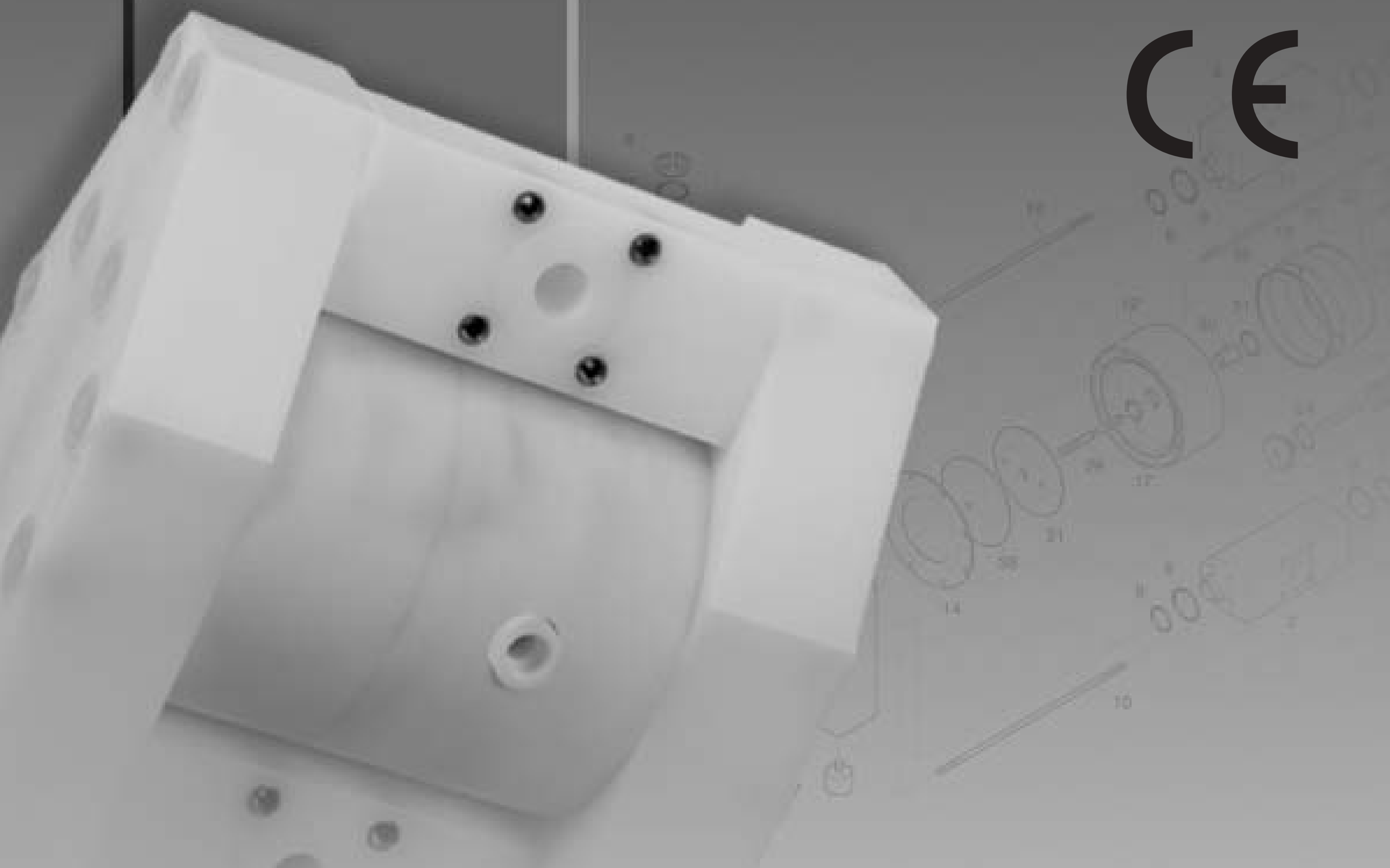
UNITEC™ SERIES

UH Series

Engineering Operation & Maintenance

CE



WILDEN®

A DOVER COMPANY

UNI-FLO™

PROGRESSIVE PUMP TECHNOLOGY

High-Pressure Plastic Pumps

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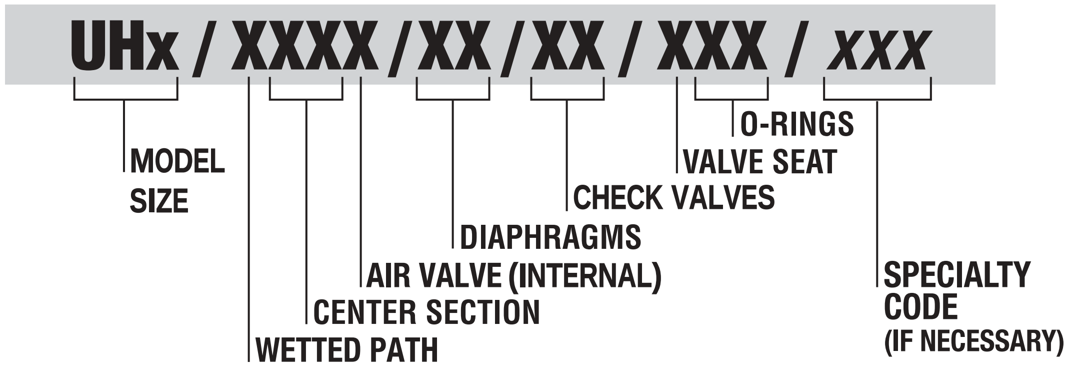
Member of: Hydraulic INSTITUTE

SECTION 1

WILDEN PUMP DESIGNATION SYSTEM



UNITEC™ SERIES HIGH PRESSURE PLASTIC PUMP MATERIAL CODES

MODEL SIZES
UH.050 = 13 mm (½")
UH2 = 25 mm (1")
UH4 = 38 mm (1-½")

WETTED PATH
E = POLYETHYLENE

CENTER SECTION
YY = NYLON

AIR VALVE
E = POLYETHYLENE

DIAPHRAGMS
ET = TEFLON® PTFE W/ INTEGRAL OUTER PISTON (White)
EX = NORDEL® W/ INTEGRAL OUTER PISTON
BX = BUNA-N W/ INTEGRAL OUTER PISTON

CHECK VALVES
TF = TEFLON® PTFE (White) - Ball
ND = NORDEL® - Ball
BN = BUNA-N - Ball

VALVE SEAT
E = POLYETHYLENE

VALVE SEAT O-RINGS
TV = TEFLON® ENCAP. VITON®
ND = NORDEL®
BN = BUNA-N

SPECIALTY CODES

504	DIN flange
812	Stroke sensor
813	Stroke sensor, DIN
814	Stroke counting pneumatic with pressure transmitter
815	Stroke counting pneumatic with pressure transmitter, DIN
816	Diaphragm sensor
817	Diaphragm sensor, DIN

Nordel® and Viton® are registered trademarks of DuPont Dow Elastomers.
Teflon® is a registered trademark of DuPont.

SECTION 2

THE UNITEC™ HIGH-PRESSURE PUMP — HOW IT WORKS

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

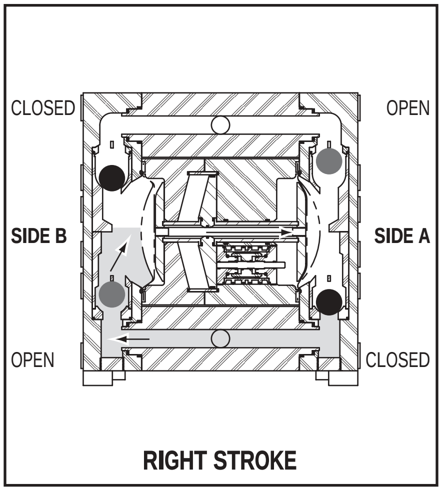


FIGURE 1: The air valve directs pressurized air simultaneously to the back side of diaphragm A and the power piston. The compressed air is applied directly to the liquid column separated by elastomeric diaphragms and assisted by the power piston, connected to the diaphragms by the shaft. The diaphragm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

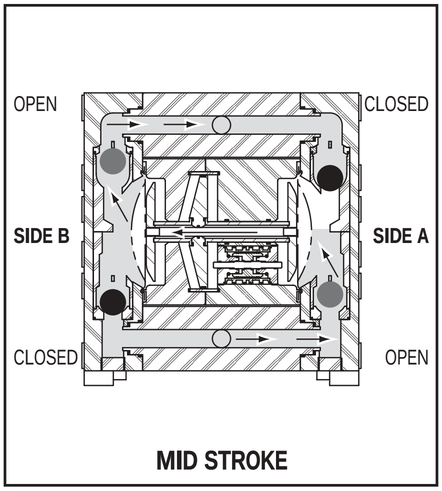


FIGURE 2: When the pressurized diaphragm, diaphragm A, reaches the limit of its discharge stroke, the air valve redirects pressurized air to the back side of diaphragm B and the opposite side of the power piston. The pressurized air forces diaphragm B away from the center block while pulling diaphragm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

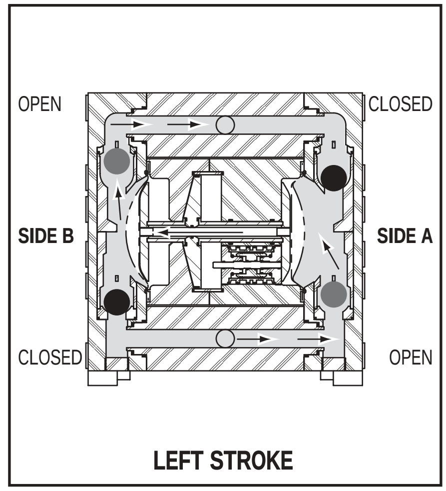


FIGURE 3: At completion of the stroke, the air valve again redirects air to the back side of diaphragm A and the original side of the power piston, which starts diaphragm B on its exhaust stroke. As the pump reaches its original starting point, each diaphragm has gone through one exhaust and one discharge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

THE UNI-FLO™ AIR SYSTEM — HOW IT WORKS

The Uni-Flo™ air distribution system, the driving force behind UNITEC™ pumps, is assembled inside the center section of the pump, between the reciprocating diaphragms. The Uni-Flo™ systems uses a main air valve body and mechanically actuated pilot spool mechanism to direct inlet air pressure alternately behind each diaphragm and each side of the power piston, while at the same time exhausting the air behind the opposite diaphragm and opposite side of the power piston to atmosphere. Air inlet pressure has a direct relation to the fluid discharge pressure that the pump can develop (head), while the volume of air has a direct relation to how quickly the pump will reciprocate (flow). The UH series pumps use a power piston to amplify the inlet air pressure for discharge pressures more than twice the air inlet pressure.

The pilot spool is pushed alternately left and right through contact with the inside of the left diaphragm and power piston as it moves toward the center section on its exhaust stroke. The movement of the pilot spool from one side to the other changes the inlet and exhaust porting to each diaphragm and each side of the power piston by reversing the air flow. The diaphragm/power piston that pushed the pilot spool to shift the pump while on its exhaust stroke is now pressurized with inlet air pressure and pushed away from the center section displacing fluid.

This inherently safe design needs no electronic sensors or switches to operate reliably while delivering product. Speed and flow can be controlled with simple adjustments to the air regulator, air inlet valve or fluid system valves. The Uni-Flo™ system operates solely on compressed air and is simple to use, specify and operate.

SECTION 3

WILDEN UNITEC™ HIGH-PRESSURE PLASTIC PUMPS CAUTIONS — READ FIRST!

CAUTION: This pump is designed to run only on clean-dry air at all times. If oil and water may migrate into pump from air supply, a desiccant dryer must be installed.

CAUTION: Do not lubricate air supply — lubrication will reduce pump performance.

TEMPERATURE LIMITS:

Polyethylene	0.0°C	to 70.0°C	32°F to 158°F
Teflon® PTFE	4.4°C	to 120.0°C	40°F to 248°F
Nordel®	–51.1°C	to 137.8°C	–60°F to 280°F
Buna-N	-17.8°C	to 93.3°C	0°F to 200°F

CAUTION: When choosing pump materials, be sure to check the temperature limits for all wetted components. Example: Nordel® has a maximum limit of 137.8°C (280°F) but polyethylene has a maximum limit of only 70.0°C (158°F).

CAUTION: Maximum temperature limits are based upon mechanical stress only. Certain chemicals will significantly reduce maximum safe operating temperatures. Consult Wilden Chem Guide (E-04) for chemical compatibility and temperature limits.

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

WARNING: Prevention of static sparking — If static sparking occurs, fire or explosion could result. Pump, valves, and containers must be grounded when handling flammable fluids and whenever discharge of static electricity is a hazard. The UH series pumps are not conductive and therefore may not be acceptable for applications where a static discharge may occur. Please consult factory for additional information on conductive pumps. As each application has different requirements, please consult the local, regional or government regulatory agency for details on proper grounding for any application.

CAUTION: Do not exceed 7 bar (100 psig) air supply pressure. The UH series pumps can generate more than a 2:1 ratio discharge pressure to air supply pressure [16 bar (230 psig) maximum].

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. Before disassembly of the pump, or removal from process lines, all pressure must also be bled from the liquid side of the pump and all fluid drained into a suitable container. Failure to do so may result in product under pressure being sprayed from system.

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

CAUTION: When installing diaphragms, be sure to insert the shaft stud into the outer piston first, tightening with a hex head wrench. Then proceed to install diaphragms on the end of shaft by rotating both diaphragms clockwise. If diaphragms are hand-tight on the shaft and the bolt holes do not line up, attempt to continue rotating clockwise until holes align, if possible. Reverse rotation to align holes only if it is impossible to align holes through clockwise rotation.

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

CAUTION: UH plastic pumps are not submersible. If your application requires your pump to be submersed contact the factory for details on a different Wilden pump model.

CAUTION: Pumps should be flushed thoroughly with water before installation into process line.

CAUTION: Tighten all hardware prior to installation.

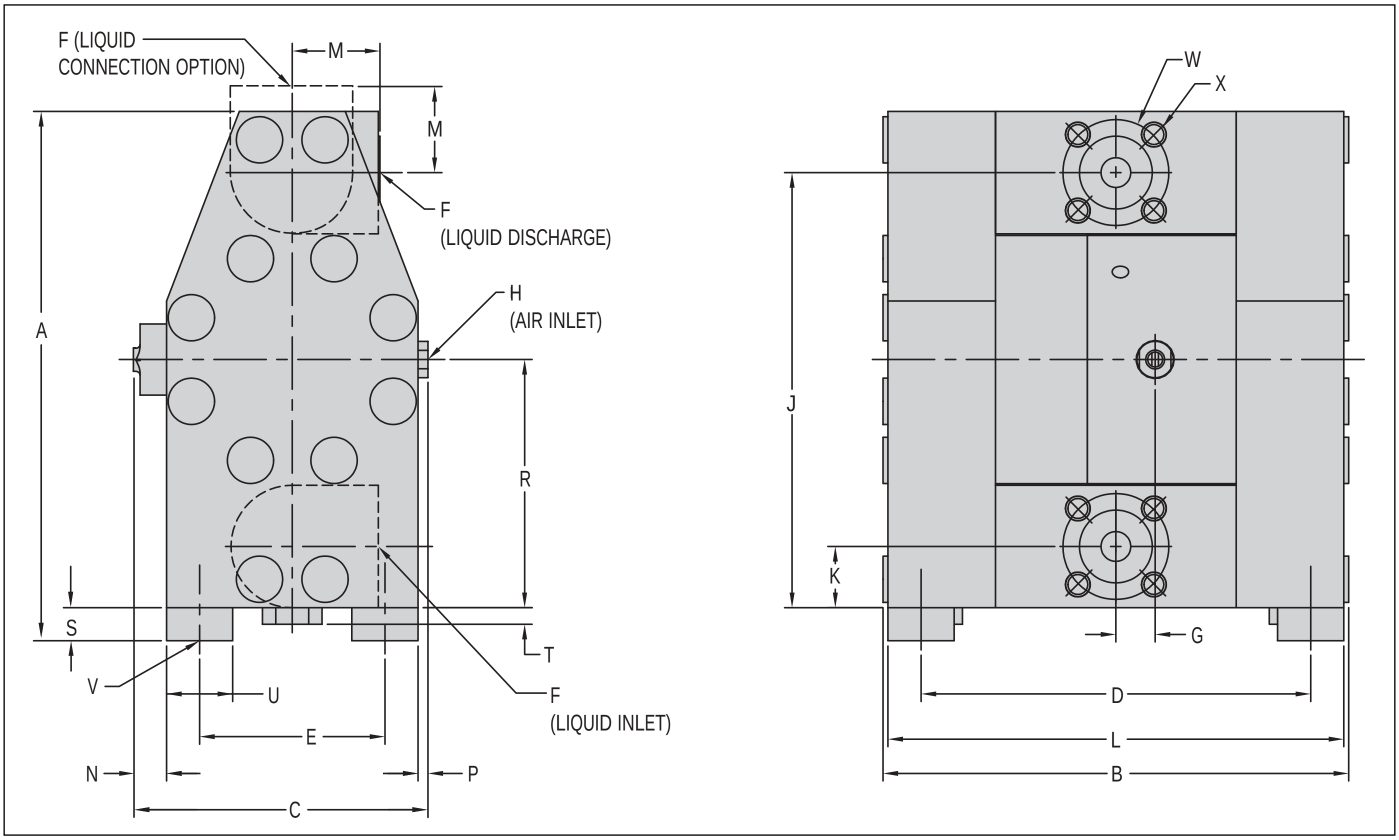
CAUTION: Long-term exposure to UV rays may damage unfilled polyethylene. If located outside an unfilled PE pump should be protected from UV rays.

SECTION 4A

DIMENSIONAL DRAWING

WILDEN UNITEC™ HIGH-PRESSURE PLASTIC MODEL

DIMENSIONS FOR ALL UH SERIES PUMPS



	UH.050	UH2	UH4
A	323 mm (12.7")	406 mm (16.0")	539 mm (21.2")
B	282 mm (11.1")	382 mm (15.0")	490 mm (19.3")
C	179 mm (7.0")	256 mm (10.1")	296 mm (11.7")
D	235 mm (9.3")	335 mm (13.2")	433 mm (17.0")
E	112 mm (4.4")	160 mm (6.3")	220 mm (8.7")
F ANSI[1]	13 mm (1/2") ANSI	25 mm (1") ANSI	38 mm (1-1/2") ANSI
F DIN[2]	DIN 15	DIN 25	DIN 40
G	24 mm (0.9")	36 mm (1.4")	47 mm (1.9")
H	6 mm (1/4") FNPT/BSP	13 mm (1/2") FNPT/BSP	13 mm (1/2") FNPT/BSP
J	263 mm (10.4")	336 mm (13.2")	454 mm (17.9")
K	37 mm (1.5")	44 mm (1.7")	60 mm (2.4")
L	276 mm (10.9")	376 mm (14.8")	484 mm (19.1")
M	53 mm (2.1")	56 mm (2.2")	70 mm (2.8")
N	21 mm (0.8")	48 mm (1.9")	18 mm (0.7")
P	6 mm (0.2")	8 mm (0.3")	8 mm (0.3")
R	150 mm (5.9")	190 mm (7.5")	257 mm (10.1")
S	20 mm (0.8")	20 mm (0.8")	20 mm (0.8")
T	10 mm (0.4")	12 mm (0.5")	12 mm (0.5")
U	40 mm (1.6")	40 mm (1.6")	50 mm (2.0")
V THREAD	M8	M8	M10
W	61 mm (2.4") Ø	79 mm (3.1") Ø	99 mm (3.9") Ø
X ANSI BOLT	1/2"-13 UNC 2A x 2-1/4"	5/8"-11 UNC 2A x 2-1/2"	3/4"-10 UNC 2A x 3"
X DIN BOLT	M12	M12	M16

[1] ANSI compatible
[2] DIN compatible

SECTION 5A

PERFORMANCE CURVE

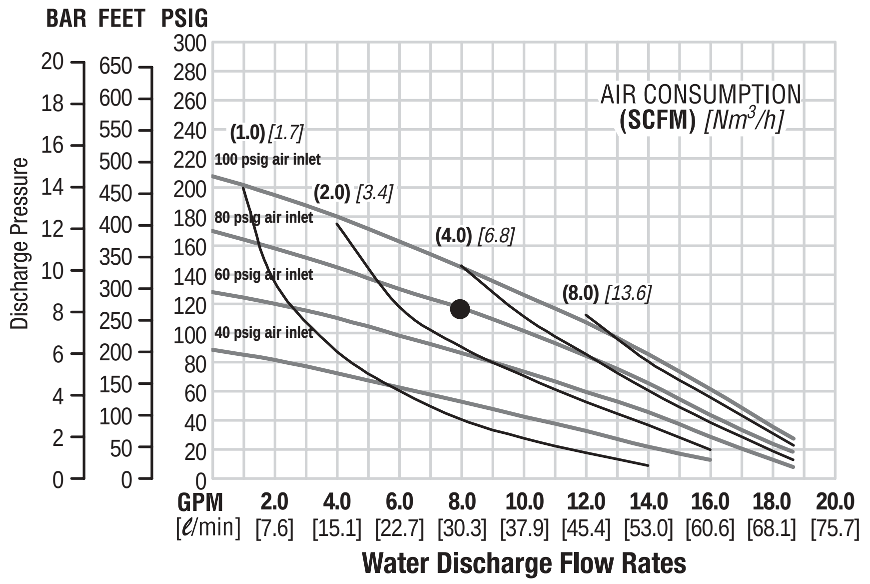
UH.050 PLASTIC RUBBER/TEFLON®-FITTED

Height..................................323 mm (12.7")
Width ....282 mm (11.1")
Depth ....179 mm (7.0")
Ship Weight: Polyethylene ......11 kg (24 lbs)
Air Inlet ....6 mm (¼") FNPT/BSP
Inlet ....13 mm (½") ANSI or DIN 15
Discharge..........13 mm (½") ANSI or DIN 15
Suction Lift ....3.0 m (9.8') Dry
9.5 m (31.2') Wet

Max. Flow Rate ....70.0 lpm (18.5 gpm)
Max. Size Solids ....4.0 mm (0.16")

Example: To pump 30.2 lpm (8.0 gpm) against a discharge pressure head of 8.1 bar (118 psig) requires 5.5 bar (80 psig) and 5.1 Nm^3/h (3 scfm) air consumption. (See dot on chart.)

Caution: Do not exceed 7 bar (100 psig) air inlet supply pressure.



SECTION 5B

PERFORMANCE CURVE

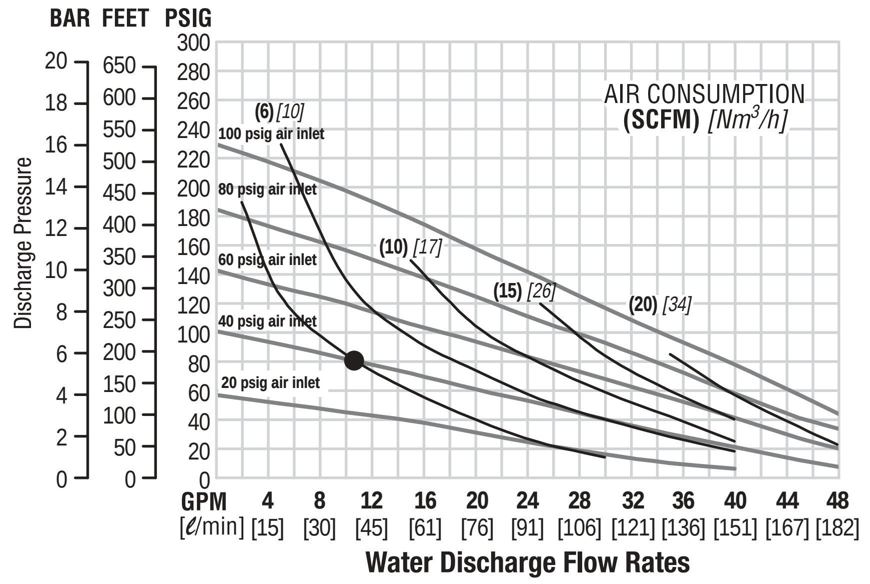
UH2 PLASTIC RUBBER/TEFLON®-FITTED

Height..................................406 mm (16.0")
Width ....382 mm (15.0")
Depth ....256 mm (10.1")
Ship Weight: Polyethylene ......30 kg (66 lbs)
Air Inlet ....13 mm (½") FNPT/BSP
Inlet....................25 mm (1") ANSI or DIN 25
Discharge ....25 mm (1") ANSI or DIN 25
Suction Lift ....2.0 m (6.6') Dry
9.5 m (31.2') Wet

Max. Flow Rate ....180 lpm (48 gpm)
Max. Size Solids ....5.0 mm (0.20")

Example: To pump 39.7 lpm (10.5 gpm) against a discharge pressure head of 5.5 bar (80 psig) requires 2.8 bar (40 psig) and 5.1 Nm^3/h (3.0 scfm) air consumption. (See dot on chart.)

Caution: Do not exceed 7 bar (100 psig) air inlet supply pressure.



SECTION 5C

PERFORMANCE CURVE

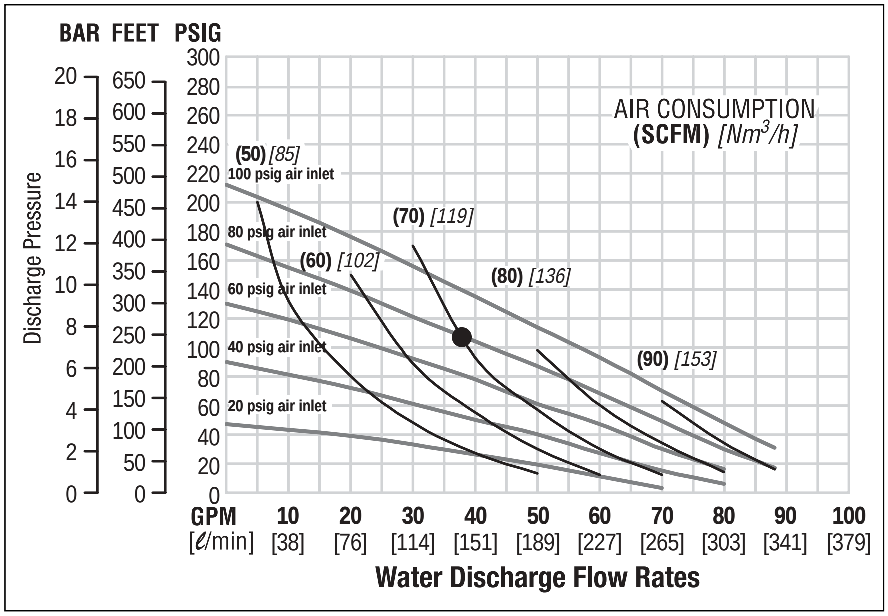
UH4 PLASTIC RUBBER/TEFLON®-FITTED

Height..................................539 mm (21.2")
Width ....490 mm (19.3")
Depth ....296 mm (11.7")
Ship Weight: Polyethylene........58 kg (127 lbs)
Air Inlet ....13 mm (½") FNPT/BSP
Inlet ....38 mm (1-½") ANSI or DIN 40
Discharge......38 mm (1-½") ANSI or DIN 40
Suction Lift ....3.0 m (9.8') Dry
9.5 m (31.2') Wet

Max. Flow Rate ....330 lpm (87 gpm)
Max. Size Solids ....8.0 mm (0.31")

Example: To pump 144 lpm (38 gpm) against a discharge pressure head of 7.4 bar (107 psig) requires 5.5 bar (80 psig) and 119 Nm³/h (70 scfm) air consumption. (See dot on chart.)

Caution: Do not exceed 7 bar (100 psig) air inlet supply pressure.



SECTION 6A

INSTALLATION

UH SERIES PLASTIC PUMPS

The UH plastic pumps are manufactured with wetted parts of polyethylene. The UH pumps are constructed with a center housing of nylon. A variety of diaphragms and O-rings are available to satisfy temperature, chemical compatibility, abrasion and flex concerns.

The suction pipe size for all installations should be as large as the pump inlet or larger if highly viscous material is being pumped. The suction hose must be non-collapsible, reinforced type as the UH pumps are capable of pulling a high vacuum. Discharge piping should be as large as the pump discharge, however, larger diameter pipe may be used to reduce friction losses. The discharge piping must also be capable of handling 16 bar (230 psig) as the UH series pumps can produce discharge pressure twice that of the air inlet supply pressure. It is critical that all fittings and connections are airtight or a reduction or loss of pump suction capability will result. For all UH models, Wilden offers FNPT/BSP air connections on all sizes, and ANSI or DIN compatible liquid connections for all models.

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 where equipment 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, every pump should be located in such a way that five key factors are balanced against each other to maximum advantage.

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.

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 Section 5). Use air pressure up to a maximum of 7 bar (100 psig) depending on pumping requirements. For best results, the pumps should use a 5µ (micron) air filter, needle valve and regulator. The pumps should also be run on clean-dry air only at all times. If this is not possible, a desiccant dryer must be installed and continually maintained on the air inlet to prevent migration of condensation or air line oil into the air system. The use of an air filter before the pump will insure that the majority of any pipeline contaminants will be eliminated. Sound levels are reduced below OSHA specifications using the standard Wilden muffler element supplied with pump.

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

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

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

Flexible hose can be installed to aid in absorbing the forces created by the natural reciprocating action of the pump. 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 pulsation dampener should be installed to protect the pump, piping and gauges from surges and water hammer.

Valves should be installed in the suction and discharge lines to permit closing of the lines for pump service. The use of isolation valves prevents the media being pumped from flowing back into the pump and out any loosened connections. Note: When inlet and discharge valves are closed, pressure may still remain trapped in the pump and piping. Use caution when performing any maintenance on the pump. Be sure to properly drain all air and liquid pressure from the pump before servicing.

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

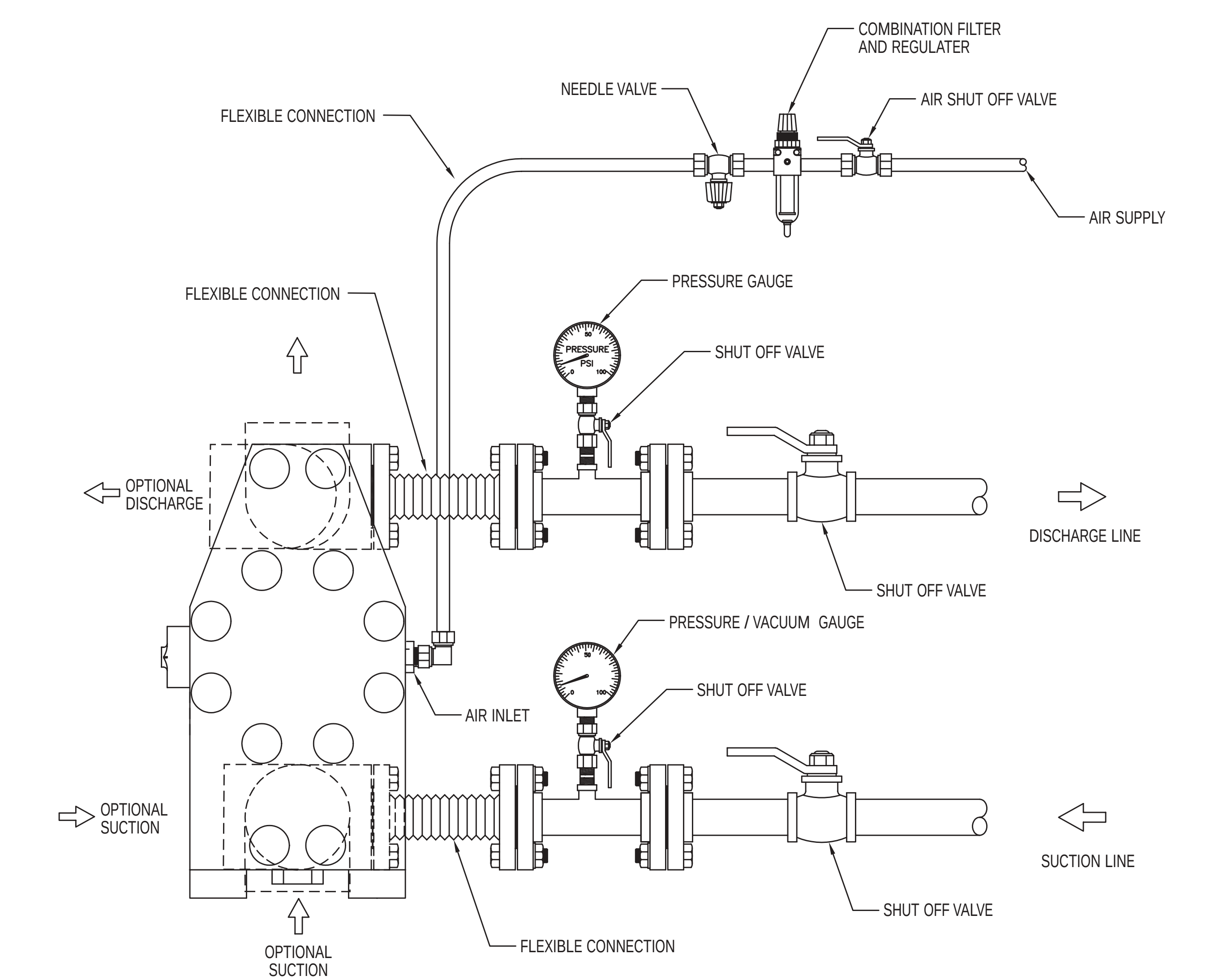
Pumps in service with a positive suction head are most efficient when inlet pressure is limited to 0.5–0.7 bar (7–10 psig). Premature diaphragm failure may occur if positive suction is higher than 0.7 bar (10 psig).

THE MODEL UH SERIES PUMPS HAVE LIMITED SOLIDS PASSAGE CAPABILITY. WHENEVER THE POSSIBILITY EXISTS THAT LARGER SOLID OBJECTS MAY BE SUCKED INTO THE PUMP, A STRAINER SHOULD BE USED ON THE SUCTION LINE. (See Section 5 for Max. Size Solids.)

CAUTION: DO NOT EXCEED 7 BAR (100 PSIG) AIR SUPPLY PRESSURE.

UH PUMPS CANNOT BE SUBMERGED. FOR SUBMERGED APPLICATIONS, CONTACT THE FACTORY FOR AN ALTERNATIVE WILDEN MODEL.

SUGGESTED INSTALLATION



SECTION 6B

SUGGESTED OPERATION AND MAINTENANCE INSTRUCTIONS

OPERATION: UH pumps do not require in-line lubrication. Lubrication will damage the pump! If the pump is lubricated by an external source, the pump's internal seal may be damaged causing premature failure of the pump.

Pump discharge rate can be controlled by limiting the volume and/or pressure of the air supply to the pump (preferred method). An air regulator is used to regulate air pressure. A needle valve is used to regulate volume. Pump discharge rate can also 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. 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. The Wilden UH pump runs solely on clean-dry air and generates little heat, therefore your process fluid temperature will not be affected.

MAINTENANCE AND INSPECTIONS: Since each application is unique, maintenance schedules may be 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. Read all cautions before performing any service on a Wilden pump.

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 6C

TROUBLESHOOTING

Pump will not run or runs slowly.

1. 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).
2. Check air inlet filter for debris (see recommended installation). A 5µ (micron) air filter must be installed in the air inlet line of the pump to prevent air line particulate from entering and damaging air system.
3. Check for extreme air leakage (blow by) which would indicate worn seals/bores in the air valve, pilot spool main shaft, or power piston.
4. Disassemble pump and check for obstructions in the air passageways or objects which would obstruct the movement of internal parts.
5. Check for sticking ball check valves. If material being pumped is not compatible with pump elastomers, swelling may occur. Replace ball check valves and seals with proper elastomers. Also, as the check valve balls wear out, they become smaller and can become stuck in the seats. In this case, replace balls and seats.
6. Diaphragms may have a pinhole allowing air to escape to the liquid side of the pump reducing performance. Check and replace diaphragms as necessary.
7. Air valve may have debris from inlet air system. A 5µ (micron) air filter must be installed in the air inlet line of the pump to prevent air line particulate from entering and damaging air system.

Pump does not run.

1. Air supply line or discharge fluid line is blocked or a valve is closed. Check valves for system and ensure they are set as desired, or disassemble pump and check for blockage.
2. Muffler may be blocked with debris or other contaminates. This will prevent air from exhausting. Replace muffler.

Pump runs and then stops with no external visible reason.

1. Ice within the air system may be blocking a port. Check system for blockage and add a dryer in air inlet line to prevent moisture from entering air system.
2. System air pressure may have dropped below system requirements. This will not hurt the pump but will put the pump into a dead-head condition. The pump will restart once air supply pressure is increased or discharge head decreases below air inlet pressure.
3. Air system may have become blocked by debris. A 5µ (micron) air filter must be installed in the air inlet line of the pump to prevent air line particulate from entering and damaging air system.
4. Air system may need maintenance. Disassemble pump and replace worn parts as necessary.
5. Diaphragm has ruptured and the product being pumped has flooded the air system stalling the pump. Disassemble the pump, clean air system of process fluid and replace diaphragms.
6. Air inlet line filter may be blocked with debris not allowing enough volume into pump for proper operation. Check and replace air inlet filter as necessary. A 5µ (micron) air filter must be installed in the air inlet line of the pump to prevent air line particulate from entering and damaging air system.

Pump runs but discharge flow decreases over time.

1. Ice within the air system may be reducing air flow in the pump. Check system for blockage and add a dryer in air inlet line to prevent moisture from entering air system.
2. Check air inlet line pressure to confirm a pressure drop has not occurred. If air pressure has decreased, locate the source of the air pressure loss and correct.
3. Debris from the air inlet line may have migrated into air system prematurely wearing the seals. Disassemble pump and replace parts as necessary. A 5µ (micron) air filter must be installed in the air inlet line of the pump to prevent air line particulate from entering and damaging air system.

Product comes out air exhaust.

1. Check for diaphragm rupture.

Pump runs but little or no product flows.

1. Check for pump cavitation; slow pump speed down to allow thick material to flow into the 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. If material being pumped is not compatible with pump elastomers, swelling may occur. Replace ball check valves and seals with proper elastomers. Also, as the check valve balls wear out, they become smaller and can become stuck in the seats. In this case, replace balls and seats.
4. Pump may be operating too fast. Often to prime the pump, especially when at the maximum capability of the pump with the system design, you must lower the air inlet pressure to achieve maximum suction lift. Once primed, line pressure can be raised to meet system requirements.
5. Abrasives in the product have deteriorated the valve ball or check valve and a good seal against the valve seat is no longer being achieved. Disassemble pump and replace worn parts as necessary.
6. Ensure a vacuum is not present inside the source fluid container. Check that the tank/tote vent is open and air is allowed into the tank/tote as product is being removed.
7. Check suction line for leaks and tight connections. In the event a union is loose the pump will be unable to pull the product efficiently into the pump. Tighten any loose suction line connections.
8. Check EOM for details on suction capabilities and ensure the system design is within the suction capabilities of the pump.

Pump air valve freezes.

1. Condensation from the air line is most likely bypassing the desiccant dryer or the dryer is beyond its useful life. Replace/service dryer.
2. No dryer is installed ahead of pump, allowing moisture into air system. This will damage air system and may render it inoperable. Install a desiccant dryer on the air inlet line with a 5µ (micron) air filter.

Air bubbles in pump discharge.

1. Check for ruptured diaphragm.
2. Check tightness of housing bolts and integrity of O-rings and seals, especially at intake manifold.
3. Ensure pipe connections are airtight.

Pump leaks between center section and liquid chambers.

1. Tighten all tie rods on pump to ensure a tight fit with the center section.
2. The O-rings on the sleeves between the liquid chambers and center section may be damaged. Disassemble pump and check O-rings for damage and replace as necessary.
3. Diaphragms and/or O-rings may have been damaged due to incompatibility with chemical being pumped. Check chemical use chart and select a material more appropriate for the process fluid.
4. Sleeves between center section and liquid chambers may be damaged during maintenance. Disassemble pump and replace worn or damaged parts as necessary.

SECTION 7A

UH HIGH-PRESSURE PLASTIC PUMPS

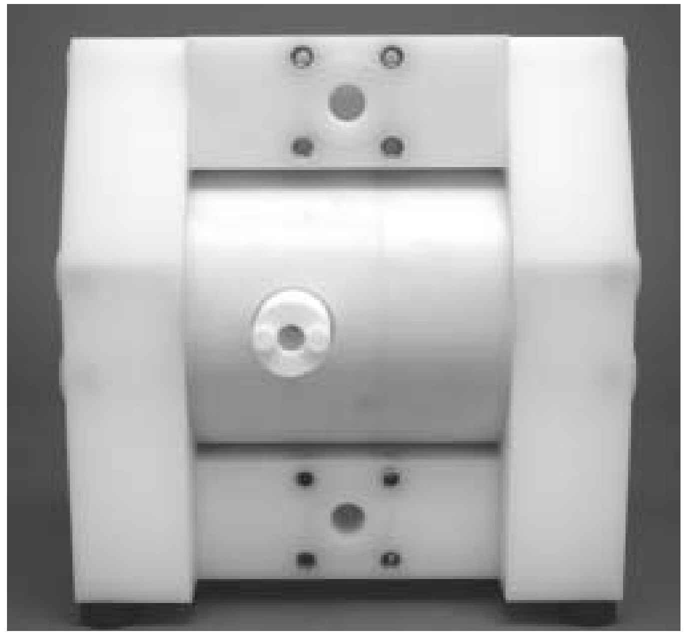
DIRECTIONS FOR DISASSEMBLY/REASSEMBLY

CAUTION: Before any maintenance or repair is attempted, the compressed air line to the pump should be disconnected and all air pressure allowed to bleed from the pump. Use extreme caution as the pump liquid path may still be under pressure even though air line is disconnected. 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.

The UH series pumps are available with wetted parts of ultra-high molecular weight polyethylene.

TOOLS REQUIRED:
Metric Socket Wrench Set
Metric Open-end / Box-end Wrench Set
Adjustable Wrench
Medium Flat Head Screwdriver
Air Valve Tool Included with Pump

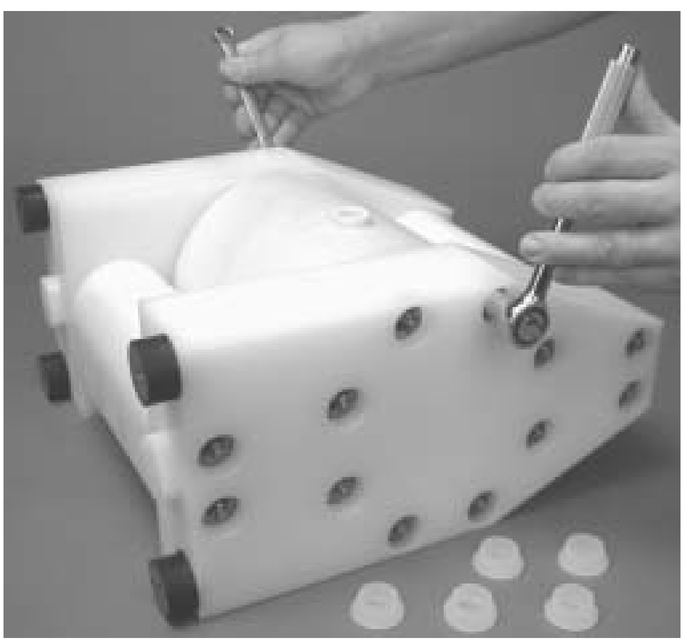
NOTE: The model used for these instructions incorporates Teflon® diaphragms, balls and seat O-rings. Models with Nordel® or Buna-N diaphragms, balls and seat O-rings are the same except where noted.



DISASSEMBLY:

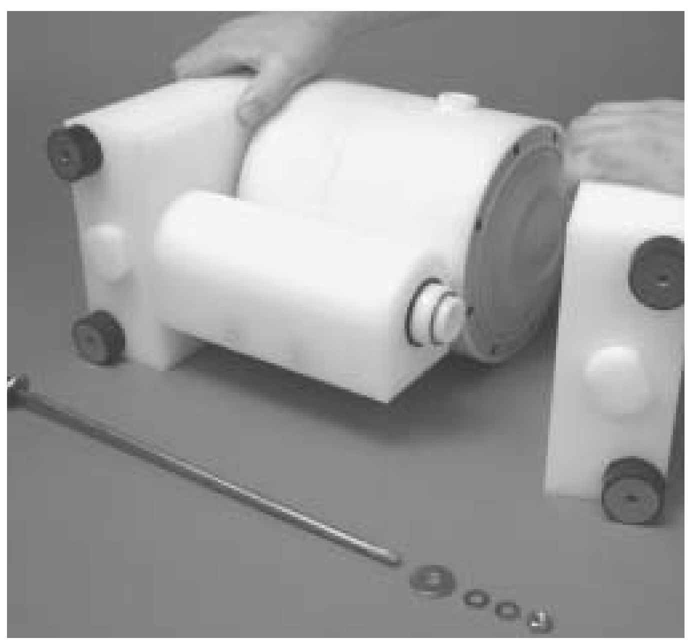
STEP 1. *Figure 1*

Before disassembly, note orientation of center housing. The muffler should be on the left side when viewing from the back of the pump. Remove muffler by turning counterclockwise with hand.



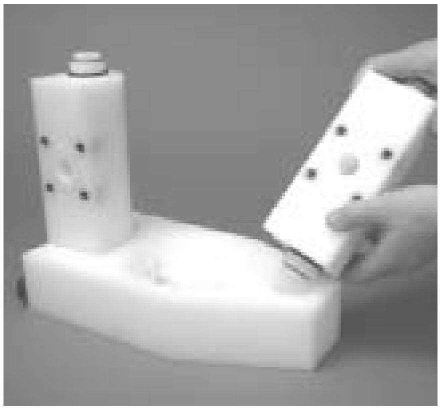
STEP 2. *Figure 2*

Remove hardware caps with a flat head screwdriver. Remove all nuts, washers, spring washers and tie rods from pump using metric socket and box end wrench. **NOTE:** Mark center section and liquid chamber with marker to ensure proper reassembly.



STEP 3. *Figure 3*

Pull tie rods out of pump and separate the two liquid chambers from center section and manifolds.

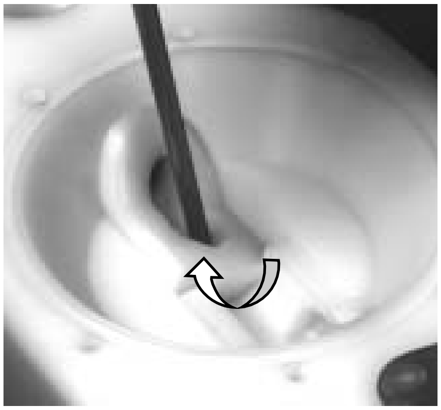


STEP 4. *Figure 4*

Set aside the center section with diaphragm assembly. Remove the two manifolds from the liquid chambers, inspect O-rings and replace if necessary.

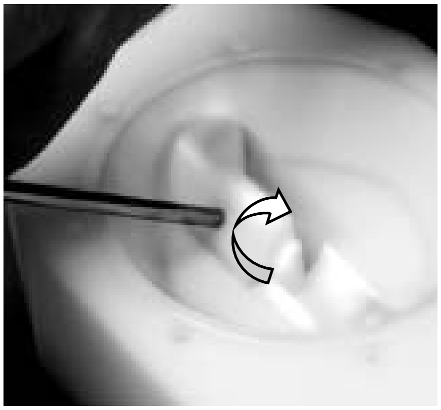
STEP 5. *Figure 5*

Remove top seat assembly by rotating it counter-clockwise (viewed from top of pump). This is done by hitting a socket placed on the part with a soft mallet. **NOTE:** The seat assembly must be rotated counterclockwise. If rotated clockwise, damage to the pump may result.



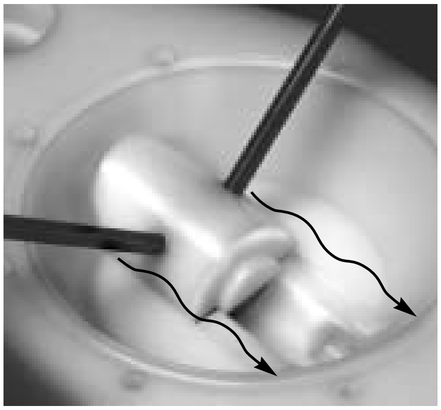
STEP 6. *Figure 6*

Once the seat assembly is rotated 1/8 turn, thread tie rod into hole and rotate another 1/8 turn counterclockwise, using caution not to damage seat assembly.



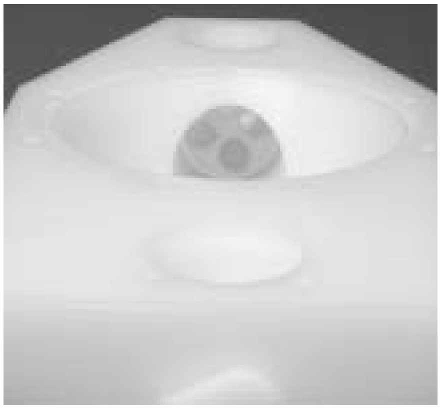
STEP 7. *Figure 7*

You should now be able to thread tie rod into hole in the seat assembly from the OD. Continue rotating the seat assembly until it is a full 180˚ from its original position.



STEP 8. *Figure 8*

Once fully rotated, place two tie rods into the holes of the seat assembly and walk the part out toward the center of the pump. This can be accomplished with a gentle rocking and pulling action.



STEP 9. *Figure 9*

Remove ball and set aside. It is recommended that the top ball cage be inspected for cracks and/or abrasion without removal. If ball cage does not show signs of wear or damage, do not remove.

STEP 10. *Figure 10*

If removal is necessary, remove O-ring first with O-ring tool (this may destroy O-ring and replacement is necessary). Then simply insert finger in liquid chamber port above ball cage and press firmly to remove cage.

STEP 11. *Figure 11*

Remove feet from bottom of liquid chamber by turning them counterclockwise. Remove inlet valve plug by turning counter-clockwise with an adjustable wrench. **NOTE**: For reassembly, use Teflon® tape as a thread sealant to prevent fluid leakage.

STEP 12. *Figure 12*

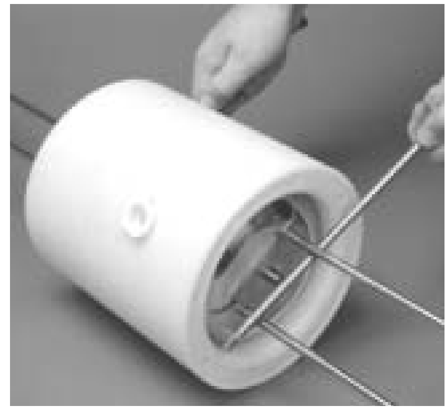
Prepare tie rod for use as a disassembly tool to drive-out inlet ball cage. Simply thread nut half way onto tie rod. This will distribute force evenly to prevent ball scaring.

STEP 13. *Figure 13*

Remove inlet ball cage by pushing on the valve ball with the tool made in Step 12. This may require tapping the tie rod lightly. DO NOT STRIKE as this will lead to valve ball scarring and a reduction in suction lift and performance.

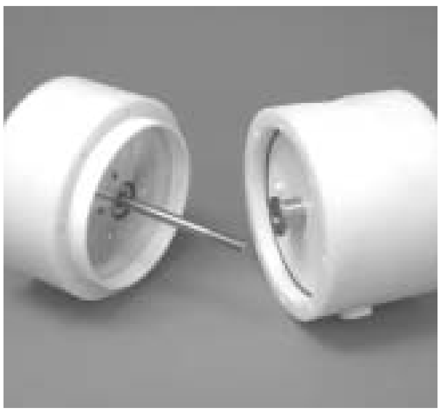
STEP 14. *Figure 14*

Push down on center section to reveal diagram edge. Grasp edge of diaphragm and turn counterclockwise to remove both diaphragms and anti-friction shield.



STEP 15. *Figure 15*

Screw two tie rods into each inner piston. Utilize two other tie rods as breaker bars to loosen inner pistons by turning counter-clockwise. Remove and set aside.



STEP 16. *Figure 16*

Remove booster chamber assembly from center section. Inspect shaft for damage and replace as necessary.

STEP 17. *Figure 17*

Remove shaft bushing and power cylinder O-ring, inspect and replace if necessary.

STEP 18. *Figure 18*

With installation tool provided, remove air valve assembly, inspect, and replace if necessary. If air valve end cap is stuck, do not force. Turn center section over and try other side. Once removed, turn tool over and push out air valve sleeve.

STEP 19. *Figure 19*

Push down on assembly such that the shaft and other components are freed from the power piston housing. Inspect for wear or damage and replace as necessary.

STEP 20. *Figure 20*

When removing shaft from power piston, turn it counter-clockwise to prevent damage to O-ring in the ID of power piston. Inspect all parts for wear or damage and replace as necessary.

STEP 21. *Figure 21*

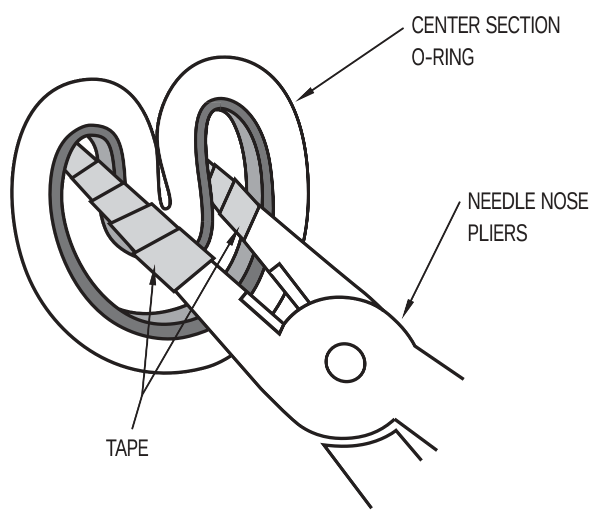
REASSEMBLY HINT: The power piston has one flat and one tapered side. The tapered side must face the concave side of the power piston sleeve upon reassembly.

SECTION 7B

REASSEMBLY HINTS & TIPS

When reassembling a UH pump, it is important to pay particular attention to specific details to avoid damaging the pump or limiting pump performance. To reassemble a UH pump follow disassembly instructions 1 through 21 in reverse order and be sure to adhere to the following assembly hints & tips:

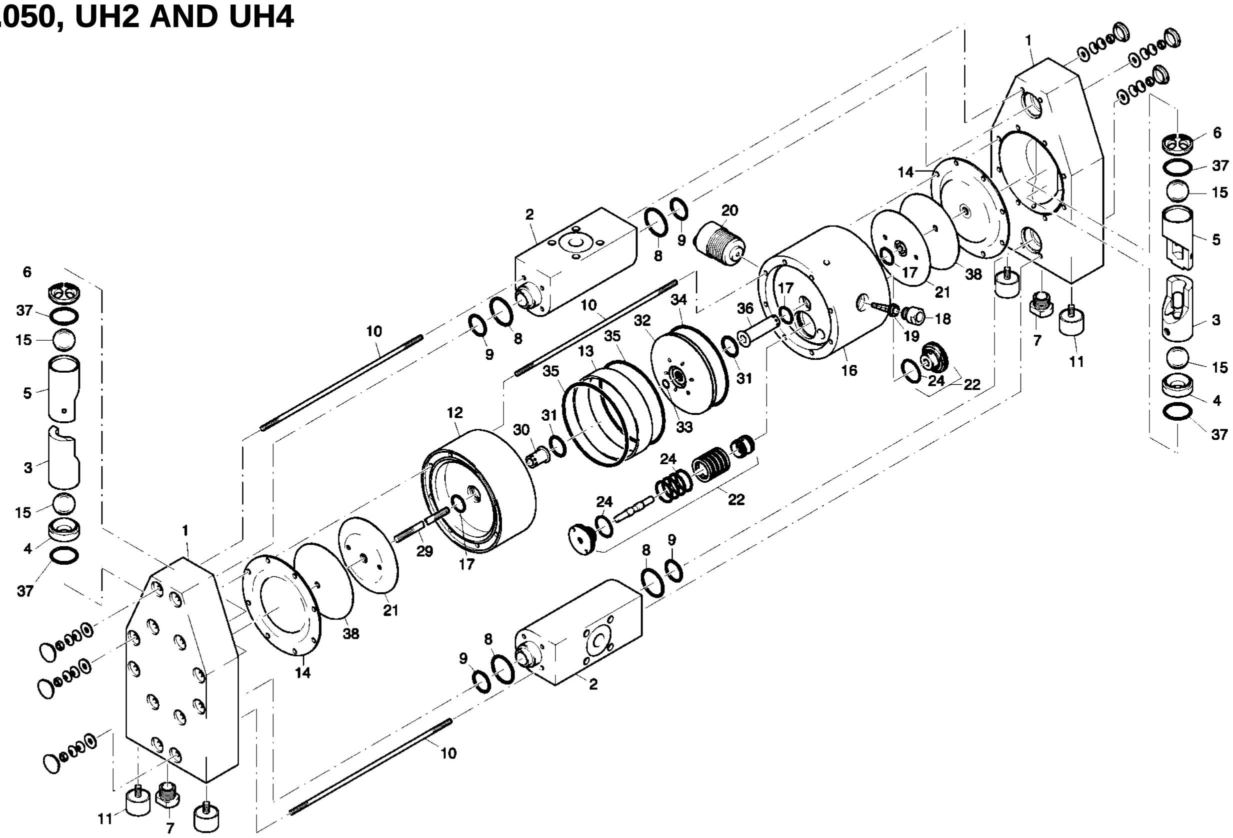
1. Before installing or inserting any components, moisten all parts with distilled water for lubrication. DO NOT use any oil or silicone lubricants as these may damage the pump or render it inoperable.
2. When tightening the air valve end into the center section, be sure to use the tool included with pump upon arrival.
3. Continue to tighten the air valve ends until the top of the end cap is flush with the center housing.
4. To prevent damage to O-rings in center block from being damaged upon insertion, carefully fold into a kidney shape before insertion. (See figure.) After insertion, carefully smooth O-rings with a tie rod before inserting shaft.
5. When reattaching diaphragms to the shaft, first insert and tighten the shaft stud into the diaphragm piston using a hex head wrench. Then proceed to hand-tighten onto end of shaft.
6. **CAUTION:** When installing diaphragms, be sure to insert the shaft stud into the outer piston first, tightening with a hex head wrench. Then proceed to install diaphragms on the end of shaft by rotating both diaphragms clockwise. If diaphragms are hand-tight on the shaft and the bolt holes do not line up, attempt to continue rotating clockwise until holes align if possible. Reverse rotation to align holes only if it is impossible to align holes through clockwise rotation.
7. Use care when installing balls and seat/cages. Ensure proper alignment and rotation, as explained in steps 5-8, to prevent pump damage.
8. Reassemble both liquid chambers against the center housing, aligning all bolt holes. Insert all tie rods and install all nuts and washers. Be sure the Belleville washers have the concave side of the washer facing toward the center housing. Continue to tighten until all three pieces meet tightly, but do not overtighten. Overtorque of the tie rod nuts will cause pump damage.
9. To prevent seizing of hardware upon reassembly, spray a Teflon® lubricant on the tie-rod threads before tightening.
10. Always tighten inner pistons independent of diaphragms to insure proper support.



SECTION 8A

EXPLODED VIEW / PARTS LISTING

UH.050, UH2 AND UH4



UNITEC™ UH SERIES PUMPS

UNITEC™ Series Pumps - Polyethylene High-Pressure Models					
Pump Model			UH.050	UH2	UH4
Item	Description	Qty.	P/N	P/N	P/N
1	Chamber, Liquid	2	U3-15-110-52	U3-25-110-52	U3-40-110-52
2	Manifold, Suction, Discharge Combo, DIN	2	U3-15-011-52	U3-25-011-52	U3-40-011-52
	Manifold, Suction, Discharge Combo, ANSI		U3-15-111-52	U3-25-111-52	U3-40-111-52
3	Retainer, Suction Valve, HP	2	U3-15-013-52	U3-25-013-52	U3-40-013-52
4	Seat, Inlet Valve	2	U3-15-014-52	U3-25-014-52	U3-40-014-52
5	Retainer, Discharge Valve, HP	2	U3-15-015-52	U3-25-015-52	U3-40-015-52
6	Screen, Ball Retainer	2	U3-15-016-52	U3-25-016-52	U3-40-016-52
7	Plug, side housing	2	U1-25-017-52	U3-25-017-52	U1-40-017-52
8	O-ring, Manifold, Back-Up, ND	4	U9-37-528-72	U9-42-540-72	U9-65-516-72
9	O-ring, Manifold, Primary, ND	4	U9-33-526-72	U9-33-526-72	U9-51-513-72
	O-ring, Manifold, Primary, TV		U9-33-553-59	U9-33-553-59	U9-50-554-59
10	Tie Rod, Housing	12	U3-15-120-22	U3-25-120-22	U3-40-120-22
11	Foot, Pump Base	4	U1-15-322-85	U1-15-322-85	U1-40-322-85
12	Chamber, Booster HP	1	U3-15-148-53	U3-25-148-53	U3-40-148-53
13	Sleeve, Power Piston	1	U3-15-049-84	U3-25-049-84	U3-40-049-84
14	Diaphragm, HP, BX	2	U3-15-031-72	U3-25-031-72	U3-40-031-72
	Diaphragm, HP, EX		U3-15-031-71	U3-25-031-71	U3-40-031-71
	Diaphragm, HP, ET		U3-15-031-67	U3-25-031-67	U3-40-031-67
15	Valve Ball, BN	4	U1-25-032-72	U3-25-032-72	U3-40-032-72
	Valve Ball, ND		U1-25-032-71	U3-25-032-71	U3-40-032-71
	Valve Ball, TF		U1-25-032-60	U3-25-032-60	U3-40-032-60
16	Center block	1	U3-15-140-53	U3-25-140-53	U3-40-140-53
17	Shaft Piston Ring	3	U1-40-041-64	U1-50-041-64	U3-40-041-64
18	Bushing, Air Inlet Reducer	1	U1-15-047-84	U1-40-047-84	U1-40-047-84
19	Filter, Air Inlet	1	U1-15-043-51	U1-40-043-51	U1-40-043-51
20	Muffler, Complete	1	U1-15-244-51	U1-40-244-51	U1-50-244-51
21	Supporting disc	2	U3-15-033-31	U3-25-033-31	U3-40-033-31
22	Uni-Flo™ Air Valve Assembly	1	U2-15-001-84	U2-40-001-84	U2-50-001-84
24	O-ring, air valve housing	6	U9-36-504-71*	U9-46-515-71*	U9-66-533-71*
29	Shaft	1	U3-15-030-22	U3-25-030-22	U3-40-030-22
30	Shaft bushing, short	1	U3-15-035-22	U3-25-035-22	U3-40-035-22
31	O-ring, shaft bushing	2	U9-24-514-71	U9-30-510-71	U9-36-591-71
32	Power Piston, HP	1	U3-15-034-31	U3-25-034-31	U3-40-034-32
33	O-ring, Dual Stage Shaft	1	U9-10-507-74	U9-12-506-71	U9-17-557-74
34	Seal, Power Piston, HP	1	U3-15-037-52	U3-25-037-52	U3-40-037-52
35	O-ring, dual stage bushing	2	U9-99-567-71	U9-99-562-71	U9-99-573-71
36	Shaft bushing, long	1	U3-15-036-22	U3-25-036-22	U3-40-036-22
37	O-ring, Valve Seat, ND	4	U9-37-603-72	U9-48-604-72	U9-72-605-72
	O-ring, Valve Seat, TF		U9-37-603-60	U9-48-604-60	U9-72-605-60
38	Piston, Inner, HP	2	U3-15-039-60	U3-25-039-60	U3-40-039-60

* included in item 22

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WARRANTY

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Wilden Pump and Engineering, LLC warrants that pumps, accessories and parts manufactured or supplied by it to be free from defects in material and workmanship for a period of one year from date of startup or two years from date of shipment, whichever comes first. Failure due to normal wear, misapplication, or abuse is, of course, excluded from this warranty.

Since the use of Wilden pumps and parts is beyond our control, we cannot guarantee the suitability of any pump or part for a particular application and Wilden Pump and Engineering, LLC shall not be liable for any consequential damage or expense arising form the use or misuse of its products on any application. Responsibility is limited solely to replacement or repair of defective Wilden pumps and parts.

All decisions as to the cause of failure are the sole determination of Wilden Pump and Engineering, LLC.

Prior approval must be obtained from Wilden for return of any items for warranty consideration and must be accompanied by the appropriate MSDS for the product(s) involved. A Return Goods Tag, obtained from an authorized Wilden distributor, must be included with the items which must be shipped freight prepaid.

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Item #______________________________ Serial # ____________________________________

Company Purchased From ____

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Industry ____

Your Name __________________________ Title______________________________________

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Number of pumps in facility? _________Diaphragm _________Centrifugal

________Gear ________Submersible ________Lobe ________Other _____________________

Chemical(s) being pumped ____

How did you hear of Wilden Pump? ________Trade Journal ________Trade Show

________Internet/E-mail ________Distributor ________Other ____________________________

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NOTES

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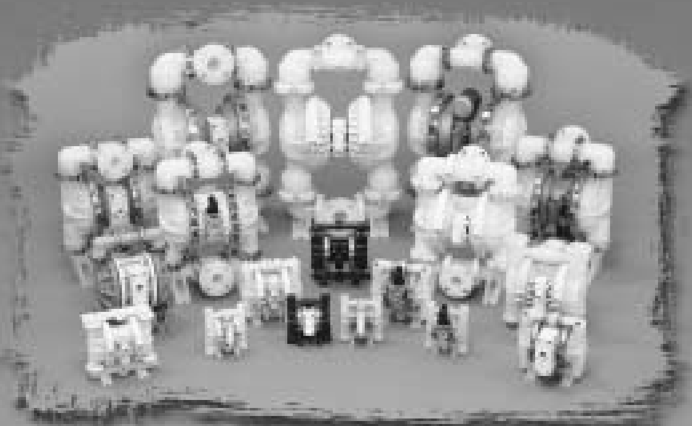
ENGINEERED REVOLUTION

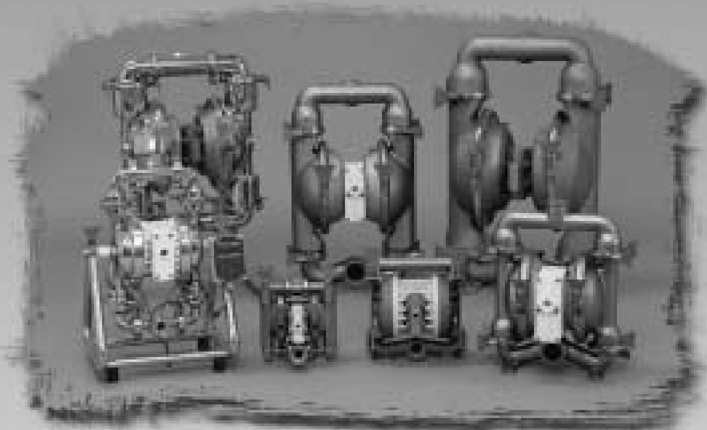


Plastic

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

Metal

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



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