

SERIES "KK" MAGNETIC-COUPLED PUMPS

OPERATION AND
SERVICE GUIDE
O-1330
MARCH 1990

MODEL PM1000

Refer to Parts List P-1330

BEFORE STARTING PUMP

1. Read operating instructions and instructions supplied with chemicals to be used.
2. Refer to Chemical Resistance Data Chart, Bulletin T-102 for compatibility of materials in pump with solution to be used.
3. Note temperature and pressure limitations.
4. Personnel operating pump should always wear suitable protective clothing; face mask or goggles, apron and gloves.
5. All piping must be supported and aligned independently of the pump.
6. Always close valves slowly to avoid hydraulic shock.
7. Ensure that all fittings and connections are properly tightened.

BEFORE CHANGING APPLICATION OR PERFORMING MAINTENANCE

1. Wear protective clothing as described in item 4 above.
2. Flush pump thoroughly with a neutralizing solution to prevent possible harm to personnel.
3. Verify compatibility of materials as stated in item 2 above.
4. Shut off power to motor at disconnect switch.

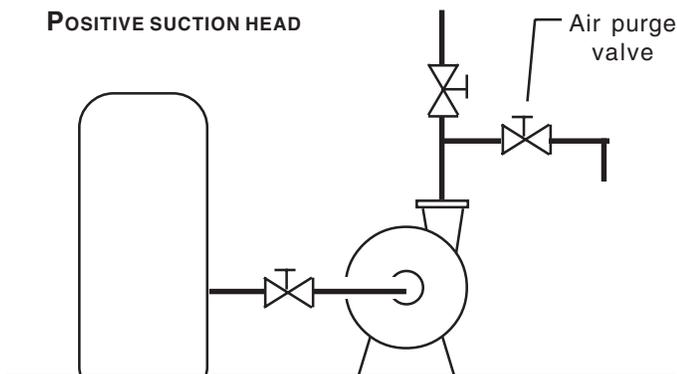
GENERAL

Series "KK" is a magnetic drive chemical pump. The drive magnet attached to the electric motor transfers the torque to the impeller magnet. Since there is no shaft seal, there is no leakage.

PRECAUTIONS

DO NOT RUN DRY - If the pump is run without liquid, there is a danger of damaging the ceramic shaft or other parts.

STANDARD PIPING



DO NOT RUN SHUT OFF - Short runs of 3 minutes or less will not damage the pump. This allows you time to start the pump with the discharge valve shut off.

DO NOT RUN WITH CAVITATION OR AIR ENTRAINMENT - Use "Dry-Stop" Mac-Meter if possibility of these conditions exists.

DO NOT RUN IN REVERSE - The impeller must rotate in a clockwise direction when viewed through the fan end of the motor. (Counter-clockwise when viewed from the pump end.)

MINIMUM CAPACITY - The "KK" pump should not exceed the specified head and capacity. (Never run the pump throttling the discharge more than the TDH or GPM required.)

VISCOUS FLUID - The "KK" pump should not be used for viscous solutions above 10 centipoise. Please contact SERFILCO for more information about viscous solutions.

INSTALLATION AND PIPING

Bolt the pump in place horizontally. Allow sufficient clearance for the removal of drain plug.

Take care to prevent excessive force on the pump. Construct piping that can absorb the strains of thermal expansion of high temperature liquid.

Install a suction valve to check the pump when the pump has a flooded suction.

A short pipe longer than one foot is recommended for ease in disassembly.

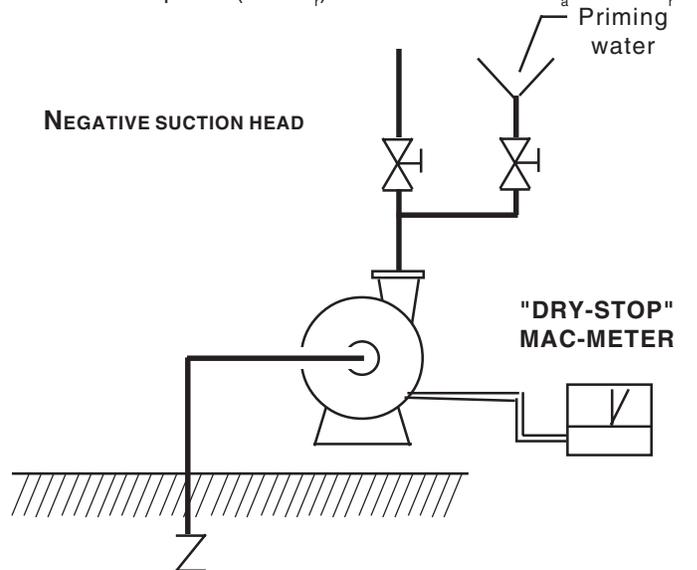
When the pump does not have a flooded suction, install a foot valve on suction lines.

"DRY-STOP" MAC-METER MUST BE USED.

REQUIRED LIQUID LEVEL - Minimum required liquid level at the suction nozzle should be more than five times that of the suction nozzle.

Take care to prevent foreign material from entering the piping.

Calculate available NPSH ($NPSH_a$) and compare with the NPSH required ($NPSH_r$). Ensure that: $NPSH_a > NPSH_r$.



INITIAL STARTING PROCEDURE

OPERATION TO PURGE AIR (BUBBLES) WITH MOTOR OFF

1. Open the suction valve fully and shut off the discharge valve.
2. Open the discharge valve once and shut it off again.
3. Open the air purge valve and purge air out of it. Overflow the liquid until you can see no air bubbles in it.

CHECK THE DIRECTION OF MOTOR ROTATION

1. Run the pump for a moment.
2. Stop the motor and check the direction of motor rotation. Ensure that it is the same as the direction indicated by the arrow. (If the direction of motor rotation is correct, the fan of the motor

rotates clockwise when viewed from the fan end of the motor.

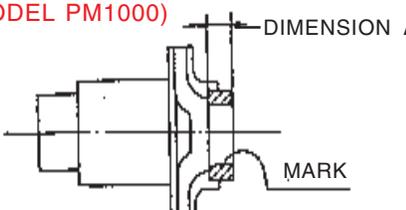
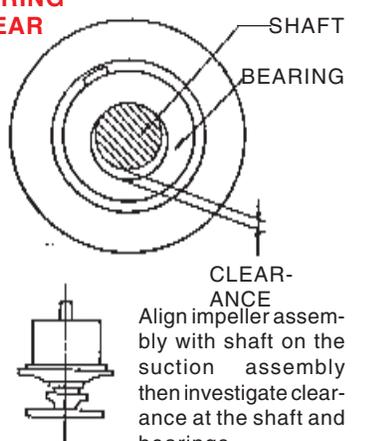
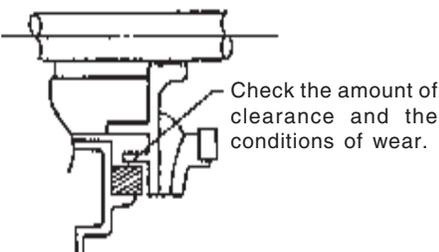
TEST RUN

1. Switch on the pump, then open the discharge valve slowly.
2. Run the pump for 5 minutes.
3. Shut off the discharge valve and switch off the pump.
4. Shut off the suction valve.

CHECK TO ENSURE THAT THE AIR IS TOTALLY PURGED

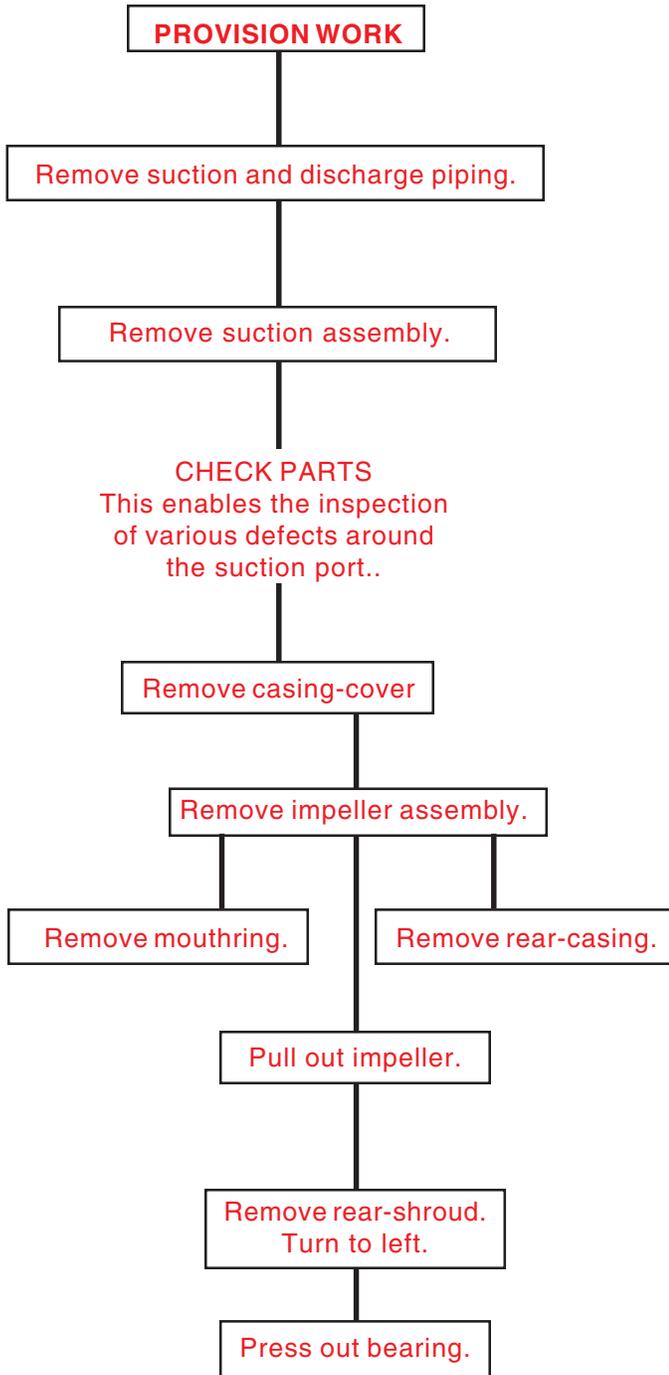
1. After the above mentioned test run, stop the pump and leave it for a few minutes.
2. Open the suction valve and shut off the discharge valve.

LIST OF CHECKPOINTS

CHECKPOINT	RESULT	CHECK INTERVALS
<p>MOUTHRING WEAR* (MODEL PM1000)</p>  <p>Regular dimension A is marked inside the mouthring.</p>	<p>DIMENSION A If worn 0 - .007 in. (0 - 0.2mm)</p> <p>DIMENSION A If worn between .007 - .019 in. (0.2 - 0.5 mm)</p> <p>DIMENSION A If worn above .019 in. (0.5 mm)</p> <p>Maximum wear allowance before replacement: .078.</p>	<p>Check or replace every 6 months to 1 year.</p> <p>Replace every 6 months.</p> <p>Replace every 3 months.</p>
<p>BEARING WEAR</p>  <p>Align impeller assembly with shaft on the suction assembly then investigate clearance at the shaft and bearings.</p>	<p>EVEN CLEARANCE Clearance is below .007 in. (0.2 mm)</p> <p>SLIGHT ECCENTRIC WEAR Clearance is about .011 - .015 in. (0.3 - 0.4 mm)</p> <p>CONSIDERABLE ECCENTRIC WEAR Clearance is over .019 - .023 in. (0.5 - 0.6 mm)</p> <p>Maximum wear allowance before replacement: CLEARANCE .019 - .023 in. (0.5 - 0.6 mm)</p>	<p>Check or replace every 6 months to 1 year.</p> <p>Check or replace every 6 months.</p>
<p>SUCTION LINER WEAR RING</p>  <p>Check the amount of clearance and the conditions of wear.</p>	<p>If there is a decrease of capacity or an increase in motor current, replace the liner ring.</p> <p>Basically, it is only required to investigate the wear of bearings.</p>	

* Check within 2 or 3 months after the pump has been started.

DISASSEMBLY (Model PM1000)



(Warm magnet-can about 212°F [100°C]
for easier removal from bearings.)

Drain internal liquid.

Remove four hexagon head bolts from suction port.
Pull out the suction port, using care that the shaft is not
damaged.

CAUTION

Handle carefully, because the shaft is easily damaged
by shock or vibration.

In the event that only the shaft is damaged, warm
suction port (near 212°F or 100°C) and then pull out and
replace the shaft.

Remove hexagon socket head bolts.

CAUTION (with DRY-STOP MAC-METER)

1. Do not remove the rear casing when there is no
trouble.
2. Be extremely careful so as not to stress leads
from MAC-Meter.
3. First, remove leads out of the connection pipe
and then remove the rear casing.
4. Pry open little by little with a screw driver
inserted under the brim or rear casing.

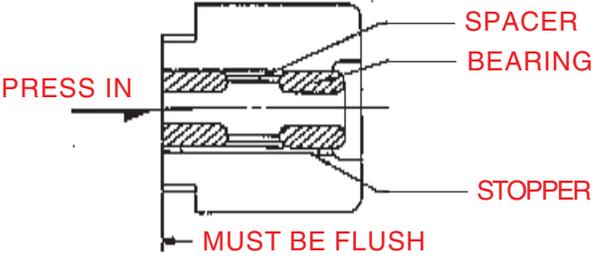
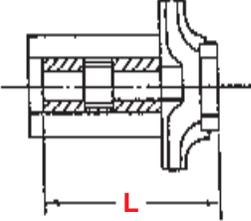
CAUTION:

1. The impeller assembly should be laid on a cloth or paper to avoid picking up metal particles.
2. Magnets are strong. Hold tight and install slowly to prevent shock to the rear casing and magnet-can and possible injury to personnel.

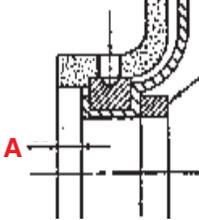
REASSEMBLY (MODEL PM1000)

Reassembly is reverse of disassembly.

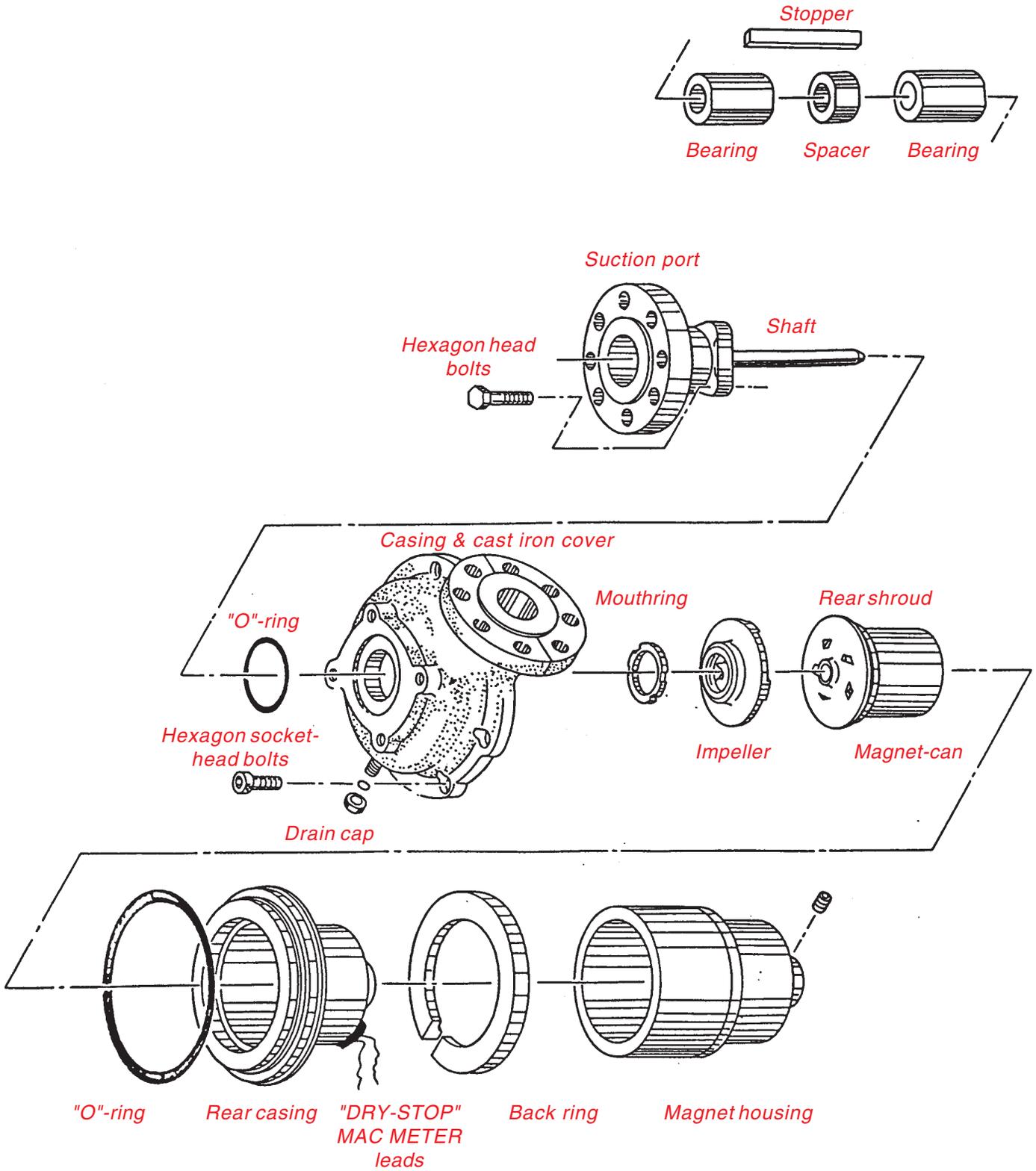
Observe the following precautions.

REPLACE MOUTHRING.	<p>Push on mouthring. (Warm near 212°F or 100°C.)</p>
REPLACE BEARING.	<p>Press bearings into position, do not use a hammer.</p> <div style="text-align: center;">  <p style="text-align: right;">SPACER BEARING</p> <p style="text-align: left;">PRESS IN</p> <p style="text-align: right;">STOPPER</p> <p style="text-align: center;">MUST BE FLUSH</p> </div> <p>Warm magnet-can with a drying oven or boiling water for easier press of bearings.</p>
TWIST ON IMPELLER SHROUD.	<div style="text-align: center;">  </div> <p>It is important to check the standard dimension L. L = 6.240 - 6.279 in. (158.5 - 159.5 mm)</p>
INSTALL REAR-CASING.	<p>Check the back thrust-ring. Install the rear-casing on bracket by fitting with cut portion of back-ring.</p>
CAUTION	<p>When wiring "DRY-STOP" MAC-METER: Install back rib with extreme caution, and then insert leads in connecting pipe.</p>
INSTALL IMPELLER ASSEMBLY.	<p>Draw impeller magnet-can firmly into pump. Hold tight and install slowly to prevent shock to the rear casing and possible injury to fingers.</p>

REASSEMBLY (continued)

<p>REPLACE REAR CASING</p>	<div style="text-align: center;">  </div> <p style="text-align: center;">A = .303 - .314 in. (7.7 - 8.0 mm)</p> <p>It is important to check the standard dimension A. Be sure that said dimension is correct, and then tighten all set screws securely.</p>
<p>INSTALLATION - CASING COVER</p>	<p>Tighten all bolts evenly.</p>
<p>CAUTION CHECK "O"-RING</p>	<p>Make sure that there is a clearance between the mouthring and the thrust ring by moving them.</p>
<p>INSTALLATION - SUCTION PORT</p>	<p>Push the shaft through the impeller bearings. Push slowly using care that the "O"-ring is not dropped from groove.</p>
<p>INSTALL DRAIN CAP</p>	
<p>REPLACE DRIVE MAGNET HOUSING</p>	<p>Remove four hexagon head bolts from the motor flange, then pull out the motor with magnet housing horizontally.</p> <p>A new magnet housing should be carefully installed until it is snug on the shaft.</p> <p>Fit onto the shaft with key, tighten set-screw.</p>

CONSTRUCTION



TROUBLE SHOOTING

PROBLEM	PROBABLE CAUSE	CORRECTION
NO DELIVERY	Air pocket in suction	Check piping of suction lines.
	Lack of prime (when suction head is negative)	Prime again.
	Air pocket inside the pump	Work out all air.
	Slipped magnet coupling (motor running with no load)	Excessive specific gravity or viscosity (pump is not suitable). Throttle discharge valve.
	Wear or damage of parts	Replace parts.
	Air entrainment, air pockets	Check joint sections of suction lines.
	Cavitation Excessive piping loss	Check to ensure that $NPSH_a$ is adequate.
	Impeller clogged with foreign materials	Remove foreign materials.
	Change in the shape of impeller	Replace impeller.
EXCESSIVE POWER	Excessive specific gravity or viscosity	Pump is not suitable or throttle discharge.
	Excessive wear of parts	Replace parts.
EXCESSIVE NOISE OR VIBRATION	Excessive piping loss or cavitation	Repipe.
	Wear or damage of parts	Replace parts.
	Impeller clogged with foreign material	Remove foreign materials.
LEAKING FROM CASING	Change in the shape of casing	Replace casing.
	Corrosion of "O"-ring	Replace "O"-ring.
	Wrong installation of "O"-ring	Replace "O"-ring.
BROKEN SHAFT	Dry run, thermal shock, run at no flow, shock at handling, corrosion, cavitation	Replace shaft. Do not use wrong way.
REAR CASING CRACK OR DAMAGE	Dry run, excessive wear, shut off run, corrosion, excessive high temperature or pressure	Replace shaft. Do not use wrong way.
MAGNET CAN DAMAGE	Dry run, excessive wear, crack (corrosion)	Replace shaft. Do not use wrong way.
IMPELLER, CASING HAS CHANGED ITS SHAPE	Unusual temperature rise (shut off run)	Replace shaft. Do not use wrong way.
EXCESSIVE WEAR - BEARING, MOUTHRING, LINER RING	Cavitation, air entrainment	Check suction lines.
	Slurries or abrasive liquid	Pump is not suitable.
	Corrosion	Check compatibility of materials of construction with liquid being pumped.