WDM PUMPS

Operation Manual

Medium pressure Pumps

WDM Water Systems

1. Introduction.

This manual contains instructions for installation and commissioning of your ME pump. Read carefully these recommendations before starting up your pump. ALWAYS KEEP ON HAND!.

Congratulations! You have purchased a product developed with the latest WDM Pumps technology.

Our pumps are designed and manufactured with parts of the highest quality. Long experience as manufacturers, our special care and dedication in production, make our products meet the highest standards.

This operation manual contains important information and guidance for the installation, operation and maintenance of your GS pump. Read instructions carefully before installing the product. Retain it for later use.

The pumps have been built according to the standards of American manufacturers pumps (Contractors Pump Bureau) and factory tested by hydrostatic testing performance to ensure proper operation. Inspect carefully and make sure there are no missing or damaged pieces in transit. If necessary, make a claim to the transportation company as soon as possible.

The design, materials and processes used in the manufacture of products ensure proper operation. However life and duration depend on appropriate application, installation, periodic inspection and general preventive maintenance.

WARNING.

WDM Pumps is not responsible for damage or accidents that occur due to non-compliance with the instructions given in this manual. The warranty is only valid when using original spare parts.

Factory's counseling is strongly recommended for installation and start-up.

2. Safety Recommendations.

- Wear safety shoes when handling heavy parts or tools.
- Do not operate the pump with the discharge valve closed.
- Do not remove drain plugs or valves when the pump is running.
- Never attempt to attach pipes to the pumps forcing it. Sizes must be appropriate.
- For any maintenance always disconnect power.
- Ensure that the pump is isolated from a pressurized system before remove.
- Use gloves when handling parts with sharp edges.
- To avoid risk of explosion never apply heat to disassemble the pump.
- Do not wear loose clothing that could be caught by the impeller or other moving parts.
- Never place hands in the suction or discharge openings.
- Do not operate the pump by grasping the cable assembly.
- Secure the pump before operating to prevent falling or sliding.
- Operating the pump with the discharge valve closed, decreases the life of bearings and mechanical seal.

Pump coupled to combustion engines.

- Never operate the pump in an enclosed area where fumes can collect.
- Do not add fuel to the tank while the engine is running. Stop engine and wait until it cools.

Beware of gas evacuation systems these rotting burning engine.

These pumps are designed to operate safely when used and maintained according to what is stated in this manual. A pump is a device that contains parts that are in rotation and therefore can be dangerous. Operators and maintenance personnel should be aware of this and follow safety recommendations.

The pumps are heavy equipment: handle them with care.

3. Installation.

Location.

- Place the pump as close to the suction source as possible. Suction piping should be as short and direct as possible.
- Place the pump below the water level whenever possible. This will facilitate priming, ensures a constant flow of liquid, and provides a positive suction.
- Make sure the NPSH (Net Positive Suction Head) is provided at the suction end of pump considering the location relative to the whole system. Available NPSH must always exceed required NPSH as specified in the yield curve of the pump.
- Always allow sufficient access for maintenance and inspection, plus a space for the use of a crane strong enough to lift the unit.
- Be sure to have an adequate power supply for the pump motor. The electrical characteristics should coincide with those specified in the engine data plate and be within the limits framed.
- Prevent pump exposure to extremely low temperatures to prevent fluid inside the pump to reach freezing temperatures as problems may arise within the system.

The foundation for a horizontal pump.

- Horizontal pumps must be installed permanently on a firm concrete or steel base with a size sufficient to absorb any vibration and prevent any deviation or misalignment.
- The platform can float on springs or be in a high proportion of equipment.
- The foundations must be poured without interruption to 3/4 to 1-1/2 inches below the elevation of the end pump.
- Anchor bolts should be placed on the sleeves of the pipe to the designation of the position.
- Allow the foundation to cure for several days before proceeding with the installation of the pump.

Ensure the board.

- After the concrete slab has been poured, place the pump base plate over the anchor bolts and lay it on loose fit wedges or shims placed near each anchor bolt and at intervals not to exceed 24” along each side.
- The wedges should be placed to augment the 3/4 “to 1-1/4” above the pad, allowing a free height of slurry. Level the pump shaft, flanges, and the motherboard with a spirit level, adjust the shims if necessary.
- Ensure that the pipe can be aligned to the pump flanges without placing any strain on the flanges.
- After alignment of the pump is established, to put the bolt nuts and tighten them, is sufficient to maintain the pump base anchored to the concrete base.

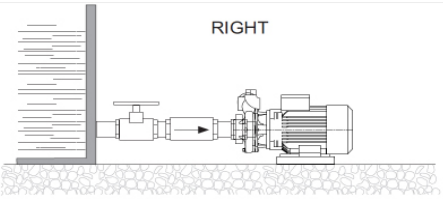
Suction (inlet) piping.

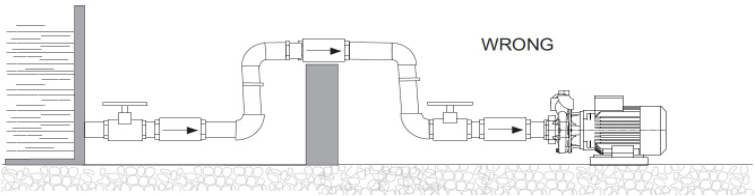
The sizing and installation of suction piping is particularly important. It must be selected and installed in a manner that minimizes pressure loss and permits sufficient liquid flow into the pump during starting and operation.

Many NPSH problems can be traced directly to improper sizing of suction piping systems.

Observe the following precautions when installing suction piping:

- Suction piping should be as direct as possible, and ideally the length should be at least ten times the pipe diameter.
- Short suction piping can be the same diameter as the suction opening.
- Longer piping should be one or two sizes larger (depending on length), reducing to the diameter of the pump suction opening.
- Use an eccentric reducer, with the eccentric side down when reducing the pipe diameter to the diameter of suction opening.
- At no point should suction piping be smaller in diameter than the pump suction opening.
- Avoid any high points, such as pipe loops, that may create air pockets and throttle the system or produce erratic pumping.





- Install a valve in the suction line to isolate the pump during shut-down and maintenance, and facilitate pump removal. Where two or more pumps are connected to the same suction line, install duplicate gate valves to isolate each pump from the line.
- Gate valves should always be installed in positions that avoid air pockets. Globe valves should not be used, particularly when NPSH is critical.
- During pumping operation, valves on the suction line must always be at FULLY OPEN.
- Properly sized pressure gauges can be installed in gauge taps on pump suction and discharge nozzles. Gauges enable the operator to monitor pump performance and determine that the pump conforms to the parameters of the performance curve. If cavitation, vapor binding, or other unstable operation occurs, pressure gauges will indicate wide fluctuation in suction and discharge pressures.

ATTENTION.

WDM Pumps does not supply all the accessories (valves, gauges, pipes, extensions, etc.) mentioned earlier in this operation manual and installation.

Discharge (outlet) piping.

- Short discharge piping can be the same diameter as the pump discharge opening.
- Longer piping should be one or two sizes larger depending on length.
- An even gradient is best for long horizontal runs of discharge piping.
- Install a valve near the discharge opening to prime and start the pump. The discharge gate valve is also used to isolate the pump during shutdown, maintenance, and facilitate pump removal.
- Any high points in discharge piping may entrap air or gas and thus retard pump operation.
- If the possibility of liquid hammer exists, (i.e. check valves are used) close the discharge gate valve before pump shutdown.

Packing gland adjustment.

With the pump running, the packing gland should be adjusted to permit 40 to 60 drops per minute leakage. This is required for shaft lubrication. After initial start up, additional packing and adjustment may be required.

- All pumps on GS line of WDM Pumps are equipped with mechanical seals matched to conditions for which the pump was sold.
- Observe the following precautions to avoid seal damage and obtain maximum seal life:
- Do not exceed temperature or pressure limitations for the mechanical seal used.
- Do not run the pump dry or against a closed valve! Dry operation will cause seal failure within minutes.
- Clean and purge suction piping in new installations before installing and operating pump. Pipe scale, welding slag and other abrasives can cause rapid seal failure.

Coupling alignment.

- This is a anchoring and alignment procedure typical and, if per-

formed with care, should result in a smooth running, trouble-free installation.
- If the pump and motor were shipped mounted on the pump base as an assembly, remove the coupling guard.

Electrical installation.

- Motor Disconnecting device that is capable of disconnecting both the controller and the motor from their source of power such as a circuit breaker or fusible disconnect switch must be installed.
- The disconnecting device must be located so that the controller can be seen from the disconnecting means. In all cases, the distance from the disconnecting device to the controller must be less than 15 meters (About 50 Feets).
- In most installations the disconnecting device will be a circuit breaker or fusible disconnect switch.
- Short circuit and ground fault protection are usually provided by means of a circuit breaker or fusible disconnect switch.

Wiring installation.

- Mount the control panel or motor starter(s) in close proximity to the pump to provide convenient control and ease of installation.
- Check incoming power source to ensure that it is the same as the voltage and phase of the motors.

Priming.

- WDM ME line pumps are not self-priming, and must be completely primed, filled with liquid, before starting.
- If the pump will operate with a positive suction head, prime by opening the suction valve allowing liquid to enter pump casing. Open air vents at this time, and make sure all air is forced from pump by liquid before closing.
- If pump has a suction lift, priming must be accomplished by other methods. The use of foot valves or ejectors, or manual filling of the pump casing and suction line with liquid are pos-

sible methods suggested for this purpose.

CAUTION.

Never run the pump dry in the hope that it will prime itself. Serious damage to the mechanical seal will result.

Pre-start checklist.

WARNING.

In the interest of operator safety, the unit must not be operated above the nameplate conditions.

Such operation could result in unit failure causing injury to operating personnel.

Consult instruction book for proper operation and maintenance of the pump and its supporting components.

Make the following inspections before starting your WDM Pump:

- Make sure all wiring connections to the motor (and starting device) match the wiring diagram and produce clockwise rotation as viewed from the back of the motor.
- If the motor has been in storage for an extended length of time, either before or after installation, refer to motor instructions before starting.
- Check voltage, phase, and line circuit frequency with the motor data plate.
- Turn rotating element by hand to make sure it rotates freely.
- Check suction and discharge piping for leaks, and make sure all flange bolts are securely tightened.

Motor rotation.

CAUTION.

Never check driver rotation unless pump and driver couplings are disconnected and physically separated. Failure to follow this instruction can result in serious damage to pump and driver if rotation is wrong.

After the unit has been wired and checked to insure that all components in the system (disconnect device, magnetic starters, pilot devices and motors) are properly connected, check motor rotation as follows:

- For 3 phase units only—momentarily energize the motor to ensure that the rotation is correct as indicated by the arrow cast into the pump volute. If rotation is incorrect, interchange two wires at the motor starter terminals.

CAUTION.

The pumps must not be operated while dry. Use extreme caution that motors are energized only momentarily to determine proper rotation.

4. Starting the pump.

- Install coupling guard on flexible coupled units.
- Fully open gate valve (if any) in suction line, and close gate valve in discharge line.
- Fill suction line with liquid and completely prime pump.
- Start the motor (pump).
- Immediately make a visual check of pump and suction piping for pressure leaks.
- Immediately after pump reaches full operating speed, slowly open the discharge gate valve until complete system flow is achieved.
- Check discharge piping for pressure leaks.
- If pump is fitted with pressure gauges, open gauge cocks and record pressure reading for future reference.
- Verify that the pump is performing in accordance with parameters specified on performance curve.
- Check and record voltage, amperage per phase, and kilowatts, if a wattmeter is available.

Voltage regulation.

The motor will operate satisfactorily under the following conditions for voltage and frequency variation, but not necessarily in accordance with the standards established for operation under rated conditions:

- The voltage variation may not exceed 10% above or below rating specified on the motor data plate.
- The frequency variation may not exceed 5% above or below motor rating.
- The sum of the voltage and frequency variations may not exceed 10% above or below motor rating, provided the frequency variation does not exceed 5%.

5. Maintenance.

WARNING.

The pump must not be operated without an approved coupling guard in place. Failure to observe this warning could result in injury to operating personnel.

Before attempting any inspection or repair on the pump, the driver controls must be in the “OFF” position, locked and tagged to prevent injury to personnel performing service on the pump.

Motor lubrication.

To lubricate the motor while running or at rest, remove grease drain plug (if any) and filler plug on grease fitting. Grease with clean lubricant until grease appears at drain hole or along motor shaft.

Table 1. Recommended Lubrication Periods.

Motor rpm	Motor hp	Operation conditions		
		Standar	Severe	Extreme
1,750 & below	1/3-7-1/2	3 years	1 year	6 months
	10-40	1-3 years	6 months-1 year	3 months
	50-150	1 year	6 months	3 months
	200	6 months	3 months	3 months
Above	Up (All hp)	6 months	3 months	3 months

Standar conditions: 8 hours per day operation, normal or light loading, clean air, 100ºF (38ºC), maximum ambient temperature.

Severe conditions: Continuous 24 hours operation, shock loading or vibration, poor ventilation, 100ºF to 150ºF (38ºC to 66ºC), ambient temperature.

Extreme conditions: Continuous operation, heavy shock or vibration, dirt or dust in air, extreme ambient temperature.

One-half to one cubic inch of grease is sufficient for motors 5.0 hp and under, with proportionately more grease for greater HP motors.

- Most fractional and some integral frame motors have “sealed-for-life” bearings, and do not require further lubrication throughout motor life.
- Always follow motor manufacturer’s lubrication instructions, and periodically check grease fittings and drain plugs for leaks.
- Below table 2 lists recommended types of grease for both pump and motor lubrication. These types have all been thoroughly tested and should be used whenever possible.

Table 2. Recommended Lubricants.

Manufacturer	Lubricant
Shell	Dolium®R
Exxon	Polyrex
Chevron	SRI Grease NLGI 2
	Black Pearl-NLGI 2
Texaco	Polystar RB

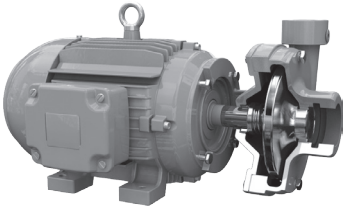
- To lubricate regreasable bearings, remove grease drain plug (if any) and filler plug. Add clean ball bearing lubricant until grease appears at drain hole or along shaft. On units with drain hole, all old grease can be purged out ahead of new. In such cases, the drain should be left unplugged for several minutes during pump operation to allow excess grease to be forced out.
- Lubricate bearing frame bearings at intervals of one to three months, depending on severity of environment. Pumps in a clean, dry, moderate temperature (100° F maximum) environment should be regreased at three month intervals. Too much grease can cause premature bearing failure—do not overgrease.

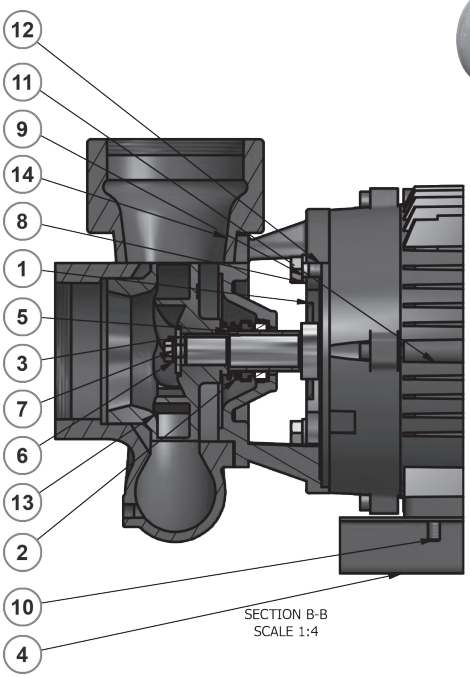
Service Engine and mechanical seal.

After the first 200 hours of operation the oil should be changed. To

change the oil, remove the drain plug at the bottom of the bearing cover and the filler plug (that also acts as a vent plug) at the top of the housing. After draining oil, replace the fittings and refill with an acceptable oil selected from Table 3. After the first oil change, the oil should be changed again at 2000 hours and then at intervals of 8000 hours or once yearly, thereafter.

6. Sectional.





Item	Description	QTY
1	O-RING	1
2	MECHANICAL SEAL	1
3	WASHER IMPELLER	1
4	BASE BRACKET	2
5	SHAFT SLEEVE	1
6	SPRING LOCK WASHER IMPELLER	1
7	BOLT IMPELLER	1
8	WATCHER MOTOR BRACKET	4
9	BOLT MOTOR BRACKET	4
10	BOLT BASE BRACKET	2
11	MOTOR	1
12	MOTOR BRACKET	1
13	IMPELLER	1
14	CASE	1

7. Trouble shooting.

Symptom	Cause code
Pump does not deliver any liquid at star-up.	1*2*3*4*5*6*7*8*9*10*11*14*16*17*22*23*24*34
Pump stops delivering liquid after start-up.	2*3*4*5*6*7*8*9*10*11*12*13*22*23*24*34
Pump overheats and/or ceases to deliver liquid.	1*3*9*10*11*21*22*27*29*30*31*33*34*38*39
Insufficient flow rate.	2*3*4*5*6*7*8*9*10*11*14*16*17*20*21*22*23*24*25*26*34
Excessive flow rate.	15*18*20*34
Discharge pressure is too high.	4*14*16*18*20*22*23*24*25*26*34
Shaft seal leaks appreciably, or the packing leaks excessively.	27*28*29*30*33*34*35*36*39
Shaft seal or packing fails prematurely.	12*13*27*28*29*30*33*34*35*36*37*38
Pump uses too much power.	15*16*18*19*20*23*25*27*28*31*33*34*35*42
Pump runs rough and noisily.	2*3*4*5*6*7*8*9*10*11*15*17*18*21*23*24*27*28*29*30*31*32*33*34*38*40*43*44
Bearings overheat and/or fail prematurely.	27*28*29*30*31*32*33*34*38*39*40*43*44

Possible causes.

1. The pump has not been properly bled of air.
2. The pump suction line have not been completely primed.
3. The suction head (NPSHR) required by the pump is too high, or the net positive suction head available (NPSHA) at your facility is too low.
4. The fluid pumped contains too much entrained air or gas.
5. There are air pockets in the suction line.
6. An entry of air has suddenly occurred in the suction line.
7. An entry of air past the shaft seal into the pump has occurred.
8. The inlet of the suction line is insufficiently submerged.
9. The suction valve is closed or only partially open.
10. The suction strainer is clogged with dirt or debris.
11. The foot valve is clogged or undersized.
12. Little or no cooling fluid supplied to the shaft seals.
13. The lantern ring is not positioned opposite the flushing inlet thereby restricting fluid flow.
14. Pump drive rotational speed too low.
15. Pump drive rotational speed too high.

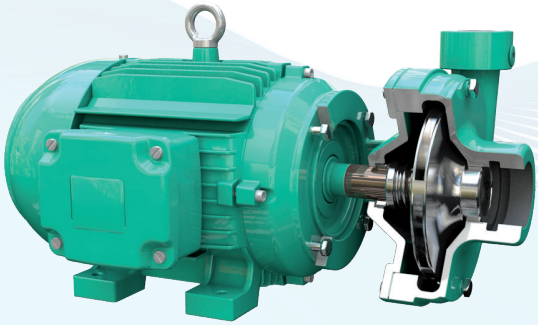
16. Pump rotation wrong or impeller installed backwards.
17. Total head of installation (back Pressure) higher than rated total head of the pump.
18. Total head of installation (back Pressure) lower than rated total head of the pump.
19. Density of fluid pumped differs from that specified when the pump was purchased.
20. Viscosity of fluid pumped differs from that specified when the pump was purchased.
21. The pump is operating at too low a rate of flow (The discharge valve may be throttled too much).
22. If pumps are operating in parallel, the pump characteristics may not be suitable for parallel operation.
23. The impeller may be clogged with debris.
24. The impeller may be damaged.
25. The casing and impeller wear rings may be excessively worn.
26. There may be internal leakage from the discharge to the suction compartments as the result of internal gasket failure.
27. There may be a misalignment of the pump shaft.
28. The shaft may chatter because it is bent.
29. The pump may run rough due to improper balancing of the impeller.
30. The shaft may not be running due to worn bearings.
31. The impeller may be rubbing against the inside of the case.
32. The concrete pad might not be of sufficient size to provide pump stability.
33. The pump may have become misaligned during installation.
34. The operating conditions of the installation do not agree with the data specified when the pump was purchased.
35. The shaft seal may be incorrectly installed, or the stuffing box has not been packed correctly.
36. The shaft sleeve may be scored or pitted in the region of the packing due to dirt or abrasive matter in the flushing fluid.
37. Excessive tightening of the packing gland may block the flushing port thereby diminishing the sealing fluid flow.
38. Packing material may have become wedged or extruded between the shaft and the bottom of the stuffing housing due to excessive clearance on the packing backup washer.
39. The mechanical seal may have been damaged by running dry.
40. There may be excessive axial thrust (side loading) due to improper impeller central alignment.
41. The bearings may be worn.
42. The bearings may have been damaged during installation and/or dirt or other foreign matter may have entered the bearings during greasing or oiling.
43. Excessive greasing may cause the bearings to overheat.
44. Inadequate lubrication may be causing bearing failure.

9. Warranty.

WDM guarantees its ME Pumps for a period of 18 months from the date of delivery, against defects in material and workmanship, according the indicated in its general conditions of sale.

Failure of the suggestions and recommendations in this manual, as well as improper product use or handling, totally invalidates the warranty.

The warranty excludes wear and tear, misuse, repair or replacement of the defective part by the user or unskilled personnel without specific permission of WDM Pumps.



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