60.3	2 3/8
J	6.4	1/4
K	69.9	2 3/4
L	46.8	1 27/32

## SECTION 5A

# PERFORMANCE CURVES

## MODEL P.025 METAL RUBBER-FITTED

Height .....148.4 mm (5<sup>7</sup>/<sub>32</sub>" )  
 Width .....165.1 mm (6<sup>1</sup>/<sub>2</sub>" )  
 Depth .....114.3 mm (4<sup>1</sup>/<sub>2</sub>" )  
 Ship Weight .....Aluminum 1.8 kg (4 lbs.)  
                           Stainless Steel 4.0 kg (8.9 lbs.)  
                           Hastelloy® 4.3 kg (9.5 lbs.)  
 Air Inlet .....3.18 mm (1/8")  
 Inlet .....6.35 mm (1/4")  
 Outlet .....6.35 mm (1/4")  
 Suction Lift .....3.3 m Dry (10'8")  
                           9.3 m Wet (30'6")

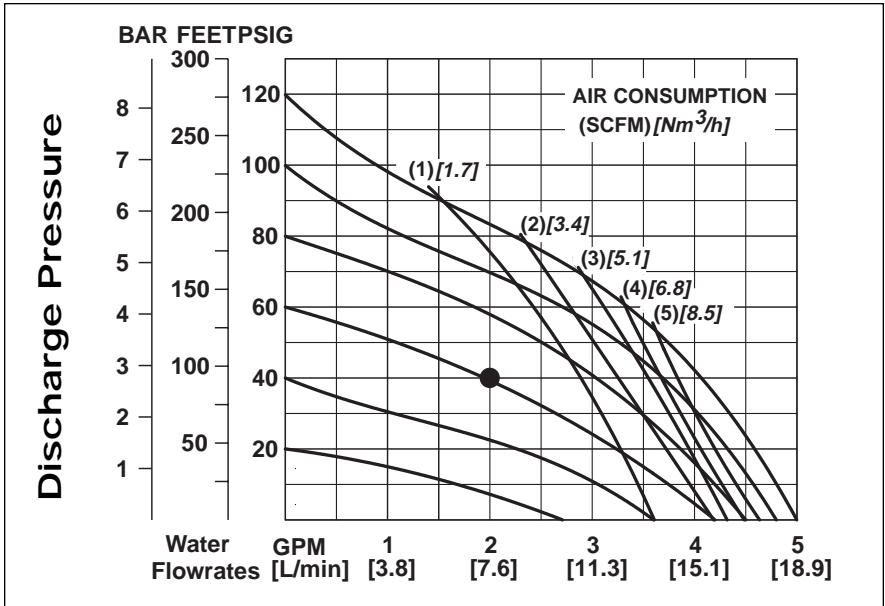
### Displacement per

Stroke ..... 0.02 l (0.005 gal.)<sup>1</sup>  
 Max. Flow Rate.....18.91 lpm (5 gpm)  
 Max. Size Solids..... .4 mm (1/64")

<sup>1</sup>Displacement per stroke was calculated at 70 psig (4.8 Bar) air inlet pressure against a 30 psig (2 Bar) head pressure.

**Example:** To pump 7.6 lpm (2 gpm) against a discharge pressure head of 40 psig (2.8 Bar) requires 4.1 Bar (61 psig) and 1.2 Nm<sup>3</sup>/h (.7 scfm) air consumption. (See dot on chart.)

**Caution: Do not exceed 8.6 Bar (125 psig) supply pressure.**



Flow rates indicated on chart were determined by pumping water.

For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

## SECTION 5B

# PERFORMANCE CURVES

## MODEL P.025 METAL TPE-FITTED

Height .....148.4 mm (5<sup>7</sup>/<sub>32</sub>" )  
 Width .....165.1 mm (6<sup>1</sup>/<sub>2</sub>" )  
 Depth .....114.3 mm (4<sup>1</sup>/<sub>2</sub>" )  
 Ship Weight .....Aluminum 1.8 kg (4 lbs.)  
                           Stainless Steel 4.0 kg (8.9 lbs.)  
                           Hastelloy® 4.3 kg (9.5 lbs.)  
 Air Inlet .....3.18 mm (1/8")  
 Inlet .....6.35 mm (1/4")  
 Outlet .....6.35 mm (1/4")  
 Suction Lift .....4.1 m Dry (13'6")  
                           9.3 m Wet (30'6")

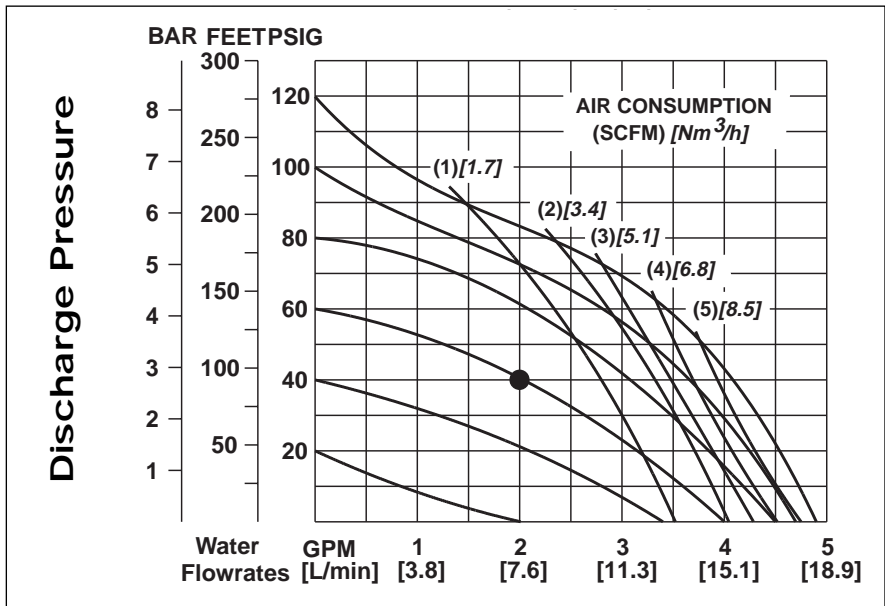
### Displacement per

Stroke ..... 0.02 l (0.005 gal.)<sup>1</sup>  
 Max. Flow Rate.....18.9 lpm (5 gpm)  
 Max. Size Solids..... .4 mm (1/64")

<sup>1</sup>Displacement per stroke was calculated at 70 psig (4.8 Bar) air inlet pressure against a 30 psig (2 Bar) head pressure.

**Example:** To pump 7.6 lpm (2 gpm) against a discharge pressure head of 40 psig (2.8 Bar) requires 4.0 Bar (59 psig) and 1.1 Nm<sup>3</sup>/h (.7 scfm) air consumption. (See dot on chart.)

**Caution: Do not exceed 8.6 Bar (125 psig) air supply pressure.**



Flow rates indicated on chart were determined by pumping water.

For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

## SECTION 5C

# PERFORMANCE CURVES

## MODEL P.025 METAL TEFLON®-FITTED

Height .....148.4 mm (5<sup>27</sup>/<sub>32</sub>" )  
 Width .....165.1 mm (6<sup>1</sup>/<sub>2</sub>" )  
 Depth .....114.3 mm (4<sup>1</sup>/<sub>2</sub>" )  
 Ship Weight .....Aluminum 1.8 kg (4 lbs.)  
                           Stainless Steel 4.0 kg (8.9 lbs.)  
                           Hastelloy® 4.3 kg (9.5 lbs.)  
 Air Inlet .....3.18 mm (1/8")  
 Inlet .....6.35 mm (1/4")  
 Outlet.....6.35 mm (1/4")  
 Suction Lift .....4 m Dry (13')  
                           9.5 m Wet (31'2")

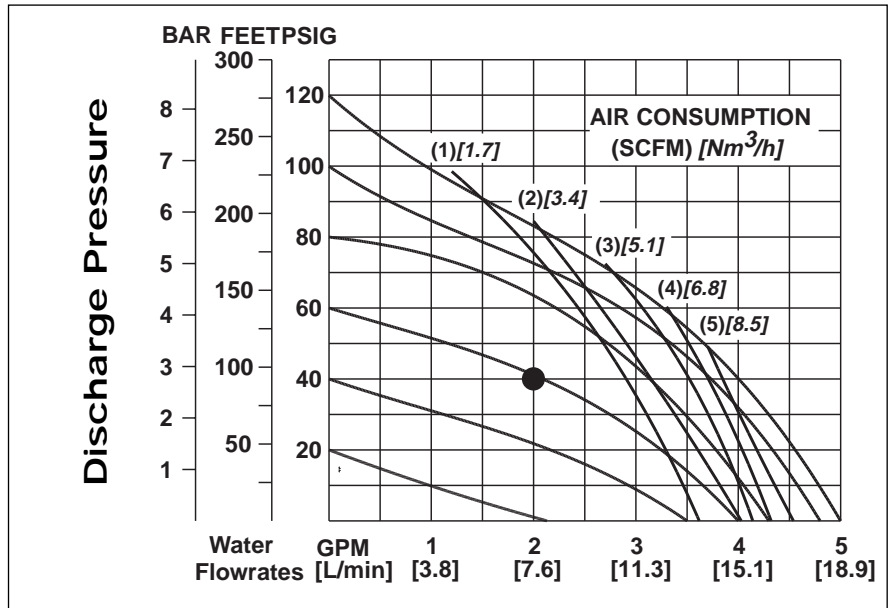
Displacement per

Stroke ..... 0.02 l (0.005 gal.)<sup>1</sup>  
 Max. Flow Rate.....18.9 lpm (5 gpm)  
 Max. Size Solids......4 mm (1/64")

<sup>1</sup>Displacement per stroke was calculated at 70 psig (4.8 Bar) air inlet pressure against a 30 psig (2 Bar) head pressure.

**Example:** To pump 7.6 lpm (2 gpm) against a discharge pressure head of 2.8 Bar (40 psig) requires 4.0 Bar (58 psig) and 1.0 Nm<sup>3</sup>/h (.6 scfm) air consumption. (See dot on chart.)

**Caution: Do not exceed 8.6 Bar (125 psig) air supply pressure.**

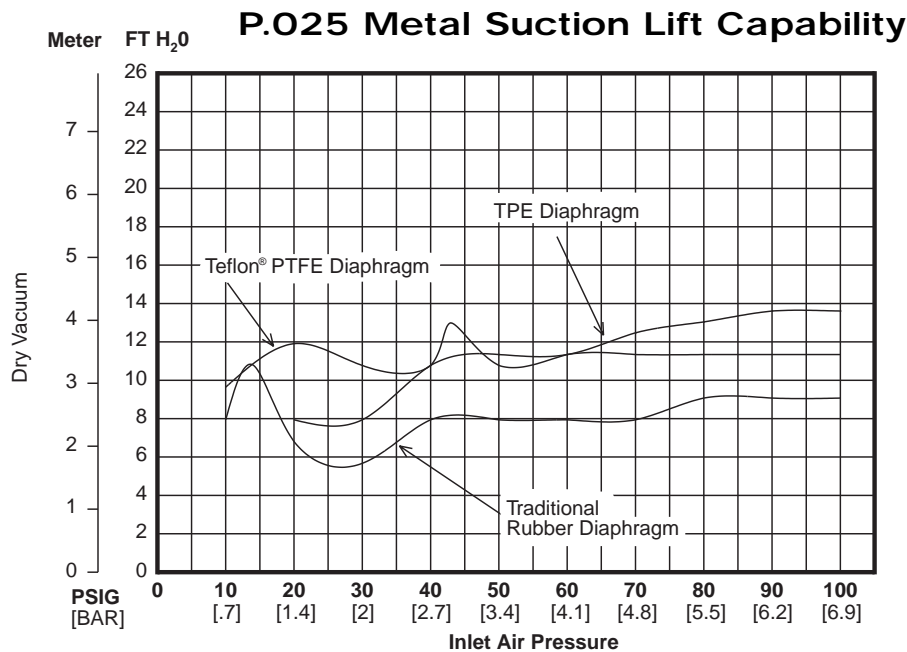


Flow rates indicated on chart were determined by pumping water.

For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

## SECTION 6

# SUCTION LIFT CURVES & DATA



Suction lift curves are calibrated for pumps operating at 305 m (1000') above sea level. This chart is meant to be a guide only. There are many variables which can affect your pump's operating characteristics. The number of intake and discharge elbows,

viscosity of pumping fluid, elevation (atmospheric pressure) and pipe friction loss all affect the amount of suction lift your pump will attain.

# SECTION 7A

## INSTALLATION

---

The Pro-Flo™ model P.025 has a 6.35 mm (¼") inlet and 6.35 mm (¼") outlet and is designed for flows to 18.9 l/m (5 gpm). The **P.025 metal** pump is manufactured with wetted parts of aluminum Hastelloy® and stainless steel. The center section of the **P.025 metal** is constructed of virgin acetal or polypropylene. A variety of diaphragms and O-rings are available to satisfy temperature, chemical compatibility, abrasion and flex concerns.

The suction pipe size should be at least 6.35 mm (¼") diameter or larger if highly viscous material is being pumped. The suction hose must be non-collapsible, reinforced type as the P.025 is capable of pulling a high vacuum. Discharge piping should be at least 6.35 mm (¼"); larger diameter can be used to reduce friction losses. It is critical that all fittings and connections are airtight or a reduction or loss of pump suction capability will result.

**INSTALLATION:** Months of careful planning, study, and selection efforts can result in unsatisfactory pump performance if installation details are left to chance.

Premature failure and long term dissatisfaction can be avoided if reasonable care is exercised throughout the installation process.

**LOCATION:** Noise, safety, and other logistical factors usually dictate that "utility" equipment be situated away from the production floor. Multiple installations with conflicting requirements can result in congestion of utility areas, leaving few choices for siting of additional pumps.

Within the framework of these and other existing conditions, every pump should be located in such a way that four key factors are balanced against each other to maximum advantage.

1. **ACCESS:** First of all, the location should be accessible. If it's easy to reach the pump, maintenance personnel will have an easier time carrying out routine inspections and adjustments. Should major repairs become necessary, ease of access can play a key role in speeding the repair process and reducing total downtime.

2. **AIR SUPPLY:** Every pump location should have an air line large enough to supply the volume of air necessary to achieve the desired pumping rate (see pump performance chart). Use air pressure up to a maximum of 8.6 Bar (125 psi) depending on pumping requirements.

Sound levels are reduced below OSHA specifications using the standard Wilden muffler element.

3. **ELEVATION:** Selecting a site that is well within the pump's dynamic lift capability will assure that loss-of-prime troubles will be eliminated. In addition, pump efficiency can be adversely affected if proper attention is not given to site location.

4. **PIPING:** Final determination of the pump site should not be made until the piping problems of each possible location have been evaluated. The impact of current and future installations should be considered ahead of time to make sure that inadvertent restrictions are not created for any remaining sites.

The best choice possible will be a site involving the shortest and straightest hook-up of suction and discharge piping. Unnecessary elbows, bends, and fittings should be avoided. Pipe sizes should be selected so as to keep friction losses within practical limits. All piping should be supported independently of the pump. In addition, the piping should be aligned so as to avoid placing stresses on the pump fittings.

Flexible hose can be installed to aid in absorbing the forces created by the natural reciprocating action of the pump. If the pump is to be bolted down to a solid location, a mounting pad placed between the pump and the foundation will assist in minimizing pump vibration. Flexible connections between the pump and rigid piping will also assist in minimizing pump vibration. If quick-closing valves are installed at any point in the discharge system, or if pulsation within a system becomes a problem, a Wilden SD½ Equalizer surge dampener should be installed to protect the pump, piping and gauges from surges and water hammer.

When pumps are installed in applications involving flooded suction or suction head pressures, a gate valve should be installed in the suction line to permit closing of the line for pump service.

The P.025 cannot be used in submersible applications.

If the pump is to be used in a self-priming application, be sure that all connections are airtight and that the suction lift is within the model's ability. Note: Materials of construction and elastomer material have an effect on suction lift parameters. Please consult Wilden distributors for specifics.

Pumps in service with a positive suction head are most efficient when inlet pressure is limited to .4-.7 Bar (7-10 psig). Premature diaphragm failure may occur if positive suction is .7 Bar (10 psi) and higher.

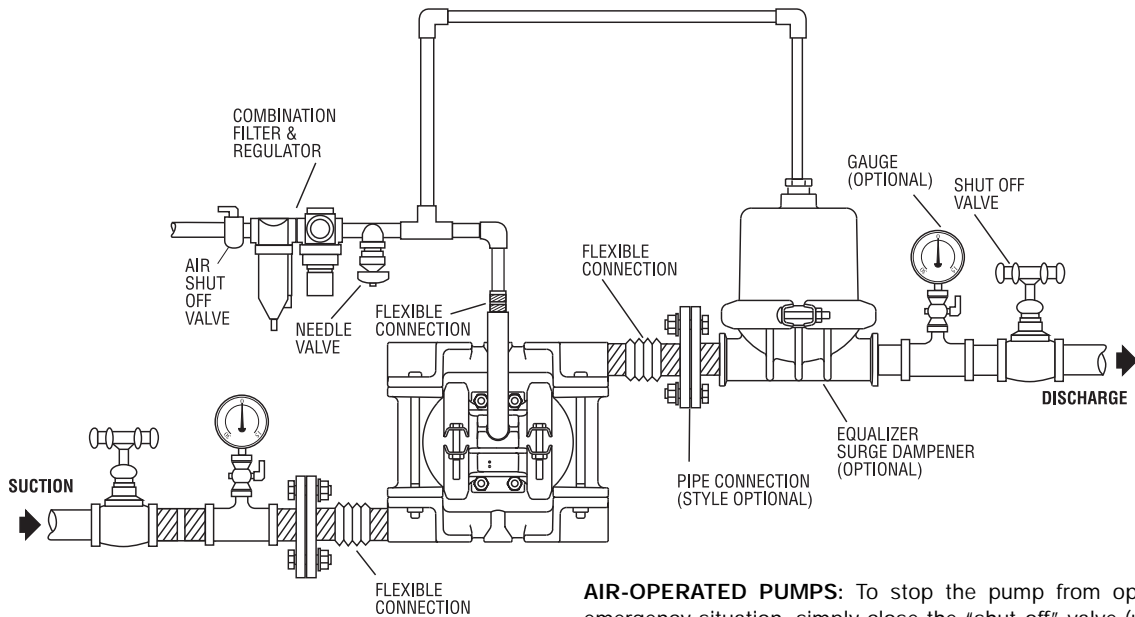
**THE MODEL P.025 WILL PASS .4 MM (¼") SOLIDS. WHENEVER THE POSSIBILITY EXISTS THAT LARGER SOLID OBJECTS MAY BE SUCKED INTO THE PUMP, A STRAINER SHOULD BE USED ON THE SUCTION LINE.**

**CAUTION: DO NOT EXCEED 8.6 BAR (125 PSIG) AIR SUPPLY PRESSURE.**

**BLOW OUT AIR LINE FOR 10 TO 20 SECONDS BEFORE ATTACHING TO PUMP TO MAKE SURE ALL PIPE LINE DEBRIS IS CLEAR.**

The Pro-Flo™ pump is not submersible.

# SUGGESTED INSTALLATION

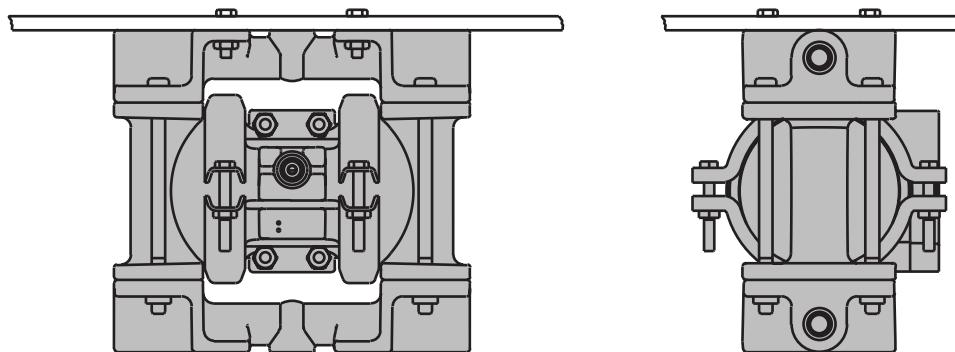


**AIR-OPERATED PUMPS:** To stop the pump from operating in an emergency situation, simply close the “shut-off” valve (user supplied) installed in the air supply line. A properly functioning valve will stop the air supply to the pump, therefore stopping output. This “shut-off” valve should be located far enough away from the pumping equipment such that it can be reached safely in an emergency situation.

**NOTE:** In the event of a power failure, the shutoff valve should be closed, if the restarting of the pump is not desirable once power is regained.

**NOTE:** Wilden 1/4” metal pumps come standard side ported with 2 NPT or BSP pipe plugs for side inlet and discharge porting. Center, top and bottom inlet and discharge porting are optional. Simply drill flat areas provided with a 7/16” drill bit for NPT or 11mm drill bit for BSP and tap with an NTP or BSP tap as needed.

**NOTE:** Wilden offers drum pump kits for the Metal P.025/A.025 pump (bung base and pick-up tube) for convenient drum pumping (P/N 50-9290-20/23/55).



**NOTE:** This pump can be mounted from the underside of a flat surface providing you more flexibility in tight areas/systems.

**CAUTION:** Pump performance will be seriously hampered if pump is installed upside down.

## **SECTION 7B**

# **SUGGESTED OPERATION AND MAINTENANCE INSTRUCTIONS**

---

For best results, the pumps should use an air filter and regulator. The use of an air filter before the pump will insure that the majority of any pipeline contaminants will be eliminated. The P.025 is permanently lubricated, and does not require in-line lubrication. Additional lubrication will not damage the pump, however if the pump is heavily lubricated by an external source, the pump's internal lubrication may be washed away. If the pump is then moved to a non-lubricated location, it may need to be disassembled and re-lubricated as described in the ASSEMBLY/DISASSEMBLY INSTRUCTIONS.

Pump discharge rate can be controlled by limiting the volume and/or pressure of the air supply to the pump (preferred method). A regulator is used to regulate air pressure. A needle valve is used to regulate air volume. Pump discharge rate can also be controlled by throttling the pump discharge by installing a valve in the discharge line of the pump. This is useful when the need exists to control the pump from a remote location. When

the pump discharge pressure equals or exceeds the air supply pressure, the pump will stop; no bypass or pressure relief valve is needed, and pump damage will not occur. When operation is controlled by a solenoid valve in the air line, two-way or three-way valves may be used. Pumping volume can be set by counting the number of strokes per minute.

**INSPECTIONS:** Periodic inspections have been found to offer the best means for preventing unscheduled pump downtime. Personnel familiar with the pump's construction and service should be informed of any abnormalities that are detected during operation.

**RECORDS:** When service is required, a record should be made of all necessary repairs and replacements. Over a period of time, such records can become a valuable tool for predicting and preventing future maintenance problems and unscheduled downtime. In addition, accurate records make it possible to identify pumps that are poorly suited to their applications.

## **SECTION 7C**

# **TROUBLESHOOTING**

---

### ***Pump will not run or runs slowly.***

1. Ensure that the air inlet pressure is at least 5 psig above startup pressure and that the differential pressure (the difference between inlet and discharge pressures) is not less than 10 psig.
2. Check air inlet filter for debris (see recommended installation).
3. Check for extreme air leakage which would indicate worn out seals/bores.
4. Disassemble pump and check for obstructions in the air passageways or objects which would obstruct the movement of internal parts.
5. Check for sticking ball check valves. If material being pumped is not compatible with pump elastomers, swelling may occur. Replace ball check valves and seals with proper elastomers. Also, as the check valve balls wear out, they become smaller and can become stuck in the seats. In this case, replace balls and seats.

### ***Pump runs but little or no product flows.***

1. Check for pump cavitation; slow pump speed down to match thickness of material being pumped.
2. Verify that vacuum required to lift liquid is not greater than the vapor pressure of the material being pumped (cavitation).
3. Check for sticking ball check valves. If material being pumped is not compatible with pump elastomers, swelling may occur. Replace ball check valves and seals with proper elastomers. Also, as the check valve balls wear out, they become smaller and can become stuck in the seats. In this case, replace balls and seats.
4. Ensure that all suction connections are tight.

### ***Pump air valve freezes.***

1. Check for excessive moisture in compressed air. Either install a dryer or hot air generator for compressed air. Alternatively, a coalescing filter may be used to remove the water from the compressed air in some applications.

### ***Air bubbles in pump discharge.***

1. Check for ruptured diaphragm.
2. Check tightness of outer pistons.
3. Check tightness of clamp bands and integrity of O-rings and seals, especially at intake manifold.
4. Ensure pipe connections are airtight.

### ***Product comes out air exhaust.***

1. Check for diaphragm rupture.
2. Check tightness of pistons to shaft.

### ***Pump rattles.***

1. See E9 Troubleshooting Guide.
2. Create false discharge head or suction lift.

## SECTION 8A

# MODEL P.025 METAL DIRECTIONS FOR DISASSEMBLY/REASSEMBLY

**CAUTION:** Before any maintenance or repair is attempted, the compressed air line to the pump should be disconnected and all air pressure allowed to bleed from pump. Disconnect all intake, discharge, and air lines. Drain the pump by turning it upside down and allowing any fluid to flow into a suitable container. Wetted flushing of parts may be required prior to handling.

The Wilden model P.025 (*Figure 1*) is an air-operated, double-diaphragm pump with all wetted parts of aluminum, stainless steel or Hastelloy®. The single-piece center section, consisting of center block and air chambers, is molded from acetal or polypropylene. The air valve is manufactured of acetal or polypropylene. All O-rings used in the pump are of special materials and should only be replaced with factory-supplied parts.

To expedite parts ordering, please find an exploded view of the P.025 model at the back of this manual.

PLEASE read all directions before starting disassembly.

### TOOLS REQUIRED:

$\frac{3}{16}$ " Hex Key (Allen wrench)

$\frac{7}{16}$ " Wrench or Socket for Rubber-Fitted

$\frac{3}{8}$ " Wrench or Socket

$\frac{3}{8}$ " Wrench

O-ring Pick

$\frac{3}{16}$ " Rod or Equivalent



### DISASSEMBLY:

*Figure 1*

#### Step 1.

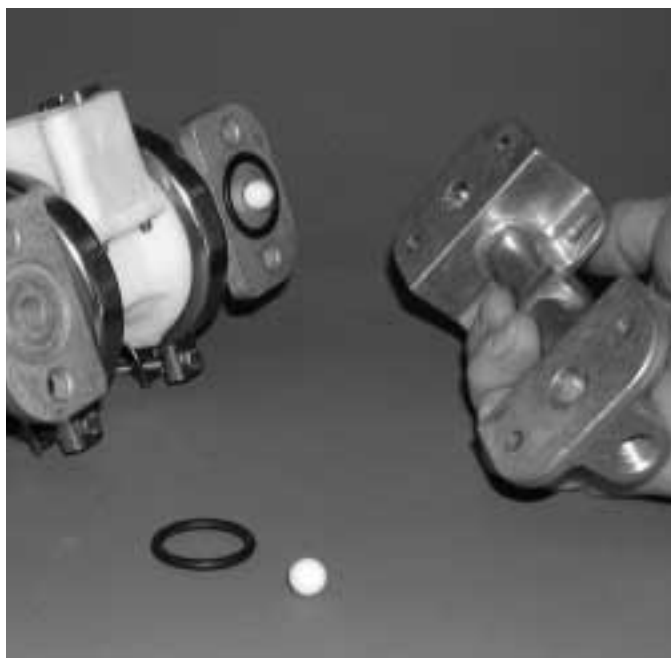
Before actual disassembly is started, turn pump upside down and drain all liquid trapped in the pump into a suitable container. Be sure to use proper caution if liquid is corrosive or toxic. Mark each liquid chamber to its respective air chamber for easy alignment during reassembly. (*Figure 1*)



#### Step 2.

*Figure 2*

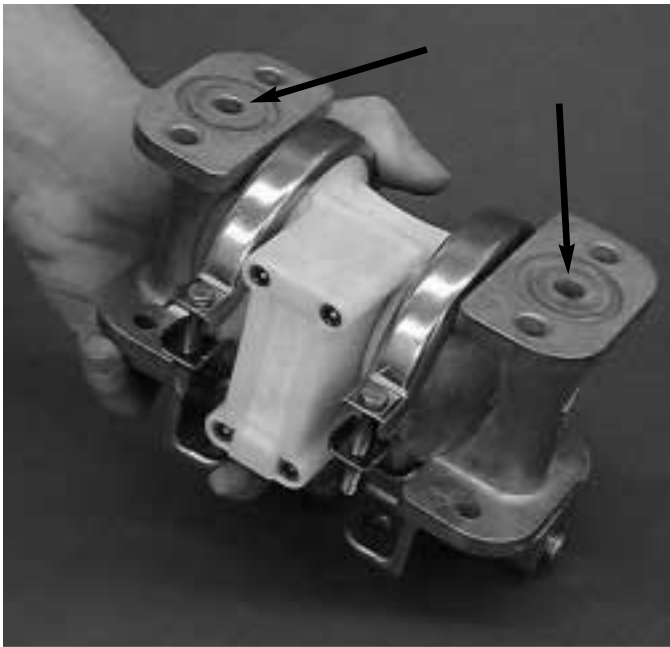
Using a  $\frac{3}{16}$ " allen wrench, loosen the four manifold bolts. (*Figure 2*) Remove the top and bottom manifolds.



#### Step 3.

*Figure 3*

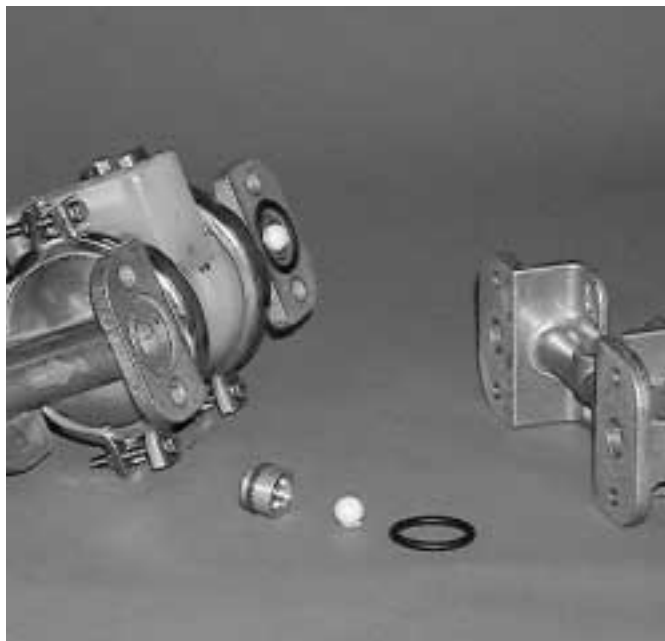
Inspect both manifolds, manifold O-rings, and valve balls. (*Figure 3*) If swelling, cracking or other damage is apparent, these parts must be replaced with genuine Wilden parts.



**Step 4** *Figure 4*  
**NOTE:** Top valve seats of aluminum P.025 pumps are cast in the liquid chamber.

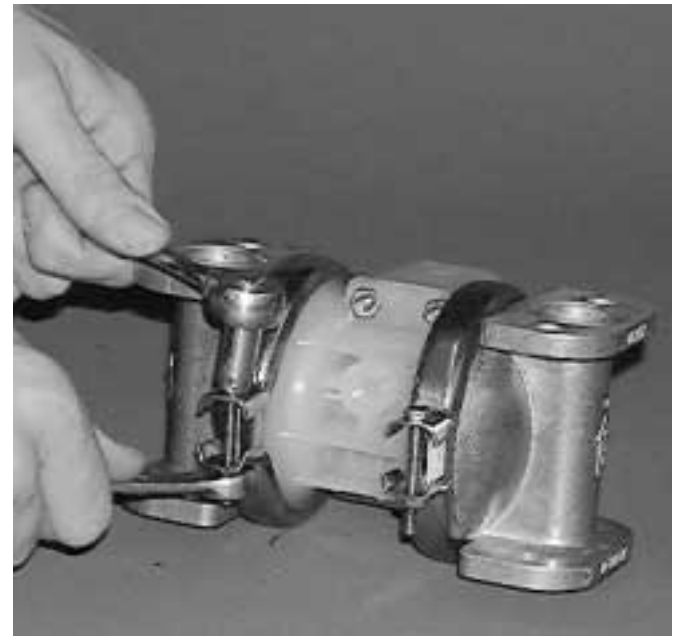


**Step 4a.** *Figure 4a*  
 To remove top and bottom valve seats, on stainless steel or Hastelloy® pumps, use an O-ring pick and pull seats out from top to bottom or use 3/16" rod and push seats through. (*Figure 4a*)



**Step 5.** *Figure 5*  
 Remove bottom manifold. Inspect balls and seats for abrasion. Inspect seat O-rings and manifold O-rings for swelling, cracking, or other damage. These parts should be replaced if damage is observed. (*Figure 5*)

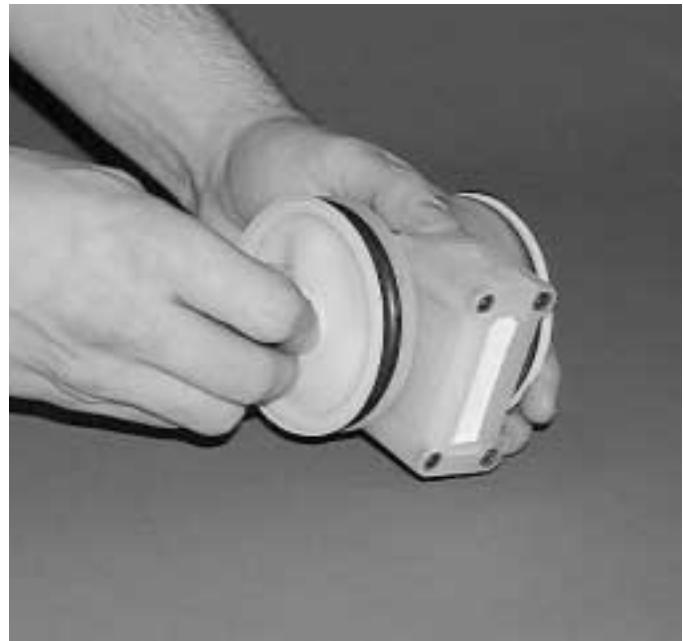
**NOTE:** Aluminum pumps employ 2 O-rings per valve seat.



**Step 6.** *Figure 6*  
 Loosen clamp band with 5/16" socket and 3/8" wrench. (*Figure 6*)  
 Remove screw and nut.

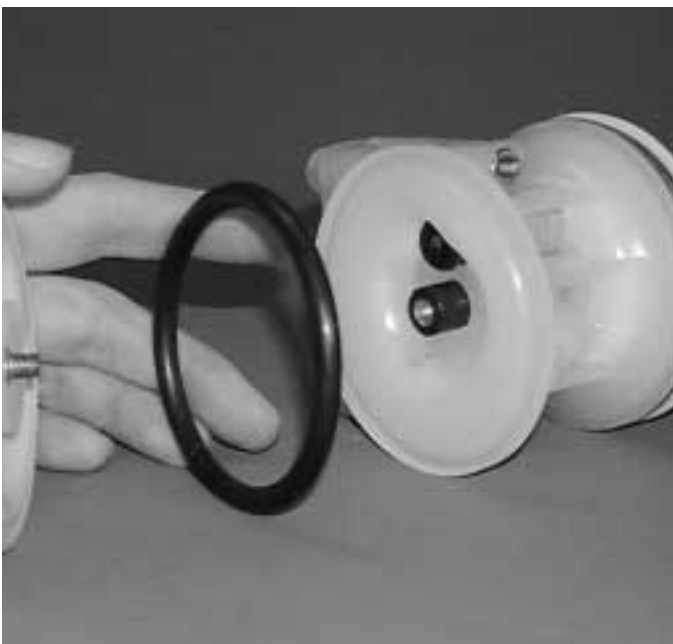


**Step 7.** *Figure 7*  
 After clamp bands are removed, pull chambers away from center section (*Figure 7*).



**Step 8.** *Figure 8*  
 Remove diaphragm by turning in counter-clockwise direction. (*Figure 8*)

**NOTE:** Teflon®-fitted pumps (shown) utilize a Neoprene back-up O-ring. Rubber or TPE-fitted pumps do not. (See figure 10 for details.)



**Step 9.** *Figure 9*  
 Pull off Teflon® PTFE diaphragm and O-ring. (*Figure 9*) Twist off remaining diaphragm in counter-clockwise direction. Inspection of diaphragms and O-rings is now possible.



**Step 10.** *Figure 10*  
 For Rubber / TPE fitted pumps, remove the outer piston with  $\frac{7}{16}$ " wrench. You are now able to remove the complete assembly. Inspection of diaphragms and outer pistons is now possible.

## SECTION 8B

# PRO-FLO™ AIR VALVE/CENTER SECTION DISASSEMBLY, CLEANING, INSPECTION

### AIR VALVE DISASSEMBLY:

**CAUTION:** Before any maintenance or repair is attempted, the compressed air line to the pump should be disconnected and all air pressure allowed to bleed from the pump. Disconnect all intake, discharge, and air lines. Drain the pump by turning it upside down and allowing any fluid to flow into a suitable container. Be aware of hazardous effects of contact with your process fluid.

The Wilden Metal P.025 utilizes a revolutionary Pro-Flo™ air distribution system. A 3.18 mm ( $\frac{1}{8}$ " ) air inlet connects the air supply to the center section. Proprietary composite seals reduce the coefficient of friction and allow the P.025 to run lube-free. Constructed of acetal or polypropylene, the Pro-Flo™ air distribution system is designed to perform in on/off, non-freezing, non-stalling, tough duty applications.

### TOOLS REQUIRED:

$\frac{5}{32}$ " Hex Head Wrench  
O-Ring Pick



**Step 1.**

*Figure 1*

Remove air valve screws from center section with a  $\frac{5}{32}$ " hex key (Allen wrench). (*Figure 1*)



**Step 2.**

*Figure 2*

Take care while removing air valve not to damage gasket. (*Figure 2*)

**NOTE:** Air valve has molded-in alignment pins for proper positioning during assembly.



**Step 3.**

*Figure 3*

Remove air valve end cap by simply pulling it away from air valve body (no tools required). (*Figure 3*) Inspect O-ring and replace as needed with genuine Wilden parts.



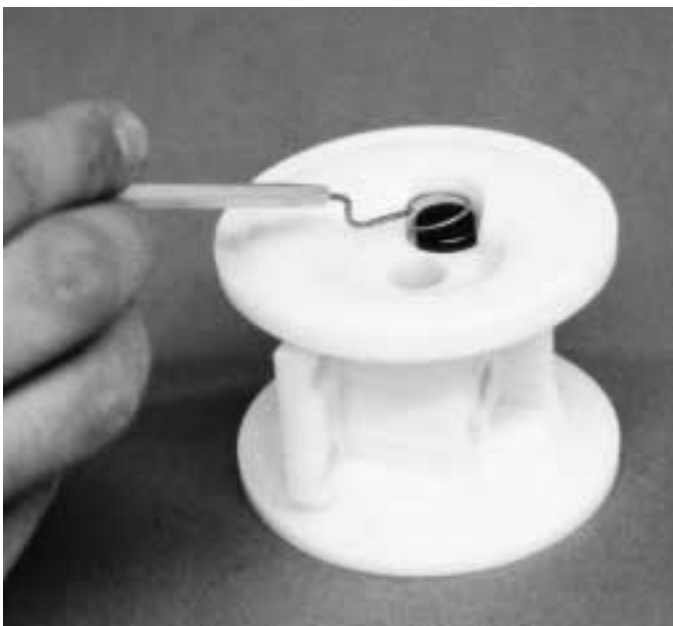
**Step 4.** *Figure 4*

The air valve spool can now be removed. A 10-24 UNC (Unified National Coarse thread) screw can be screwed into the threaded hole located in the center of the spool. Grip the screw with pliers and remove. If a 10-24 UNC screw is not available, the spool can be tapped out against a wood block or blown out with compressed air. Upon reassembly, lubricate air valve with NLGI grade 2 molybdenum disulfide based grease or equivalent. (*Figure 4*)



**Step 5.** *Figure 5*

Remove the porous polyethylene muffler element by sliding it toward the end cap opening. (*Figure 5*) The element can be cleaned by soaking it in a cleaning solution (no solvents). If the muffler restricts the air exhaust, replace muffler element.



**Step 6.** *Figure 6*

Remove pilot spool retaining ring with an O-ring pick. (*Figure 6*)



**Step 7.** *Figure 7*

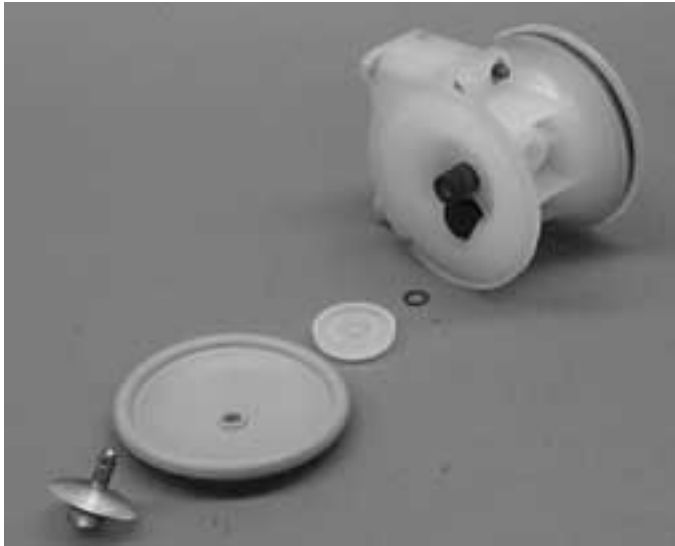
Push pilot spool through center section and remove. Inspect seals for integrity and spool for damage. Replace pilot spool assembly if necessary. Upon reassembly of spool, apply a film of NLGI grade 2 molybdenum disulfide based grease or equivalent (P/N 99-8310-99). (*Figure 7*)

# SECTION 8C

## REASSEMBLY

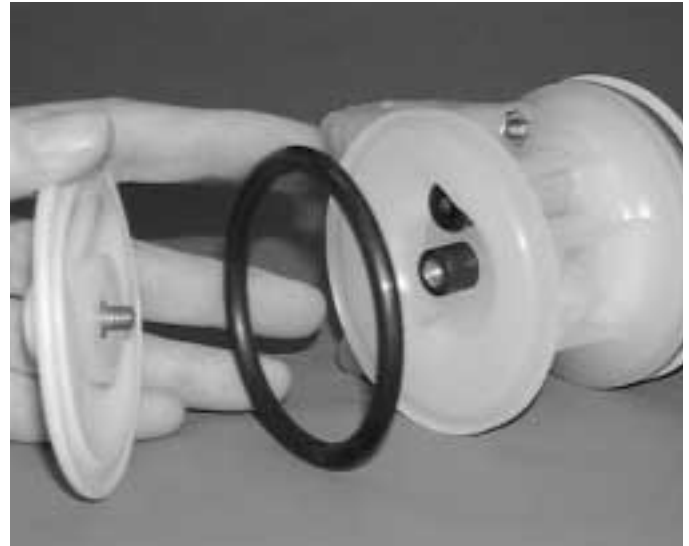
Upon performing applicable maintenance to the air distribution system, the pump can now be reassembled. Please refer to the disassembly instructions for photos and parts placement. To reassemble pump, follow the disassembly instructions in reverse order. The air distribution system needs to be assem-

bled first, then the diaphragms, and finally the wetted parts. Please find applicable torque specifications in this section.



**Rubber/TPE diaphragm configuration** *Figure 1*

There are two types of diaphragm configurations available for the P.025: 1) Rubber or TPE diaphragm, and 2) Teflon® primary diaphragm with back-up O-ring. Observe the “This Side Out” marking on the convex side of the diaphragm. Install the disc spring, inner piston, diaphragm, back-up O-ring (Teflon®-fitted models only), and the outer piston to main shaft assembly. (NOTE: Teflon® Fitted pumps employ an integral piston diaphragm). Add a small amount of Loctite 242 to the bore of the main shaft. Set up time is 20 minutes. Tighten outer piston to torque value found below.



**Teflon® diaphragm configuration** *Figure 2*

Lubricate the main shaft assembly with NLGI grade 2 molybdenum disulfide based grease or equivalent and insert through main shaft bore in center section. Assemble the other side and torque to proper value as listed below. Please review the photos above for proper alignment.

### TORQUE SPECIFICATIONS FOR MODEL P.025 PUMPS

Description of Part	Maximum Torque
Air Valve	[2.3 m-N] 20 in.-lbs.
Outer Piston, Rubber and TPE Diaphragms	[4.6 m-N] 40 in.-lbs.
Clamp Band	[2.3 m-N] 20 in.-lbs.
Manifold Bolt	[5.6 m-N] 50 in.-lbs.

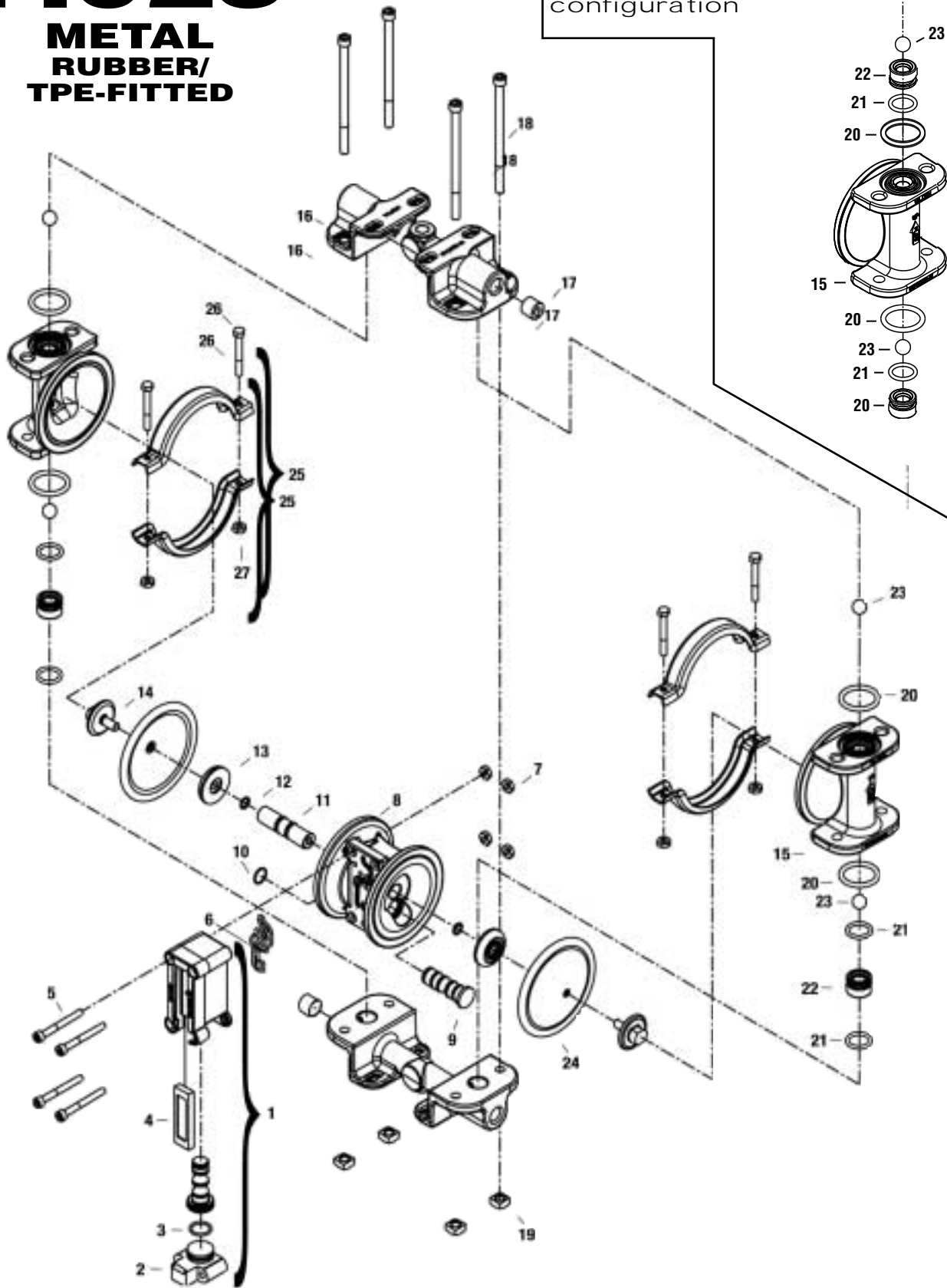
- Apply a small amount of Loctite 242 to the internal threads of the shaft prior to reassembly.

# SECTION 9A

# EXPLODED VIEW/PARTS LISTING

## P.025 METAL RUBBER/ TPE-FITTED

Stainless Steel &  
Hastelloy® seating  
configuration



## Wilden Model P.025 Metal Rubber/TPE-Fitted Pumps

Item #	Description	Qty. per Pump	P.025/APPP ALUMINUM P/N	P.025/ALLL ALUMINUM P/N	P.025/SPPP STAINLESS STEEL P/N
1	Pro-Flo™ Air Valve Assembly <sup>1</sup>	1	00-2000-20-700	00-2000-13-700	00-2000-20-700
2	Pro-Flo™ Air Valve End Cap	1	00-2300-20-700	00-2300-13-700	00-2300-20-700
3	End Cap O-Ring	1	00-2390-52-700	00-2390-52-700	00-2390-52-700
4	Muffler Element	1	00-3240-26-700	00-3240-26-700	00-3240-26-700
5	Air Valve Bolt	4	00-6000-03-700	00-6000-03-700	00-6000-03-700
6	Air Valve Gasket	1	00-2600-52-700	00-2600-52-700	00-2600-52-700
7	Air Valve Nut	4	01-6400-03	01-6400-03	01-6400-03
8	Pro-Flo™ Center Section	1	00-3150-20-700	00-3150-13-700	00-3150-20-700
<b>9</b>	<b>Pilot Spool Assembly</b>	<b>1</b>	<b>00-3850-99-700</b>	<b>00-3850-99-700</b>	<b>00-3850-99-700</b>
10	Pilot Spool Retaining Ring	1	00-2650-03-700	00-2650-03-700	00-2650-03-700
11	Main Shaft Assembly	1	00-3800-99-700	00-3800-99-700	00-3800-99-700
12	Disc Spring	2	00-6800-08	00-6800-08	00-6800-08
13	Inner Piston for Rubber/TPE	2	00-3700-20-700	00-3700-13-700	00-3700-20-700
14	Outer Piston	2	00-4570-08	00-4570-08	00-4570-03
15	Liquid Chamber	2	00-5000-01	00-5000-01	00-5000-03
16	Manifold (NPT)	2	00-5050-01	00-5050-01	00-5050-03
	Manifold (BSP)	2	00-5051-01	00-5051-01	00-5051-03
17	Pipe Plug (NPT)	2	00-7010-08	00-7010-08	00-7010-03
	Pipe Plug (BSP)	2	00-7011-08	00-7011-08	00-7011-03
18	Manifold Bolt	4	01-6000-03	01-6000-03	01-6000-03
19	Square Nut	4	00-6505-03	00-6505-03	00-6505-03
<b>20</b>	<b>Manifold O-ring*</b>	<b>4</b>	<b>*</b>	<b>*</b>	<b>*</b>
<b>21</b>	<b>Valve Seat O-Ring*</b>	<b>4</b>	<b>*</b>	<b>*</b>	<b>*</b>
<b>22</b>	<b>Valve Seat</b>	<b>4</b>	<b>00-1120-01**</b>	<b>00-1120-01**</b>	<b>00-1120-03</b>
<b>23</b>	<b>Valve Ball</b>	<b>4</b>	<b>00-1080-55</b>	<b>00-1080-55</b>	<b>00-1080-55</b>
<b>24</b>	<b>Diaphragm*</b>	<b>2</b>	<b>*</b>	<b>*</b>	<b>*</b>
25	Clamp Band Assembly	2	00-7300-03	00-7300-03	00-7300-03
26	—Clamp Band Bolt	4	01-6100-03	01-6100-03	01-6100-03
27	—Clamp Band Nut	4	01-6400-03	01-6400-03	01-6400-03

## Wilden Model P.025 Metal Rubber/TPE-Fitted Pumps

Item #	Description	Qty. per Pump	P.025/SLLL STAINLESS STEEL P/N	P.025/HPPP HASTELLOY P/N	P.025/HLLL HASTELLOY P/N
1	Pro-Flo™ Air Valve Assembly <sup>1</sup>	1	00-2000-13-700	00-2000-20-700	00-2000-13-700
2	Pro-Flo™ Air Valve End Cap	1	00-2300-13-700	00-2300-20-700	00-2300-13-700
3	End Cap O-Ring	1	000-2390-52-700	00-2390-52-700	00-2390-52-700
4	Muffler Element	1	00-3240-26-700	00-3240-26-700	00-3240-26-700
5	Air Valve Bolt	4	00-6000-03-700	00-6000-03-700	00-6000-03-700
6	Air Valve Gasket	1	00-2600-52-700	00-2600-52-700	00-2600-52-700
7	Air Valve Nut	4	01-6400-03	01-6400-03	01-6400-03
8	Pro-Flo™ Center Section	1	00-3150-13-700	00-3150-20-700	00-3150-13-700
<b>9</b>	<b>Pilot Spool Assembly</b>	<b>1</b>	<b>00-3850-99-700</b>	<b>00-3850-99-700</b>	<b>00-3850-99-700</b>
10	Pilot Spool Retaining Ring	1	00-2650-03-700	00-2650-03-700	00-2650-03-700
11	Main Shaft Assembly	1	00-3800-99-700	00-3800-99-700	00-3800-99-700
12	Disc Spring	2	00-6800-08	00-6800-08	00-6800-08
13	Inner Piston for Rubber/TPE	2	00-3700-13-700	00-3700-20-700	00-3700-13-700
14	Outer Piston	2	00-4570-03	00-4570-04	00-4570-04
15	Liquid Chamber	2	00-5000-03	00-5000-04	00-5000-04
16	Manifold (NPT)	2	00-5050-03	00-5050-04	00-5050-04
	Manifold (BSP)	2	00-5051-03	00-5051-04	00-5051-04
17	Pipe Plug (NPT)	2	00-7010-03	00-7010-04	00-7010-04
	Pipe Plug (BSP)	2	00-7011-03	00-7011-04	00-7011-04
18	Manifold Bolt	4	01-6000-03	01-6000-03	01-6000-03
19	Square Nut	4	00-6505-03	00-6505-03	00-6505-03
<b>20</b>	<b>Manifold O-ring*</b>	<b>4</b>	<b>*</b>	<b>*</b>	<b>*</b>
<b>21</b>	<b>Valve Seat O-Ring*</b>	<b>4</b>	<b>*</b>	<b>*</b>	<b>*</b>
<b>22</b>	<b>Valve Seat</b>	<b>4</b>	<b>00-1120-03</b>	<b>00-1120-04</b>	<b>00-1120-04</b>
<b>23</b>	<b>Valve Ball</b>	<b>4</b>	<b>00-1080-55</b>	<b>00-1080-55</b>	<b>00-1080-55</b>
<b>24</b>	<b>Diaphragm*</b>	<b>2</b>	<b>*</b>	<b>*</b>	<b>*</b>
25	Clamp Band Assembly	2	00-7300-03	00-7300-03	00-7300-03
26	—Clamp Band Bolt	4	01-6100-03	01-6100-03	01-6100-03
27	—Clamp Band Nut	4	01-6400-03	01-6400-03	01-6400-03

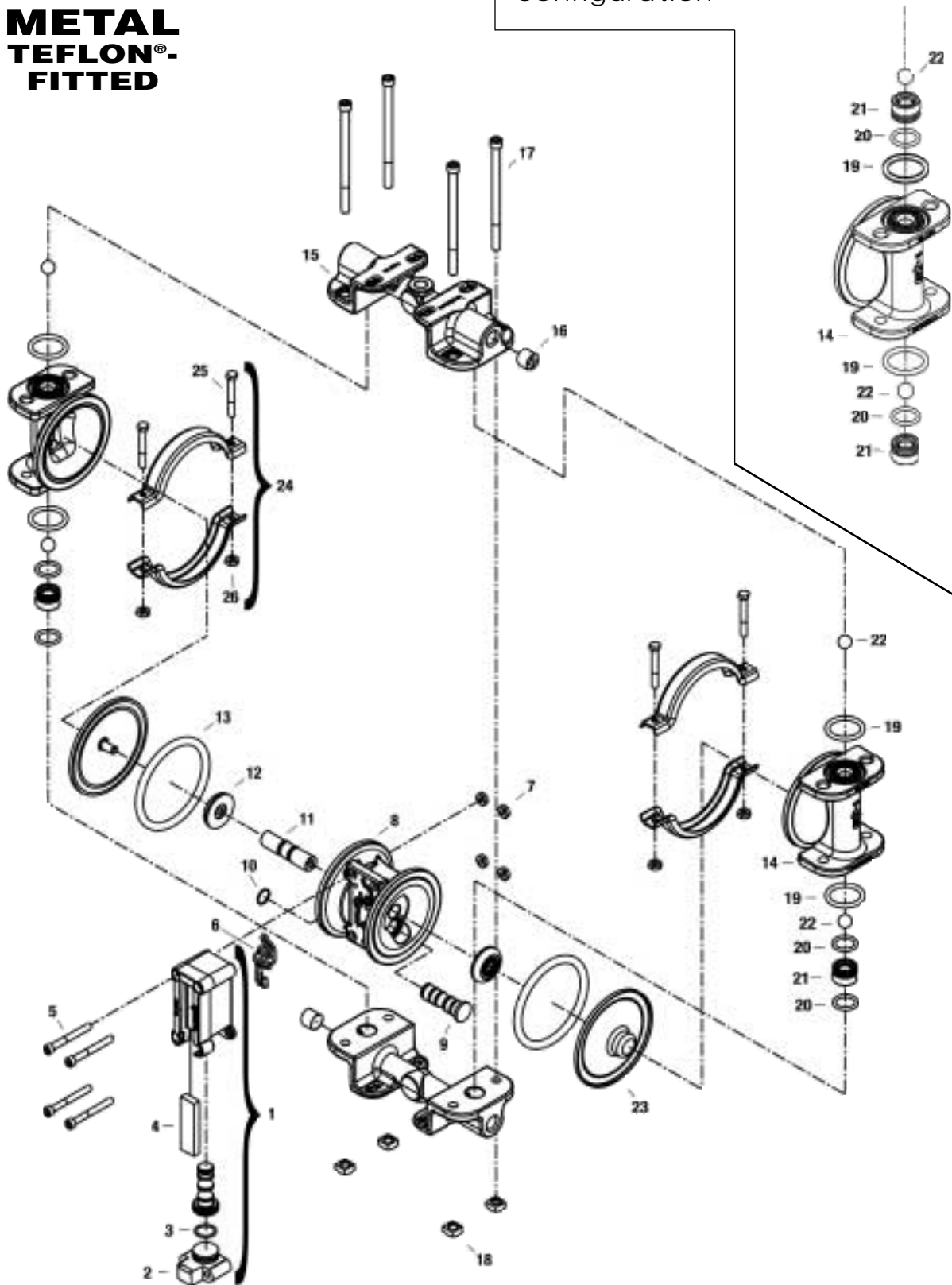
\*Refer to Elastomer Options in Section 10. <sup>1</sup>Air Valve Assembly includes items 2, 3, and 4. \*\*Quantity per pump is 2  
**All boldface items are primary wear parts.**

# SECTION 9B

# EXPLODED VIEW/PARTS LISTING

## P.025 METAL TEFLON®- FITTED

Stainless Steel &  
Hastelloy® seating  
configuration



## Wilden Model P.025 Metal Teflon®-Fitted Pumps

Item #	Description	Qty. per Pump	P.025/APPP ALUMINUM P/N	P.025/ALLL ALUMINUM P/N	P.025/SPPP STAINLESS STEEL P/N
1	Pro-Flo™ Air Valve Assembly <sup>1</sup>	1	00-2000-20-700	00-2000-13-700	00-2000-20-700
2	Pro-Flo™ Air Valve End Cap	1	00-2300-20-700	00-2300-13-700	00-2300-20-700
3	End Cap O-Ring	1	00-3240-26-700	00-3240-26-700	00-3240-26-700
4	Muffler Element	1	00-2340-26-700	00-2340-26-700	00-2340-26-700
5	Air Valve Bolt	4	00-6000-03-700	00-6000-03-700	00-6000-03-700
6	Air Valve Gasket	1	00-2600-52-700	00-2600-52-700	00-2600-52-700
7	Air Valve Nut	4	01-6400-03	01-6400-03	01-6400-03
8	Pro-Flo™ Center Section	1	00-3150-20-700	00-3150-13-700	00-3150-20-700
<b>9</b>	<b>Pilot Spool Assembly</b>	<b>1</b>	<b>00-3850-99-700</b>	<b>00-3850-99-700</b>	<b>00-3850-99-700</b>
10	Pilot Spool Retaining Ring	1	00-2650-03-700	00-2650-03-700	00-2650-03-700
11	Main Shaft Assembly	1	00-3800-99-700	00-3800-99-700	00-3800-99-700
12	Inner Piston for Teflon® Fitted	2	00-3750-20-700	00-3750-13-700	00-3750-20-700
13	Back-Up O-Ring	2	00-1070-51	00-1070-51	00-1070-51
14	Liquid Chamber	2	00-5000-01	00-5000-01	00-5000-03
15	Manifold (NPT)	2	00-5050-01	00-5050-01	00-5050-03
	Manifold (BSP)	2	00-5051-01	00-5051-01	00-5051-03
16	Pipe Plug (NPT)	2	00-7010-08	00-7010-08	00-7010-03
	Pipe Plug (BSP)	2	00-7011-08	00-7011-08	00-7011-03
17	Manifold Bolt	4	01-6000-03	01-6000-03	01-6000-03
18	Square Nut	4	00-6505-03	00-6505-03	00-6505-03
<b>19</b>	<b>Manifold O-ring*</b>	<b>4</b>	<b>*</b>	<b>*</b>	<b>*</b>
<b>20</b>	<b>Valve Seat O-Ring*</b>	<b>4</b>	<b>*</b>	<b>*</b>	<b>*</b>
<b>21</b>	<b>Valve Seat</b>	<b>4</b>	<b>00-1120-01**</b>	<b>00-1120-01**</b>	<b>00-1120-03</b>
<b>22</b>	<b>Valve Ball</b>	<b>4</b>	<b>00-1080-55</b>	<b>00-1080-55</b>	<b>00-1080-55</b>
23	Diaphragm	2	00-1030-55	00-1030-55	00-1030-55
24	Clamp Band Assembly	2	00-7300-03	00-7300-03	00-7300-03
25	—Clamp Band Bolt	4	01-6100-03	01-6100-03	01-6100-03
26	—Clamp Band Nut	4	01-6400-03	01-6400-03	01-6400-03

## Wilden Model P.025 Metal Teflon®-Fitted Pumps

Item #	Description	Qty. per Pump	P.025/SLLL STAINLESS STEEL P/N	P.025/HPPP HASTELLOY P/N	P.025/HLLL HASTELLOY P/N
1	Pro-Flo™ Air Valve Assembly <sup>1</sup>	1	00-2000-13-700	00-2000-20-700	00-2000-13-700
2	Pro-Flo™ Air Valve End Cap	1	00-2300-13-700	00-2300-20-700	00-2300-13-700
3	End Cap O-Ring	1	00-2390-52-700	00-2390-52-700	00-2390-52-700
4	Muffler Element	1	00-3240-26-700	00-3240-26-700	00-3240-26-700
5	Air Valve Bolt	4	00-6000-03-700	00-6000-03-700	00-6000-03-700
6	Air Valve Gasket	1	00-2600-52-700	00-2600-52-700	00-2600-52-700
7	Air Valve Nut	4	01-6400-03	01-6400-03	01-6400-03
8	Pro-Flo™ Center Section	1	00-3150-13-700	00-3150-20-700	00-3150-13-700
<b>9</b>	<b>Pilot Spool Assembly</b>	<b>1</b>	<b>00-3850-99-700</b>	<b>00-3850-99-700</b>	<b>00-3850-99-700</b>
10	Pilot Spool Retaining Ring	1	00-2650-03-700	00-2650-03-700	00-2650-03-700
11	Main Shaft Assembly	1	00-3800-99-700	00-3800-99-700	00-3800-99-700
12	Inner Piston for Teflon® Fitted	2	00-3750-13-700	00-3750-20-700	00-3750-13-700
13	Back-Up O-Ring	2	00-1070-51	00-1070-51	00-1070-51
14	Liquid Chamber	2	00-5000-03	00-5000-04	00-5000-04
15	Manifold (NPT)	2	00-5050-03	00-5050-04	00-5050-04
	Manifold (BSP)	2	00-5051-03	00-5051-04	00-5051-04
16	Pipe Plug (NPT)	2	00-7010-03	00-7010-04	00-7010-04
	Pipe Plug (BSP)	2	00-7011-03	00-7011-04	00-7011-04
17	Manifold Bolt	4	01-6000-03	01-6000-03	01-6000-03
18	Square Nut	4	00-6505-03	00-6505-03	00-6505-03
<b>19</b>	<b>Manifold O-ring*</b>	<b>4</b>	<b>*</b>	<b>*</b>	<b>*</b>
<b>20</b>	<b>Valve Seat O-Ring*</b>	<b>4</b>	<b>*</b>	<b>*</b>	<b>*</b>
<b>21</b>	<b>Valve Seat</b>	<b>4</b>	<b>00-1120-03</b>	<b>00-1120-04</b>	<b>00-1120-04</b>
<b>22</b>	<b>Valve Ball</b>	<b>4</b>	<b>00-1080-55</b>	<b>00-1080-55</b>	<b>00-1080-55</b>
<b>23</b>	<b>Diaphragm</b>	<b>2</b>	<b>00-1030-55</b>	<b>00-1030-55</b>	<b>00-1030-55</b>
24	Clamp Band Assembly	2	00-7300-03	00-7300-03	00-7300-03
25	—Clamp Band Bolt	4	01-6100-03	01-6100-03	01-6100-03
26	—Clamp Band Nut	4	01-6400-03	01-6400-03	01-6400-03

\* Refer to Elastomer Options in Section 10. <sup>1</sup>Air Valve Assembly includes items 1, 2 and 3. \*\*Quantity per pump is 2

All boldface items are primary wear parts.

# SECTION 10

## ELASTOMER OPTIONS

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### Model P.025 Pumps

Material	Valve Seat O-Ring	Manifold O-Ring	Diaphragm	Back-Up Diaphragm O-Ring	Valve Ball
Wil-Flex™	—	—	00-1010-58	—	N/A
Buna-N®	00-1200-52	04-2390-52	00-1010-52	—	N/A
Viton®	—	—	—	—	N/A
Teflon® PTFE	00-1200-55 <sup>2</sup>	00-1370-55	00-1030-55	—	00-1080-55
Stainless Steel	—	—	—	—	N/A
Teflon®-Encapsulated Viton®	00-1200-60 <sup>1</sup>	—	—	—	N/A
Neoprene	—	—	—	00-1070-51	N/A

1. Used on SS/Hastelloy® only

2. Used on Aluminum only



# ENGINEERED REVOLUTION

“Revolutionizing the way you solve your toughest pumping problems”



## Plastic

- Polypropylene
- Carbon-Filled Acetal
- PVDF
- Teflon® PTFE
- Teflon® PFA



## Metal

- Aluminum
- 316 S.S.
- Cast Iron
- Hastelloy



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SANITARY PUMP TECHNOLOGY

FDA USDA 3A



## Peristaltic Dosing Pumps

**ACCUPULSE**  
PERISTALTIC DOSING PUMP



## Accessories

- SPCI
- Wil-Gard II
- FCSII
- Equalizers
- Drum Pump Kits
- APV

## WILDEN®

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