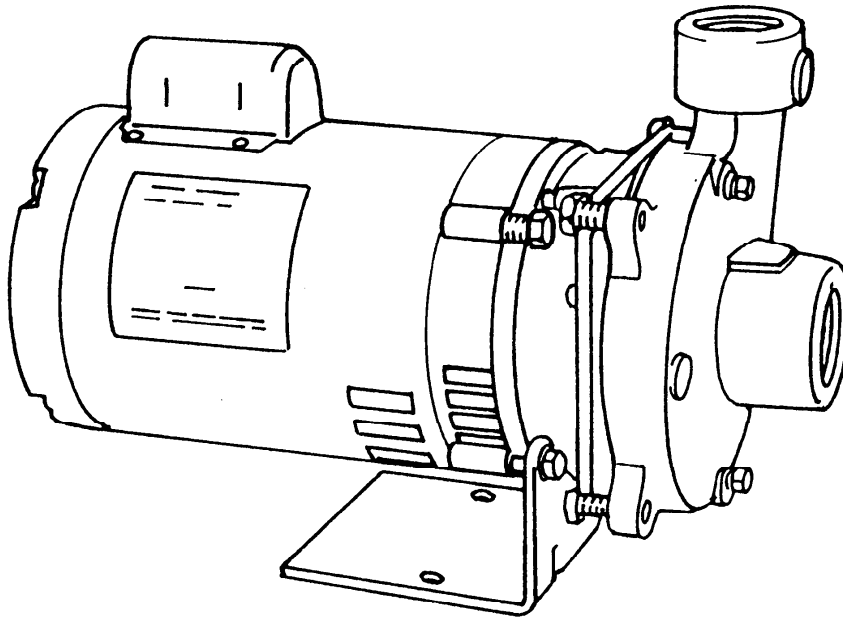


burks®

INSTALLATION AND OPERATION MANUAL

Centrifugal Pumps



IMPORTANT!

Read all instructions in this manual before operating pump.

DO NOT work on pump until you are sure pump and associated piping are totally depressurized, pump and motor have cooled down, and electricity to the motor has been shut off and locked out. As a result of Crane Pumps & Systems, Inc., constant product improvement program, product changes may occur. As such Crane Pumps & Systems reserves the right to change product without prior written notification.

CRANE[®]

A Crane Co. Company

PUMPS & SYSTEMS

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Form No. F0706D-Rev. F

SAFETY FIRST!

Please Read This Before Installing Or Operating Pump. This information is provided for **SAFETY** and to **PREVENT EQUIPMENT PROBLEMS**. To help recognize this information, observe the following symbols:



IMPORTANT! Warns about hazards that can result in personal injury or indicates factors concerned with assembly, installation, operation, or maintenance which could result in damage to the machine or equipment if ignored.

CAUTION! Warns about hazards that **can or will cause minor** personal injury or property damage if ignored. Used with symbols below.

WARNING! Warns about hazards that can or will cause serious personal injury, death, or major property damage if ignored. Used with symbols below.



Hazardous fluids can cause fire or explosions, burns or death could result.



Extremely hot - Severe burns can occur on contact.



Biohazard can cause serious personal injury.



Hazardous fluids can Hazardous pressure, eruptions or explosions could cause personal injury or property damage.

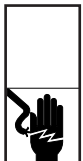


Rotating machinery Amputation or severe laceration can result.



Hazardous voltage can shock, burn or cause death.

Only qualified personnel should install, operate and repair pump. Any wiring of pumps should be performed by a qualified electrician.



WARNING! To reduce risk of electrical shock, pumps and control panels must be properly grounded in accordance with the National Electric Code (NEC) or the Canadian Electrical Code (CEC) and all applicable state, province, local codes and ordinances. Improper grounding voids warranty.



WARNING! To reduce risk of electrical shock, always disconnect the pump from the power source before handling or servicing. Lock out power and tag.



WARNING! Operation against a closed discharge valve will cause premature bearing and seal failure on any pump, and on end suction and self priming pump the heat build may cause the generation of steam with resulting dangerous pressures. It is recommended that a high case temperature switch or pressure relief valve be installed on the pump body.



CAUTION! Pumps build up heat and pressure during operation-allow time for pumps to cool before handling or servicing.



WARNING! This pump is designed to handle materials which could cause illness or disease through direct exposure. Wear adequate protective clothing when working on the pump or piping.



WARNING! Do not pump hazardous materials (flammable, caustic, etc.) unless the pump is specifically designed and designated to handle them.



WARNING! Do not wear loose clothing that may become entangled in moving parts.



WARNING! Keep clear of suction and discharge openings. **DO NOT** insert fingers in pump with power connected.



Make sure lifting handles are securely fastened each time before lifting. **DO NOT** operate pump without safety devices in place. Always replace safety devices that have been removed during service or repair. Secure the pump in its operating position so it can not tip over, fall or slide.



WARNING! To reduce risk of electrical shock, all wiring and junction connections should be made per the NEC or CEC and applicable state or province and local codes. Requirements may vary depending on usage and location.



WARNING! Products returned must be cleaned, sanitized, or decontaminated as necessary prior to shipment, to insure that employees will not be exposed to health hazards in handling said material. All Applicable Laws And Regulations Shall Apply.



Crane Pumps & Systems, Inc. is not responsible for losses, injury, or death resulting from a failure to observe these safety precautions, misuse or abuse of pumps or equipment.

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®Burks is a registered trademark of Crane Pumps & Systems, Inc.

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Alteration Rights Reserved

GENERAL INFORMATION

To the Purchaser:

Congratulations! You are the owner of one of the finest pumps on the market today. Burks® Pumps are products engineered and manufactured of high quality components. Over eighty years of pump building experience along with a continuing quality assurance program combine to produce a pump which will stand up to the toughest pumping projects.

This manual will provide helpful information concerning installation, maintenance, and proper service guidelines.

Receiving:

Upon receiving the pump, it should be inspected for damage or shortages. If damage has occurred, file a claim immediately with the company that delivered the pump. If the manual is removed from the crating, do not lose or misplace.

Storage:

Short Term - Burks Pumps are manufactured for efficient performance following long inoperative periods in storage. For best results, pumps can be retained in storage, as factory assembled, in a dry atmosphere with constant temperatures for up to six (6) months.

Long Term - Any length of time exceeding six (6) months, but not more than twenty four (24) months. The units should be stored in a temperature controlled area, a roofed over walled enclosure that provides protection from the elements (rain, snow, wind blown dust, etc.), and whose temperature can be maintained between +40 deg. F and +120 deg. F.

If extended high humidity is expected to be a problem, all exposed parts should be inspected before storage and all surfaces that have the paint scratched, damaged, or worn should be recoated with a water base, air dry enamel paint. All surfaces should then be sprayed with a rust-inhibiting oil.

Service Centers:

For the location of the nearest Burks Service Center, check your Burks representative or Crane Pumps & Systems, Inc., in Piqua, Ohio, telephone (937) 778-8947.

To insure safety and a successful repair, if there is anything about the pump and motor you do not completely understand, contact your distributor or the factory for instructions.



WARNING ! - DO NOT work on this pump until you are sure the pump and associated piping are totally depressurized, and if pumping hot liquids that the temperature is safe to handle.



WARNING ! - Be sure that electricity to the motor is shut off and locked out, or if the motor is to be tested while running that test is conducted by a qualified person and safe electrical procedures are followed.



WARNING ! - DO NOT start pump until it has been filled with water.

WIRING:

1. Motor wiring should conform to national, state and local electrical codes.
2. Use wire of adequate size to prevent voltage drop.
3. Pump should be on a branch or separate circuit, fused or circuit breaker, protected, with a manual disconnect.
4. Connect the electrical supply from the switch to the motor terminals, following the wiring diagram on the motor nameplate or terminal coverplate.
NOTE: Be sure that the connections to the motor terminals correspond with the voltage to be applied.

Check wiring and fuse charts before connecting wires to service line. Make sure the voltage and frequency of the electrical current supply agrees with that stamped on the motor nameplate. If in doubt, check with power company.

Some pumps are equipped with three phase motors. Three phase motors require magnetic starters, and can run in either direction, depending on how they are connected to the power supply.

ROTATION:

The rotation is indicated by an arrow on the casing, and the correct rotation of three phase motors should be established before assembling the coupling on base mounted units. The pump should not be operated backwards or in reverse rotation. If the motor operates in the wrong rotation, interchange any two of the lead wires and the correct rotation will result.

GROUNDING MOTOR:

Wiring to this pump must be installed and maintained in accordance with the National Electrical code or your State and local electrical code.

It is required that a permanent ground connection be made to the unit using a conductor of appropriate size from a metal underground water pipe or a grounded lead in the service panel. **DO NOT connect to electric power supply until unit is permanently grounded.** Connect the ground wire to the approved ground and then connect to the terminal provided.



IMPORTANT ! - Centrifugal pumps should never be started or run dry. Operating a pump dry will cause scoring of the mechanical seal, resulting in premature seal failure. To prevent the pump from being run dry, it should be primed before starting.

FLOODED SUCTION PRIMING:

This method of priming a pump is relatively simple. The liquid source is located above the pump and all that is necessary to prime the pump is to open the air vent valve or plug in the pump casing and to crack the gate valve in the suction line.

The suction line and pump should be filled slowly until a steady stream of liquid is observed flowing from the air vent. After the pump is operating, it is recommended that the air vent valve or plug be opened again to insure that all air has been expelled from the pump casing.

SUCTION LIFT PRIMING:

A foot valve should be used for priming on suction lift applications. The foot valve, located at the end or foot of the suction piping, functions as a check valve and allows flow in one direction only, toward the pump. Otherwise, all the liquid will drain from the pump and suction piping back into the sump after shutdown.

Initial priming is accomplished by completely filling the suction piping and pump casing with the liquid to be pumped. This can be done by removing the air vent valve or plug at the top of the pump casing, and inserting a pipe nipple in the orifice with an appropriate increaser to accommodate a hose connection. A priming line can also be inserted in the discharge piping between the check valve and the pump, or the priming can be done with a bucket and funnel. The important thing is to completely fill the suction pipe and pump casing with liquid.

When the pump is started, the vacuum created by pumping the priming fluid, combined with atmospheric pressure in the liquid well, forces liquid into the suction piping, thus opening the valve and keeping it open until the pump is shut down. When the pump is shut down, the liquid being pumped reverses its flow causing the valve to close. The liquid is now trapped in the suction piping and pump casing, thus maintaining a prime on the pump.

VACUUM PRIMING:

Vacuum priming consists of removing air from the pump casing and suction piping and drawing liquid into them by means of a vacuum creating device. The types of vacuum equipment range from a simple hand pump to a complex central priming system. Your specific priming requirements will govern what type of vacuum primer you use.

STARTING:

For initial starting, the gate valve in the discharge line should be closed, and opened gradually as the motor approaches full speed, usually in five to ten seconds. After the pump has once been in operation so that the discharge line has been completely filled, it is then unnecessary to close the gate valve in starting.

SEASONAL SERVICE:

To take out of service;

1. Drain the liquid from the pump to prevent freezing and damage to the pump body. It is recommended that a good rust inhibitor be put into the liquid end to prevent excessive corrosion. Keep the motor dry and covered.
2. To drain, remove the drain plug which is located below the suction inlet of the pump. Drain the suction pipe to a point below the frost line. All other pipes, which may be exposed to freezing temperatures, should also be drained.
3. Remove the priming plug. This will help the pump body to drain by permitting air to enter the case.

To Place Pump Back into Service:

1. Replace all drain plugs previously removed, using pipe joint compound on all male threads.
2. Make sure suction and discharge lines have been reconnected and tightened.
3. Check to be certain that the pump shaft turns freely.
4. Verify with name plate that motor has been configured for your system voltage requirements.
5. Prime and start.



DO NOT START THE PUMP UNTIL IT IS FILLED WITH WATER.

STUFFING BOX - MECHANICAL SEAL:

With the exercise of a few precautions a mechanical seal will furnish very satisfactory operation in pumps. Precautions which should be observed are:

1. Do not run the pump dry. The flat faces of the seal are lubricated by the liquid being pumped.
2. Vent the seal housing if it is the highest point in the pump.
3. Purge the system thoroughly to remove scale or dirt which may injure the seal prematurely due to the abrasive condition of the liquid.

INSTALLING A NEW MECHANICAL SEAL

CAUTION: This seal is a precision product and should be handled accordingly. Be especially careful not to scratch or chip the lapped sealing faces of the washer and floating seat. If reinstalling a used seal, both sealing faces should be relapped.

INSTALLING STATIONARY ELEMENT

The seat must be seated securely in the seat ring with the lapped face out. The unlapped face is marked and correctly assembled when shipped. Oil the seat ring with light oil and seat it firmly and squarely. If this cannot be done with the fingers, use a sleeve as shown in Figure 1, inserting the cardboard shipping disc between the sleeve and the lapped face to prevent scratching sealing face.

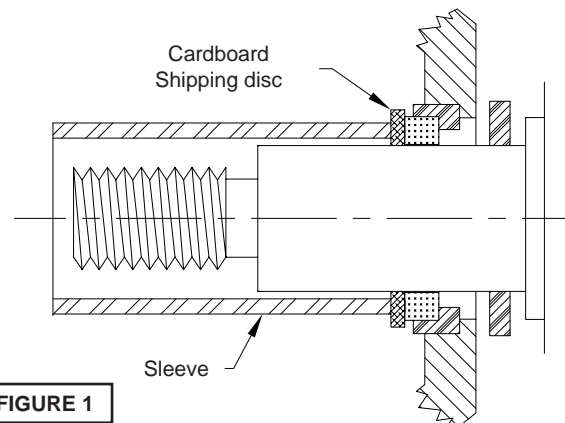


FIGURE 1

INSTALLING ROTATING ELEMENT

Oil shaft with light oil. Shaft should be clean and polished smooth. Slide seal body on shaft (washer end first) and seat firmly. A sleeve as shown in Figure 2 will facilitate this operation and prevent the rubber driving ring from pulling out of place as the seal body is slid along the shaft. Assembly of impeller automatically sets seal in proper position.

Make sure at all times, and particularly before final assembly, that both sealing faces are absolutely clean. Sealing faces should be oiled with clean, light oil.



NOTE: DO NOT use petroleum based products to lubricate EPT or EPDM elastomers - use only water based lubricant.

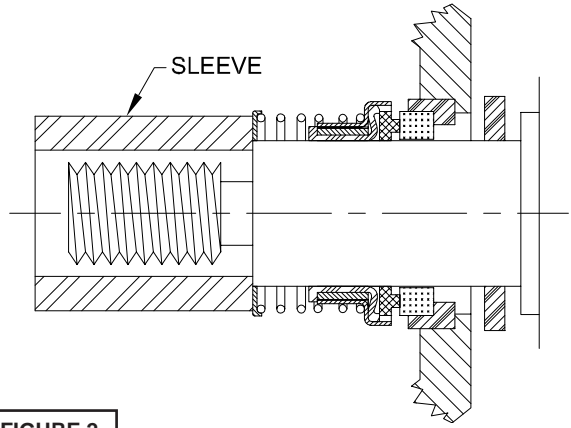
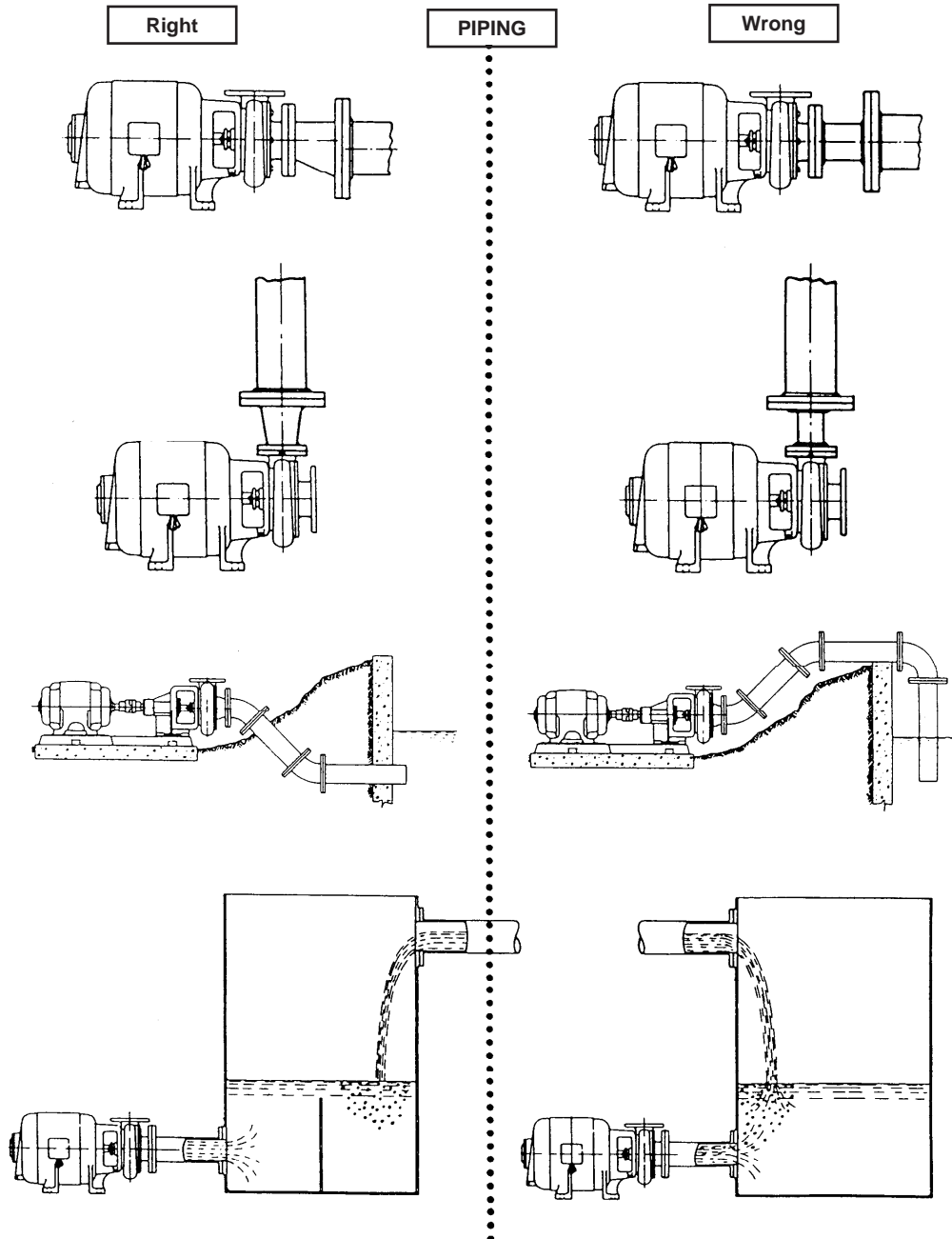


FIGURE 2



TROUBLE SHOOTING

CAUTION ! Always disconnect the pump from the electrical power source before handling.
If the system fails to operate properly, carefully read instructions and perform maintenance recommendations.

SYMPTOM	POSSIBLE CAUSE(S)	
Little or no discharge and unit will not prime	<ol style="list-style-type: none"> 1. Casing not filled with water 2. Total head too high 3. Suction head higher than pump designed for 4. Impeller partially or completely plugged 5. Hole or leak in suction line 6. Foot-valve too small 7. Impeller damaged 8. Foot-valve or suction line not submerged deep enough in water; pulling air 9. Insufficient inlet pressure or suction head 10. Suction piping too small 11. Casing gasket leaking 12. Suction or discharge line valves closed 13. Piping is fouled or damaged 14. Clogged strainer or foot-valve 	<ol style="list-style-type: none"> 1. Fill pump casing. Using a foot-valve will extend pump life and facilitate immediate priming 2. Shorten suction head 3. Lower suction head, install foot-valve and prime. 4. Disassemble pump and clean out impeller 5. Repair or replace suction line 6. Match foot-valve to piping or install one size larger foot-valve 7. Disassemble pump and replace impeller 8. Submerge lower in water 9. Increase inlet pressure by adding more water to tank or increasing back pressure by turning gate valve on discharge line partially closed position 10. Increase pipe size to pump inlet size or larger 11. Replace 12. Open 13. Clean or replace 14. Clean or replace
Loss of suction after satisfactory operation	<ol style="list-style-type: none"> 1. Air leak in suction line 2. When unit was last turned off, water siphoned out of pump casing 3. Suction head higher than pump designed for 4. Insufficient inlet pressure or suction head 5. Clogged foot-valve, strainer, or pump 6. Defective wearplate(s) 	<ol style="list-style-type: none"> 1. Repair or replace suction line 2. Refill (reprime) pump casing before restarting 3. Lower suction head, install foot-valve and primer 4. Increase inlet pressure by adding more water to tank or increasing back pressure by turning gate valve on discharge line to partially closed position. 5. Unclog, clear or replace as necessary. 6. Replace.
Pump overloads driver	<ol style="list-style-type: none"> 1. Total head lower than pump rating, unit delivering too much water 2. Specific gravity and viscosity of liquid being pumped different than the pump rating 	<ol style="list-style-type: none"> 1. Increase back pressure on pump by turning gate valve on discharge line to partially closed position that will not overload motor. 2. Consult factory.
Pump vibrates and/or makes excessive noise	<ol style="list-style-type: none"> 1. Mounting plate or foundation not rigid enough 2. Foreign material in pump causing unbalance 3. Impeller bent 4. Cavitation present 5. Piping not supported to relieve any strain on pump assembly 	<ol style="list-style-type: none"> 1. Reinforce. 2. Disassemble pump and remove. 3. Replace impeller. 4. Check suction line for proper size and check valve in suction line if completely open, remove any sharp bends before pump and shorten suction line. 5. Make necessary adjustments.
Pump runs but no fluid	<ol style="list-style-type: none"> 1. Faulty suction piping (air leak) 2. Pump located too far from fluid source 3. Gate valve closed 4. Clogged strainer 5. Fouled foot-valve 6. Discharge height too great 7. Fouled impeller 8. Faulty mechanical seal 	<ol style="list-style-type: none"> 1. Replace 2. Replace 3. Open 4. Clean or replace 5. Clean or replace 6. Lower the height 7. Clean or replace. 8. Replace
Pump leaks at shaft	<ol style="list-style-type: none"> 1. Worn mechanical seal 2. Replacement seal not installed properly 	<ol style="list-style-type: none"> 1. Replace 2. Follow Maintenance instructions carefully

BARNES®



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WEINMAN®

DEMING®

PROSSER®

Limited 24 Month Warranty

Crane Pumps & Systems warrants that products of our manufacture will be free of defects in material and workmanship under normal use and service for twenty-four (24) months after manufacture date, when installed and maintained in accordance with our instructions. This warranty gives you specific legal rights, and there may also be other rights which vary from state to state. In the event the product is covered by the Federal Consumer Product Warranties Law (1) the duration of any implied warranties associated with the product by virtue of said law is limited to the same duration as stated herein, (2) this warranty is a LIMITED WARRANTY, and (3) no claims of any nature whatsoever shall be made against us, until the ultimate consumer, his successor, or assigns, notifies us in writing of the defect, and delivers the product and/or defective part(s) freight prepaid to our factory or nearest authorized service station. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply. **THE SOLE AND EXCLUSIVE REMEDY FOR BREACH OF ANY AND ALL WARRANTIES WITH RESPECT TO ANY PRODUCT SHALL BE TO REPLACE OR REPAIR AT OUR ELECTION, F.O.B. POINT OF MANUFACTURE OR AUTHORIZED REPAIR STATION, SUCH PRODUCTS AND/OR PARTS AS PROVEN DEFECTIVE. THERE SHALL BE NO FURTHER LIABILITY, WHETHER BASED ON WARRANTY, NEGLIGENCE OR OTHERWISE.** Unless expressly stated otherwise, guarantees in the nature of performance specifications furnished in addition to the foregoing material and workmanship warranties on a product manufactured by us, if any, are subject to laboratory tests corrected for field performance. Any additional guarantees, in the nature of performance specifications must be in writing and such writing must be signed by our authorized representative. Due to inaccuracies in field testing if a conflict arises between the results of field testing conducted by or for user, and laboratory tests corrected for field performance, the latter shall control. **RECOMMENDATIONS FOR SPECIAL APPLICATIONS OR THOSE RESULTING FROM SYSTEMS ANALYSES AND EVALUATIONS WE CONDUCT WILL BE BASED ON OUR BEST AVAILABLE EXPERIENCE AND PUBLISHED INDUSTRY INFORMATION. SUCH RECOMMENDATIONS DO NOT CONSTITUTE A WARRANTY OF SATISFACTORY PERFORMANCE AND NO SUCH WARRANTY IS GIVEN.**

This warranty shall not apply when damage is caused by (a) improper installation, (b) improper voltage (c) lightning (d) excessive sand or other abrasive material (e) scale or corrosion build-up due to excessive chemical content. Any modification of the original equipment will also void the warranty. We will not be responsible for loss, damage or labor cost due to interruption of service caused by defective parts. Neither will we accept charges incurred by others without our prior written approval.

This warranty is void if our inspection reveals the product was used in a manner inconsistent with normal industry practice and/or our specific recommendations. The purchaser is responsible for communication of all necessary information regarding the application and use of the product. **UNDER NO CIRCUMSTANCES WILL WE BE RESPONSIBLE FOR ANY OTHER DIRECT OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO TRAVEL EXPENSES, RENTED EQUIPMENT, OUTSIDE CONTRACTOR FEES, UNAUTHORIZED REPAIR SHOP EXPENSES, LOST PROFITS, LOST INCOME, LABOR CHARGES, DELAYS IN PRODUCTION, IDLE PRODUCTION, WHICH DAMAGES ARE CAUSED BY ANY DEFECTS IN MATERIAL AND/OR WORKMANSHIP AND/OR DAMAGE OR DELAYS IN SHIPMENT. THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.**

No rights extended under this warranty shall be assigned to any other person, whether by operation of law or otherwise, without our prior written approval.

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**IMPORTANT!
WARRANTY REGISTRATION**

Your product is covered by the enclosed Warranty.
To complete the Warranty Registration Form go to:

<http://www.cranepumps.com/ProductRegistration/>

If you have a claim under the provision of the warranty, contact your local
Crane Pumps & Systems, Inc. Distributor.

RETURNED GOODS

**RETURN OF MERCHANDISE REQUIRES A "RETURNED GOODS AUTHORIZATION".
CONTACT YOUR LOCAL CRANE PUMPS & SYSTEMS, INC. DISTRIBUTOR.**



**Products Returned Must Be Cleaned, Sanitized,
Or Decontaminated As Necessary Prior To Shipment,
To Insure That Employees Will Not Be Exposed To Health
Hazards In Handling Said Material. All Applicable Laws
And Regulations Shall Apply.**