

4730 SERIES

VERTICAL MULTISTAGE PUMPS

INSTALLATION, OPERATION & MAINTENANCE MANUAL





SECTION 4730 PAGE 2 OF 22 DATE APRIL 2021

Ta	able of Contents	021
4	OVERVIEW	
4	SAFETY PRECAUTIONS	
5	PERSONNEL QUALIFICATION	
5	NON-COMPLIANCE	
5	INSPECTION & INSTALLATION	
5	UNAUTHORIZED MODIFICATION	
5	GENERAL INSTRUCTIONS	
5	TRANSPORT & LIFTING	
6	STORAGE	
6	SHORT-TERM STORAGE	
7	LONG-TERM STORAGE	
7	PUMP IDENTIFICATION	
7	MANUFACTURER	
7	CONSTRUCTION FEATURES	
7	INSTALLATION, OPERATION & MAINTENANCE MANUAL IDENTIFICATION	
7	NAMEPLATE INFORMATION	
9		
10	PRESSURE GAUGES	
10	ACCESSORIES	
10	COUPLING GUARDS	
10	PUMP STARTUP	
10	ROTATION CHECK	
11	PRE START-UP CHECKS	
11	PRIMING	
11	ENSURING PROPER NPSHA	
12	STARTING THE PUMP & ADJUSTING FLOW	
12	OPERATION IN SUB-FREEZING CONDITIONS	
12	SHUTDOWN CONSIDERATIONS	
12	TROUBLESHOOTING	



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- MAINTENANCE 16
- 16PREVENTATIVE MAINTENANCE
-NEED FOR MAINTENANCE RECORDS 16
- 16NEED FOR CLEANLINESS
- MAINTENANCE OF PUMP DUE TO FLOOD DAMAGE 16
- 16ROUTINE MAINTENANCE CHART
- 17 DISASSEMBLY
- 17 INSPECTION
- 18 ASSEMBLY
- MODEL VM VERTICAL MULTISTAGE 19





-AMERIFLO -**OVERVIEW**

AMERIFLO has used the most current and advanced technology for research and design when engineering the pumps & system components of the product line. A concentrated focus on state-of-the-art quality control during the manufacturing process ensures safety and reliability as primary goals.

This manual is designed so that the end user becomes familiar with the characteristics and proper operation of the VM vertical multistage product line.

This manual provides very important guidance for the installation, reliable operation and efficient maintenance when the need arises. The operating procedures must be strictly followed to ensure reliability of the product and to maximize the service life of the pump with a focus on avoiding injury and hazards.

Local laws & regulations are not taken into account in this manual as they can vary greatly from region to region. Operators must ensure total and strict compliance with local laws and regulations, including proper procedures required during the installation process.

Do not operate any equipment in excess of it's limits as specified in this operating manual, including transmission medium, flow, rated speed, density, pressure and temperature. The end user must ensure the operation of the pump & system is in accordance with this manual.

If you have any questions, please contact AMERIFLO with your serial number & nameplate information. AMERIFLO can assist you if damage has occurred to the equipment and/or if the need arrises for spare parts.

SAFETY PRECAUTIONS

This installation, operation & maintenance manual contains general installation, operation and maintenance instructions that must be followed. This manual must be read and understood in it's entirety by the responsible personnel/operators prior to installation and commissioning and the manual must be kept readily available at the job site for easy access.

To minimize risk of injury or death, the "safety" provisions of this entire manual MUST be followed. AMERIFLO shall not be liable for physical injury, damage or delays caused by a failure to observe the instructions for installation, operation & maintenance contained in this manual.

Paying constant attention to safety is always extremely important. This manual covers areas of danger that require additional attention. These areas of precaution are identified by using the following symbols:



DANGER - Immediate hazards which WILL result in severe personal injury or death.



WARNING - Hazards or unsafe practices which COULD result in severe personal injury or death.



CAUTION - Hazards or unsafe practices which COULD result in minor personal injury or property damage.



SHOCK HAZARD - ELECTRICAL Hazards are present which COULD result in severe personal injury or death.



ROTATING EQUIPMENT - Hazards are present which COULD result in severe personal injury or death.

Equipment maximum lifting speed of 15 FT/S [4.6 M/S] should not be exceeded.



In colder climates where liquid could freeze in the pump or engine, precautions must be made to make sure the fluid never freezes. Freezing fluid can damage equipment. Drain fluid from any piece of equipment in this environment.

Never start or run equipment without a proper prime. Significant damage to the equipment can occur.

Never operate any pump for an extended period of time with a closed discharge valve. The allowable amount of time a pump can operate in this condition depends on several variables at the job site. Contact AMERIFLO for proper engineering support.

Never operate any pump for an extended period of time below minimum flow. Temperature rise and extreme damage can occur.

Never operate any pump with a closed suction valve.



SECTION 4730 PAGE 5 OF 22 DATE APRIL 2021

If excessive noise is heard from any rotating piece of equipment, shut the equipment down immediately.

Always lockout power before doing any maintenance on the pump or driver.

Never operate the pump & driver without a proper coupling guard in place.



If any leaks of hazardous fluids are identified, shut the unit down immediately and address the issue.

PERSONNEL QUALIFICATION

All personnel involved in the installation, operation & maintenance must be fully gualified to manage, operate, maintain, inspect and install the pump assembly. The responsibilities, competence and supervision of all personnel involved in installation, operation and maintenance must be clearly defined by the end user. Lack of knowledge must be addressed by means of training and instruction provided by sufficiently trained personnel. Upon request, the end user can contact AMERIFLO to train the operators and end user. In addition, it is the responsibility of the operator to ensure that the operating instructions contained in this manual are fully understood by all parties involved with the equipment.

NON-COMPLIANCE

Non-compliance with the safety instructions contained in this manual can result in an accident causing damage to equipment, the site and to personal injury or death. The end user is solely responsible for correctly installing all equipment and a safely run operation after installation.

INSPECTION & INSTALLATION

The operator will ensure that maintenance, inspection and installation is performed by authorized, qualified personnel who are thoroughly familiar with this manual and the operation of this equipment. WORK MUST BE PERFORMED ON A PUMP ONLY AFTER THE PIECE IF EQUIPMENT HAS BEEN COMPLETELY LOCKED **OUT OF OPERATION**. When taking the pump unit out of service always adhere to the strict procedures described in the manual. Properly decontaminate pumps which handle fluids posing a health hazard. As soon as the work has been completed, re-install and re-activate any safetyrelevant devices and protective devices. Before returning the product to service, review all instructions before restarting any equipment.

- AMERIFLO — UNAUTHORIZED MODIFICATION

Modifications or alterations to the pump unit are only permitted with the manufacturer's prior written consent. Use only original spare parts or parts authorized by AMERIFLO. The use of other parts will invalidate any remaining warranty. Warranty relating to the pump and driver unit is only valid if the equipment is used in accordance with its intended use and only authentic AMERIFLO parts are used for maintenance and repair. Never operate the pump & driver outside of the limits stated in the pump data sheet and information contained in this manual.

GENERAL INSTRUCTIONS

The pump and driver must be examined upon arrival to ascertain any damage caused during shipment. If damaged, immediately notify the carrier and/or the sender. Confirm that the goods correspond exactly to the description on the shipping documents and report any differences as soon as possible to AMERIFLO . Always reference the pump type and serial number stamped on the data plate.

The pumping unit must be used only for applications for which AMERIFLO has specified:

- The construction materials
- The operating conditions (flow, pressure, temperature, etc.)
- The field of application

In case of doubt, contact AMERIFLO.

TRANSPORT & LIFTING

The pump and driver must be transported in the horizontal position.

Proper handling measures must be followed during transportation of equipment. Observe the following precautions.



During all phases of transportation (truck, rail & ocean) all components must be handled and transported by using suitable slings and hoists. All handling should be carried out by specially trained personnel to avoid damage to the equipment and persons. The lifting rings attached to various components should be used exclusively to lift the



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SECTION 4730 PAGE 6 OF 22 DATE APRIL 2021

components for which they have been supplied.



CAUTION - All equipment shall be bolted to a suitable pallet or strapped down appropriately during transport. All loose parts should be crated accordingly.



CAUTION - The lugs on the pump and driver are only designed to lift that piece of equipment separately. When lifting the pump set attention needs to be placed on the tension direction. See below figure for proper lifting.

It is important to exercise extreme care in handling and installing all components. Certain items are precision machined for proper alignment and if dropped or mistreated in any way, misalignment and malfunction can result. The insulation on all wire must be protected. Parts which are too heavy to be lifted from the transporting vehicle should be skidded slowly and carefully to the ground to prevent damage. Never unload any item by dropping parts directly from the truck to the ground.

If job site conditions permit, you may be able to install directly from the truck that delivered the equipment. If not, move the components to the installation area and lay them out in a clean and protected space convenient to the work location.

If installation cannot begin within a few days after delivery, segregate and identify all components of the shipment so they will not be confused with other equipment arriving at the job site.

Read and follow the storage instructions carefully as care of the pump during this period before installation can be as important as maintenance after operation has begun.

Check all parts against the packing list to make sure nothing is missing. It is much better to find out now than during the installation. If damage occurred during transportation report it to the carrier immediately. Freight claims MUST be reported by the recipient. Report any item discrepancies immediately to AMERIFLO.

STORAGE

SHORT-TERM STORAGE

Normal shipment packaging is designed to protect the pump and driver during shipment and for dry, indoor storage for up to two months or less.

If the pump is not to be installed or operated soon after



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delivery, store the unit in a clean, dry place, having slow changes in environmental conditions. Steps should be taken to protect the pump against moisture, dirt and foreign particulate intrusion. The procedure followed for this short-term storage is summarized below:

Standard Protection for Shipment:

a. Loose unmounted items, including, but not limited to, packing and coupling spacers are packaged in a water proof plastic bag and placed under the coupling quard. Larger items are boxed and metal banded to the base plate. All bags and cartons are identified with the AMERIFLO sales order number, the customer purchase order number and the pump item number (if applicable).

b. Inner surfaces of the bearing housing, shaft (area through bearing housing) and bearings are coated with Cortec VCI-329 rust inhibitor or equal.

c. Re-greasable bearings are packed with grease.

d. After a performance test, the pump is tipped on the suction flange for drainage (some residual water may remain in the casing). Then, internal surfaces of ferrous casings, covers, flange faces and the impeller surface are sprayed with Calgon Vestal Labs RP-743m or equal. Exposed shafts are taped with Polywrap.

e. Flange faces are protected with plastic covers secured with plastic drive bolts. 3/16 in (7.8 mm) steel or 1/4 in (6.3 mm) wood covers with rubber gaskets, steel bolts and nuts are all available for extra cost.

f. All assemblies are bolted to a wood skid which confines the assembly within the perimeter of the skid.

g. Assemblies with special paint are protected with a plastic wrap.

h. Bare pumps, when not mounted on base plates, are bolted to wood skids.

i. All assemblies having external piping (seal flush and cooling water plans), etc. are packaged and braced to withstand normal handling during shipment. In some cases components may be disassembled for shipment. The pump must be stored in a covered, dry location.

It is recommended that the following procedure is taken:

1. Ensure that the bearings are packed with the recommended grease to prevent moisture from entering the bearing housings.

2. Ensure that the suction and discharge flanges are covered and secured with cardboard, plastic or wood to

SECTION 4730 PAGE 7 OF 22 DATE APRIL 2021

prevent foreign objects from entering the pump.

3. If the pump is to be stored outdoors with no overhead covering, cover the unit with a tarp or other suitable covering.

LONG-TERM STORAGE

Long-term storage is defined as more than two months, but less than 12 months. The procedure AMERIFLO follows for long-term storage of pumps is given below. These procedures are in addition to the short-term procedure above.

Solid wood skids are utilized. Holes are drilled in the skid to accommodate the anchor bolt holes in the base plate or the casing and bearing housing feet holes on assemblies less base plate. Tackwrap sheeting is then placed on top of the skid and the pump assembly is placed on top of the Tackwrap. Metal bolts with washers and rubber bushings are inserted through the skid, the Tackwrap and the assembly from the bottom of the skid and are then secured with hex nuts. When the nuts are "snugged" down to the top of the base plate or casing and bearing housing feet, the rubber bushing is expanded, sealing the hole from the atmosphere. Desiccant bags are placed on the Tackwrap. The Tackwrap is drawn up around the assembly and hermetically (heat) sealed across the top. The assembly is completely sealed from the atmosphere and the desiccant will absorb any entrapped moisture. A solid wood box is then used to cover the assembly to provide protection from the elements and handling. This packaging will provide protection up to twelve months without damage to bearings, lip seals, etc. due to humidity, salt laden air, dust, etc. After unpacking, protection will be the responsibility of the user. If units are to be idle for extended periods, the addition of lubricants, inhibitor oils and greases should be used.

Every three months, the shaft should be rotated approximately 10-15 revolutions. When the unit is ready to be installed, replace all old lubricant with new lubricant.

PUMP IDENTIFICATION

MANUFACTURER

AMERIFLO 125 Morrison Drive, Rossville TN 38066 United States of America

www.ameriflo-usa.com

CONSTRUCTION FEATURES

The ES product line is a horizontal, single stage, center-



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line discharge, end suction centrifugal pump. It is designed with a horizontal fluid inlet and a top vertical outlet with cast integral feet under the casing. The discharge nozzle is at the 12 o'clock position and is self-venting by design. The impeller features hydraulic balancing holes to balance axial force. The pump features packing with a packing gland. Both suction and discharge flanges are raised face and rated for 250 pounds per square inch (PSI). The pump is standard clockwise rotation (as viewed from the driver end).

The casing features a radially split volute with renewable wear ring at the suction. The suction and discharge nozzles are integral to the casing. The impeller is of the single suction design with back pump out vanes designed to reduce axial forces. The rear cover features packing with packing gland. The power frame utilizes SKF, angular contact bearings for rotor support.

DATE OF MANUFACTURER

The date of manufacture is indicated on the Sales Order paperwork.

INSTALLATION, OPERATION & MAINTENANCE MANUAL **IDENTIFICATION**

PREPARED: MARCH 1, 2021 REVISION:

EDITION: 01 DATE:

NAMEPLATE INFORMATION

	FLO SERIAL NO.	125 MORRISON DRIVE ROSSVILLE, TN 38066 UNITED STATES OF AMERICA
FLOW	PRESSURE	POWER
SPEED	NPSHR	WEIGHT
δ		

FIGURE 1 - PUMP NAMEPLATE

MODEL:

Model of the pump

SERIAL NUMBER:

Serial number of the pump issued by Production Control

FLOW:

Rated flow rate of pump in Gallons Per Minute

PRESSURE:

Rated discharge pressure of the pump in Pounds Per

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Square Inch Gauge

POWER:

Rated Brake Horsepower at duty point

SPEED:

Rated Speed of pump in Revolutions Per Minute

NPSHr:

Net Positive Suction Head Required

WEIGHT:

Weight of the Pump Assemblu

WARRANTY

AMERIFLO offers new equipment manufactured by seller or service supplied by seller to be warranted to be free from defects in material and craftsmanship under normal use and service for a period of one year from date of shipment. Further details of the AMERIFLO warranty can be obtained from your AMERIFLO customer service representative.

Do not remove the pump warranty seal PRIOR to contacting AMERIFLO for warranty consideration. Removing the pump warranty seal without PRIOR AMERIFLO permission can invalidate a potential warranty claim.

INSTALLATION

- 1. Special attention must be paid to the baseplate during the foundation installation making sure stress is not induced on the baseplate. The motor end of the baseplate shall not be higher than the pump at any condition and the deviation shall not exceed ± 0.004 IN/FT [0.1 MM/M] between the baseplate and horizontal level. Recommended mass of the concrete foundation should be three (3) times that of the complete installed assembly (at a minimum). Note that foundation bolts are imbedded in the concrete inside a sleeve to allow some movement of the bolt making installation easier.
- 2. Level the pump baseplate assembly. If the baseplate has machined coplanar mounting surfaces, these machined surfaces are to be referenced when leveling the baseplate. This may require that the pump and motor be removed from the baseplate in order to reference the machined faces. If the baseplate is without machined coplanar mounting surfaces, the pump and motor are to be left on the baseplate. The proper surfaces to reference when leveling the pump baseplate assembly are the pump suction and discharge flanges. DO NOT stress the baseplate. DO **NOT** bolt the suction or discharge flanges of the pump

SECTION **4730** PAGE **8** OF **22**

DATE APRIL 2021

to the system piping until the baseplate foundation is completely installed. Use shims and wedges to level the baseplate to the foundation. See FIGURE 2. Check for level in both the longitudinal and lateral directions. Shims or wedges should be placed at all baseplate anchor bolt locations and in the middle of the baseplate if the base is more than five feet [1.5 meters] long. Do not rely on the bottom of the baseplate to be flat. Standard base plate bottoms are not machined and it is not likely that the field foundation surface is flat either.

3. After leveling the baseplate, tighten the anchor bolts in a diagonal pattern evenly. If shims or wedges were used, make sure that the baseplate was shimmed near each anchor bolt before tightening. Failure to do this may result in a torsional twisting of the baseplate, which could make it impossible to obtain a final and correct field alignment. Check the level of the baseplate to make sure that tightening of the anchor bolts did not disturb the level of the baseplate in any manner. If the anchor bolts did change the level, adjust the jackscrews or shims as needed to level the base plate again. Continue adjusting the jackscrews or shims and tightening the anchor bolts until the base plate is level.



FIGURE 2 - BASEPLATE FOUNDATION

GROUT THE BASEPLATE. A non-shrinking grout



SECTION 4730 PAGE 9 OF 22 DATE APRIL 2021

should be used. Grout compensates for uneven foundation, distributes weight of the unit and prevents the entire installation from shifting. Use only an approved, non-shrinking grout after setting and leveling the unit.

a. Build a strong form around the foundation to contain the grout.

b. Soak the top of the concrete foundation thoroughly and remove all surface water. c. A raised motor pedestal should also be completely filled with grout during this process. d. After the grout has thoroughly hardened, check the foundation bolts and tighten if necessary. e. Approximately 14 days after the grout has been poured or when the grout has thoroughly cured, apply an oil base paint to the exposed edges of the grout to prevent air and moisture from coming in contact with the grout.

Make sure that the grout completely fills the area under the baseplate or in the case of an I-beam base, all compartments are completely filled to the top. After the grout has cured, check for voids and repair them.



CAUTION - Once the baseplate is grouted, the baseplate cannot be adjusted so it is extremely important that all alignment procedures be completed PRIOR to grouting.

5. Run the system piping to the suction and discharge flanges of the pump. There should be no piping loads transmitted to the pump after connection is made. Recheck the alignment to verify that there are no significant loads being transferred to the pump. Remember, pipe strain is invisible and alignment checks must be made after system connection to make sure none exist.

EXISTING GROUTED BASE PLATES

When a pump is being installed on an existing grouted baseplate, the procedure is somewhat different from the previous section "New Grouted Base Plates."

- 1. Mount the pump on the existing baseplate.
- 2. Level the pump by putting a level on the discharge flange. If not level, add or delete shims between the pump foot and the baseplate.
- 3. Check initial field alignment. (Step 5 above)
- 4. Run the piping to the suction and discharge flanges of the pump. (Step 7 above)

- 5. Perform final field alignment. (Step 8 above)
- 6. Recheck field alignment after the pump is hot. (Step 8) above)

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All piping must be independently supported, accurately aligned and preferably connected to the pump by a short length of flexible piping. The pump should not have to support the weight of the pipe or compensate for misalignment. It should be possible to install suction and discharge bolts through mating flanges without pulling or prying either of the flanges.

All piping must be tight. Pumps may air-bind if air is allowed to leak into the piping. If the pump flange(s) have tapped holes, select flange fasteners with thread engagement at least equal to the fastener diameter but that do not bottom out in the tapped holes before the joint is tight.

PIPING - SUCTION & DISCHARGE

SUCTION PIPING

Suction and discharge piping should be installed per Hydraulic Institute and NFPA 20 standards. Do not use the pump as an anchorage point for the piping. A suction lift line should be laid with a continuous upward slope and a suction head line with a continuous downward slope towards to the pump. The suction line shall be as short as possible and connected to the pump properly without transmitting any stresses or stains from the system piping to the pump.

Tie bolts should be used with expansion joints to prevent pipe strain being transferred to the pump casing. Do not install expansion joints next to the pump or in any way that would cause a strain on the pump resulting from system pressure changes.

It is usually advisable to increase the size of both suction and discharge pipes at the pump connections to decrease the loss of head from friction. When reducing the piping to the suction opening diameter, use an eccentric reducer with the eccentric side down to avoid air pockets.

Piping should be supported independently of the pump so as to not transfer any strain to the pump casing. Piping runs should be as short as possible with the nominal diameter of the piping equal to or greater than the diameter of the pump suction. The additional loads on the nozzles are mainly the weight of piping filled with water. The fluctuation of medium temperature leads to the change of pipeline length. The stress caused by the unsupported auxiliary equipment shall not exceed the limit.



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Before installing the pump in the piping, remove the flange covers on the suction and discharge nozzles of the pump. After all piping connections have been made, the alignment should be checked again.

DISCHARGE PIPING

If the discharge piping is short, the pipe diameter can be the same as the pump discharge opening. If the piping is long, pipe diameter should be one or two sizes larger than the pump discharge opening. On long horizontal runs, it is desirable to maintain as even a grade as possible.



WARNING - When fluid velocity in the pipe is high, for example, at or above 10 ft/s [3 m/s], a rapidly closing discharge valve can cause a damaging pressure wave. A dampening arrangement should be provided in the piping.

PRESSURE GAUGES

Properly sized pressure gauges are installed on both the suction and discharge nozzles in supplied gauge taps. Stainless steel tubing (with integral pulsation damping) are supplied standard at both the suction and discharge locations. These gauges will allow the end user a proper differential pressure reading that the pump is generating. These gauges will enable the operator to easily observe the operation of the pump and also determine if the pump is operating in conformance with the performance curve. If cavitation, vapor binding or other unstable operation should occur, widely fluctuating discharge pressure readings will be noted.

ACCESSORIES

Dimensions and installation locations of accessories (control panel, main relief valves, fuel tank, battery, etc.) are specified in the equipment installation and piping layout drawings. More detailed installation instructions are provided in the operating instructions for each component. These accessories will ensure the normal operation of the pump and driver.

The diesel engine bearing centerline and the pump bearing centerline angle must be kept to 2° (with a ± 1° deviation). See FIGURE 8.

MECHANICAL SEAL

All 4730 VM multistage pumps supplied by AMERIFLO are equipped with cartridge mechanical seal. Turn the shaft to ensure it does not bind on the bore of the gland assembly.

SECTION 4730 PAGE 10 OF 22 DATE APRIL 2021



CAUTION - It is very important to inspect and ensure that the mechanical seal is installed correctly. Failure to do so could result in serious leakage of the pumped fluid..

COUPLING GUARDS

It is very important that all coupling guards (at the driver coupling and near the pump mechanical seal location) be installed PRIOR to startup. Failure to do so can cause serious injury or death.



ROTATING EQUIPMENT - Severe injury and/or death can occur if all coupling guards are not properly installed PRIOR to pump startup.

A direction arrow is cast on the pump casing. Make sure the motor rotates in the correct direction before coupling the motor to the pump. Three phase wiring can be connected in an incorrect manner allowing the motor to operate in the incorrect direction.

It is absolutely essential that the rotation of the motor be checked before connecting the shaft coupling. Incorrect rotation of the pump, for even a short time period, can dislodge the impeller nut which may cause serious damage to the rotating assembly.

The coupling should be installed as advised by the coupling manufacturer. Pumps are shipped without the spacer installed to make sure proper rotation and the proper alignment procedures are followed. If the spacer has been installed to facilitate alignment, then it must be removed prior to checking rotation. Remove all protective material from the coupling and any exposed portions of the shaft before installing the coupling itself.

PUMP STARTUP

Refer to PRE-START UP and START-UP sheets at the end of this manual for proper start-up procedures.

ROTATION CHECK



WARNING - It is EXTREMELY important that the rotation of the motor is confirmed before installing the shaft coupling. Incorrect rotation, even for a short period, can cause catastrophic damage to the pumping unit.

VM pumps can only operate clockwise (as viewed from the driver). Double check the rotation PRIOR to starting up the pump unit.



SECTION 4730 PAGE 11 OF 22 DATE APRIL 2021 PRE START-UP CHECKS

In order to have a smooth start-up, the following list MUST be checked.

- The pump and driver are securely bolted to the foundation.
- The motor rotation has been confirmed.
- The system piping is connected correctly, is liquid tight and is not transmitting any pipe strain to the pump casing.
- The shaft assembly is free to rotate without any binding.
- The coupling guards are installed correctly.
- Confirm that no damage is present to any system device including the pump and driver.
- Confirm that all safety devices are installed correctly (casing relief valve, main relief valve, diesel engine cooling loop, etc.) according to their respective installation instructions.
- Pump has been properly lubricated.
- System piping and pump are properly primed with no air present.
- Packing is installed correctly and the gland bolts are loose.

PRIMING

If the pump is installed with a positive head on the suction line, it can be primed by opening the suction valve and venting air through the air relief valve in the pump or system to allow the liquid to enter the casing. If the pump is installed with a suction lift, priming must be done by some other method such as by using foot valves, ejectors or by manually filling the casing and suction line.



WARNING - Failure to ensure that the pump is completely filled with liquid PRIOR to start-up can cause catastrophic damage to the pumping assembly and Diesel engine (if supplied).

ENSURING PROPER NPSHA

Net Positive Suction Head – Available (NPSHA) is the measure of the energy in a liquid above the vapor pressure. It is used to determine the likelihood that a



fluid will vaporize within the pump. It is a critical number because a centrifugal pump is designed to pump a liquid, not a vapor. Vaporization within a pump will result in damage to the pump, deterioration of the Total Differential Head (TDH) and possible catastrophic damage to the pump.

Net Positive Suction Head – Required (NPSHR) is the decrease of fluid energy between the inlet of the pump and the point of lowest pressure in the pump. This decrease occurs because of friction losses and fluid accelerations near the inlet region of the pump suction as the fluid enters the impeller vanes. The value for NPSHR for the specific pump is given in the pump data sheet and on the pump performance curve.

For a pump to operate properly the NPSHA must be greater than the NPSHR. Good design practice dictates that this margin should be at least 5 ft (1.5 m) or 20% more than NPSHR, whichever is greater. By using this guideline, it will reduce the likelihood of cavitation which can severely damage the pump and cause possible catastrophic damage.



WARNING - It is important to make sure that the NPSHA is larger than the NPSHR by the suggested margin above. Incorporating this into the system design will enhance pump performance & reliability.

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-AMERIFLO -**STARTING THE PUMP & ADJUSTING FLOW**

1. When starting the pump it is very important to make sure the suction valve is completely open. Any throttling of the pump to control flowrate should always be done with the valve located in the discharge piping.



DANGER - Never operate the pump with the suction and discharge valves in the closed position. This could cause the fluid within the pump to vaporize and cause an explosion which could cause personal injury and/or death.

- 2. The pump must be fully primed for correct operation. while keeping the discharge valve closed. Open the suction valve to allow the pump to be primed. The casing air release valve should help evacuate any air from the pump and system.
- 3. Be sure that all cooling lines are connected to the pump and that all fluids are at proper levels if using a diesel engine.
- 4. Start the driver.
- Slowly open the discharge valve until the correct 5. flowrate is achieved. Be sure that the unit does not operate a lower than specified flows for extended periods as this could cause damage to the pump and/ or other system equipment.



DANGER - Never allow the pump to operate for an extended period of time at shut-off. This could cause the fluid within the pump to vaporize and cause an explosion which could cause personal iniurv and/or death.

Monitor the pump performance, motor performance 6. (if equipped) and any other overall performance measures to make sure the unit is operating as it should be.

The pump and driver assembly should be shut down immediately if any of the following situations exist.

- No liquid is delivered.
- A significantly lower amount of fluid is being delivered.
- A significantly lower discharge pressure is being delivered.
- Loss of liquid after the pump starts up.



- DATE APRIL 2021 Excessive vibration from the pump and/or driver.
- Electric motor is running hot or overheating.

OPERATION IN SUB-FREEZING CONDITIONS

If the unit will operate in sub-freezing temperatures, measures must be taken to ensure that no fluid is allowed to freeze within the pump, system piping and/or diesel engine. Frozen fluid can cause catastrophic damage to the pump and system. A heater or other means for keeping the equipment warm must be placed in the filed for proper pump operation.

SHUTDOWN CONSIDERATIONS

When the pump is ready to be shutdown, follow the startup procedures in reverse. Slowly shut the discharge valve (if desired), shutdown the driver and then close the suction valve (if desired).

TROUBLESHOOTING

The following is a guide to troubleshooting problems with AMERIFLO Pumps & Engines. Common problems are analyzed and solutions are offered. Obviously, it is impossible to cover every possible scenario. If a problem exists that is not covered by one of these examples, then contact a local AMERIFLO Engineer or Distributor/ Representative for assistance. Refer to the appropriate AMERIFLO diesel engine Installation, Operation & Maintenance manual for specific engine service and troubleshooting instructions.

SECTION 4730	PAGE 13	OF	22	

DATE APRIL 2021

CESSIVELY LOW DISCHARGE PRESSURE	CESSIVELY HIGH DISCHARGE PRESSURE	OW RATE TOO HIGH	OW RATE TOO LOW	TOR HIGH AMPERAGE	LIQUID AFTER PUMP START-UP	LIQUID PRESENT IN SYSTEM	ISY OPERATION & EXCESSIVE VIBRATION	6H PUMP TEMPERATURE	6H PUMP BEARING TEMPERATURE	CESSIVE PACKING LEAKAGE	MP LEAKAGE	TROUBLESHOOTING			
EX	EX	FL	FL	MO	0 N	0 N	NO	Ħ	HIC	EX	PU	POSSIBLE CAUSE	REMEDY		
٥	٥	0	٥	0	٥		٥	٥				PUMP DUTY POINT NOT COMPATIBLE WITH SYSTEM HEAD CURVE	RE-EVALUATE THE PUMP DUTY AND MAKE A NEW HYDRAULIC SELECTION		
							0					PUMP AND/OR SYSTEM PIPING ARE NOT PRIMED AND VENTED	VENT AND/OR PRIME THE PUMP AND SYSTEM PIPING		
Q			¢		٩	٩	٩	Q				SUCTION PIPING PLUGGED OR IMPELLER OBSTRUCTION	 INSPECT/CLEAN IMPELLER INSPECT THE SUCTION PIPING REMOVE OBSTRUCTIONS IN THE IMPELLER OR SYSTEM PIPING REMOVE DEBRIS FROM ANY STRAINERS IN THE SYSTEM 		
						0	€	٢	R			CAVITATION SOUND IN PIPING	ADJUST THE SYSTEM PIPING WITH A FOCUS ON NPSHA & NPSHR ALTER THE SYSTEM PIPING TO IMPROVE NPSHA		
Ø			0		0	0	٩					INADEQUATE NPSHA	CHECK PUMP OPERATION IMPROVE SUCTION PIPING IMPROVE NPSHA THROTTLE THE PUMP INSTALL THE PUMP AT A LOWER POINT IN THE SYSTEM MODIFY THE SUCTION PIPING BY CHANGING SIZE AND LENGTH		
٥			\$	0			٩					INCORRECT ROTATION	CHECK MOTOR WIRING CONFIRM CONTROL PANEL WIRING CONFIRM IMPELLER INSTALLED CORRECTLY		
٥			0				٩					SPEED IS TOO LOW	INCREASE THE SPEED INSPECT SYSTEM CONTROLS INSTALL A LARGER IMPELLER		
0			0	0	٥	¢						WORN INTERNAL COMPONENTS	CONFIRM DUTY POINT REQUIREMENTS THROTTLE THE PUMP INSPECT PUMP FLUID FOR ABRASIVES OR CHEMICAL ATTACK REPLACE WORN COMPONENTS		
				0								NEEDED DISCHARGE PRESSURE IS LOWER THAN ORDERED	READJUST THE DUTY POINTTHROTTLE THE PUMP		
				٥								HIGHER VISCOSITY OF PUMPED FLUID	REDUCE THE SPEED INSPECT THE PUMP & MOTOR		
	٥	٥		٥			٥					SPEED IS TOO HIGH	REDUCE THE SPEED INSPECT THE PUMP & MOTOR		



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													DATE APRIL 2021			
CESSIVELY LOW DISCHARGE PRESSURE	CESSIVELY HIGH DISCHARGE PRESSURE	JW RATE TOO HIGH	JW RATE TOO LOW	TOR HIGH AMPERAGE	LIQUID AFTER PUMP START-UP	LIQUID PRESENT IN SYSTEM	ISY OPERATION & EXCESSIVE VIBRATION	H PUMP TEMPERATURE	H PUMP BEARING TEMPERATURE	CESSIVE PACKING LEAKAGE	MP LEAKAGE	TROUBLESHOOTING				
EX	EX	FLO	FLO	M M O	N N	No	NO	BIH	BIH	EX	PUI	POSSIBLE CAUSE	REMEDY			
											٩	CAPSCREWS/STUDS ARE LOOSE OR DEFECTIVE	 INSPECT CAPSCREWS/STUDS RE-TIGHTEN THE FASTENER REPLACE THE HARDWARE INSPECT THE PIPING AND MAKE SURE ALL HARDWARE IS TIGHT 			
										٥		WORN PACKING	INSPECT FLUSHING SYSTEM & FLUSHING SYSTEM PRESSURE CLEAN THE STUFFING BOX AND FLUSH LINES INSTALL NEW PACKING REPLACE WARN COMPONENTS			
٥			٥				٥		٢			INSUFFICIENT FLUID AT SUCTION	CORRECT SYSTEM PIPING INSPECT SYSTEM PIPING FOR WEAR AND/OR DAMAGE			
								O		0		PACKING GLAND INSTALLED INCORRECTLY	CHANGE PART REPLACE PART CORRECT INSTALLATION REPLACE PACKING REPLACE WORN COMPONENTS			
								٥		٥		COOLING FLUID INADEQUATE	CHECK FLUSHING SYSTEM CLEAN FLUSHING SYSTEM OR INCREASE PRESSURE OF LIQUID INCREASE AMOUNT OF LIQUID LOOSEN GLAND ASSEMBLY			
							٥		Q			COUPLING MISALIGNMENT AND VIBRATION	 REALIGN PUMP & DRIVER CHECK SYSTEM PIPING FOR PIPE STRAIN INSTALL ANTI-VIBRATION ACCESSORIES 			
									٥			HIGH AXIAL THRUST	CONFIRM THE DUTY POINT CHECK THE SYSTEM CHECK THE SUCTION FLOW RATE			
									٥			EXCESSIVE LUBRICATION	CLEAN THE BEARINGS RE-LUBRICATE CHANGE TYPE OF GREASE			
٥		٥	٥									MOTOR RUNNING ON ONLY TWO- PHASES	CHECK FUSES INSPECT ELECTRICAL CONNECTIONS INSPECT CONTROL PANEL			
							٥		٥	٥		ROTOR IMBALANCE	CLEAN THE IMPELLER CHECK ROTOR BALANCE RE-BALANCE THE IMPELLER			
							٥		٥	٥		DEFECTIVE BEARINGS	REPLACE			



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CESSIVELY LOW DISCHARGE PRESSURE	CESSIVELY HIGH DISCHARGE PRESSURE	DW RATE TOO HIGH	DW RATE TOO LOW	TOR HIGH AMPERAGE	LIQUID AFTER PUMP START-UP	LIQUID PRESENT IN SYSTEM	ISY OPERATION & EXCESSIVE VIBRATION	6H PUMP TEMPERATURE	6H PUMP BEARING TEMPERATURE	CESSIVE PACKING LEAKAGE	MP LEAKAGE	TROUBLESHOOTING				
EXC	EXC	FLC	FLC	ЮW	NO	NO	NOI	HIG	HIG	EX	PU	POSSIBLE CAUSE	REMEDY			
							O	0				FLOW RATE IS TOO LOW	RE-ADJUST THE DUTY POINT OPEN THE SUCTION VALVE COMPLETELY OPEN THE DISCHARGE VALVE COMPLETELY RE-CALCULATE SYSTEM FRICTION LOSSES			
Q			٩									STAR-DELTA MOTOR STUCK IN DELTA MODE	CHECK THE ELECTRICAL CABLE CONNECTIONS CHECK THE CONTROL PANEL			
0			٥				٥					ENTRAPPED AIR IN THE FLUID	VENT THE SYSTEM INSPECT THE PACKING AREA			
٩			٩		0	٥	0					AIR ENTERING SYSTEM THROUGH	IMPROVE SUCTION PIPING REDUCE FLUID VELOCITY IN SUCTION PIPING INSPECT THE PACKING SEAL AREA REPLACE DAMAGED PIPING			
							٥					CAVITATION NOISE	 REDUCE FLUID VELOCITY IN SUCTION PIPING INSPECT SYSTEM PIPING SHORTEN SUCTION PIPING INSTALL THE PUMP AT A LOWER POINT IN THE SYSTEM 			
							٥		٥			BASE PLATE FLEXING	INSPECT REPLACE			
٥			0		٥	0	0					PARALLEL PUMP OPERATION ISSUES	RE-ADJUST THE DUTY POINT ALTER THE PUMP PERFORMANCE			
							٥		٥			SHAFT SIZE INCORRECT	REPLACE			
													CHECK THE ROTOR			

IMPELLER WEAR ON PUMP CASING

SECTION 4730 PAGE 15 OF 22



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0 0 CHECK THE IMPELLER POSITION CONFIRM NO PIPE STRAIN PRESENT

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-AMERIFLO -MAINTENANCE

PREVENTATIVE MAINTENANCE

The MAINTENANCE section of this manual will give the end user a complete procedure for giving the pump a complete overhaul. There are also sub-sections that detail other important maintenance procedures that may come up during normal pump & driver operation. It is also important to note that periodically the PRE START-UP checklist should be reviewed to make sure that site conditions have not changed since the initial start-up.

NEED FOR MAINTENANCE RECORDS

It is very important that the end user keep a record of daily. weekly, monthly and yearly maintenance records. These records are important when certain milestone events that need to be performed are recorded in a central location. From these records other important information can be gathered including trending in certain data. The analysis of this data can help with future maintenance issues and also help with elminating certain issues that may be effecting pump or driver performance. Lastly, when and if a warranty claim is ever addressed at some future date, AMERIFLO personell will ask for all pertinent maintenance records so that they have a clear picture of what has been done to the unit.

NEED FOR CLEANLINESS

Perhaps the major cause of pump & driver failure has to do with contamination at the job site. Contamination can be in the form of moisture, dust, dirt or other foreign debris from the job site. This contamination is very harmful to the bearings in the pump. Dust and other debris can plug air and fuel filters in diesel engine drivers.

It is very important to maintain as clean of an area as job site conditions permit. When preventative maintenance is being performed on the pump & driver, make sure this maintenance is done in a clean area as well. Do not unpack bearings until they are ready to be immediately installed. Make sure filters and engine fluids are changed per the recommended intervals. Work should be done in an area free of moisture, dust, dirt, oil or grease. Never re-use bearings, gaskets, lip seals, o-rings and filters. Only use clean towels, shop rags and other tools when performing maintenance.

Due to the location of many pump rooms, flooding is a common occurance. Servicing the pump is a fairly straightforward process.

The bearings in the rotor assembly need the most attention during this time period. Completely remove the pump from the installation and proceed to the later section for DISASSEMBLY. AMERIFLO's recommendation is that all gaskets and roller bearings be replaceed as all most likely have been in contact with water.

Inspect the stuffing boxes and make sure that they are clear of any foreign debris. AMERIFLO aslo recommends that the stuffing boxes be repacked with new packing to make sure foreign debris will not score any shaft sleeves while in service.

Dismantle all couplings and thoroughly clean them.

ROUTINE MAINTENANCE CHART

R	ROUTINE MAINTENANCE CHART									
SCHEDULE	# PEOPLE	TASK								
EVERY WEEK	1	 VISUALLY CHECK FOR LEAKS CHECK FOR LUBRICATION HAND TEST BEARING HOUSING FOR ANY SIGN OF TEMPERATURE RISE 								
EVERY MONTH	1	CHECK BEARING TEMPERATURE WITH INSTRUMENTATION								
EVERY 6 MONTHS	1	CHECK THE PACKING AND REPLACE IF NECESSARY CHECK ALIGNMENT OF THE PUMP AND MOTOR CHECK HOLDING DOWN BOLTS FOR TIGHTNESS CHECK COUPLING FOR WEAR								
EVERY YEAR	1	CHECK ROTATING ELEMENT FOR WEAR CHECK WEAR RING CLEARANCES CHECK AND MEASURE TOTAL DYNAMIC SUCTION AND DISCHARGE HEAD								
EVERY 4 YEARS	2	COMPLETE PUMP INSPECTION								



SECTION 4730 PAGE 17 OF 22 DATE APRIL 2021 DISASSEMBLY

DRIVER

Refer to the specific Installation, Operation and Maintenance manual for the driver.

PUMP

Refer to FIGURE XX for item numbers used in the disassembly process.



DANGER - Lockout power to the driver to prevent personal injury or death.

Whenever any disassembly work is to be done on the pump, disconnect the power source to the driver to eliminate any possibility of the unit starting. Close the valves in the suction and discharge line. Allow the pump set to cool to ambient temperature. Properly depressurize and drain the pump.

Always have repair work and maintenance work performed by specially trained, qualified personnel. Only use original authentic parts from AMERIFLO. Contact AMERIFLO if any questions regarding disassembly or assembly arise.

No special tools are required to remove the coupling. Please refer to the manufacture instructions for proper disassembly.

Remove the coupling guard screws (#2) abd remove both coupling guard halves (#1b). Remove the coupling bolts (#9) and the coupling (#5) from the motor and pump shaft (#51). Remove the motor (#40) from the motor bracket (#3).

The mechanical seal (#34) can be removed from the motor bracket (#3) and replaced. This cartridge mechanical seal (#34) is threaded into the motor bracket (#3). The cartridge mechanical seal (#34) can be removed and replaced without removing the motor (#40) from the pump assembly. Removing the coupling bolts (#9) and coupling (#5) allows for access to remove and replace the cartridge mechanical seal (#34).

Remove the tie rod (#5) nuts & washer (#8 & 8a).move the motor bracket (#3). The stack assembly can now be removed from the pump assembly. Replacement stacks are available for each VM model.

Remove the tack straps (#14) to allow access to all stack

components. Remove the stack components: mpellers (#49), diffusers (#4), bearings (#47a), impeller collets (#47) and support diffuser (#4a).

INSPECTION

All parts should be thoroughly cleaned.



WARNING - It is important that only nonflammable, non-contaminated cleaning fluids are used. These fluids must comply with plant safety and environmental quidelines.

Visually inspect all parts for any damage that could effect performance. Replace all o-rings (#30), bearings (#47a), cartridge mechanical seal (#34), and neck rings (#4b & #4c). Install the shaft (#51) between centers and check the concentricity over it's entire length. Concentricity should not exceed 0.002 in [0.051 mm]. Bearing surfaces should be smooth with square shoulders and no other scoring marks. Replace any parts that are outside of factory tolerances.

Inspect the neck ring (#4b & #4c) and impeller hub (#49) for any excessive wear. Confirm that the running clearances between the impeller (#49) and neck wear ring (#4b & 4c) are within factory tolerances. Surfaces must be smooth and concentric. Inspect impeller passages for any cracks, dents or foreign material. Replace any parts that are outside of factory tolerances.

When replaceing parts only use genuine AMERIFLO parts. Refer to the appropriate AMERIFLO aftermarket repair manual for the correct part numbers.



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SECTION 4730 PAGE 18 OF 22 DATE APRIL 2021 **RECOMMENDED SPARE PARTS**

Refer to TABLE III for all bolt tightening torque information
and FIGURE 10 for tightening sequence.

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ASSEMBLY

BOLT	SIZE	TIGHTENIN	G TORQUE
METRIC	STANDARD	LB-FT	N-M
4 MM	5/32 IN	2.7	3.6
5 MM	3/16 IN	5.2	7.0
6 MM	1/4 IN	8.9	12.0
7 MM	9/32 IN	14.6	19.8
8 MM	5/16 IN	21.8	29.6
9 MM	11/32 IN	28.0	38.0
10 MM	3/8 IN	38.7	52.5
12 MM	1/2 IN	65.6	89.0
14 MM	9/16 IN	99.6	135
16 MM	5/8 IN	151	205
18 MM	11/16 IN	190	257
20 MM	3/4 IN	264	358
22 MM	7/8 IN	321	435
24 MM	15/16 IN	411	557

TABLE 3 - CAPSCREW & NUT TIGHTENING TORQUE RATINGS

It is very important that all pipe threads be sealed properly. PTFE tape provides a very reliable seal over a wide range of fluids but it has serious shortcomings if not used properly. If, during application to the threads, the tape is wrapped over the end of the male thread, strings of the tape will be sheared off when threaded into the female fitting. This string can then tear away and lodge in the piping system. If this occurs in the seal flush system, small orifices can become blocked effectively eliminating the flow. For this reason, AMERIFLO does not recommend the use of PTFE tape as a thread sealant.

AMERIFLO has investigated and tested alternate sealants and has identified two that provide an effective seal, have the same chemical resistance as the PTFE tape and will not plug flush systems.

These are La-co SlicTite and Bakerseal. Both products contain finely ground PTFE particles in an oil based carrier. They are supplied in a paste form which is brushed on the male pipe threads. AMERIFLO recommends using one of these paste sealants.

Full thread length engagement is required for all fasteners.

Reassembly of the pump can be accomplished in the reverse order.



	N	NUMBER OF INSTALLED PUMPS											
PART	2	3	4	5	6	8	≥ 10						
QUANTITY OF SPARE PARTS O													
IMPELLER	1	1	1	2	2	2	30%						
CASE WEAR RING	4	4	4	6	6	6	50%						
HARDWARE	1	1	2	2	2	3	30%						
BEARING	2	2	4	4	6	8	100%						
SHAFT SLEEVE	4	4	4	6	6	8	50%						
MECHANICAL SEAL	4	6	8	10	12	16	150%						

O Recommended spare parts for 2 years of operation

DATE APRIL 2021 **MODEL VM - VERTICAL MULTISTAGE COMPONENT BREAKDOWN**



1 - Coupling guard 1a - Coupling guard 2 - Hexagon Socket Head Screw 3 - Motor Bracket 4 - Diffuser 4a - Support Diffuser 4b - Neck Ring Cover 4c - Neck Ring 5 - Coupling 5a - Inducer 7 - Shaft Pin 8 - Nut & Washer 8a - Nut & Washer 9 - Hexagon Socket Head Screw 10 - Clip Cover 14 - Strap 17 - Impeller Sleeve 23 - Nut & Washer 24 - Impeller Collet 25 - Tie-Rod 26g - Flange Type Suction & Discharge Chamber 28 - Drain Plug 29 - Drain Plug 30 - O-ring 31 - O-ring 33 - Impeller Sleeve (S) 33b - Impeller Sleeve (L) 34 - Mechanical Seal 36 - Air Vent Plug 37 - O-ring 38 - Air Vent Plug 39 - Screw & Washer 40 - Motor 46 - Adjusting Gromett 47a - Bearing 49 - Impeller 50a - Top Diffuser 51 - Shaft 55 - Outer Casing 63 - O-ring Retainer 65 - Hexagon Socket Head Screw

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28

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FIGURE 4730 VM INSTALLATION, OPERATION & MAINTENANCE MANUAL ©2021 AMERIFLO

-AMERIFLO

PRESTART-UP CHECKLIST

AMERIFLO REPRESENTATIVE:	REP PHONE NUMBER:	
CONTRACTOR:	CONTRACTOR PHONE NUMBER:	
PROJECT ENGINEER:	ENGINEER PHONE NUMBER:	
PROJECT NAME:	PUMP LOCATION:	

EQUIPMENT INFORMATION

PUMP MODEL:	PUMP S/N:	ES:	
MOTOR MODEL:	MOTOR S/N:	VI:	
ENGINE MODEL:	ENGINE S/N:	SC:	
GEAR MODEL:	GEAR S/N:	VT:	

PROCEDURE		YES	NO	N/A	COMMENTS		
1. SHIPMENT							
WAS THERE ANY DAMAGE DURING SHIPMENT?							
WERE ALL ORDERED ITEMS RECEIVED?							
2. STORAGE							
HAS EQUIPMENT BEEN PROTECTED FROM THE WEATHER?							
WAS EQUIPMENT SUBJECT TO DAMAGE IN STORAGE?							
HAVE ALL BEARINGS BEEN PROTECTED FROM MOISTURE?	?						
3. INSTALLATION							
IOM MANUAL COMPLETELY READ AND UNDERSTOOD?							
WERE FASTENERS USED IN SHIPPING AND REMOVED PRIOR TO INSTALLATION?		-					
IS GROUTING UNDER BASE PROPERLY COMPACTED?							
IS GROUT OF THE NON-SHRINK TYPE?							
HAVE PROPER ANCHOR BOLTS BEEN USED?							
HAVE SUCTION AND DISCHARGE PIPING BEEN CHECKED FOR THE PRESENCE OF PIPE STRAIN?							
ARE LUBRICATION LINES AND COOLING LINES CONNECTED PROPERLY?							
ARE ACCESSORIES MOUNTED AND PROPERLY INSTALLED?							
ARE ALL SAFETY GUARDS INSTALLED PROPERLY?							
HAVE IMPELLERS BEEN CHECKED FOR PROPER CLEARANCE?							
IS ALL WIRING CONNECTED PROPERLY AND CHECKED FOR VOLTAGE, PHASE, FREQUENCY, ETC.?							
4. ALIGNMENT							
HAS THE PUMP & DRIVER ALIGNMENT BEEN CHECKED?							
HAVE INDICATOR READINGS BEEN TAKEN?							
5. ROTATATION							
HAS THE DRIVER ROTATION BEEN CHECKED?							
COUPLING & SHAFT TURNED AND FREE TO ROTATE?							
6. SYSTEM							
IS THE SYSTEM FREE OF FOREIGN DEBRIS?							
IS LIQUID PRESENT IN SYSTEM?							
ALL SYSTEM PIPING IS PROPERLY SUPPORTED?							
ARE THE PUMPS AND CONTROLS ACCESSIBLE AND UNLOCKED?							
CUSTOMER'S REPRESENTATIVE WITNESSING START-UP AMERI		IFLO REPRESENTATIVE WITNESSING START-UP:					
NAME: DATE:	N/	NAME: DATE:					
AMERIFLO 125 Morrison Road, Rossville, TN 38066 www.ameriflo-usa.com				47	30 VM INSTALLATION, OPERAT	ION & MAINTENANCE MANUAL ©2021 AMERIFLC	

SECTION 4730 PAGE 21 OF 22									- AMERIFLO -	
DATE APRIL 2021										
				-		REP	PHONE N			
				-		ЛОк	PHONE N			
				-	ENGIN	IEek	PHONE N	UMBER.		
PROJECT NAME:				-			PUMPLO	CATION:		
EQUIPMENT INFORMATION										
PUMP MODEL:	PUM	√IP S/N:						ES:		
MOTOR MODEL:	мотс	DR S/N:				-		VI:		
ENGINE MODEL:	ENGINE S/N:			SC:						
GEAR MODEL:	GE/	AR S/N:				_		VT:		
PEOLON CONDITIONS										
FLOW.	RPM:				VC	דאר דאכ	2⊑·			
	HP.			-	• -	DHAS			_	
	111.			-		FLUSS	DE		_	
PROCEDURE		YES	NO	N/A	CON	IME	NTS			
1. PRESTART-UP		'			<u> </u>					
HAS THE PROCEDURE CHECKLIST FOR PRE- START-UP BEEN COMPLETED?	-									
VERIFY PUMP ROTATION:	1	'			0 C	WE	CCW (AS VIEW	/ED FROM THE MOTOR)	
VERIFY DRIVER ROTATION:					□ с	WC	CCW (AS VIEW	ED FROM THE MOTOR)	
2. IMPELLER CLEARANCE SETTING										
HAS IMPELLER BEEN PROPERLY ADJUSTED	?									
VTP AXIAL IMPELLER CLEARANCE:	IN									
3. LUBRICATION		· ·								
HAVE THE BEARINGS BEEN PROPERLY LUBF CATED?	{ -									
HAS THE COUPLING BEEN PROPERLY LUBRI CATED?	-									
HAS THE MOTOR BEEN PROPERLY LUBRICA	TED?	□ '								
DIESEL ENGINE COOLANT LEVEL CHECKED?	2									
DIESEL ENGINE OIL LEVEL CHECKED?	1									
DIESEL ENGINE FUEL LEVEL CHECKED?										
4. SYSTEM		<u> </u>			T					
HAS FLOW BEEN ESTABLISHED?										
HAVE GAUGE READINGS BEEN TAKEN?	I									
EXCESSIVE VIBRATION PRESENT?	I									
BEARING TEMPERATURE NORMAL?	1									
ENGINE TEMPERATURE NORMAL?	I									
5. PACKING			1		1					
PACKING BROKEN IN CORRECTLY?										
PACKING LEAKAGE IS ACCEPTABLE AFTER BREAK-IN PERIOD?						_				
CUSTOMER'S REPRESENTATIVE WITNESSING STAR	T-UP:	<u> </u>	AMER	IFLO LL	C REPF	RESE	NTATIVE V	VITNESS	SING START-UP:	
NAME: DATE:	AME: DATE:			NAME: DATE:						



				S	ECTION 4	730 PAGE	22 OF 22			
						DATE AF	RIL 2021			
FIELD TEST REPORT										
AMERIFLO REPRESENTATIVE:		REP PHONE NUMBER:								
CONTRACTOR:		CONTRACTOR PHONE NUMBER:								
PROJECT ENGINEER:				ENGINEER PHO	ONE NUMBER:					
PROJECT NAME:				PUN	IP LOCATION:					
				1 1						
					50					
	MP S/N:				ES:	□ _				
	DR S/N:				VI:					
ENGINE MODEL: ENGIN	NE S/N:				SC:					
GEAR MODEL: GEA	AR S/N:				VT:					
DESIGN CONDITIONS										
			-	VULIAGE.		-				
PRESSURE: F.				PRAJE.		-				
PROCEDURE	YES	NO	N/A	COMMENTS	<u> </u>					
1. PRESTART-UP				-						
HAS THE PROCEDURE CHECKLIST FOR PRE- START-UP BEEN COMPLETED?										
2. START-UP										
HAS THE PROCEDURE CHECKLIST FOR START-UP BEEN COMPLETED?										
3. SYSTEM										
SUCTION VALVE OPEN?										
SUMP LIQUID LEVEL CORRECT?										
SUMP CLEAR OF DEBRIS?										
ARE ALL SYSTEM VALVES IN THE CORRECT POSI- TION?										
IS ALL PIPING SECURE AND FLOW PROPERLY ROUTED?										
4. RECORDED DATA		POI	NT 1	POINT 2	POINT 3	POINT 4	POINT 5			
SPEED	(RPM):		-							
FLOW	(GPM):					 				
DISCHARGE PRESSURE	DISCHARGE PRESSURE (PSIG):									
	SUCTION PRESSURE (PSIG):									
LIFT (WATER LEVEL TO DISCHARGE CENTERLINE)	(FEE1):									
INPUT POWER (KW):										
CURRENT (AMPS):										
VOLTAGE (VOLTS):										
ESTIMATED FRICTION LOSS TO DISCHARGE GAUGE (FEET):										
	IENCT.	POI	NT 1	POINT 2	POINT 3	POINT 4	POINT 5			
	(TDH)	1 01					1 0111 0			
PUMP BHP (KW x MOTOR FEFICIENCY /	0 746)									
PUMP EFFICIENCY (TDH x SG x GPM) / BHP x 3960):										
CUSTOMER'S REPRESENTATIVE WITNESSING START-UP:	,	AMERI	FLO LL	C REPRESENTA	TIVE WITNESS	ING START-UP:				
NAME: DATE:			NAME: DATE:							

