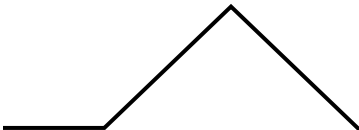
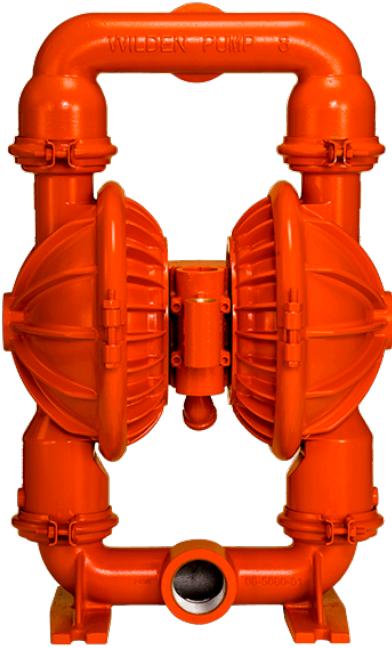


EOM

ENGINEERING OPERATION
& MAINTENANCE MANUAL

T8 Clamped Metal Pump



Where Innovation Flows

WILDEN®



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Warranty

Each and every product manufactured by Wilden is built to meet the highest standards of quality. Every pump is functionally tested to ensure integrity of operation. Wilden warrants that pumps, accessories and parts manufactured or supplied by it to be free from defects in material and workmanship for a period of five (5) years from date of installation or six (6) years from date of manufacture, whichever comes first.

For more information, and to register your Wilden pump for warranty, please visit <https://www.psgdover.com/wilden/support/warranty-registration>.

Certifications

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SECTION 1

PRECAUTIONS – READ FIRST!



WARNING: Always wear safety glasses when operating a pump to avoid eye injury. If diaphragm rupture occurs, material being pumped may be forced out of the air exhaust.



CAUTION: Do not apply compressed air to the exhaust port – pump will not function.



CAUTION: Do not over-lubricate air supply– excess lubrication will reduce pump performance. Pump is pre-lubed.



TEMPERATURE LIMITS:

Acetal	-29°C to 82°C	-20°F to 180°F
Buna-N	-12°C to 82°C	10°F to 180°F
Bunastat™	-40°C to 130°C	-40°F to 266°F
Geolast®	-40°C to 82°C	-40°F to 180°F
Neoprene	-18°C to 93°C	0°F to 200°F
Nordel™ EPDM	-51°C to 138°C	-60°F to 280°F
Nylon	-18°C to 93°C	0°F to 200°F
PFA	-7°C to 107°C	45°F to 225°F
Polypropylene	0°C to 79°C	32°F to 175°F
Polyurethane	-12°C to 66°C	10°F to 150°F
PVDF	-12°C to 107°C	10°F to 225°F
Saniflex	-29°C to 104°C	-20°F to 220°F
SIPD PTFE with EPDM-backed	4°C to 137°C	40°F to 280°F
SIPD PTFE with Neoprene-backed	4°C to 93°C	40°F to 200°F
PTFE*	4°C to 104°C	40°F to 220°F
FKM	-40°C to 177°C	-40°F to 350°F
Wil-Flex®	-40°C to 107°C	-40°F to 225°F

*4°C to 149°C (40°F to 300°F) - 13 mm (1/2") and 25 mm (1") models only.

NOTE: Not all materials are available for all models. See "Wilden Pump Designation System" for material options for your pump.



CAUTION: When choosing pump materials, be sure to check the temperature limits for all wetted components. Example: FKM has a maximum limit of 177°C (350°F), but polypropylene has a maximum limit of only 79°C (175°F).



CAUTION: Maximum temperature limits are based on mechanical stress only. Certain chemicals will reduce maximum safe operating temperatures significantly. Consult the Chemical Resistance Guide for chemical compatibility and temperature limits.



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



CAUTION: All Wilden pumps are capable of passing solids. Use a strainer on the pump intake to ensure that the pump's rated solids capacity is not exceeded.



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



CAUTION: Do not exceed 82°C (180°F) air inlet temperature for all models.



CAUTION: The process fluid and cleaning fluids must be compatible chemically with all wetted pump components.



CAUTION: Before attempting any maintenance or repair, disconnect the compressed air line to the pump and allow all air pressure 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 any hazardous effects of contact with your process fluid.



CAUTION: Thoroughly flush pumps before installing them into process lines. Clean and/or sanitize FDA- and USDA- approved pumps before using them.



CAUTION: Before attaching the air line to the pump, blow out the air line for 10 to 20 seconds to make sure all pipeline debris is clear. Use an in-line air filter. A 5µ (micron) air filter is recommended.



CAUTION: Pro-Flo pumps cannot be used in submersible applications. Pro-Flo SHIFT is available in both single-point exhaust (submersible) and standard (non-submersible) options. Do not use standard Pro-Flo SHIFT models in submersible applications.



CAUTION: Before installation, tighten all hardware.



NOTE: Materials of construction and elastomer material may influence suction lift parameters. Please refer to "Performance" for specifics.



NOTE: When installing PTFE diaphragms, it is important to tighten outer pistons simultaneously (turning in opposite directions) to ensure tight fit. (See "Maximum Torque Specifications").



NOTE: In the event of a power failure, close the shut-off valve if you do not want the pump to restart when the power returns.



WARNING: This product can expose you to chemicals including Nickel, Chromium, Cadmium, or Cobalt, which are known to the State of California to cause cancer and/or birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov.

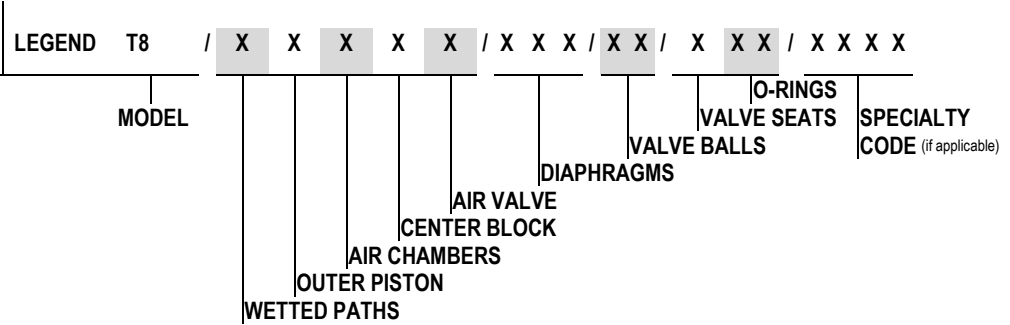
SECTION 2

WILDEN PUMP DESIGNATION SYSTEM

T8 ORIGINAL™ METAL

51 mm (2") Pump

Maximum Flow Rate:
617 lpm (163 gpm)



MATERIAL CODES

MODEL

T8 = 51 MM (2")

WETTED PATH

A = ALUMINUM
W = DUCTILE IRON

OUTER PISTON

A = ALUMINUM
S = STAINLESS STEEL
W = DUCTILE IRON

AIR CHAMBERS

A = ALUMINUM
W = DUCTILE IRON

CENTER BLOCK

A = ALUMINUM
P = POLYPROPYLENE

AIR VALVE

B = BRASS

DIAPHRAGMS

BNS = BUNA-N (RED DOT)
BNS = BUNA-N, ULTRA-FLEX™
EPS = EPDM (BLUE DOT)
EPS = EPDM, ULTRA-FLEX™
FSS = SANIFLEX™ [HYTREL® (CREAM)]
NES = NEOPRENE (GREEN DOT)
NEU = NEOPRENE, ULTRA-FLEX™
TEU = PTFE W/EPDM BACK-UP (WHITE)
TNU = PTFE W/NEOPRENE BACK-UP (WHITE)
TSU = PTFE W/SANIFLEX™ BACK-UP (WHITE)
VTS = FKM (WHITE DOT)
VTU = FKM, ULTRA-FLEX™
ZWS = WIL-FLEX® [SANTOPRENE® (THREE BLACK DOTS)]

VALVE BALLS

BN = BUNA-N (RED DOT)
EP = EPDM (BLUE DOT)
FS = SANIFLEX™ [HYTREL® (CREAM)]
NE = NEOPRENE (GREEN DOT)
PU = POLYURETHANE (BROWN)
TF = PTFE (WHITE)
VT = FKM (WHITE DOT)
WF = WIL-FLEX® [SANTOPRENE® (THREE BLACK DOTS)]

VALVE SEAT

A = ALUMINUM
BN = BUNA-N (RED DOT)
EP = EPDM (BLUE DOT)
FS = SANIFLEX™ [HYTREL® (CREAM)]
M = MILD STEEL*
NE = NEOPRENE (GREEN DOT)
PU = POLYURETHANE (BROWN)
S = STAINLESS STEEL*
VT = FKM (WHITE DOT)
WF = WIL-FLEX® [SANTOPRENE® (THREE BLACK DOTS)]

VALVE SEAT O-RING

TF = PTFE (WHITE)

SPECIALTY CODES

0014 BSPT	0048 Stallion®, internals	0116 Stallion®, BSPT, without handles
0030 Screen based	0049 Stallion®, aluminum screen base	0117 Stallion®, footed, BSPT, without handles
0036 Screen based, BSPT	0050 Stallion®	0231 Stallion®, externals (screen & handles)
0039 Screen based, polyurethane screen	0051 Stallion®, BSPT	0233 Stallion®, externals (screen & handles), BSPT
0044 Stallion®, balls & seats ONLY	0053 Stallion®, footed, BSPT	
0045 Stallion®, shaft & bumpers ONLY	0054 Stallion®, footed	
0046 Stallion®, internals, BSPT		

! NOTE: Most elastomeric materials use colored dots for identification

! NOTE: Not all models are available with all material options

FKM® is a registered trademark of DuPont Dow Elastomers.

Santoprene® is a registered trademark of Monsanto Company, licensed to Advanced Elastomer Systems, L.P.

Hytrel® is a registered trademark of DuPont Dow Elastomers.

SECTION 3

HOW IT WORKS – AIR-OPERATED DOUBLE-DIAPHRAGM PUMP

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.

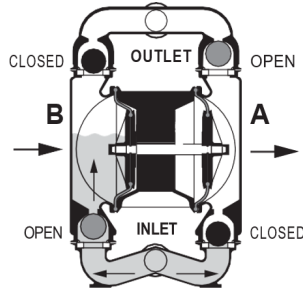


FIGURE 1 The air valve directs pressurized air to the back side of diaphragm A. The compressed air is applied directly to the liquid column separated by elastomeric diaphragms. The diaphragm acts as a separation membrane between the compressed air and liquid; a balanced load removes mechanical stress from the diaphragm. The compressed air moves the diaphragm away from the center 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 atmosphere through the exhaust port of the pump. The movement of diaphragm B toward the center 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).

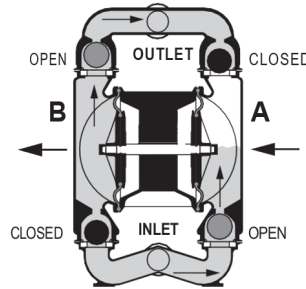


FIGURE 2 When the pressurized diaphragm, diaphragm A, reaches the limit of its discharge stroke, the air valve redirects pressurized air to the back side of diaphragm B. The pressurized air forces diaphragm B away from the center while pulling diaphragm A to the center. Diaphragm B is now on its discharge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

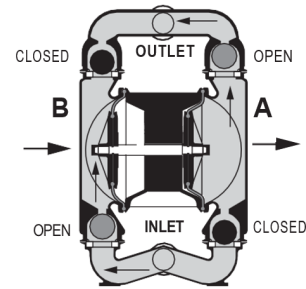
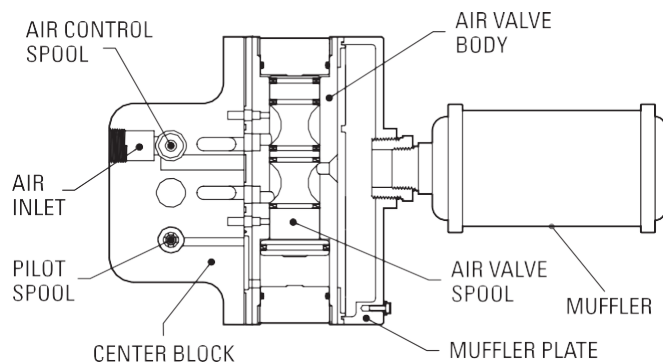


FIGURE 3 At completion of the stroke, the air valve again redirects air to the back side of diaphragm A, which starts diaphragm B on its exhaust stroke. As the pump reaches its original starting point, each diaphragm has gone through one exhaust and one discharge stroke. This constitutes one complete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

HOW IT WORKS – AIR DISTRIBUTION SYSTEM

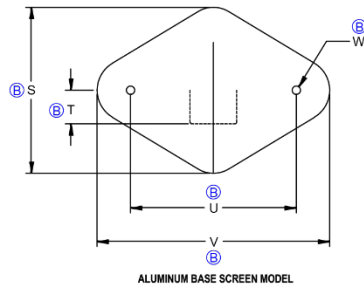
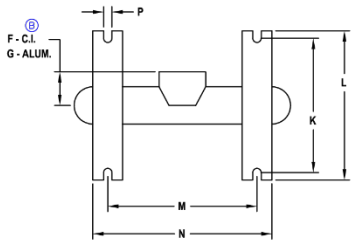
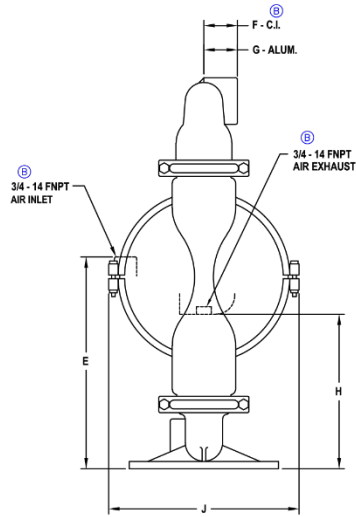
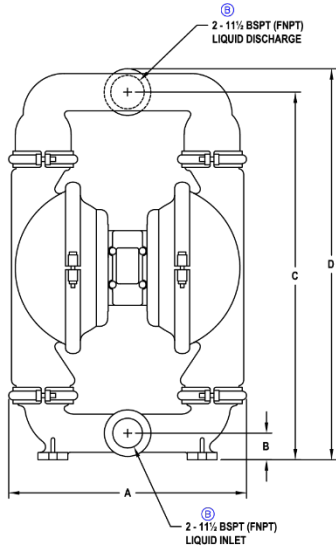


The heart of the patented Pro-Flo® SHIFT Air Distribution System (ADS) is the air valve assembly. The air valve design incorporates an unbalanced spool with the small end of the spool being pressurized continuously while the large end of the spool is alternately pressurized, then exhausted to move the spool. The air valve spool directs pressurized air to one chamber while exhausting the other. The air forces the main shaft/diaphragm assembly to move to one side – discharging liquid on that side and pulling liquid in on the other side. When the shaft reaches the end of the stroke, the inner piston actuates the pilot spool, which controls the air to the large end of the air valve spool. The repositioning of the air valve spool routes the air to the other air chamber. The air control spool allows air to flow freely into the air chamber for the majority of each pump stroke, but it significantly restricts the flow of air into the air chamber when activated by the inner piston near the end of each stroke.

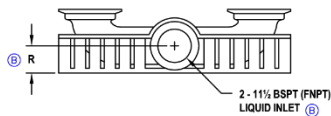
SECTION 4

DIMENSIONAL DRAWING

T8 METAL



NOTES: UNLESS OTHERWISE SPECIFIED
1. DIMENSIONS AND TOLERANCES PER ASME Y14.5M-1994.



DIMENSIONS

ITEM	METRIC (mm)	STANDARD (inch)
A	404	15.9
B	48	1.9
C	630	24.8
D	668	26.3
E	361	14.2
F	58	2.3
G	61	2.4
H	272	10.7
J	343	13.5
K	229	9.0
L	254	10.0
M	257	10.1
N	312	12.3
P	15	0.6
R	51	2.0
S	282	11.1
T	71	2.8
U	282	11.1
V	386	15.2
W	15 DIA	0.6 DIA

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LW0389 REV. B

SECTION 5

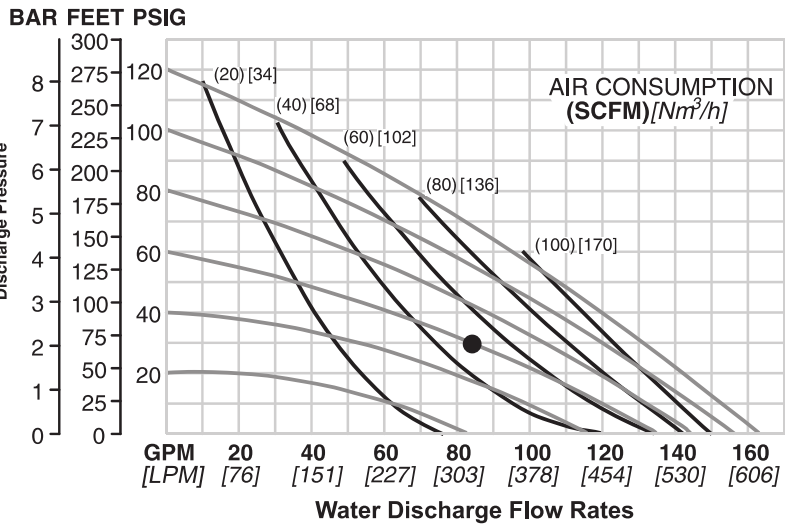
PERFORMANCE

T8 METAL RUBBER-FITTED

Ship Weight.....Aluminum 33 kg (72 lb)
Cast Iron 52 kg (114 lb)
Air Inlet.....19 mm(3/4")
Inlet.....51 mm (2")
Outlet.....51 mm (2")
Suction Lift.....6.4 m Dry (21')
9.5 m Wet (31')
Disp. Per Stroke¹.....2.69 L (0.71 gal)
Max. Flow Rate.....617 lpm (163 gpm)
Max. Size Solids.....6.4 mm (1/4")

¹Displacement per stroke was calculated at 4.8 bar (70 psig) air inlet pressure against a 2.1 bar (30 psig) head pressure.

Example: To pump 318 lpm (84 gpm) against a discharge head of 2.1 bar (30 psig) requires 4.1 bar (60 psig) and 85 Nm³/h (50 scfm) air consumption.



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's performance curve.

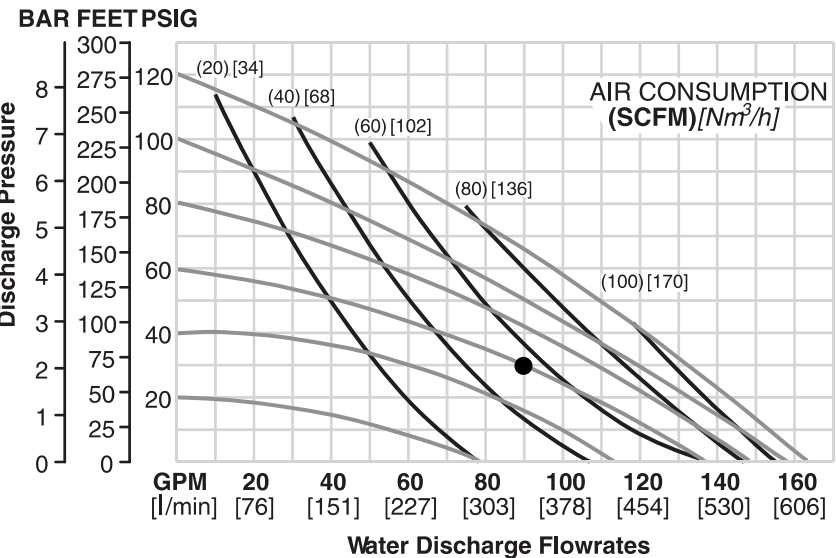
Caution: Do not exceed 8.6 bar (125 psig) air supply pressure.

T8 METAL TPE-FITTED

Ship Weight.....Aluminum 33 kg (72 lb)
Cast Iron 52 kg (114 lb)
316 Stainless Steel 48.8 kg (106 lb)
Alloy C 53.4 kg (116 lb)
Air Inlet.....19 mm(3/4")
Inlet.....51 mm (2")
Outlet.....51 mm (2")
Suction Lift.....6.1 m Dry (20')
9.5 m Wet (31')
Disp. Per Stroke¹.....2.80 L (0.74 gal)
Max. Flow Rate.....613 lpm (162 gpm)
Max. Size Solids.....6.4 mm (1/4")

¹Displacement per stroke was calculated at 4.8 bar (70 psig) air inlet pressure against a 2.1 bar (30 psig) head pressure.

Example: To pump 341 lpm (90 gpm) against a discharge head of 2.1 bar (30 psig) requires 4.1 bar (60 psig) and 85 Nm³/h (50 scfm) air consumption.



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's performance curve.

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

PERFORMANCE

T8 METAL PTFE-FITTED

Ship Weight.....Aluminum 33 kg (72 lb)
Cast Iron 52 kg (114 lb)
316 Stainless Steel 48.8 kg (106 lb)
Alloy C 53.4 kg (116 lb)

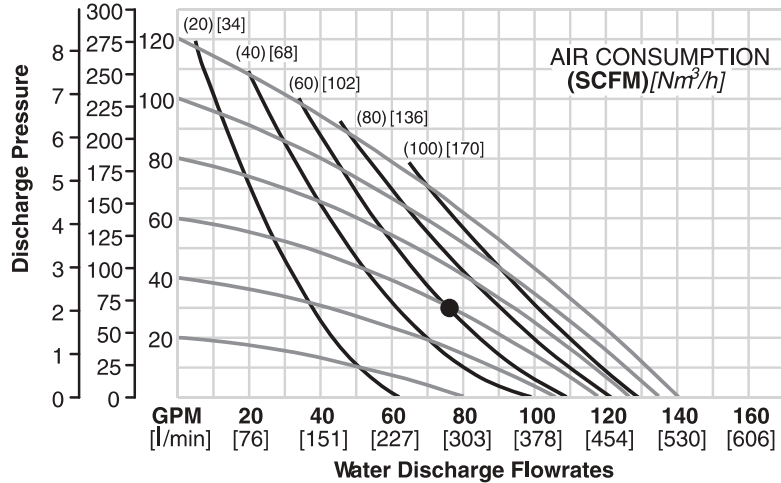
Air Inlet.....19 mm (3/4")
Inlet.....51 mm (2")
Outlet.....51 mm (2")
Suction Lift.....3.7 m Dry (12')
9.5 m Wet (31')

Disp. Per Stroke¹.....1.51 L (0.40 gal)
Max. Flow Rate.....534 lpm (141 gpm)
Max. Size Solids.....6.4 mm (1/4")

¹Displacement per stroke was calculated at 4.8 bar (70 psig) air inlet pressure against a 2.1 bar (30 psig) head pressure.

Example: To pump 284 lpm (75 gpm) against a discharge head of 2.1 bar (30 psig) requires 4.1 bar (60 psig) and 102 Nm³/h (60 scfm) air consumption.

BAR FEET PSIG



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's performance curve.

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

**T8 METAL STALLION
ULTRA-FLEX™-FITTED**

Ship Weight.....Aluminum 33 kg (72 lb)
Cast Iron 52 kg (114 lb)
316 Stainless Steel 48.8 kg (106 lb)
Alloy C 53.4 kg (116 lb)

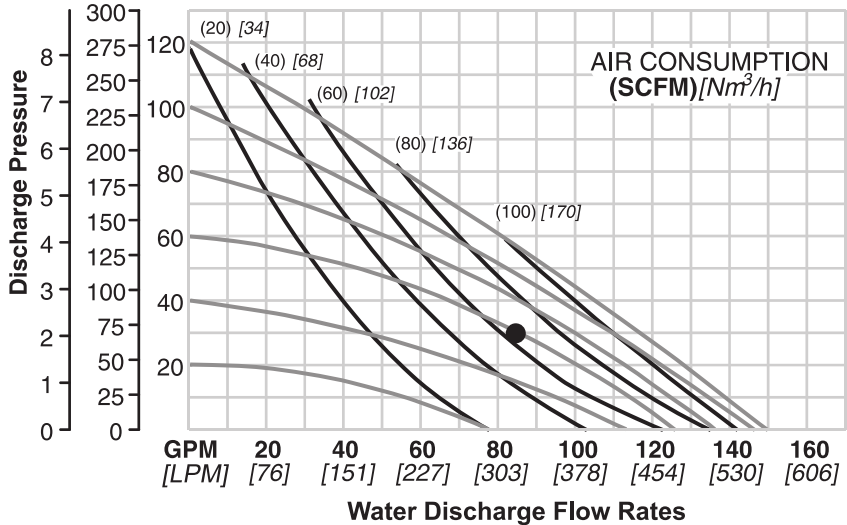
Air Inlet.....19 mm (3/4")
Inlet.....51 mm (2")
Outlet.....51 mm (2")
Suction Lift.....3.4 m Dry (11')
9.5 m Wet (31')

Disp. Per Stroke¹.....1.66 L (0.44 gal)
Max. Flow Rate.....568 lpm (150 gpm)
Max. Size Solids.....19 mm (3/4")

¹Displacement per stroke was calculated at 4.8 bar (70 psig) air inlet pressure against a 2.1 bar (30 psig) head pressure.

Example: To pump 257 lpm (68 gpm) against a discharge head of 1.4 bar (20 psig) requires 4.1 bar (60 psig) and 73 Nm³/h (43 scfm) air consumption.

BAR FEET PSIG



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's performance curve.

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

PERFORMANCE

**T8 METAL STALLION
TPE-FITTED**

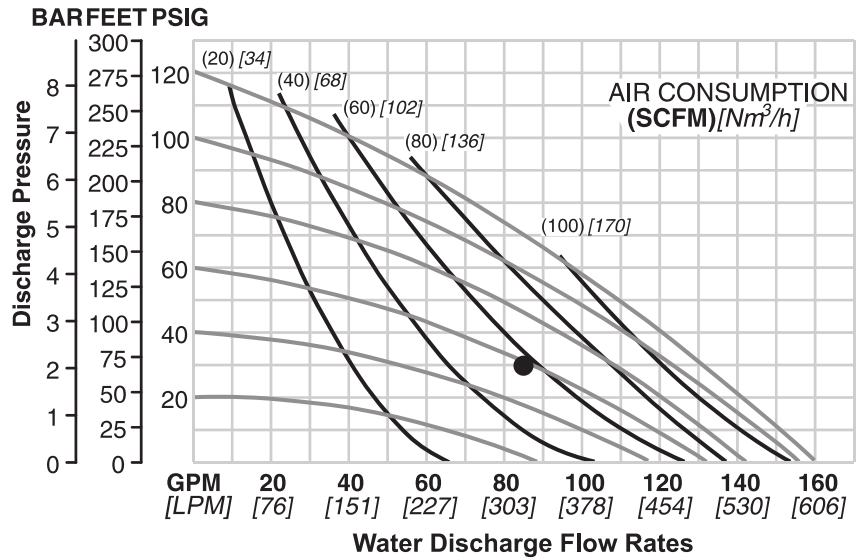
Ship Weight.....Aluminum 33 kg (72 lb)
Cast Iron 52 kg (114 lb)
316 Stainless Steel 48 kg (106 lb)

Air Inlet.....19 mm(3/4")
Inlet.....51 mm (2")
Outlet.....51 mm (2")
Suction Lift.....2.1 m Dry (7')
9.5 m Wet (31')

Disp. Per Stroke¹.....1.89 L (0.50 gal)
Max. Flow Rate.....606 lpm (160 gpm)
Max. Size Solids.....19 mm (3/4")

¹Displacement per stroke was calculated at 4.8 bar (70 psig) air inlet pressure against a 2.1 bar (30 psig) head pressure.

Example: To pump 322 lpm (85 gpm) against a discharge head of 2.1 bar (30 psig) requires 4.1 bar (60 psig) and 94 Nm³/h (55 scfm) air consumption.



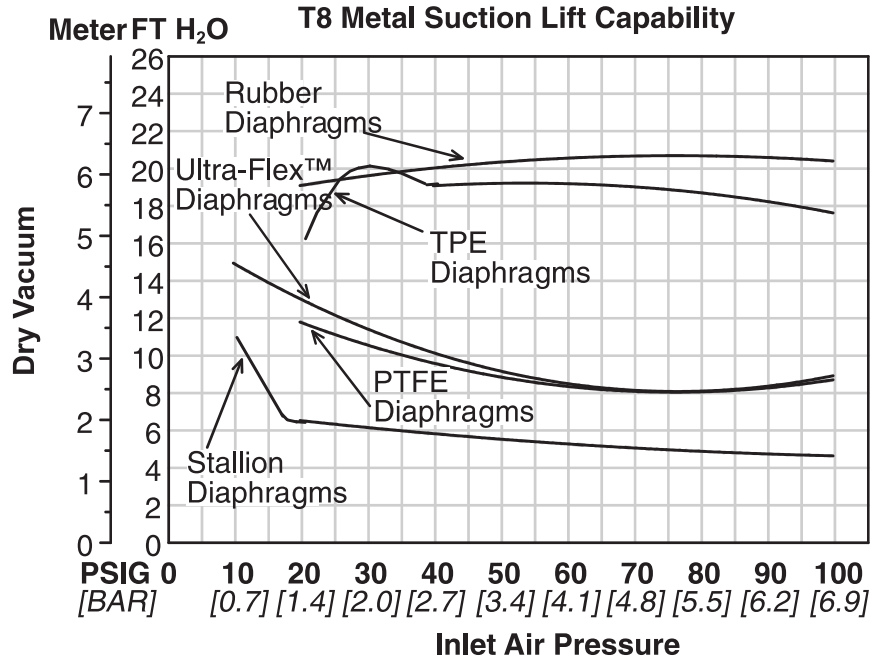
Flow rates indicated on chart were determined by pumping water. For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump's performance curve.

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

SUCTION LIFT CAPABILITY

**T8 METAL
SUCTION LIFT
CAPABILITY**

Suction-lift curves are calibrated for pumps operating at 305 m (1,000') above sea level. This chart is meant to be a guide only. There are many variables that 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 6

**SUGGESTED INSTALLATION, OPERATION, MAINTENANCE
AND TROUBLESHOOTING**

Wilden pumps are designed to meet the performance requirements of even the most demanding pumping applications. They have been designed and manufactured to the highest standards and are available in a variety of liquid path materials to meet your chemical resistance needs. Refer to "Performance" for an in-depth analysis of the performance characteristics of your pump. Wilden offers the widest variety of elastomer options in the industry to satisfy temperature, chemical compatibility, abrasion resistance and flex concerns.

The suction pipe size should be at least equal to or larger than the diameter size of the suction inlet on your Wilden pump. The suction hose must be a non-collapsible, reinforced type because these pumps are capable of pulling a high vacuum. Discharge piping should also be equal to or larger than the diameter of the pump discharge, which will help reduce friction losses.

⚠ CAUTION: All fittings and connections must be airtight. Otherwise, pump suction capability will be reduced or lost.

Months of careful planning, study and selection efforts can result in unsatisfactory pump performance if installation details are left to chance. You can avoid premature failure and long-term dissatisfaction by exercising reasonable care throughout the installation process.

Location

Noise, safety and other logistical factors usually dictate where equipment will be situated on the production floor. Multiple installations with conflicting requirements can result in congestion of utility areas, leaving few choices for additional pumps. Within the framework of these and other existing conditions, locate every pump in such a way that the following six key factors are balanced against each other to maximum advantage:

- **Access:** First, the location should be accessible. If it's easy to reach the pump, maintenance personnel will be able to perform routine inspections and adjustments more easily. If major repairs become necessary, ease of access can play a key role in speeding the repair process and reducing total downtime.
- **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. For best results, the pumps should use a 5µ (micron) air filter, needle valve and regulator. The use of an air filter before the pump will ensure that the majority of any pipeline contaminants will be eliminated.
- **Solenoid Operation:** When operation is controlled by a solenoid valve in the air line, three-way valves should be used. This valve allows trapped air between the valve and the pump to bleed off, which improves pump performance. You can estimate pumping volume by counting the number of strokes per minute, and then multiplying that figure by the displacement per stroke.
- **Muffler:** Using the standard Wilden muffler, sound levels are reduced below OSHA specifications. You can use other mufflers to reduce sound levels farther, but they usually reduce pump performance.
- **Elevation:** Selecting a site that is well within the pump's dynamic lift capability will assure that loss-of-prime issues will

be eliminated. In addition, pump efficiency can be adversely affected if proper attention is not given to site location.

- **Piping:** Final determination of the pump site should not be made until the piping challenges 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 to keep friction losses within practical limits. All piping should be supported independently of the pump. In addition, the piping should be aligned to avoid placing stress 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 surge suppressor (SD Equalizer) should be installed to protect the pump, piping and gauges from surges and water hammer.

If the pump is to be used in a self-priming application, make 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 refer to "Performance" for specifics.

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.

Pumps in service with a positive suction head are most efficient when inlet pressure is limited to 0.5–0.7 bar (7–10 psig). Premature diaphragm failure may occur if positive suction is 0.7 bar (10 psig) and higher.

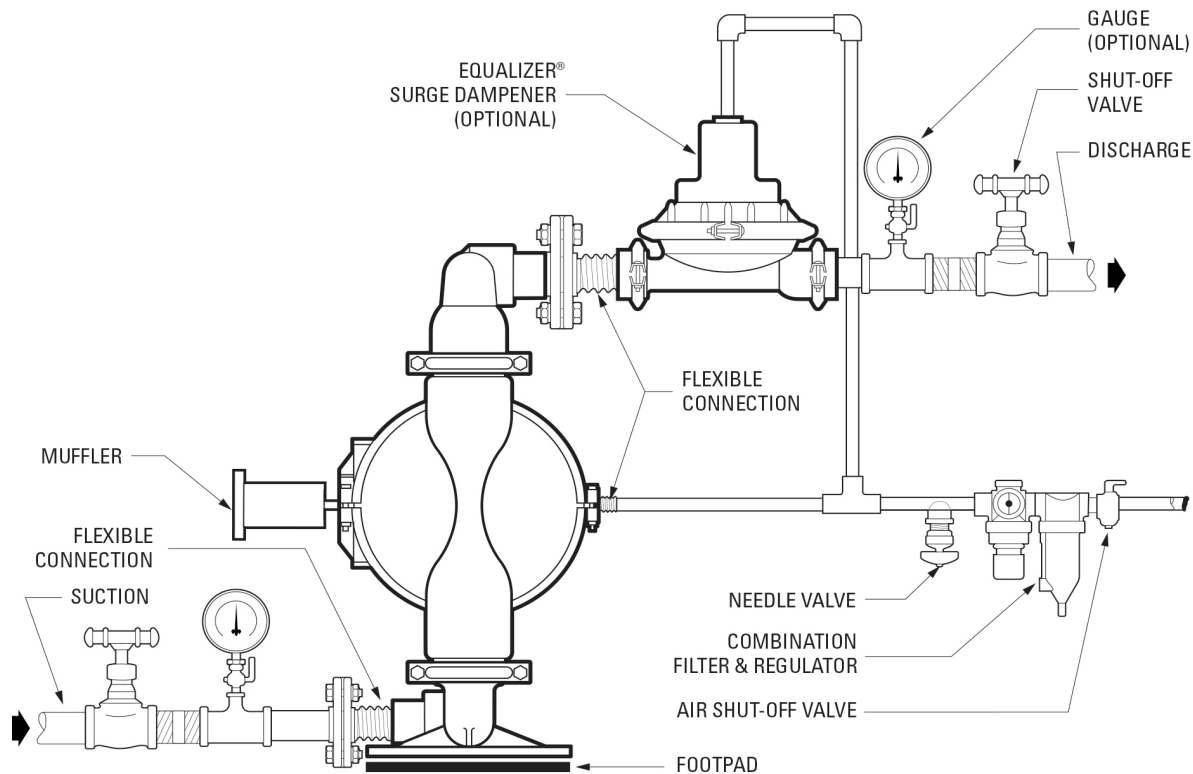
Single-Point Exhaust

Pro-Flo SHIFT pumps can be used for submersible applications when using the Pro-Flo SHIFT's single-point exhaust.

⚠ CAUTION: All Wilden pumps are capable of passing solids. Use a strainer on the pump intake to ensure that the pump's rated solids capacity is not exceeded.

⚠ CAUTION: Do not exceed 8.6 bar (125 psig) air supply pressure.

SUGGESTED INSTALLATION, OPERATION, MAINTENANCE AND TROUBLESHOOTING



! **NOTE:** In the event of a power failure, close the shut-off valve if you do not want the pump to restart when the power returns.

Air-Operated Pumps: To stop the pump from operating in an emergency, 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.

Operation

The Pro-Flo SHIFT pumps are pre-lubricated and do 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 maybe washed away. If the pump is then moved to a nonlubricated location, it may need to be disassembled and re-lubricated as described in "Disassembly/ Reassembly".

Pump discharge rate can be controlled by limiting the volume and/or pressure of the air supply to the pump. An air regulator is used to regulate air pressure. A needle valve is used to regulate volume. Pump discharge rate also can be controlled by throttling the pump discharge by partially closing a valve in the discharge line of the pump. This action increases friction loss, which reduces flow rate. (See "Performance") 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. The pump has reached a "deadhead" situation and can be restarted by reducing the fluid discharge pressure or increasing the air inlet pressure. Wilden Pro-Flo SHIFT pumps run solely on compressed air and do not generate heat. Therefore, your process fluid temperature will not be affected.

Maintenance and Inspections

Because each application is unique, maintenance schedules maybe different for every pump. Frequency of use, line pressure, viscosity and abrasiveness of process fluid all affect the parts life of a Wilden pump. 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.

SUGGESTED INSTALLATION, OPERATION, MAINTENANCE AND TROUBLESHOOTING

Troubleshooting

Pump will not run or runs slowly.

1. Remove plug from pilot spool exhaust.
2. Ensure that the air inlet pressure is at least 0.4 bar (5 psig) above startup pressure and that the differential pressure (the difference between air inlet and liquid discharge pressures) is not less than 0.7 bar (10 psig).
3. Check air inlet filter for debris (see "Suggested Installation, Operation, Maintenance and Troubleshooting").
4. Check for extreme air leakage (blow by) that would indicate worn seals/bores in the air valve, pilot spool and main shaft.
5. Disassemble the pump and check for obstructions in the air passageways or objects that would obstruct the movement of internal parts.
6. Check for sticking ball check valves.
 - a. If material being pumped is not compatible with pump elastomers, swelling may occur. Replace ball check valves and seals with proper elastomers.
 - b. 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.
7. Check for any broken inner piston that would cause the air valve spool to be unable to shift.

Pump runs, but little or no product flows.

1. Check for pump cavitation. Slow pump speed down to allow thick material to flow into liquid chambers.
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.
 - a. If material being pumped is not compatible with pump elastomers, swelling may occur. Replace ball check valves and seals with proper elastomers.
 - b. 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 air valve freezes.

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

Air bubbles in pump discharge.

1. Check for a ruptured diaphragm.
2. Check tightness of outer pistons (see "Disassembly/Reassembly").
3. Check tightness of fasteners 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 a diaphragm rupture.
2. Check the tightness of the outer pistons to the shaft.

SECTION 7

DISASSEMBLY / REASSEMBLY

PUMP DISASSEMBLY

Tools Required:

- 1/2" Socket Wrench
- 9/16" Socket Wrench
- 11/16" Box Wrench
- Adjustable Wrench
- Vise equipped with soft jaws (such as plywood, plastic or other suitable material)



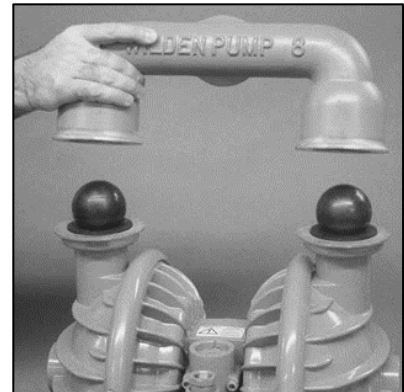
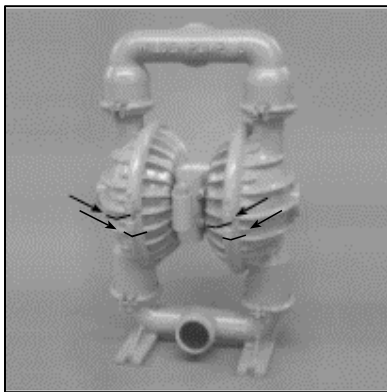
CAUTION: Before attempting any maintenance or repair, disconnect the compressed air line to the pump and allow all air pressure to bleed from the pump. Disconnect all intake, discharge, and air lines. Drain the pump by turning it upside down and allowing any fluid to flow into a suitable container. Be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



NOTE: Your specific pump model may vary from the configuration shown; however, pump disassembly procedure will be the same.



NOTE: Replace worn parts with genuine Wilden parts for reliable performance.



Step 1

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

Step 2

Utilizing the 13 mm (1/2") box wrench, remove the two small clamp bands that fasten the discharge manifold to the liquid chambers.

Step 3

Remove the discharge manifold to expose the valve balls and seats. Inspect the ball cage area of the manifold for excessive wear or damage. Remove the discharge valve balls, seats and o-rings from the discharge manifold and inspect for nicks, gouges, chemical attack or abrasive wear. Replace worn parts with genuine Wilden parts for reliable performance. PTFE o-rings should be replaced when reassembled.

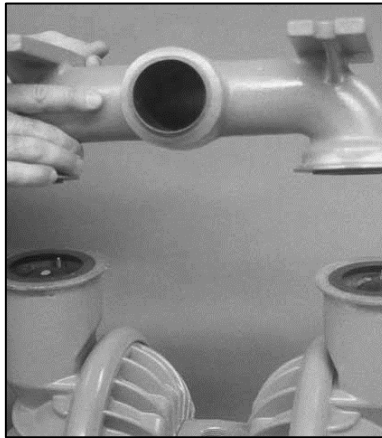
DISASSEMBLY / REASSEMBLY



Step 4

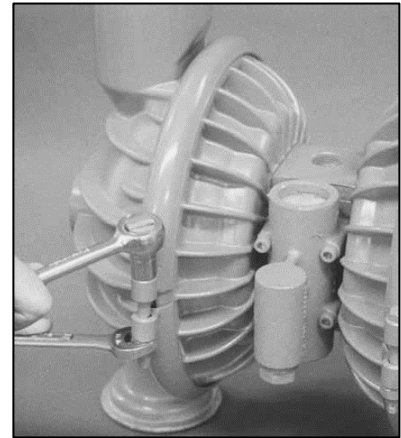
Using an appropriate-sized wrench, remove the two small clamp bands that fasten the inlet manifold to the liquid chambers.

NOTE: Inverting the pump will facilitate removal of the inlet manifold.



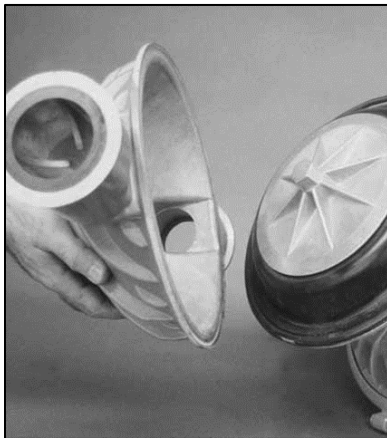
Step 5

Remove the inlet manifold and inspect the ball cage area of manifold for wear or damage. Remove the inlet valve balls and valve seats from the liquid chambers, and inspect for nicks, gouges, chemical attack or abrasive wear. Replace worn parts with genuine Wilden parts for reliable performance.



Step 6

With 14 mm (9/16") socket and 17 mm (11/16") box wrench, remove one set of large clamp bands that attach liquid chamber to center section assembly.



Step 7

Lift liquid chamber away from center section to expose diaphragm and outer piston.



Step 8

Using a 25 mm (1") box wrench, adjustable wrench, or by rotating the diaphragm by hand, remove the diaphragm assembly.



Figure 9a



Figure 9b

Step 9

NOTE: Due to varying torque values, one of the following two situations may occur:

1) The outer piston, diaphragm and inner piston remain attached to the shaft and the entire assembly can be removed from the center section (Figure 9a).

2) The outer piston, diaphragm and inner piston separate from the shaft which remains connected to the opposite side diaphragm assembly (Figure 9b). Repeat disassembly instructions for the opposite liquid chamber. Inspect diaphragm assembly and shaft for signs of wear or chemical attack. Replace all worn parts with genuine Wilden parts for reliable performance.



Step 10

To remove diaphragm assembly from shaft, secure shaft with soft jaws (a vise fitted with plywood or other suitable material) to ensure shaft is not nicked, scratched or gouged. Using an adjustable wrench, remove diaphragm assembly from shaft.

DISASSEMBLY / REASSEMBLY

Air Valve / Center Section Disassembly

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 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 dull, dark gray in color. If the piston appears to be a shiny aluminum color, the air valve is probably worn beyond working tolerances and should be replaced.

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.

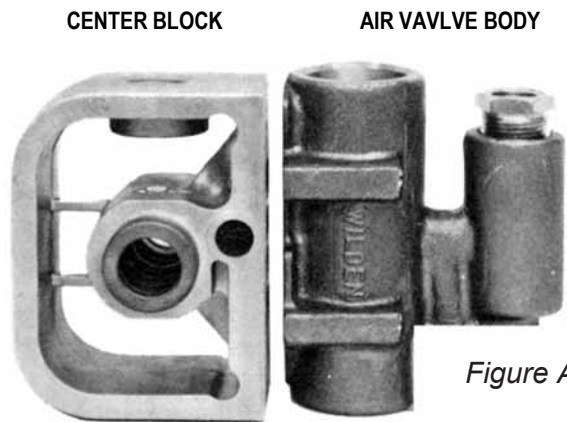


Figure A

AIR VALVE ASSEMBLY

If the air valve piston does not move freely after the above cleaning, the air valve should be disassembled 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.

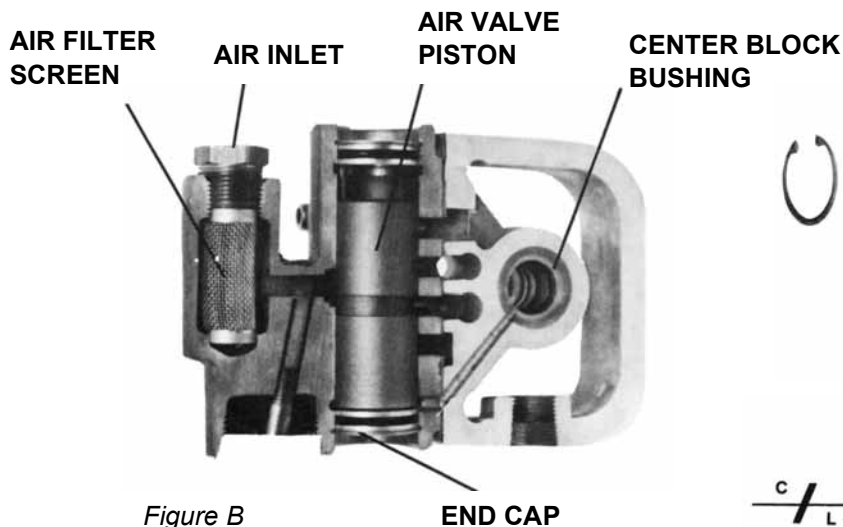


Figure B

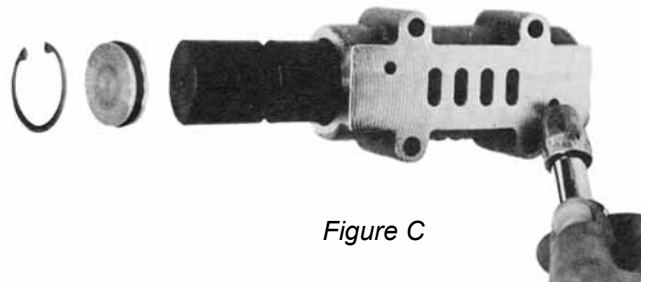


Figure C

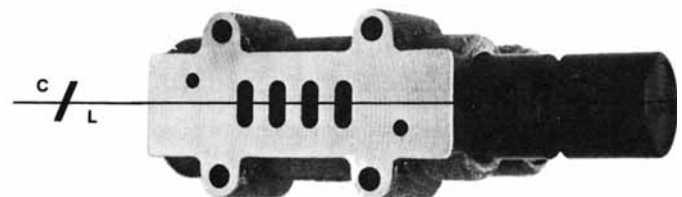


Figure D

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.

GLYD™ RING REPLACEMENT:

When the Glyd™ rings become worn, they will no longer seal and must be replaced. Due to the design characteristics of the Glyd™ rings, it is suggested that you use the Ringer Seal installation kit when replacing Glyd™ rings. Consult EOM- Ringer for installation instructions.

CENTER BLOCK ASSEMBLY:

The pump’s center block consists polypropylene or die cast housing with a cast-in-bronze bushing (Figure G). Figure H shows T4 injection-molded polypropylene center section and alignment with air valve. The bushing has eleven grooves cut on the inside diameter. There are seven Glyd™ rings that fit in these grooves (see Figure E). Since these Glyd™ rings form a part of the shifting function of the pump, it is necessary that they be located in the proper grooves. The bronze bushing is replaceable in cast iron center block only. When bushing wear becomes excessive, a new center block must be used.



Figure F
(Side View)

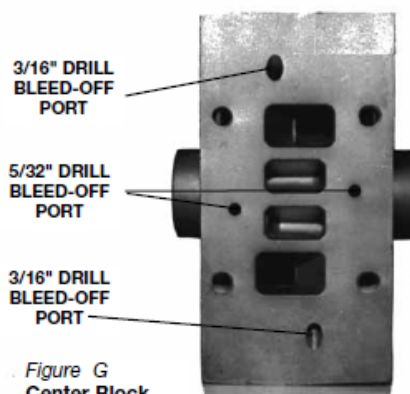


Figure G
Center Block
(Front View)

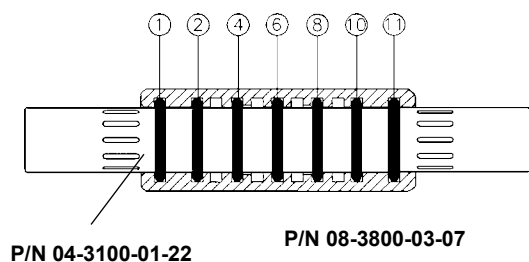


Figure E

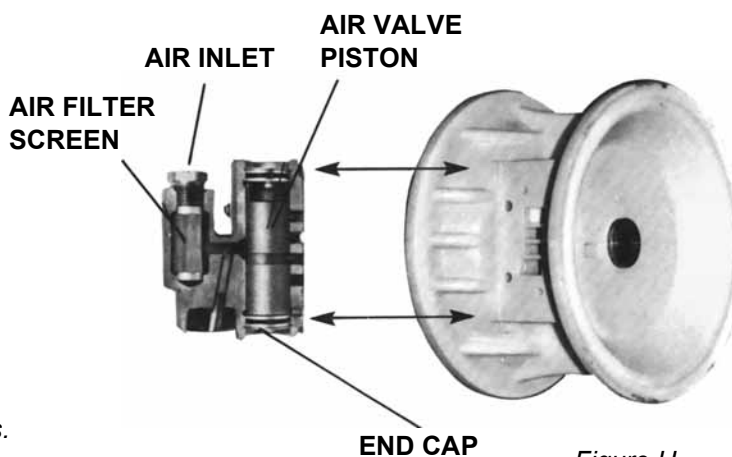


Figure H

*Refer to Section 8 for torque specifications.

DISASSEMBLY / REASSEMBLY

REASSEMBLY HINTS & TIPS

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 the pump, follow the disassembly instructions in reverse order. The air distribution system needs to be assembled first, then the diaphragms and finally the wetted path. Please find the applicable torque specifications on this page. The following tips will assist in the assembly process.

- Clean the inside of the center section shaft bushing to ensure no damage is done to new seals.
- Stainless bolts should be lubed to reduce the possibility of seizing during tightening.
- Be sure to tighten outer pistons simultaneously on PTFE- fitted pumps to ensure proper torque values.
- Ensure proper alignment on the sealing surfaces of intake and discharge manifolds.
- Liquid chambers are easier to attach when the diaphragm is inverted. Prior to attaching the second water chamber, push diaphragm assembly so that it is as close as possible to the center section.
- PVDF and PFA pumps require PTFE gasket kits for improved sealing. Gasket kits may be installed on other pumps where sealing is an issue.
- When assembling PTFE-coated hardware, care should be taken to keep the coating intact.
- When installing Glyd™ rings, the use of the Wilden Ringer tool simplifies seal installation.

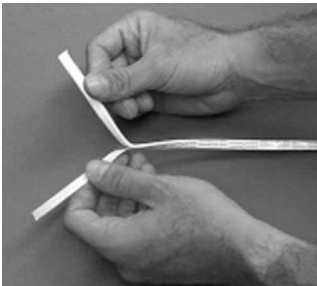
MAXIMUM TORQUE SPECIFICATION

Description of Part	Metal Pumps
Air Valve	9.6 N•m (85 in-lbs)
Outer Piston (PTFE-fitted)	108.5 N•m (80 ft-lbs)
Outer Piston (Rubber-fitted)	108.5 N•m (80 ft-lbs)
Small Clamp Band (PTFE-fitted))	6.6 N•m (58 in-lbs)
Small Clamp Band (Rubber-fitted))	2.8 N•m (25 in-lbs)
Large Clamp Band (All)	47.4 N•m (35 ft-lbs)
Center Block Assembly	31.1 N•m (23 ft-lbs)
Polyurethane Screen Base	2.3 N•m (20 in-lbs)
Metal Screen Base	9.0 N•m (80 in-lbs)
Inlet Cover	9.0 N•m (80 in-lbs)
Stallion Handle	20.4 N•m (15 ft-lbs)

GASKET KIT INSTALLATION

The Wilden T8 cast iron pumps require PTFE gasket tape on the liquid chambers (P/N 04-9502-99). Other pump types may use PTFE gasket kits for additional sealing characteristics. During reassembly follow the procedures listed in your pump's Engineering, Operation and Maintenance manual. Carefully prepare sealing surfaces by removing all debris and foreign matter from diaphragm bead and all mating surfaces. If necessary, smooth or deburr all sealing surfaces. Mating surfaces must be properly aligned in order to ensure positive sealing characteristics.

Always wear safety glasses when performing maintenance on any Wilden product.



Step 1

Gently remove the adhesive covering from the back of the PTFE tape. Ensure that the adhesive strip remains attached to the PTFE tape.



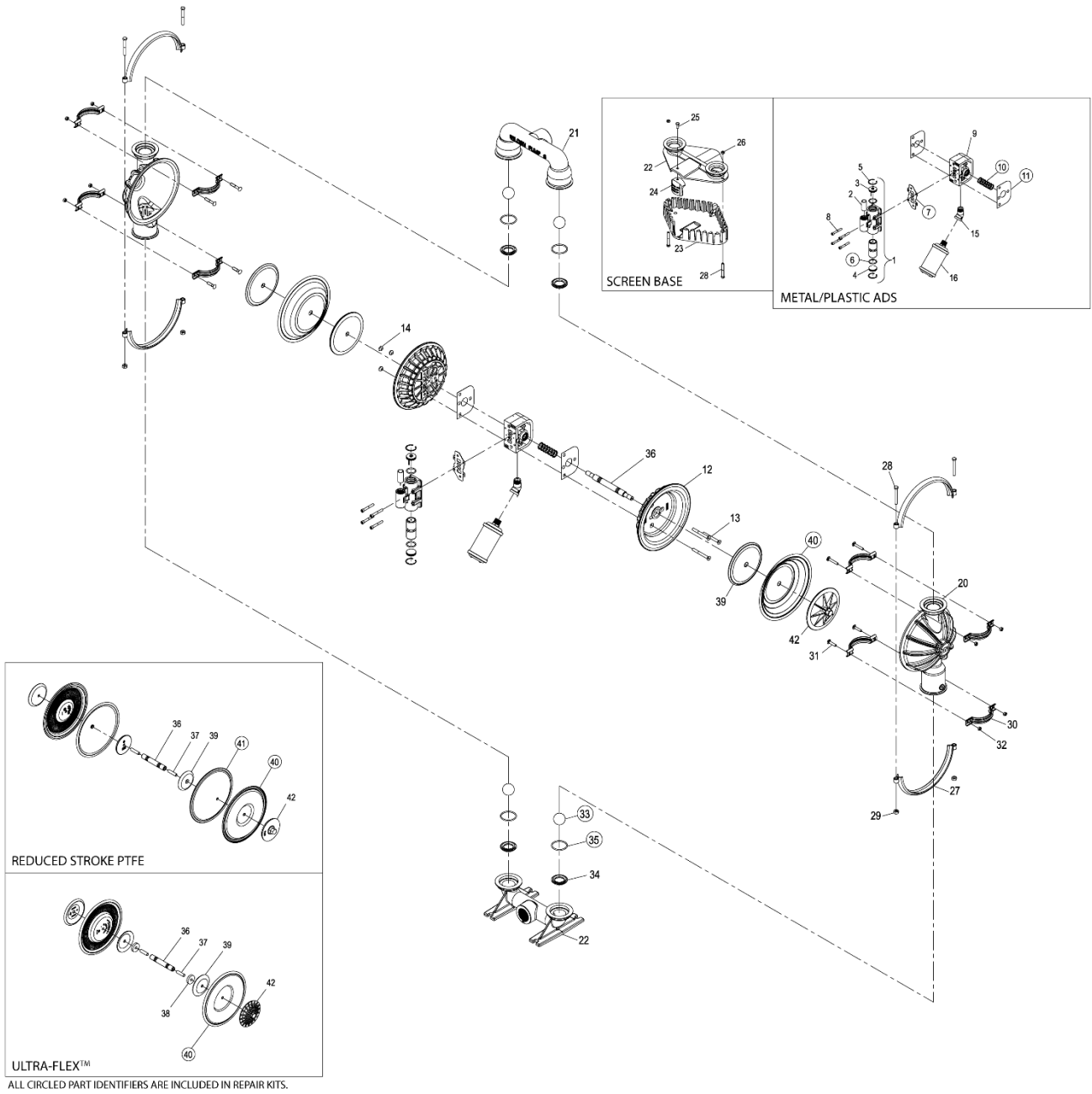
Step 2

Starting at any point, place the PTFE tape in the center of the diaphragm bead groove on the liquid chamber and press lightly on the tape to ensure that the adhesive holds in place during assembly. Do not stretch the tape during placement in the center of diaphragm bead groove.



Step 3

The end of the tape should overlap approximately 13 mm (1/2"). Proceed to install the PTFE tape on the remaining diaphragm.



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SECTION 8

EXPLODED VIEW AND PARTS LIST

			Model Description		
			T8/AAAAB/4	T8/AAAAB/.../00304	T8/WWAPB/4
Item	Description	Qty.	P/N	P/N	P/N
Air Distribution Components					
1	Air Valve Assembly ¹	1		08-2000-07	
2	Air Valve Screen	1		08-2500-07	
3	End Cap w/Guide (Top)	1		08-2300-23	
4	End Cap w/o Guide (Bottom)	1		08-2330-23	
5	Snap Ring	2		08-2650-03	
6	O-Ring, End Cap (-218, Ø1.234" x Ø.139")	2		08-2390-52	
7	Gasket, Air Valve	1		08-2600-52	
8	Screw, SHC, Air Valve (5/16"-18 x 2-1/4")	4		08-6000-08	
9	Center Block Assembly ²	1	08-3100-01-225		
	Center Block Assembly ³	1			08-3100-20-225
10	Seal, Shaft, Glyd Ring	7		08-3210-55-225	
11	Gasket, Center Block	2		08-3520-52	
12	Air Chamber	2		08-3650-01	
13	Screw, FHSC, 3/8"-16 x 3-9/16"	3		08-6200-08	
14	Nut, Cone, 3/8"-16	3		08-6550-08	
15	Connector, Muffler (3/4" x 45°)	1	08-3250-08		08-3250-08
16	Muffler, 3/4" MNPT	1	08-3510-99R		08-3510-99R
17	Pipe Nipple, 3/4" Check Body (not shown)	1		08-7420-08	
18	Ball, Check (not shown)	1		08-1450-51	
19	Check Body (not shown)	1		08-3550-01	
Wetted Path Components					
20	Liquid Chamber	2		08-5000-01	08-5000-02
21	Manifold, Discharge NPT	1		04-5020-01	08-5020-02
	Manifold, Discharge BSPT	1		04-5020-01-14	08-5020-02-14
22	Manifold, Footed Inlet NPT	1	08-5080-01		08-5080-02
	Manifold, Footed Inlet BSPT	1	08-5080-01-14		08-5080-02-14
	Manifold, Screen Based NPT	1		08-5080-01-30	
	Manifold, Screen Based BSPT	1		08-5080-01-36	
23	Screen Base	1		08-5620-01	
24	Cover, Suction Hook-Up	1		08-5660-01	
25	Screw, HHC 3/16"-16 x 7/8"	1		08-6140-08	
26	Nut, Hex, 3/8"-16	2		02-6430-08	
27	Large Clamp Band Assembly ⁵	2		08-7300-08	
28	Screw, HHC Large (3/8"-16 x 3")	4	08-6120-08		08-6120-08
	Screw, HHC Large (3/8"-16 x 3")	6		08-6120-08	
29	Large Hex Nut (3/8"-16)	4		08-6450-08	
30	Small Clamp Band Assembly ⁶	4		08-7100-08	
31	Screw, HHC Small (5/16"-18 x 1-1/2")	8		08-6050-08	
32	Small Hex Nut (5/16"-18)	8		04-6420-08	
Valve Balls/Valve Seats/Valve O-Rings					
33	Ball, Valve	4		*	
34	Seat, Valve	4		*	
35	O-Ring, Valve Seat, PTFE Fitted (-334, Ø2.600 x Ø.210)	4		08-1200-55	
Rubber/TPE Components					
36	Shaft, Non PTFE Fitted	1		08-3800-03-07	
39	Piston, Inner	2		08-3700-01	
40	Diaphragm, Primary	2		*	
42	Piston, Outer	2	08-4550-01		08-4550-02
PTFE Components					
36	Shaft, PTFE Fitted	1		08-3820-03-07	
37	Shaft Stud, 1/2"-20 X 2-1/8"	2		08-3700-01	
39	Piston, Inner	2		08-3750-01	
40	Diaphragm, Primary	2		*	
41	Diaphragm, Back-Up	2		*	

42	Piston, Outer	2	08-4600-01	08-4600-03
Ultra-Flex™ Components				
36	Shaft, PTFE Fitted	1	08-3820-03-07	
37	Shaft Stud, 1/2"-20 X 1-7/8"	2	08-6150-08	
38	Spacer, Piston, Ultra-Flex™	2	08-3860-08	
39	Piston, Inner	2	04-3700-08	
40	Diaphragm, Primary	2	*	
42	Piston, Outer	2	04-4552-01	08-4560-02

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* See elastomer chart - Section 9

¹ Air Valve Assembly includes items 2, 3, 4, 5 and 6.

² Metal Center Block Assembly includes item 10.

³ Plastic Center Block Assembly includes item 10.

⁴ Pumps with PTFE Diaphragms contains Stainless Steel Hardware.

⁵ Large Clamp Band Assembly includes item 28 and 29.

⁶ Small Clamp Band Assembly includes item 31 and 32.

All boldface items are primary wear parts.

SECTION 9

ELASTOMER OPTIONS

T8 Metal Pumps

MATERIAL	DIAPHRAGM (2)	BACK-UP DIAPHRAGMS (2)	ULTRA-FLEX™ DIAPHRAGMS (2)	VALVE BALLS (4)	VALVE SEATS (4)	VALVE SEAT O-RINGS (4)
Polyurethane	08-1010-50			08-1080-50	08-1120-50	
Neoprene	08-1010-51	08-1060-51	08-1020-51	08-1080-51	08-1120-51	
Buna-N®	08-1010-52		08-1020-52	08-1080-52	08-1120-52	
EPDM	08-1010-54	08-1060-54	08-1020-54	08-1080-54	08-1120-54	
Viton®	08-1010-53		08-1020-53	08-1080-53	08-1120-53	
PTFE ²	08-1010-55			08-1080-55		08-1200-55 ¹
Saniflex™ ²	08-1010-56	08-1060-56		08-1080-56	08-1120-56	
Wil-Flex™	08-1010-58			08-1080-58	08-1120-58	
Aluminum					08-1121-01	
Stainless Steel					08-1121-03	
Mild Steel					08-1121-08	

¹ Used in conjunction with metallic valve seat.

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T8 Metal STALLION Pumps

Material	Diaphragms (2) P/N	Valve Balls (4) P/N	Valve Seats (4) P/N
Polyurethane	08-1010-50	08-1080-62-50	08-1120-62-50
Wil-Flex™	08-1010-58	08-1080-58-50	08-1120-58-50
Saniflex™	08-1010-56	08-1080-56-50	08-1120-56-50
Neoprene	08-1010-51	08-1080-51-50	08-1120-51-50
Buna-N	08-1010-52	08-1080-52-50	08-1120-52-50
FKM	08-1020-53	08-1080-53-50	08-1120-53-50
EPDM	08-1020-54	08-1080-54-50	08-1120-54-50

NOTES

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