

SERIES PST

200 HP @ 1750 & 3500 RPM

Installation, Operation & Maintenance Manual

NPT Close Coupled Centrifugal



IMPORTANT! - READ ALL INSTRUCTIONS IN THIS MANUAL
BEFORE OPERATING OR SERVICING A PUMP.

→ RULES FOR SAFE INSTALLATION AND OPERATION

1. Read these rules and instructions carefully. Failure to follow them could cause serious bodily injury and/or property damage.
2. Check your local codes before installing. You must comply with their rules
3. For maximum safety, this product should be connected to a grounded circuit equipped with a ground fault interrupter device.
4. Before installing this product, have the electrical circuit checked by an electrician to make sure it is properly grounded.
5. Before installing or servicing your pump, BE CERTAIN pump power source is disconnected.
6. Make sure the line voltage and frequency of the electrical current supply agrees with the motor wiring. If motor is dual voltage type, BE SURE it is wired correctly for your power supply.
7. Complete pump and piping system MUST be protected against below freezing temperature.
Failure to do so could cause severe damage and voids the Warranty.
8. Avoid system pressures that may exceed one and a half times the operating point selected from the pump performance curve.
9. Do not run your pump dry. If it is, there will be damage to the pump seal.

→ INSTALLATION

Package Contents

1. Be sure all parts have been furnished and that nothing has been damaged in shipment.
2. The catalog lists all parts included with package. A packing list packed with pump, also lists contents.
3. OPEN PACKAGES AND MAKE THIS CHECK BEFORE GOING ON JOB.

Piping

Pipes must line up and not be forced into position by unions. Piping should be independently supported near the pump so that no strain will be placed on the pump casing. Where any noise is objectionable, pump should be insulated from the piping with rubber connections. Always keep pipe size as large as possible and use a minimum of fittings to reduce friction losses.

Suction Piping

Suction pipe should be direct and as short as possible. It should be at least one size larger than suction inlet tapping and should have a minimum of elbows and fittings (5 to 6 pipe diameters of straight pipe before inlet is recommended). The piping should be laid out so that it slopes upward to pump without dips or high points so that air pockets are eliminated. The highest point in the suction piping should be the pump inlet except where liquid flows to the pump inlet under pressure. The suction pipe must be tight and free of air leaks or pump will not operate properly.

→ RULES FOR SAFE INSTALLATION AND OPERATION

Discharge piping

Discharge piping should never be smaller than pump tapping and should preferably be one size larger. A gate valve should always be installed in discharge line for throttling if capacity is not correct. To protect the pump from water hammer and to prevent backflow, a check valve should be installed in the discharge line between the pump and gate valve.

Electrical Connections

Be sure motor wiring is connected for voltage being used. Unit should be connected to a separate circuit. A fused disconnect switch or circuit breaker must be used in this circuit. Wire of sufficient size should be used to keep voltage drop to a maximum of 5%.

Single phase motors have built-in overload protection. Flexible metallic conduit should be used to protect the motor leads.

Priming

The pump must be primed before starting. The pump casing and suction piping must be filled with water before starting motor. In the PST models, remove vent plug in top of casing while pouring in priming water. A hand pump or ejector can be used for priming when desired. When water is poured into pump to prime, remove all air before starting motor.

Starting

When the pump is up to operating speed, open the discharge valve to obtain desired capacity or pressure. Do not allow the pump to run for long periods with the discharge valve tightly closed. If the pump runs for an extended period of time without liquid being discharged, the liquid in the pump case can get extremely hot.

Rotation

All single phase motors are single rotation and leave factory with proper rotation. Three phase motors should be checked to ensure proper rotation.

Freezing

Care should be taken to prevent the pump from freezing during cold weather. It may be necessary, when there is any possibility of this, to drain the pump casing when not in operation. Drain by removing the pipe plug in the bottom of the casing.

Rotation Seal - Pro Steel

PRO STEEL pumps are fitted only with rotary seal. This seal is recommended for LIQUIDS free from abrasives.

Location of unit

The pump should be installed as near to the liquid source as is practical so that the static suction head (vertical distance from the center line of the pump to water level) is maximized, and so that a short, direct suction pipe may be used. The capacity of a centrifugal pump is reduced when the unit is operated under a high suction lift. The piping should be as free from turns and bends as possible, as elbows and fittings greatly increase friction loss. Place the unit so that it is readily accessible for service and maintenance and on a solid foundation, which provides a rigid and vibration-free support. Protect the pump against flooding and excess moisture.

MODEL PST SELECTION CHART

Synchronous Speed 3450 RPM

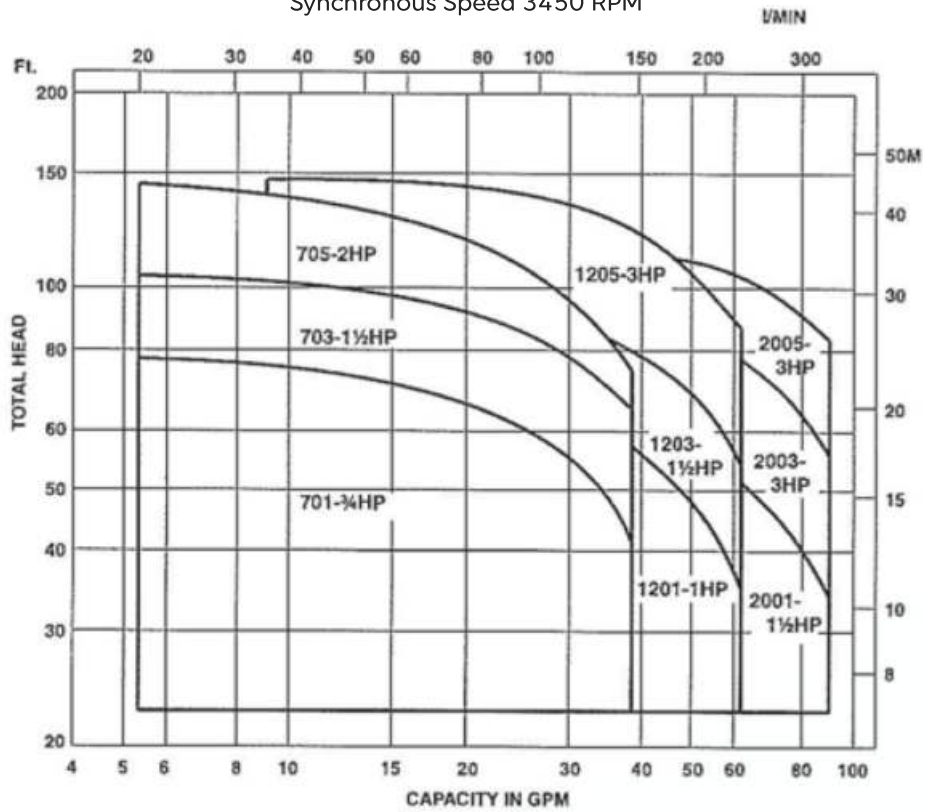


Table 1 PST

	STANDARD	OPTIONAL
Size Suction Size Discharge	PST70 - 1 1/4" NPT thread PST120 - 1 1/4" NPT thread PST200 - 1 1/2" NPT thread 1" NPT thread	
Range of HP	3/4 HP to 3 HP	
Range of Performance Capacity Head	5.5 to 95 GPM at 3450 RPM 26 to 144 feet at 3450 RPM	
Liquid handled Type of liquid Temperature Max. working pressure	Water 212°F (100°C) 125 PSI (9 Bar)	Max. 250°F (121°C) with optional high temperature seal
Materials Casing Impeller (closed type) Shaft Bracket Shaft Seal Bearing	304L Stainless Steel 304L Stainless Steel Stainless Steel Aluminum Mechanical Seal - Type 21 Ball Bearing	High temperature version Mild chemical version
Direction of Rotation	Clockwise when viewed from motor end	
Motor Type Speed Single Phase Three Phase Motor Protection	NEMA 56J Frame 60 Hz, 3450 RPM (2 poles) TEFC - 3/4 HP to 3 HP ODP - 3/4 HP to 3 HP, 115/230V TEFC - 3/4 HP to 3 HP ODP - 3/4 HP to 3 HP, 208/230/460V Built-in overload protection (single phase)	60 Hz, 1725 RPM (4 poles) Explosion proof Washdown duty Explosion proof Washdown duty

PST

Exploded View

FLANGED CLOSE COUPLED CENTRIFUGAL

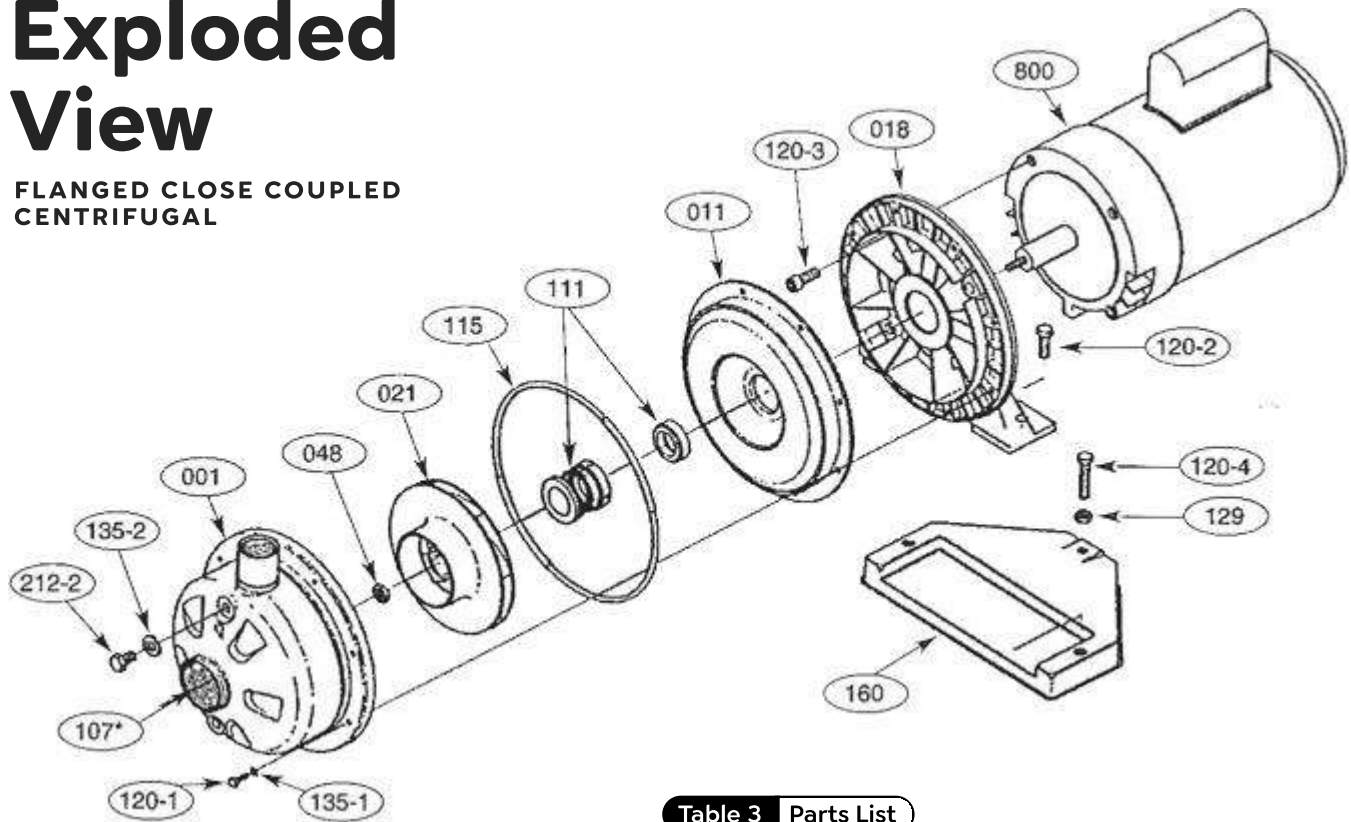


Table 3 Parts List

ITEM	DESCRIPTION	MATERIAL	NO. FOR 1 UNIT
001	Casing	304L Stainless	1
011	Casing cover	304L Stainless	1
018	Bracket	Aluminium	1
021	Impeller	304L Stainless	1
048	Impeller nut	304L Stainless	1
107*	Casing ring (*CDU 70 series only)	Viton	1
111	Mechanical Seal	—	1
115	O-Ring	Viton	1
120-1	Bolt	304L Stainless	8
120-2	Bolt	304L Stainless	2
120-3	Bolt	304L Stainless	4
120-4	Bolt	304L Stainless	1
129	Nut	304L Stainless	1
135-1	Washer	304L Stainless	8
135-2	Washer	Aluminium	2
160	Base	Steel	1
212-2	Plug	304L Stainless	2
800	Motor	—	1

→SERVICE

Keep ventilation openings clear of extraneous objects which may hinder free flow of air thru motor. Motor bearings are lubricated during manufacture. Additional lubrication is not required during their normal lifetime.

CAUTION!

→DRAINING

The pump and piping should always be protected against freezing temperatures. If there is any danger of freezing, the unit should be drained. To drain the pump, remove the drain plug at the bottom of the volute, and remove the priming plug to vent the pump. Drain all piping.

→DISASSEMBLY INSTRUCTIONS

All pumping parts can be removed from case without disturbing the piping.

WARNING

POWER SUPPLY - Open the power supply switch contacts and remove fuses. Disconnect the electrical wiring from the motor.

Volute Case

- (a) Drain pump case by removing drain plugs.
- (b) Remove the bolts securing volute case to pump bracket.
- (c) Pry volute case from casing cover with a screwdriver.

Impeller

(a) Hold the motor shaft with a screwdriver in the shaft end slot. Grasp and turn the impeller counter clockwise (as viewed from pump end).

Seal

- (a) Remove the rotating part of the seal by pulling it off the shaft.
- (b) The stationary seat can be pressed from the casing cover.

→CHECK LIST FOR EXAMINATION OF PUMP PARTS

Impeller

Replace the impeller if any vane is broken, excessive erosion shows, or if labyrinth surfaces are worn. Impeller cap screw, washer and lock washer should be replaced if damaged.

Mechanical Seal

Seal face, O-ring and sealing members should be free of burrs and dirt. Complete seal assembly should be replaced if not in perfect condition.

Shaft

Shaft sleeve surface under seal or packing must be clean, smooth and without any grooves. It should be replaced if necessary.

Volute and Seapacking plate labyrinth Surfaces

Shaft sleeve surface under seal or packing must be clean, smooth and without any grooves. It should be replaced if necessary.

Gaskets

Volute, suction pipe and discharge pipe gaskets should be checked for damage. Replace if necessary.

→NOTE

If replacement parts are ordered, please furnish the following information to your FloFab distributor:

1. Reference Numbers
2. Description of Pump Part
3. FloFab Model Number and Serial Number on the Nameplate.

→PST ASSEMBLY INSTRUCTIONS

Position the pump on its end with the shaft up. The work surface should be level, capable of supporting the motor.

WARNING

Make certain the motor is not connected to a power source. Do not install or assemble the pump on a motor connected to a power source. Serious injury could occur if the motor activates during pump assembly.

→ASSEMBLING THE PUMP

1. Position the motor bracket on the motor with the mounting feet toward the motor. Cross-tighten bolts to factory recommended torque of 6 ft. lbs.
2. Using finger pressure only, firmly press the stationary seal seat into the casing cover. Press the seat until it evenly bottoms out in the seat cavity.
3. Be careful not to damage the stationary seal.
 - a. Position the casing cover over the the motor shaft.
 - b. Align the casing cover holes with the motor bracket holes.
 - c. Firmly press the casing cover into position. (Casing cover may need to be tapped into place by using a rubber mallet.)
4. Ensure all seals have good contact.
 - a. Carefully press the rotating seal assembly onto the motor shaft. Ensure the face of the seal assembly has solid, square contact with the stationary seal seat.
 - b. The seal retainer must seal against the motor shaft.
 - c. Position the seal spring and seal washer.
5. Failure to properly install the impeller and the impeller nut could result in the impeller spinning off the shaft in three phase applications (when the motor may start in reverse rotation).
 - a. While holding the seal spring in place, thread the impeller clockwise onto the motor shaft.
 - b. Use a screwdriver to hold the motor shaft stationary. Turn the impeller on the shaft until it spins down and bottoms out. Make certain that the impeller is firmly bottomed and sealed.
 - c. Install the impeller nut onto the shaft in the same manner as the impeller was installed. Make certain the impeller nut is firmly sealed against the impeller. Apply lock tite to the impeller nut before installing.
6. Position the Viton O-ring over the casing cover. Do not cut nick or damage the O-ring during installation.
7. The discharge can be positioned in the direction desired.
 - a. Position the pump volute casing over the casing cover.
 - b. Rotate the discharge to the desired direction.
 - c. Align the bolt holes and secure the case to the casing cover with lock washers and cap screws.

d. Cross tighten the bolts to 3.4 lbs (factory recommended torque). Overtightening may result in stripping of the motor bracket threads.

8. Position the mounting base on the pump and secure with cap screws.

9. Place the bolt and Jock nut on the back of the mounting base. Adjust the bolt height to support the motor and tighten the lock nut to secure the bolt height.

10. Rotate the impeller to ensure proper alignment.

Mounting the Assembly

Do not operate the pump unless the assembly is securely and properly mounted. Misalignment of the motor/pump assembly or not having the assembly reasonably level may cause pump vibration, noisy operation, fluid leaks, or air leaks and air locks in the suction pipe.

Initial Operation

Make certain the motor is not connected to a power source until the motor is properly assembled and mounted. Serious personal injury or damage to the motor/pump assembly could occur if the motor is activated improperly.

WARNING

Only certified electricians should make electrical connections.

1. Prime the pump by adding fluid to the volute case through the top plug. To properly prime the pump, venting may be required.
2. Check the nameplate on the motor to determine the correct wiring procedure for your intended power source and if the motor is single or three phase. Connect the motor to a power source by following the wiring procedure on the motor's nameplate.

→ NOTE

- a. Single phase motors are typically dual voltage. In some cases, three phase motors are tri-voltage. Check the nameplate and follow the proper wiring procedure for the voltage you are using. Improperly wiring the motor could result in damage to the motor.
- b. Three phase motors require a control box. Install overload protection to help prevent motor damage.
- c. Depending on the wiring, three phase motors may start in reverse. Interchange any two power leads to change the starting direction and pump rotation.
 - Always follow correct operating procedures.
 - Always disconnect the motor/pump assembly from all power sources before servicing the pump or motor.
 - Periodically check all power connections, bolts, screws, and the motor's mounting.
 - Failure to properly follow assembly and operating instructions could result in damage to the pump and motor.
 - Failure to properly install the impeller and impeller nut could result in damage to the pump and could cause serious personal injury.



TO PREVENT SERIOUS ACCIDENTS, DISCONNECT THE POWER SUPPLY BEFORE INSPECTING THE PUMP

TROUBLE	POSSIBLE CAUSE	TROUBLESHOOTING
Pump doesn't run.	Faulty connection of power supply circuit.	Check power supply circuit.
	Wrong wiring of control circuit.	Correct control circuit.
	Bound shaft	Remove cause of obstruction.
	Mechanical seal faces stuck together	Release seal by turning shaft.
	Faulty motor.	Repair or replace motor.
	Damage to bearing.	Repair or replace any damaged bearing.
Pump does not pump water. Inadequate quantity.	Considerable voltage drop.	Correct rotation direction.
	Rotation direction reversed.	Re-prime the pump.
	Lack of priming.	Re-examine the plan.
	High discharge head.	Re-examine the plan.
	Large piping lost.	Clear foot valve suction.
	Clogged foot valve.	Check and repair suction piping.
	Leakage from suction piping.	Re-install as per our instructions.
	Too high suction lift.	Foot valve in ample immersion.
	Low water level.	
Overcurrent	Considerable fluctuation of power supply voltage.	Throttle flow rate at outlet.
	Considerable voltage drop.	Replace any damage bearing.
	Low head and overflow rate.	
	Damaged bearing.	
Pump vibrates, excessive operating noise.	Beyond rated capacity.	Reduce flow rate.
	Cavitation.	Consult distributor.
	Improper piping.	Secure piping again.
	Damaged bearing.	Replace any damaged bearing.
	Foreign matter clogging cooling fan.	Remove foreign matter.
Pressurizing application. Pump starts and soon stops.	Too limited pressure switch setting.	Replace pressure switch to wider range.
		Check and repair leaks.
Pump does not stop.	Leakage in system. Too high pressure setting.	Reduce max pressure setting to the lower in pressure switch.

→ MAINTENANCE

The pump does not require special maintenance.

The following rules must be observed for safe operation:

If the pump is not going to be used for a long period, the pump should be drained of water and flushed with clean water. Where the pump is exposed to freezing temperatures, it should always be left drained when not in use.

*All specifications subject to change without notice.

Table 5 Chemical Compatibility Chart

Item No.	Pumpage Type	Formula	Conc. %	Temp. °F	Temp. °C	*Code Level	Item No.	Pumpage Type	Formula	Conc. %	Temp. °F	Temp. °C	*Code Level
1	Acetic acid	CH ₃ COOH	10	68°	20°	2	36	Phosphoric acid	H ₃ PO ₄		176°	≤80°	3
2	Ammonium bicarbonate	NH ₄ CO ₃	10	68°	20°	2	37	Phthalic acid	C ₆ H ₄ (COOH) ₂	Wat. Sol.	68°	20°	2
3	Ammonium carbonate	(NH ₄) ₂ CO ₃		68°	60°	3	38	Potassium bicarbonate	KHCO ₃	30	68°	20°	1
4	Ammonium chloride	NH ₄ Cl	10	68°	20°	3	39	Potassium carbonate	K ₂ CO ₃	40	68°	20°	1
5	Ammonium hydroxide	NH ₄ OH	10	176°	<80°	3	40	Potassium chloride	KCl	10	68°	20°	2
6	Ammonium nitrate	NH ₄ NO ₃	5			3	41	Potassium hydroxide	KOH	10	176°	<80°	2
7	Beer					1	42	Potassium permanganate	KMnO ₄		68°	20°	2
8	Benzilic acid	C ₆ H ₅ COOH	10	68°	20°	2	43	Potassium phosphate	KH ₂ PO ₄	10	176°	80°	3
9	Benzilic acid	C ₆ H ₅ COOH		68°	20°	2	44	Potassium sulfate	K ₂ SO ₄				2
10	Boric acid	H ₃ BO ₃	5	68°	20°	1	45	Propionic acid	CH ₃ CH ₂ CO ₂ H	20	68°	20°	2
11	Boric acid	H ₃ BO ₃	5	176°	80°	1	46	Propylene glycol	CH ₃ CHOHCH ₂ OH	60	68°	20°	3
12	Brine					2	47	Salicylic acid	C ₆ H ₄ OHCOOH		68°	20°	2
13	Butyric acid	C ₃ H ₇ COOH	Wat. Sol.			2	48	Sodium bicarbonate	NaHCO ₃	10	68°	20°	1
14	Calcium chloride	CaCl ₂		68°	20°	3	49	Sodium carbonate	Na ₂ CO ₃		140°	<60°	1
15	Calcium nitrate	Ca(NO ₃) ₂	10			2	50	Sodium chloride	NaCl				3
16	Calcium phosphate	Ca ₃ (PO ₄) ₂	10	212°	≤100°	2	51	Sodium hydroxide	NaOH	<10	140°	<60°	2
17	Citric acid	C ₆ H ₈ O ₇	5	68°	20°	2	52	Sodium nitrate	NaNO ₃	10			2
18	Coffee					1	53	Sodium phosphate	Na ₃ PO ₄		212°	≤100°	1
19	Copper sulfate	CuSO ₄	5	68°	20°	2	54	Sodium sulfate	Na ₂ SO ₄	5	140°	<60°	2
20	Ethylene glycol	CH ₂ OHCH ₂ OH				1	55	Sulfuric acid	H ₂ SO ₄	10	68°	20°	4
21	Fluosilicic acid	H ₂ SIF ₆	20	68°	20°	4	56	Sulfurous acid	H ₂ SO ₃	Sat.	68°	20°	3
22	Fruit juices					1	57	Sulfurous acid	H ₂ SO ₃	10	68°	20°	2
23	Hydrocyanic acid	HCN		68°	20°	2	58	Tannic acid	C ₇₆ H ₅₂ O ₄₆	10	68°	20°	1
24	Hydrogen peroxide			68°	20°	2	59	Tartaric acid	C ₄ H ₆ O ₆	10	68°	20°	2
25	Lactic acid	C ₃ H ₆ O ₃	5	149°	≤65°	3	60	Tea					1
26	Lactic acid	C ₃ H ₆ O ₃	10	68°	20°	2	61	Vinegar			140°	≤60°	1
27	Magnesium chloride	MgCl ₂				3	62	Water			230°	≤110°	1
28	Magnesium sulfate	MgSO ₄		68°	20°	2	63	Water, condensation					1
29	Maleic acid	(CHCO ₂ H) ₂	10	68°	20°	3	64	Water, de-cationized					3
30	Milk					1	65	Water, demineralized					1
31	Nitric acid	HNO ₃	20	68°	20°	4	66	Water, distilled					1
32	Nitric acid	HNO ₃	20	158°	70°	4	67	Water, mine					1
33	Oleic acid	C ₁₈ H ₃₄ O ₂	20	68°	20°	3	68	Water, sea					3
34	Oxalic acid	(COOH) ₂	≤10	68°	≤20°	2	69	Water, thermal					1
35	Oxalic acid	(COOH) ₂	10	158°	70°	4	70	Wine-Whiskey					1

Where hot and aggressive liquids are to be pumped, in addition to checking the chemical compatibility, bear in mind that any deviations in temperature, density, and viscosity from the reference data would bring about variations in terms of power input, hydraulic performance, and suction capacity. Make sure in all cases that the power input is not higher than the rated power.

***Code Key: 1 = Good 2 = Fair 3=Poor* 4=Not recommended**
 Important – Pumpages coded 3 "poor" may result in reduced or unsatisfactory service life.

→LONG TERM STORAGE

Here are some general suggestions for long term storage. The applicability of all, or some, of these suggestions depends on several factors such as type of equipment, length of storage, and condition of the environment.

→GENERAL CARE

Drain the casing completely and dry it thoroughly, including its bearing housing and stuffing box, or seal chamber. Apply a coat of soluble rust preventive solution both internally and externally.

Cover all openings. Flanged openings (such as suction and discharge nozzles) should be covered with blind flanges with elastomer gasket. Threaded openings should be covered with steel plugs or caps.

Protect the bearing housing from moisture by placing bags of vapor phase inhibitor crystals around the housing.

Cover the equipment with industrial strength plastic, preferably transparent to allow its visual inspection, including its nameplate, without uncovering the unit.

Store the unit in its normal position in a dry place.

Inspect the unit periodically and turn the shaft a few times at least 1/4 turn. Turning the shaft prevents pitting of finished surfaces. The extra 1/4 turn is to displace the sag and prevent the shaft from developing a permanent bow.

This needs to be done at least once a month.

