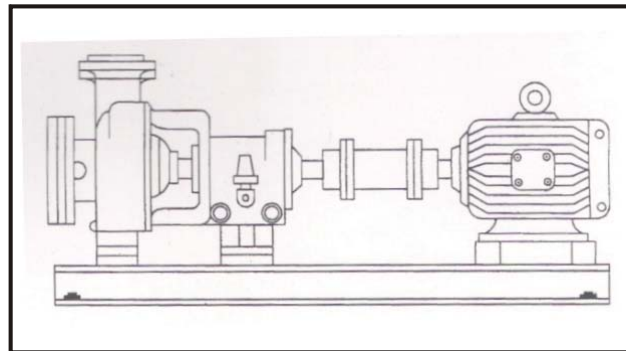




Instructions for

**INSTALLATION, OPERATION AND MAINTENANCE of
ROTECH make centrifugal Pumps Type - ANSI**



“answer to corrosion”



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Back Pull-Out Design / One Craft Maintenance

Only One Labour Craft Required For Inspection And Maintenance.

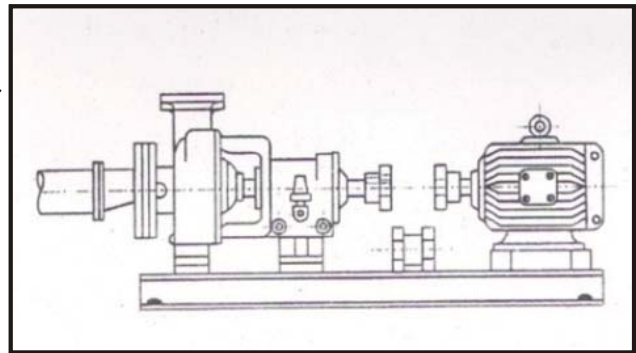
Downtime Minimized With Utilization Of Spare Back-Pull-Out Assembly.

Piping and Driver Not Disturbed When Back Pull-Re-assembly is Removed For Inspection Or Maintenance. More Important, Upon Re-assembly, No Re-Alignment is Necessary Provided

Normal Installation Procedures Are Followed.

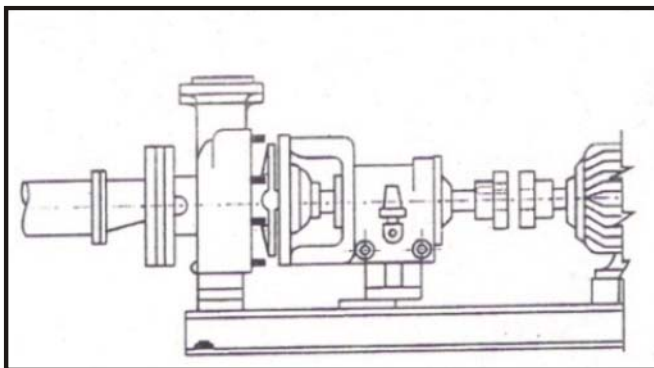
1

REMOVE SPACER COUPLING BETWEEN THE COUPLING HUBS ON THE PUMP AND DRIVER;



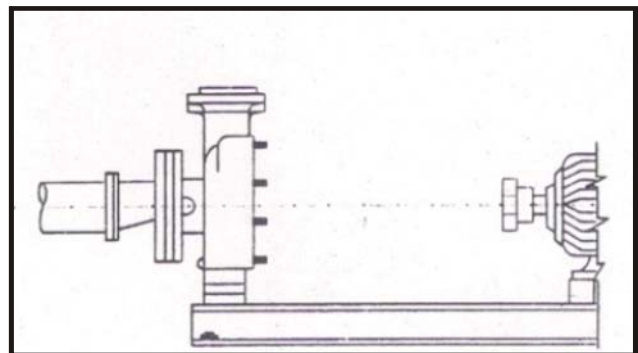
2

REMOVE CASING NUTS WHICH FASTEN ADAPTER / FRAME TO CASING; LOOSEN BOLTS HOLDING FRAME / FRAME FOOT TO BASEPLATE;



3

BACK PULL-OUT IS THEN REMOVE FOR INSPECTION OR FURTHER DISASSEMBLY;



“A Rugged pump built for Reliability and Economy today and tomorrow”

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1. GENERAL

SERIES '1196 Series ANSI PUMPS' pumps are quality products. Each and every pump undergoes a running tested to check performance at our works before dispatch. If the installation and operation instructions given here are carefully followed. Your pump will give trouble free service and meet the specified performance.

1. Pump model number (punched on the name plate).
2. Pump serial number (punched on the name plate).
3. Part number of relevant component (as listed in sectional drawing and parts list).
4. Sealing details (punched on the name plate).
5. Date of installation.
6. Service conditions.
7. Average time operated per day.
8. Frequency of maintenance.
9. Date of replacement parts.

2. GUARANTEE

We guarantee the satisfactory operation of pumps as per the guarantee clause specified in our terms and condition of sale. It is suggested that all installation , operation and maintenance personnel study this instruction carefully before installing and commissioning the pump. Any repairs or changes during the guarantee period should be undertaken only by our personnel or with our written permission. If the pump is to be used for different liquid, different temperature or different concentration of the liquid than that specified in our confirmation of our order or the conditions regarding the head , capacity and NPSH are changed, it requires our confirmation that the pump in question and the material of construction are suitable for the changed conditions. Guarantee are not valid if these instruction are not followed.

3. START PUMP WITH CARE

Like all machinery, centrifugal pumps are dangerous if used improper.

It is not possible to list all the conceivable misuses. The following list is not meant to be complete and is provided only as a guide and as a example of types of misuses which can damage a pump and cause injury. The list also gives you the idea of the kinds of misuses which will void all warranties.

- Do not run a pump with discharge valve closed.
- Do not connect the pump to the drive system without first checking to see that the drive system is running in correct direction of rotation.
- Do not start a pump which is 'wind milling' in the reverse direction due to fluid flowing back down the discharge pipe and into the suction pipe.
- Do not continue to run a pump which gives an indication of overheating.
- Do not continue to operate a pump when there are indication that something is rubbing, binding or knocking.
- Do not operate a pump that is vibrating , surging or making abnormal noise.
- Do not work on a pump unless the drive systems is locked out and pump is disconnected from the drive system.
- Do not run a pump in the reverse direction.
- Do not rely in the factory's alignment of pump and drive system.
- Do not hit a pump with any object.
- Do not examine a pump without using proper eye & face protection.

4. INSTALLATION – GENERAL

ROTECH centrifugal pumps, when properly installed and given reasonable care and maintenance, should operate satisfactorily operation, the discussion in Following pages must be considered.

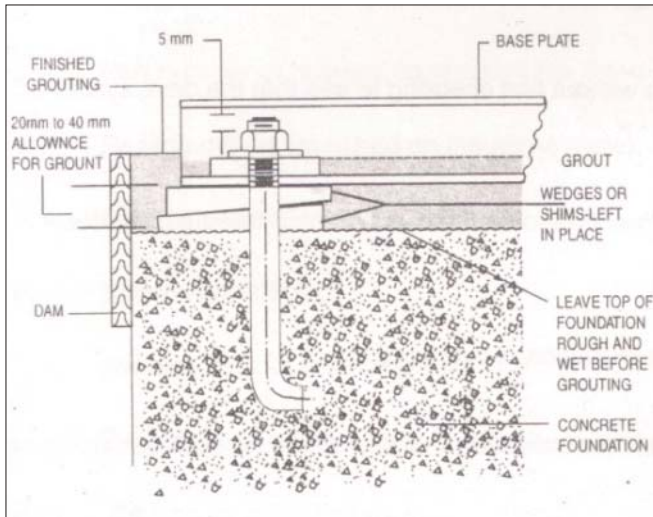


FIG.1 TYPICAL FOUNDATION BOLT DESIGN

4.2 FOUNDATION

For permanent installation, pump should be mounted on a rigid concrete foundation 200 to 300mm high and extending 50 to 75mm beyond the pump base plate. Foundation bolts of the proper size should be embedded in the concrete, located by a template.

4.3 ALIGNMENT

Pumps and motors (if supplied) that are relieved from the factory with mounted on a common base plate, were accurately aligned before shipment. Realignment is necessary after the complete unit has been leveled on the foundation and again after the grout has set and foundation bolts have been tightened. The alignment must be checked after the unit is pipe and rechecked periodically.

4.1 LOCATION

The pump should be located as close to the liquid supply as possible so that suction pipe is short and direct discharge pipe with minimum number of elbows and fittings, should be used to minimize head loss due to friction. The area around pump should be adequate so that it is readily accessible for inspection and maintenance and can be attended with a minimum of effort.

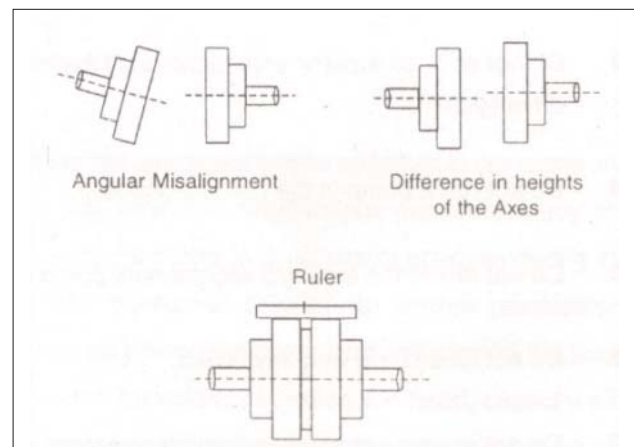
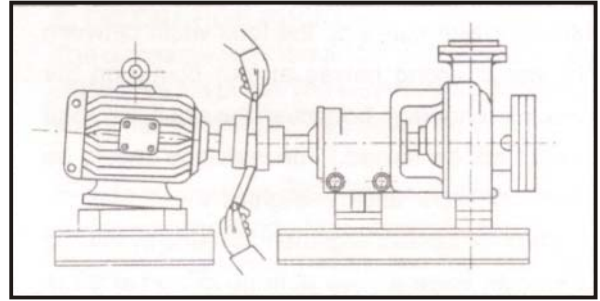


FIG.2 TYPE OF MISALIGNMENT

4.4 LEVELLING

When the unit is received with the pump and the motor mounted on the base plate, it should be placed on the foundation and the coupling halves disconnected, the coupling should not be reconnected until the alignment is completed.

Check the coupling faces as well as the suction and discharge flanges by means of a level. Correct the position, if necessary, by adjusting the base plate as required.



4.5 FLEXIBLE COUPLINGS

The purpose of flexible coupling is to compensate for temperature changes and to permit movement to the shaft without interference with each other while transmitting power from motor to the pump. It should not be used to compensate for misalignment of the pump and driver shafts.

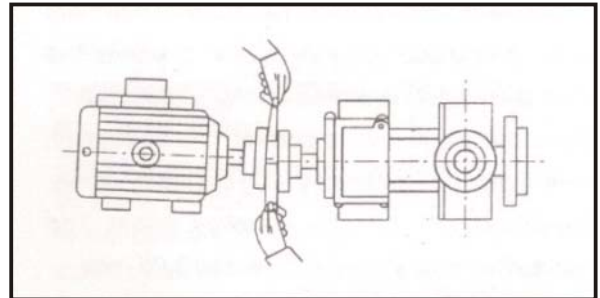


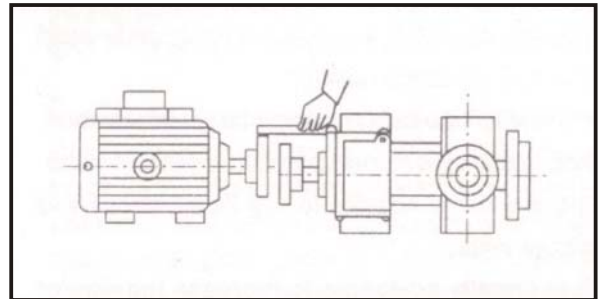
FIG.3 CHECKING ANGULAR ALIGNMENT

4.6 TYPES OF MISALIGNMENT

There are two misalignments between pump shaft and the motor shaft.

Angular misalignment – shafts within axis concentric but not parallel.
(See fig.3)

Parallel misalignment - shafts with axis parallel but not concentric. (See fig.4)



4.7 COUPLING ALIGNMENT

The faces of coupling halves should be spaced far enough apart so that they cannot strike each other when the motor rotor is moved hard over towards the pump. Due allowance should be made for wear of the thrust bearing.

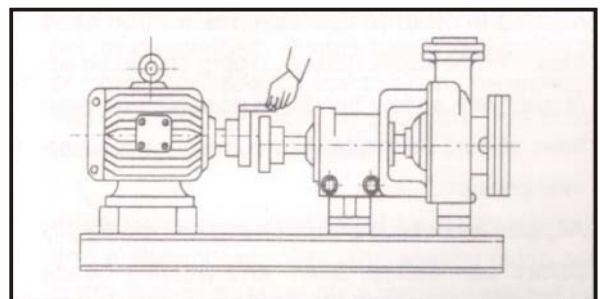


FIG.4 CHECKING PARALLEL ALIGNMENT

Measure with calipers, the total width between the two coupling shaves at four points on the circumference [top, bottom and the sides, the shaft should not be turned. The readings should be same for proper angular alignment.

A check for parallel alignment is made by placing a straight edge across both coupling halves at the top, bottom and at both sides. The unit will be in parallel alignment is correct, the foundation bolts should be tightened evenly but not too firmly. The alignment is to be checked again. The permissible error should not exceed.

5. PIPING LAYOUT

It is desirable to provide support to both, the suction and discharge pipes near the pumps to avoid strain to the pump casing. In installation involving large temperature variation, expansion at the connected piping may subject the pump nozzle to significant forces and movements.

It is usually advisable to increase the size of both, suction and discharge pipes at the pump nozzles in order to decrease the friction head loss. For the same reason, piping should be arranged with as few bends as possible and even then, should be made with a long radius wherever possible.

All pipes and fittings should be cleaned thoroughly before connecting. Burrs and welding beads should be removed. Flanges Gaskets should not protrude into the pipe.

6. SUCTION AND INLET PIPING

The suction pipe must be kept free of air leaks. This is particularly important when the suction line is as long one or the static suction lift is high.

Between pump suction nozzle and suction pipe of unequal diameters, eccentric reducers should be Used.

To avoid air pockets, the suction pipe should be laid out continually rising towards the pump and in case of gravity feed, inlet pipe should be laid out continually falling. (See Fig 5)

It is recommended that gate valve in suction line should be installed, so that the losses are minimum.

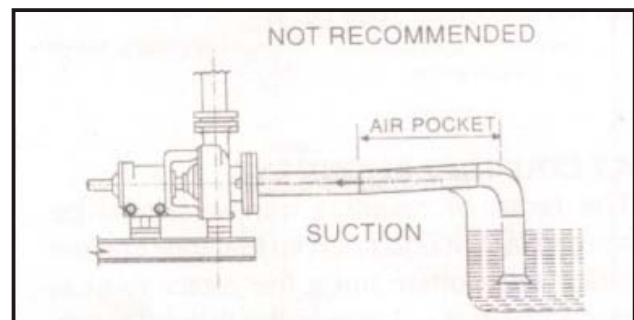
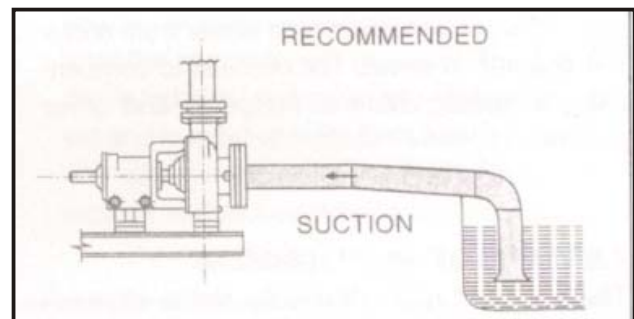


FIG.5 SUCTION PIPE DESIGN

6.1 FOOT VALVE

When the suction lift is not very high, it is advisable to install a foot valve to facilitate timing and prevent dry running of pump. Foot valves should not be used when the pump is operating against a high suction head.

The foot valve should be of low loss flap type and have a clear passage for liquid at least of the same area as that of the suction pipe.

Care must be taken to prevent foreign substances from being drawn into the pump choking the foot valve.

Many a times, it is observed that due to lesser passage area of the foot valve results in higher head loss and thereby reduces the pump capacity.

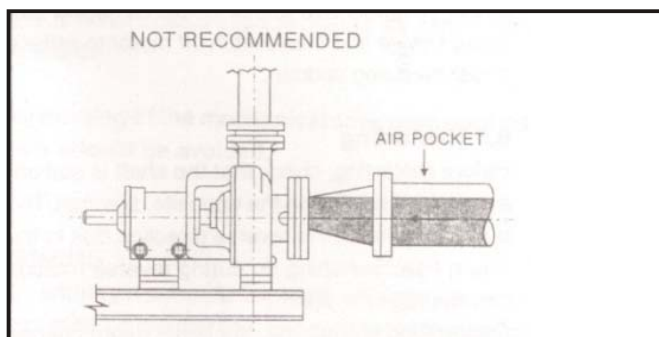
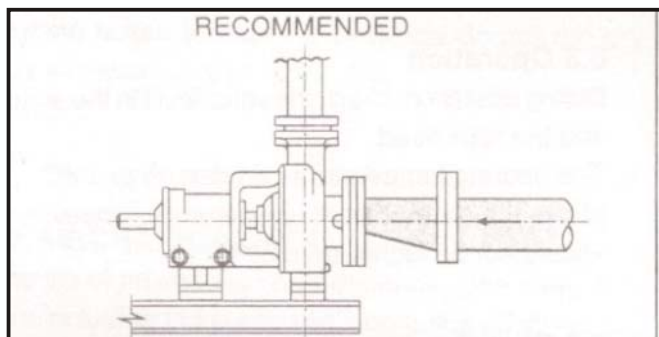


FIG.6 REDUCER AT PUMP SUCTION

7. DISCHARGE PIPING

The discharge pipe should be laid out continually rising from the pump. The valve is to be fitted near the pump discharge to regulate the flow.

In case of long pipe and higher discharge heads, it is recommended to fit a check valve between the pump discharge nozzle and the discharge valve to prevent harmful waterhammer on the pump and the foot valve.

8. OPERATIONAL AND MAINTENANCE

8.1 GENERAL

The shaft should be easily turnable by hand. The direction of rotation of motor should correspond to the direction of rotation of the pump as indicated by an arrow mark on the pump. Uncouple the pump and check the rotation of the motor by switching on for a moment. Wrong direction of rotation can be injurious to the pump and hampers its performance, as the impeller unlocks and gets touched the casing and pump get jammed.

It is necessary to check the stuffing box and see that the gland is not too tight. One should not try to tighten the gland nuts in order to stop the leakage completely, as there will always be some leakage through gland packing's. When the leakage can no longer be controlled by adjusting the gland all packing rings should be replaced. The addition of a single ring to restore gland adjustment is not recommended. Pump handling hazardous or expensive liquids or liquids where the leakage from the stuffing box is objectionable, are often lifted with mechanical seal.

A mechanical seal consist of a rotating element and a stationary element. The sealing faces are highly lapped surface on material selected for there low coefficient of friction and their resistance to corrosion by the liquid being pumped.

Since mechanical seals are made in a wide variety of design, the instruction for specific seal installation are furnished which must be carefully studied and followed exactly.

All series ANSI pumps are oil lubricated. A constant level oiler with a clear Polycarbonate oil reservoir indicates the oil reserve. The oiler accurately maintains a fixed oil level at the 1/3 diameter the lower ball of the bearings. For filling the oiler, the bottle should be filled through the stem of the bottle. Never pour oil directly into the bearing frame. Too much oil is injurious to the bearings. Use SAE 30 or equivalent grade oil.

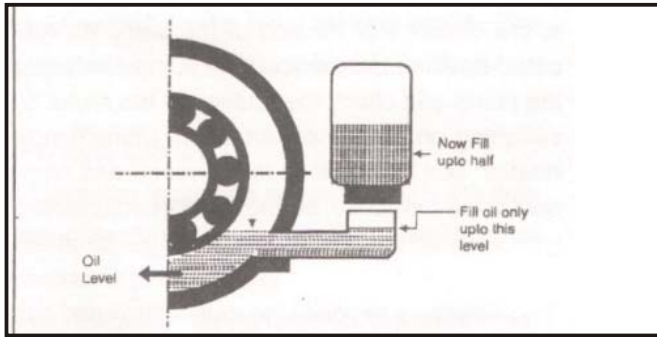


FIG.7 CONSTANT LEVEL OILER OPERATION

NOTE : At the time of shipment all the oil from bearing housing is drain out so please fill oil before starting the pumps.

Before starting the pump, check that the suction pipe is leak tight and free of air. Air-lock in the line has a negative influence on the performance of the pumped.

8.2 STARTING

The following points should be checked before starting a pump :

1. Check the motor rotation before the bolting up the coupling.
2. Couple the pump to the motor and make sure that both run freely.

3. Open the suction valve and close the discharge valve.
4. Prime the pump.
5. Start the pump.
6. Open the discharge valve until the required flow rate and head are obtained.
7. Check that the necessary external sealing and flushing connections corresponds to the existing shaft sealing arrangements.

Note : Centrifugal pumps can be run for a short period without injury against a closed discharge. Long running of pump with close discharge valve can lead to heating up of the pump and subsequent damage.

Valve installed in the suction line should not be used to throttle the flow.

8.3 Operation

During operation, check the liquid level in the sump and total head.

The bearing temperature can rise up to 39°C above the normal room temperature, however, it should not be higher than 80°C.

8.4 Stopping the pump

In the absence of a check valve, close the discharge valve and then switch off motor to reduce thrust on pump sudden.

8.5 Restarting

Before restarting, check that the shaft is stationary and not rotating in the opposite direction. The pump may run in the reverse direction due to the return flow. Switching on during reverse rotation can damage the shaft.

During the shutdowns, the liquid might change its concentration, crystallize or solidify. Therefore, the pump is to be drained and flushed with a suitable liquid.

In the absence of a check valve, close the discharge valve and then switch off motor to reduce thrust on pump sudden.

9. RUNNING MAINTENANCE

The pump should run without vibration. The suction lift and head condition should not be disturbed due to changes in the level of liquid of the suction vessel. Don't overload the motor above it's rated power.

Excessive leakage through the stuffing box during early period of operation stops itself after the running time. If necessary, tighten the gland nuts. Avoid excessive tightening. There should be a slight leak at the stuffing box to carry away the frictional heat generated at the packing.

If the leakage is excessive and tightening does not help, the packings should be replaced because they might lost their elasticity. Also check the outside diameter of the sleeve for it's wear and smoothness.

Pumps for handling volatile fluids should have cooled stuffing boxes so that the packings do not run dry due to vaporization of the liquid.

10. MECHANICAL SEAL

The life of the mechanical seal depends upon many factors including the purity and lubricating quality of the pump liquid. In view of the various operating conditions, it is not possible to specify the life of mechanical seals.

Dry running of the mechanical seal, even momentarily should be avoided.

PRIMING

All centrifugal pump, except self priming type, must be primed before starting. The pump must not be run unless it is completely filled with fluid, as there is danger of injuring some of the parts of the pump which depend upon the fluid for their lubrication.

11. TROUBLE SHOOTING

The most common causes of service interruption or deficiencies and they may be detected are as follows:

11.1 No. Discharge/Insufficient Discharge :

Lack of adequate flow from a pump may be caused by any of the following conditions:

- Pump not primed
- Speed too low
- System head too high
- Suction lift higher than that for which pump is designed
- Impeller completely clogged
- Wrong direction of rotation
- Air leak in suction line
- Air leak through stuffing box
- Suction or discharge lines are clogged
- Insufficient NPSHA
- Suction lift too high. Check with gauges. Check also for clogged suction line or screen
- Not enough suction head for hot or volatile liquids.
- Foot valve too small
- Foot valve or suction opening not submerged Enough.

11.2 Insufficient Pressure:

Insufficient pressure from a pump may be caused by any of the following conditions:

- Speed too low
- System head loss less than anticipated.
- Air or gas in the liquid.
- Impeller damaged
- Impeller diameter too small
- Wrong direction of rotation.

11.3 LOSS OF PRIMING WHILE OPERATING

Loss of priming or suction under these conditions may be caused by any following conditions:

- Leaky suction line.
- Water seal plugged
- Suction lift too high or insufficient.
- Air or gas in the liquid
- Strainer clogged.

11.4 Excessive power consumption

Excessive power consumption may be caused by any of the following conditions:

- Speed too high
- System head lower than rating, pumps too much liquid pumped is too high
- Mechanical seal defects.
- Shaft bent
- Rotating element binds.
- Stuffing box too tight

11.5 Noise or Vibration

Noise or Vibration may be caused by any of the following conditions:

- Air or gas in the liquid
- Air pocket in suction line
- Pump misalignment
- Insufficient NPSHA
- Pump contains foreign material
- Improper foundation
- Mechanical defects
- Shaft bent
- Impeller touching to casing
- Impeller plugged or damaged
- Pump or motor bearings damaged

11.6 Bearings Overheat or Wear Rapidly

- Lack of lubrication
- Improper or poor grade oil
- Dirt or water in bearing
- Misalignment
- Shaft bent
- Vibration
- Insufficient cooling

11.7 Frequent Packing Replacement

- Improper packing grade
- Shaft sleeve worn out
- Bearings worn
- Wrong alignment
- Crystallization of liquid or embedded abrasives present in stuffing box area.
- Insufficient lubrication or cooling
- Gland too tight

The success of packing depends upon

- Packing being of the right type and size compatible with the liquid pumped
- Gradual and even compression throughout
- The ability of each ring to take its share of the pressure
- A slight amount of leakage at all times for lubrication

12. ADVANTAGES OF CASING CORROSION ALLOWANCE

There is minimum 3mm gap between bearing cover and bearing housing which known as casing corrosion allowance. In case due to long

period of operation casing / impeller is eroded take them for machining match the degree and repair the same. Due to this metal removal front clearance (casing to impeller) is increased which will effect hydraulic performance of pump to avoid this, original clearance is to be maintained which is 0.25 to 0.4mm which can be easily done by pushing the shaft assembly from back side, if pump is fitted with seal, loosen the seal and take new marking to install seal.

13 DISMANTLING & REPAIR

- When a pump is dismantled for overhauling if necessary, do not hesitate to ask for our service Engineer's assistance.
- All necessary spare part should be procured well before hand to minimize downtime.
- When ordering spare parts, it is essential to give an exact description of the part, its part number the pump model and serial number.

13.1 DISMANTLING

- Close the suction and discharge valves.
- Secure the motor against start up.
- Flush the pump with clean water.
- Remove any instruments and auxiliary pipe work.
- Remove coupling spacer.
- Detach bearing frame foot from base plate.
- Remove casing nuts from studs.
- Withdraw the complete back pull out with using jack bolts.

Dismantling the shaft sleeve

- Lock pump shaft and take out the impeller.
- Loosen other part of the shaft seal (gland from the stuffing box cover).
- If mechanical seal is fitted, remove the shaft sleeve together with rotary seal unit remove the gland plate (seal cover).

Dismantling the pump shaft

- Remove the shaft sleeve.
- Remove the pump coupling half and coupling key.
- Remove the deflector.
- Remove oil seals.
- Remove the bearing housing bolts.
- Drive out the shaft in direction of the coupling.
- Draw off anti friction bearings.

13.2 Indication for overhauling

Check all parts for wear, if necessary, re-machine or replace them.

Shaft

Mount the shaft on Vee block and check straightness (Maximum run out 0.05).

Impeller

Check impeller for corrosion and erosion damage and machine/replace if necessary.

Shaft sealing parts:

Mechanical seal :

- The faces of the seal must not show signs of scoring. If necessary re-lap them if the faces are badly Scoured, replace them.
- Check the shaft sleeve for perfect surface particularly at the seat of secondary sealing, regrind or replace as necessary

Packed stuffing box :

Check shaft sleeve for scoring and regrind or replace if necessary ensuring that the sleeve diameter. Replace the packing rings.

Bearings :

Rinse the bearings with cleaning fluid (diesel) and check for excessive play or rough running. Replace if worn out.

13.3 Re-assembly:

Preliminary work:

- Clean pump parts
- Always use new gaskets and “O” rings as PTFE gets expanded after tightening

Assembly of the pump shaft:

- Heat bearing to approximately 80°C. Push them on the shaft and secure them. If heating arrangements is not available use press (Press bearing using equal force on bearing OD)
- Insert the assembly into the bearing cover and secure it with cir clip
- Insert the whole assembly into the bearing housing from coupling side and bolt it.
- Push new oil seal
- Push the deflector
- Push the coupling half on shaft

Assembly of the Shaft Seal:

Mechanical Seal: (Inside mounted)

- Check sleeve for any damage
- Sleeve should be accurate in size and finish (As per manufacturer's standard)
- Inspect gland plate (dimensionally & physically)
- Insert the stationary face with secondary gasket into the gland and push it onto the shaft

- Take new readings on sleeve for seal installation
- Tight rotary unit on sleeve giving necessary seal compression
- Push the shaft sleeve along with rotary unit on to the shaft
- Push the stuffing box into the bearing frame and bolt it, tighten the gland.
- Fit the impeller

Stuffing box packing

- Push the shaft sleeve on to shaft, fit lantern ring if applicable
- Insert packing rings into the stuffing box Loosely attach gland pusher
- Push stuffing box into the bearing frame and bolt it.

Assembly of back pull out unit:

- Insert gasket of correct size into casing.
- Inset “back pull out unit:” and tighten nuts.
- Fasten support to base plate.
- Adjust gap between impeller and casing.
- Connect ancillary pipe-work and instruments.
- Connect coupling to the motor.

**You are requested to inform us regarding the modification carried out by you at your end for updating our records in complaint information for,.



Customer Service Nos:
1-866-217-7867

