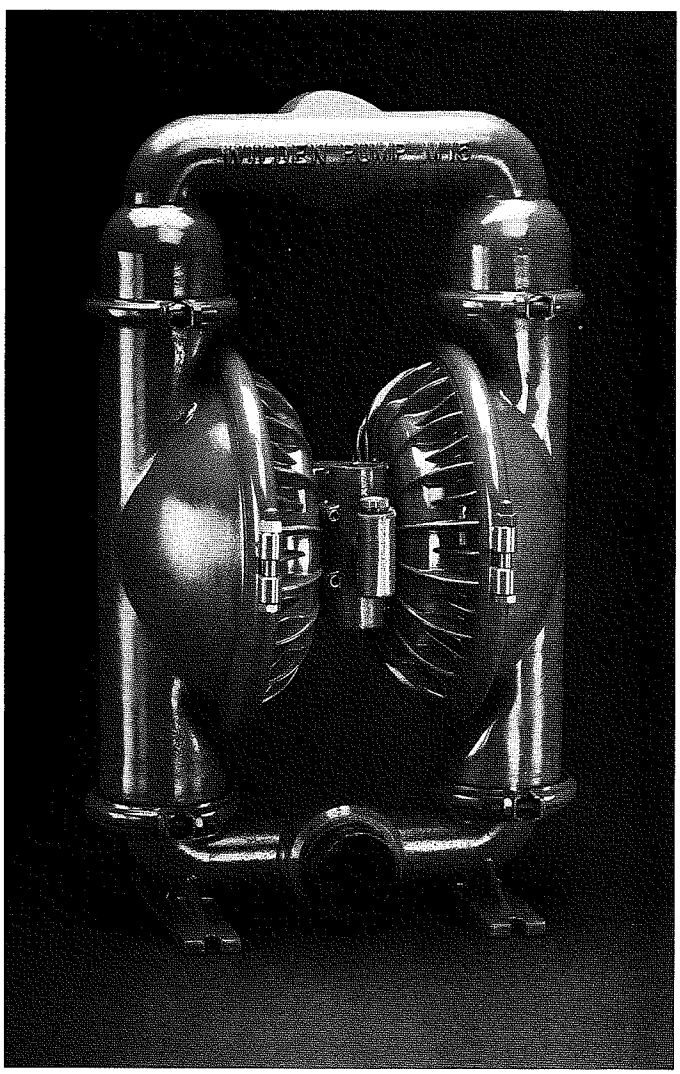
WILDEN®

AIR OPERATED DOUBLE DIAPHRAGM PUMPS

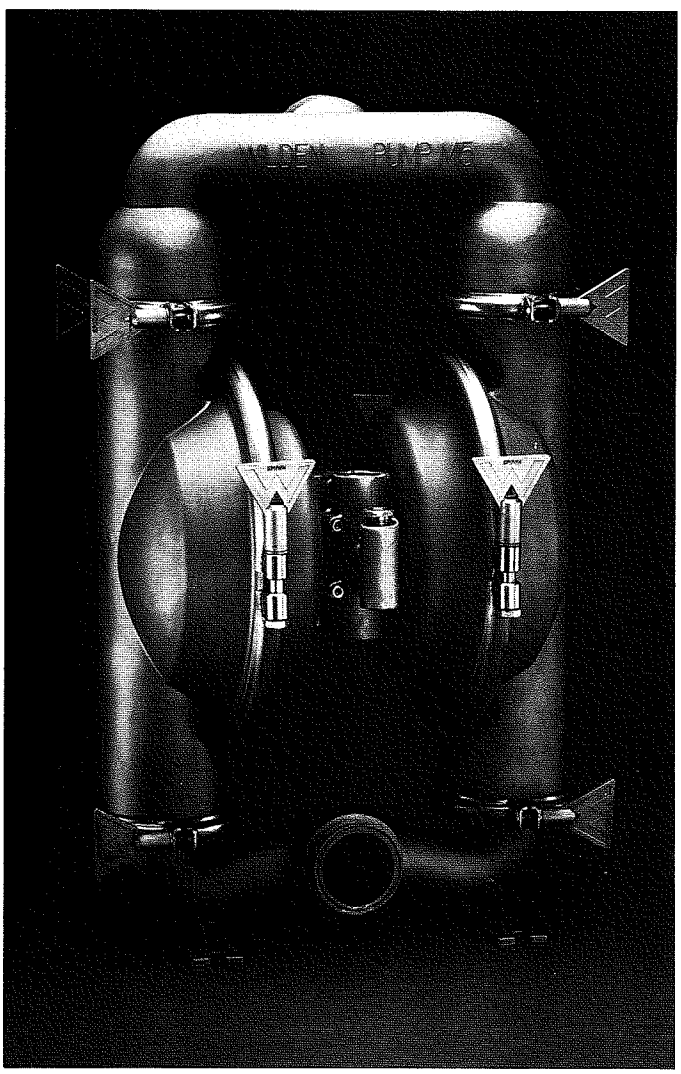
M15 Engineering Operation and Maintenance

MODEL M15 METAL

MODEL M15 FOOD PROCESSING



M15 METAL



M15 FOOD PROCESSING

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.

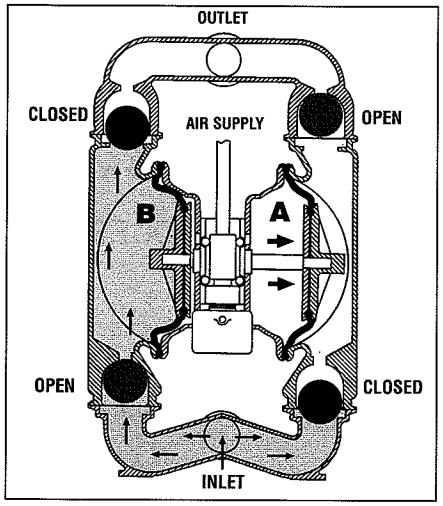


FIGURE 1 The air valve directs pressurized air to the back side of diaphragm A. The compressed air is applied directly to the liquid column separated by elastomer diaphragms. The diaphragm acts as a separation membrane between the compressed air and liquid, balancing the load and removing mechanical stress from the diaphragm which allows for millions of flex cycles. 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 now on its suction stroke; air behind the diaphragm has been forced out to the atmosphere through the exhaust port of the pump. Diaphragm A is working against atmospheric air pressure. 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.

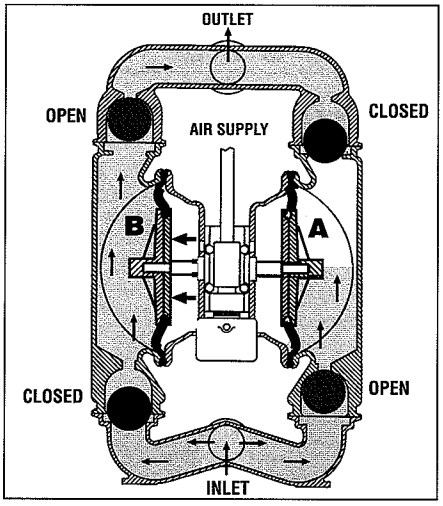


FIGURE 2 When the pressurized diaphragm, diaphragm A, reaches the limit of its discharge stroke, the air valve redirects pressurized air to the back side of diaphragm B. The pressurized air forces diaphragm B away from the center block while pulling diaphragm A to the center block. Diaphragm B is now 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 to 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.

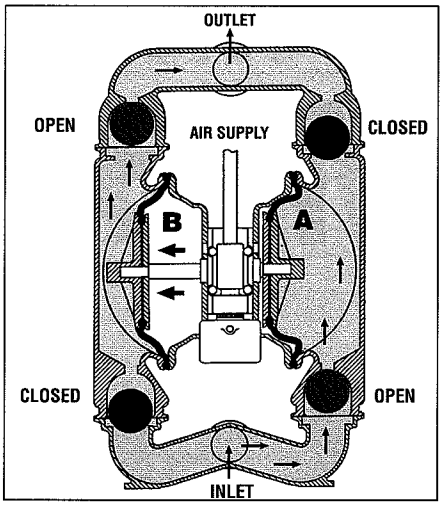
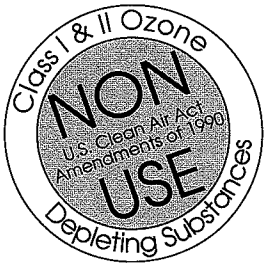


FIGURE 3 At completion of the stroke, the air valve again redirects air to the back side of diaphragm A, which starts diaphragm B on its exhaust stroke. As the pump reaches its original starting point, each diaphragm has gone through one exhaust and one discharge stroke. This constitutes one complete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

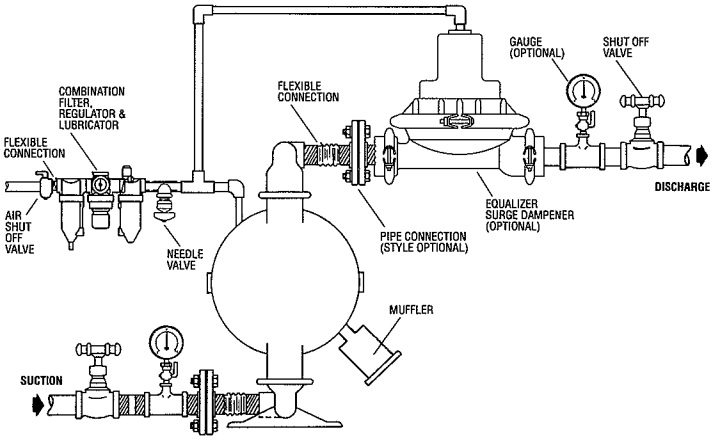
WILDEN PUMP DESIGNATION SYSTEM

XX / XX / XX / XX / XX
1 2 3 4 5 6

1 MODEL (SIZE)
2 WETTED CONSTRUCTION
3 NON-WETTED CONSTRUCTION
4 DIAPHRAGMS
5 VALVE BALLS
6 VALVE SEATS (O-RINGS)



SUGGESTED INSTALLATION



NOTE: UL-listed pumps must not exceed 50 psig air supply pressure.

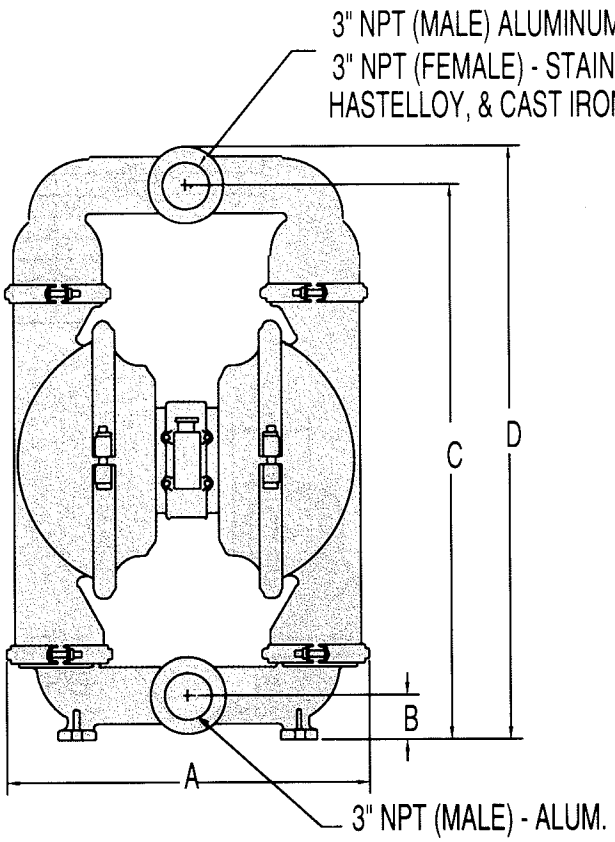
WARNING: Possible explosion can result from Halogenated Hydrocarbon solvents when used in pressurized fluid systems having aluminum or galvanized wetted parts.

CAUTION: WEAR SAFETY GLASS. WHEN DIAPHRAGM RUPTURE OCCURS, MATERIAL BEING PUMPED MAY BE FORCED OUT AIR EXHAUST.

NOTE: Pump must be lubricated. Wilden suggests an arctic 5 weight oil (ISO grade 15).

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

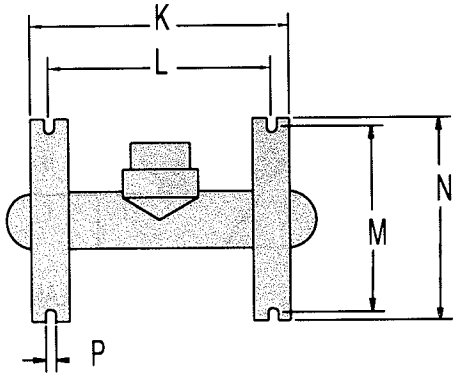
DIMENSIONAL DRAWING
MODEL M15 METAL

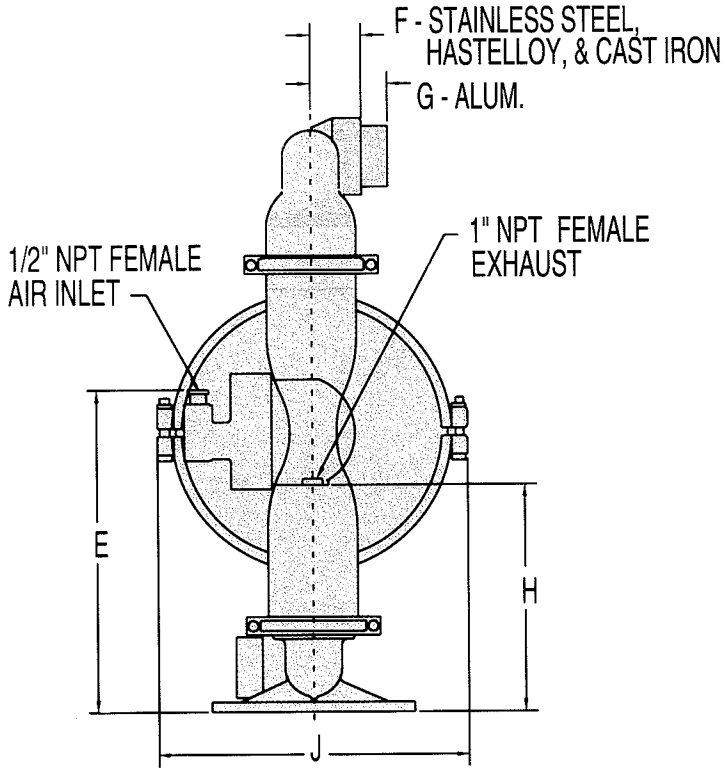


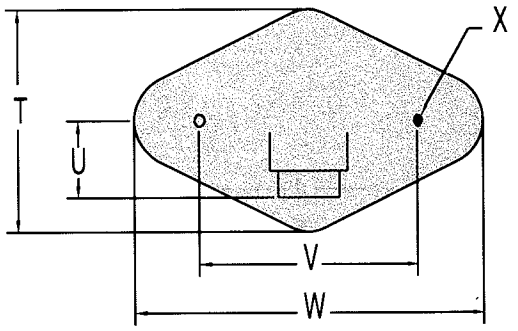
DIMENSIONS – M15 METAL		
ITEM	STANDARD (inch)	METRIC (mm)
A	19 29/32	505.2
B	2 13/32	61.1
C	29 31/32	760.6
D	32 3/8	821.7
E	17	431.5
F	2 23/32	69.0
G	3 15/16	100.0
H	12 5/16	312.5
J	16 3/4	425.5
K	14 3/16	360.4
L	12 1/16	306.2
M	10 5/32	257.8
N	11 3/32	281.8
P	5/8	15.9
R	2 3/4 (N/A)	69.8
S	2 19/32	65.8
T	12 1/32	305.4
U	4	101.6
V	12 1/32	305.4
W	18 3/4	475.9
X	Ø9/16	Ø14.3

BSP threads available.

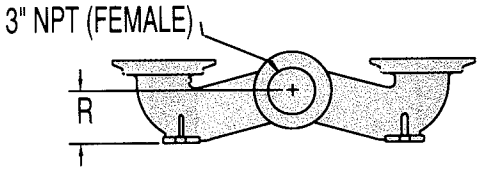
Standard aluminum pumps are manufactured with mild steel nipples. Stainless steel nipples are available.







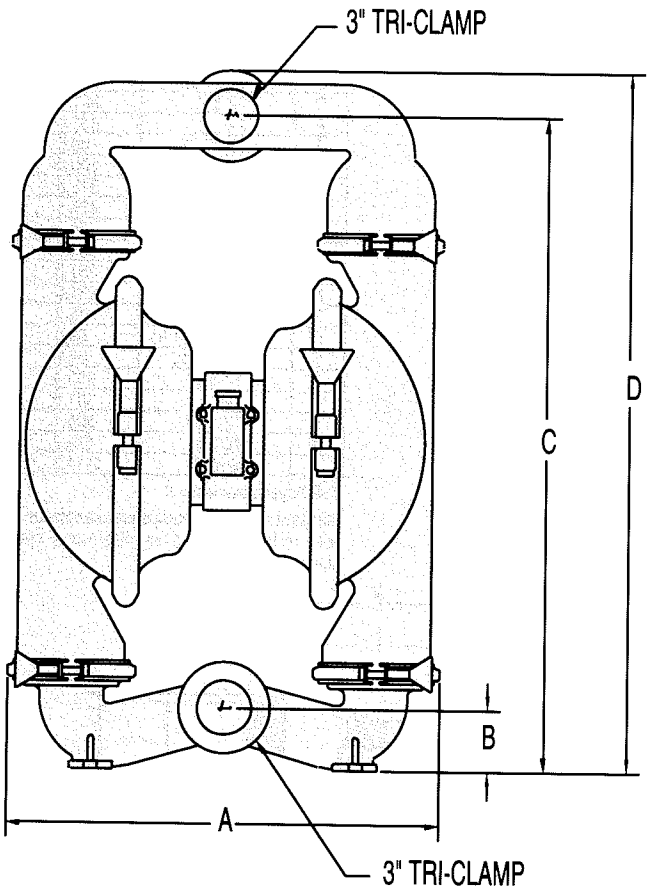
ALUMINUM BASE SCREEN MODEL

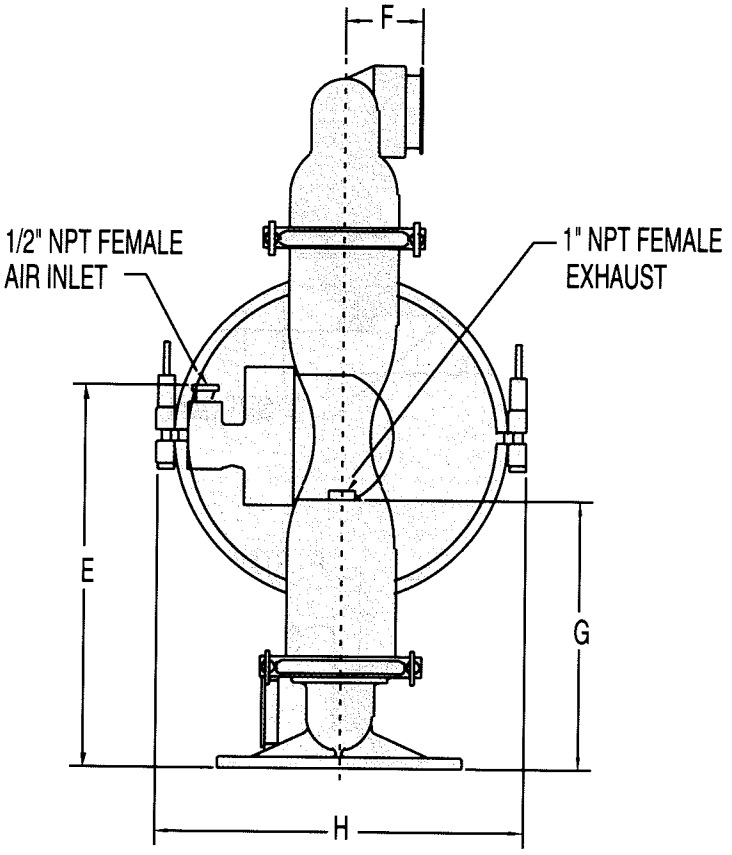


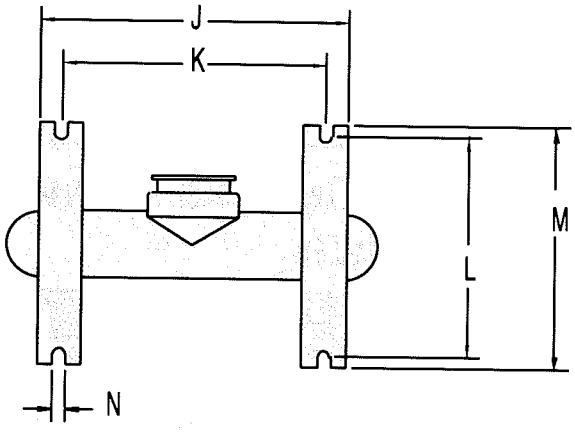
FOOTED BASE FOR STAINLESS STEEL & HASTELLOY MODELS

DIMENSIONAL DRAWING
MODEL M15 FOOD PROCESSING

DIMENSIONS – M15 FOOD GRADE		
ITEM	STANDARD (inch)	METRIC (mm)
A	20 1/2	520.3
B	3	76.2
C	30 5/32	766.0
D	31 15/16	810.6
E	17 1/32	432.2
F	3 1/2	88.9
G	12 9/32	311.7
H	17	431.8
J	14	355.3
K	11 31/32	303.8
L	10	253.8
M	10 31/32	278.4
N	9/16	14.3







PUMP PERFORMANCE CURVES

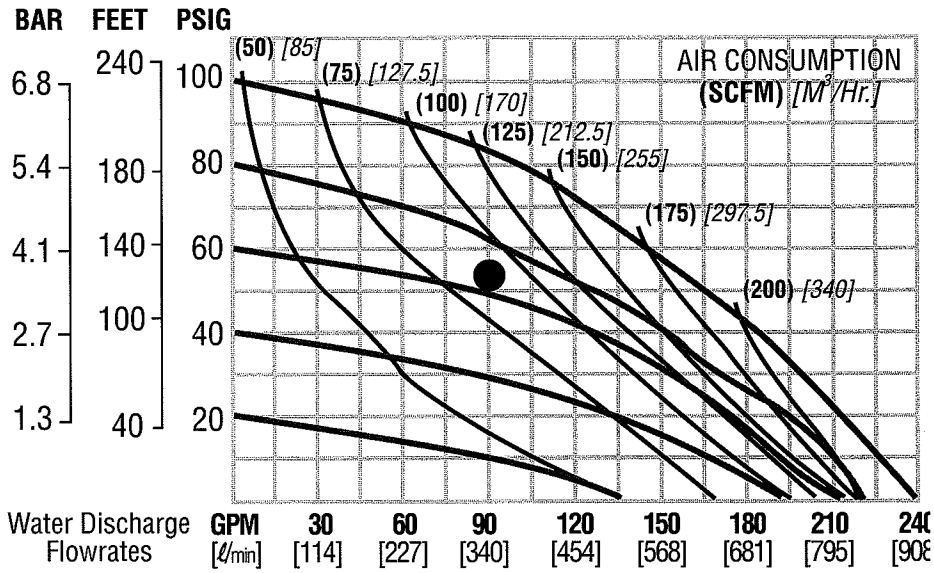
MODEL M15 (Rubber/TPE-Fitted)

Weight.....Aluminum 110 lbs.
Cast Iron 181 lbs.
Stainless Steel 165 lbs.
Hastelloy 218 lbs.
Air Inlet .....½" Female NPT
Inlet .....3" Male NPT[1]
Outlet.....3" Male NPT[1]
Suction Lift.....**Rubber 17' Dry**
25' Wet
TPE 14' Dry
25' Wet
Displacement per Stroke .... 1.36 gal.[2]
Max. Size Solids .....⅜" Dia.

Example: To pump 90 gpm against a discharge head of 55 psig requires 70 psig and 87 scfm air consumption. (See dot on chart.)

[1]BSP threads available.
[2]Displacement per stroke was calculated at 70 psig air inlet against 30 psig discharge head pressure.

Caution: Do not exceed 125 psig air supply pressure.



Volumes indicated on chart were determined by actually pumping water in calibrated tanks.

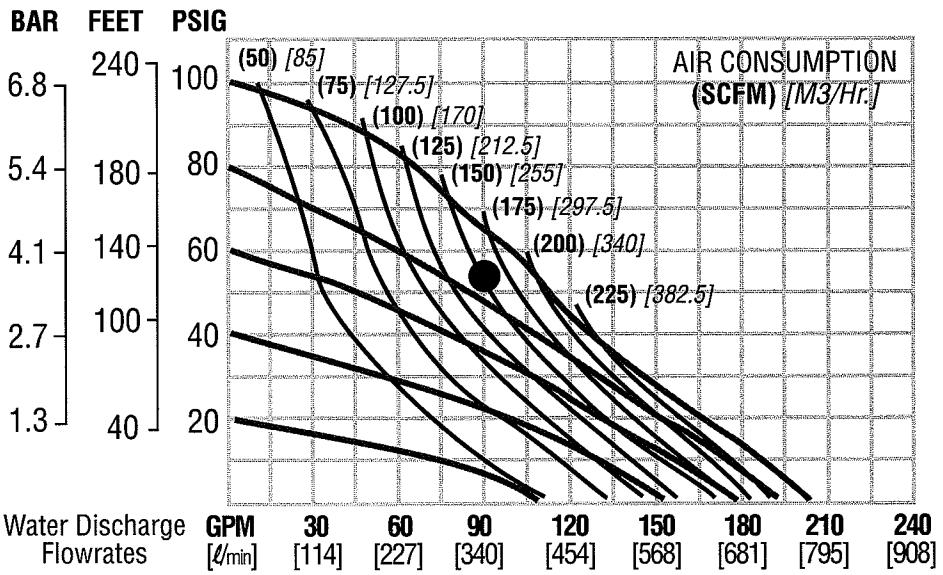
MODEL M15 (Teflon®-Fitted)

Weight.....Aluminum 110 lbs.
Cast Iron 181 lbs.
Stainless Steel 165 lbs.
Hastelloy 218 lbs.
Air Inlet .....½" Female NPT
Inlet .....3" Male NPT[1]
Outlet.....3" Male NPT[1]
Suction Lift.....14' Dry
25' Wet
Displacement per Stroke .... .926 gal.[2]
Max. Size Solids .....⅜" Dia.

Example: To pump 90 gpm against a discharge head of 55 psig requires 83 psig and 125 scfm air consumption. (See dot on chart.)

[1]BSP threads available.
[2]Displacement per stroke was calculated at 70 psig air inlet against 30 psig discharge head pressure.

Caution: Do not exceed 125 psig air supply pressure.



Volumes indicated on chart were determined by actually pumping water in calibrated tanks.

*BSP threads available.

SECTION I
INSTALLATION

The Model M15 has a 3" inlet and 3" outlet and is designed for flows to 230 gpm. The **M15 Metal** pump is manufactured with wetted parts of aluminum, cast iron, 316 Stainless Steel, or Hastelloy. The center block of the **M15 Metal** is constructed of glass-filled polypropylene. A variety of diaphragms, valve balls, and O-rings are available to satisfy temperature, chemical compatibility, abrasion and flex concerns.

The suction pipe size should be at least 3" diameter or larger if highly viscous material is being pumped. The suction hose must be non-collapsible, reinforced type as the M15 is capable of pulling a high vacuum. Discharge piping should be at least 3"; 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.

The M15 can be used in submersible applications only when both wetted and non-wetted portions are compatible with the material being pumped. If the pump is to be used in a submersible application, a hose should be attached to the pump's air exhaust and the exhaust air piped above the liquid level.

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 pump's ability. Note: Materials of construction and elastomer material have an effect on suction lift parameters. Please consult Wilden distributor's for specifics.

Pumps in service with a positive suction head are most efficient when inlet pressure is limited to 7–10 psig. Premature diaphragm failure may occur if positive suction is 11 psig and higher.

THE MODEL M15 WILL PASS 3/8" 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 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.

SECTION II
SUGGESTED OPERATION AND MAINTENANCE INSTRUCTIONS

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 125 psi depending upon pumping requirements.

For best results, the pumps should use an air filter, regulator, and lubricator system. The use of an air filter before the pump will insure that the majority of any pipeline contaminants will be eliminated. The use of a lubricant, suitable for the application, helps perform a number of functions. Lubricants reduce friction to minimize required shifting forces and reduce wear. Lubricants provide a protective coating against some forms of corrosion and contaminants. **Wilden suggests an oil with arctic characteristics (ISO 15-5Wt.) This oil is chemically compatible with the center block O-rings and has a low pour point to guard against problems associated with low temperatures.** The amount of lubrication required is directly related to the amount of oil introduced from the factory air system. We therefore suggest that the lowest setting on the lubricator be utilized and then increased as necessary.

Pump discharge rate can be controlled by limiting the volume and/or pressure of the air supply to the pump (preferred method). The use of a needle valve installed at the air inlet to the pump is suggested for this purpose. Pump discharge rate can also be controlled by throttling the pump discharge by installing a valve in the discharge line of the pump when the need to control the pump from a remote location exists. 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, a three-way valve should be used. Pumping volume can be set by counting the number of strokes per minute.

A muffler installed on the pump's air exhaust will give quiet exhaust. Sound levels are reduced below OSHA specifications using a Wilden muffler.

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 elevation (see pump performance chart).

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 the 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, it should line up without placing stress on the pump fittings.

Expansion joints 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 foundation, a mounting pad placed between the pump and 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 surge suppressor 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.

INSPECTIONS: Periodic inspections have been found to offer the best means for preventing unscheduled pump downtime.

Individuals responsible for checking and maintaining lubrication levels in the pumps should also check for any abnormal noise or leakage. Personnel familiar with the pumps' construction and service should be informed of any abnormalities that are detected.

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 III
TROUBLESHOOTING

Pump will not run or runs slowly.

1. Check air inlet screen and air filter for debris.
2. Check for sticking air valve, flush air valve in solvent.
3. Check for worn out air valve. If piston face in air valve is shiny instead of dull, air valve is probably worn beyond working tolerances and must be replaced.
4. Check center block O-rings. If worn excessively, they will not seal and air will simply flow through pump and out air exhaust. Use only Wilden O-rings as they are of special construction.
5. Check for rotating piston in air valve.
6. Check type of lubricant being used. A higher viscosity oil than suggested may cause the piston to stick or run erratically. Wilden suggests the use of a hydraulic oil with arctic characteristics (ISO 15-5 wt.).

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. Check for sticking ball checks. If material being pumped is not compatible with pump elastomers, swelling may occur. Replace ball checks and seal with proper elastomers.
3. Check to make sure all suction connections are air tight, especially clamp bands around intake balls.

Pump air valves freezes.

Check for excessive moisture in compressed air. Either install dryer or hot air generator for compressed air.

Air bubbles in pump discharge.

1. Check for ruptured diaphragm.
2. Check tightness of clamp bands, especially at intake manifold.

Product comes out air exhaust.

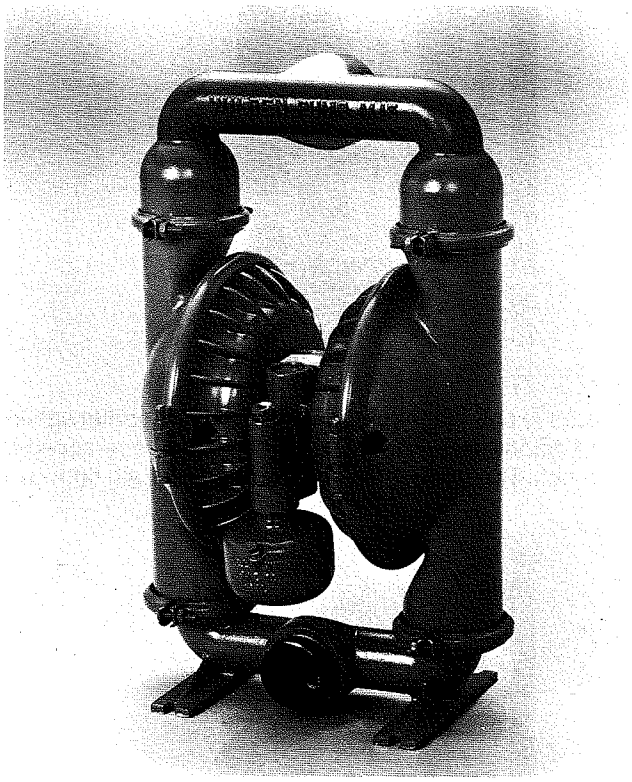
1. Check for diaphragm rupture.
2. Check tightness of piston plates to shaft.

TORQUE SPECIFICATIONS FOR MODEL M15		
Item #	**Description of Part**	**Maximum Torque**
1	Air Valve — Lubed	80 in.-lbs. [9.0 m-N]
2	Outer Piston	78 ft.-lbs. [105.8 m-N]
3	Small Clamp Band — Rubber	50 in.-lbs. [5.6 m-N]
4	Small Clamp Band — Teflon	137 in.-lbs. [15.5 m-N]
5	Large Clamp Band — All	45 ft.-lbs. [61.0 m-N]
6	Air Chambers and Center Block Assembly	23 ft.-lbs. [31.2 m-N]
7	2C-Ring and Outer Piston Assembly	18 ft.-lbs. [24.4 m-N]
8	Screen and Inlet Cover	80 in.-lbs. [9.0 m-N]

SECTION IV
DISASSEMBLY/REASSEMBLY INSTRUCTIONS

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.

The M15 has a 3" inlet and 3" outlet and is designed for flows up to 240 gpm. Its air distribution system is based upon design simplicity and proven efficiency. The model M15 is available in aluminum, cast iron, 316 Stainless Steel, or Hastelloy "C" wetted parts. It is available with optional screened base for submersible applications (aluminum only).



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.

NOTE: Model used for these instructions incorporates rubber diaphragms, balls, and seats. Models with Teflon® diaphragms, balls and metallic seats are the same except where noted.

Start by removing the two clamp bands that fasten the discharge manifold to the main body of the pump. *(Figures 1A and 1B)* The discharge valve balls and seats are now available for inspection.

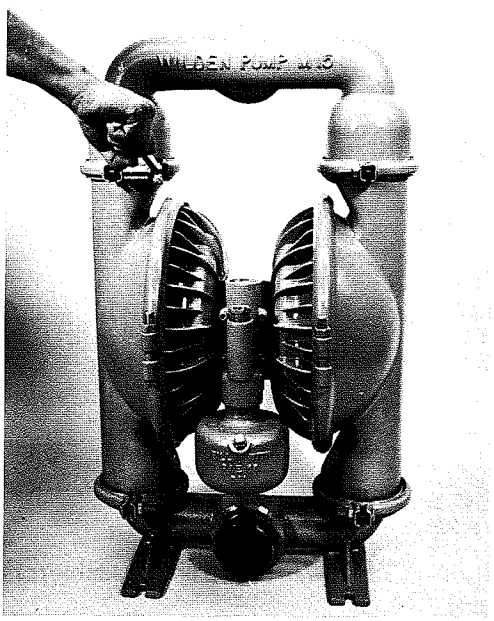


Figure 1A

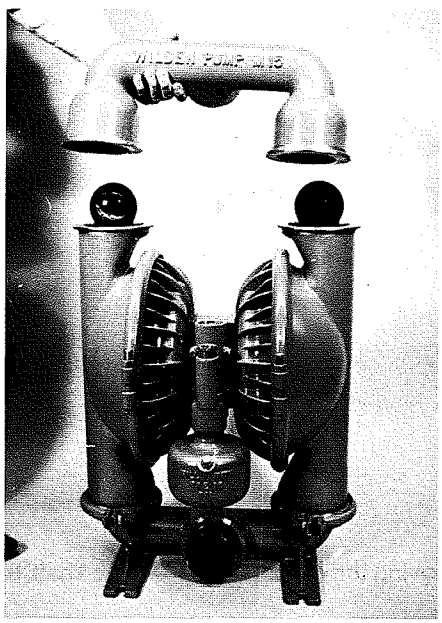


Figure 1B

STEP 2

Remove the two clamp bands that hold the inlet manifold to the main body of the pump. Lift the main body of the pump from the inlet manifold and set it to one side. The inlet ball valves and seats are now available for examination. (See *Figure 2A)* Next, remove large clamp band which attaches water chamber to the center section of the pump. (See *Figure 2B)*

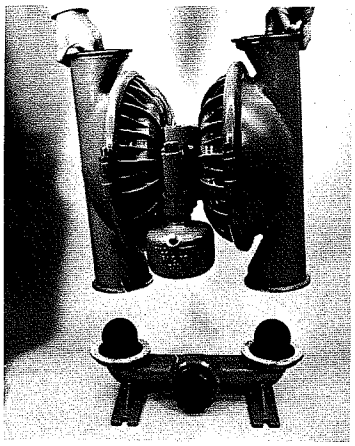


Figure 2A

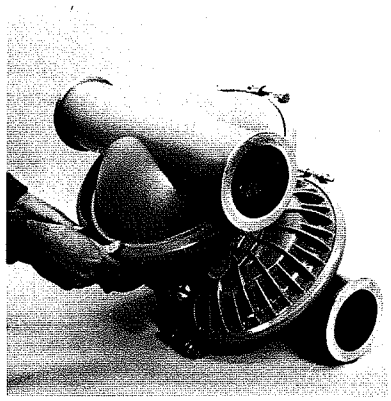


Figure 2B

Remove only one liquid chamber from the center section. This will expose the diaphragm and its piston plate. (See *Figure 2C)* The diaphragm and the piston plate can be removed by unscrewing them from the connecting air shaft with an adjustable wrench. The opposite diaphragm will be held tight by the opposite liquid chamber. (See *Figure 2D)*

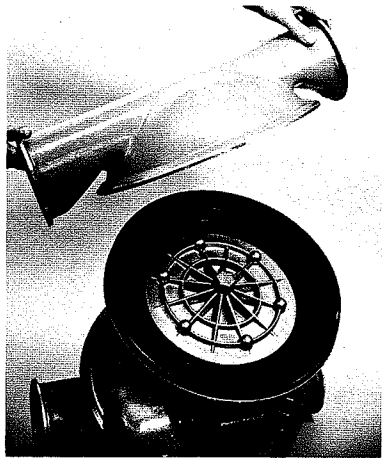


Figure 2C

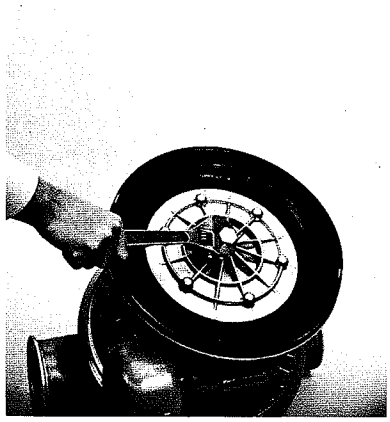


Figure 2D

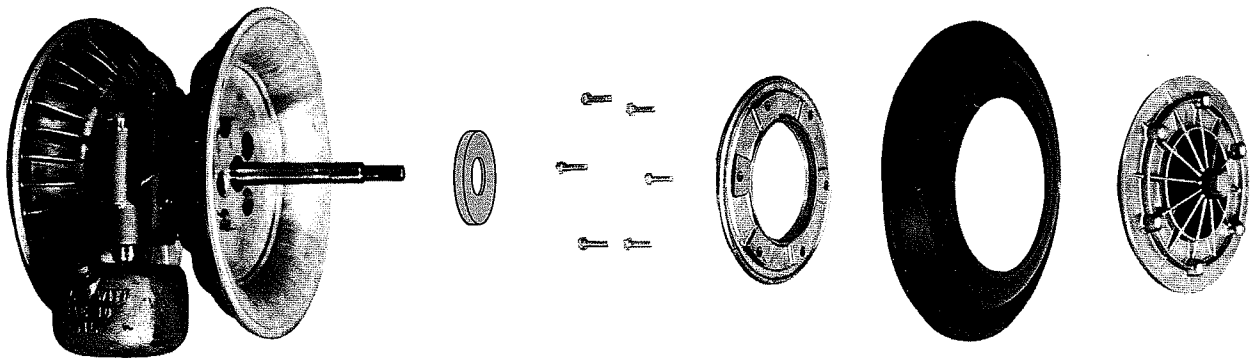
Now remove the opposite liquid chamber. The second diaphragm is now available for inspection and cleaning. (See *Figure 2E)* A vise with wood blocks is suggested as a method of securing the shaft while removing the second diaphragm. **It is important not to score or mark the chrome-plated shaft.**

Figure 2E

Upon removing the outer piston from the shaft, the inner piston and the shaft are now exposed and available for inspection.

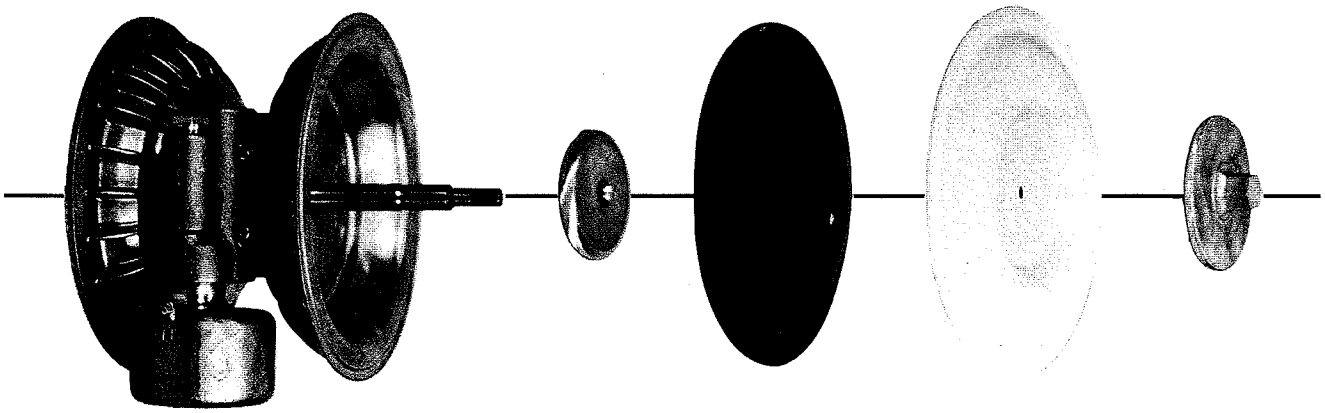
ASSEMBLY:

STEP 1 *(RUBBER DIAPHRAGMS)* *Exploded View* *Figure 3A*



Inner piston ring maximum torque rating: refer to page 6, Item #7.

(TEFLON® DIAPHRAGMS) *Exploded View* *Figure 3B*



Expanded Teflon® gasket material is installed during factory assembly of all plastic Wilden pumps fitted with Teflon® diaphragms to assure seal integrity with minimum flange pressures. Because this material is highly compressable and not reusable, these gaskets must be replaced whenever a plastic Teflon® diaphragm fitted pump is disassembled.

Figure 4A

Figure 4B

STEP 2

Before assembly, remove O-rings from center block bushing and flush center block, removing grit and contaminants. Install new O-rings in center block. (See page 13.) To install shaft, push shaft firmly through the bushing in the center block. Be sure to lubricate bushing with 5 weight arctic oil (ISO grade 15) so that shaft may pass by the O-rings. (See *Figure 4A.)* Next, pull diaphragm down so that it fits into the lip of the air chamber. Then, turn center section over and push diaphragm from full stroke position to exhaust position, thus exposing shaft so that other diaphragm can be positioned. *(Figure 4B.)* Next, place inner piston and opposite diaphragm in position for assembly. *(Figure 4C.)* Once diaphragms are installed, it is important to tighten outer piston simultaneously (turning in opposite direction) to ensure a tight, secure fit. *(Figure 4D.)* Tighten outer piston per the torque specifications* (Item #2).

Figure 4C

*Refer to page 6 for torque specifications.

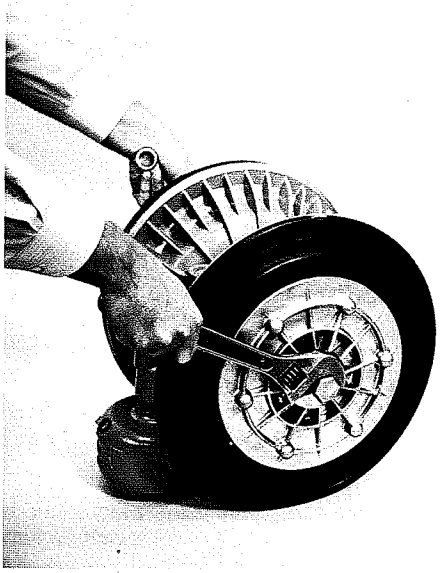


Figure 4D

Figure 4E

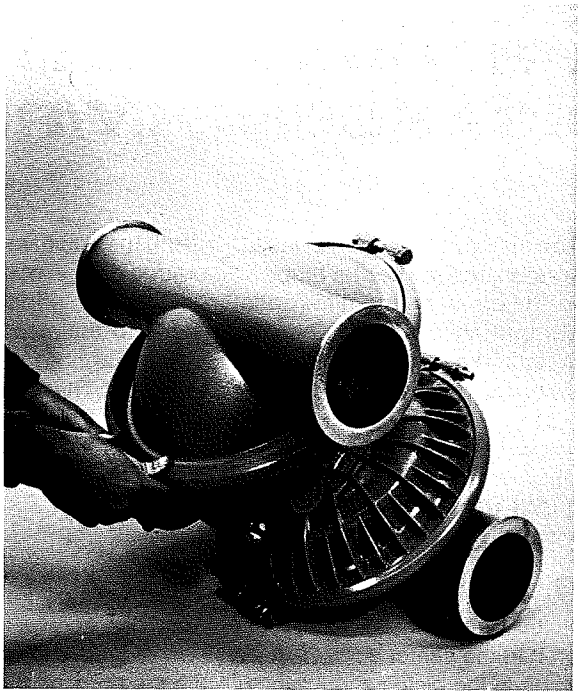


Figure 4F

Now install water chamber with large clamp band on one side. Center section should then be turned over so that diaphragm can be pushed up with pry bars to full stroke position so that opposite water chamber can be installed. *(Figure 4E* and *Figure 4F)* **CAUTION:** Both the top and bottom flange surfaces of the water chambers must be aligned so that they are level and in the same planes to prevent leakage. Tighten large clamp band per the torque specifications* (Item #5).

*Refer to page 6 for torque specifications.

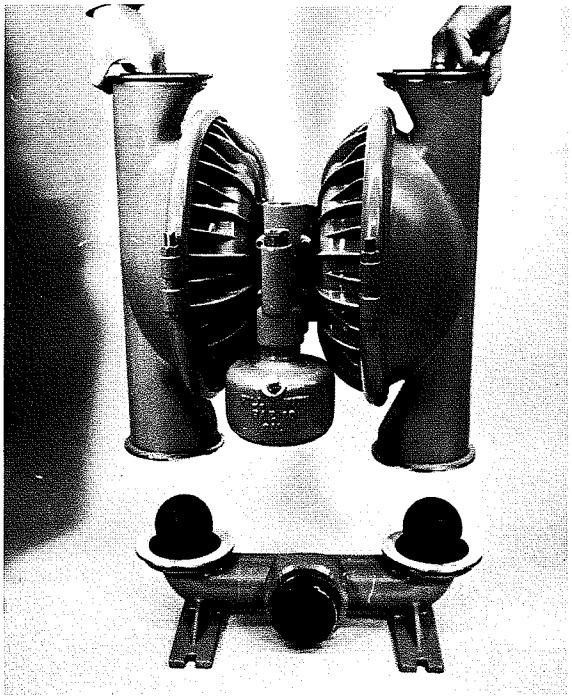


Figure 4G

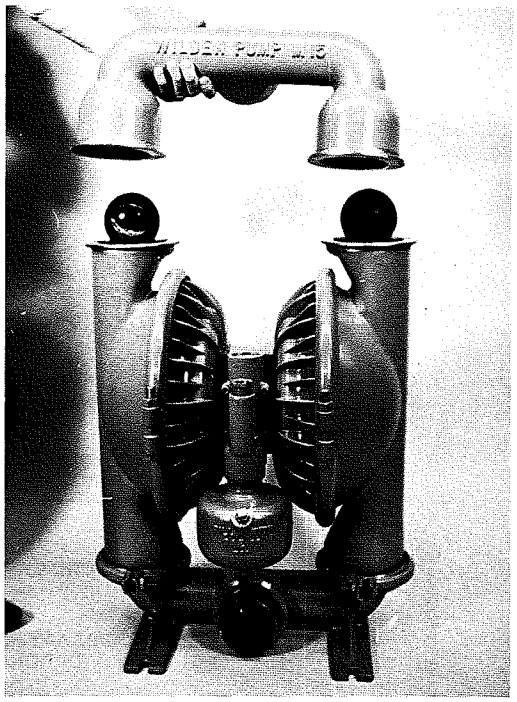


Figure 4H

Install the valve seats in the water chambers and inlet manifold with the molded seat O-ring down inside the seat recess. Next, securely tighten small clamp bands around inlet manifold and water chambers. *(Figure 4G)* Finally, place discharge manifold over assembled center section *(Figure 4H)* and secure clamp bands per the torque specifications* (Item #3 or #4).

SECTION V
AIR VALVE/CENTER BLOCK DISASSEMBLY/REASSEMBLY

The air valve assembly consists of both the air valve body and piston and the center block. The unique design of the air valve relies only on differential pressure to effect the diaphragm shift. It is reliable and simple to maintain. The bushing in the center block, along with the diaphragm shaft, provides the "trigger" to tell the air valve to shift. The following procedure will ensure that the air valve on your Wilden pump will provide long trouble-free service.

AIR VALVE BODY AND PISTON ASSEMBLY AND DISASSEMBLY:

The air valve body and piston can be disconnected from the pump by removing the four socket-head cap screws which attach it to the center block. The piston should move freely and the ports in the piston should line up with the ports on the face of the air valve body (see *Figure D).* The piston should also appear to be a dull dark gray in color. If the piston appears to be a shiny sluminum color, the air valve is probably worn beyond working tolerances and should be replaced.

NOTE: Lubricate air valve with a 5 weight arctic oil (ISO grade 15).

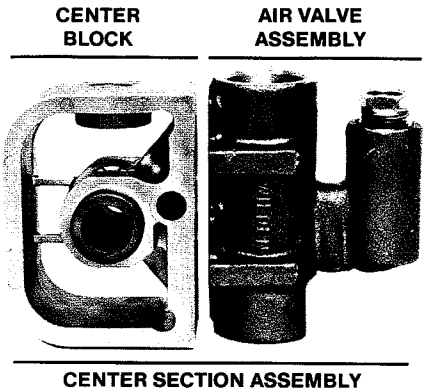


Figure A

If the piston does not move freely in the air valve, the entire air valve should be immersed in a cleaning solution (**NOTE:** Do not force the piston by inserting a metal object.) This soaking should remove any accumulation of sludge and grit which is preventing the air valve piston from moving freely. Also, remove and clean the air valve screen (P/N 20E). If the air valve piston does not move freely after the above cleaning, the air valve should be dissassembled as follows: remove the snap ring from the top end of the air valve cylinder and apply an air jet to the 3/16-inch hole on the opposite end of the air valve face (see *Figure C).* **CAUTION:** The air valve end cap may come out with considerable force. Inspect the piston and cylinder bore for nicks and scoring.

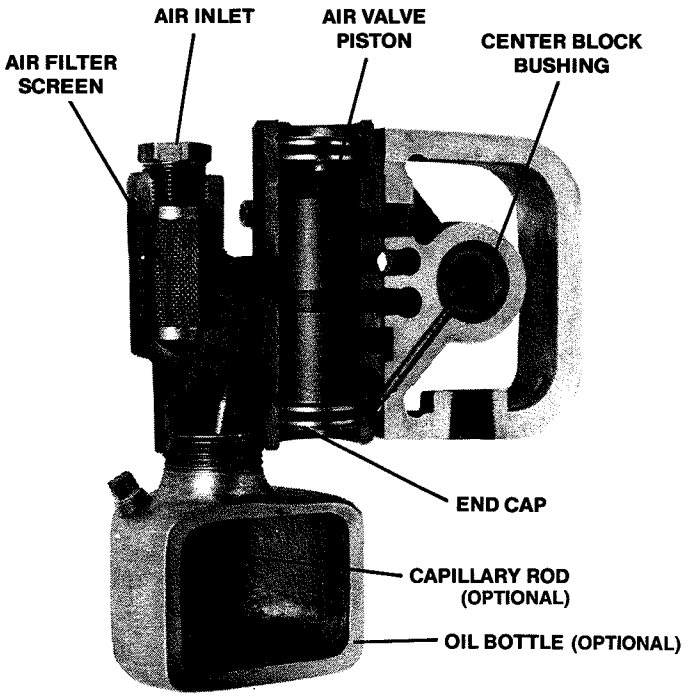


Figure B

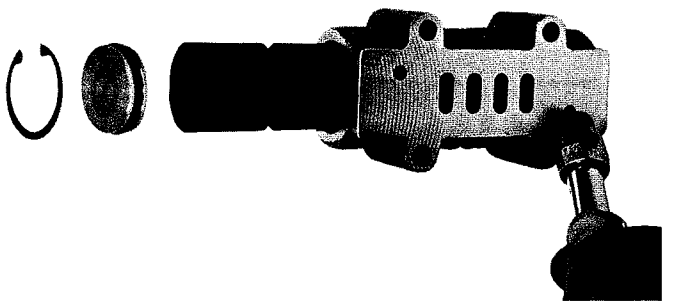


Figure C

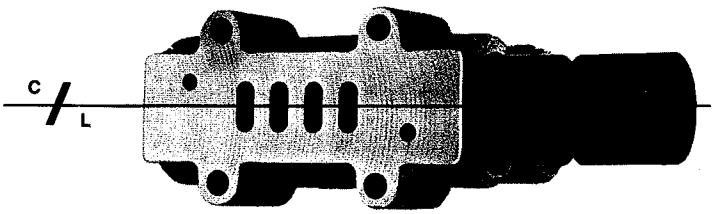


Figure D

Small nicks can usually be dressed out and the piston returned to service. Inspect the cylinder end caps. Make sure that the guide pin is straight and smooth or the piston will not move freely in the cylinder. New O-rings should be installed on the end caps, assuring that proper alignment of the piston and cylinder ports is maintained. (See *Figure D.)* Reinstall air valve to center block of pump and tighten per the torque specifications* (Item #1).

O-RING REPLACEMENT:

When the O-rings become worn or flat, they will no longer seal and must be replaced. This is most easily accomplished by using a tool called an O-ring pick, available through most industrial supply companies.

CENTER BLOCK ASSEMBLY (P/N P1H):

The pump's center block consists of an injection-molded polypropylene housing with a cast-in bronze bushing. The bushing has eleven grooves cut on the inside diameter. There are seven O-rings that fit in these grooves (see *Figure E).* Since these O-rings form a part of the shifting function of the pump, it is necessary that they be located in the proper grooves. When bushing wear becomes excessive, a new center block must be used. Attach air chambers to center block and tighten per the torque specifications* (Item #6).

NOTE: When attaching air valve to center block, align bleed-off ports in center block to air valve gasket.

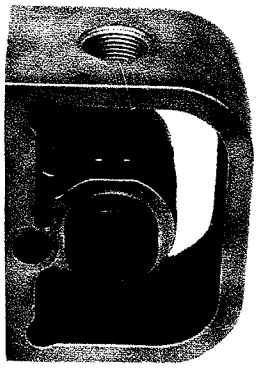


Figure F (Side View)

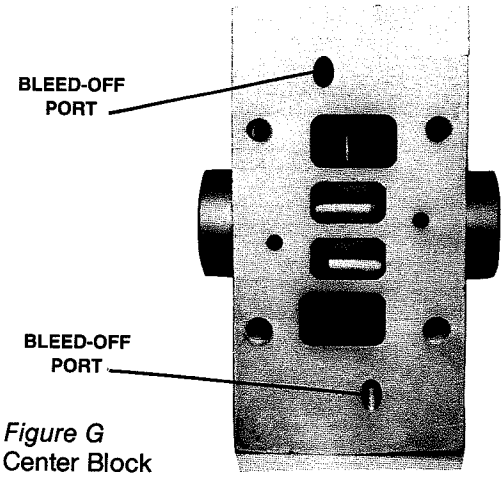


Figure G
Center Block
(Front View)

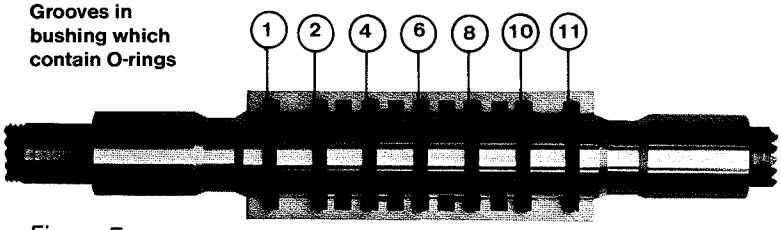


Figure E

*Refer to page 6 for torque specifications.

WILDEN MODEL M15 w/RUBBER ELASTOMERS

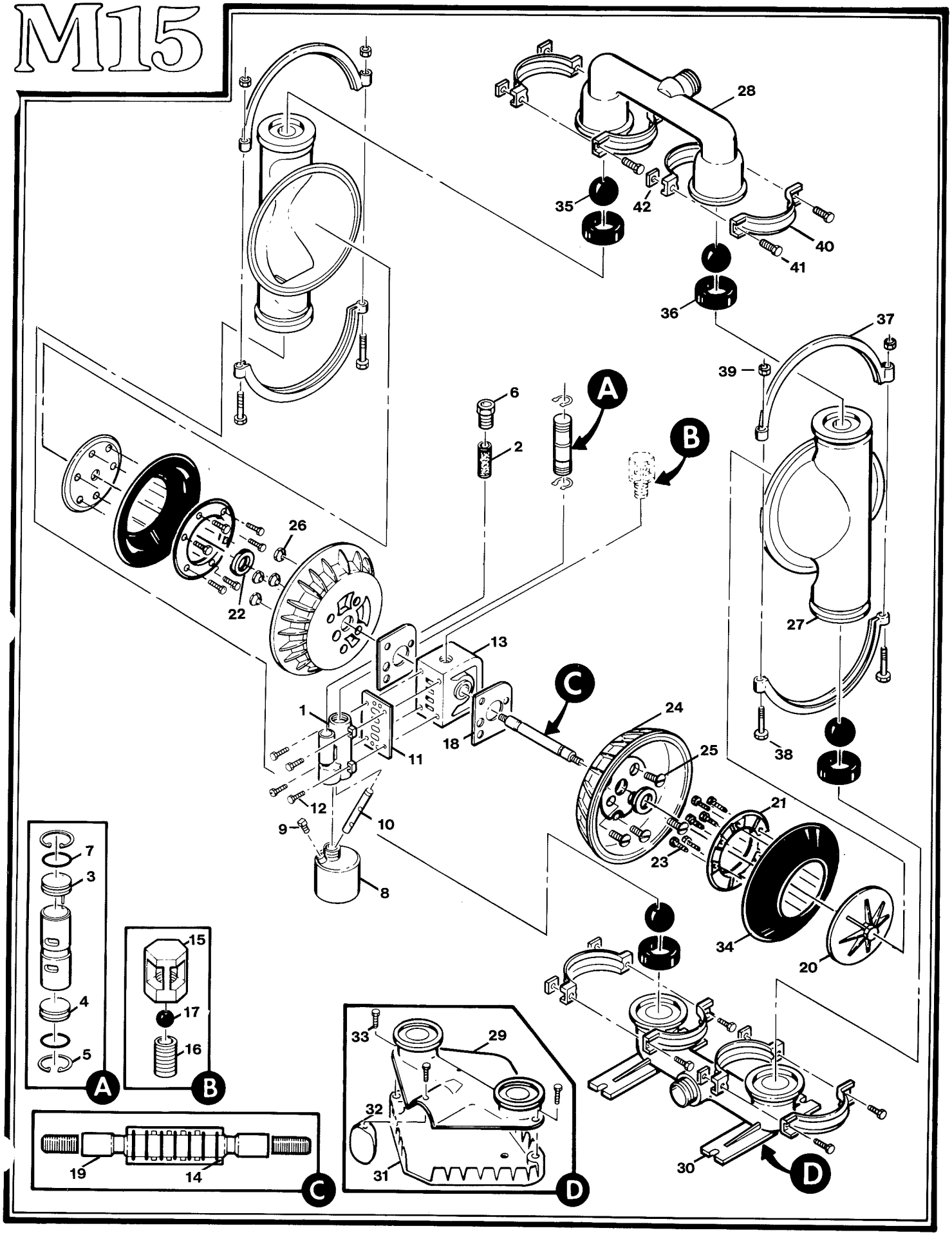
Item	Description	Qty.	M15 /00 P/N	M15 /F0 P/N	M15 /B0 P/N	M15 /BF P/N	M15 /0A P/N	M15 /0B P/N	M15 /0F P/N	M15 /FB P/N	M15 /H0 P/N	M15 /HJ P/N	M15 /HS P/N
1	Air Valve Assembly[1]	1	1A	1A	1A	1A	1A	1A	1A	1A	1A	SG1A	1A
2	Air Valve Screen	1	20E	20E	20E	20E	20E	20E	20E	20E	20E	20E	20E
3	Air Valve End Cap with Guide (top)	1	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23
4	Air Valve End Cap without Guide (bottom)	1	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23
5	Air Valve Snap Ring	2	S1T	S1T	S1T	S1T	S1T	S1T	S1T	S1T	S1T	S1T	S1T
6	Air Valve Bushing	1	30AP	30AP	30AP	30AP	30AP	30AP	30AP	30AP	30AP	S20AP	S20AP
7	Air Valve Cap O-Ring	2	1U	1U	1U	1U	1U	1U	1U	1U	1U	1U	1U
8	Oil Bottle (Optional)	1	1D	1D	1D	1D	1D	1D	1D	1D	1D	SG1D	1D
9	Plug (Optional)	1	1DP	1DP	11DP	11DP	1DP	11DP	1DP	11DP	11DP	S1DP	11DP
10	Capillary Rod (Optional)	1	1C	1C	1C	1C	1C	1C	1C	1C	1C	1C	1C
11	Air Valve Gasket — Buna N	1	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52
12	Air Valve Screw	4	20AS	20AS	30AS	30AS	;20AS	30AS	20AS	30AS	30AS	30AS	30AS
13	Center Block	1	P1H	P1H	P1H	P1H	1H	1H	1H	1H	P1H	SG1H	S1H
14	Center Block O-Ring	7	1JH	1JH	1JH	1JH	1JH	1JH	1JH	1JH	1JH	1JH	1JH
15	Check Body	1	1K1	N/R	1K1	N/R	1K1	1K1	N/R	N/R	N/R	N/R	N/R
16	Nipple	1	1F	N/R	1FS	N/R	1F	1FS	N/R	N/R	N/R	N/R	N/R
17	Check Ball	1	1M	N/R	1M	N/R	1M	1M	N/R	N/R	N/R	N/R	N/R
18	Block Gasket — Buna N	2	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52
19	Shaft	1	2A	2A	2A	2A	2A	2A	2A	2A	2A	2A	2A
20	Piston, Outer	2	B2B	B2B	B2B	B2B	B2B	B2B	B2B	B2B	H2B	H2B	H2B
21	Piston, Inner	2	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C	S2C
22	Washer, Inner Piston Back-up	2	2EE	2EE	2EE	2EE	2EE	2EE	2EE	2EE	2EE	2EE	2EE
23	Piston Assembly — Bolt & Washer	12	2G/68B	2G/68B	2G/68B	2G/68B	2G/68B	2G/68B	2G/68B	2G/68B	2G/68B	2G/68B	2G/68B
24	Air Chamber, Counter Sunk	2	3B	3B	3B	3B	3B	3B	3B	3B	3B	SG3B	S3B
25	Air Chamber Screw	4	3C	3C	3C	3C	3C	3C	3C	3C	3C	S3C	S3C
26	Air Chamber Cone Nut	4	22D	22D	22D	22D	22D	22D	22D	22D	22D	S22D	S22D
27	Water Chamber	2	50	50	50	50	50	50	50	50	H50	H50	H50
28	Discharge Manifold	1	51	51	B51	B51	51	B51	51	B51	H51	H51	H51
29	Inlet Housing — Screened	1	52	N/R	B52	N/R	52	B52	N/R	N/R	N/R	N/R	N/R
30	Inlet Housing for Footed Base	1	N/R	52F	N/R	B52F	N/R	N/R	52F	B52F	H52	H52	H52
31	Screen (for P/N 52 & B52)	1	53	N/R	53	N/R	53	53	N/R	N/R	N/R	N/R	N/R
32	Suction Hook-up Cover	1	57	N/R	57	N/R	57	57	N/R	N/R	N/R	N/R	N/R
33	Hex Head Machine Screw	3	38A	N/R	38AS	N/R	38A	38AS	N/R	N/R	N/R	N/R	N/R
34	Diaphragm	2	*	*	*	*	*	*	*	*	*	*	*
35	Valve Ball	4	*	*	*	*	*	*	*	*	*	*	*
36	Valve Seat	4	*	*	*	*	*	*	*	*	*	*	*
37	Large Clamp Band	2	11	11	S11	S11	11	S11	11	S11	S11	S11	S11
38	Large Carriage Bolt	4	11C	11C	S11C	S11C	11C	S11C	11C	S11C	S11C	S11C	S11C
39	Large Hex Nut	4	11D	11D	S11D	S11D	11D	S11D	11D	S11D	S11D	S11D	S11D
40	Small Clamp Band	4	54	54	S54	S54	54	S54	54	S54	S54	S54	S54
41	Small Carriage Bolt	8	54B	54B	S54B	S54B	54B	S54B	54B	S54B	S54B	S54B	S54B
42	Small Hex Nut	8	30D	30D	S30D	S30D	30D	S30D	30D	S30D	S30D	S30D	S30D
43	Muffler (Optional; not shown)	1	70B	70B	70B	70B	70B	70B	70B	70B	70B	70B	70B

Item	Description	Qty.	M15 /HW P/N	M15 /S0 P/N	M15 /SJ P/N	M15 /SS P/N	M15 /SW P/N	M15 /SX P/N	M15 /W0 P/N	M15 /WS P/N	M15 /WW P/N	M15 /SGR P/N
1	Air Valve Assembly[1]	1	1A	1A	SG1A	1A	1A	S1A	1A	1A	1A	SG1A
2	Air Valve Screen	1	20E	20E	20E	20E	20E	20E	20E	20E	20E	20E
3	Air Valve End Cap with Guide (top)	1	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23
4	Air Valve End Cap without Guide (bottom)	1	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23
5	Air Valve Snap Ring	2	S1T	S1T	S1T	S1T	S1T	S1T	S1T	S1T	S1T	S1T
6	Air Valve Bushing	1	30AP	30AP	S20AP	30AP	30AP	S20AP	30AP	30AP	30AP	S20AP
7	Air Valve Cap O-Ring	2	1U	1U	1U	1U	1U	1U	1U	1U	1U	1U
8	Oil Bottle (Optional)	1	1D	1D	1D	1D	1D	1D	1D	1D	1D	1D
9	Plug (Optional)	1	11D	11D	11D	11D	11D	11DP	11D	11D	11D	11D
10	Capillary Rod (Optional)	1	1C	1C	1C	1C	1C	1C	1C	1C	1C	1C
11	Air Valve Gasket — Buna N	1	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52
12	Air Valve Screw	4	30AS	30AS	30AS	30AS	30AS	30AS	30AS	30AS	30AS	30AS
13	Center Block	1	P1H	P1H	SG1H	S1H	P1H	S1H	P1H	P1H	P1H	S1H
14	Center Block O-Ring	7	1JH	1JH	1JH	1JH	1JH	1JH	1JH	1JH	1JH	1JH
15	Check Body	1	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
16	Nipple	1	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
17	Check Ball	1	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
18	Block Gasket — Buna N	2	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52
19	Shaft	1	2A	2A	2A	2A	2A	2A	2A	2A	2A	2A
20	Piston, Outer	2	H2B	S2B	S2B	S2B	S2B	S2B	W2B	W2B	W2B	S2B
21	Piston, Inner	2	2C	2C	2C	2C	2C	2C	2C	2C	2C	2C
22	Washer, Inner Piston Back-up	2	2EE	2EE	2EE	2EE	2EE	2EE	2EE	2EE	2EE	2E
23	Piston Assembly — Bolt & Washer	12	2G/68B	2G/68B	2G/68B	2G/68B	2G/68B	2G/68B	2G/68B	2G/68B	2G/68B	2G/68B
24	Air Chamber, Counter Sunk	2	W3B	3B	SG3B	S3B	W3B	S3B	3B	3B	W3B	S3B
25	Air Chamber Screw	4	3C	3C	S3C	S3C	3C	S3C	3C	3C	3C	S3C
26	Air Chamber Cone Nut	4	22D	22D	S22D	S22D	22D	22D	22D	22D	22D	S22D
27	Water Chamber	2	H50	S50	S50	S50	S50	S50	W50	W50	W50	S50
28	Discharge Manifold	1	H51	S51	S51	S51	S51	W51	W51	W51	W51	SG51
29	Inlet Housing — Screened	1	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
30	Inlet Housing for Footed Base	1	H52	S52	S52	S52	S52	S52	W52	W52	W52	SG52
31	Screen (for P/N 52 & B52)	1	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
32	Suction Hook-up Cover	1	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
33	Hex Head Machine Screw	3	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R	N/R
34	Diaphragm	2	*	*	*	*	*	*	*	*	*	FG5
35	Valve Ball	4	*	*	*	*	*	*	*	*	*	FG55
36	Valve Seat	4	*	*	*	*	*	*	*	*	*	FB56
37	Large Clamp Band	2	S11	S11	S11	S11	S11	S11	11	S11	S11	SG11
38	Large Carriage Bolt	4	S11C	S11C	S11C	S11C	S11C	S11C	11C	S11C	S11C	S11C
39	Large Hex Nut	4	S11D	S11D	S11D	S11D	S11D	S11D	11D	S11D	S11D	N/A
40	Small Clamp Band	4	S54	S54	S54	S54	S54	S54	54	S54	S54	SG54
41	Small Carriage Bolt	8	S54B	S54B	S54B	S54B	S54B	S54B	54B	S54B	S54B	S54B
42	Small Hex Nut	8	S30D	S30D	S30D	S30D	S30D	S30D	30D	S30D	S30D	N/A
43	Muffler (Optional; not shown)	1	70B	70B	70B	70B	70B	70B	70B	70B	70B	70B

[1]Air Valve Assembly includes parts thru 1U.
[2]Optional elastomers available. See page 16.
[3]SGR pump large clamp band comes with SP11WN wing nut and SP11C washer.
[4]SGR pump small clamp band comes with SP30WN wing nut and SP30C washer.

***Refer to page 16 for elastomer options.**

M15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WILDEN MODEL M15 w/TEFLON® ELASTOMERS

Item	Description	Qty.	M15 /TO P/N	M15 /OT P/N	M15 /BT P/N	M15 /TB P/N	M15 /HT P/N	M15 /HV P/N	M15 /HY P/N	M15 /ST P/N	M15 /SV P/N	M15 /SY P/N	M15 /SZ P/N	M15 /WT P/N	M15 /WY P/N	M15 /SNR P/N
1	Air Valve Assembly[1]	1	1A	1A	1A	1A	1A	1A	1A	1A	1A	1A	S1A	1A	1A	SG1A
2	Air Valve Screen	1	20E	20E	20E	20E	20E	20E	20E	20E	20E	20E	20E	20E	20E	20E
3	Air Valve End Cap w/Guide (top)	1	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23	15-2340-23	S1RA	15-2340-23	15-2340-23	15-2340-23
4	Air Valve End Cap without Guide (bottom)	1	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23	15-2350-23	S1S	15-2350-23	15-2350-23	15-2350-23
5	Air Valve Snap Ring	2	S1T	S1T	S1T	S1T	S1T	S1T	S1T	S1T	S1T	S1T	S1T	S1T	S1T	S1T
6	Air Valve Bushing	1	30AP	30AP	30AP	30AP	30AP	S20AP	30AP	30AP	30AP	30AP	S20AP	30AP	30AP	S20AP
7	Air Valve Cap O-Ring	2	1U	1U	1U	1U	1U	1U	1U	1U	1U	1U	1U	1U	1U	1U
8	Oil Bottle (Optional)	1	1D	1D	1D	1D	1D	1D	1D	1D	1D	1D	1D	1D	1D	1D
9	Plug (Optional)	1	11D	11D	11D	11D	11D	11D	11D	11D	11D	11D	11D	11D	11D	11D
10	Capillary Rod (Optional)	1	1C	1C	1C	1C	1C	1C	1C	1C	1C	1C	1C	1C	1C	1C
11	Air Valve Gasket — Buna N	1	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52	15-2600-52
12	Air Valve Screw	4	30AS	30AS	30AS	30AS	30AS	30AS	30AS	30AS	30AS	30AS	30AS	30AS	30AS	30AS
13	Center Block	1	P1H	1H	P1H	1H	P1H	S1H	P1H	P1H	S1H	P1H	S1H	P1H	P1H	S1H
14	Center Block O-Ring	7	1JH	1JH	1JH	1JH	1JH	1JH	1JH	1JH	1JH	1JH	1JH	1JH	1JH	1JH
15	Block Gasket — Buna N	2	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52	15-3520-52
16	Shaft	1	2A	2A	2A	2A	2A	2A	2A	2A	2A	2A	2A	2A	2A	2A
17	Piston, Outer	2	ST2B	ST2B	ST2B	ST2B	HT2B	HT2B	HT2B	ST2B	ST2B	ST2B	ST2B	ST2B	ST2B	ST2B
18	Piston, Inner	2	ST2C	ST2C	ST2C	ST2C	ST2C	ST2C	ST2C	ST2C	ST2C	ST2C	ST2C	ST2C	ST2C	ST2C
19	Air Chamber, Counter Sunk	2	3B	3B	3B	3B	3B	S3B	W3B	3B	S3B	W3B	S3B	3B	W3B	S3B
20	Air Chamber Screw	4	3C	3C	S3CV	S3C	3C	S3C	3C	3C	S3C	3C	S3C	3C	3C	3C
21	Air Chamber Cone Nut	4	22D	22D	S22D	S22D	22D	S22D	22D	22D	S22D	22D	S22D	22D	22D	22D
22	Water Chamber	2	50	50	50	50	H50	H50	H50	S560	S50	S50	S50	W50	W50	S50
23	Discharge Manifold	1	51	51	B51	B51	H51	H51	H51	S51	S51	S51	S51	W51	W51	SG51
24	Inlet Manifold	1	52F	52F	B52F	B52F	H52	H52	H52	S52	S52	S52	S52	W52	W52	SG52
25	Diaphragm	2	TF5	TF5	TF5	TF5	TF5	TF5	TF5	TF5	TF5	TF5	TF5	TF5	TF5	TF5
26	Back-up Diaphragm[4]	2	15-1060-56	15-1060-56	15-1060-56	15-1060-56	15-1060-56	15-1060-56	15-1060-56	15-1060-56	15-1060-56	15-1060-56	15-1060-56	15-1060-56	15-1060-56	15-1060-56
27	Valve Ball	4	TF55	TF55	TF55	TF55	TF55	TF55	TF55	TF55	TF55	TF55	TF55	TF55	TF55	TF55
28	Valve Seat	4	A56	A56	A56	A56	H56	H56	H56	S56	S56	S56	S56	CS56	CS56	S56
29	Large Clamp Band	2	S11	S11	S11	S11	S11	S11	S11	S11	S11	S11	S11	S11	S11	SG11
30	Large Carriage Bolt	4	S11C	S11C	S11C	S11C	S11C	S11C	S11C	S11C	S11C	S11C	S11C	S11C	S11C	S11C
31	Large Hex Nut[2]	4	S11D	S11D	S11D	S11D	S11D	S11D	S11D	S11D	S11D	S11D	S11D	S11D	S11D	N/A
32	Small Clamp Band	4	S54	S54	S54	S54	S54	S54	S54	S54	S54	S54	S54	S54	S54	S54B
33	Small Carriage Bolt	8	S54B	S54B	S54B	S54B	S54B	S54B	S54B	S54B	S54B	S54B	S54B	S54B	S54B	S54B
34	Small Hex Nut[3]	8	S30D	S30D	S30D	S30D	S30D	S30D	S30D	S30D	S30D	S30D	S30D	S30D	S30D	N/A
35	Teflon® Valve Seat O-Ring	4	56T	56T	56T	56T	56T	56T	56T	56T	56T	56T	56T	56T	56T	SP30C
36	Muffler (optional)	1	70B	70B	70B	70B	70B	70B	70B	70B	70B	70B	70B	70B	70B	70B

[1]Air Valve Assembly includes parts thru 1U.
[2]SNR pump large clamp band comes with SP11WN wing nut and SP11C washer.
[3]SNR pump small clamp band comes with SP30WN wing nut and SP30C washer.
[4]Neoprene back-up diaphragm, P/N TF5B, is available upon request. Please consult your local distributor.

Teflon — Registered Trademark E.I. DuPont de Nemours & Co.

ELASTOMER OPTIONS FOR MODEL M15

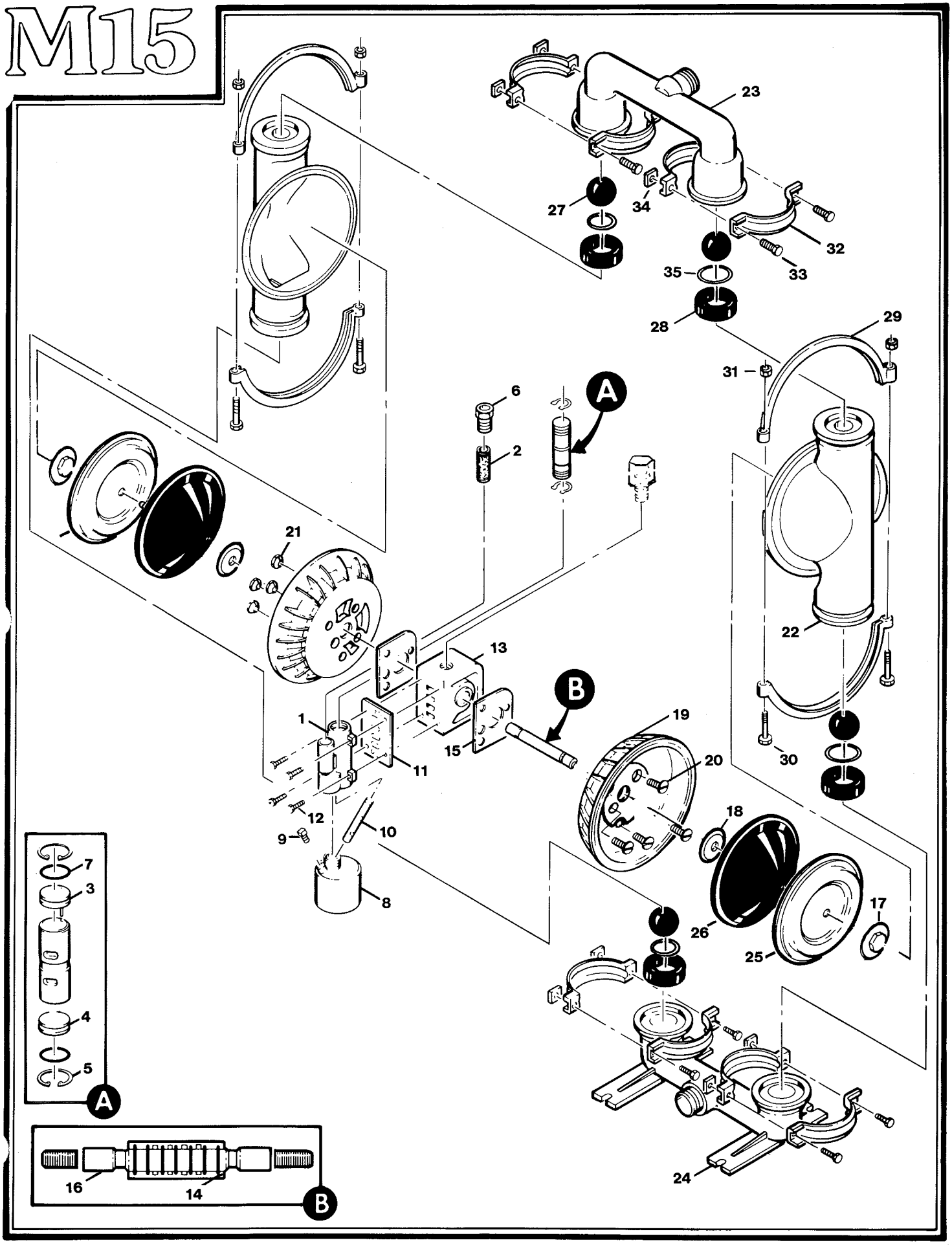
MATERIAL	DIAPHRAGMS (2) PER PUMP (ITEM #34)	VALVE BALLS (4) PER PUMP (ITEM #35)	VALVE SEATS (4) PER PUMP
Buna-N	BN5	BN55	BN56
Neoprene	5	55	56
Nordel (EPDM)	ND5	ND55	ND56
Polyurethane	PU5	15-1080-50	15-1120-50
Saniflex™	FG5	FG55	FB56
Teflon® PTFE	TF5[1]	TF55	N/A
Viton	VT5	VT55	VT56
Wil-Flex™	15-1010-58	15-1080-58	15-1120-58
Aluminum	N/A	N/A	A56[2]
Carbon Steel	N/A	N/A	CS56[2]
Hastelloy	N/A	N/A	H56[2]
Stainless Steel	N/A	N/A	S56[2]

NOTES:

[1]Teflon® diaphragms utilize a Saniflex™ back-up diaphragm (P/N 15-1060-56). Neoprene back-up diaphragm, P/N TF5B, is available upon request. Please consult your local distributor.

[2]Metallic valve seats utilize a Teflon® O-ring, P/N 56T.

M15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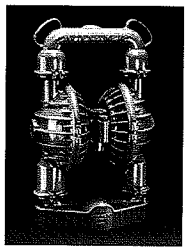
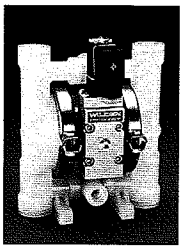
WILDEN'S SPECIALTY PUMPS

M8 STALLION



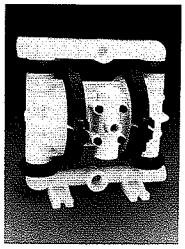
2" inlet. Solids clearance up to ¾". Built to handle rough treatment: cast-in handles for easy portability, reinforced shaft and high impact polyurethane base.

SOLENOID-OPERATED



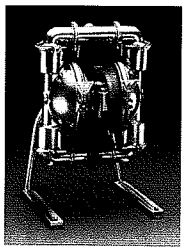
Each stroke of this pump is controlled by electrical impulses making it ideal for batching, metering, and other electrically controlled dispensing applications.

M1 ULTRAPURE III



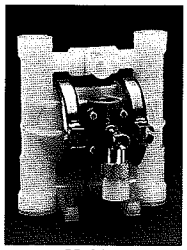
½" inlet. Teflon® PFA construction, temperatures to 300°F. Up to 14 GPM. Materials of construction have been selected to reduce contamination while providing a safer work environment.

FOOD PROCESSING



Constructed with FDA approved materials: bead blasted 316 Stainless Steel construction with tri-clamp porting and wing-nut fasteners. Foodmaster™ (pictured) is USDA accepted.

THE WILDEN PUMP LINE



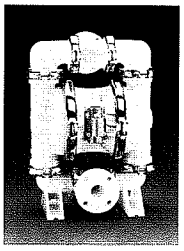
M.025 (CHAMP SERIES)

MODEL M.025

- ¼" Inlet
- 125 Max. PSIG
- Up To 4.5 GPM
- Max. Particle Size: 1/64"

Materials of Construction:
PVDF, Acetal, Polypropylene, Carbon-filled Acetal

Suction Lift:		
(Rubber)	Dry: 4.5'	
	Wet: 25'	
(Teflon®)	Dry: 4.5'	
	Wet: 25'	



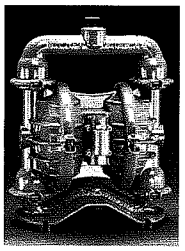
M4 PLASTIC (CHAMP SERIES)

MODEL M4

- 1½" Inlet
- 125 Max. PSIG
- Up To 73 GPM
- Max. Particle Size: 3/16"

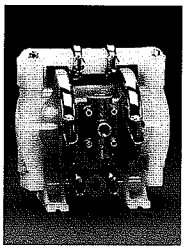
Materials of Construction:
Aluminum, Cast Iron, Stainless Steel, Hastelloy, Polypropylene, PVDF, Teflon® PFA

Suction Lift:	Plastic	Metal
(Rubber)	Dry: 17'	21'
	Wet: 25'	25'
(Teflon®)	Dry: 7'	7'
	Wet: 25'	25'



M4 METAL

LUBE-FREE AVAILABLE



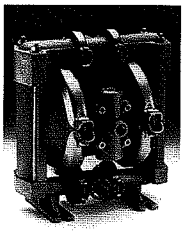
M1 PLASTIC (CHAMP SERIES)

MODEL M1

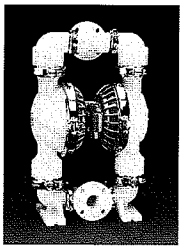
- ½" Inlet
- 110 Max. PSIG
- Up To 14 GPM
- Max. Particle Size: 1/16"

Materials of Construction:
Polypropylene, PVDF, Teflon®, Graphite-filled Polypropylene, Aluminum, Stainless Steel

Suction Lift:	Plastic	Metal
(Rubber)	Dry: 10'	10'
	Wet: 25'	25'
(Teflon®)	Dry: 7'	8'
	Wet: 25'	25'



M1 METAL



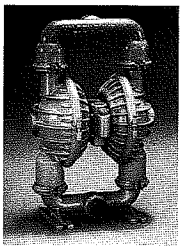
M8 PLASTIC (CHAMP SERIES)

MODEL M8

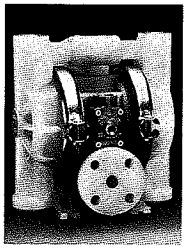
- 2" Inlet
- 125 Max. PSIG
- Up To 155 GPM
- Max. Particle Size: ¼"

Materials of Construction:
Aluminum, Cast Iron, Stainless Steel, Hastelloy, PVDF, Polypropylene

Suction Lift:	Plastic	Metal
(Rubber)	Dry: 17'	20'
	Wet: 25'	25'
(Teflon®)	Dry: 8'	8'
	Wet: 25'	25'



M8 METAL



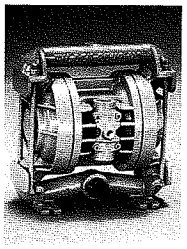
M2R PLASTIC (CHAMP SERIES)

MODEL M2

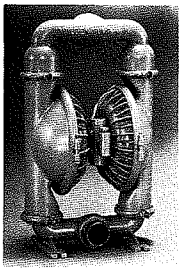
- 1" Inlet
- 125 Max. PSIG
- Up To 37 GPM
- Max. Particle Size: 1/8"

Materials of Construction:
Aluminum, Stainless Steel, Hastelloy, Polypropylene, PVDF

Suction Lift:	Plastic	Metal
(Rubber)	Dry: 17'	19'
	Wet: 25'	25'
(Teflon®)	Dry: 7'	8'
	Wet: 25'	25'



M2 METAL



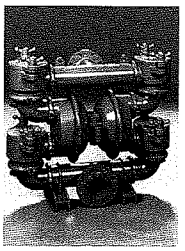
M15

MODEL M15

- 3" Inlet
- 125 Max. PSIG
- Up To 230 GPM
- Max. Particle Size: 3/8"

Materials of Construction:
Aluminum, Cast Iron, Stainless Steel, Hastelloy

Suction Lift:	
(Rubber)	Dry: 17'
	Wet: 25'
(Teflon®)	Dry: 14'
	Wet: 25'



M20

MODEL M20

- 4" Inlet
- 125 Max. PSIG
- Up To 304 GPM
- Max. Particle Size: 1⅜"

Materials of Construction:
Cast Iron

Suction Lift:
Dry: 13'
Wet: 25'

For further information contact your local Wilden distributor:

WILDEN PUMP & ENGINEERING COMPANY
22069 Van Buren St., Grand Terrace, CA 92313
(909) 422-1730 • FAX (909) 783-3440