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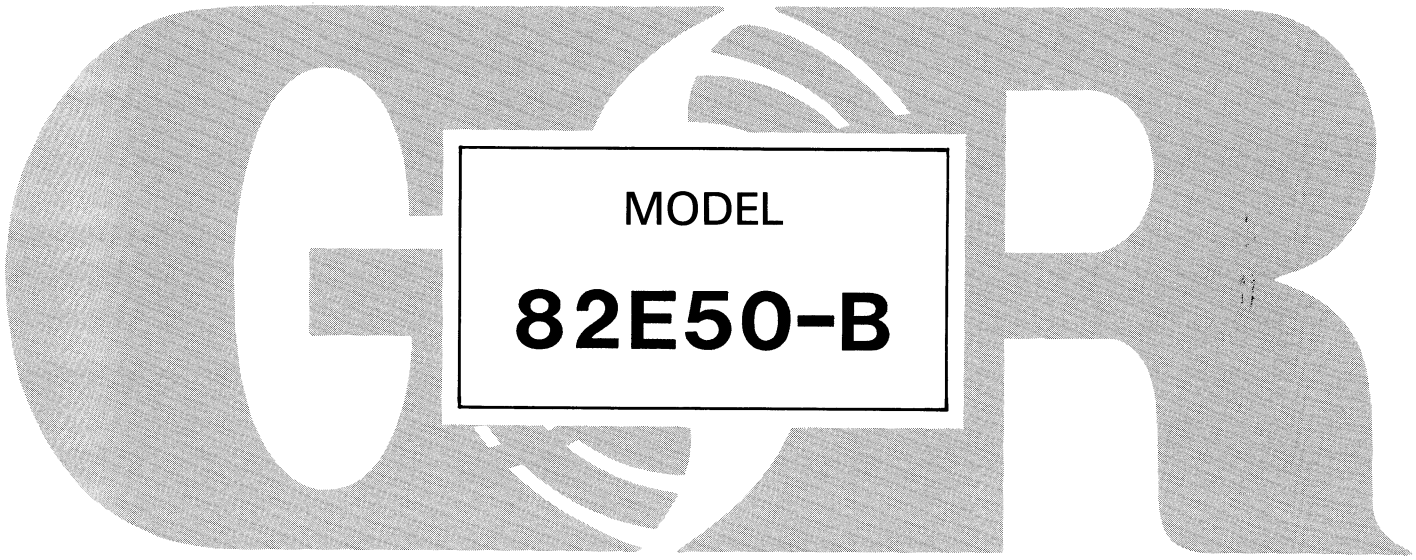
80 SERIES™

INSTALLATION, OPERATION, PARTS LIST, AND MAINTENANCE MANUAL



THE GORMAN-RUPP COMPANY • MANSFIELD, OHIO
GORMAN-RUPP OF CANADA LIMITED • ST. THOMAS, ONTARIO, CANADA
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INTRODUCTION

This Installation, Operation, and Maintenance Manual is designed to help you achieve the best performance and longest life from your Gorman-Rupp pump.

This pump is an 80 Series, semi-open impeller, self-priming centrifugal model with a suction check valve. The pump is designed for handling liquids containing non-abrasive chemicals. This pump is **not** recommended for solutions in concentrations which will **'salt-out'** or form precipitates. The basic material of construction (pump casing, flanges, seal plate and impeller) is fiberglass-reinforced thermosetting polyester. All other wetted parts are Type 316 stainless steel.

This pump will safely handle chemicals and chemical waste solutions of the concentrations and temperatures shown on the chart on Page A-3.

If there are any questions regarding the pump or its application which are not covered in this manual or in other literature accompanying this unit, please contact your Gorman-Rupp distributor, or write:

The Gorman-Rupp Company
P.O. Box 1217
Mansfield, Ohio 44901

or

Gorman-Rupp of Canada Limited
70 Burwell Road
St. Thomas, Ontario N5P 3R7

For information or technical assistance on the power source, contact the power source manufacturer's local dealer or representative.

The following are used to alert maintenance personnel to procedures which require special attention, to those which could damage equipment, and to those which could be dangerous to personnel:

NOTE

Instructions to aid in installation, operation, and maintenance or which clarify a procedure.

CAUTION

Instructions which must be followed to avoid causing damage to the product or other equipment incidental to the installation. These instructions describe the requirements and the possible damage which could result from failure to follow the procedures.

WARNING

These instructions must be followed to avoid causing injury or death to personnel, and describe the procedure required and the injury which could result from failure to follow the procedure.

WARNINGS - SECTION A

THESE WARNINGS APPLY TO 80 SERIES BASIC PUMPS. GORMAN-RUPP HAS NO CONTROL OVER OR PARTICULAR KNOWLEDGE OF THE POWER SOURCE WHICH WILL BE USED. REFER TO THE MANUAL ACCOMPANYING THE POWER SOURCE BEFORE ATTEMPTING TO BEGIN OPERATION.

WARNING

Before attempting to open or service the pump:

1. Familiarize yourself with this manual.
2. Disconnect the power source to ensure that the pump will remain inoperative.
3. Allow the pump to cool if overheated.
4. Vent the pump slowly and cautiously.
5. Close the suction and discharge valves.
6. Check the temperature before opening any covers, plates, or plugs.
7. Drain the pump.

WARNING

This pump is designed to pump materials which could cause serious illness or injury through direct exposure or emitted fumes. Wear protective clothing, such as rubber gloves, face mask, and rubber apron, as necessary before disassembling the pump or piping.

WARNING

This pump is designed to pump liquids containing non-abrasive chemicals of the type and concentration indicated on the application chart (Page A-3). Do not attempt to pump any solutions which has not been specified, or liquids which may damage the pump or endanger personnel as a result of pump failure.

WARNING

After the pump has been installed, make certain that the pump and all piping connections are secure before attempting to operate the pump.

WARNING

Do not operate the pump without a guard over the rotating parts. Exposed rotating parts can catch clothing, fingers, or tools, causing severe injury to personnel.

WARNING

Do not operate the pump against a closed discharge valve for long periods of time. This could bring the liquid to a boil, build pressure, and cause the pump to rupture or explode.

WARNING

Overheated pumps can cause severe burns and injury. If overheating of the pump occurs:

1. Stop the pump immediately.
2. Allow the pump to cool.
3. Refer to instructions in this manual before restarting the pump.

WARNING

Do not remove plates, covers, gauges, pipe plugs, or fittings from an overheated pump. Vapor pressure within the pump can cause parts being disengaged to be ejected with great force. Allow the pump to cool before servicing.

COMPATABILITY APPLICATION RECOMMENDATION CHART

The wetted portions of this pump are constructed of fiberglass-reinforced thermosetting polyester and type 316 stainless steel. It incorporates a mechanical self-lubricating shaft seal with ceramic and carbide faces. The pump will safely handle non-abrasive chemicals and solutions, at the recommended concentrations and within a 0° to 160°F temperature range, as specified in the following chart.

The application compatibility shown on the following chart can be further affected by dynamic and static product pressures and by hydrostatic shock pressure loading.

This pump is keyed as R = RECOMMENDED and N S = NOT SUITABLE for the liquids and concentrations listed. Concentrations are keyed as < = LESS THAN and > = GREATER THAN.

WARNING

DO NOT apply this pump on liquids which have not been listed as compatible on the Compatibility Application Recommendation Chart, or at temperatures beyond 0° to 160°F, or at other than specified concentrations. Operating this pump in any other manner could damage it, and cause the pump to rupture and release corrosive chemicals and/or fumes.

LIQUID PUMPED AND CONCENTRATION	APPLICATION		LIQUID PUMPED AND CONCENTRATION	APP	
Acetic Acid	<50%	R	Amyl Chloride		N S
Acetic Anhydride		N S	Aniline		N S
Acetone		N S	Aniline Sulfate		R
Acetonitrile		R	Aqua Regia		N S
Aluminum Fluoride		N S	Arsenic Acid	80%	R
Aluminum Hydroxide		N S	Arsenious Acid	15%	R
Aluminum Nitrate	10%	R	Barium Acetate		R
Ammonia, Aqueous	<30%	N S	Barium Chloride		R
Ammonium Benzoate		R	Barium Sulfate		R
Ammonium Bicarbonate	10-50%	R	Barium Sulfide		R
Ammonium Carbonate		R	Beer		R
Ammonium Chloride		R	Beet Sugar Liquor		R
Ammonium Citrate		R	Benzaldehyde		N S
Ammonium Fluosilicate		N S	Benzene		N S
Ammonium Hydroxide		N S	Benzene Sulfonic Acid	0-75%	R
Ammonium Nitrate		R	Benzoic Acid		R
Ammonium Persulfate		R	Benzoquinones		R
Ammonium Phosphate		R	Benzyl Alcohol		R
Ammonium Sulfate	>20%	R	Black Liquor		R
Ammonium Thiocyanate	20-50%	R	Blood		R
Amyl Acetate		R	Borax		R
Amyl Alcohol		R	Boric Acid		R

*Requires Special Seal

LIQUID PUMPED AND CONCENTRATION	APPLICATION	
Brine (NaCl & CaCl)		R
Bromine		N S
Butyl Acetate		N S
Butyl Alcohol		R
Butyric Acid	50%	R
Cadmium Chloride		R
Calcium Chlorite		R
Calcium Hydroxide		N S
Calcium Sulfate		R
Cane Juice, Liquor & Sweetwater		R
Caprylic Acid		R
Carbon Dioxide		R
Carbon Disulfide		N S
Carbon Tetrachloride		R
Caustic Potash		N S
Chloroacetic Acid	100%	N S
Chlorobenzene		R
Chloroform		N S
Chlorosulfonic Acid		N S
Chrome Plating Solution	Consult G-R	
Chromium Sulfate		R
Citric Acid		R
Coconut Oil		R
Copper Chloride		R
Copper Cyanide		R
Copper Nitrate		R
Copper Sulfate (Blue Vitriol)		R
Corn Oil		R
Corn Starch Slurry		N S
Cottonseed Oil		R
Cresylic Acid		N S
Crude Oil		R
Detergents Sulfonated		R
Dimethyl Phthalate		R
Dimethyl Sulfoxide		R
Dioctyl Phthalate		R
Ethyl Acetate		N S
Ethyl Alcohol (Ethanol)		R
Ethyl Ether		N S
Ethylene Chloride		N S
Ethylene Chloroformate		N S
Ethylene Dichloride		N S
Ethylene Glycol		R
Fatty Acids		R
Ferric Nitrate		R
Ferric Sulfate		R
Ferrous Sulfate		R
Formaldehyde	10-40%	R
Formic Acid		N S
Fruit Acid		R
Gasoline		R
Gluconic Acid	50%	R

LIQUID PUMPED AND CONCENTRATION	APP	
Green Liquor		R*
Hydrocyanic Acid	10%	R
Hydrofluoric Acid		N S
Hydrogen Peroxide	3-30%	R*
Hydrogen Sulfide		R
Kerosene		R
Lead Acetate (Sugar of Lead)		R
Linseed Oil		R
Magnesium Sulfate		R
Methyl Chloride		R
Milk		R
Naphtha		R
Nickel Chloride		R
Nickel Nitrate		R
Nickel Sulfate		R
Nitric Acid	5%	R
Nitric Acid	>10%	N S
Nitrobenzene		N S
Oleic Acid		R
Oleum		N S
Perchloric Acid	>25%	N S
Phenol		N S
Phosphoric Acid	10-85%	R
Phthalic Anhydride		R
Picric Acid (Alc soln.)	10%	R
Potassium Bicarbonate	10%	R
Potassium Carbonate		N S
Potassium Chloride		R
Potassium Dichromate		R
Potassium Ferrocyanide		R
Potassium Hydroxide		N S
Potassium Nitrate		R
Potassium Permanganate		R
Potassium Persulfate		R
Potassium Sulfate		R
Silver Nitrate		R
Sodium Acetate		R
Sodium Bicarbonate	10%	R
Sodium Bisulfite		R
Sodium Bromide		R
Sodium Carbonate		N S
Sodium Chloride		N S
Sodium Cyanide		N S
Sodium Ferricyanide		R
Sodium Hydroxide		N S
Sodium Hypochlorite	5%	R*
Sodium Hypochlorite	>10%	N S
Sodium Nitrate		R*
Sodium Nitrite		R
Sodium Sulfate		R
Stannous Chloride		R
Stearic Acid		R

*Requires Special Seal

LIQUID PUMPED AND CONCENTRATION	APPLICATION		LIQUID PUMPED AND CONCENTRATION	APP	
Sulfur Dioxide		R	Trichloromonofluoromethane		N S
Sulfuric Acid	10%	R	Urea-Ammonia Nitrate Fert.		N S
Sulfuric Acid	>75%	N S	8-8-8 Fertilizer		N S
Tannic Acid		R	Water, potable city		R
Tartaric Acid		R	Water, de-ionized		R
Trichloroacetic Acid	50%	N S	Water, distilled		R
Trichloroethylene		N S	Water, well		R
Tetrachloroethylene		N S	Xylene (Xylol)		N S
Toluene		N S	Zinc Nitrate		R
Trisodium Phosphate		N S	Zinc Sulfate		R

*Requires Special Seal

INSTALLATION - SECTION B

Since pump installations are seldom identical, this section offers only general recommendations and practices required to inspect, position, and arrange the pump and piping.

Most of the information pertains to a standard **static lift application** where the pump is positioned above the free level of liquid to be pumped.

If installed in a **flooded suction application** where the liquid is supplied to the pump under pressure, some of the information such as mounting, line configuration, and priming must be tailored to the specific application. Since the pressure supplied to the pump is critical to performance and safety, **be sure** to limit the incoming pressure to 50% of the maximum pressure developed by the pump. (See Section E, Page 1.) If the pump is fitted with a Gorman-Rupp double grease lubricated seal, the maximum incoming pressure must be reduced to 10 p.s.i..

For further assistance, contact your Gorman-Rupp distributor or the Gorman-Rupp Company.

Pump Dimensions

See Figure 1 for the approximate physical dimensions of this pump.

OUTLINE DRAWING

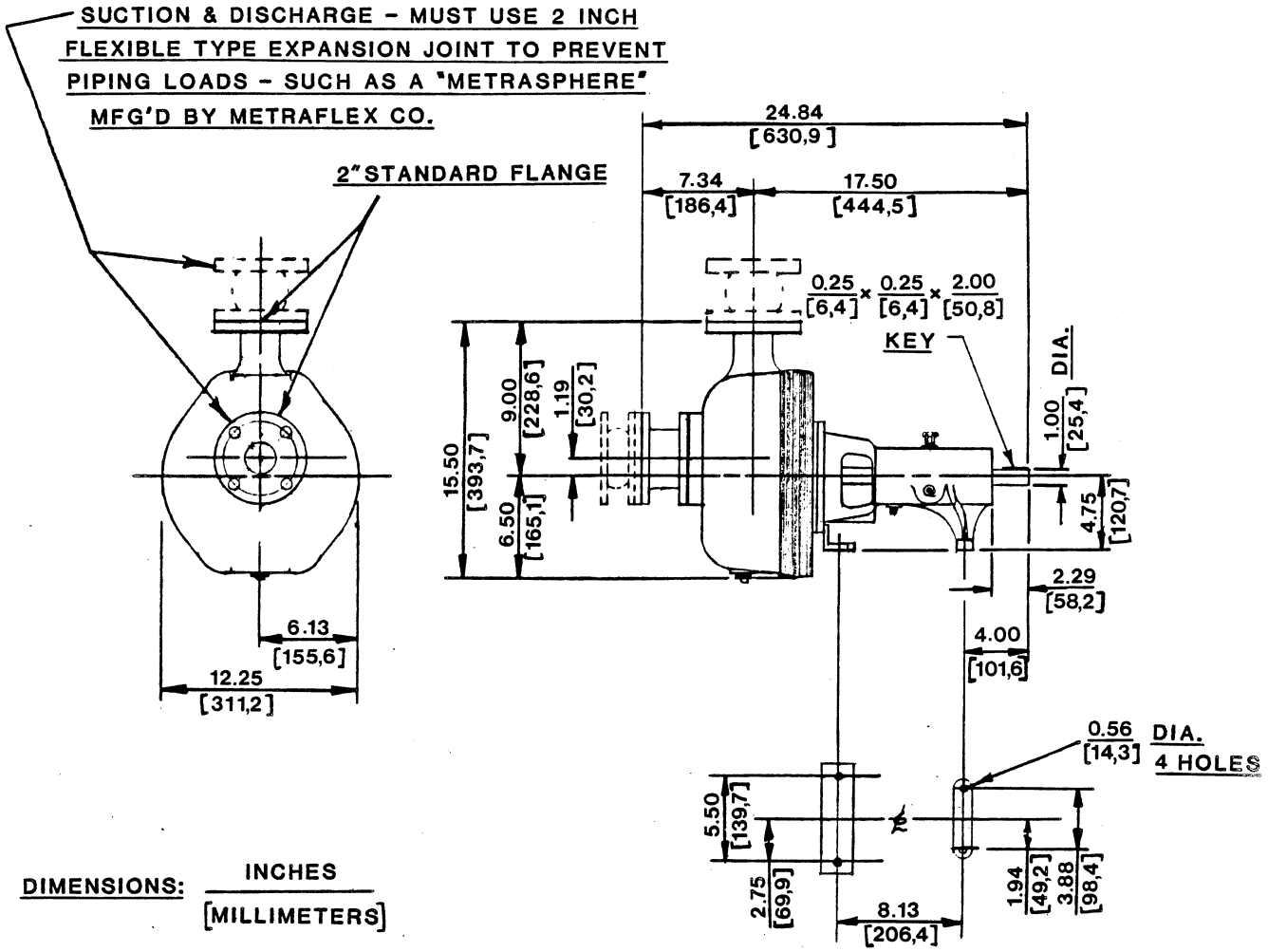


Figure 1. Pump Model 82E50-B

PREINSTALLATION INSPECTION

The pump assembly was inspected and tested before shipment from the factory. Before installation, inspect the pump for damage which may have occurred during shipment. Check as follows:

a. Inspect the pump assembly for cracks, dents, damaged threads, and other obvious damage.

b. Check for and tighten loose bolts, nuts, capscrews, and other attaching hardware. Since gaskets tend to shrink after drying, check for and tighten loose nuts and capscrews securing mating surfaces.

c. Carefully read all tags, decals, and markings on the pump assembly, and perform all duties indicated. Note the direction of rotation indicated

on the pump. Check that the pump shaft rotates in the required direction.

CAUTION

Only operate this pump in the direction indicated by the arrow on the pump body and on the accompanying decal. Otherwise, the impeller could become loosened from the shaft and seriously damage the pump.

d. Check all lubricant levels and lubricate as necessary. Refer to LUBRICATION in the MAINTENANCE AND REPAIR section of this manual and perform duties as instructed.

e. If the pump and power source have been stored for more than 12 months, some of the components or lubricants may have exceeded their maximum shelf life. These **must be inspected or replaced** to ensure maximum pump service.

f. Check to ensure the impeller removal tool (P/N 48731-006) has been shipped with the pump assembly.

If the maximum shelf life has been exceeded, or if anything appears to be abnormal, contact your Gorman-Rupp distributor or the factory to determine the repair or updating policy. **Do not** put the pump into service until appropriate action has been taken.

POSITIONING PUMP

Lifting

Use lifting equipment with a capacity of a least **300 pounds**. This pump weighs approximately **60 pounds**, not including the weight of accessories and base.

CAUTION

The pump assembly can be seriously damaged if the cables or chains used to lift and move the unit are improperly wrapped around the pump.

CAUTION

The pump casing, flanges, and seal plate are made of glass-reinforced polyester which can crack under impact or shock. Take every precaution against dropping the pump or striking plastic parts.

Mounting

Locate the pump in an accessible place as close as practical to the liquid being pumped. Level mounting is essential for proper operation. The pump may have to be supported or shimmed to provide for level operation or to eliminate vibration.

Recommended Pump Installation

Figure 2 shows a typical installation recommended for this pump.

Anchor the pump assembly securely to the base (A), or to the floor, to prevent movement of the pump.

Remove the 1/2-inch NPT drain plug from the bottom of the pump casing, and install a 1/4-inch pipe (minimum) or 3/8-inch I.D. drain line from the pump casing to the sump or drain. Install a manual shutoff valve (B) in the line to drain the pump prior to any maintenance or repair. Support the drain line.

Install a flexible pipe connector (C) at the pump suction flange, and install a full vacuum type line. A flexible connector may also be fabricated from a full vacuum type hose as an alternative. In either case, make certain that the material content of the flexible connector is compatible with the liquid being pumped.

Use pipe hangers (D) to support both suction and discharge piping, and to prevent piping loads from being transferred to the flexible pipe connectors or to the pump casing. The reinforced plastic body of the pump is strong but brittle, and bending loads combined with vibration from normal operation can cause fatigue or cracking of the piping or pump casing.

Install a 4-way piping cross (E) on the pump discharge flange (F) to facilitate priming, and install a blind flange (G) at the top of the cross. Remove this flange to fill the pump casing, and replace it before starting the pump.

WARNING

Replace and secure the blind flange at the top of the piping cross before starting the pump. If the flange is not securely tightened, caustic or hazardous liquid could be forcibly discharged when the pump is operating, and personnel could be injured.

A permanent priming line (H), fitted with a suitable shutoff valve (J) and a wall-mounted priming reservoir (K), is recommended for installations where the pump must be primed with caustic or hazardous liquids.

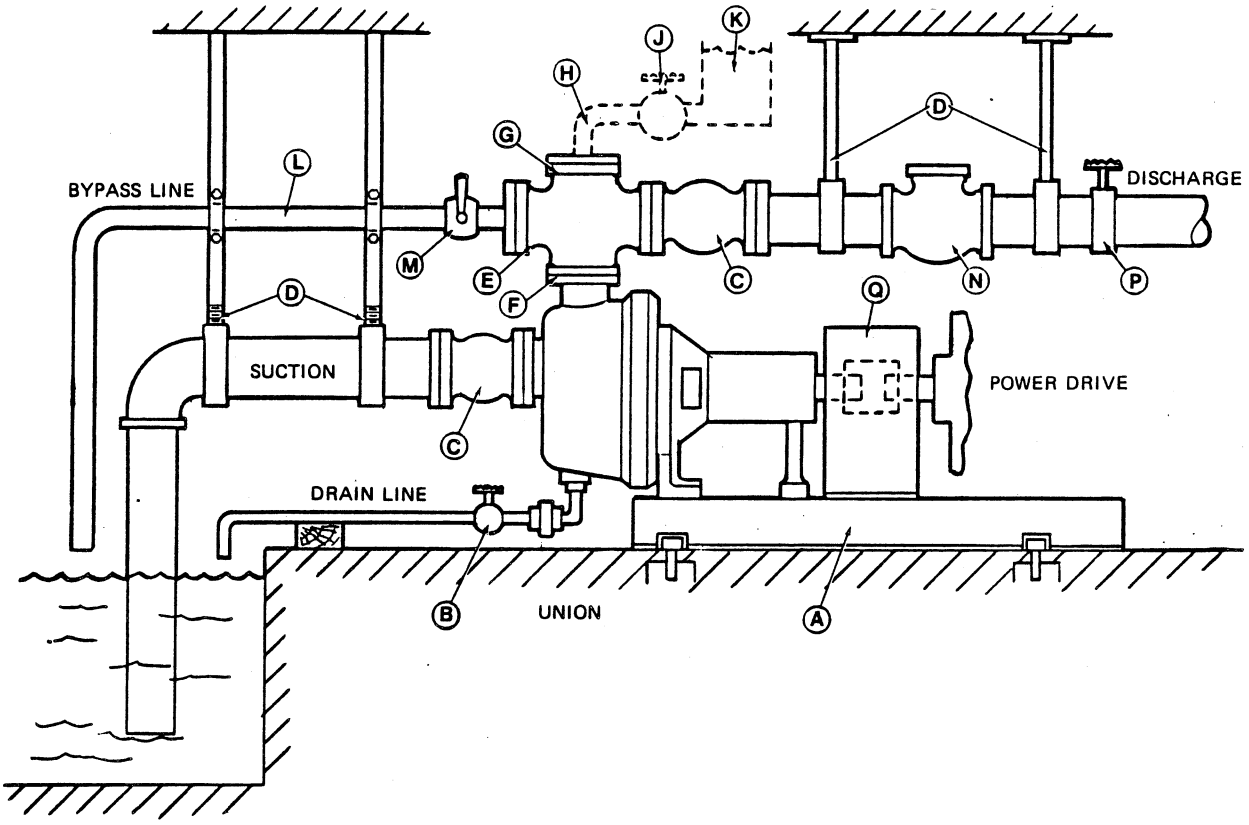


Figure 2. Typical Recommended Installation, Pump 82E50-B

SUCTION AND DISCHARGE PIPING

Materials

Either pipe or hose may be used for suction and discharge lines. Piping materials must be compatible with the liquid being pumped. If hose is used in suction

lines, it must be the rigid-wall, reinforced type to prevent collapse under suction. Using piping couplings in suction lines is not recommended.

Line Configuration

Keep suction and discharge lines as straight as possible to minimize friction losses. Make minimum use of elbows and fittings, which substantially increase friction loss. If elbows are necessary, use the long-radius type to minimize friction loss.

Flexible connectors are required on all suction and discharge connections in order to prevent piping loads.

CAUTION

In order to prevent piping loads, flexible connectors must be used on all suction and discharge connections. IF FLEXIBLE CONNECTORS ARE NOT USED, THE PUMP WARRANTY WILL BE VOIDED.

Connections to Pump

Before tightening a connecting flange, align it exactly with the pump port. Never pull a pipe line into place by tightening the flange bolts and/or couplings.

Lines near the pump must be independently supported to avoid strain on the pump which could cause excessive vibration, decreased bearing life, and increased shaft and seal wear. If hose-type lines are used, they should have adequate support to secure them when filled with liquid and under pressure.

Gauges

Most pumps are drilled and tapped for installing discharge pressure and vacuum suction gauges. If these gauges are desired for pumps that are not tapped, drill and tap the suction and discharge lines close to the pump before installing the lines.

SUCTION LINES

To avoid air pockets which could affect pump priming, the suction line must be as short and direct as possible. When operation involves a suction lift, the line must always slope upward to the pump from the source of the liquid being pumped; if the line slopes down to the pump at any point along the suction run, air pockets will be created.

Fittings

Suction lines should be the same size as the pump inlet. If reducers are used in suction lines, they should be the eccentric type, and should be installed with the flat part of the reducers uppermost to avoid creating air pockets. Valves are not normally used in suction lines, but if a valve is used, install it with the stem horizontal to avoid air pockets.

Strainers

If a strainer is furnished with the pump, be certain to use it; any spherical solids which pass through a strainer furnished with the pump will also pass through the pump itself.

If a strainer is not furnished with the pump, but is installed by the pump user, make certain that the total area of the openings in the strainer is at least three or four times the cross section of the suction line, and that the openings will not permit passage of solids larger than the solids handling capability of the pump.

This pump is designed to handle up to 3/4 inch diameter spherical solids.

Sealing

Since even a slight leak will affect priming, head, and capacity, especially when operating with a high suction lift, all connections in the suction line should be sealed with pipe dope to ensure an airtight seal. Follow the sealant manufacturer's recommendations when selecting and applying the pipe dope. The pipe dope should be compatible with the liquid being pumped.

Suction Lines In Sumps

If a single suction line is installed in a sump, it should be positioned away from the wall of the sump at a distance equal to one and one-half times the diameter of the suction line.

If there is a liquid flow from an open pipe into the sump, the flow should be kept away from the suction inlet because the inflow will carry air down into the sump, and air entering the suction line will reduce pump efficiency.

If it is necessary to position inflow close to the suction inlet, install a baffle between the inflow and the suction inlet at a distance one and one-half times the diameter of the suction pipe. The baffle will allow entrained air to escape from the liquid before it is drawn into the suction inlet.

If two suction lines are installed in a single sump, the flow paths may interact, reducing the efficiency of one or both pumps. To avoid this, position the suction inlets so that they are separated by a distance equal to at least three times the diameter of the suction pipe.

Suction Line Positioning

The depth of submergence of the suction line is critical to efficient pump operation. Figure 3 shows recommended minimum submergence vs. velocity.

NOTE

The pipe submergence required may be reduced by installing a standard pipe increaser fitting at the end of the suction line. The larger opening size will reduce the inlet velocity. Calculate the required submergence using the following formula based on the increased opening size (area or diameter).

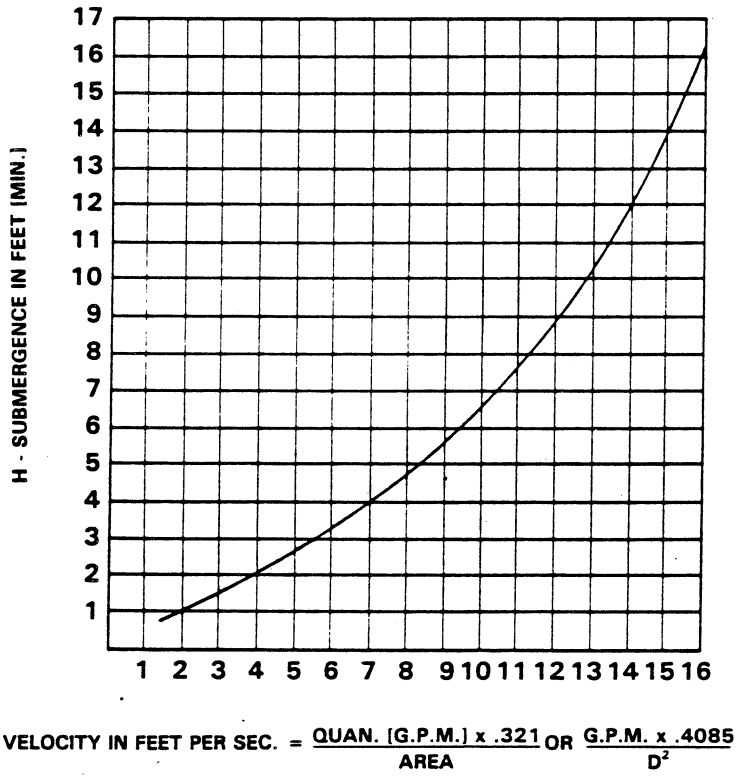


Figure 3. Recommended Minimum Suction Line Submergence Vs. Velocity

DISCHARGE LINES

Siphoning

Do not terminate the discharge line at a level lower than that of the liquid being pumped unless a siphon breaker is used in the line. Otherwise, a siphoning action causing damage to the pump could result.

Valves

If a throttling valve is desired in the discharge line, use a valve as large as the largest pipe in the line to minimize friction losses. Never install a throttling valve in a suction line.

A check valve in the discharge line is normally recommended, but is not necessary in low discharge head applications.

With high discharge heads, it is recommended that a throttling valve and a check valve be installed in the discharge line to protect the pump from excessive shock pressure and reverse rotation when it is stopped.

Bypass Lines

(See Figure 2)

In a system with an existing static discharge head, it is recommended that a bypass line (L) be installed to permit the escape of air to atmosphere during initial priming and in the repriming cycle. This bypass line should be sized at 1/2-inch or 3/4-inch, and fitted with a hand-operated shutoff valve (M).

NOTE

This bypass line may clog frequently, particularly if the shut-off valve remains closed for long periods of time. If this condition occurs, either install a larger bypass line or leave the shutoff valve open slightly during the pumping operation.

Install a flexible pipe connector (C) on the discharge side of the piping cross (E).

The installation of a discharge check valve (N) and a manual shutoff valve (P) in the discharge piping is also recommended in systems with existing static discharge heads. The check valve will close off the static discharge head during priming when the bypass shutoff valve is open, and it will open after priming has been accomplished and the bypass shutoff valve is closed. The manual shutoff valve in the discharge line is intended to be used to close off system pressure when the check valve or pump are being serviced.

CAUTION

Close the manual shut-off valve (P) in the discharge line to completely isolate the system before any maintenance, service, or repair on the pump or discharge check valve.

WARNING

When operating this pump, make certain that the discharge throttling valve is open. If this pump is operated against a closed discharge throttling valve, pump components will deteriorate, and the liquid could come to a boil, build pressure, and cause the pump to rupture.

Do not terminate the discharge line at a level lower than that of the liquid being pumped unless a siphon breaker is used in the line. Otherwise, a siphoning action could result, causing damage to the pump.

ALIGNMENT

The alignment of the pump and its power source is critical for trouble-free mechanical operation. In either a flexible coupling or V-belt driven system, the driver and pump must be mounted so that their shafts are aligned with and parallel to each other. It is imperative that alignment be checked after the pump is installed, and before operation.

NOTE

Check **Rotation**, Section C, before final alignment of the pump.

When mounted at the Gorman-Rupp factory, driver and pump are aligned before shipment. Misalignment can occur in transit and handling. Pumps should be checked, and realigned if necessary, before being put into operation. Before checking alignment, tighten the foundation bolts. The pump casing feet and/or pedestal feet, and the driver mounting bolts should also be tightly secured.

WARNING

When checking alignment, disconnect the power source to ensure that the pump will remain inoperative.

CAUTION

Adjusting the alignment in one direction may alter the alignment in another direction. Check each procedure after altering alignment.

Coupled Drives

When using couplings, the axis of the power source must be aligned to the axis of the pump shaft in both the horizontal and vertical planes. Most couplings require a specific gap or clearance between the driving and the driven shafts. Refer to the coupling manufacturer's service literature.

Align spider insert type couplings by using calipers to measure the dimensions on the circumference of the outer ends of the coupling hub every 90 degrees. The coupling is in alignment when the hub ends are the same distance apart at all points (see Figure 4a).

Align non-spider type couplings by using a feeler gauge or taper gauge between the coupling halves every 90 degrees. The coupling is in alignment when the hubs are the same distance apart at all points (see Figure 4b).

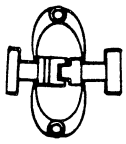


Figure 4a. Aligning Spider-Type Couplings

Figure 4b. Aligning Non-Spider Type Couplings

Check parallel adjustment by laying a straightedge across both coupling rims at the top, bottom, and side. When the straightedge rests evenly on both halves of the coupling, the coupling is in horizontal parallel alignment. If the coupling is misaligned, use a feeler gauge between the coupling and the straightedge to measure the amount of misalignment.

V-Belt Drives

When using V-belt drives, the power source and the pump must be parallel. Use a straightedge along the sides of the pulleys to ensure that the pulleys are properly aligned (see Figure 4c). In drive systems using two or more belts, make certain that the belts are a matched set; unmatched sets will cause accelerated belt wear.

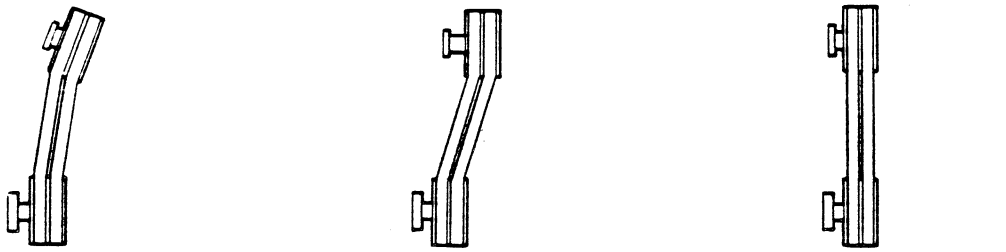


Figure 4c. Alignment of V-Belt Driven Pumps

Tighten the belts in accordance with the belt manufacturer's instructions. If the belts are too loose, they will slip; if the belts are too tight, there will be excessive power loss and possible bearing failure. Select pulleys that will match the proper speed ratio; overspeeding the pump may damage both pump and power source.

WARNING

Do not operate the pump without a guard over the rotating parts. Exposed rotating parts can catch clothing, fingers, or tools, causing severe injury to personnel.

OPERATION - SECTION C

WARNING

Before attempting to open or service the pump:

1. Familiarize yourself with this manual.
2. Disconnect the power source to ensure that the pump will remain inoperative.
3. Allow the pump to cool if overheated.
4. Vent the pump slowly and cautiously.
5. Close the suction and discharge valves.
6. Check the temperature before opening any covers, plates, or plugs.
7. Drain the pump.

WARNING

DO NOT apply this pump on liquids which have not been listed as compatible on the Compatibility Application Recommendation Chart, or at temperatures beyond 0° to 160°F, or at other than specified concentrations. Operating this pump in any other manner could damage it, and cause the pump to rupture and release corrosive chemicals and/or fumes.

PRIMING

Install the pump and piping as described in INSTALLATION. Make sure that the piping connections are tight, and that the pump is securely mounted. Check that the pump is properly lubricated (see LUBRICATION in MAINTENANCE AND REPAIR).

This pump should never be operated unless there is liquid in the casing.

CAUTION

Never operate this pump unless there is liquid in the casing. The pump will not prime when dry. Extended operation of a dry pump will destroy the seal assembly.

Add liquid to the pump casing when:

1. The pump is being put into service for the first time.
2. The pump has not been used for a considerable length of time.

3. The liquid in the pump casing has evaporated.

WARNING

After filling the pump casing, reinstall and tighten the fill plug. Do not attempt to operate the pump unless all connecting piping is securely installed. Otherwise, liquid in the pump forced out under pressure could cause injury to personnel.

STARTING

Consult the operations manual furnished with the power source.

Rotation

The correct direction of pump rotation is clockwise when viewed from the drive end. If the pump is operated in the wrong direction, the impeller could become loosened from the shaft and seriously damage the pump.

CAUTION

Be sure the pump is operated in the correct direction. Otherwise, the impeller could become loosened from the shaft and seriously damage the pump.

Consult the operating manual furnished with the power source before attempting to start the power source.

OPERATION

Lines With a Bypass

A hand operated shutoff valve may be installed in a bypass line.

If a hand operated shutoff valve has been installed, close the throttling valve in the discharge line, and open the bypass shutoff valve so that the pump will not have to prime against the weight of the liquid in the discharge line. When the pump has been primed, and liquid is flowing steadily from the bypass line, close the bypass shutoff valve and open the discharge throttling valve.

Lines Without a Bypass

Open all valves in the discharge line and start the power source. Priming is indicated by a positive reading on the discharge pressure gauge or by a quieter operation. The pump may not prime immediately because the suction line must first fill with liquid. If the pump fails to prime within five minutes, stop it and check the suction line for leaks.

After the pump has been primed, partially close the discharge line throttling valve in order to fill the line slowly and guard against excessive shock pressure which could damage pipe ends, gaskets, sprinkler heads, and any other fixtures connected to the line. When the discharge line is completely filled, adjust the throttling valve to the required flow rate.

Leakage

No leakage should be visible at pump mating surfaces, or at pump connections or fittings. Keep all line connections and fittings tight to maintain maximum pump efficiency.

Liquid Temperature And Overheating

The **maximum** liquid temperature for this pump is 160°F, or as dictated by the chemical characteristics. Do not apply it at a higher operating temperature.

Overheating can occur if the valves in the suction or discharge lines are closed. Operating against closed valves could bring the liquid to a boil, build pressure, and cause the pump to rupture or explode. If overheating occurs, stop the pump and allow it to cool before servicing it. Refill the pump casing with cool liquid.

WARNING

Do not remove plates, covers, gauges, pipe plugs, or fittings from an overheated pump. Vapor pressure within the pump can cause parts being disengaged to be ejected with great force. Allow the pump to cool before servicing.

Strainer Check

If a suction strainer has been shipped with the pump or installed by the user, check the strainer regularly, and clean it as necessary. The strainer should also be checked if pump flow rate begins to drop.

Pump Vacuum Check

With the pump inoperative, install a vacuum gauge in the system, using pipe dope on the threads. Block the suction line and start the pump. At operating speed the pump should pull a vacuum of 20 inches or more of mercury. If it does not, check for air leaks in the seal, gasket, or discharge valve.

Open the suction line, and read the vacuum gauge with the pump primed and at operation speed. Shut off the pump. The vacuum gauge reading will immediately drop proportionate to static suction lift, and should then stabilize. If the vacuum reading falls off rapidly after stabilization, an air leak exists. Before checking for the source of the leak, check the point of installation of the vacuum gauge.

STOPPING

Never halt the flow of liquid suddenly. If the liquid being pumped is stopped abruptly, damaging shock waves can be transmitted to the pump and piping system. Close all connecting valves slowly.

CAUTION

> If application involves a high discharge head, gradually close the discharge throttling valve before stopping the pump.

After stopping the pump, disconnect power source to ensure that the pump will remain inoperative.

Cold Weather Preservation

In below freezing conditions, drain the pump to prevent damage from freezing. Also, clean out any solids by flushing with a hose. Operate the pump for approximately one minute; this will remove any remaining liquid that could freeze the pump rotating parts.

If the pump will be idle for more than a few hours, or if it has been pumping liquids containing a large amount of solids, drain the pump, and flush it thoroughly with clean water. To prevent large solids from clogging the drain port and preventing the pump from completely draining, insert a rod or stiff wire in the drain port, and agitate the liquid during the draining process. Clean out any remaining solids by flushing with a hose.

BEARING TEMPERATURE CHECK

Bearings normally run at higher than ambient temperatures because of heat generated by friction. Temperatures up to 160°F are considered normal for bearings,

and they can operate safely to at least 180°F.

Checking bearing temperatures by hand is inaccurate. Bearing temperatures can be measured accurately by placing a contact-type thermometer against the housing. Record this temperature for future reference.

A sudden increase in bearing temperatures is a warning that the bearings are at the point of failing to operate properly. Make certain that the bearing lubricant is of the proper viscosity and at the correct level (see LUBRICATION in MAINTENANCE AND REPAIR). Bearing overheating can also be caused by shaft misalignment and/or excessive vibration.

When pumps are first started, the bearings may seem to run at temperatures above normal. Continued operation should bring the temperatures down to normal levels.

TROUBLESHOOTING - SECTION D

WARNING

Before attempting to open or service the pump:

1. Familiarize yourself with this manual.
2. Disconnect the power source to ensure that the pump will remain inoperative.
3. Allow the pump to cool if overheated.
4. Vent the pump slowly and cautiously.
5. Close the suction and discharge valves.
6. Check the temperature before opening any covers, plates, or plugs.
7. Drain the pump.

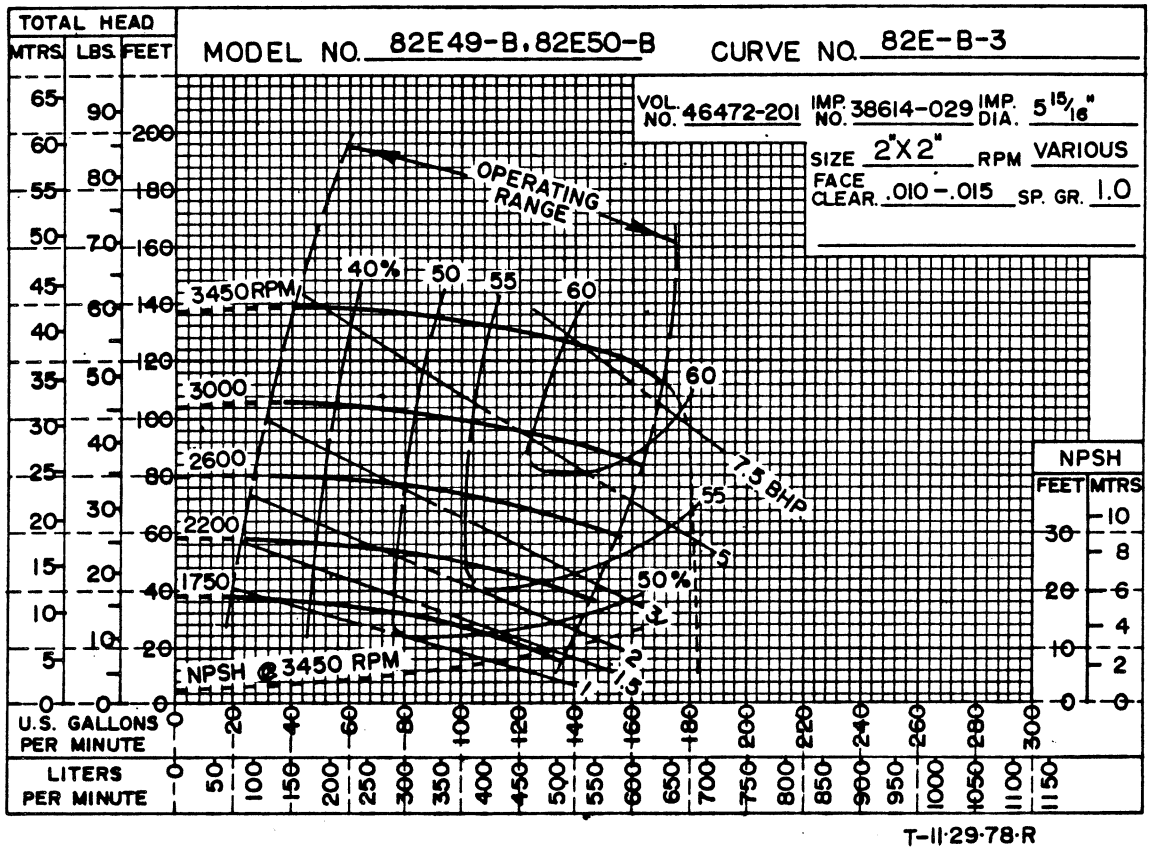
TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP FAILS TO PRIME	Air leak in suction line.	Correct leak.
	Lining of suction hose collapsed.	Replace suction hose.
	Leaking or worn seal or pump gasket.	Check pump vacuum. Replace leaking or worn seal or gasket.
	Suction check valve or foot valve clogged or binding.	Clean valve.
	Suction lift or discharge head too high.	Check piping installation and install bypass line if needed. See INSTALLATION.
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE	Air leak in suction line.	Correct leak.
	Suction intake not submerged at proper level or sump too small.	Check installation and correct as needed.Check submergence chart (Section B).
	Lining of suction hose collapsed.	Replace suction hose.
	Impeller or other wearing parts worn or damaged.	Replace worn or damaged parts. Check that impeller is properly centered and rotates freely.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
PUMP STOPS OR FAILS TO DELIVER RATED FLOW OR PRESSURE(cont.)	Impeller clogged.	Free impeller of debris.
	Pump speed too slow.	Check driver output; check belts or couplings for slippage.
	Discharge head too high.	Install bypass line.
	Suction lift too high.	Reduce suction lift.
	Leaking or worn seal or pump gasket.	Check pump vacuum. Replace leaking or worn seal or gasket.
PUMP REQUIRES TOO MUCH POWER	Pump speed too high.	Check driver output; check that sheaves or couplings are correctly sized.
	Discharge head too low.	Adjust discharge valve.
	Liquid solution too thick.	Dilute if possible.
PUMP CLOGS FREQUENTLY	Discharge flow too slow.	Open discharge valve fully to increase flow rate, and run engine at maximum governed speed.
	Suction check valve or foot valve clogged or binding.	Clean valve.
EXCESSIVE NOISE	Cavitation in pump.	Reduce suction lift and/or friction losses in suction line.
	Pumping entrained air.	Locate and eliminate source of air bubble.
	Pump or drive not securely mounted.	Secure mounting hardware.
	Impeller clogged or damaged.	Clean out debris; replace damaged parts.

TROUBLE	POSSIBLE CAUSE	PROBABLE REMEDY
BEARINGS RUN TOO HOT	Bearing temperature is high, but within limits.	Check bearing temperature regularly to monitor any increase.
	Low or incorrect lubricant.	Check for proper type and level of lubricant.
	Suction and discharge lines not properly supported.	Check piping installation for proper support.
	Drive misaligned.	Align drive properly.

MAINTENANCE AND REPAIR - SECTION E

MAINTENANCE AND REPAIR OF THE WEARING PARTS OF THE PUMP WILL MAINTAIN PEAK OPERATING PERFORMANCE.

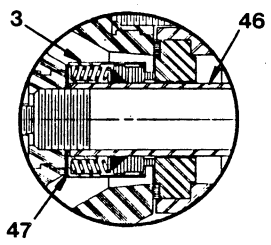


*STANDARD PERFORMANCE FOR PUMP MODEL 82E50-B

*Based on 70°F clear water at sea level with minimum suction lift. Since pump installations are seldom identical, your performance may be different due to such factors as viscosity, specific gravity, elevation, temperature, and impeller trim.

If your pump serial number is followed by an "N", your pump is NOT a standard production model. Contact the Gorman-Rupp Company to verify performance or part numbers.

SECTIONAL DRAWING



SEAL AREA DETAIL

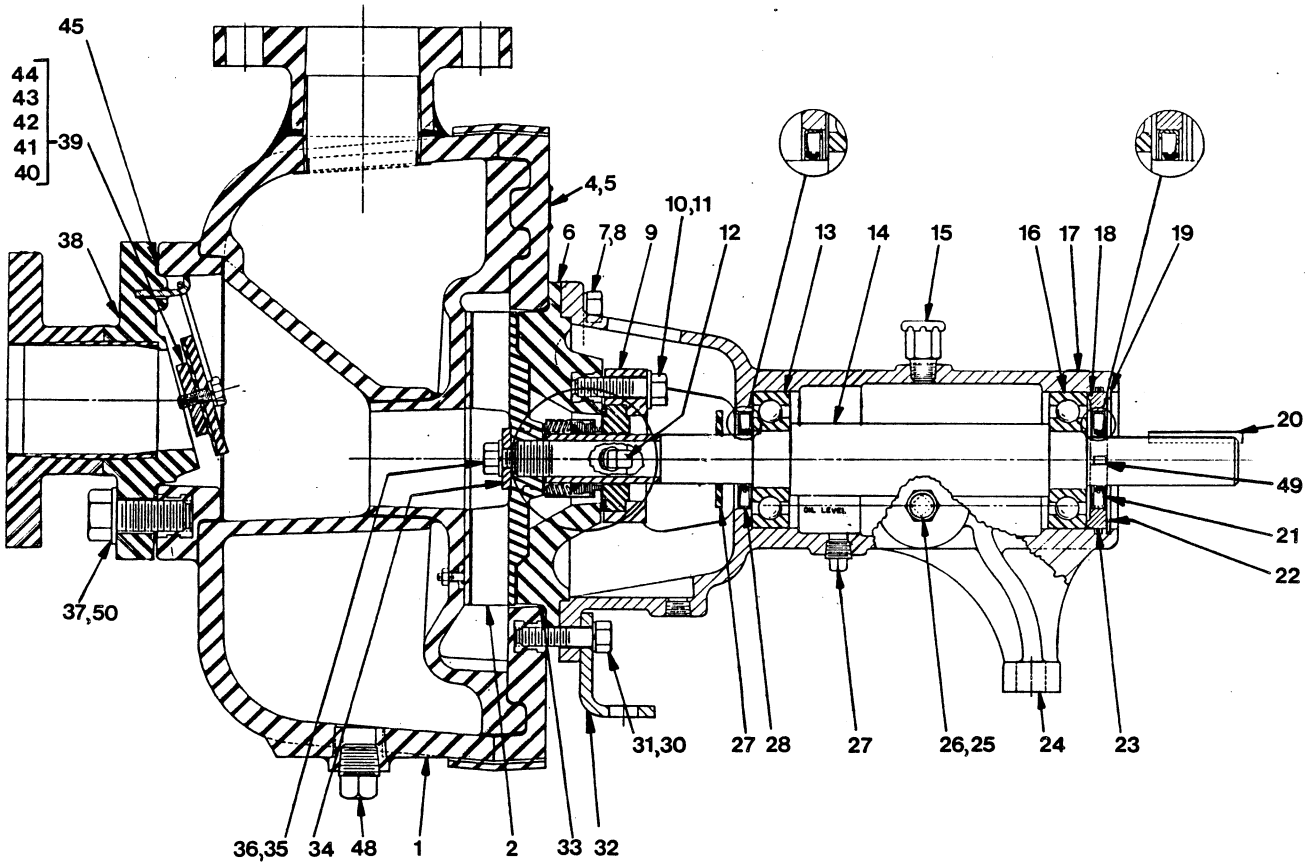


Figure 1. Pump Model Assembly 82E50-B

PARTS LIST
Pump Model 82E50-B
(From S/N 778308 up)

ITEM NO.	PART NAME	PART NUMBER	MATL CODE	QTY
1	PUMP CASING ASSY	46472-201	-----	1
2	*IMPELLER	38614-029	23140	1
3	*SEAL ASSY	S01212	-----	1
4	NAME PLATE	2613-CW	13990	1
5	DRIVE SCREW	BM#04-03	15990	2
6	SEAL PLATE	38272-227	23140	1
7	HEX HD CAPSCREW	B00605	17090	4
8	LOCKWASHER	J00006	17090	4
9	*SEAL CLAMP	11003	17070	1
10	HEX HD CAPSCREW	B00606	17090	2
11	FLAT WASHER	KB00006	17090	2
12	PIPE PLUG	P00002	17090	1
13	*BALL BEARING	S00390	-----	1
14	*IMPELLER SHAFT	38514-210	17130	1
15	PED AIR VENT	S01703	-----	1
16	*BALL BEARING	S00390	-----	1
17	ROTATION DECAL	2613-CU	00000	1
18	*BRG RETAINER	38322-517	26000	1
19	*RETANING RING	S00219	-----	1
20	SHAFT KEY	N00407	15990	1
21	*OIL SEAL	25227-216	-----	1
22	*BRG SHIM SET	S00464	-----	1
23	*BRG RET O-RING	25152-149	-----	1
24	PEDESTAL	3212-C	10010	1
25	PIPE PLUG	P00006	11990	1
26	*PED SIGHT GAUGE	26714-011	-----	1
27	PED DRAIN PLUG	P00006	11990	1
28	*OIL SEAL	25227-216	-----	1
29	SLINGER RING	2351	19120	1
30	HEX HD CAPSCREW	B00606	17090	2
31	LOCKWASHER	J00006	17090	2
32	FOOT BRACKET	34265-020	15990	1
33	*CASING O-RING	25153-163	-----	1
34	*IMP WASHER	3118	17090	1
35	*IMP CAPSCREW	B00603	17090	1
36	*IMP LOCKWASHER	J00006	17090	1
37	HEX HD CAPSCREW	B01006	17090	4
38	CHECK VALVE FLANGE ASSY	46353-036	24010	1
39	CHECK VALVE ASSY	46411-004	-----	1
40	*-LG VALVE WEIGHT	44211-002	24170	1
41	-LOCKWASHER	J00004	17090	1
42	-HEX HD CAPSCREW	B00403	17090	1
43	*-VALVE WEIGHT	31137-001	17090	1
44	*-CHECK VALVE GSKT	38681-210	19210	1
45	JOINT SEALANT	31312-025	19250	1
46	*SHAFT SLEEVE	3217	17090	1
47	*IMP SHIM SET	2-Y	17090	1
48	CASING DRAIN PLUG	P00008	17090	1
49	SETSCREW	GA#10-01-S	15990	2
50	FLAT WASHER	KB00010	17090	4
NOT SHOWN:				
	IMPELLER TOOL	48731-006	-----	1

*INDICATES PARTS RECOMMENDED FOR STOCK

Above Serial Numbers Do Not Apply To Pumps Made In Canada.

CANADIAN SERIAL NO ..... AND UP

PUMP AND SEAL DISASSEMBLY AND REASSEMBLY

This pump requires little service due to its rugged, minimum-maintenance design. However, if it becomes necessary to inspect or replace the wearing parts, follow these instructions which are keyed to the sectional view (see figure 1) and the accompanying parts list.

Before attempting to service the pump, take precautions to ensure that the power source will remain inoperative. Close all connecting valves in the suction and discharge lines.

WARNING

Before attempting to open or service the pump:

1. Familiarize yourself with this manual.
2. Disconnect the power source to ensure that the pump will remain inoperative.
3. Allow the pump to cool if overheated.
4. Vent the pump slowly and cautiously.
5. Close the suction and discharge valves.
6. Check the temperature before opening any covers, plates, or plugs.
7. Drain the pump.

WARNING

This pump is designed to pump materials which could cause serious illness or injury through direct exposure or emitted fumes. Wear protective clothing, such as rubber gloves, face mask, and rubber apron, as necessary before disassembling the pump or piping.

Suction Check Valve Removal

Before servicing the check valve (39), remove the pump casing drain plug (48) and drain pump. Clean and reinstall plug.

Remove the suction piping, and hardware (37 and 50) securing the suction flange (38) to the pump casing. Pull the suction flange and check valve assembly from the suction port. Scrape the old joint sealant (45) from the mating surfaces.

Lift the check valve assembly from the suction flange and separate the check valve (44) and weights (40 and 43) by removing the hardware (41 and 42). Inspect all parts for wear and replace as necessary.

Pump Disassembly

The casing (1) and pedestal (24) must be separated to perform all maintenance and repair. This may be accomplished by removing the suction and discharge piping, or by removing the power source and withdrawing the pedestal. If the piping is to be left in tact, support the pump casing before removing the pedestal. The following instructions are based on removing the piping.

Remove the capscrews (7 and 30) and lockwashers (8 and 31) securing the seal plate (6) and pedestal to the pump casing. Separate the assemblies and remove the pump casing O-ring (33).

Inspect the casing assembly (1), particularly where paint has peeled or hairline cracks have developed. Examine stress areas and cemented joints. Replace the casing assembly if cracked or damaged.

WARNING

Do not attempt to repair a cracked pump casing. The casing is designed to handle hazardous liquids at pressures up to 60 psi. The repaired area could rupture, releasing corrosive chemicals and/or toxic fumes.

Inspect the surface of the wear plate which is an integral part of the pump casing assembly. If the wear plate is scored or badly worn, the casing must be replaced as a complete assembly.

To remove the impeller (2), install a lathe dog on the end of the shaft (14) to prevent rotation and remove the impeller retaining hardware (34, 35, and 36). Install the impeller removal tool and use the end of a 1/2-inch drive ratchet extension (see Figure 2) to unscrew the impeller in a counterclockwise direction (when facing the impeller).

CAUTION

Do not try to loosen the impeller by striking the wrench, impeller tool, or impeller; this will crack or chip the impeller. If the impeller will not unscrew readily, hold the impeller stationary and strike the lathe dog sharply with a soft faced hammer.

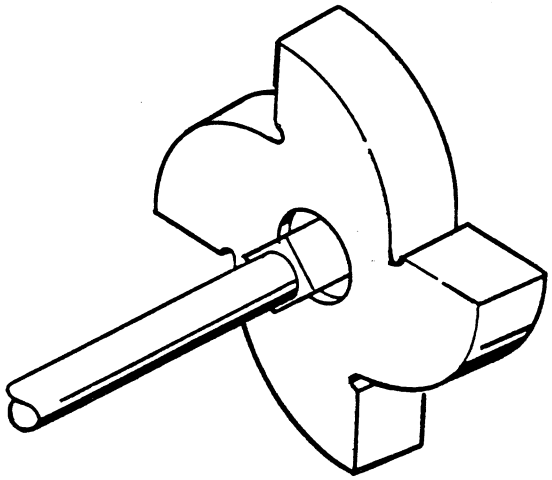


Figure 2. 48731-006 Impeller Tool With Drive Wrench

Inspect the impeller, and replace it if cracked or badly worn. Remove the impeller adjusting shims (47). For ease of reassembly, tag and tie the shims, or measure and record their thickness.

Seal Disassembly

There are four setscrews around the circumference of the seal retainer. These screws secure the seal assembly to the shaft sleeve (46) and ensure proper spring tension. Remove the shaft sleeve and the seal assembly - with the exception of the stationary seat and gaskets - as a complete unit. **Do not loosen the seal retainer set screws until the distance between the impeller end of the seal retainer and the impeller end of the shaft sleeve has been measured and recorded.** This measurement is critical.

Use an allen wrench to loosen the seal retainer set screws, and slide the seal assembly off the shaft sleeve.

To remove the stationary seal seat and gaskets, slide the seal plate and seal clamp (9) off the shaft, and disengage the hardware (10 and 11) securing the clamp to the seal plate.

If no further disassembly is required, see **Seal Reassembly**.

Impeller Shaft And Bearing Disassembly

When the pump is properly operated and maintained, the pedestal should not require disassembly. Disassemble the shaft and bearings **only** when there is evidence of wear or damage.

CAUTION

> Shaft and bearing disassembly in the field is not recommended. These operations should be performed only in a properly-equipped shop by qualified personnel.

Remove the pedestal drain plug (27) to drain the oil from the pedestal. Clean and reinstall drain plug.

Remove the shaft key (20) and the retaining ring (19) from the drive end of the shaft and slide the bearing adjustment shims (22) off. For ease of reassembly, tag and tie the shims, or measure and record their thickness.

Place a block of wood against the impeller end of the shaft and drive the shaft, bearings (13 and 16), and bearing retainer (18) from the pedestal.

NOTE

> The bearing retainer (18) can also be removed by replacing the setscrews (49) with two machine screws, and use a gear puller to slide the retainer out of the bore. **Do not** use the machine screws as jacking screws against the bearing.

Remove the bearing retainer O-ring (23). Inspect the oil seal (21) for damage.

Remove the bearings from the shaft with a bearing puller or arbor press. The inboard bearing (13) should come free with the shaft, if it does not, press it out of the pedestal cavity. Remove and inspect the inboard oil seal (28) for damage and replace as necessary.

Impeller Shaft And Bearing Reassembly

Clean the impeller shaft, pedestal cavity and all component parts (except bearings) with a soft cloth soaked in cleaning solvent, and dry thoroughly.

WARNING

Most cleaning solvents are toxic and flammable. Use them only in a well-ventilated area free from excessive heat, sparks, and flame. Read and follow all precautions printed on solvent containers.

Inspect the shaft for damaged threads, distortion, or nicks and scratches on the oil seal seating surfaces. Dress small nicks and burrs with a fine file or honing stone. Replace the impeller shaft if defective.

To prevent contamination, wash the bearings separately in **fresh** cleaning solvent. Dry the bearings with filtered compressed air and coat with light oil.

Rotate the bearings by hand to check for roughness or binding, and inspect the bearing balls. If rotation is rough or the balls discolored, replace the bearings.

CAUTION

> Bearings must be kept free of all dirt and foreign material. Failure to do so will greatly shorten bearing life. DO NOT spin dry bearings. This may scratch the rollers or races and cause premature bearing failure.

The bearing tolerances provide a light press fit onto the impeller shaft, and a snug push fit into the pedestal. If the bearings slip on and off easily, the shaft is worn and must be replaced. The pedestal must be replaced if the bearings do not fit snugly.

Inspect the pedestal for cracks, especially around the mounting flange and at the foot. Remove nicks and burrs from the bearing seating surfaces with extra fine emery cloth or a fine stone.

Position the lip of the inboard oil seal (28) as shown in Figure 1 and press it into the pedestal bore.

Dip the bearings in clean oil and position them on the shaft. Using an arbor press, press against the inner races until the bearings seat squarely against the shaft shoulders.

NOTE

> When installing the bearings onto the shaft, **never** press or hit against the outer race, balls, or ball cage. Press **only** on the inner race.

Push the shaft and assembled bearings into the pedestal until the inboard bearing bottoms against the pedestal cavity. Be careful to avoid damaging the oil seal already installed.

NOTE

> When installing the shaft and bearings into the pedestal, push against the outer race. **Never** hit the balls or ball cage.

Install a new O-ring (23) in the drive end of the pedestal.

NOTE

Coat the O-ring with a light coating of petroleum jelly or light oil to ease assembly.

Position the lip of the oil seal (21) as shown in Figure 1, and press it into the bearing retainer. Position the bearing retainer setscrews horizontally inline, and press the retainer into the pedestal bore until it bottoms against the bearing. Use care in sliding the oil seal lip over the end of the shaft.

Install the same thickness of bearing shims as previously removed at disassembly, and install the retainer snap ring. Use a soft-faced mallet to drive the shaft toward the impeller end of the pump and check the shaft end play.

NOTE

The shaft end play should be between .002 to .010 inch. Add or subtract shims (22) until within specified limits.

Position the slinger ring on the shaft about 1/2 inch from the pedestal and reinstall the shaft key. Lubricate the bearings as indicated in LUBRICATION.

Seal Reassembly

Clean the seal plate cavity, seal clamp, and the impeller shaft with a soft cloth soaked in cleaning solvent.

WARNING

Most cleaning solvents are toxic and flammable. Use them only in a well-ventilated area free from excessive heat, sparks, and flame. Read and follow all precautions printed on solvent containers.

Clean and polish the shaft sleeve, or replace it if there are nicks or cuts on the end.

The seal is not normally reused since any damage to the precision finished faces could result in premature seal failure. If it is necessary to reuse the old seal in an emergency, **carefully** wash all metallic parts in fresh cleaning solvent and allow them to dry thoroughly.

NOTE

Do not remove the snap ring from the inside diameter of the seal retainer. Complete disassembly of the rotating portion of the seal is not recommended.

Inspect the seal components for wear, scoring, grooves, or other damage which might cause leakage. If any components are worn, replace the complete seal.

Never mix old and new seal parts. Handle the seal parts with extreme care to prevent damage. Be careful not to contaminate the precision finished faces, even fingerprints on the faces can shorten seal life.

See Figure 3 for the correct order of installation of seal components.

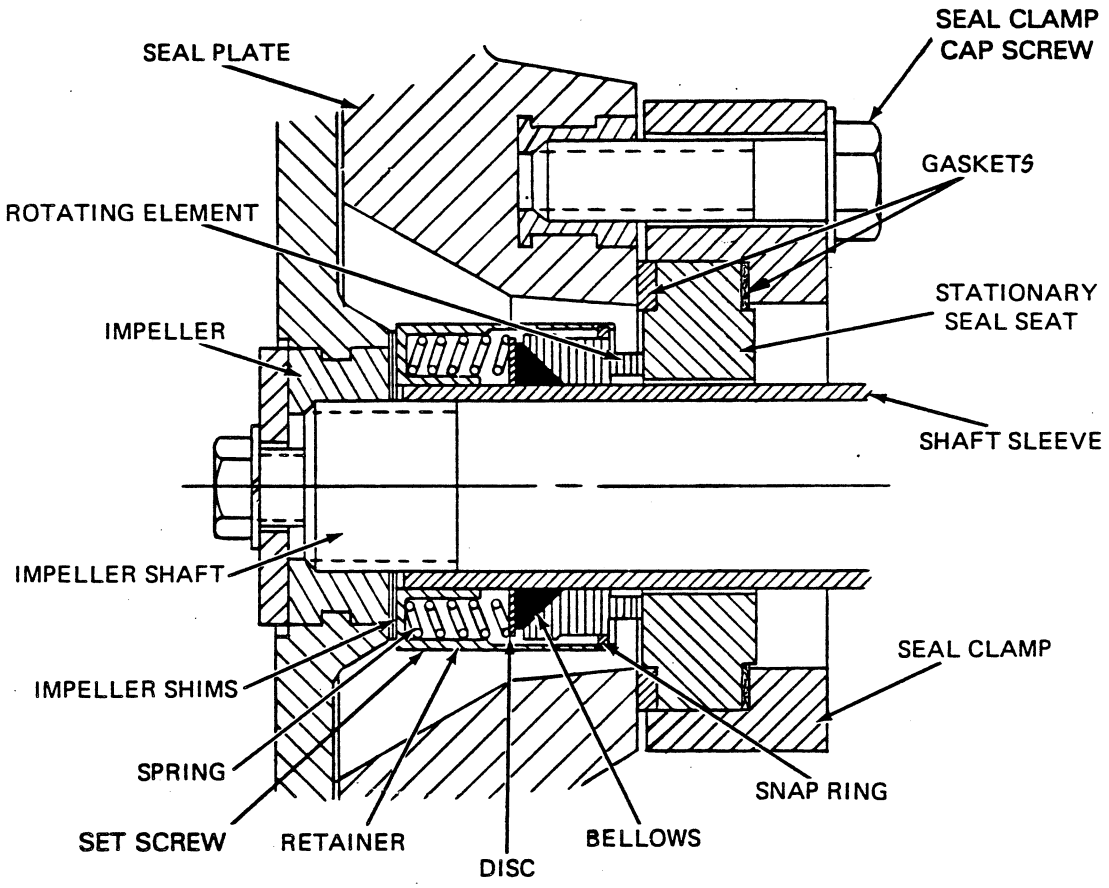


Figure 3. S01212 Seal Assembly

CAUTION

This seal is not designed for operation at temperatures above 160°F, or as dictated by the chemical characteristics. Do not use at higher operating temperatures.

If the **old seal** is being reinstalled, install the stationary seat and gaskets in the seal clamp (4) with the asbestos gasket against the clamp. Slide the seal clamp onto the shaft. Position the seal plate onto the shaft and secure the seal clamp to the seal plate.

CAUTION

Be certain to reinstall the flat washers (11) under the capscrews when reassembling the seal clamp. Since the threaded inserts are imbedded in plastic, and bolt length is critical, DO NOT over tighten or change capscrews length, this may crack the plastic.

Lubricate the I.D. of wedge with soft grease or oil. Slide the rotating portion of the seal onto the shaft sleeve (the rotating element must be directed toward the chamfered end of the shaft). Refer to the measurement taken before the seal retainer setscrews were loosened. Position the seal retainer at that same distance and tighten the seal retainer setscrews. Peen the setscrews in place with punch to prevent loosening.

NOTE

If the retainer mounting dimension was not recorded during disassembly, slide the sleeve completely onto the shaft and scribe the seal working length (see dimension on Figure 3) on the sleeve. Remove the sleeve and secure the seal retainer at this mark.

Place a drop light lubricating oil on the precision finished faces of the stationary seat and the rotating element. Slide the sleeve and assembled seal parts completely on the shaft.

If a completely **new seal** assembly is being installed, remove it from the container, and inspect the precision finished faces to ensure that they are not damaged and are free of any foreign matter. Install the stationary seat and gaskets in the seal clamp as previously described, and secure the seal clamp to the seal plate. Position the seal plate on the shaft.

Lubricate the I.D. of the wedge with soft grease or oil, and slide the rotating portion of the new seal assembly onto the shaft sleeve. A new seal assembly is furnished with restraining clips which keep the wedge from being compressed prior to assembly.

Position the seal retainer at the proper mounting distance on the sleeve as previously described. Tighten the four setscrews with an allen wrench and lock in-place with a punch to prevent loosening. **Remove and discard the seal spring restraining clips.**

WARNING

New seal assemblies are equipped with spring holding clips for storage purposes. Remove and discard these clips before proceeding with seal reassembly. When removing the clips, use caution so that they do not pop off abruptly and cause personal injury. Failure to remove these clips can result in seal failure and pump damage.

Place a drop of light lubricating oil on the precision finished faces of the stationary seat and the rotating element. Slide the sleeve and assembled seal parts completely on the shaft.

Pump Reassembly

Inspect the impeller, and replace it if cracked or badly worn.

Install the same number of impeller adjusting shims as previously removed and screw the impeller onto the shaft. Install the impeller washer, and lockwasher, and tighten the impeller capscrew. Replace the pump casing O-ring (33) and reassemble the pump casing to the seal plate and pedestal assembly. Secure the pedestal foot (32) to the pump.

CAUTION

Be certain to reinstall the lockwashers (8 and 31) under the capscrews (7 and 30) when reassembling the pump. The threaded inserts are imbedded in plastic, and bolt length is critical. Install the two longer capscrews (30) in the bottom of the pedestal through the pedestal foot (32). Do not overtighten or change capscrew length, this may crack the plastic around the inserts. Tighten the capscrews in an alternating pattern to ensure uniform torque.

A clearance of .008 to .015 inch between the impeller and the wear plate is necessary for maximum pump efficiency. To achieve this clearance rotate the impeller shaft by hand. If the impeller binds slightly against the wear plate, separate the pump casing and pedestal assemblies, remove the impeller, and remove .010 inch of impeller shims. Reassemble the pump. The clearance between the impeller and the wear plate should now be correct.

If the shaft moves freely when rotated by hand, separate the pump casing and pedestal, remove the impeller, and add another impeller shim. Reassemble the pump and rotate the shaft by hand. Repeat this procedure, adding one shim at a time, until the impeller binds slightly against the wear plate. When this occurs, remove .010 inch of shims as indicated above.

Suction Check Valve Installation

Replace any worn or damaged parts and secure the valve weights to the check valve (44) using the attaching hardware. Position the check valve assembly onto the suction flange. Apply the teflon-based joint sealant (45) on the contacting surfaces of the suction flange and around each bolt hole and secure the flange to the pump casing.

NOTE

The suction flange is sealed with a 1/4-inch diameter - 20-inch long cord of teflon joint sealant. Make sure to cross the ends of the sealant to ensure a tight seal.

Check the operation of the check valve to ensure proper seating and free movement.

Final Pump Reassembly

Be sure the pump is secured to the base and power source.

Seal pipe plugs that were removed with a thin coat of Teflon-based sealant or equivalent.

Install the suction and discharge lines, and open all valves. Make certain that all piping connections are secure.

Be sure the pump has been lubricated, see **LUBRICATION**.

Prime the pump through the discharge port with liquid compatible with that being pumped.

Refer to **OPERATION**, Section C, before putting the pump back into service.

LUBRICATION

Seal Assembly

The seal is lubricated by the medium being pumped.

Bearings

The pedestal was fully lubricated when shipped from the factory. Check the oil level regularly through the sight gauge (26) and maintain it at the mid-point of the gauge.

NOTE

When lubrication is required, remove the air vent (15) and add S.A.E. #30 non-detergent oil. Fill to center of sight gauge.

Under normal operating conditions, drain and refill the pedestal once each year with clean oil. **Do not** over lubricate. Excessive oil could cause preloading and over-heating of the bearings.

For cold weather operation, consult the factory or a lubricant supplier for the recommended grade of oil.

For U.S. and International Warranty Information,
Please Visit www.grpumps.com/warranty
or call:
U.S.: 419—755—1280
International: +1—419—755—1352

For Canadian Warranty Information,
Please Visit www.grcanada.com/warranty
or call:
519—631—2870

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GORMAN-RUPP OF CANADA LIMITED ● ST. THOMAS, ONTARIO, CANADA