WARREN RUPP®
IDEX FLUID & METERING
SANDPIPER®
A WARREN RUPP PUMP BRAND

SERVICE AND OPERATING MANUAL

Model SET2-A

Sanitary Type 3

PLEASE NOTE!

The photos shown in this manual are for general instruction only. Your specific model may not be shown. Always refer to the parts list and exploded view drawing for your specific model when installing, disassembling or servicing your pump.

PRINCIPLE OF OPERATION

All SandPIPER pumps, including this Spill Containment model, operate on the same basic principle. They are powered by compressed air which alternately pressurizes the inner sides of the two diaphragm chambers while simultaneously exhausting the opposite inner chambers causing the diaphragms, which are connected by a shaft, to move endwise. Since air pressure is applied over the entire surface of the diaphragm which is forcing liquid to be discharged by its other side, the diaphragm is operating under a balanced condition during the discharge stroke. This allows the unit to be operated at discharge heads over 200 feet (61 meters) of water head.

Alternate pressurizing and exhausting of the diaphragm chamber is performed by an externally mounted, pilot-operated, four way, spool type air distribution valve. When the spool is at one end of the valve body, inlet air pressure is connected to one diaphragm chamber and the other diaphragm chamber is connected to the exhaust. When the spool is removed to the opposite end of the valve body, the porting of chambers is reversed. The air distribution valve spool is moved from one end position to the other in the valve body by means of an internal pilot valve which alternately pressurizes the ends of the air distribution valve spool while simultaneously exhausting the other ends. The pilot valve is positively shifted at each end of the diaphragm stroke by the diaphragm plate's coming in contact with the end of the pilot valve spool and pushing 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 to maintain flow in one direction through the pump.

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

INSTALLATION PROCEDURES

Position the pump as close as possible to the source of the liquid to be pumped. Avoid long or undersize suction lines and use the minimum number of fittings. High vacuums reduce flow rate capability and shorten driver diaphragm service life. Suction head is not recommended except where NPSH might so dictate.

For permanent installations involving rigid piping, install short flexible sections of hose between the pump and piping. This reduces strains and permits easier removal of the pump for service when required. **At time of installation, inspect all external gasketed fasteners for looseness caused by gasket creep. Tighten loose fittings securely to prevent leakage.**

FILLING OF DRIVER CHAMBERS WITH LIQUID

THE DRIVER CHAMBERS WILL BE FILLED WITH WATER AT THE FACTORY.

If you prefer to substitute another liquid, to prevent system contamination consult the factory first to determine compatibility of the substitute 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 spill containment chamber. Remove the plugs.

⚠ 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.

⚠ CAUTION

Before pump operation, inspect all gasketed fasteners for looseness caused by gasket creep. Re-torque loose fasteners to prevent leakage. Follow recommended torques stated in this manual.

⚠ WARNING

Before maintenance or repair, shut off the com-pressed 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.

⚠ WARNING

In the event of diaphragm rupture, pumped material may enter the air end of the pump, and be discharged into the atmosphere. The air exhaust must be piped to an appropriate area for safe disposition.

⚠ 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.

2. Remove the entire discharge manifold assembly exposing the ports in the outer diaphragm chambers.
3. With 5-10 PSI of air pressure at inlet, lock the spool to one side with locking pin (safety clip; item 61). You will fill the opposite side diaphragm from the "Locked Area."
4. Fill with 2500MI. (84.53 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 Teflon diaphragm with a blunt tool through the material flow port in the outer chamber until it does come to the top. Relieving air pressure will relax diaphragms at this point.
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. (Do not overtighten.) Remember to keep pressure on the Teflon 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.

AIR SUPPLY

Do not connect the unit to an air supply in excess of 125 PSI (8.61 bars). Install a shutoff valve in the air supply line to permit removal of the unit for servicing. When connecting an air supply of rigid piping, mount a section of flexible line to the pump to eliminate piping strain. In permanent installations, an air line filter is recommended.

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 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 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 four hex head capscrews (each end) on the end caps of 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.

⚠ WARNING

Do not smoke near the pump or use the pump near an open flame. Fire or explosion could result.

⚠ WARNING

This pump must not be used for fluid transfer into aircraft.

⚠ 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.

⚠ WARNING

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

⚠ WARNING

Before doing any main-tenance 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.

⚠ WARNING

Airborne particles and loud noise hazards. Wear ear and eye protection.

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, 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, gasket and bumper on the valve body. Using the arbor press or bench vise that was used in disassembly, press the sleeve back into the valve body. You may have to clean the surfaces of the valve body where the end caps mount. Material may remain from the old gasket. Old material not cleaned from this area may cause air leakage after reassembly. Take care that the bumper stays in place allowing the sleeve to press in all the way. Re-install the spool, the opposite end cap, gasket and bumper 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.

OPERATION

Your SandPIPER pump has been tested prior to shipment and is ready for use as received. It is completely self-priming and no initial filling with fluid is required.

If the unit is to be totally submerged, the air exhaust must be piped above the liquid level to prevent the liquid and foreign material from entering the air distribution valve mechanism.

Open the inlet air valve at least one turn to allow sufficient cycling rate for the pump to prime (30 to 60 cycles per minute). After pumping starts, adjust the inlet air valve for the desired pumping capacity. When further opening of the inlet air valve increases cycling rate without increasing the flow rate, the pump is being starved of liquid due to suction limitations. Further opening of the air inlet valve will waste compressed air. Set the inlet air valve for lowest cycling rate that does not decrease flow rate for most efficient operation.

FREEZING OR ICING OF EXHAUST

Icing of the air exhaust can occur under certain conditions of temperature and humidity on compressed air power equipment. When pump performance suffers because of icing, use of an air dryer will solve the problem. Icing is more likely to occur at high discharge pressures.

AIR EXHAUST

SandPIPER pumps can be submerged if the materials of construction are compatible with the liquid and the exhaust is piped above the liquid level. (See **OPERATION,** above.) Piping used for the exhaust should not be smaller than 1" pipe size. Reduced pipe size can restrict the exhausted air and reduce pump performance.

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.

DIAPHRAGM SERVICING:

Driver Diaphragms

Drain the driver diaphragm chamber by removing the boss plug on the underside of the driver chamber. Remove eight bolts securing the two manifolds to the chambers. Remove eight bolts securing the diaphragm chamber. This permits inspection of the Teflon 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 by inserting two or three capscrews through the bolt holes so that 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.

Procedures for reassembling the diaphragms are the reverse of the above. The diaphragms must be installed with their natural bulge to the outside, toward the outer diaphragm plate. Install the inner plate with the flat face against the diaphragm.

After all components are in position in a vise and hand tight, tighten with a wrench to approximately 40 ft. lbs. (5.53 kilograms/meters) torque. After both diaphragm assemblies have been assembled, thread one assembly into the shaft (hold the shaft near the middle in a vise with soft jaws, to protect the finish). Install this subassembly into the pump and secure by placing the outer chamber on the end with the diaphragm. This holds the assembly in place while the opposite side is installed. Torque the last diaphragm assembly to 30 ft. lbs. (4.147 kilograms/meters). This final torquing will lock the diaphragm assemblies together. Place the remaining outer chamber on the open end and loosely tighten the bolts. Replace the manifold assemblies to square the flanges before final tightening of the remaining bolts, alternating for progressive tightening, the eight capscrews that secure outer chamber to inner chamber.

Make sure the o-ring between the Teflon driver chamber and Teflon driver diaphragm is in place before final torquing of the eight capscrews that hold the chambers together.

MAINTENANCE AFTER USE

When the pump is used for materials that tend to settle out or transform from liquid to solid form, care must be taken after each use or during idle time to remove them and flush the pump as required to prevent damage.

In freezing temperatures the pump must be completely drained when idle. This model must be tilted to allow the liquid from the chambers to run out of the discharge port.

MAINTENANCE NOTE

A preventative maintenance procedure should be established to check the Teflon diaphragms for breakage. Even though this part was proven to be good for millions of cycles, each application may present its own problems.

The choice of the Teflon unit would tend to show that the material being handled would not be compatible with the standard Neoprene or other rubber. If a Teflon diaphragm were to break, the unit would continue pumping via the driver diaphragm. In a standard SandPIPER, a ruptured diaphragm would show up as air bubbles in media being pumped or pumped material being blown out the exhaust muffler. These events would not occur in the Teflon unit until the material in the driver diaphragm had been attacked and destroyed. If it were to reach that point, the pump as a whole would stand a chance of being lost instead of just a diaphragm.

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.

F. Plugged or dirty exhaust muffler.

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. Check driver fluid level.

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. Low flow rate as discharge pressure increases can also be a sign of too little or no driver liquid in the driver chamber.

B. Check the vacuum at the pump suction. Capacity is reduced as vacuum increases. Reduced flow rate due to starved suction will be evident when the 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. Using the Warren Rupp extractor/ dryer should solve this problem.

E. Check driver fluid level.

WARRANTY

This unit is guaranteed for a period of five years against defective material and workmanship.

WARREN RUPP® SANDPIPER®
A WARREN RUPP PUMP BRAND

REPAIR PARTS LIST AND DRAWING

Model SET2-A

Sanitary Type 3

ITEM NO.	PART NUMBER	DESCRIPTION	TOTAL RQD.
1	070-006-170	Bearing, Sleeve	2
2	**114-005-332**	**Bracket, Intermediate**	**1**
3	**720-004-360**	**Seal, U-Cup**	**2**
4	135-008-000	Bushing, Threaded w/O-Ring	2
5	620-004-114	Plunger, Actuator	2
6	095-073-000*	Body Assembly, Pilot Valve	1
7	360-041-425	Gasket, Valve Body	1
8	560-001-360	O-Ring (included in item 4)	2
9	095-047-332	Body, Valve	1
10	**132-014-358**	**Bumper, Valve Spool**	**2**
11	165-011-332	Cap, End	2
12	**360-048-425**	**Gasket, Valve Body**	**1**
13	**360-010-425**	**Gasket, End Cap**	**2**
14	**560-020-360**	**O-Ring**	**6**
15	**031-012-000**	**Sleeve & Spool Set**	**1**
16	170-032-115	Capscrew, Hex Head	8
17	170-045-115	Capscrew, Hex Head	4
18	**132-002-360**	**Bumper, Diaphragm**	**2**
19	196-068-332	Chamber, Inner	2
20	**286-005-366**	**Diaphragm**	**2**
21	**560-022-360**	**O-Ring**	**2**
22	**685-007-120**	**Rod, Diaphragm**	**1**
23	478-007-115†	Knob, Locking	16
24	170-024-115	Capscrew, Hex Head	8
25	618-003-110	Plug Pipe	2
26	900-006-115	Washer, Lock	16
27	612-052-157	Plate, Diaphragm	2
28	612-097-111	Plate, Outer	2
29	807-026-115	Stud	2
30	518-094-110	Manifold, Suction	1
31	518-093-110	Manifold, Discharge	1
32	**722-040-600**	**Seat, Valve**	**4**
33	**050-018-600**	**Ball, Check Valve**	**4**
34	542-007-000	Stud Nut Assembly	8
35	**132-022-360**	**Bumper, Actuator**	**2**
36	**902-003-000**	**Stat-O-Seal**	**2**
37	200-032-115	Clamp, Discharge	2
38	200-034-115	Clamp, Suction	2
39	542-002-114	Nut, Stud	4
41	196-070-111	Chamber, Outer	2
42	530-008-000	Muffler, Exhaust	1
43	312-057-111	Elbow, Suction	2

* Available only in kit form. Order P/N 031-055-000 which also includes items 5,7,12 & 35

† **NOTE:** Items 23 and 49 **MUST** be torqued to 430 in./lbs. **before** operating pump.

Repair Parts shown in **bold face (darker) type** are more likely to need replacement after extended periods of normal use. They are readily available from most Warren Rupp distributors. 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.

MATERIAL CODES
The Last 3 Digits of Part Number

000...Assembly, sub-assembly; and some purchased items
010...Cast Iron
015...Ductile Iron
025...Music Wire
080...Carbon Steel, AISI B-1112
100...Alloy 20
110...Alloy Type 316 Stainless Steel
111…Electropolished Stainless Steel
112...Alloy "C"
114...303 Stainless Steel
115...302/304 Stainless Steel
120...416 Stainless Steel (Wrought Martensitic)
148...Hardcoat Anodized Aluminum
150...6061-T6 Aluminum
151...6063-T6 Aluminum
154...Almag 35 Aluminum
155 or 156...356-T6 Aluminum
157...Die Cast Aluminum Alloy #380
159...Anodized Aluminum
162...Brass, Yellow, Screw Machine Stock
170...Bronze, Bearing Type, Oil Impregnated
180...Copper Alloy
330...Plated Steel
331...Chrome Plated Steel
332...Electroless Nickel Plated
335...Galvanized Steel
356...Injection Molded Hytrel
357...Rupplon (Urethane Rubber)
360...Buna-N Rubber. Color coded: RED
363...Viton (Fluorel). Color coded: YELLOW
364...E.P.D.M. Rubber. Color coded: BLUE
365...Neoprene Rubber. Color coded: GREEN
366...Food Grade Nitrile. Color coded: WHITE
375...Fluorinated Nitrile
405...Cellulose Fibre
408...Cork and Neoprene
425...Compressed Fibre
440...Vegetable Fibre
500...Delrin 500
501...Delrin 570
520...Injection Molded PVDF, Natural Color, Food Grade/USDA Acceptable
540...Nylon "Foodgrade"
550...Polyethylene
551...Polypropylene
555...PVC
580...Ryton
600...Teflon (virgin material) Tetrafluoroethylene (TFE)
603...Blue Gylon
604...Teflon, Diaphragm
610...Teflon Encapsulated Silicon
611...Teflon Encapsulated Viton
632...Neoprene Rupplon
633...Viton/Teflon
634...EPDM/Teflon
635… Neoprene/Teflon
636...White Nitrile/Teflon
637…Viton

ITEM NO.	PART NO.	DESCRIPTION	TOTAL RQD.
44	312-058-111	Elbow, Discharge	2
45	**361-005-600**	**Gasket, Sealing (Discharge)**	**2**
46	**361-008-600**	**Gasket, Sealing (Suction)**	**2**
47	031-019-332	Main Air Valve Assembly (Inc. Items 9, 10, 11, 13, 14, 15, 16, 40)	1
48	807-064-115	Stud	8
49	545-007-115†	Nut, Hex	8
50	542-012-000	Stud Nut Assembly	8
51	115-083-115	Bracket, Foot	2
52	115-084-115	Bracket, Foot	2
53	286-041-604	Diaphragm	2
54	196-079-600	Chamber, Spill Containment	2
55	618-025-110	Boss Plug	4
56	**560-078-611**	**O-Ring**	**4**
57	**560-077-611**	**O-Ring**	**2**
Not Shown:			
	031-019-332	Valve Body Assembly (Inc. Items 9, 10, 11, 13, 14, 15, 16)	1

This pump uses Air End Kit 476-100-000

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

MATERIAL CODES
The Last 3 Digits of Part Number

000...Assembly, sub-assembly; and some purchased items
010...Cast Iron
015...Ductile Iron
025...Music Wire
080...Carbon Steel, AISI B-1112
100...Alloy 20
110...Alloy Type 316 Stainless Steel
111…Electropolished Stainless Steel
112...Alloy "C"
114...303 Stainless Steel
115...302/304 Stainless Steel
120...416 Stainless Steel (Wrought Martensitic)
148...Hardcoat Anodized Aluminum
150...6061-T6 Aluminum
151...6063-T6 Aluminum
154...Almag 35 Aluminum
155 or 156...356-T6 Aluminum
157...Die Cast Aluminum Alloy #380
159...Anodized Aluminum
162...Brass, Yellow, Screw Machine Stock
170...Bronze, Bearing Type, Oil Impregnated
180...Copper Alloy
330...Plated Steel
331...Chrome Plated Steel
332...Electroless Nickel Plated
335...Galvanized Steel
356...Injection Molded Hytrel
357...Rupplon (Urethane Rubber)
360...Buna-N Rubber. Color coded: RED
363...Viton (Fluorel). Color coded: YELLOW
364...E.P.D.M. Rubber. Color coded: BLUE
365...Neoprene Rubber. Color coded: GREEN
366...Food Grade Nitrile. Color coded: WHITE
375...Fluorinated Nitrile
405...Cellulose Fibre
408...Cork and Neoprene
425...Compressed Fibre
440...Vegetable Fibre
500...Delrin 500
501...Delrin 570
520...Injection Molded PVDF, Natural Color, Food Grade/USDA Acceptable
540...Nylon "Foodgrade"
550...Polyethylene
551...Polypropylene
555...PVC
580...Ryton
600...Teflon (virgin material) Tetrafluoroethylene (TFE)
603...Blue Gylon
604...Teflon, Diaphragm
610...Teflon Encapsulated Silicon
611...Teflon Encapsulated Viton
632...Neoprene Rupplon
633...Viton/Teflon
634...EPDM/Teflon
635… Neoprene/Teflon
636...White Nitrile/Teflon
637…Viton

Delrin, Teflon, Viton and Hytrel are registered tradenames of E.I. DuPont.
Gylon is a registered tradename of Garlock, Inc.
Nylatron is a registered tradename of Polymer Corporation.
Rupplon and SandPIPER are registered tradenames of Warren Rupp, Inc.
Ryton is a registered tradename of Phillips Chemical Company.