

SERVICE AND OPERATING MANUAL Original Instructions

Model SET1

Sanitary Type 3

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Tel: 866-777-6060

Fax: 866-777-6383

Warren Rupp, Inc. • A Unit of IDEX Corporation







SET 1 BALL VALVE Type 3

Air-Powered Double Diaphragm Sanitary Containment Pumps

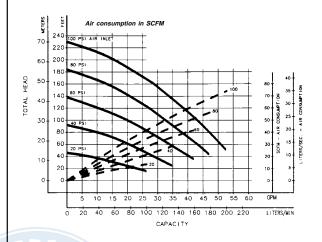
ENGINEERING, PERFORMANCE & CONSTRUCTION DATA

	MODEL SET1					
5	SUCTION/DISCHARGE PIPE SIZE 1½" Sanitary Clamp Fittings	CAPACITY 0 to 52 gallons per minute (0 to 196 liters per minute)	AIR VALVE No-lube, no-stall design	SOLIDS-HANDLING ¼ in. (6 mm)	HEADS UP TO 125 psi or 289 ft. of water (8.8 Kg/cm² or 88 meters)	

PERFORMANCE CURVE

 $(\textbf{SANDPIPER}^{\circledast} \text{ pumps are designed to be powered } \textbf{only} \text{ by compressed air})$

Temperature Limit: 212°F - 100°C MAXIMUM



MATERIALS OF CONSTRUCTION

SET1	Driver Chamber	Manifold/ Elbow	Outer Chamber	Inner Chamber	Outer Driver Diaphragm Plate	Inner Driver Diaphragm Plate	Intermediate Housing	Diaphragm Rod	Valve Seat	Hard- ware	Pumping Diaphragm Driver Diaphragm	Ball Valve Material	Seat/ Manifold Gasket		Shipping Weight (lbs)
TGF-3-SS	T	302/304SS	316SS*	AL380DC	316SS*	PS	AL380DC	416SS	Т	304SS	T/WN	T	Т	AL380DC	65

Meanings of **Abbreviations:**

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Quality System ISO9001 Certified

Environmental

Management System ISO14001 Certified

*= Electropolished = Electroless Nickel Plated AL = Aluminum DC = Die Cast PP = Polypropylene - Glass Filled

PS = Plated Steel T = PTFE SS = Stainless Steel WN= White Nitrile - Food Grade

NITRILE TEMPERATURE LIMITATIONS: 190°F (88°C) for Continuous Operation 280°F (138°C) for Intermittent Operation

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> Springer Pumps, LLC www.springerpumps.com Sandpiper Maintenance Videos: https://goo.gl/Vn9Gdt Int'l: +001 267 404 2910

SET 1

SANITARY CONTAINMENT



MODEL

SET1

Dimensions are ± 1/8" Figures in parenthesis = millimeters —10 3/16"<u>(268)</u> 1 1/2" SIZE -2 3/8" SANITARY CLAMP (60) (104) FITTING DISCHARGE A I R EXHAUST (454) -15 3/4" (400) ...8/ 3/8" (238) 11/16" (195)

SUCTION

(74) 2 29/32"

-5 27/32"⁽¹⁴⁸⁾

-7 1/4" (184)

 $1^1/2"$ SANITARY PROCESS CLAMP FITTING SUCTION AND DISCHARGE $^1/2"$ NPT(F) AIR INLET PORT • $^3/4"$ NPT(M) AIR EXHAUST PORT

(60) 3/8".

> 1 1/2" SIZE SANITARY CLAMP FITTING

(114) (116) —4 1/2"—— 4 9/16"

9" (228)

-10" (254)



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SERVICE AND OPERATING MANUAL Original Instructions Model SET1

Sanitary Type 3

PRINCIPLE OF OPERATION

This ball check valve pump is powered by compressed air and is a 1:1 pressure ratio design. It alternately pressurizes the inner side of one diaphragm chamber, while simultaneously exhausting the other inner chamber. This causes the diaphragms, which are connected by a common rod, to move endwise. Air pressure is applied over the entire surface of the diaphragm, while liquid is discharged from the opposite side. The diaphragm operates under a balanced condition during the discharge stroke, which allows the unit to be operated at discharge heads over 200 feet (61 meters) of water head.

Since the diaphragms are connected by a common rod, secured by plates to the center of the diaphragms, one diaphragm performs the discharge stroke, while the other is pulled to perform the suction stroke in the opposite chamber.

For maximum diaphragm life, keep the pump as close to the liquid being pumped as possible. Positive suction head in excess of 10 feet of liquid (3.048 meters) may require a back pressure regulating device. This will maximize diaphragm life.

Alternate pressuring and exhausting of the diaphragm chamber is performed by means of an externally mounted, pilot operated, four-way spool type air distribution valve. When the spool shifts to one end of the valve body, inlet air pressure is applied to one diaphragm chamber and the other diaphragm chamber exhausts. When the spool shifts to the opposite end of the valve body, the porting of chambers is reversed. The air distribution valve spool is moved by an internal pilot valve which alternately pressurizes one side of the air distribution valve spool, while exhausting the other side. The pilot valve is shifted at each end of the diaphragm stroke by the diaphragm plate coming in contact with the end of the pilot valve spool. This pushes it into position for shifting of the air distribution valve.

The chambers are manifolded together with a suction and discharge check valve for each chamber, maintaining flow in one direction through the pump.

This SandPIPER pump differs from others in that it utilizes four diaphragms instead of two. The two rod-connected diaphragms are the driver diaphragms, and the other two (outermost) diaphragms are the actual pumping diaphragms. Each driver diaphragm (of Neoprene or other elastomer), and the pumping diaphragm (of TFE), are separated by a chamber filled with liquid which transmits the reciprocating motion of the driver diaphragm to the pumping diaphragm. The pumping diaphragms, create the alternating suction and discharge action to each outer diaphragm chamber. The pumping diaphragms are the only ones in contact with the liquid being pumped.

INSTALLATION & START-UP

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Locate the pump as close to the product being pumped as possible, keeping suction line length and number of fittings to a minimum. Do not reduce line size.

For installations of rigid piping, short flexible sections of hose should be installed between pump and piping. This reduces vibration and strain to the piping system. A Warren Rupp Tranquilizer® surge suppressor is recommended to further reduce pulsation in flow.

This pump was tested at the factory prior to shipment and is ready for operation. It is completely self-priming from a dry start for suction lifts of 10-15 feet (9-14 meters) or less. For suction lifts exceeding 15 feet of liquid, fill the chambers with liquid prior to priming.

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AIR SUPPLY

Air supply pressures cannot exceed 125 psi (8.61 bar). Connect the pump air inlet (see Fig. 1) to an air supply of sufficient capacity and pressure required for desired performance. When the air line is solid piping, use a short length of flexible hose (not less than 3/4" [19mm] in diameter) between pump and piping to eliminate strain to pipes.

AIR INLET & PRIMING

For start-up, open an air valve approximately ½ to ¾ turn. After the unit primes, an air valve can be opened to increase flow as desired. If opening the valve increases cycling rate, but does not increase flow rate, cavitation has occurred, and the valve should be closed slightly.

For the most efficient use of compressed air and the longest diaphragm life, throttle the air inlet to the lowest cycling rate that does not reduce flow.

A NOTE ABOUT AIR VALVE LUBRICATION

The SandPIPER pump's pilot valve and main air valve assemblies are designed to operate WITHOUT lubrication. This is the preferred mode of operation. There may be instances of personal preference, or poor quality air supplies when lubrication of the compressed air supply is required. The pump air system will operate with properly lubricated compressed air supplies. Proper lubrication of the compressed air supply would entail the use of an air line lubricator (available from Warren Rupp) set to deliver one drop of 10 wt., non-detergent oil for every 20 SCFM of air the pump consumed at its point of operation. Consult the pump's published Performance Curve to determine this.

It is important to remember to inspect the sleeve and spool set routinely. It should move back and forth freely. This is most important when the air supply is lubricated. If a lubricator is used, oil accumulation will, over time, collect any debris from the compressed air. This can prevent the pump from operating properly.

Water in the compressed air supply can create problems such as icing or freezing of the exhaust air causing the pump to cycle erratically, or stop operating. This can be addressed by using a point of use air dryer (available from Warren Rupp) to supplement a plant's air drying equipment. This device will remove excess water from the compressed air supply and alleviate the icing or freezing problem.

ESADS: EXTERNALLY SERVICEABLE AIR DISTRIBUTION SYSTEM

Please refer to the exploded view drawing and parts list in the Service Manual supplied with your pump. If you need replacement or additional copies, contact your local Warren Rupp Distributor, or the Warren Rupp factory Literature Department at the number shown below. To receive the correct manual, you must specify the MODEL and TYPE information found on the name plate of the pump.

MODELS WITH 1" SUCTION/DISCHARGE OR LARGER, AND NON-METAL CENTER SECTIONS

The main air valve sleeve and spool set is located in the valve body mounted on the pump with four hex head capscrews. The valve body assembly is removed from the pump by removing these four hex head capscrews.

With the valve body assembly off the pump, access to the sleeve and spool set is made by removing a retaining ring (each end) securing the end cap on the valve body assembly. With the end caps removed, slide the spool back and forth in the sleeve. The spool is closely sized to the sleeve and must move freely to allow for proper pump operation. An accumulation of oil, dirt or other contaminants from the pump's air supply, or from a failed diaphragm, may prevent the spool from moving freely. This can cause the spool to stick in a position that prevents the pump from operating. If this is the case, the sleeve and spool set should be removed from the valve body for cleaning and further inspection.

Remove the spool from the sleeve. Using an arbor press or bench vise (with an improvised mandrel), press the sleeve from the valve body. Take care not to damage the sleeve. At this point, inspect the o-rings on the sleeve for nicks, tears or abrasions. Damage of this sort could happen during assembly or servicing. A sheared or cut o-ring can allow the pump's compressed air supply to leak or bypass within the air valve assembly, causing the pump to leak compressed air from the pump air exhaust or not cycle properly. This is most noticeable at pump dead head or high discharge pressure conditions. Replace any of these o-rings as required or set up a routine,

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preventive maintenance schedule to do so on a regular basis. This practice should include cleaning the spool and sleeve components with a safety solvent or equivalent, inspecting for signs of wear or damage, and replacing worn components.

To re-install the sleeve and spool set, lightly lubricate the o-rings on the sleeve with an o-ring assembly lubricant or lightweight oil (such as 10 wt. air line lubricant). Press the set into the valve body easily, without shearing the o-rings. Re-install one end cap, and retaining ring on the valve body. Using the arbor press or bench vise that was used in disassembly, press the sleeve back into the valve body. Re-install the spool, keeping the counter-bored end toward you, and install the spring, opposite end cap and retaining ring on the valve body. After inspecting and cleaning the gasket surfaces on the valve body and intermediate, re-install the valve body on the pump using new gaskets. Tighten the four hex head capscrews evenly and in an alternating cross pattern, at 150 in./lbs. (16.94 Newton meters).

AIR EXHAUST

If a diaphragm fails, the pumped liquid or fumes can enter the air end of the pump, and be exhausted into the atmosphere. When pumping hazardous or toxic materials, pipe the exhaust to an appropriate area for safe disposition.

This pump can be submerged if materials of construction are compatible with the liquid. The air exhaust must be piped above the liquid level. Piping used for the air exhaust must not be smaller than 1" (2.54 cm). Reducing the pipe size will restrict air flow and reduce pump performance. When the product source is at a higher level than the pump (flooded suction), pipe the exhaust higher than the product source to prevent siphoning spills.

Freezing or icing of the air exhaust can occur under certain temperature and humidity conditions. Use of a Warren Rupp Extractor/Dryer unit should eliminate most icing problems. Check the exhaust periodically for build-up of ice or contaminants (see Fig. 2).

BETWEEN USES

When used for materials that tend to settle out or transform to solid form, the pump should be completely flushed after each use, to prevent damage. Product remaining in the pump between uses could dry out or settle out. This could cause problems with valves and diaphragms at re-start. In freezing temperatures, the pump must be drained between uses in all cases.

FILLING OF DRIVER CHAMBER WITH LIQUID

The driver chambers are filled at the factory with water.

If you need to substitute another liquid to prevent system contamination, first consult the factory for chemical compatibility with pump construction.

Follow the steps listed below to replace the liquid in the pump after disassembly or liquid loss:

- 1. Filling is accomplished through the pipe plugs at the top of the liquid driver chamber (see Fig. 3).
- 2. After the driver fluid has been emptied from the pump, the driver diaphragms will naturally come to center.
- 3. Remove the entire discharge manifold assembly exposing the ports in the outer diaphragm chambers.
- 4. Fill either side with 600 ml. (20.3 fl. oz.) by volume with the driver liquid. It is imperative that the driver liquid chambers be filled with the correct amount of driver liquid as too little or too much will cause premature diaphragm failure and erratic pumping.
- 5. After filling with the proper amount of liquid, if the liquid does not come to the top of the fill hole, pressure should be applied to the Virgin PTFE diaphragm with a blunt tool through the discharge material flow port in the outer chamber until it does come to the top (see Fig. 4). To facilitate this filling, a taper punch can be used in the hole of the rod to manually shift the pump.
- 6. When the driver fluid rises to the top of the fill plug hole, screw the boss plug, with o-ring installed, into the chamber (see Fig. 5). (Do not overtighten.) Remember to keep pressure on the Virgin PTFE diaphragm until the boss plug is tight to prevent air from drawing back into the chamber.
- 7. Filling the opposite side is accomplished in the same manner as described in 5 and 6. The correct amount of fluid will come to the top of the fill hole. Screw in the boss plug.

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CHECK VALVE SERVICING

Need for inspection or service is usually indicated by poor priming, unstable cycling, reduced performance or the pump's cycling but not pumping.

Remove the six flange bolts securing the inlet and outlet flanges to the manifold. Inspect the surfaces of both check valve and seat for wear or damage that could prevent proper sealing. If pump is to prime properly, valves must seat air tight (see Fig. 6).

DIAPHRAGM SERVICING

Driver Diaphragms:

Drain the driver diaphragm chamber by removing the boss plug on the underside of the driver chamber. **NOTE:** This is also the part used for leak detector probes. Remove twelve bolts securing the two manifolds to the chambers. Remove eight bolts securing the diaphragm chamber. This permits inspection of the TFE diaphragm and the driver diaphragm. Loosen the plate which secures the diaphragm and plate to the rod by keeping the diaphragm engaged with the inner diaphragm chamber. Insert two or three capscrews through the bolt holes so the diaphragm cannot rotate when loosening. The diaphragm plates, diaphragm and bumper will now come off the assembly. Repeat all actions if the other diaphragm needs to be inspected or replaced.

NOTE: See "Filling of Driver Chamber with Liquid" for the correct procedure to recharge the pump for operation.

Reassembly is the reverse of the tear down. During reassembly, be sure the rubber bumper is on the rod on each side. Install the diaphragm with the natural bulge to the outside as marked on the diaphragm. Be sure that the large radius side of each plate is toward the diaphragm. Place the sealing washer between the inner diaphragm plate and the end of the rod. Tighten the plate to approximately 25 ft. lbs. (3.456 pounds/sq. cm.). Torque while allowing the diaphragm to turn freely with the plate. Hold the opposite side with a wrench on the plate to prevent rotation of the rod. If the opposite chamber is assembled, this will not be necessary.

When reassembling the outer chambers and the manifold, the bolts securing the manifold flange to the chamber should be snugged prior to tightening the manifold flange. Finish tightening the manifold flange bolts after the chamber bolting is secured.

PILOT VALVE

The pilot valve assembly is accessed by removing the main air distribution valve body from the pump and lifting the pilot valve body out of the intermediate housing (see Fig. 9).

Most problems with the pilot valve can be corrected by replacing the o-rings. Always grease the spool prior to inserting it into the sleeve. If the sleeve is removed from the body, reinsertion must be at the chamfered side. Grease the o-rings to slide the sleeve into the valve body. Securely insert the retaining ring around the sleeve. When reinserting the pilot valve, push both plungers (located inside the intermediate bracket) out of the path of the pilot valve spool ends to avoid damage.

PILOT VALVE ACTUATOR

Bushings for the pilot valve actuators are held in the inner chambers with retaining rings. An o-ring is behind each bushing. If the plunger has any sideways motion check o-rings and bushings for deterioration or wear. The plunger may be removed for inspection or replacement. First remove the air distribution valve body and the pilot valve body from the pump. The plungers can be located by looking into the intermediate. It may be necessary to use a fine piece of wire to pull them out. The bushing can be turned out through the inner chamber by removing the outer chamber assembly. Replace the bushings if pins have bent (see Fig. 10 and Fig. 11).

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SERVICE INSTRUCTIONS: TROUBLE SHOOTING

1. Pump will not cycle

- A. Check to make sure the unit has enough pressure to operate and that the air inlet valve is open.
- B. Check the discharge line to insure that the discharge line is neither closed nor blocked.
- C. If the spool in the air distribution valve is not shifting, check the main spool. It must slide freely.
- D. Excessive air leakage in the pump can prevent cycling. This condition will be evident. Air leakage into the discharge line indicates a ruptured diaphragm. Air leakage from the exhaust port indicates leakage in the air distribution valve. See further service instructions.
- E. Blockage in the liquid chamber can impede movement of diaphragm.

2. Pump cycles but will not pump

- A. Suction side of pump pulling in air. Check the suction line for air leaks and be sure that the end of the suction line is submerged. Check flange bolting. Check valve flanges and manifold to chamber flange joints.
- B. Make certain the suction line or strainer is not plugged. Restriction at the suction is indicated by a high vacuum reading when a vacuum gauge is installed in the suction line.
- C. Check valves may not be seating properly. To check, remove the suction line and cover the suction port with your hand. If the unit does not pull a good suction (vacuum), the check valves should be inspected for proper seating.
- D. Static suction lift may be too high. Priming can be improved by elevating the suction and discharge lines higher than the check valves and pouring liquid into the unit through the suction inlet. When priming at high suction lifts or with long suction lines operate the pump at maximum cycle rate.
- E. Incorrect driver fluid level or air has not been properly purged.

3. Low performance

- A. Capacity is reduced as the discharge pressure increases, as indicated on the performance curve. Performance capability varies with available inlet air supply. Check air pressure at the pump inlet when the pump is operating to make certain that adequate air supply is maintained.
- B. Check vacuum at the pump suction. Capacity is reduced as vacuum increases. Reduced flow rate due to starved suction will be evident when cycle rate can be varied without change in capacity. This condition will be more prevalent when pumping viscous liquids. When pumping thick, heavy materials the suction line must be kept as large in diameter and as short as possible, to keep suction loss minimal.
- C. Low flow rate and slow cycling rate indicate restricted flow through the discharge line. Low flow rate and fast cycling rate indicate restriction in the suction line or air leakage into suction.
- D. Unstable cycling indicates improper check valve seating on one chamber. This condition is confirmed when unstable cycling repeats consistently on alternate exhausts. Cycling that is not consistently unstable may indicate partial exhaust restriction due to freezing and thawing of exhaust air. Use of an anti-freeze lubricant in an air line lubricator should solve this problem.
- E. Incorrect driver fluid level or air has not been properly purged. For additional information, see the Warren Rupp Trouble Shooting Guide.

WARRANTY

Tel: 866-777-6060

Fax: 866-777-6383

This pump is warranted for a period of five years against defective material and workmanship. Failure to comply with the recommendations stated in this manual voids all factory warranty.

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IMPORTANT SAFETY INFORMATION



IMPORTANT

Read these safety warnings and instructions in this manual completely, before installation and start-up of the pump. It is the

responsibility of the purchaser to retain this manual for reference. Failure to comply with the recommendations stated in this manual will damage the pump, and void factory warranty.



A CAUTION

Before pump operation, inspect all gasketed fasteners for looseness caused by gasket creep. Retorque loose fasteners to

prevent leakage. Follow recommended torques stated in this manual.



A CAUTION

Pump not designed, tested or certified to be powered by compressed natural gas. Powering the pump with natural

gas will void the warranty.



A WARNING

In the event of diaphragm rupture, pumped material may enter the air end of the pump, and be discharged into the atmosphere. If

pumping a product which is hazardous or toxic, the air exhaust must be piped to an appropriate area for safe disposition.



A WARNING

Take action to prevent static sparking. Fire or explosion can result, especially when handling flammable liquids. The pump, piping, valves,

containers or other miscellaneous equipment must be grounded. (See page 32)



A WARNING

This pump is pressurized internally with air pressure during operation. Always make certain that all bolting is in good condition and that all of the correct

bolting is reinstalled during assembly.



A WARNING

When used for toxic or aggressive fluids, the pump should always be flushed clean prior to disassembly.



A WARNING

Before doing any maintenance on the pump, be certain all pressure is completely vented from the pump, suction, discharge,

piping, and all other openings and connections. Be certain the air supply is locked out or made non-operational, so that it cannot be started while work is being done on the pump. Be certain that approved eye protection and protective clothing are worn all times in the vicinity of the pump. Failure to follow these recommendations may result in serious injury or death.



A WARNING

Airborne particles and loud noise hazards.

Wear ear and eye protection.



A WARNING

Before maintenance or repair, shut off the compressed air line, bleed the pressure, and disconnect the air line

from the pump. The discharge line may be pressurized and must be bled of its pressure.



A WARNING

Use safe practices when lifting

RECYCLING

Many components of SANDPIPER® AODD pumps are made of recyclable materials (see chart on page 9 for material specifications). We encourage pump users to recycle worn out parts and pumps whenever possible, after any hazardous pumped fluids are thoroughly flushed.

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MATERIAL CODES THE LAST 3 DIGITS OF PART NUMBER

6000 Assembly, sub-assembly, and some parkased lines 354 Gelacits: Color: BLACK 557 Conductive Polypropylenes: Color Good SILVER Randingers - Durn 4001 - J-S: Color: BELAD C. Good Conded SILVER Standard Plane House - Durn 4001 - J-S: Color: BELAD C. Color: BLACK Color: BLAC						
2	000				557	- · · · · · · · · · · · · · · · · · · ·
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December						
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December Color NATURAL S80 Syvon			357			
Alloy 709 Alloy 709 Alloy 709 Alloy 709 at 6 Stainless Steel Compression Motig) 591 Nylatron CS						
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Alloy Type 316 Stainless Steel		·			600	
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115 302/304 Stainless Steel 365 Neoprene Rubber:		(Hand Polished)		Color Coded: YELLOW	602	
117			364	E.P.D.M. Rubber. Color Coded: BLUE	603	
120			365	•		
(Wrought Martensitic) 368 Food Grade EPDM; Color: GRAY 608 Conductive PTFE; Color: BLACK 123 410 Stainless Steel 370 Bulyl Rubber 610 PTFE Encapsulated Silicon (Wrought Martensitic) Color Coded: BROWN 611 PTFE Encapsulated Silicon 148 Hardcoat Anodized Aluminum 371 Philthane (Tuftane) 632 Neoprene/Hytrel 149 2024-74 Aluminum 374 Carboxylated Nitrile 633 FKM/PTFE 150 6061-76 Aluminum 378 Fluorinated Nitrile 634 EPDM/PTFE 151 6063-76 Aluminum 378 High Density Polypropylene 635 Neoprene/PTFE 152 2024-74 Aluminum (2023-1351) 379 Conductive Nitrile: 637 PTFE , FKM/PTFE 154 Almag 35 Aluminum Color Coded: RED & SILVER 638 PTFE , HYMPTFE 155 356-T6 Aluminum 384 Conductive Neoprene: 639 Nitrie/TFE 156 355-T6 Aluminum 405 Celliose Fibre 644 Santoprene PIFFE 15		440-C Stainless Steel (Martensitic)				PTFE
123	120	416 Stainless Steel	366	Food Grade Nitrile; Color: WHITE	607	Envelon
(Wrought Martensitic) Color Coded: BROWN 611 PTFE Encapsulated FKM 148 Hardcoat Anodized Aluminum 371 Philthane (Tuftane) 632 Neoprene/Hytrel 149 2024-174 Aluminum 374 Carboxylated Nitrile 633 RKMPTFE 150 6061-76 Aluminum 375 Fluorinated Nitrile 634 EPDMPTFE 151 6063-76 Aluminum (2023-T351) 379 Conductive Neoproproprene 635 Neoprene/PTFE 152 2024-74 Aluminum (2023-T351) 379 Conductive Neoprone; 637 PTFE , FKMPTFE 154 Almag 3S Aluminum Color Coded: RED & SILVER 638 PTFE , Hytrel/PTFE 155 356-76 Aluminum 384 Conductive Neoprone; 639 Nitrile/TFE 156 356-76 Aluminum 405 Cellulose Fibre 644 Santoprene*/PDM 157 Die Cast Aluminum Alloy #380 405 Cellulose Fibre 644 Santoprene*/PDM 158 Aluminum Alloy SR-319 408 Cork and Neoprene 656 Santoprene Pibre		(Wrought Martensitic)	368	Food Grade EPDM; Color: GRAY	608	Conductive PTFE; Color: BLACK
Hardcoat Anodized Aluminum 371 Philthane (Turlane) 632 Neoprene/Hytrel	123	410 Stainless Steel	370	Butyl Rubber	610	PTFE Encapsulated Silicon
149 2024-T4 Aluminum		(Wrought Martensitic)		Color Coded: BROWN	611	PTFE Encapsulated FKM
150 6061-T6 Aluminum 375 Fluorinated Nitrile 634 EPDM/PTFE 151 6063-T6 Aluminum 378 High Density Polypropylene 635 Neoprene/PTFE 152 2024-T4 Aluminum (2023-T351) 379 Conductive Nitrile; 637 PTFE , FKM/PTFE 154 Almag 35 Aluminum Color Coded: REE D & SILVER 638 PTFE , Hytrel/PTFE 155 356-T6 Aluminum 384 Conductive Neoprene; 639 Nitrile/TFE 156 356-T6 Aluminum Color Coded: REED & SILVER 643 Santoprene/PEPDM 157 Die Cast Aluminum Alloy #380 405 Cellulose Fibre 644 Santoprene/PEPDM 158 Aluminum Alloy #380 405 Cellulose Fibre 656 Santoprene Diaphragm and 159 Anodized Aluminum 425 Compressed Fibre Check Balls/EPDM Seats 162 Brass, Yellow, Screw Machine Stock 426 Blue Card 661 EPDM/Santoprene 165 Cast Bronze, 85-5-5 440 Vegetable Fibre Check Balls/EPDM Seats 166 Bronze, SAE 660 465 Fibre PTFE Overlay, Balls, and Seals 170 Bronze, Bearing Type, Oil Impregnated 500 Delrin 570 Delrin 570 180 Copper Alloy 502 Conductive Acetal, ESD-800; Color: BLACK Tradename of E.I. DuPont. 305 Carbon Steel, Black Epoxy Coated Color: BLACK Color Coded: YELLOW Of Garlox, Inc. 308 Stainess Steel, Black PTFE Coated 505 Acrylic Resin Plastic Of Garlox, Inc. 309 Aluminum, Black Epoxy Coated 520 Injection Molded PVDF; Color: NATURAL Of Polymer Corp. 310 Aluminum, White Epoxy Coated 521 Injection Molded PVDF; Color: NATURAL Of Polymer Corp. 321 Chrome Plated Steel GREEN Rujon Ryton is a registered tradename Of Dixion Industries Corp. 322 Aluminum, Electroless Nickel Plated 540 Nylon Saton Steel, Electroless Sickel Plated 542 Nylon Of Phillips Chemical Co. 323 Carbon Steel, Electroless Sickel Plated 542 Nylon Of Phillips Chemical Co. 324 Aluminum, Electroless Sickel Plated S42 Nylon Of Phillips Chemical Co. 325 Galvanized Steel S44 Nylon Injection Mo	148	Hardcoat Anodized Aluminum	371	Philthane (Tuftane)	632	Neoprene/Hytrel
151 6063-T6 Aluminum 378 High Density Polypropylene 635 Neoprene/PTFE 152 2024-T4 Aluminum (2023-T351) 379 Conductive Nitrile: 637 PTFE , FKM/PTFE 154 Almag 35 Aluminum 384 Conductive Neoprene: 639 Nitrile/TFE 155 356-T6 Aluminum 384 Conductive Neoprene: 639 Nitrile/TFE 156 356-T6 Aluminum 384 Conductive Neoprene: 639 Nitrile/TFE 157 Die Cast Aluminum Alloy #380 405 Cellulose Fibre 644 Santoprene*/PTFE 158 Aluminum Alloy SR-319 408 Cork and Neoprene 656 Santoprene Diaphragm and Check Balls/EPDM Seats 159 Anodized Aluminum 425 Compressed Fibre Check Balls/EPDM Seats 162 Brass, Yellow, Screw Machine Stock 426 Blue Gard 661 EPDM/Santoprene 165 Cast Bronze, 85-5-5 440 Vegetable Fibre 666 FDA Nitrile Diaphragm 166 Bronze, SAE 660 465 Fibre PTFE Covelay, Balls, and Seals 170 Bronze, Bearing Type, Oil Impregnated 500 Delrin 570 180 Copper Alloy 502 Conductive Acetal, ESD-800; Delrin is a registered 175 Die Cast Zinc 501 Delrin 570 Delrin 570 180 Copper Alloy 502 Conductive Acetal, Glass-Filled Gylon is a registered 180 Carbon Steel, Black Epoxy Coated 503 Conductive Acetal, Glass-Filled Gylon is a registered tradename of E.I. DuPont. 306 Carbon Steel, Black PTFE Coated 505 Acrylic Resin Plastic Grack; Color Coded: YELLOW Of Garlock, Inc. 310 PVDF Coated 520 Injection Molded PVDF; Color: NATURAL 311 Aluminum, Black PTFE Coated 520 Injection Molded PVDF; Color: NATURAL 312 Aluminum, Electroless Nickel Plated 540 Nylon Of Dixion Industries Corp. 330 Zinc Plated Steel 541 Nylon Nylon Ryton is a registered tradename of Dixion Industries Corp. Ryton is a registered tradename of Phillips Chemical Co.	149	2024-T4 Aluminum	374	Carboxylated Nitrile	633	FKM/PTFE
152 2024-T4 Aluminum (2023-T351) 379 Conductive Nitrile; 637 PTFE, FKM/PTFE 154 Almag 35 Aluminum Color Coded: RED & SILVER 638 PTFE, Hytrel/PTFE 155 356-T6 Aluminum 384 Conductive Neoprene; 639 Nitrile/TFE 156 356-T6 Aluminum Color Coded: GREEN & SILVER 643 Santoprene*/PDM 157 Die Cast Aluminum Alloy #380 405 Cellulose Fibre 644 Santoprene*/PTFE 158 Aluminum Alloy \$FR-319 408 Cork and Neoprene 656 Santoprene*/PTFE 159 Anodized Aluminum 425 Compressed Fibre 644 Santoprene*/PTFE 159 Anodized Aluminum 425 Compressed Fibre 656 Santoprene Diaphragm and 657 Cast Bronze, 85-5-5-5 440 Vegetable Fibre 666 FDA Nitrile Diaphragm, PTFE Overlay, Balls, and Seals 667 Bronze, 85-5-5-5 440 Vegetable Fibre 666 FDA Nitrile Diaphragm, PTFE Overlay, Balls, and Seals 770 Bronze, Bearing Type, Oil Impregnated 500 Delrin 500 668 PTFE, FDA Santoprene/PTFE 770 Conductive Acetal, ESD-800; Conductive Acetal, ESD-800; Conductive Acetal, Glass-Filled Color: BLACK Color Coded: YELLOW 780 Aluminum, Black Epoxy Coated 780 Aluminum, Black Epoxy Coated 780 Aluminum, Black PTFE Coated 780 Acrylic Resin Plastic 780 Acrylic Resi	150	6061-T6 Aluminum	375	Fluorinated Nitrile	634	EPDM/PTFE
Almag 35 Alurninum 384 Conductive Neoprene; 39 Nitrile/TFE 356 356-T6 Alurninum 384 Conductive Neoprene; 39 Nitrile/TFE 396-T6 Alurninum 380 405 Cellulose Fibre 404 Santoprene*/EPDM 381 Alurninum Alloy \$R-319 408 Cork and Neoprene 556 Santoprene Diaphragm and 384 Combustive Neoprene 556 Santoprene Diaphragm and 385 Alurninum Alloy SR-319 408 Cork and Neoprene 556 Santoprene Diaphragm and 385 Comperssed Fibre 586 Check Balls/EPDM Seats 587 Anodized Alurninum 587 Anodized Alurninum 588 Alurninum Alloy SR-319 408 Cork and Neoprene 588 Alurninum Alloy SR-319 588 Alurninum Alloy SR-319 589 Anodized Alurninum 589 Anodized Alurninum 580 Cork Balls/EPDM Seats 580 Comperssed Fibre 580 Check Balls/EPDM Seats 580 Compersed Fibre 580 Check Balls/EPDM Seats 580 Check Balls/EPDM Seats 581 EPDM/Santoprene 582 EPDM/Santoprene 583 EPDM/Santoprene 583 EPDM/Santoprene 584 EPDM/Santoprene 585 EPDM/Santoprene 585 EPDM/Santoprene 586 Santoprene Diaphragm and 585 Check Balls/EPDM Seats 586 Santoprene Diaphragm and 585 Check Balls/EPDM Seats 586 Santoprene Diaphragm and 587 EPDM/Santoprene 586 Santoprene Diaphragm and 587 EPDM/Santoprene 586 Santoprene Diaphragm and 587 EPDM/Santoprene 586 Santoprene Diaphragm and 588 EPDM/Santoprene 586 Santoprene Diaphragm and 588 EPDM/Santoprene 588 Alurninum Allox Balls/EPDM Seats 588 EPDM/Santoprene 588 Alurninum Allox Balls/EPDM Seats 588 EPDM/Santoprene 588 Alurninum Allox Balls/EPDM/Santoprene 588 EPDM/Santoprene 588 Alurninum Allox Balls/EPDM/Santoprene 588 EPDM/Santoprene 588 EPDM/Santoprene 589 Santoprene Plapted Tradename 589 EPDM/Santoprene Plapted Tradename 589 EPDM/Santoprene 589 Santoprene Plapted Tradename 580 EPDM/Santoprene 589 Santoprene Plapted Tradename 590 EPDM/Santoprene 590 Santoprene Plapted Tradename 590 EPDM/Santoprene 590 Santoprene Plapted Tradename 590 EPDM/Santoprene 590 Santoprene Plapted Tra	151	6063-T6 Aluminum	378	High Density Polypropylene	635	Neoprene/PTFE
155 356-T6 Aluminum 156 356-T6 Aluminum 157 Die Cast Aluminum Alloy #380 158 Aluminum Alloy \$8.319 159 Anodized Aluminum 159 Anodized Aluminum 150 Anodized Aluminum 150 Anodized Aluminum 151 Cork and Neoprene 152 Brass, Yellow, Screw Machine Stock 153 Bronze, 85-5-5-5 154 Vegetable Fibre 155 Bronze, SAE 660 156 Bronze, SAE 660 157 Die Cast Zinc 158 Carbon Steel, Black Epoxy Coated 159 Carbon Steel, Black PTFE Coated 150 Carbon Steel, Black PTFE Coated 151 Carbon Steel, Black PTFE Coated 155 Carbon Steel, Black PTFE Coated 156 Carbon Steel, Black PTFE Coated 157 Delrin 50 158 Carbon Steel, Black PTFE Coated 159 Aluminum, Black Fpoxy Coated 150 Delrin 150 150 Delrin Sa registered tradename of Garlock, Inc. 150 Delrin Sa registered tradename 150 Aluminum, Black PTFE Coated 150 Delrin 150 150 Delrin Sa registered tradename	152	2024-T4 Aluminum (2023-T351)	379	Conductive Nitrile;	637	PTFE , FKM/PTFE
156 356-T6 Aluminum 157 Die Cast Aluminum Alloy #380 158 Aluminum Alloy SR-319 159 Anodized Aluminum 150 Aluminum 150 Aluminum 150 Aluminum 151 Aluminum 151 Aluminum 152 Brass, Yellow, Screw Machine Stock 153 Brass, Yellow, Screw Machine Stock 154 Blue Gard 155 Cast Bronze, 85-5-5-5 155 At40 156 Bronze, SAE 660 157 Bronze, Bearing Type, Oil Impregnated 158 Copper Alloy 159 Carbon Steel, Black Epoxy Coated 150 Carbon Steel, Black Epoxy Coated 150 Carbon Steel, Black PTFE Coated 150 Carbon Steel, Black PTFE Coated 151 Carbon Steel, Black PTFE Coated 152 Aluminum, Black Epoxy Coated 153 Carbon Steel, Black PTFE Coated 154 Carbon Steel, Black PTFE Coated 155 Carbon Steel, Black PTFE Coated 156 Carbon Steel, Black PTFE Coated 157 Die Cast Zinc 150 Carbon Steel, Black PTFE Coated 150 Acrylic Resin Plastic 150 Nylatron is a registered tradename of Garlock, Inc. 151 Aluminum, White Epoxy Coated 152 Injection Molded PVDF; Color: NATURAL 152 Aluminum, Black PTFE Coated 154 Nylon 155 Carbon Steel, Electroless 1541 Nylon 155 Carbon Steel, Electroless 1541 Nylon 156 Carbon Steel, Electroless 1541 Nylon 157 Carbon Steel, Electroless 1541 Nylon 158 Carbon Steel, Electroless 1541 Nylon 159 Carbon Steel, Electroless 1541 Nylon 150 Carbon Molded 154 Nylon Injection Molded 155 Carbon Molded 155 Carbon Steel, Electroless 1541 Nylon 156 Carbon Molded 155 Carbon Steel, Electroless 1541 Nylon 157 Carbon Steel, Electroless 1541 Nylon 158 Carbon Steel, Electroless 1541 Nylon 159 Carbon Molded 159 Carbon Steel, Electroless 1541 Nylon 159 Carbon Molded 159 Carbon Steel, Electroless 1541 Nylon 159 Carbon Steel,	154	Almag 35 Aluminum		Color Coded: RED & SILVER	638	PTFE , Hytrel/PTFE
157 Die Cast Aluminum Alloy #380 405 Cellulose Fibre 644 Santoprene"/PTFE 158 Aluminum Alloy SR-319 408 Cork and Neoprene 656 Santoprene Diaphragm and 159 Anodized Aluminum 425 Compressed Fibre Check Balls/EPDM Seats 162 Brass, Yellow, Screw Machine Stock 426 Blue Gard 661 EPDM/Santoprene 165 Cast Bronze, 85-5-5-5 440 Vegetable Fibre 666 FDA Nitrile Diaphragm, 166 Bronze, SAE 660 465 Fibre PTFE Overlay, Balls, and Seals 170 Bronze, Barring Type, Oil Impregnated 500 Delrin 500 668 PTFE, FDA Santoprene/PTFE 175 Die Cast Zinc 501 Delrin 570 180 Copper Alloy 502 Conductive Acetal, ESD-800; Carbon Steel, Black Epoxy Coated Color: BLACK tradename of E.I. DuPont. 306 Carbon Steel, Black PTFE Coated 503 Conductive Acetal, Glass-Filled Color: BLACK Golor Coded: YELLOW 308 Stainless Steel, Black PTFE Coated 505 Acrylic Resin Plastic 309 Aluminum, Black PTFE Coated 506 Delrin 150 Nylatron is a registered tradename of Garlock, Inc. 310 PVDF Coated 500 Delrin 150 Nylatron is a registered tradename of Polymer Corp. 331 Aluminum, White Epoxy Coated 521 Injection Molded PVDF; Color: NATURAL 313 Aluminum, White Epoxy Coated 521 Injection Molded Conductive PVDF; Santoprene is a registered tradename of Exxon Mobil Corp. 332 Aluminum, Electroless Nickel Plated 540 Nylon GREEN Rylon I is a registered tradename of Dixlon Industries Corp. 333 Galvanized Steel 541 Nylon Rylon Sieter of Phillips Chemical Co.	155	356-T6 Aluminum	384	Conductive Neoprene;	639	Nitrile/TFE
Aluminum Alloy SR-319 408 Cork and Neoprene 656 Santoprene Diaphragm and Check Balls/EPDM Seats 162 Brass, Yellow, Screw Machine Stock 426 Blue Gard 661 EPDM/Santoprene 165 Cast Bronze, 85-5-5-5 440 Vegetable Fibre 666 FDA Nitrile Diaphragm, 166 Bronze, SAE 660 465 Fibre 97FE Overlay, Balls, and Seals 170 Bronze, Bearing Type, Oil Impregnated 500 Delrin 500 668 PTFE, FDA Santoprene/PTFE 175 Die Cast Zinc 501 Delrin 570 180 Copper Alloy 502 Conductive Acetal, ESD-800; Carbon Steel, Black Epoxy Coated Color: BLACK Toolor Coded: YELLOW 503 Stainless Steel, Black PTFE Coated 504 Color: BLACK; Color Coded: YELLOW 504 Color: BLACK Stainless Steel, Black PTFE Coated 505 Acrylic Resin Plastic 506 Delrin 150 Nylatron is a registered tradename of Garlock, Inc. 180 PVDF Coated 501 Injection Molded PVDF; Color: NATURAL 313 Aluminum, White Epoxy Coated 502 Injection Molded Conductive PVDF; Santoprene is a registered tradename of EXXXXIII Santoprene is a registered tradename of DelxxxiII Santoprene is a registered tradename of DelxxxiII Santoprene is a registered tradename of DelxxiII Santoprene is a registered tradename of DixxiII Injection Molded Conductive PVDF; Santoprene is a registered tradename of DixxiII Injection Molded Conductive PVDF; Santoprene is a registered tradename of DixxiII Injection Molded Conductive PVDF; Santoprene is a registered tradename of DixxiII Injection Molded Conductive PVDF; Santoprene is a registered tradename of DixxiII Injection Molded Conductive PVDF; Santoprene is a registered tradename of DixxiII Injection Molded Conductive PVDF; Color: Santoprene is a registered tradename of DixxiII Injection Molded Conductive PVDF; Color: Santoprene is a registered tradename of DixxiII Injection Molded Conductive PVDF; Color: Santoprene is a registered tradename	156	356-T6 Aluminum		Color Coded: GREEN & SILVER	643	Santoprene®/EPDM
159 Anodized Aluminum 425 Compressed Fibre Check Balls/EPDM Seats 162 Brass, Yellow, Screw Machine Stock 426 Blue Gard 661 EPDM/Santoprene 165 Cast Bronze, 85-5-5-5 440 Vegetable Fibre 666 FDA Nitrile Diaphragm, 166 Bronze, SAE 660 465 Fibre PTFE Overlay, Balls, and Seals 170 Bronze, Bearing Type, Oil Impregnated 500 Delrin 500 668 PTFE, FDA Santoprene/PTFE 175 Die Cast Zinc 501 Delrin 570 180 Copper Alloy 502 Conductive Acetal, ESD-800; Carbon Steel, Black Epoxy Coated Color: BLACK Tradename of E.I. DuPont. 306 Carbon Steel, Black PTFE Coated 503 Conductive Acetal, Glass-Filled Color: BLACK; Color Coded: YELLOW of Garlock, Inc. 307 Aluminum, Black Epoxy Coated Color: BLACK; Color Coded: YELLOW of Garlock, Inc. 308 Stainless Steel, Black PTFE Coated 505 Acrylic Resin Plastic Of Garlock, Inc. 310 PVDF Coated 506 Delrin 150 Nylatron is a registered tradename of Polymer Corp. 311 Aluminum, White Epoxy Coated 520 Injection Molded PVDF; Color: NATURAL 521 Injection Molded Conductive PVDF; Santoprene is a registered tradename of Export Mobil Corp. 311 Chrome Plated Steel 540 Nylon of Dixion Industries Corp. 312 Carbon Steel, Electroless 541 Nylon Plated 542 Nylon of Phillips Chemical Co.	157	Die Cast Aluminum Alloy #380	405	Cellulose Fibre	644	Santoprene®/PTFE
162 Brass, Yellow, Screw Machine Stock 165 Cast Bronze, 85-5-5-5 166 Bronze, SAE 660 166 Bronze, SAE 660 167 Bronze, SAE 660 168 Bronze, SAE 660 170 Bronze, Bearing Type, Oil Impregnated 170 Bronze, Bearing Type, Oil Impregnated 170 Die Cast Zinc 170 Delrin 500 171 Delrin 570 171 Delrin 570 172 Carbon Steel, Black Epoxy Coated 173 Carbon Steel, Black PTFE Coated 174 Aluminum, Black Epoxy Coated 175 Aluminum, Black Epoxy Coated 176 Aluminum, Black PTFE Coated 177 Aluminum, Black PTFE Coated 178 Aluminum, Black PTFE Coated 179 Aluminum, Black PTFE Coated 170 Bronze, Bearing Type, Oil Impregnated 170 Delrin 500 171 Delrin 570 175 Die Cast Zinc 175 Die Cast Zinc 176 Conductive Acetal, ESD-800; 177 Conductive Acetal, ESD-800; 178 Conductive Acetal, Glass-Filled 179 Cooler: BLACK; Color Coded: YELLOW 179 Aluminum, Black Epoxy Coated 170 Aluminum, Black PTFE Coated 170 Color: BLACK; Color Coded: YELLOW 170 Aluminum, Black PTFE Coated 170 Delrin is a registered tradename 170 of Garlock, Inc. 170 Mylatron is a registered tradename 170 Aluminum, White Epoxy Coated 170 Delrin 150 170 Delrin 570 170 Color: BLACK; Color Coded: YELLOW 170 Acrylic Resin Plastic 170 Nylatron is a registered tradename 170 PVDF Coated 170 Delrin is a registered tradename 170 PVDF Coated 170 Delrin is a registered tradename 170 PVDF Coated 170 Delrin is a registered tradename 170 Polymer Corp. 170 Santoprene is a registered tradename 170 Polymer Corp. 171 Santoprene is a registered tradename 171 Delrin Molded Conductive PVDF; 171 Santoprene is a registered tradename 172 Santoprene is a registered tradena	158	Aluminum Alloy SR-319	408	Cork and Neoprene	656	Santoprene Diaphragm and
165 Cast Bronze, 85-5-5-5 440 Vegetable Fibre 666 FDA Nitrile Diaphragm, 166 Bronze, SAE 660 465 Fibre PTFE Overlay, Balls, and Seals 170 Bronze, Bearing Type, Oil Impregnated 500 Delrin 500 668 PTFE, FDA Santoprene/PTFE 175 Die Cast Zinc 501 Delrin 570 180 Copper Alloy 502 Conductive Acetal, ESD-800; Carbon Steel, Black Epoxy Coated Carbon Steel, Black PTFE Coated 503 Conductive Acetal, Glass-Filled Color: BLACK Tadename of E.I. DuPont. 306 Carbon Steel, Black PTFE Coated 505 Acrylic Resin Plastic Garbon, Black PTFE Coated 506 Delrin 150 Nylatron is a registered tradename of Garlock, Inc. 307 Aluminum, Black PTFE Coated 506 Delrin 150 Nylatron is a registered tradename of Garlock, Inc. 308 Stainless Steel, Black PTFE Coated 506 Delrin 150 Nylatron is a registered tradename of Polymer Corp. 310 PVDF Coated 520 Injection Molded PVDF; Color: NATURAL 313 Aluminum, White Epoxy Coated 521 Injection Molded Conductive PVDF; Santoprene is a registered tradename 310 Zinc Plated Steel Color: BLACK; Color Coded: LIGHT GREEN Rulon II is a registered tradename of Dixion Industries Corp. 320 Aluminum, Electroless Nickel Plated 540 Nylon Rylon Ryton is a registered tradename of Dixion Industries Corp. 331 Carbon Steel, Electroless 541 Nylon Rylon Rylon is a registered tradename of Phillips Chemical Co.	159	Anodized Aluminum	425	Compressed Fibre		Check Balls/EPDM Seats
166 Bronze, SAE 660 465 Fibre PTFE Overlay, Balls, and Seals 170 Bronze, Bearing Type, Oil Impregnated 500 Delrin 500 668 PTFE, FDA Santoprene/PTFE 175 Die Cast Zinc 501 Delrin 570 180 Copper Alloy 502 Conductive Acetal, ESD-800; Carbon Steel, Black Epoxy Coated 503 Conductive Acetal, Glass-Filled 12 Color: BLACK 12 Color: BLACK 13 Conductive Acetal, Glass-Filled 14 Color: BLACK; Color Coded: YELLOW 508 Stainless Steel, Black PTFE Coated 505 Acrylic Resin Plastic 506 Delrin 150 500 Injection Molded PVDF; Color: NATURAL 500 Santoprene is a registered tradename 500 of Polymer Corp. 500 Santoprene is a registered tradename 500 of Exxon Mobil Corp. 500 Santoprene is a registered tradename 500 Santoprene is a registered tradename 500 of Exxon Mobil Corp. 500 Santoprene is a registered tradename 500 of Exxon Mobil Corp. 500 Size Plated 510 Nylon 500 Size Plated 500 Nylon 500 Size Plated 500 Size Plated 500 Nylon 500 Size Plated 500 Si	162	Brass, Yellow, Screw Machine Stock	426	Blue Gard	661	EPDM/Santoprene
170 Bronze, Bearing Type, Oil Impregnated 500 Delrin 500 668 PTFE, FDA Santoprene/PTFE 175 Die Cast Zinc 501 Delrin 570 502 Conductive Acetal, ESD-800; Delrin is a registered tradename of E.I. DuPont. 305 Carbon Steel, Black Epoxy Coated 503 Conductive Acetal, Glass-Filled Color: BLACK 501 Color: BLACK 501 Color: BLACK; Color Coded: YELLOW 503 Acrylic Resin Plastic 505 Acrylic Resin Plastic 506 Delrin 150 507 Notation, White Epoxy Coated 506 Delrin 150 507 Notation is a registered tradename of Garlock, Inc. 501 Notatron is a registered tradename of Garlock, Inc. 502 Injection Molded PVDF; Color: NATURAL 503 Notatron is a registered tradename of Polymer Corp. 503 Santoprene is a registered tradename of Garlock, Inc. 503 Notatron is a registered tradename of Polymer Corp. 504 Santoprene is a registered tradename of Polymer Corp. 505 Santoprene is a registered tradename of E.I. DuPont. 507 Notatron is a registered tradename of Garlock, Inc. 507 Notatron is a registered tradename of Garlock, Inc. 507 Notatron is a registered tradename of Polymer Corp. 507 Santoprene is a registered tradename of E.I. DuPont. 507 Notatron is a registered tradename of Garlock, Inc. 507 Notatron is a registered tradename of Garlock, Inc. 507 Notatron is a registered tradename of Polymer Corp. 507 Notatron is a registered tradename of Dixion Industries Corp. 507 Notatron is a registered tradename of Phillips Chemical Co. 507 Phillips Chemical Co.	165	Cast Bronze, 85-5-5-5	440	Vegetable Fibre	666	FDA Nitrile Diaphragm,
175 Die Cast Zinc 180 Copper Alloy 190 Carbon Steel, Black Epoxy Coated 190 Carbon Steel, Black Epoxy Coated 190 Carbon Steel, Black PTFE Coated 190 Carbon Steel, Black PTFE Coated 190 Aluminum, Black Epoxy Coated 190 Aluminum, Black PTFE Coated 190 Delrin 150 190 PVDF Coated 190 Injection Molded PVDF; Color: NATURAL 191 Aluminum, White Epoxy Coated 191 Injection Molded Conductive PVDF; 191 Santoprene is a registered tradename 192 Aluminum, White Epoxy Coated 193 Cinc Plated Steel 193 Aluminum, Electroless Nickel Plated 193 Aluminum, Electroless Nickel Plated 194 Nylon 195 Reserved 194 Nylon 195 Ryton is a registered tradename 195 Of Dixion Industries Corp. 195 Ryton is a registered tradename 196 Phillips Chemical Co.	166	Bronze, SAE 660	465	Fibre		PTFE Overlay, Balls, and Seals
Copper Alloy Carbon Steel, Black Epoxy Coated Color: BLACK Corbon Steel, Black PTFE Coated Color: BLACK Color: BLACK Color: BLACK Color: BLACK Color: BLACK Color: BLACK Stainless Steel, Black PTFE Coated Color: BLACK; Color Coded: YELLOW Color: BLACK; Color: NATURAL Color: BLACK; Color: NATURAL Color: BLACK; Color: NATURAL Color: BLACK; Color: NATURAL Color: BLACK; Color Coded: LIGHT C	170	Bronze, Bearing Type, Oil Impregnated	500	Delrin 500	668	PTFE, FDA Santoprene/PTFE
Carbon Steel, Black Epoxy Coated Carbon Steel, Black PTFE Coated Carbon Steel, Black PTFE Coated Color: BLACK Carbon Steel, Black PTFE Coated Color: BLACK; Color Coded: YELLOW Color: BLACK; Color: NATURAL Color: Natural Color: Natural Color: BLACK; Color: NATURAL Color: Natural Color: BLACK; Color:	175	Die Cast Zinc	501	Delrin 570		
Carbon Steel, Black Epoxy Coated Carbon Steel, Black PTFE Coated Carbon Steel, Black PTFE Coated Carbon Steel, Black PTFE Coated Color: BLACK; Color Coded: YELLOW Color: NATURAL Color: NATURAL Color: BLACK; Color: NATURAL Color	180	Copper Alloy	502	Conductive Acetal, ESD-800;	Delrin	is a registered
Carbon Steel, Black PTFE Coated Aluminum, Black Epoxy Coated Stainless Steel, Black PTFE Coated Aluminum, Black PTFE Coated Stainless Steel, Black PTFE Coated Sobation Steel, Black PTFE Coated Aluminum, Black PTFE Coated Sobation Steel, Black PTFE Coated Sobation Steel Steel Sobation Steel, Black PTFE Coated Sobation Steel Steel Sobation	305	Carbon Steel, Black Epoxy Coated		Color: BLACK		9
307 Aluminum, Black Epoxy Coaled 308 Stainless Steel, Black PTFE Coated 309 Aluminum, Black PTFE Coated 310 PVDF Coated 311 Aluminum, White Epoxy Coated 312 Aluminum, White Epoxy Coated 313 Aluminum, White Epoxy Coated 314 Chrome Plated Steel 315 Chrome Plated Steel 316 Carbon Steel, Electroless 317 Carbon Steel, Electroless 318 Carbon Steel, Electroless 319 Electroless 320 Aluminum, White Epoxy Coated 331 Chrome Plated Steel 332 Aluminum, Electroless Nickel Plated 333 Carbon Steel, Electroless 334 Carbon Steel, Electroless 335 Galvanized Steel 336 Calvanized Steel 337 Chrome Plated Steel 338 Carbon Steel, Electroless 340 Nylon 341 Nylon 342 Nylon 345 Oglvanized Steel 344 Nylon Injection Molded 345 Of Polymer Corp. 346 Santoprene is a registered tradename 347 of Exxon Mobil Corp. 348 Rulon II is a registered tradename 349 Of Dixion Industries Corp. 340 Rylon is a registered tradename 340 Of Phillips Chemical Co.	306	Carbon Steel, Black PTFE Coated	503	Conductive Acetal, Glass-Filled		
Stainless Steel, Black PTFE Coated 505 Acrylic Resin Plastic Nylatron is a registered tradename of Polymer Corp. 310 PVDF Coated 520 Injection Molded PVDF; Color: NATURAL of Polymer Corp. 311 Aluminum, White Epoxy Coated 521 Injection Molded Conductive PVDF; Santoprene is a registered tradename of Exxon Mobil Corp. 312 Zinc Plated Steel Color: BLACK; Color Coded: LIGHT of Exxon Mobil Corp. 313 Chrome Plated Steel GREEN Rulon II is a registered tradename of Dixion Industries Corp. 314 Nylon Olickel Plated 542 Nylon Rylon Rylon is a registered tradename of Phillips Chemical Co.	307	Aluminum, Black Epoxy Coated		Color: BLACK; Color Coded: YELLOW	,	O .
310 PVDF Coated 520 Injection Molded PVDF; Color: NATURAL of Polymer Corp. 313 Aluminum, White Epoxy Coated 521 Injection Molded Conductive PVDF; Santoprene is a registered tradename of Exxon Mobil Corp. 330 Zinc Plated Steel Color: BLACK; Color Coded: LIGHT of Exxon Mobil Corp. 331 Chrome Plated Steel Reluminum, Electroless Nickel Plated 540 Nylon of Dixion Industries Corp. 332 Aluminum, Electroless 541 Nylon Ryton is a registered tradename of Polymer Corp. 333 Carbon Steel, Electroless 541 Nylon Ryton is a registered tradename of Phillips Chemical Co.	308	Stainless Steel, Black PTFE Coated	505	Acrylic Resin Plastic		•
313 Aluminum, White Epoxy Coated 521 Injection Molded Conductive PVDF; Santoprene is a registered tradename of Exxon Mobil Corp. 330 Zinc Plated Steel Color: BLACK; Color Coded: LIGHT of Exxon Mobil Corp. 331 Chrome Plated Steel Rulon II is a registered tradename of Dixion Industries Corp. 332 Aluminum, Electroless Nickel Plated 540 Nylon of Dixion Industries Corp. 333 Carbon Steel, Electroless 541 Nylon Ryton is a registered tradename of Phillips Chemical Co.	309	Aluminum, Black PTFE Coated	506	Delrin 150	-	3
Zinc Plated Steel Color: BLACK; Color Coded: LIGHT Of Exxon Mobil Corp. Rulon II is a registered tradename Aluminum, Electroless Nickel Plated Aluminum, Electroless Nickel Plated Carbon Steel, Electroless Aluminum, Electroless Fullon II is a registered tradename Of Dixion Industries Corp. Ryton is a registered tradename Of Phillips Chemical Co. Ryton is a registered tradename Of Phillips Chemical Co.	310	PVDF Coated	520	Injection Molded PVDF; Color: NATURAL	of Poly	mer Corp.
331 Chrome Plated Steel GREEN Rulon II is a registered tradename 332 Aluminum, Electroless Nickel Plated 540 Nylon of Dixion Industries Corp. 333 Carbon Steel, Electroless 541 Nylon Nickel Plated 542 Nylon Ryton is a registered tradename 335 Galvanized Steel 544 Nylon Injection Molded	313	Aluminum, White Epoxy Coated	521	Injection Molded Conductive PVDF;	Santo	orene is a registered tradename
Aluminum, Electroless Nickel Plated 540 Nylon of Dixion Industries Corp. 333 Carbon Steel, Electroless 541 Nylon Rylon Nickel Plated 542 Nylon Rylon is a registered tradename of Phillips Chemical Co.	330	Zinc Plated Steel		Color: BLACK; Color Coded: LIGHT	of Exx	on Mobil Corp.
332 Aluminum, Electroless Nickel Plated 333 Carbon Steel, Electroless 541 Nylon 754 Nylon 754 Nylon 754 Nylon 755 Ryton is a registered tradename of Phillips Chemical Co. 755 Nylon Of Dixion Industries Corp. 756 Ryton is a registered tradename of Phillips Chemical Co.	331	Chrome Plated Steel		GREEN	Rulon	II is a registered tradename
333 Carbon Steel, Electroless 541 Nylon Ryton is a registered tradename of Phillips Chemical Co. 335 Galvanized Steel 544 Nylon Injection Molded	332	Aluminum, Electroless Nickel Plated	540	Nylon		9
335 Galvanized Steel 544 Nylon Injection Molded of Phillips Chemical Co.	333	Carbon Steel, Electroless	541	Nylon		•
335 Galvanized Steel Sylon injection Moided		Nickel Plated	542	Nylon	-	· ·
336 Zinc Plated Yellow Brass 550 Polyethylene Valox is a registered tradename	335	Galvanized Steel	544	Nylon Injection Molded	OI Phil	ilps Chemical Co.
	336	Zinc Plated Yellow Brass	550	Polyethylene		9
337 Silver Plated Steel 551 Glass Filled Polypropylene; Color: BLACK of General Electric Co.	337	Silver Plated Steel	551	Glass Filled Polypropylene; Color: BLACK	of Ger	neral Electric Co.
340 Nickel Plated 552 Unfilled Polypropylene; Color: NATURAL PortaPump, Tranquilizer and SludgeMaster are	340	Nickel Plated	552	Unfilled Polypropylene; Color: NATURAL	PortaF	Pump, Tranquilizer and SludgeMaster are
342 Filled Nylon 555 Polyvinyl Chloride registered tradenames of Warren Rupp, Inc.	342	Filled Nylon	555	Polyvinyl Chloride	registe	ered tradenames of Warren Rupp, Inc.
351 Food Grade Santoprene; Color: NATURAL 556 Black Vinyl	351	Food Grade Santoprene; Color: NATURAL	556	Black Vinyl		

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Tel: 866-777-6060



REPAIR PARTS LIST AND DRAWING Original Instructions Model SET1 Sanitary Type 3

ITEM NO.	PART NUMBER	DESCRIPTION	TOTAL RQD.
1	095-051-558	Body, Spool Valve	1
2	031-039-000	Sleeve & Spool Set	1
3	560-058-360	O-Ring	8
4	165-038-558	Cap, End	2
5	675-043-115	Ring, Retaining	2
6	165-042-332	Cap, Valve Body	1
7	360-056-360	Gasket	1
8	360-057-360	Gasket	1
9	360-058-360	Gasket	1
10	095-074-001	Pilot Valve Body Assembly*	1
10-A	095-071-557	Pilot Valve Body	1
10-B	755-025-000	Sleeve (with O-Ring)	1
10-C	560-033-360	O-Ring (Sleeve)	4
10-D	775-014-000	Spool (with O-Ring)	1
10-E	560-023-360	O-Ring (Spool)	4
10-F	675-037-080	Retaining Ring	1
11 12	170-063-115	Capscrew, Hex Head Washer, Flat	1 7
13	901-035-115 542-001-115	*	1
14	170-033-115	Nut, Square Capscrew, Hex Head	4
15	901-005-115	Washer, Flat	4
16	170-043-115	Capscrew, Hex Head	6
17	114-011-332	Bracket, Intermediate	1
18	196-066-332	Chamber, Inner	1
19	196-064-332	Chamber, Inner	1
20	560-040-360	O-Ring	2
21	560-001-360	O-Ring	2
22	135-013-162	Bushing	2
23	675-042-115	Ring, Retainer	2
24	620-007-114	Plunger, Actuator	2
25	132-022-360	Bumper	2
26	070-012-170	Bearing, Sleeve	2
27	720-010-375	Seal, U-Cup	2
28	196-065-111	Chamber, Outer	2
29	901-012-180	Washer, Sealing	2
30	115-078-115	Bracket, Foot	1
31	675-040-360	Ring, Sealing	2
32	685-039-120	Rod, Diaphragm	1
33	132-019-360	Bumper	2
34	612-101-111	Plate, Outer Diaphragm	2
35	612-022-330	Plate, Inner Diaphragm	2 2
36	286-008-366 286-008-368	Diaphragm Diaphragm	2
37	722-045-600	Seat, Valve	4
37	050.004.000	Dell Charle Value	4

Ball, Check Valve

Manifold, Suction

Model SET1 Type 3 Page 10

050-024-600

518-077-110

38

39

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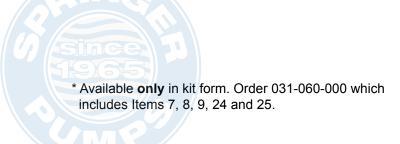
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NO.	PART NO.	DESCRIPTION	TOTAL RQD.
40	518-076-110	Manifold, Discharge	1
41	312-052-111	Elbow, Suction	2
42	312-051-111	Elbow, Discharge	2
43	361-005-600	Gasket Seal, Suction	2
44	361-006-600	Gasket Seal, Discharge	2
45	200-032-115	Clamp, Suction	2
46	200-033-115	Clamp, Discharge	2
47	542-002-114	Stud Nut	4
48	542-011-000	Stud Nut Assembly	16
49	542-004-000	Stud Nut Assembly	12
50	170-044-115	Capscrew, Hex Head	4
51	900-004-115	Washer, Lock	4
52	545-004-115	Hex Nut	4
53	618-003-110	Pipe Plug	1
54	312-044-555	45° Elbow	1
55	538-025-555	Nipple, Pipe	1
56	530-018-000	Muffler, Exhaust	1
57	780-027-025	Spring	1
58	807-048-115	Stud	2
59	286-040-604	Diaphragm	2
60	196-077-600	Chamber, Driver	2
61	618-025-110	Boss Plug	4
61-A	560-078-611	O-Ring	4
Not Sh	nown:		
	031-030-000	Valve Body Assembly Includes Items 1,2,3,4,5, & 57	1
	535-015-000	Name Plate	1
	705-002-000	Screw, Drive	4

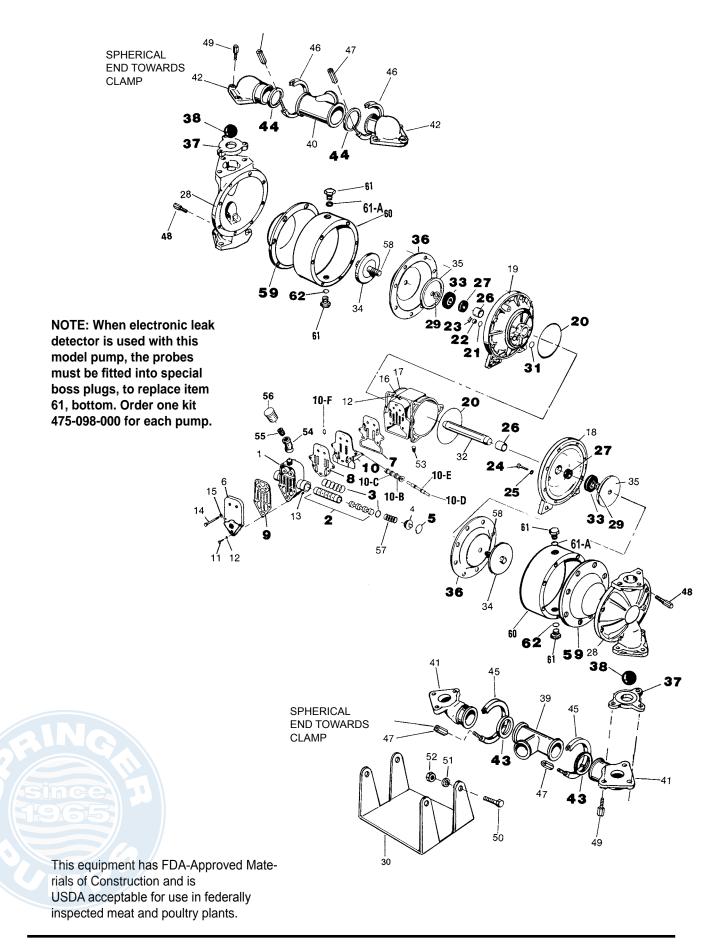
Repair Parts shown in **bold face** (darker) type are more likely to need replacement after extended periods of normal use. The pump owner may prefer to maintain a limited inventory of these parts in his own stock to reduce repair downtime to a minimum.

IMPORTANT: When ordering repair parts always furnish pump model number, serial number and type number.

Parts <u>underlined</u> are only available for sale in kits



Tel: 866-777-6060



WARREN RUPP, INC.®

Declaration of Conformity

Manufacturer:

Warren Rupp, Inc.®, 800 N. Main Street Mansfield, Ohio, 44902 USA

certifies that Air-Operated Double Diaphragm Pump Series: HDB, HDF, M Non-Metallic, S Non-Metallic, M Metallic, S Metallic, T Series, G Series, RS Series U Series, EH and SH High Pressure, W Series, SMA and SPA Submersibles, and Tranquilizer Surge Suppressors comply with the European Community Directive 2006/42/EC on Machinery, according to Annex VIII. This product has used Harmonized Standard EN809:1998+A1:2009, Pumps and Pump Units for Liquids - Common Safety Requirements, to verify conformance.

David Reselverry
Signature of authorized person

David Roseberry

Printed name of authorized person

Revision Level: F

October 20, 2005

Date of issue

Engineering Manager

Title

April 19, 2012

Date of revision



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