Mud Puppy 250 Pump
Installation and Operation Manual

"RECYCLES THE MUD AND DUMPS THE CRUD"
MUD PUPPY
MUDPUPPYINC.COM

TABLE OF CONTENTS

FOREWORD

This manual contains instructions for the installation, operation, and maintenance of the MUD PUPPY 250 pump. As pump service conditions and specifications vary considerably in pump installation, this manual cannot cover every situation. But, it is intended that the information included will serve as a guide. Should questions arise, or start-up problems occur, it is suggested that you contact the Mud Puppy Corp. distributor or Sales Representative in your area.

The MUD PUPPY 250 pump generation is an improved version of older 2½ inch shaft pumps. The MUD PUPPY 250 pump is designed to give longer service life through a wear pad replacement casing, superior bearings, stainless shaft sleeve, labyrinth bearing cap seals, semi open impellers and stainless casing nuts.

There are many principles of proper pump installation and applications as well as special considerations for the MUD PUPPY 250 design that, if followed, will further enhance its performance.

This document will deal with both general and specific recommendations for improved Mud Puppy 250 performance in both oilfield and also industrial applications.

GENERAL INSTRUCTIONS

1. Operate the pump only in the performance range for which it was designed.
2. The pump driver must drive the pump CLOCKWISE when viewed from the coupling end. Reversing the rotation will damage the pump.
3. Do not operate the pump with the suction or discharge valves closed.
4. Adjust the packing so that a small amount of leakage remains for lubrication and cooling (not applicable for pumps equipped with mechanical seal).
5. When operating in drilling mud, prevent packing drip page from clogging the drip area and hardening around the slinger and front seal. See Section E for mechanical seal installation.

CAUTION!
EXERCISE SAFETY IN ALL PERFORMANCES: DO NOT IGNORE ANY WARNINGS; USE ONLY APPROVED METHODS, MATERIALS AND TOOLS. DO NOT PERMIT ANY FUNCTION OF QUESTIONABLE SAFETY; ACCIDENTS ARE CAUSED BY UNSAFE ACTS AND UNSAFE CONDITIONS.

WARNING!
FAILURE TO OBSERVE THE WARNINGS AND NOTES OF CAUTION IN THIS PUBLICATION CAN RESULT IN PROPERTY DAMAGE, SERIOUS BODILY INJURY, OR DEATH.

ATTENTION!
THESE TERMS ARE USED TO DRAW ATTENTION TO ACTION THAT WILL CAUSE DAMAGE TO THE PUMP, COMPONENTS OR ATTACHMENTS.

WARNING!
FAILURE TO SHUT DOWN POWER AND RELIEVE PRESSURE FROM THE PUMP BEFORE SERVICING CAN RESULT IN SERIOUS PERSONAL INJURY AND PROPERTY DAMAGE.

BEFORE SERVICING PUMPS

1. SHUT DOWN OR DISENGAGE THE PUMP POWER SOURCE.
2. SHUT DOWN ALL PUMP ACCESSORY EQUIPMENT.
3. RELIEVE OR "BLEED OFF" ALL PRESSURE FROM THE LINES PRIOR TO REMOVING PIPING.

INSTALLATION

INTERCHANGEABILITY

The MUD PUPPY 250 horizontal centrifugal pumps outside envelope dimensions are the same as older 2½ inch pumps of the same nominal size so the models can be interchanged without changing existing piping, couplings, or bases.

PUMP ASSEMBLY AND MOUNTING

To install the Mud Puppy 250 pump, place the pump on the machine lining up the pump with the mounting holes. Mount using (4) 5/8" X 2 ¾" bolts, (8) 5/8" flat washers (4) 5/8" lock washers and (4) 5/8" nuts.

250 Pump Short Body Pedestal

250 Pump Long Body Pedestal

LOCATION

The pump should be located near the liquid source so that the suction line may be short and direct. The pump should be located below the level of the liquid to eliminate the necessity of priming.

FOUNDATION

The foundation should be sufficiently rigid and substantial to absorb any vibration and support the base plate at all points. A concrete foundation, poured on a solid footing of adequate thickness to support the pumping unit, provides the most satisfactory foundation. The base plate should be installed in a level position.

NOTE:
A DETAILED DESCRIPTION OF PROPER PROCEDURES FOR GROUTING BASE PLATES MAY BE FOUND IN THE HYDRAULIC INSTITUTE STANDARDS, 13TH EDITION, PAGES 116 AND 117.

COUPLING ALIGNMENT

Good service life of the pump and driver depends upon good alignment through the flexible coupling. If the electric motor was mounted at the factory, the pump and motor were in alignment when shipped. The alignment between the pump and driver should be inspected after installation to ensure that transportation or other handling has not caused misalignment of the unit.

To check the alignment using a straight edge, lay the straight edge in line with the shaft on the OD's of the coupling halves. There should be no gaps under the straight edge. Check two locations, 90 degrees apart. Angular misalignment can be checked by measuring the gap between coupling half faces. There should be no more than a 1/64th of an inch in the gap between coupling halves.

CAUTION!
MISALIGNMENT BETWEEN THE MOTOR AND 250 PUMP COULD CAUSE FAILURE OF THE COUPLING, PUMP, MOTOR, BEARING OR EITHER SHAFT. ALIGNMENT MUST NOT BE ATTEMPTED UNTIL THE BASE IS IN POSITION AND THE MOUNTING AND FLANGE BOLTS HAVE BEEN TIGHTENED.

The recommended procedure for coupling alignment is with the use of a dial indicator, as illustrated in Figures 1 and 2. The dial indicator is attached to one coupling half with the indicator button resting on the 0.0. of the other coupling half to measure offset misalignment. To measure angular misalignment, the indicator is positioned so that the buttons rest on the face, near the 0.0., of the other coupling half. Rotate the shaft and dial indicator one revolution while the other shaft remains stationary and note the T.I.R. unless otherwise specified by the coupling manufacturer, offset misalignment should be limited to 0.005 inches T.I.R. Adjust the alignment by loosening the pump or driver mounting bolts and retighten or shim as required.

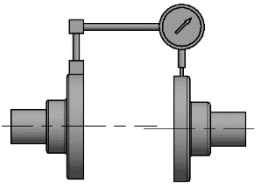


Figure 1
Measuring Offset Misalignment Using A Dial Gauge

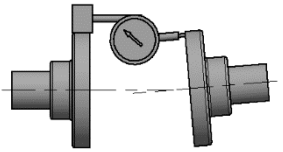


Figure 2
Measuring Angular Misalignment Using A Dial Gauge

In areas where a dial indicator arrangement is not available, an adequate job of alignment can be done with a straightedge. This method is especially useful if the coupling used contains a rubber drive element.

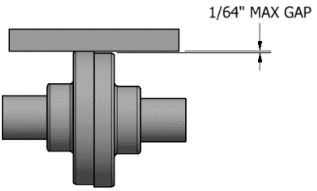


Figure 1A
Measuring Offset Misalignment Using a Straightedge

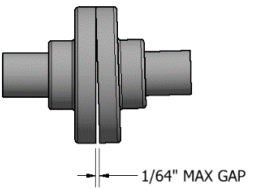


Figure 2A
Measuring Angular Misalignment Using a Straightedge

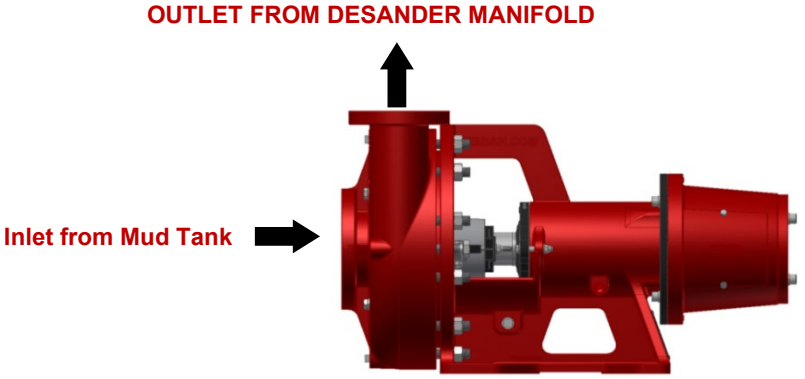
To check offset misalignment, lay the straightedge in line with the shafts on the O.O.'s of the coupling halves. There should be no gaps under the straightedge. Check two locations 90 degrees apart. Angular misalignment can be checked by measuring the gap between coupling half faces. There should be no more than a *1/64* inch gap under the straightedge or a *1/64* inch variation in the gap between the coupling halves. See Figures 1A and 2A.

NOTE:
FURTHER REFERENCE ON COUPLING ALIGNMENT CAN BE FOUND IN HYDRAULIC INSTITUTE STANDARDS, 13TH EDITION, PAGES 177 & 120.

PIPING

Piping must not be connected to the pump until the grout has hardened and the foundation and pump hold down bolts have been tightened.

Connect the inlet hose from the tank to the front of the 250 pump. Connect the hose going to the Desander Manifold from the top of the 250 pump. There will also be a hose running from the Mix Hopper.



Piping should be anchored independently of the pump and as near to it as possible. Pipe companion flanges should line up naturally with pump flanges.

CAUTION!
DO NOT DRAW THE PIPE TO THE PUMP WITH FLANGE BOLTS.

PUMP SUCTION

Properly selected and installed suction piping is extremely important to eliminate vibration and cavitation in the pump. Vibration can cause packing problems, mechanical seal damage, or undue bearing loads.

The suction line should be equal to or larger than the pump suction.

CAUTION!
THE CAPACITY OF A CENTRIFUGAL PUMP SHOULD NEVER BE ADJUSTED BY THROTTLING THE SUCTION LINE.

A positive shut-off valve of a type to cause minimal turbulence should be installed in the suction line to permit the closing of the line for removal of the pump for inspection and maintenance.

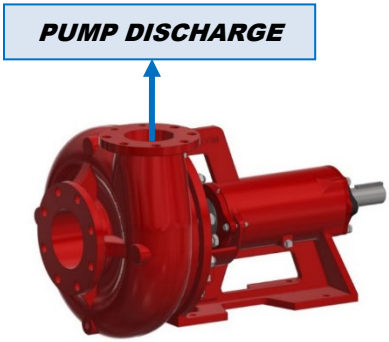
The suction line should be designed to eliminate any air pockets. The piping should gradually slope downwards to the supply source to eliminate air pockets.

The suction line should have a straight section into the pump of a length equivalent to at least two times its diameter; i.e. a 4-inch suction line should have a minimum 8-inch straight run.

For temporary hook-up when flexible hose is used, a non-collapsing hose is essential since the suction line pressure is often below atmospheric pressure. A collapsed suction line will result in below average or complete loss of flow.

PUMP DISCHARGE

A positive shut-off valve should be located in the discharge piping to permit the closing of the line for removal of the pump for inspection and maintenance. All piping should be independently supported and accurately aligned.



CAUTION!
THE PUMP MUST NOT SUPPORT THE WEIGHT OF THE PIPE OR COMPENSATE FOR MISALIGNMENT.

If operating conditions are not known with sufficient accuracy, it will be necessary to provide a throttle valve in the discharge line to ensure that the pump operates at the design point.

If the pump is connected to a pressurized system, it is important to install a check valve between the pump discharge and the throttling valve. The check valve will prevent back flow through the pump. Back flow may cause the impeller to become loose on the shaft.

CAUTION!
A LOOSE IMPELLER WILL LIKELY RESULT IN MECHANICAL DAMAGE AND FLUID LEAKAGE BENEATH THE SHAFT SLEEVE.

PREPARATION FOR OPERATION

INITIAL LUBRICATION

Standard pumps are shipped Grease Lubricated with Chevron Duralith EP#2 Grease.

The air vent should be kept clean to prevent pressure build-up due to heating that occurs in normal operation. Oil lubrication is available upon request. There is a dipstick available that indicates the correct oil level.

MECHANICAL SEALS

When mechanical seals are furnished they are installed and adjusted at the factory. The H22451-1 tungsten carbide mechanical seal normally used in drilling mud environments do not require external flush.

To properly prepare special or industrial mechanical seals for operation, various cooling and flushing flows may have to be connected. Liquid from an outside source may be required. If outside flushing is required, connect the necessary cooling or flushing lines to the seal and be sure they are operating before starting the pump. See seal drawings and instructions if special seals are used.

WARNING!
NEVER OPERATE A PUMP "DRY" WITH MECHANICAL SEALS. MECHANICAL SEAL FAILURE WILL OCCUR!

CAUTION!
CHECK PUMP ROTATION BEFORE RUNNING.

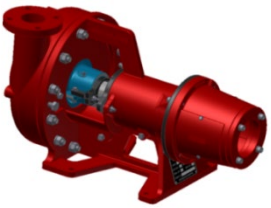
PUMP ROTATION

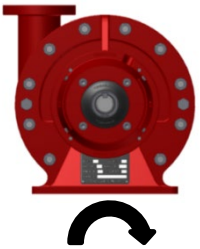
Most pumps manufactured have clockwise rotation when viewed from the coupling end. The correct rotation can be found by an arrow on the casing.

It is very important that the pump rotation is determined before starting the pump. If The Mud Puppy 250 is turned backwards the impeller may unscrew causing severe damage to the pump.

The best way to check rotation is to disconnect the coupling, but it can be checked without disconnecting the coupling. One person should be at the pump watching the shaft while a second person starts and then immediately stops the pump so the shaft barely turns over.

Once the pump is completely installed check for any water leaks, check the hydraulic fluid pressure at the desander pump; ensure you have at least 30 lbs of pressure. When performing this pressure test ensure pick up pump control valve is adjusted all the way in. Ensure the rotary valve for the pickup pump is in the off position.





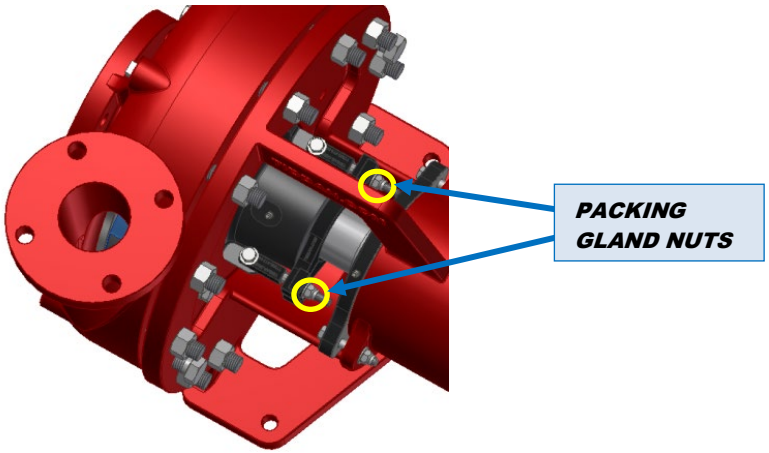
PRIMING THE PUMP

Be sure the pump has fluid in the casing before running. If the pump is operated without fluid, the mechanical seal or packing can be destroyed. Vent air from the suction line and fill it with liquid. Start the pump with the discharge valve cracked open. After discharge pressure stabilizes, gradually open the discharge valve to the required position. If flow is lost, close the discharge valve and wait a few seconds for the discharge pressure to build. Continued flow difficulty indicates improper pump selection or installation.

WARNING!
RUNNING THE PUMP WITH IMPROPER PRIMING MAY DESTROY THE SEALING FACES OF THE MECHANICAL SEAL DUE TO OVERHEATING OR MECHANICAL DAMAGE FROM PULSATION BETWEEN STATIONARY AND ROTATING COMPONENTS. DO NOT RUN THE PUMP WITH THE SUCTION VALVE CLOSED AT ANY TIME! THERMAL SHOCK CAN CRACK THE STATIONARY SEAT IF THE TEMPERATURE IS RAISED FROM ROOM TEMPERATURE TO 250°F IN LESS THAN 30 SECONDS. RUN THE PUMP WITH THE DISCHARGE VALVES CLOSED ONLY FOR SHORT PERIODS OF TIME. THE ENERGY GOING INTO THE PUMP HEATS THE FLUID IN THE CASING. IF THE PUMP NEEDS TO OPERATE SHUT IN SOME OF THE TIME, BE SURE TO INSTALL A SMALL LINE (1/4 OR 1/2 INCH) BACK TO THE SUCTION TANK BETWEEN THE DISCHARGE VALVE AND THE PUMP FOR COOLING!

PACKED PUMPS

Loosen the packing on startup. The gland bolt nut should be only finger tight. New packing will expand faster with heat than older packing. Therefore, new packing must be adjusted more slowly than old packing. Too tight and it will not leak. With no cooling, it will burn, and be no good for sealing. MUD PUPPY 250 pumps with mechanical seals have backup packing. This packing should be very loose and not tightened until seal failure occurs.



NOTE:
PACKING MUST HAVE COOLING; THEREFORE, IT MUST LEAK.

When adjusting the packing always adjust only ¼ turn on each nut at a time; waiting for the packing to heat before adjusting tighter.

CAUTION!
THE PACKING MUST LEAK 10-12 DROPS PER MINUTE TO REMAIN COOL.

MECHANICAL SEAL PUMPS

Be sure the pump is never started dry. Seal faces will gall in less than a minute if run dry. The backup packing should not be tightened until seal failure occurs. The packing can then be installed and the pump run normally until the mechanical seal is repaired.

WARNING!
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 WILL DISLODGE THE IMPELLER AND DAMAGE THE IMPELLER, SHAFT OR BEARING HOUSING. THE PUMP SHAFT MUST TURN CLOCKWISE WHEN VIEWED FROM THE MOTOR END.

Check the following items before starting the pump:

1. Pump rotates freely by hand.
2. Pump rotates in proper direction.
3. Coupling aligned.
4. Oiler full and oil level correct (oil lube pumps).
5. Suction valve fully open.
6. Pump and suction line full of fluid.
7. Discharge valve is slightly open, not fully open. Fully open the discharge valve after the pump is running.

OPERATION

MAXIMUM OPERATING CONDITIONS

PUMP RECORDS

Information to be included in these records should be:

1. Pump size and serial number.
2. Pump model number, impeller diameter, material of construction.
3. Mechanical seal manufacturer, type, code and drawing number.
4. Motor horsepower and speed of operation.
5. Service conditions.
6. Frequency of operation.
7. Record of maintenance, including parts usage and general pump conditions.
8. Nomenclature and part number of replacement items.

NOTE:
MAINTAIN DATA CARDS OR PUMP RECORDS WHENEVER POSSIBLE. THIS WILL PROVIDE READY ACCESS TO INFORMATION FOR ORDERING SPARE PARTS AND FOR EVALUATING PUMP AND MECHANICAL SEAL PERFORMANCE

LUBRICATION OF BEARINGS

The pump is shipped with sufficient lubrication packing in the bearing to assure trouble-free operation for normal service life. Under normal operating conditions, no lubricant needs to be added to the bearings. If the pump is disassembled, it is advisable to pack the bearings with grease properly before re-assembly. Pack the bearing through approximately one-half of its circumference. It is not necessary to put grease in the bearing cap or pedestal.

The bearings normally may run at temperatures up to 180ºF, without injury. A temperature of 180ºF is hotter than the hand can stand to touch for one second or two. But will not burn off the paint. The temperature may be determined by sticking a thermometer to the bearing cap with heavy grease and leaving it for (20) minutes.

If the bearing run hot, immediate service is necessary. This abnormal condition indicates that:

1. The bearings may not be properly installed.
2. Pump and motor are out of alignment.
3. Excessive grease has been forced into the bearing housing.
4. Insufficient grease is present in the housing.
5. Improper grade or contaminated lubricant is present in the bearing housing.

To correct this condition, perform the following in the order listed:

1. Check the motor and pump for misalignment.
2. Check for proper amount of grease.
3. Return the pump to service.
4. In addition, a competent lubrication engineer should be consulted to recommend the proper lubricant for the particular operating condition.

Pumps are supplied from the factory grease lubricated unless oil lubrication is requested. Oil lubrication should be used whenever the pump speed exceeds 2400 RPM. The bearing caps have been drilled and tapped for grease fittings. Mud Puppy Corp. recommended bearing grease is Chevron Duralith EP#2 or compatible grease. Greases available in tubes are the best. Five shots with a standard hand operated grease gun of the above grease or equivalents in each bearing monthly is sufficient for twenty-four hour per day operation.

LUBRICATION OF INBOARD LIP SEALS

The standard Mud Puppy 250 Pump is equipped with labyrinth seals that do not require lubrication.

WARNING!
FAILURE TO REMOVE THE GREASE RELIEF PORT PRIOR TO ADDING GREASE CAN FORCE OLD GREASE PAST THE LIP SEALS AND INTO THE BEARINGS, GREATLY SHORTENING THEIR LIFE. BEARING FAILURES IS MORE OFTEN CAUSED BY LACK OF LUBRICATION MORE OFTEN THAN NORMAL BEARING WEAR.

PACKING

Space is provided for two rings of graphite packing at the impeller side of the Lantern Ring. Packing should be of a grade suited to the operating conditions of the pump; square braded packing is regularly furnished. Excessive tightening of packing gland nuts causes shaft wear. It is unnecessary and

should be avoided. Slight leakage approximately 10-12 drops per minute is desirable to act as a packing lubricant. A grease fitting has been installed in the ¼" tapped Lantern Ring connection.

CAUTION!
MOST EARLY PACKING FAILURES ARE CAUSED BY OVER TIGHTENING OR POOR INSTALLATION.

PACKING APPEARANCE

If the packing being removed is hard and brittle, it has been run dry at some during its life. This is often done in the first hour of service. The packing has more ability to grow with heat during its early life. Even if the packing is adjusted just right before starting the pump, in the first few minutes the pacing will grow with the heat and become over-tight, it then will run hot and burn the packing.

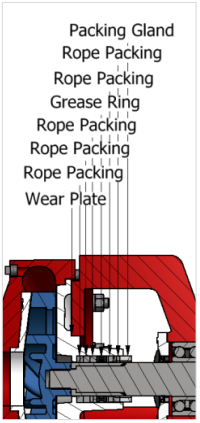
CAUTION!
ONCE PACKING IS BURNED, IT WILL NEVER SEAL PROPERLY AGAIN.

CORRECT INSTALLATION OF PACKING

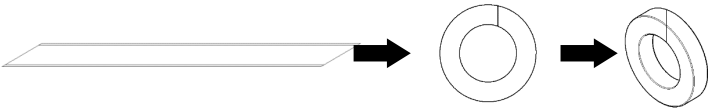
Make sure the box is clean of old packing and the plastic lantern ring. Bend a wire and pull it down the shaft to be sure it is smooth for good packing life.

The order to install is as listed. (See picture):

1. Graphite Rope Packing (against wear plate)
2. Graphite Rope Packing
3. Graphite Rope Packing
4. Grease Ring (with the groove in it)
5. Graphite Rope Packing
6. Graphite Rope Packing (until the packing is complete)



NOTE:
EACH PIECE HAS A SPLIT IN IT. SEPARATE THE SPLIT IN THE GRAPHITE ROPE PACKING BY TWISTING. FLATTEN THE GRAPHITE ROPE PACKING WITH A HAMMER FOR EASIER INSTALLATION OF ROPE.

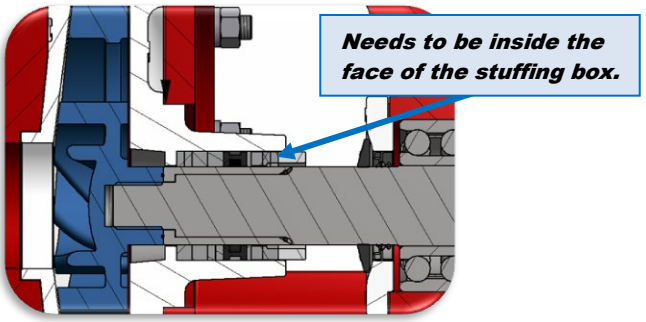


a. Wrap one piece around the shaft and push it into the stuffing box.

b. Use the packing gland to push the piece as far in as possible, (Rotate the split 90 degrees from the last, each time a piece is installed)

c. Continue with the other pieces in the order listed until the packing is complete, (repeating steps A and B above as needed)

d. When the packing is completely installed, it should be flush (or inside the face of the stuffing box) and not sticking out.



GREASE

The stuffing box may be relubricated with grease as often as necessary to prevent the packing from overheating. It should be lubricated at least once a day. It is best to install a spring-loaded grease cup to automatically lubricate the packing. As you fill the grease cup a spring is compressed, and a stem rises. As the grease is used the spring forces new grease to the packing and the stem lowers. When the stem is low the cup needs refilling. Grease should be pumped into the box while turning the shaft until it comes out around the packing gland (approximately 20 shots).

If the packing leakage is excessive, thick water pump grease should be used rather than the general purpose grease. In most cases general purpose grease is acceptable.

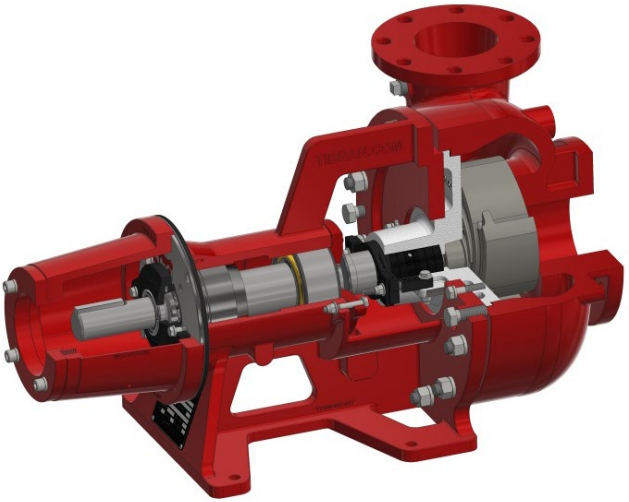
WATER

It is best to inject water into the lantern ring from an external source when pumping drilling mud. This will keep most of the solids out of the packing.

PACKING AND SHAFT LIFE WILL BE INCREASED UP TO 500%. Also, water leakage from the packing will not be as objectionable as mud.

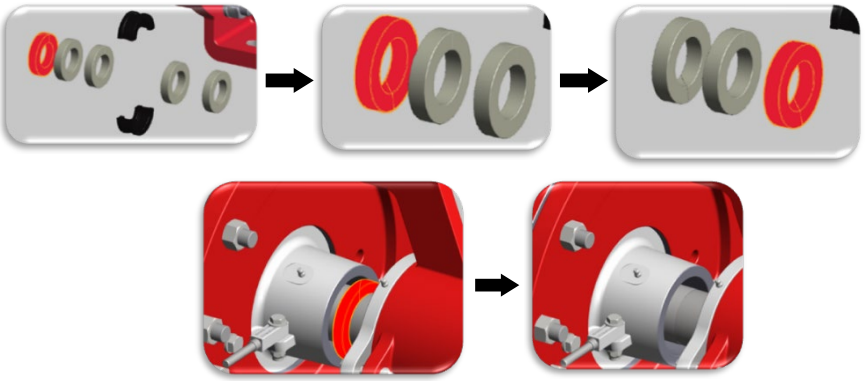
If water cannot be used, the next best addition to the packing would be grease from an automatic spring-loaded grease cup. There is a visual inspection when the cup no longer has grease. The stored grease normally last a week or more if the packing is adjusted correctly.

RE-PACKING THE PUMP (ROPE PACKING SEAL OPTION)

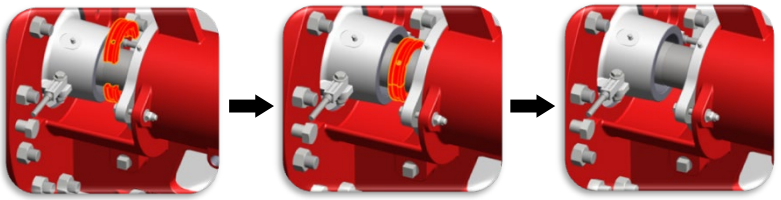


1. Make sure the box is cleaned of all old packing and the plastic grease ring. Bend a wire and pull it down the shaft to ensure it is smooth for good packing life. Feel for grooves in the shaft. Replace the shaft if there are excessive grooves.

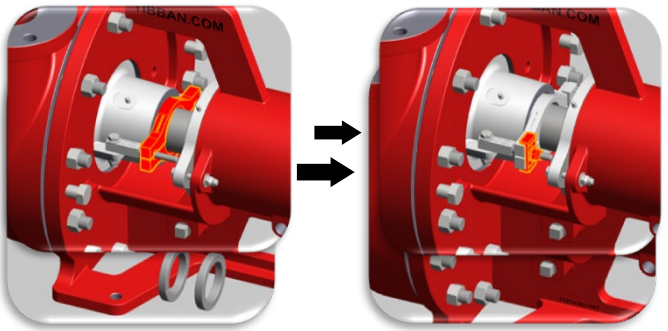
2. Grease all five shaft packing rings (5). Insert three packing rings alternating the splits in the rings from top to bottom starting with the split on the first ring on the bottom.



3. Install the Grease Ring so that the two halves encompass the pump shaft. Slide the Grease Ring halves into the pump pedestal packing box until they meet the third Rope Packing Ring.



4. Insert the final two Rope Packing Rings. The objective is to have the last split down so that the leakage will drip down.
5. With the packing gland in position, swing the gland bolts into place. Initially tighten the gland hard to compress the packing. Then back off the gland bolts and retighten only finger tight.



CAUTION!
TIGHTEN THE GLAND AGAINST THE PACKING FINGER TIGHT ONLY. IF PACKING IS OVER-TIGHTENED IT MAY BE BURNED WHEN THE PUMP IS STARTED.

PUMP INSPECTION

IMPELLER

Replace if impeller shows excessive erosion (especially on the pump-out vanes on the back of the impeller), corrosion, extreme wear, or vane breakage.

SHAFT

Check for run-out to see that the shaft has not been bent. If run out exceeds 0.002 inch, replace the shaft. Bearing seats and oil seal area must be smooth and free of scratches or grooves. Shaft threads must be in good condition. Replace shaft, if necessary.

SHAFT SLEEVE

Sleeve surface in the stuffing box must be smooth and free of grooves. If grooved, replace.

MECHANICAL SEAL

Seal faces, gaskets, and shaft sealing members must be in perfect condition or excessive leakage may result. Replace worn or damaged parts.

PACKING BOX

The packing box will need to be greased on a daily basis. We recommend Chevron SRJ-2 or equivalent. We recommend that you use the same type of grease for both the packing box and the bearings because mixing different types of grease will sometimes cause incompatibility issues. Grease the packing until the grease comes out at the shaft or at the packing.

BEARINGS

Replace if worn, loose, or rough and noisy when rotated. New bearings should not be unwrapped until ready for use. Replacement bearings must be of the proper size and type as supplied with the original equipment.

When greasing these bearings, we recommend the grease listed above, Chevron SRJ-2 or equivalent. When using a standard sized grease gun 5 shots of grease every 2-3 months should be sufficient for a 24 hour operation. If running less than 24 hours reduce for less use.

SEALS

It is recommended that all O-ring and gasket seals be removed during disassembly and replaced. In those cases where new seals are not available, the old ones can be reused if they are not torn or otherwise damaged.

GENERAL

All parts should be clean before assembly. This is especially important for retaining rings and O-ring grooves, threads, gasket surfaces, bearings, and bearing surfaces. Any burrs should be removed with crocus cloth.

PUMP ASSEMBLY

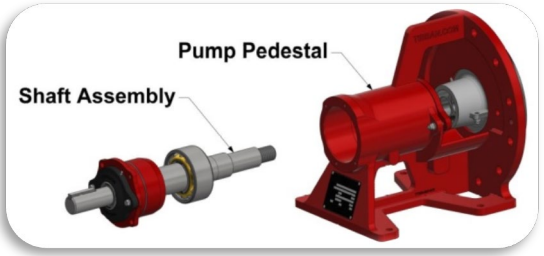
SHAFT AND BEARING SUBASSEMBLY

NOTE:
INSTALLATION OF THE BEARINGS WITH A PRESS IS AN ACCEPTABLE SUBSTITUTE FOR THE FOLLOWING METHOD. APPLY THE LOAD TO THE INNER RACE ONLY, WHEN PRESSING THE BEARINGS ONTO THE SHAFT.

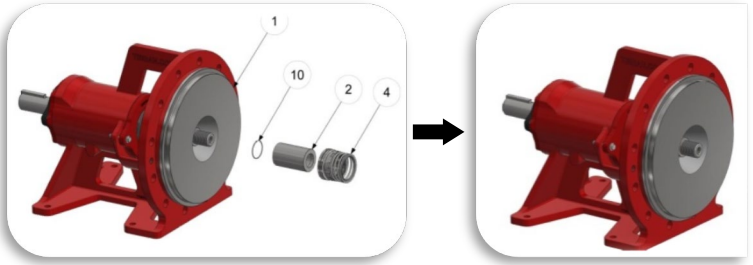
REPLACING THE MECHANICAL SEAL

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	TT250-006.4S	STUFFING BOX MECHANICAL SEAL
2	1	TT250-009.08	SEAL SLEEVE
3	1	TT250-008.15	IMPELLER TO SEAL SLEEVE O-RING
4	1	TT250-011.10S	MECHANICAL SEAL
5	1	TT250-005.12T	STUFFING BOX GASKET
6	3	TT250-011.11R	ROPE PACKING
7	2	TT250-012.06	PACKING GLAND BOLT
8	2	TT250-013.06	PACKING GLAND
9	2	TT250-014.06	PACKING GLAND LOCK
10	1	TT250-010-15	SEAL SLEEVE TO SHAFT O-RING

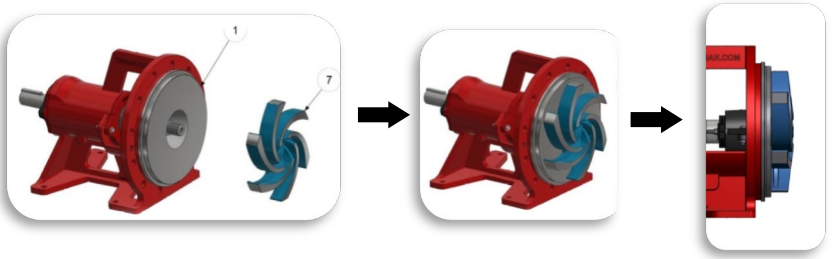
1. Install the Shaft Assembly into the Pump Pedestal.



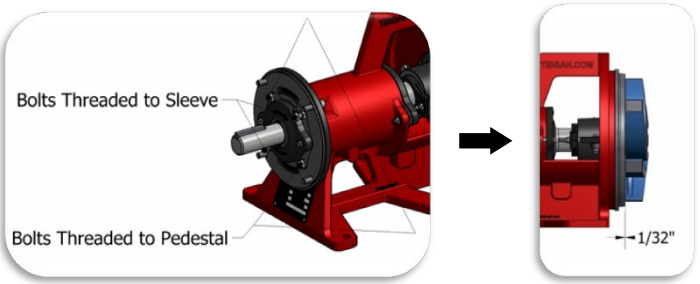
2. Install Item 10 O-Ring against Item 2 Seal Sleeve.
3. Install Item 2 Seal Sleeve into Item 1 Mechanical Seal Stuffing Box.
4. Install Item 4 Mechanical Seal into Item 1 Mechanical Seal Stuffing Box.



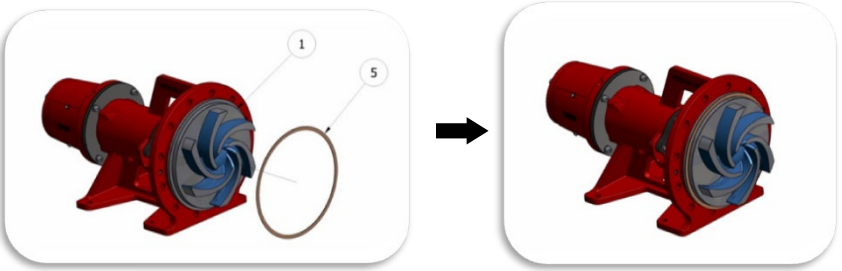
5. Thread Item 7 Impeller onto Item 8 Pump Shaft. This is done by adjusting the (4) bolts on the back of the secondary bearing sleeve. Two of the bolts are threaded into the secondary bearing sleeve, and when tightened, they pull the impeller back against the packing box, away from the wear plate. Ensure you can still turn the shaft by hand.



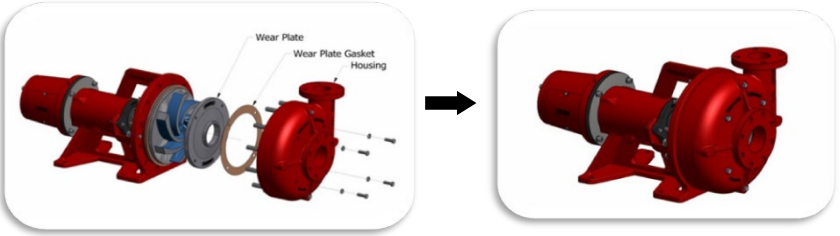
6. Bolts threaded into the sleeve, with a lock down nut. When tightened pulls the impeller towards the stuffing box. Bolts threaded into the pedestal. When tightened moves the impeller towards the wear plate. Ensure the shaft still turns, and check the gap between the impeller and the wear plate, this gap can be no more than 1/32".



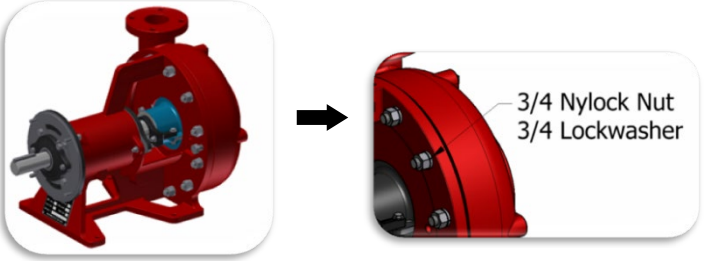
7. Install Item 5 Gasket onto Item 1 Mechanical Seal Stuffing Box.



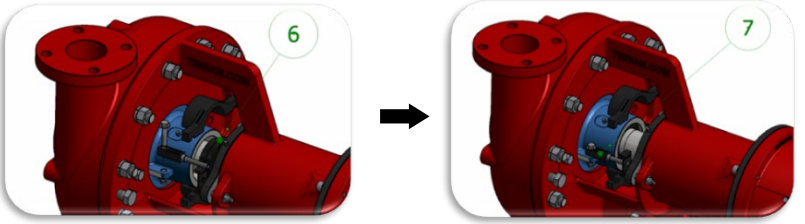
8. Install the Wear Plate Gasket and Wear Plate.



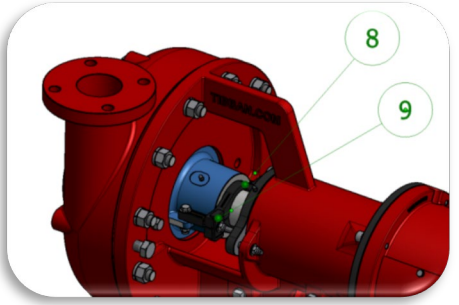
9. Install the housing, with housing in place bolt down using (10) ¾" Nylock nuts, (10) ¾" lock washers as shown



10. **Rope Packing Backup Option:** Some pumps include emergency rope packing backup which is to be used only if the mechanical seal fails. This is an optional feature. Install 3 Item 6 Rope Packing Strips into the front end of the Mechanical Seal Stuffing Box. Next install Item 7 Packing Gland Bolts on each side of the Mechanical Seal Stuffing Box.



11. Install Item 8 Packing Gland and Item 9 Packing Gland Locks on each side of the Mechanical Seal Stuffing Box.



EXCESSIVE PACKING LEAKAGE AND RAPID PACKING WEAR

GENERAL

Most early packing failures are caused by over-tightening or poor installation.

PACKING APPEARANCE

If the packing being removed is hard and brittle, it has been run dry some time in its life. This is often done in the first hour of service. The packing has more ability to grow with heat during its early life. Even if the packing is adjusted just right before starting the pump, in the first few minutes of operation the packing will grow with heat and become over tightened. It will then run drop-tight and the packing will burn. ONCE THE PACKING IS BURNED IT WILL NEVER SEALPROPERLY AGAIN. Let new packing leak more in the first few hours and then adjust it to 10-12 drops per minute.

WATER FLUSH SYSTEM ACCEPTABLE BY OIL COMPANIES

GENERAL

Many oil operators will not allow water to be put on the packing because of excess water getting into the mud, a result of poorly designed and maintained systems. Two major problems cause this complaint:

a. Too much line pressure
b. Not turning water off when pump is not in use.

CONTROLLING WATER PRESSURE TO THE PACKING

The water pressure is usually too high. The brake cooling pump is normally used which operates at pressures from 50 to 75 psi. Only 5 to 10 psi water is needed to cool and lubricate the packing. A pressure regulator should be installed to reduce the pressure on the packing. One regulator can supply all centrifugal pumps from a central system.

CONTROLLING WHEN TO USE WATER ON PACKING

LARGE VOLUMES of water get into the mud when the pump is NOT OPERATING. When the pump is running, the shaft deflects and when stopped, the shaft straightens up and a gap occurs down one side of the shaft between the packing and the shaft. This allows a stream of water to enter the mud. You can manually turn off the water when the pump is shut down but a better way is to install a solenoid valve in the water supply line that turns the water on and off as the motor is turned on and off. Only a small amount of

water (a few drops per minute) which gets into the mud while the pump is running should not be objectionable to the oil companies.

BEARING FAILURES AND HOW TO IMPROVE BEARING LIFE

GENERAL

Except for cavitation problems, bearing failure is the greatest cause of increased pump operating cost. If you continue to run a pump when bearing failures occur, there is an excellent chance the entire pump will be destroyed. Therefore it is very important to change the bearings when failure starts. If you wait for complete failure other fluid end parts will be damaged. Bearing failure is more often caused by lubrication failure than by normal bearing wear.

MISALIGNMENT BETWEEN PUMP AND DRIVER

A major cause of bearing failures is misalignment. Alignment between the pump and motor should always be checked after shipment and periodically rechecked.

DETECTION OF BEARING FAILURE WHEN PUMP IS RUNNNING

The first indication of lubricant and bearing failure is a rapid rise in operating temperature. The frame should be felt once a week to get a feel for how hot the bearings normally run. A sudden high increase in temperature normally means the bearings are beginning to fail and need changing.

You cannot hold your hand for very long on unsatisfactory temperatures. If you can keep your hand on the housing for five seconds the temperature is about 160ºF, which is suitable for most pumps. If you cannot hold your hand on the housing for five seconds or if the bearing housing is so hot you do not want to touch it, there is most likely lubricant and/or bearing failure.

NOTE:
EXCEPT FOR CAVITATION ISSUES, THE BIGGEST CAUSE OF FAILURE IS INCREASED PUMP OPERATION.

CAUTION!
IF YOU CONTINUE TO USE A PUMP WHEN BEARING FAILURE OCCURS THERE IS A VERY GOOD CHANCE THE WHOLE PUMP MAY BE DESTROYED, THEREFORE IT IS VERY IMPORTANT TO CHANGE THE BEARINGS WHEN FAILURE STARTS. IF YOU WAIT FOR COMPLETE FAILURE OTHER PARTS AND FLUIDS WILL BE DAMAGED.

IDENTIFICATION OF BEARING FAILURE

ABNORMALLY HIGH TEMPERATURES

Normal operational temperature is less than 180ºF. If you can hold your hand on the bearing housing for five seconds or longer the bearing temperature is running in a normal range (suitable for most pumps). If the bearing housing is too hot to put your hand on it, the pump probably has lubricant or bearing failure.

GREASE APPEARANCE

Indications of lubrication failure are:

1. Grease is stiff or cracked.
2. Changes in color (usually darker, or jet black)
3. Grease has an odor of burned petroleum

NOTE:
IN THE CASE OF LITHIUM BASED GREASE, BURNED GREASE HAS AN APPEARANCE OF GLOSSY BRITTLE VARNISH WHICH WILL SHATTER WHEN PUNCTURED WITH A SHARP OBJECT.

Grease is a mixture of oil and usually soap. When a pump sits for a long period of time the grease separates and runs out of the bearing. It will appear there is still grease in the bearing but it will not have any lubricant properties. You will need to re-grease the bearings after sitting for long periods of time before running. In the case of sealed bearings, they will need to be replaced after sitting for a prolonged period of time.

NOISE

Lack of lubrication is usually accompanied by a whistling noise coupled with a rise in temperature. If not corrected the bearing temperature will continue to rise and the intense heating will reduce the bearing hardness.

BEARING DISCOLORATION

A brownish or bluish discoloration indicates that the bearing operating temperature was excessively high, to the extent that the bearing lost its physical properties and was no longer operable.

RETAINER FAILURE

The bearing part that first indicates distress in lubrication failure is usually the retainer, where the greatest amount of rubbing takes place increasing the probability of early failure. Always be sure to use good clean lubricant from a tube and not from an open bucket.

DIRTY LUBRICATION

Contaminates found in lubricants often act as an abrasive compound, which will lap or polish ball and race surfaces, increasing the probability of failure. Always be sure to use clean lubricant from a tube and NOT from an open bucket.

TOO MUCH LUBRICANT

A very common error in the maintenance of machinery is the tendency to over lubricate. If the bearing reservoir is kept consistently full of grease, the friction heat developed within the lubricant cannot get out and will cause its rapid deterioration.

WRONG KIND OF LUBRICANT

After experimentation of many different lubrications, we recommend Chevron SJ-2 grease or its equivalent in as far as availability allows, you should use the same lubricant or its equivalent.

CAUTION!
MANY TYPES OF GREASE ARE INCOMPATIBLE AND ALTHOUGH COMPLETELY ADEQUATE WHEN USED INDIVIDUALLY, MAY PROVE UNSATISFACTORY WHEN MIXED.

MISCELLANEOUS INFORMATION

OPERATING LIMITS OF RIG CENTRIFUGAL PUMPS

As with any type of equipment, centrifugal pumps have operating limits. Observing these limits will extend the life of your pumps.

SUCTION LINE VELOCITY

Suction line velocity should not exceed 8.5 feet per second for reasonable pump life. This means the maximum flow for a 6 inch suction is 900 GPM and an 8 inch suction is 1600 GPM. If you want to flow more than 1600 GPM a 10-inch or larger suction line should be installed.

NET POSITIVE SUCTION HEAD (NPSH)

The system must have enough NPSH for the pump requirements or the pump will cavitate, greatly reducing its life.

It appears that most installations do not have enough NPSH to run a 5x6 pump at flows above 1400GPM even with an 8-inch suction. (This does not mean that no one has enough NPSH). The result of inadequate NPSH is cavitation and early pump failure.

CAPACITY REQUIREMENTS OF EQUIPMENT IN RIG APPLICATIONS

The chart below lists the normal design requirements when the equipment is new with no wear.

EQUIPMENT	DESIGN VOLUME
4" CONE	60 GPM
4H (5") CONE	80 GPM
6" CONE	125 GPM
8" CONE	250 GPM
10" CONE	500 GPM
6" MUD HOPPER	550 GPM
3/4" NOZZLE	80 GPM
1" NOZZLE	150 GPM
1 1/2" NOZZLE	300 GPM
2" NOZZLE	550 to 660 GPM

LONG TERM PUMP AND MOTOR STORAGE

Pump packages should be stored indoors in a clean, dry and protected environment.

1. The storage area is to be free from any vibration and temperature extremes.

2. Motor and pump shafts are to be rotated manually every two months. A record of the rotation should be made.

3. Grease in the motor and the pump bearings is to be purged at the time of removal from storage and replaced with an ample supply of fresh grease in each grease cavity.

4. Motor windings should be pegged at the time the equipment is placed in storage. At the time of removal from storage the resistance reading must not have dropped more than 50% from the initial reading. Any drop below this point necessitates electrical or mechanical drying of the motor windings. Condensation from hot days and cool nights can fill the motor half full with water. This is a greater potential problem in damp areas.

5. If the pumps are to be stored outdoors, the pump suction and discharge openings should be sealed to prevent any water from entering the pump housing. This will prevent rust and corrosion.

INSTALLATION OF REPLACEMENT PARTS

The wet end is constructed so the parts subject to wear may be readily replaced in the field. For wet end rebuild do the following:

1. Stop pump and drain all lines leading to the pump.
2. Remove the bolts to the suction and discharge flanges.
3. Remove the pipes clear of the pump casing and remove the pump from the system.
4. Remove the 8 bolts (could be nuts) that hold the housing in place and remove the housing.
5. Remove Nylock nut holding impeller on and remove the impeller.
6. Wear plate does not always need to be replaced. If the wear plate is being replaced we recommend replacing the graphite packing.
7. Install new wear plate (If needed).
8. Install new impeller; insure the keyway is still on the shaft.
9. Install new housing the housing can be installed in any direction to direct water flow. Ensure the housing is in place and tightened.
10. Check impeller for correct placement, you can do this by looking down the outlet in the housing. The impeller needs be lightly touching the housing. You will also need to turn the shaft with your hand to ensure it turns. You may hear a rubbing noise, a noise of the impeller rubbing the housing is normal.
11. Once housing is tight check the impeller, if it is bound and shaft will not turn you will need to complete the following steps:
    A. Remove rear bearing cap.
    B. Loosen set screws and loosen rear locking collar on barring to free up the shaft and impeller. This can be accomplished by tapping a punch with a hammer to turn the collar.
    C. Move shaft to desired location, checking the shaft position by turning shaft with hand. The impeller should lightly touch the housing, but still turn freely.

D. Tighten the locking collar. Always turn clockwise to tighten and counter-clockwise to loosen. Tap a punch with a hammer to tighten. Lock down the Allen-screw.

E. Install the rear baring cover.

F. Any time the wear plate is removed the packing needs to be replaced. Follow the repacking instructions listed in this manual.

G. When the repacking is finished and operational, follow the instructions on Initial Checks at startup.

NOTE:
NEW GASKETS SHOULD BE USED THROUGHOUT. USE THE PROPER GASKETS FOR THE 250 PUMP AS LISTED IN THE PARTS LIST.

INFORMATION REQUIRED TO ORDERPARTS:

1. Pump Type
2. Pump Size
3. Impeller diameter.
4. Material of construction
5. Type of seal (mechanical or packing)
6. Type of bearings
7. Service condition
8. Frequency of use

RECOMMENDED USAGE AND REPAIR INFORMATION TO COLLECT:

1. Lubrication information
2. Repacking information
3. Date and type of repairs made
4. Maintenance records including part numbers for parts replaced.

TROUBLESHOOTING

EXCESSIVE WATER LEAKING AND RAPID PACKING FAILURE:

It is normal to have some water leaking through the packing. Excessive leaking would be more than 12 drops per minute. If you have excessive leaking at the packing you will need to repack the pump. Excessive leaking is generally caused by groove in the shaft. You can check for grooves in the shaft by removing the packing and sliding a wire with a short section of the

tip bent 90 degrees across the shaft to detect damage on the shaft. If there are deep grooves in the shaft you will need to replace the shaft.

PACKING BURNED

If the packing is burned and hard when removed the packing was over tightened and the lack of leakage and/or lack of proper greasing caused the packing to burn. This will cause the packing to become hard and no longer soft and pliable which could cause damage to the shaft. To prevent burning the packing, loosen the packing glands by ¼ turn after packing.

LONG TERM PUMP AND MOTOR STORAGE

1. Pump packages should be stored indoors, in a clean, dry and protected environment.

2. The storage area is to be free of any vibration and from extreme temperatures.

3. Motor and pump shafts are to be rotated manually every two months. A record of the rotation should be made.

4. Grease in the packing and the bearings will need to be purged at the time of removal from storage, making sure that an ample supply of fresh grease is in each grease cavity. In the case of sealed bearings, they will need to be replaced after prolonged storage.

5. If the pumps are to be stored outside, the pump suction and discharge openings should be sealed to prevent any water from entering the pump housing causing rust during the wet end during storage.

CUSTOMER SERVICE

- **www.mudpuppyinc.com**
- **Phone: 442-242-7507**
- **Also contact at 530-662-5055**

MUD PUPPY 250 MUD PUMP AND WET END KIT ORDER SHEET

250 Pump

Sample Number: TT250SB43RH7M-13

TT250

Housing	
43	4X3" Housing
65	6X5" Housing

Material	
4	Cast Iron
7	Chrome Hardened

Impeller	
13	13" Impeller Fits 4X3 & 6X5
10	10" Impeller Fits 6X5
11	11" Impeller Fits 6X5
14	14" Impeller Fits 6X5

-

Seal	
M	Mechanical Seal
R	Rope Packing

Rotation	
RH	Right Hand
LH	Left Hand

Shaft Configuration	
SB	Short Body
LB	Long Body

250 Wet End

Sample Number: TT250WE43RH7M-13

TT250WE

Housing	
43	4X3" Housing
65	6X5" Housing

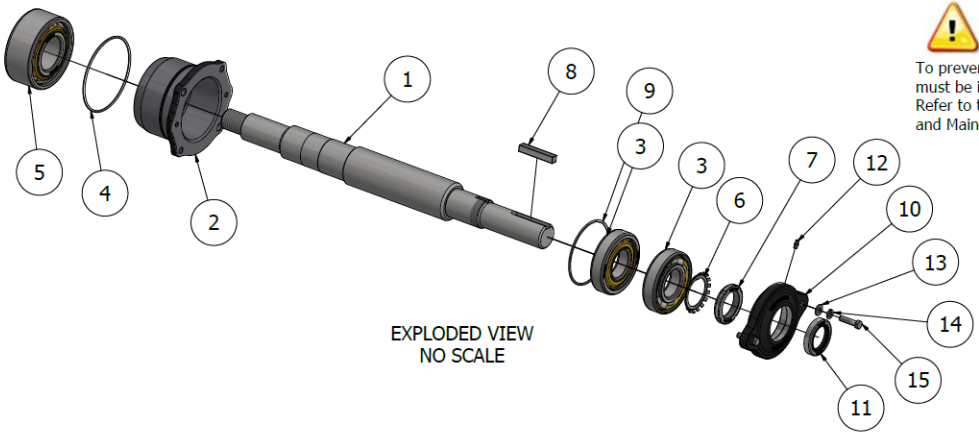
Material	
4	Cast Iron
7	Chrome Hardened

Impeller	
13	13" Impeller Fits 4X3 & 6X5
10	10" Impeller Fits 6X5
11	11" Impeller Fits 6X5
14	14" Impeller Fits 6X5

-

Seal	
M	Mechanical Seal
R	Rope Packing

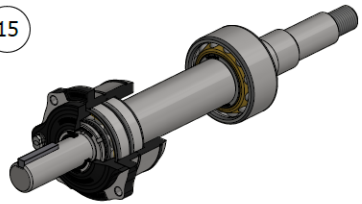
Rotation	
RH	Right Hand
LH	Left Hand



EXPLODED VIEW
NO SCALE

WARNING!

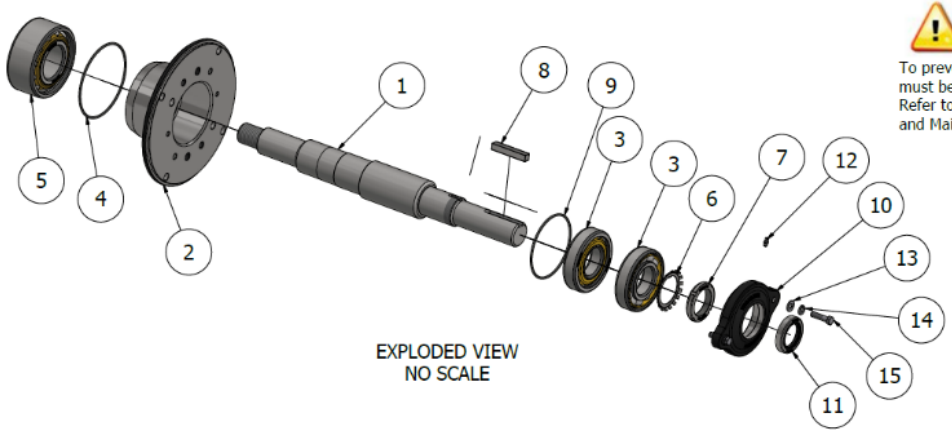
To prevent shaft distortion and damage, bearings must be installed using a heated method. Refer to the Mud Puppy 250 Pump Installation and Maintenance Manual for the proper procedure.



ISOMETRIC VIEW
NO SCALE

TT250-021-08LBP-SBS, 250 PUMP STUB SHAFT KIT LONG BODY				
Item	**Qty**	**Part Number**	**Desecription**	**Material**
1	1	TT250-021-08LBP	Long Body Shaft	Stainless Steel
2	1	TT250-023-04T	Secondary Bearing Sleeve	Ductile Iron
3	2	TT250-024-06	Pump Secondary Bearing	Stainless Steel
4	1	TT250-022-15	O-Ring, Pump Pedestal to Secondary Bearing Sleeve	Buna-n
5	1	TT250-020-06	Pump Primary Bearing	Stainless Steel
6	1	TT250-025-06	Pump Secondary Bearing Lock Washer	Stainless Steel
7	1	TT250-026-06	Secondary Bearing Lock Nut	Stainless Steel
8	1	TT250-030-06	Shaft Key - 1/2" × 1/2" × 3"	Steel
9	1	TT250-027-15	O-Ring, Secondary Bearing Sleeve to Secondary Bearing Cover	Buna-n
10	1	TT250-028-04	Secondary Bearing Cover	Steel
11	1	TT250-029-16	Secondary Grease Seal	NBR Nitrile Rubber and Steel
12	1	MPH-G-00001	Lubricating Grease Nipple 1/4-28 (Zerk)	Stainless Steel
13	2	MPH-W-00004	Washer, Flat 3/8"	Steel
14	2	MPH-W-00005	Washer, Lock 3/8"	Steel
15	2	MPH-S-00007	Hex Head Cap Screw, 3/8"-16 UNC X 1 1/2" LG Grade 5	Steel

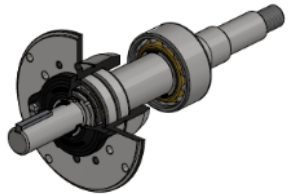
250 PUMP MOTOR MOUNT SHAFT KIT SHORT BODY



EXPLODED VIEW
NO SCALE

WARNING!

To prevent shaft distortion and damage, bearings must be installed using a heated method. Refer to the Mud Puppy 250 Pump Installation and Maintenance Manual for the proper procedure.



ISOMETRIC VIEW
NO SCALE

TT250-021-08Y-SBA, 250 Pump Motor Mount Shaft Kit Short Body				
Item	Qty	Part Number	Desecription	Material
1	1	TT250-021-08Y	Short Body Shaft	Stainless Steel
2	1	TT250-023-04U	Secondary Bearing Sleeve Motor Mount Adapter	Ductile Iron
3	2	TT250-024-06	Pump Secondary Bearing	Stainless Steel
4	1	TT250-022-15	O-Ring, Pump Pedestal to Secondary Bearing Sleeve	Buna-n
5	1	TT250-020-06	Pump Primary Bearing	Stainless Steel
6	1	TT250-025-06	Pump Secondary Bearing Lock Washer	Stainless Steel
7	1	TT250-026-06	Secondary Bearing Lock Nut	Stainless Steel
8	1	TT250-030-06	Shaft Key - 1/2" × 1/2" × 3"	Steel
9	1	TT250-027-15	O-Ring, Secondary Bearing Sleeve to Secondary Bearing Cover	Buna-n
10	1	TT250-028-04	Secondary Bearing Cover	Steel
11	1	TT250-029-16	Secondary Grease Seal	NBR Nitrile Rubber and Steel
12	1	MPH-G-00001	Lubricating Grease Nipple 1/4-28 (Zerk)	Stainless Steel
13	2	MPH-W-00004	Washer, Flat 3/8"	Steel
14	2	MPH-W-00005	Washer, Lock 3/8"	Steel
15	2	MPH-S-00007	Hex Head Cap Screw, 3/8"-16 UNC X 1 1/2" LG Grade 5	Steel

250 PUMP WET END KIT 4X3X13 DUCTILE IRON MECHANICAL SEAL

TT250WE43RH4M-13 250 PUMP WET END KIT 4X3X13 DUCTILE IRON MECHANICAL SEAL			
Item	Qty	Part Number	Description
1	1	TT250-001-04	Housing 250 RH - 3 X 4
2	1	TT250-004-04D	Impeller, 250 Pump RH - 3X4X13 Ductile
3	1	TT250-006-04S	Stuffing Box, 250 Pump Mechanical Seal
4	1	TT250-005-12T-150	Gasket, 250 Housing/Stuffing Box 1.50 MM
5	1	TT250-008-15	O-Ring (-032) Impeller to Seal Sleeve
6	1	TT250-010-15	O-Ring (-226) 250 Shaft
7	1	MPH-P-00002	Pin, 1/8" X 3/4" Roller 250
8	2	MPH-U-00001	Plug, 1/2-14 NPT SQHD Galv
9	2	MPH-B-00010	Bolt, 1/2-13 X 1 1/2" HCS GSZ
10	12	MPH-D-00002	Stud, 3/4-10 X 3" (250 Pump Housing)
11	12	MPH-N-00008	Nut, 3/4-10 UNC GS
12	2	MPH-W-00012	Washer, 1/2" Lock GSZ
13	2	MPH-B-00014	Bolt, 3/4-10 X 2" HCS SGZ
14	1	TT250-009-08	Seal Sleeve
15	1	TT250-051	250 Pump Maintenance and Operation Manual (NOT SHOWN IN VIEW)

250 PUMP WET END KIT 4X3X13 DUCTILE IRON PACKED SEAL

TT250WE43RH4R-13 250 PUMP WET END KIT 4X3X13 DUCTILE IRON PACKED SEAL			
Item	Qty	Part Number	Description
1	1	TT250-101-04	Housing, 250 R4X3X13 Ductile
2	1	TT250-006-04R	Stuffing Box, 250 Rope Packing Ductile Iron
3	1	TT250-004-04D	Impeller, 250 Pump RH - 4X3X13 Ductile
4	1	TT250-005-12T	Gasket, 250 Housing 0.05mm
5	1	TT250-008-15-IA	O-Ring (-032)
6	1	TT250-010-15	O-Ring (-226) 250 Shaft
7	6	TT250-011-11RA	Packing, Rope 250
8	2	TT250-011-11RB	Gland, 250 Greaser, Plastic
9	2	MPH-U-00001	Plug, 1/2"-14 NPT SQHD Galv
10	2	MPH-B-00010	Bolt, 1/2-13 UNC X 1-1/2" Hex GS
11	12	MPH-D-00002	Stud, 3/4-10 X 3"
12	2	MPH-B-00014	Bolt, 3/4"-10 UNC x 2" Hex
13	2	MPH-W-00012	Washer, 1/2" Lock GS
14	12	MPH-N-00008	Nut, 3/4-10 UNC GS
15	1	TT250-009-08	Sleeve, Seal, 250 Pump SS
16	1	TT250-051	Manual, 250 Pump Maintenance and Operation (NOT SHOWN IN VIEW)
17	1	MPH-G-00001	Grease Zerk w/cap 1/4-28

250 PUMP WET END KIT 4X3X13 CHROME MECHANICAL SEAL

TT250WE43RH7M-13 250 PUMP WET END KIT 4X3X13 CHROME MECHANICAL SEAL			
Item	**Qty**	**Part Number**	**Description**
1	1	TT250-101-07	Housing, 250 Pump RH-3x4 Chrome.
2	1	TT250-004-07	Impeller 250 Pump RH - 3X4X13 Chrome
3	1	TT250-006-07S	STUFFING BOX, 250 Mechanical Seal Chrome
4	1	TT250-008-15	O-RING (-032) - Impeller to Seal Sleeve O-Ring
5	1	TT250-010-15	O-RING (-226) 250 SHAFT
6	1	MPH-P-00002	PIN, 1/8" x 3/4" Roller 250
7	2	MPH-U-00001	PLUG, 1/2"-14NPT SQHD GALV
8	2	MPH-B-00012	BOLT, 1/2"-13 X 1 1/2"
9	12	MPH-D-00002	STUD,3/4"-10X3" (250 Pump Housing)
10	12	MPH-N-00008	NUT, 3/4-10 UNC G5
11	2	MPH-W-00012	WASHER, 1/2" LOCK GSZ
12	2	MPH-B-00014	BOLT, 3/4"-10 X 2" HCS GSZ
13	1	TT250-005-12T-150	GASKET, 250 HOUSING / STUFFING BOX 1.50 MM
14	1	TT250-009-07	SLEEVE, 250 Pump, Rope Seal, Cr26 (Hardened)
15	1	TT250-051	250 Pump Maintenance and Operation Manual (NOT SHOWN IN VIEW)

250 PUMP WET END KIT 4X3X13 CHROME PACKED SEAL

TT250WE43RH7R-13 250 PUMP WET END KIT 4X3X13 CHROME PACKED SEAL			
Item	Qty	Part Number	Desecription
1	1	TT250-101-07	Housing, 250 R4X3X13 Chrome
2	1	TT250-006-07S	Stuffing Box, 250 Rope Packing Chrome
3	1	TT250-004-07	Impeller, 250 Pump RH - 4X3X13 Chrome
4	1	TT250-005-12T	Gasket, 250 Housing 0.05mm
5	1	TT250-008-15-IA	O-Ring (-032)
6	1	TT250-010-15	O-Ring (-226) 250 Shaft
7	6	TT250-011-11RA	Packing, Rope 250
8	2	TT250-011-11RB	Gland, 250 Greaser, Plastic
9	2	MPH-U-00001	Plug, 1/2"-14 NPT SQHD Galv
10	2	MPH-B-00010 S	Bolt, 1/2-13 UNC X 1-1/2" Hex G5
11	12	MPH-D-00002	Stud, 3/4-10 X 3"
12	2	MPH-B-00014 Bolt	3/4"-10 UNC x 2" Hex
13	2	MPH-W-00012	Washer, 1/2" Lock GS
14	12	MPH-N-00008	Nut, 3/4-10 UNC GS
15	1	TT250-009-08	Sleeve, Seal, 250 Pump SS
16	1	TT250-051 Manual	250 Pump Maintenance and Operation (NOT SHOWN IN VIEW)
17	1	MPH-G-00001	Grease Zerk w/cap 1/4-28

250 PUMP WET END KIT 6X5X11 DUCTILE IRON MECHANICAL SEAL

TT250WE65RH4M-11 250 PUMP WET END KIT 6X5X11 DUCTILE IRON MECHANICAL SEAL			
Item	Qty	Part Number	Description
1	1	TT250-054-04	HOUSING, 250 6X5X11 RH Ductile
2	1	TT250-055-04-11	IMPELLER, 250 RH 6x5x11 Ductile RH
3	1	TT250-006-04S	STUFFING BOX, 250 Mechanical Seal Ductile
4	1	TT250-005-12T-150	Stuffing Box Gasket
5	1	TT250-008-15	O-Ring (-032) Impeller to Seal Sleeve
6	1	TT250-010-15	Seal Sleeve to Shaft O-Ring
7	1	MPH-P-00002	PIN, 1/8" x 3/4" Roller 250
8	1	MPH-U-00001	PLUG, 1/2"-14NPT SQHD GALV
9	2	MPH-B-00012	Hex Bolt, ½"-13 UNC x 2", Grade 5
10	12	MPH-D-00002	STUD,3/4"-10 X 3" (250 Pump Housing)
11	12	MPH-N-00008	NUT, 3/4-10 UNC GS
12	2	MPH-W-00012	WASHER, 1/2" LOCK GSZ
13	2	MPH-B-00014	BOLT, 3/4"-10 X 2" HCS GSZ
14	1	TT250-009-08	SLEEVE, 250 Pump, Rope Seal, C726 (Hardened)
15	1	MPH-U-00002	PLUG, 3/4" - 14NPT SQHD GALV
16	1	TT250-051	250 Pump Maintenance and Operation Manual (NOT SHOWN IN VIEW)

250 PUMP WET END KIT 6X5X14 DUCTILE IRON MECHANICAL SEAL

TT250WE65RH4M-14 250 PUMP WET END KIT 6X5X14 DUCTILE IRON MECHANICAL SEAL			
Item	Qty	Part Number	Description
1	1	TT250-056-04	Housing, 250 RH 6x5x14 Chrome
2	1	TT250-055-04-14	IMPELLER, 6X5X14 RH CHROME
3	1	TT250-006-04S	STUFFING BOX, 250 Mechanical Seal Ductile Iron
4	1	TT250-005-127-150	Stuffing Box Gasket
5	1	TT250-008-15	O-Ring (-032) Impeller to Seal Sleeve
6	1	TT250-010-15	Seal Sleeve to Shaft O-Ring
7	1	MPH-P-00002	PIN, 1/8" x 3/4" Roller 250
8	1	MPH-U-00001	PLUG, 1/2"-14NPT SQHD GALV
9	2	MPH-B-00012	Hex Bolt, ½"-13 UNC x 2", Grade 5
10	12	MPH-D-00002	STUD,3/4"-10 X 3" (250 Pump Housing)
11	12	MPH-N-00008	NUT, 3/4-10 UNC G5
12	2	MPH-W-00012	WASHER, 1/2" LOCK GSZ
13	2	MPH-B-00014	BOLT, 3/4"-10 X 2" HCS GSZ
14	1	TT250-009-08	SLEEVE, 250 Pump, Rope Seal, CZ6 (Hardened)
15	1	MPH-U-00002	PLUG, 3/4" - 14NPT SQHD GALV
16	1	TT250-051	250 Pump Maintenance and Operation Manual (NOT SHOWN IN VIEW)

250 PUMP WET END KIT 6X5X11 DUCTILE IRON PACKED SEAL

TT250WE65RH4R-11 250 PUMP WET END KIT 6X5X11 DUCTILE IRON PACKED SEAL			
Item	Qty	Part Number	Description
1	1	TT250-054-04	HOUSING, 250 RH 6x5x11 Ductile
2	6	TT250-011-11RA	Packing, Rope 250
3	1	TT250-055-04-11	Impeller 250 6X5X11 Ductile RH
4	1	TT250-006-04R	Stuffing Box, 250 Rope Packing Ductile Iron
5	1	TT250-005-12T-150	GASKET, 250 HOUSING / STUFFING BOX 150 MM
6	1	TT250-008-15	O-RING (-032) Impeller to Seal Sleeve O-Ring
7	1	TT250-010-15	O-RING (-226) 250 SHAFT
8	1	MPH-U-00001	PLUG, 1/2"-14NPT SQHD GALV
9	2	MPH-B-00012	BOLT, 1/2"-13 X 1 1/2" G5
10	12	MPH-D-00002	STUD,3/4"-10X3" (250 Pump Housing)
11	12	MPH-N-00008	NUT, 3/4-10 UNC G5
12	2	MPH-W-00012	WASHER, 1/2" LOCK G5Z
13	2	MPH-B-00014	BOLT, 3/4"-10 X 2" HCS G5Z
14	2	TT250-011-11RB	GLAND, 250 Greaser, Plastic one PC
15	1	TT250-009-08	SLEEVE, 250 Pump, Rope Seal
16	1	MPH-U-00002	PLUG, 3/4" - 14NPT SQHD GALV
17	1	TT250-051	250 Pump Maintenance and Operation Manual (NOT SHOWN IN VIEW)
18	1	MPH-G-00001	Grease Zerk w/cap 1/4-28

250 PUMP WET END KIT 6X5X14 DUCTILE IRON PACKED SEAL

TT250WE65RH4R-14 250 PUMP WET END KIT 6X5X14 DUCTILE IRON PACKED SEAL			
Item	Qty	Part Number	Description
1	1	TT250-056-04	Housing, 250 RH 6x5x14 Ductile
2	6	TT250-011-11RA	Packing, Rope 250
3	1	TT250-055-04-14	IMPELLER, 6X5X14 RH Ductile Iron
4	1	TT250-006-04R	Stuffing Box, 250 Rope Packing Ductile Iron
5	1	TT250-005-12T-150	GASKET, 250 HOUSING / STUFFING BOX 1.50 MM
6	1	TT250-008-15	O-RING (-032) Impeller to Seal Sleeve O-Ring
7	1	TT250-010-15	O-RING (-226) 250 SHAFT
8	1	MPH-U-00001	PLUG, 1/2"-14NPT SQHD GALV
9	2	MPH-B-00012	BOLT, 1/2"-13 X 1 1/2" G5
10	12	MPH-D-00002	STUD,3/4"-10X3" (250 Pump Housing)
11	12	MPH-N-00008	NUT, 3/4-10 UNC G5
12	2	MPH-W-00012	WASHER, 1/2" LOCK GSZ
13	2	MPH-B-00014	BOLT, 3/4"-10 X 2" HCS GSZ
14	2	TT250-011-11RB	GLAND, 250 Greaser, Plastic one PC
15	1	TT250-009-08	SLEEVE, 250 Pump, Rope Seal
16	1	MPH-U-00002	PLUG, 3/4" - 14NPT SQHD GALV
17	1	TT250-051	250 Pump Maintenance and Operation Manual (NOT SHOWN IN VIEW)
18	1	MPH-G-00001	Grease Zerk w/cap 1/4-28

250 PUMP WET END KIT 6X5X11 CHROME MECHANICAL SEAL

TT250WE65RH7M-11 250 PUMP WET END KIT 6X5X11 CHROME MECHANICAL SEAL			
Item	Qty	Part Number	Description
1	1	TT250-054-07	HOUSING, 250 RH 6x5x11 Chrome
2	1	TT250-055-07-11	IMPELLER, 250 RH 6x5x11 Chrome
3	1	TT250-006-075	STUFFING BOX, 250 Mechanical Seal Chrome
4	1	TT250-005-12T-150	Stuffing Box Gasket
5	1	TT250-008-15	O-Ring (-032) Impeller to Seal Sleeve
6	1	TT250-010-15	Seal Sleeve to Shaft O-Ring
7	1	MPH-P-00002	PIN, 1/8" x 3/4" Roller 250
8	1	MPH-U-00001	PLUG, 1/2"-14NPT SQHD GALV
9	2	MPH-B-00012	Hex Bolt, ½"-13 UNC x 2", Grade 5
10	12	MPH-D-00002	STUD,3/4"-10 X 3" (250 Pump Housing)
11	12	MPH-N-00008	NUT, 3/4-10 UNC G5
12	2	MPH-W-00012	WASHER, 1/2" LOCK GSZ
13	2	MPH-B-00014	BOLT, 3/4"-10 X 2" HCS GSZ
14	1	TT250-009-07	SLEEVE, 250 Pump, Rope Seal, C26 (Hardened)
15	1	MPH-U-00002	PLUG, 3/4" - 14NPT SQHD GALV
16	1	TT250-051	250 Pump Maintenance and Operation Manual (NOT SHOWN IN VIEW)

250 PUMP WET END KIT 6X5X14 CHROME MECHANICAL SEAL

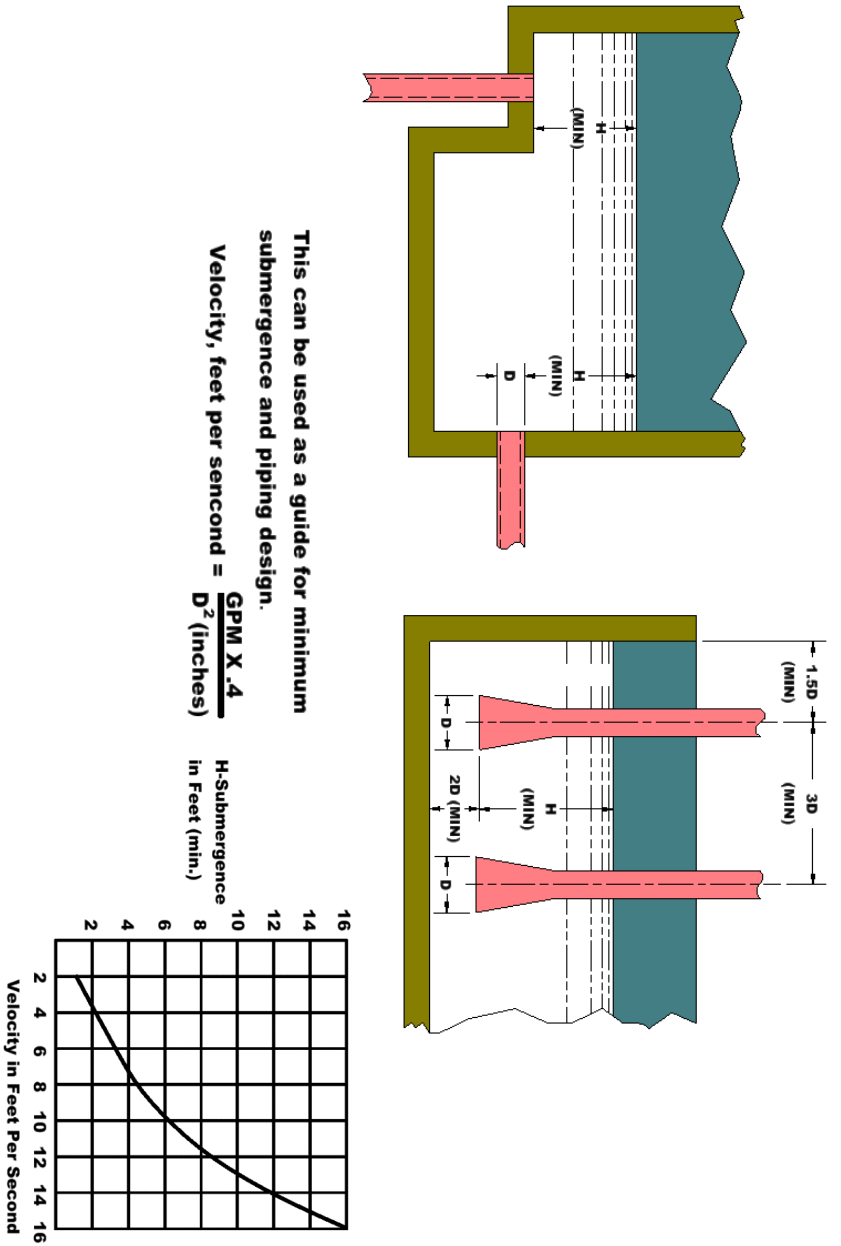
TT250WE65RH7M-14 250 PUMP WET END KIT 6X5X14 CHROME MECHANICAL SEAL			
Item	Qty	Part Number	Description
1	1	TT250-056-07	Housing, 250 RH 6x5x14 Chrome
2	1	TT250-055-07-14	IMPELLER, 6X5X14 RH CHROME
3	1	TT250-006-075	STUFFING BOX, 250 Mechanical Seal Chrome
4	1	TT250-005-127-150	Stuffing Box Gasket
5	1	TT250-008-15	O-Ring (-032) Impeller to Seal Sleeve
6	1	TT250-010-15	Seal Sleeve to Shaft O-Ring
7	1	MPH-P-00002	PIN, 1/8" x 3/4" Roller 250
8	1	MPH-U-00001	PLUG, 1/2"-14NPT SQHD GALV
9	2	MPH-B-00012	Hex Bolt, ½"-13 UNC x 2", Grade 5
10	12	MPH-D-00002	STUD,3/4"-10 X 3" (250 Pump Housing)
11	12	MPH-N-00008	NUT, 3/4-10 UNC GS
12	2	MPH-W-00012	WASHER, 1/2" LOCK GSZ
13	2	MPH-B-00014	BOLT, 3/4"-10 X 2" HCS GSZ
14	1	TT250-009-07	SLEEVE, 250 Pump, Rope Seal, C26 (Hardened)
15	1	MPH-U-00002	PLUG, 3/4" - 14NPT SQHD GALV
16	1	TT250-051	250 Pump Maintenance and Operation Manual (NOT SHOWN IN VIEW)

250 PUMP WET END KIT 6X5X11 CHROME PACKED SEAL

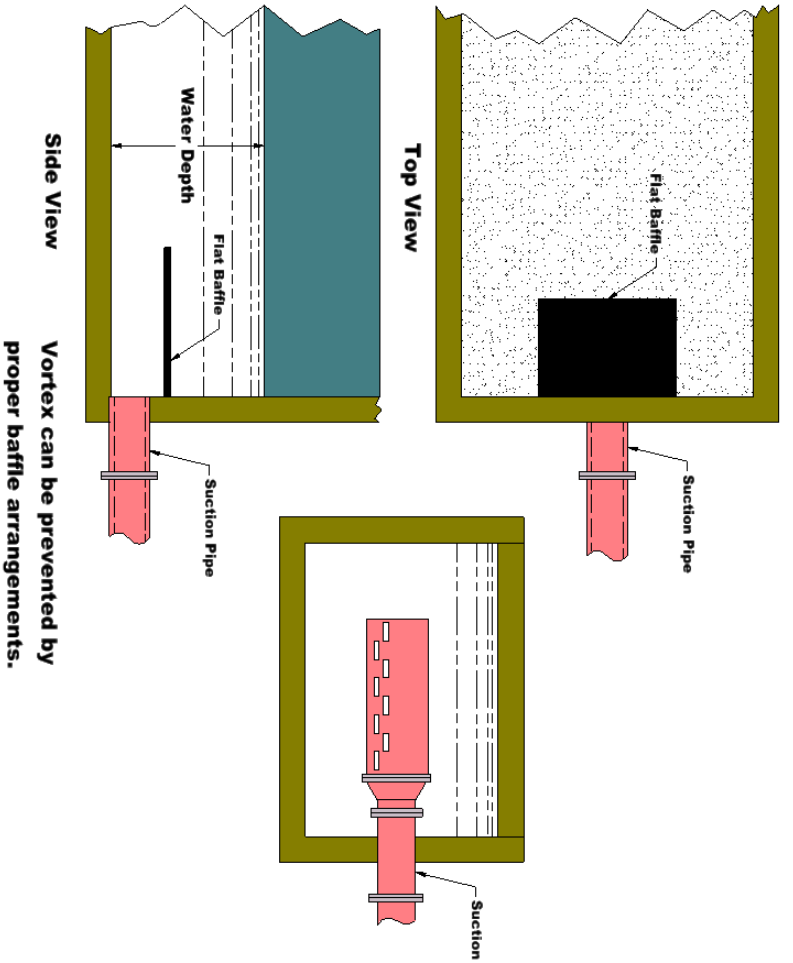
TT250WE65RH7R-11 250 PUMP WET END KIT 6X5X11 CHROME PACKED SEAL			
Item	Qty	Part Number	Description
1	1	TT250-054-07	HOUSING, 250 RH 6x6x11 Chrome
2	6	TT250-011-11RA	Packing, Rope 250
3	1	TT250-055-07-11	Impeller 250 Pump RH - 6X5X11
4	1	TT250-006-07R	Stuffing Box 250 Pump Rope Packing
5	1	TT250-005-12T-150	GASKET, 250 HOUSING / STUFFING BOX 1.50 MM
6	1	TT250-008-15	O-RING (-032) Impeller to Seal Sleeve O-Ring
7	1	TT250-010-15	O-RING (-226) 250 SHAFT
8	1	MPH-U-00001	PLUG, 1/2"-14NPT SQHD GALV
9	2	MPH-B-00012	BOLT, 1/2"-13 X 1 1/2" G5
10	12	MPH-D-00002	STUD,3/4"-10X3" (250 Pump Housing)
11	12	MPH-N-00008	NUT, 3/4-10 UNC G5
12	2	MPH-W-00012	WASHER, 1/2" LOCK GSZ
13	2	MPH-B-00014	BOLT, 3/4"-10 X 2" HCS GSZ
14	2	TT250-011-11RB	GLAND, 250 Greaser, Plastic one PC
15	1	TT250-009-07	SLEEVE, 250 Pump, Rope Seal, Cr26 (Hardened)
16	1	MPH-U-00002	PLUG, 3/4" - 14NPT SQHD GALV
17	1	TT250-051	250 Pump Maintenance and Operation Manual (NOT SHOWN IN VIEW)
18	1	MPH-G-00001	Grease Zerk w/cap 1/4-28

250 PUMP WET END KIT 6X5X14 CHROME PACKED SEAL

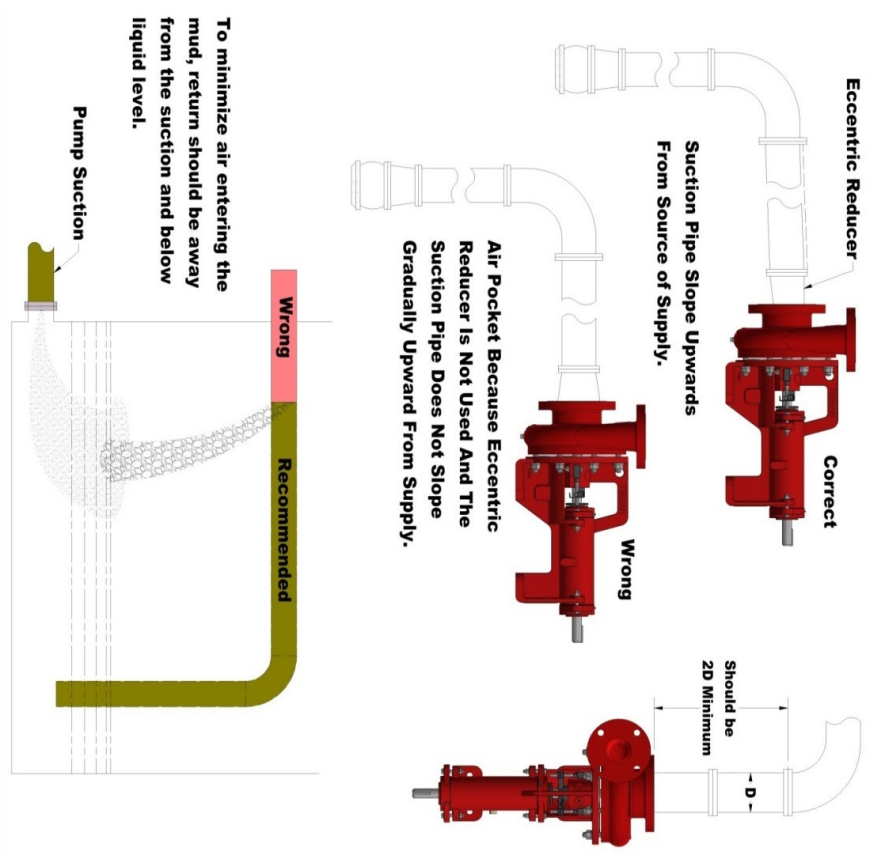
TT250WE65RH7R-14 250 PUMP WET END KIT 6X5X14 CHROME PACKED SEAL			
Item	Qty	Part Number	Description
1	1	TT250-056-07	Housing, 250 RH 6x5x14 Chrome
2	6	TT250-011-11RA	Packing, Rope 250
3	1	TT250-055-07-14	IMPELLER, 6X5X14 RH CHROME
4	1	TT250-006-07R	Stuffing Box 250 Pump Rope Packing
5	1	TT250-005-12T-150	GASKET, 250 HOUSING / STUFFING BOX 1.50 MM
6	1	TT250-008-15	O-RING (-032) Impeller to Seal Sleeve O-Ring
7	1	TT250-010-15	O-RING (-226) 250 SHAFT
8	1	MPH-U-00001	PLUG, 1/2"-14NPT SQHD GALV
9	2	MPH-B-00012	BOLT, 1/2"-13 X 1 1/2" G5
10	12	MPH-D-00002	STUD,3/4"-10X3" (250 Pump Housing)
11	12	MPH-N-00008	NUT, 3/4-10 UNC G5
12	2	MPH-W-00012	WASHER, 1/2" LOCK GSZ
13	2	MPH-B-00014	BOLT, 3/4"-10 X 2" HCS GSZ
14	2	TT250-011-11RB	GLAND, 250 Greaser, Plasticone PC
15	1	TT250-009-07	SLEEVE, 250 Pump, Rope Seal, G26 (Hardened)
16	1	MPH-U-00002	PLUG, 3/4" - 14NPT SQHD GALV
17	1	TT250-051	250 Pump Maintenance and Operation Manual (NOT SHOWN IN VIEW)
18	1	MPH-G-00001	Grease Zerk w/cap 1/4-28


H (MIN)
H (MIN)
D
D
1.5D (MIN)
3D (MIN)
D
2D (MIN)
H (MIN)
D
This can be used as a guide for minimum submergence and piping design.
Velocity, feet per sencond = GPM X .4 / D² (inches)
H-Submergence in Feet (min.)
2
4
6
8
10
12
14
16
2 4 6 8 10 12 14 16
Velocity in Feet Per Second

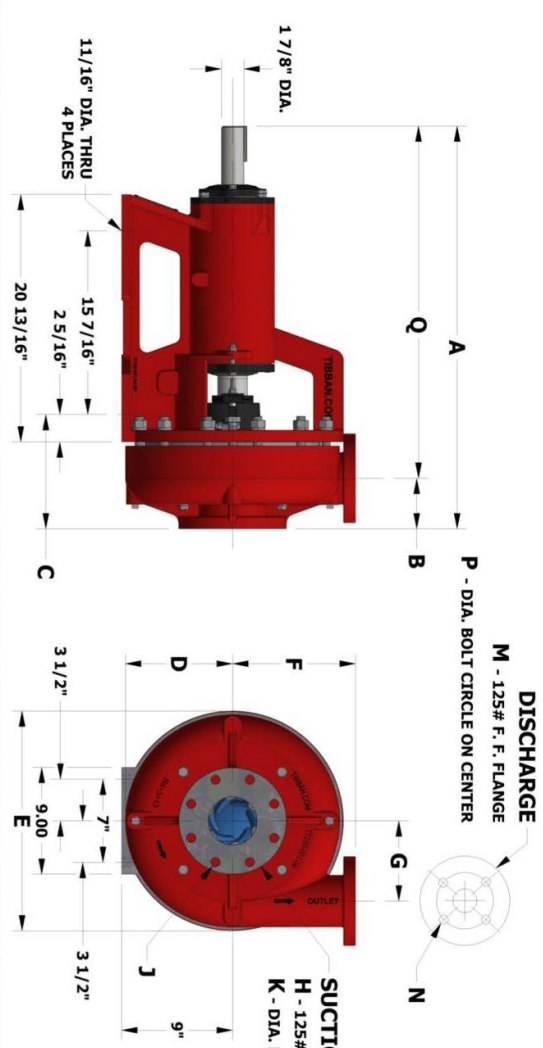
PIPING RECOMMENDATIONS (CONTINUED)



PIPING RECOMMENDATIONS (CONTINUED)

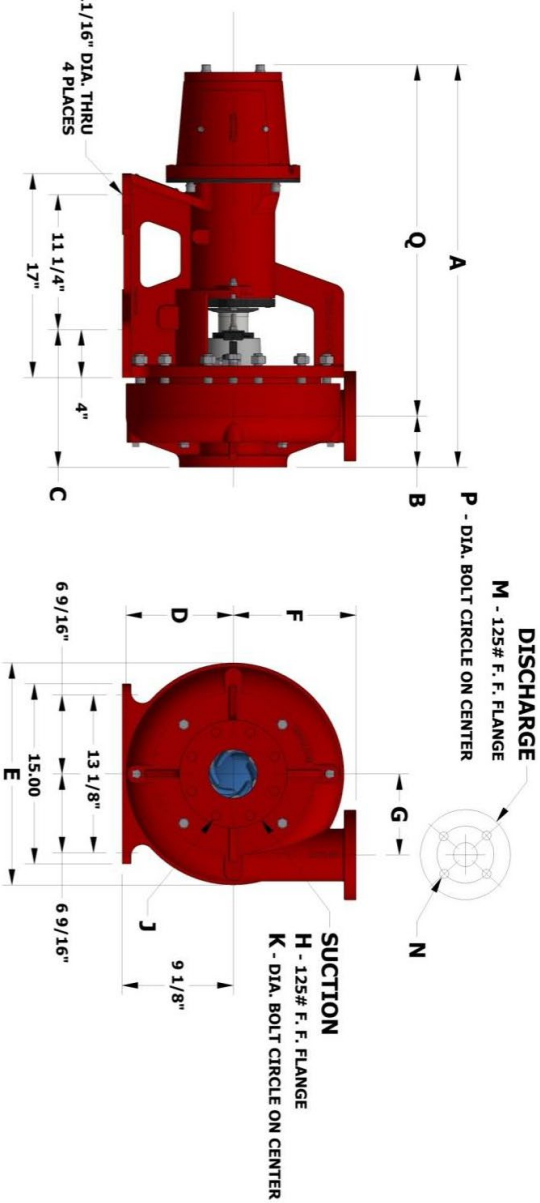


250 PUMP DIMENSIONS LONG BODY



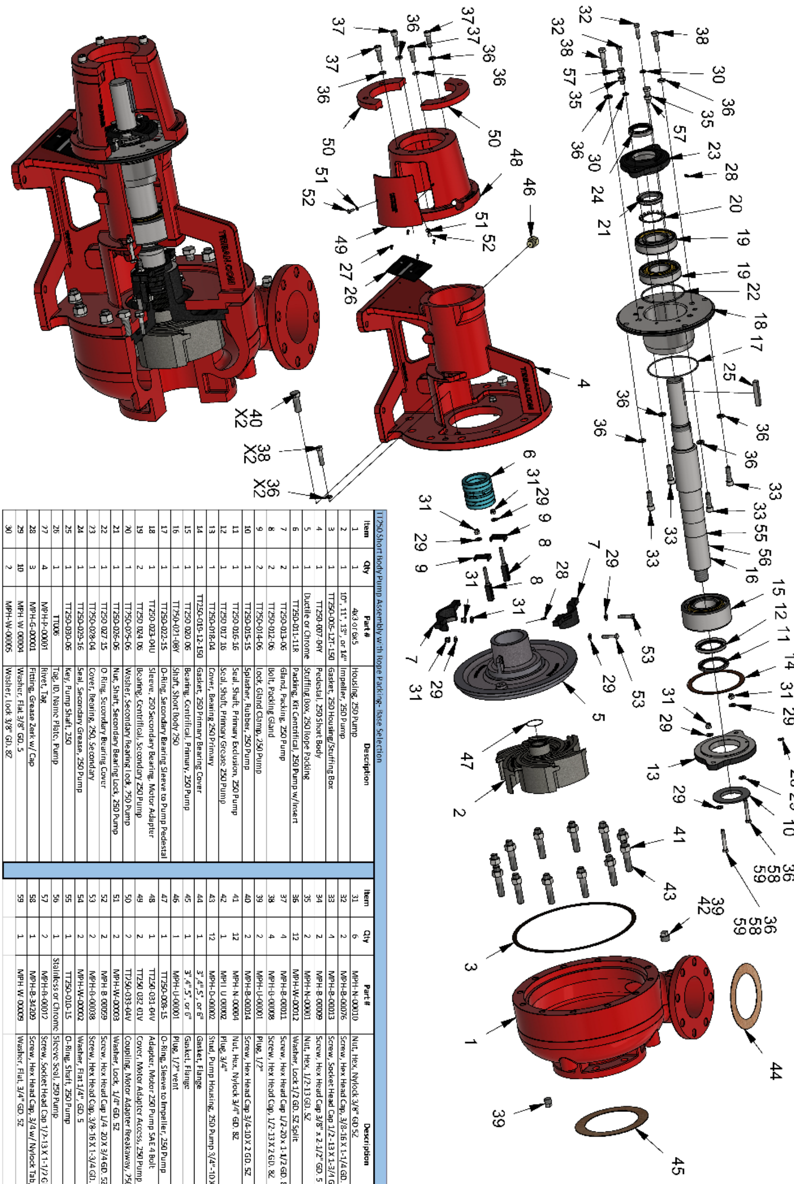
250 PUMP SIZE	A	B	C	D	E	F	G	H	J	K	M	N	P	Q
2" X 3"	33"	3 3/4"	8 3/4"	9"	17 7/8"	10 1/4"	7"	3"	3/4" DIA - 4 PLACES	6"	2"	3/4" DIA - 4 PLACES	4 3/4"	29 1/4"
3" X 4"	33 5/8"	4 1/4"	9 3/8"	9"	17 7/8"	10 1/4"	6 3/4"	4"	3/4" DIA - 8 PLACES	7 1/2"	3"	3/4" DIA - 4 PLACES	6"	29 3/8"
4" X 5"	35"	5"	10 3/4"	9"	19 3/8"	11"	6 1/8"	5"	7/8" DIA - 8 PLACES	8 1/2"	4"	3/4" DIA - 8 PLACES	7 1/2"	30"

250 PUMP DIMENSIONS SHORT BODY



250 PUMP SIZE	A	B	C	D	E	F	G	H	J	K	M	N	P	Q
2" X 3"	33 5/8"	3 3/4"	10 7/16"	8 15/16"	17 7/8"	10 1/4"	7"	3"	3/4" DIA - 4 PLACES	6"	2"	3/4" DIA - 4 PLACES	4 3/4"	29 7/8"
3" X 4"	34 1/4"	4 1/4"	11 1/16"	8 15/16"	17 7/8"	10 1/4"	6 3/4"	4"	3/4" DIA - 8 PLACES	7 1/2"	3"	3/4" DIA - 4 PLACES	6"	29 15/16"
4" X 5"	35 1/2"	5"	12 7/16"	9 1/2"	19"	11"	6 1/8"	5"	7/8" DIA - 8 PLACES	8 1/2"	4"	3/4" DIA - 8 PLACES	7 1/2"	30 5/8"

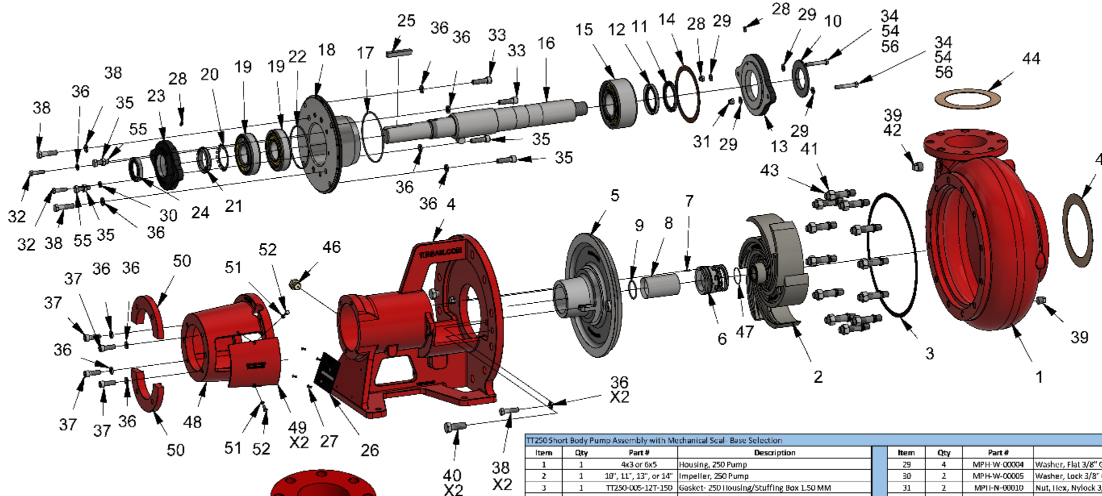
250 PUMP SHORT BODY PUMP ASSEMBLY WITH ROPE PACKING – BASE SELECTION

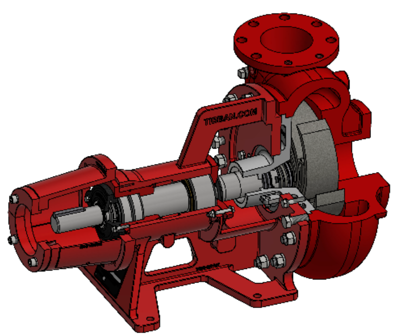


TT250 Short Body Pump Assembly with Rope Packing- Base Selection

Item	Qty	Part #	Description
1	1	4x3 or 6x5	Housing, 250 Pump
2	1	10", 11", 13", or 14"	Impeller, 250 Pump
3	1	TT250-005-12T-150	Gasket, 250 Housing/Stuffing Box
4	1	TT250-007-04Y	Pedestal, 250 Short Body
5	1	Ductile or Chrome	Stuffing Box, 250 Rope Packing
6	1	TT250-011-11R	Packing, Kit Centrifical, 250 Pump w/Insert
7	2	TT250-013-06	Gland, Packing, 250 Pump
8	2	TT250-012-06	Bolt, Packing Gland
9	2	TT250-014-06	Lock, Gland Clamp, 250 Pump
10	1	TT250-015-15	Splasher, Rubber, 250 Pump
11	1	TT250-016-16	Seal, Shaft, Primary Exclusion, 250 Pump
12	1	TT250 017 16	Seal, Shaft, Primary Grease 250 Pump
13	1	TT250-018-04	Cover, Bearing 250 Primary
14	1	TT250-019-12-150	Gasket, 250 Primary Bearing Cover
15	1	TT250 020 06	Bearing, Centrifical, Primary, 250 Pump
16	1	TT250-021-08Y	Shaft, Short Body 250
17	1	TT250-022-15	O-Ring, Secondary Bearing Sleeve to Pump Pedestal
18	1	TT250-023-04U	Sleeve, 250 Secondary Bearing, Motor Adapter
19	2	TT250 024 06	Bearing, Centrifical, Secondary 250 Pump
20	1	TT250-025-06	Washer, Secondary Bearing Lock, 250 Pump
21	1	TT250-026-06	Nut, Shaft, Secondary Bearing Lock, 250 Pump
22	1	TT250-027-15	O-Ring, Secondary Bearing Cover
23	1	TT250-028-04	Cover, Bearing, 250, Secondary
24	1	TT250-029-16	Seal, Secondary Grease, 250 Pump
25	1	TT250-030-06	Key, Pump Shaft, 250
26	1	TT006	Tag, ID, Name Plate, Pump
27	4	MPH-P-00001	Rivet, Tag
28	3	MPH-G-00001	Fitting, Grease Zerk w/ Cap
29	10	MPH-W-00004	Washer, Flat 3/8" GD. 5
30	2	MPH-W-00005	Washer, Lock 3/8" GD. 8Z
31	6	MPH-N-00010	Nut, Hex, Nylock 3/8" GD 5Z
32	2	MPH-B-00076	Screw, Hex Head Cap, 3/8-16 X 1-1/4 GD. 8Y
33	4	MPH-B-00013	Screw, Socket Head Cap 1/2-13 X 1-3/4 GD. 8
34	2	MPH-B-00009	Screw, Hex Head Cap 3/8" x 2-1/2" GD. 5
35	2	MPH-N-00001	Nut, Hex, 1/2-13 GD. 5Z
36	12	MPH-W-00012	Washer, Lock 1/2 GD. 5Z Split
37	4	MPH-B-00011	Screw, Hex Head Cap 1/2-20 x 1-1/2 GD. 8
38	4	MPH-B-00008	Screw, Hex Head Cap, 1/2-13 X 2 GD. 8Z
39	2	MPH-U-00001	Plug, 1/2"
40	2	MPH-B-00014	Screw, Hex Head Cap 3/4-10 X 2 GD. 5Z
41	12	MPH-N-00004	Nut, Hex, Nylock 3/4" GD. 8Z
42	1	MPH-U-00002	Plug, 3/4"
43	12	MPH-D-00002	Stud, Pump Housing, 250 Pump 3/4"-10 X 3"
44	1	3",4",5", or 6"	Gasket, Flange
45	1	3",4",5", or 6"	Gasket, Flange
46	1	MPH-U-00001	Plug, 1/2" vent
47	1	TT250-008-15	O-Ring, Sleeve to Impeller, 250 Pump
48	1	TT250-031-04V	Adapter, Motor 250 Pump SAE 4 Bolt
49	2	TT250 032 01V	Cover, Motor Adapter Access, 250 Pump SAE 4 Bolt
50	2	TT250-033-04V	Coupling, Motor Adapter Breakaway, 250 Pump SAE 4 Bolt
51	2	MPH-W-00003	Washer, Lock, 1/4" GD. 5Z
52	2	MPH-B-00059	Screw, Hex Head Cap 1/4-20 X 3/4 GD. 5Z
53	2	MPH-B-00038	Screw, Hex Head Cap, 3/8-16 X 1-3/4 GD. 5
54	2	MPH-W-00002	Washer, Flat 1/4", GD. 5
55	1	TT250-010-15	O-Ring, Shaft, 250 Pump
56	1	Stainless or Chrome	Sleeve Seal, 250 Pump
57	2	MPH-B-00012	Screw, Socket Head Cap 1/2-13 X 1-1/2 GD. 5
58	1	MPH-B-34209	Screw, Hex Head Cap, 3/4 w/ Nylock Tab, Impeller Bolt
59	1	MPH-W-00009	Washer, Flat, 3/4" GD. 5Z

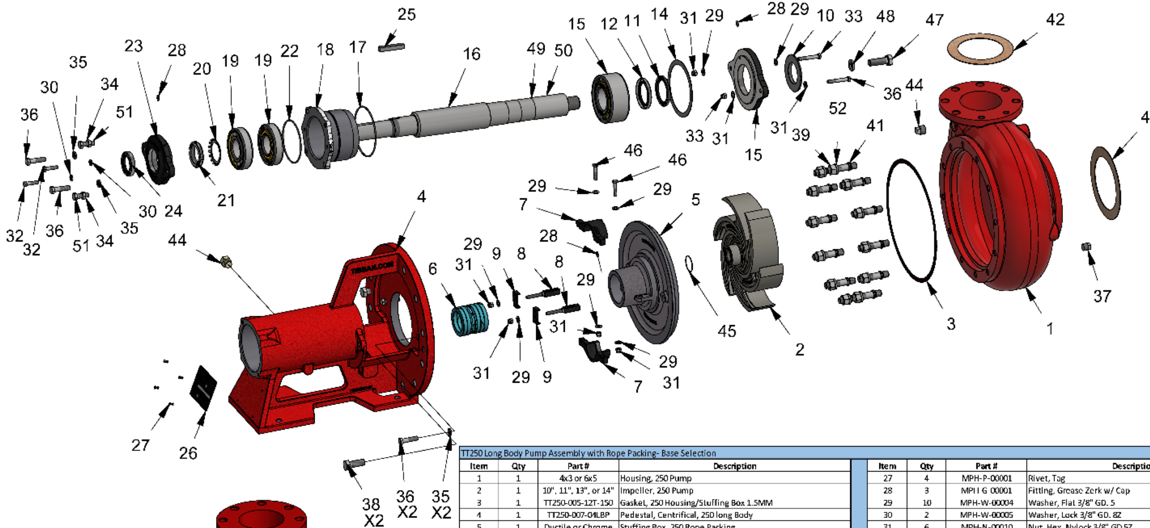
250 PUMP SHORT BODY PUMP ASSEMBLY WITH MECHANICAL SEAL – BASE SELECTION

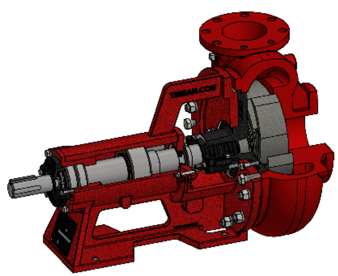




TT250 Short Body Pump Assembly with Mechanical Seal - Base Selection							
Item	Qty	Part #	Description	Item	Qty	Part #	Description
1	1	4x3 or 6x5	Housing, 250 Pump	29	4	MPH-W-00004	Washer, Flat 3/8" GD. 5
2	1	10", 11", 13", or 14"	Impeller, 250 Pump	30	2	MPH-W-00005	Washer, Lock 3/8" GD. 8Z
3	1	TT250-005-12T-150	Gasket- 250 Housing/Stuffing Box 1.50 MM	31	2	MPH-N-00010	Nut, Hex, Nylock 3/8" GD 5Z
4	1	TT250-007-04Y	Pedestal, 250 Short Body	32	2	MPH-B-00076	Screw, Hex Head Cap, 3/8-16 X 1-1/4 GD. 8Y
5	1	Ductile or Chrome	Stuffing Box, 250 Rope Packing	33	4	MPH-B-00013	Screw, Socket Head Cap 1/2 -13 X 1-3/4 GD. 8
6	1	TT250-011-10S	Seal, Mechanical, 250 Pump	34	2	MPH-B-00009	Screw, Hex Head Cap 3/8" x 2-1/2" GD. 5
7	1	MPH-P-00002	Pin, Roll, 1/8"x 1/2"	35	2	MPH-N-00001	Nut, Hex, 1/2-13 GD. 5Z
8	1	Stainless or Chrome	Sleeve Seal, 250 Pump	36	12	MPH-W-00012	Washer, Lock 1/2 GD. 5Z Split
9	1	TT250-010-15	O-Ring, Shaft, 250 Pump	37	4	MPH-B-00011	Screw, Hex Head Cap 1/2-20 X 1-1/2 GD. 8
10	1	TT250-015-15	Splasher, Rubber, 250 Pump	38	4	MPH-B-00008	Screw, Hex Head Cap, 1/2-13 X 2 GD. 8Z
11	1	TT250-016-16	Seal, Shaft, Primary Exclusion, 250 Pump	39	2	MPH-U-00001	Plug, 1/2"
12	1	TT250-017-16	Seal, Shaft, Primary Grease 250 Pump	40	2	MPH-B-00014	Screw, Hex Head Cap 3/4-10 X 2 GD. 5Z
13	1	TT250-018-04	Cover, Bearing, 250 Primary	41	12	MPH-N-00004	Nut, Hex, Nylock 3/4" GD. 8Z
14	1	TT250-019-12-150	Gasket, 250 Primary Bearing Cover	42	1	MPH-U-00002	Plug, 3/4"
15	1	TT250-020-06	Bearing, Centrifical, Primary, 250 Pump	43	12	MPH-D-00002	Stud, Pump Housing, 250 Pump 3/4" 10 X 3"
16	1	TT250-021-08Y	Shaft, Short Body 250	44	1	3",4",5", or 6"	Gasket, Flange
17	1	TT250-022-15	O-Ring, Secondary Bearing Sleeve to Pump Pedestal	45	1	3",4",5", or 6"	Gasket, Flange
18	1	TT250-023-04U	Sleeve, 250 Secondary Bearing, Motor Adapter	46	1	MPH-U-00001	Plug, 1/2" vent
19	2	TT250-024-06	Bearing, Centrifical, Secondary 250 Pump	47	1	TT250-008-15	O Ring, Sleeve to Impeller, 250 Pump
20	1	TT250-025-06	Washer, 250 Secondary Bearing Lock	48	1	TT250-031-04V	Adapter, Motor Mount, 250 Pump, SAE 'C' 4- Bolt
21	1	TT250-026-06	Nut, 250 Shaft, Secondary Bearing Lock	49	2	TT250-032-01V	Cover, 250, SAE 'C' 4 Bolt Motor Mount Adapter Hub Access
22	1	TT250-027-15	O-Ring, Secondary Bearing Cover	50	2	TT250-033-04V	Coupling, Motor Adapter Breakaway, 250 Pump SAE 4 Bolt
23	1	TT250-028-04	Cover, Bearing, 250, Secondary	51	2	MPH-W-00003	Washer, Lock, 1/4", GD. 5
24	1	TT250-029-16	Seal, Secondary Grease, 250 Pump	52	2	MPH-B-00059	Screw, Hex Head Cap, 1/4-20 x 3/4" GD. 5
25	1	TT250-030-06	Key, 250 Pump Shaft	53	2	MPH-W-00002	Washer, Flat, 1/4", GD. 5
26	1	TT006	Tag, ID, Name Plate, Pump	54	1	MPH-B-34209	Screw, Hex Head Cap, 3/4 w/ Nylock Tab, Impeller Bolt
27	4	MPH-P-00001	Rivet, Tag	55	2	MPH-B-00012	Screw, Socket Head Cap 1/2-13 X 1-1/2 GD. 5
28	2	MPH-G-00001	Fitting, Grease Zerk w/ Cap	56	1	MPH-W-00009	Washer, Flat, 3/4" GD. 5Z

250 PUMP LONG BODY PUMP ASSEMBLY WITH ROPE PACKING – BASE SELECTION

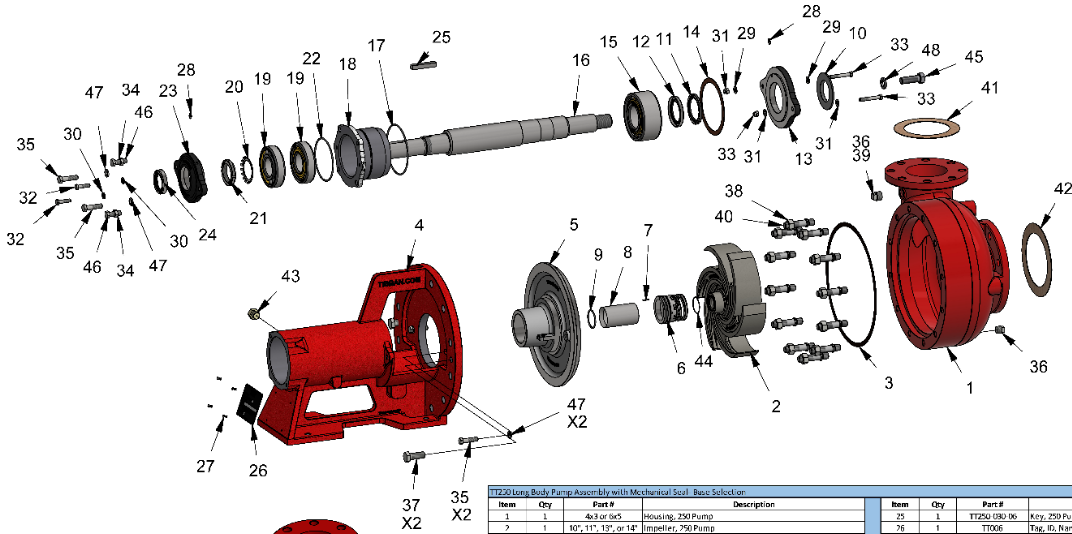


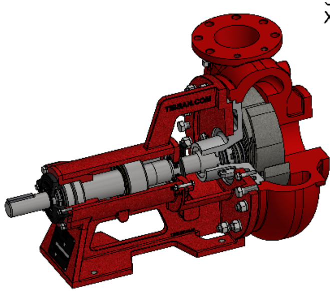


TT250 Long Body Pump Assembly with Rope Packing- Base Selection

Item	Qty	Part #	Description	Item	Qty	Part #	Description
1	1	4x3 or 6x5	Housing, 250 Pump	27	4	MPH-P-00001	Rivet, Tag
2	1	10", 11", 13", or 14"	Impeller, 250 Pump	28	3	MPH-G-00001	Fitting, Grease Zerk w/ Cap
3	1	TT250-005-12T-150	Gasket, 250 Housing/Stuffing Box 1.5MM	29	10	MPH-W-00004	Washer, Flat 3/8" GD. 5
4	1	TT250-007-04LBP	Pedestal, Centrifical, 250 long Body	30	2	MPH-W-00005	Washer, Lock 3/8" GD. 8Z
5	1	Ductile or Chrome	Stuffing Box, 250 Rope Packing	31	6	MPH-N-00010	Nut, Hex, Nylock 3/8" GD 5Z
6	1	TT250-011-11R	Packing, Kit Centrifical, 250 Pump w/Insert	32	2	MPH-B-00076	Screw, Hex Head Cap 3/8"-16 X 1-1/4 GD. 8Y
7	2	TT250-013-06	Gland, Packing, 250 Pump	33	2	MPH-B-00009	Screw, Hex Head Cap 3/8-16 X 2-1/2 GD. 5Z
8	2	TT250-012-06	Bolt, Packing Gland, 250 Pump	34	2	MPH-N-00001	Nut, Hex, 1/2-13 GD. 5Z
9	2	TT250-014-06	Lock, Gland Clamp, 250 Pump	35	4	MPH-W-00012	Washer, Lock 1/2 GD. 5Z Split
10	1	TT250-015-15	Splasher, Rubber, 250 Pump	36	4	MPH-B-00011	Screw, Hex Head Cap 1/2-20 X 1-1/2 GD. 8
11	1	TT250-016-16	Seal, Shaft, Primary Exclusion, 250 Pump	37	2	MPH-U-00001	Plug, 1/2"
12	1	TT250-017-16	Seal, Shaft, Primary Grease 250 Pump	38	2	MPH-B-00014	Screw, Hex Head Cap 3/4-10 X 2 GD. 5Z
13	1	TT250-018-04	Cover, Bearing, 250 Primary	39	12	MPH-N-00004	Nut, Hex, Nylock 3/4" GD. 8Z
14	1	TT250-019-12-150	Gasket, 250 Primary Bearing Cover	40	1	MPH-U-00002	Plug, 3/4"
15	1	TT250-020-06	Bearing, Centrifical, Primary, 250 Pump	41	12	MPH-D-00002	Stud, Pump Housing, 250 Pump 3/4"-10 X 3"
16	1	TT250-021-08LBP	Shaft, Centrifical, Long Body 250	42	1	3",4",5", or 6"	Gasket, Flange
17	1	TT250-022-15	O-Ring, Secondary Bearing Sleeve to Pump Pedestal	43	1	3",4",5", or 6"	Gasket, Flange
18	1	TT250-023-04T	Sleeve, 250, Secondary Bearing, Stub Shaft, Long Body Only	44	1	MPH-U-00001	Plug, 1/2" vent
19	2	TT250-024-06	Bearing, Centrifical, Secondary 250 Pump	45	1	TT250-008-15	O-Ring, Sleeve to Impeller, 250 Pump
20	1	TT250-025-06	Washer, Secondary Bearing Lock, 250 Pump	46	2	MPH-B-00038	Screw, Hex Head Cap 3/8-16 X 1-3/4 GD. 5
21	1	TT250-026-06	Nut, Shaft, Secondary Bearing Lock, 250 Pump	47	1	MPH-B-34209	Screw, Hex Head Cap, 3/4 w/ Nylock Tab, Impeller Bolt
22	1	TT250-027-15	O-Ring, Secondary Bearing Cover	48	1	MPH-W-00009	Washer, Flat, 3/4" GD. 5Z
23	1	TT250-028-04	Cover, Bearing, 250, Secondary	49	1	TT250-010-15	O-Ring, Shaft, 250 Pump
24	1	TT250-029-16	Seal, Secondary Grease, 250 Pump	50	1	Stainless or Chrome	Sleeve Seal, 250 Pump
25	1	TT250-030-06	Key, Pump Shaft, 250	51	2	MPH-B-00012	Screw, Socket Head Cap 1/2-13 X 1-1/2 GD. 5
26	1	TT006	Tag, ID, Name Plate, Pump				

250 PUMP LONG BODY PUMP ASSEMBLY WITH MECHANICAL SEAL – BASE SELECTION





Item	Qty	Part #	Description
1	1	4x3 or 6x5	Housing, 250 Pump
2	1	10", 11", 13", or 14"	Impeller, 250 Pump
3	1	TT250-005-12T-150	Gasket, 250 Housing/Stuffing Box 1.50 MM
4	1	TT250-007-04LBP	Pedestal, Centrifical, 250 Long Body
5	1	Ductile or Chrome	Stuffing Box, 250 Rope Packing
6	1	TT250-011-10S	Seal, Mechanical, 250 Pump
7	1	MPH-P-00002	Pin, Roll, 1/8"x 1/2"
8	1	Stainless or Chrome	Sleeve Seal, 250 Pump
9	1	TT250-010-15	O-Ring, Shaft, 250 Pump
10	1	TT250-015-15	Splasher, Rubber, 250 Pump
11	1	TT250-016-16	Seal, Shaft, Primary Exclusion, 250 Pump
12	1	TT250-017-16	Seal, Shaft, Primary Grease 250 Pump
13	1	TT250-018-04	Cover, Bearing, 250 Primary
14	1	TT250-019-12-150	Gasket, 250 Primary Bearing Cover
15	1	TT250-020-06	Bearing, Centrifical, Primary, 250 Pump
16	1	TT250-021-08LBP	Shaft, Long Body 250
17	1	TT250-022-15	O-Ring, Secondary Bearing Sleeve to Pump Pedestal
18	1	TT250-023-04T	Sleeve, 250, Secondary Bearing, Stub Shaft, Long Body Only
19	2	TT250-024-06	Bearing, Centrifical, Secondary 250 Pump
20	1	TT250-025-06	Washer, 250 Secondary Bearing Lock
21	1	TT250-026-06	Nut, 250 Shaft, Secondary Bearing Lock
22	1	TT250-027-15	O-Ring, Secondary Bearing Cover
23	1	TT250-028-04	Cover, Bearing, 250, Secondary
24	1	TT250-029-16	Seal, Secondary Grease, 250 Pump
25	1	TT250-030-06	Key, 250 Pump Shaft
26	1	TT006	Tag, ID, Name Plate, Pump
27	4	MPH-P-00001	Rivet, Tag
28	2	MPH-G-00001	Fitting, Grease Zerk w/ Cap
29	4	MPH-W-00004	Washer, Flat 3/8" GD. 5
30	2	MPH-W-00005	Washer, Lock 3/8" GD. 8Z
31	2	MPH-N-00010	Nut, Hex, Nylock 3/8" GD 5Z
32	2	MPH-B-00076	Screw, Hex Head Cap, 3/8-16 X 1-1/4 GD. 8Y
33	2	MPH-B-00009	Screw, Hex Head Cap 3/8-16 X 2-1/2 GD. 5Z
34	2	MPH-N-00001	Nut, Hex, 1/2-13 GD. 5Z
35	4	MPH-B-00011	Screw, Hex Head Cap 1/2-20 X 1-1/2 GD. 8
36	2	MPH-U-00001	Plug, 1/2"
37	2	MPH-B-00014	Screw, Hex Head Cap 3/4-10 X 2 GD. 5Z
38	12	MPH-N-00004	Nut, Hex, Nylock 3/4" GD. 8Z
39	1	MPH-U-00002	Plug, 3/4"
40	12	MPH-D-00002	Stud, Pump Housing, 250 Pump 3/4"-10 X 3"
41	1	3",4",5", or 6"	Gasket, Flange
42	1	3",4",5", or 6"	Gasket, Flange
43	1	MPH-U-00001	Plug, 1/2" vent
44	1	TT250-008-15	O-Ring, Sleeve to Impeller, 250 Pump
45	1	MPH-B-34209	Screw, Hex Head Cap, 3/4 w/ Nylock Tab, Impeller Bolt
46	2	MPH-B-00012	Screw, Socket Head, 1/2" x 1-1/2", GD. 5
47	4	MPH-W-00012	Washer, Lock, 1/2 Gd. 5
48	1	MPH-W-00009	Washer, Flat, 3/4" GD. 5Z

Table title: TT250 Long Body Pump Assembly with Mechanical Seal- Base Selection

250 PUMP HOUSING, IMPELLER, STUFFING BOX AND FLANGE GASKET SELECTION

250 PUMP HOUSING, IMPELLER, STUFFING BOX AND FLANGE GASKET SELECTION PAGE

SELECT ONE

250 Pump Housing Selection	
Part #	Description
TT250-101-23-04	Housing TT250 3X2 RH Ductile with Built-In Wear Plate
TT250-101-23-07	Housing TT250 3X2 RH Chrome with Built-In Wear Plate
TT250-101-04	Housing TT250, 4X3 Ductile with Built-In Wear Plate
TT250-101-07	Housing TT250, 4X3 Chrome with Built-In Wear Plate
TT250-054-04	Housing TT250, 6X5X11 Ductile
TT250-054-07	Housing TT250, 6X5X11 Chrome
TT250-056-04	Housing TT250, 6X5X14 Ductile
TT250-056-07	Housing TT250, 6X5X14 Chrome

SELECT ONE

250 Pump Impeller Selection	
Part #	Description
TT250-004-23-04	Impeller, 250 RH, 3X2 Ductile
TT250-004-23-07	Impeller, 250 RH, 3X2 Chrome
TT250-004-04	Impeller, 250 RH, 4X3X13 Ductile
TT250-004-07	Impeller, 250 RH, 4X3X13 Chrome
TT250-055-04-10	Impeller, 250 RH, 6X5X10 Ductile
TT250-055-07-10	Impeller, 250 RH, 6X5X10 Chrome
TT250-055-04-11	Impeller, 250 RH, 6X5X11 Ductile
TT250-055-07-11	Impeller, 250 RH, 6X5X11 Chrome
TT250-057-04	Impeller, 250 RH, 6X5X14 Ductile
TT250-057-07	Impeller, 250 RH, 6X5X14 Chrome

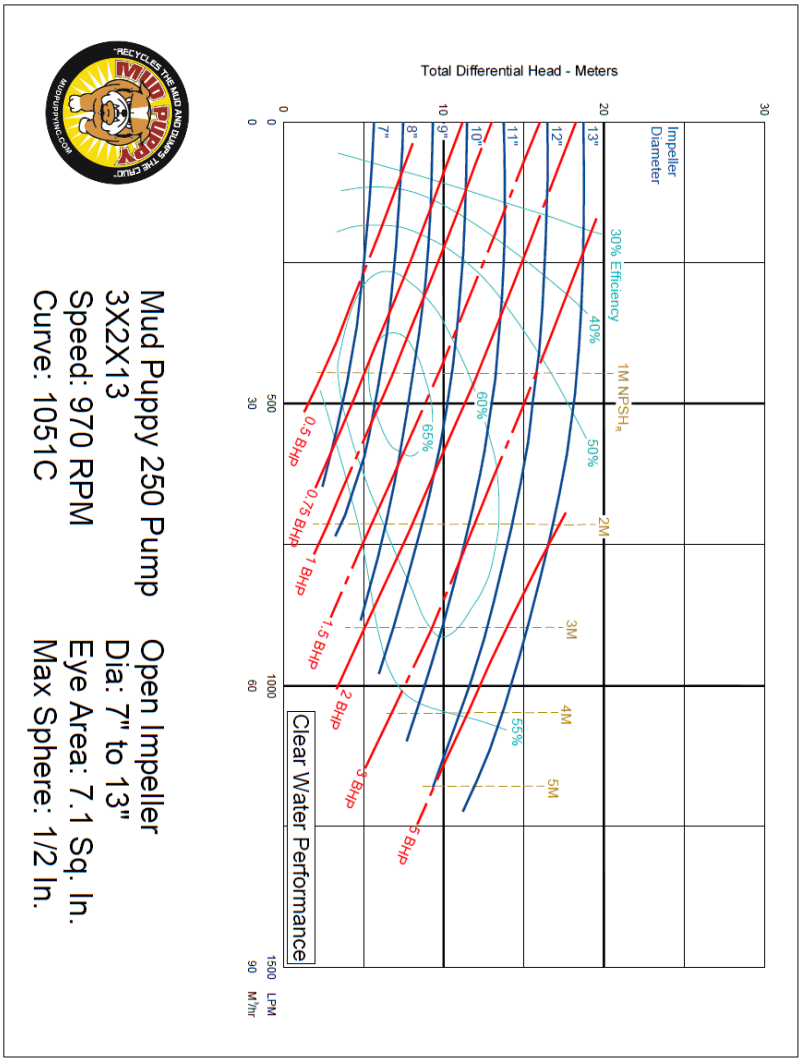
SELECT ONE
ROPE OR MECHANICAL

250 Rope Packing or Mechanical Seal Stuffing Box Selection	
Part #	Description
TT250-006-04R	Stuffing Box, Rope Packing Ductile
TT250-006-07R	Stuffing Box, Rope Packing Chrome
TT250-006-04S	Stuffing Box, Mechanical Seal Ductile
TT250-006-07S	Stuffing Box, Mechanical Seal Chrome

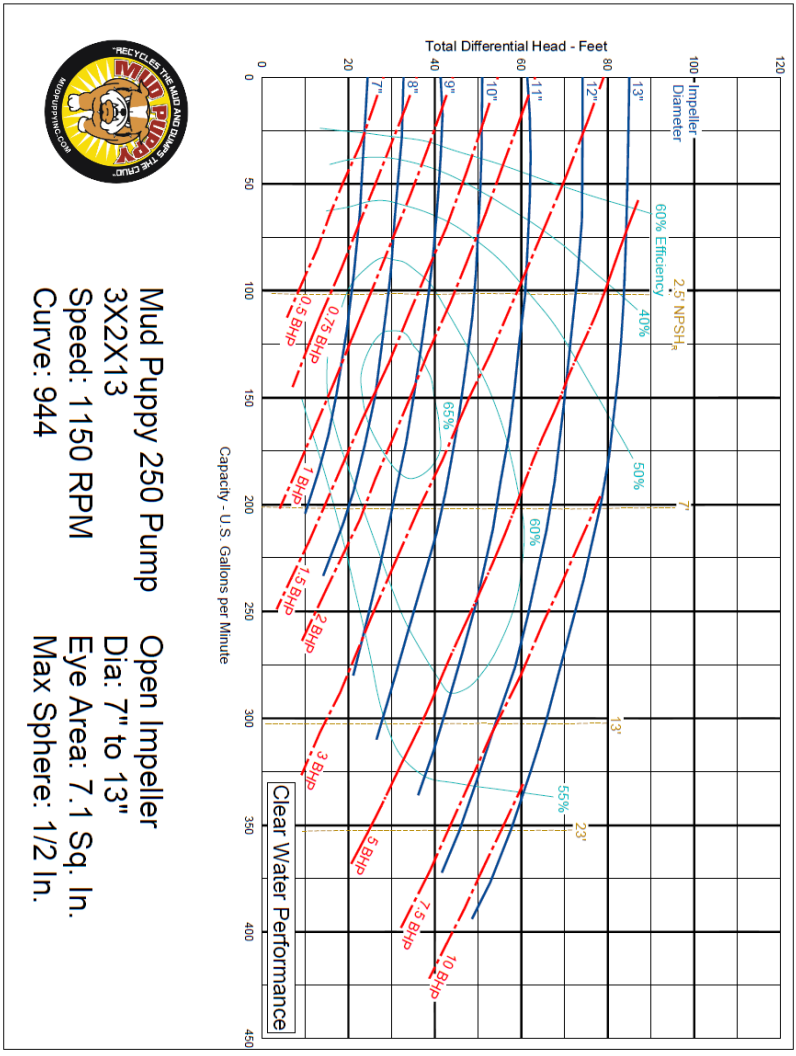
SELECT TWO
ONE FOR INLET, ONE FOR OUTLET

250 Flange Gasket Selection	
Part #	Description
TT047	Gasket, 2" Flange
TT048	Gasket, 3" Flange
TT049	Gasket, 4" Flange
TT250-060	Gasket, 5" Flange
TT250-061	Gasket, 6" Flange

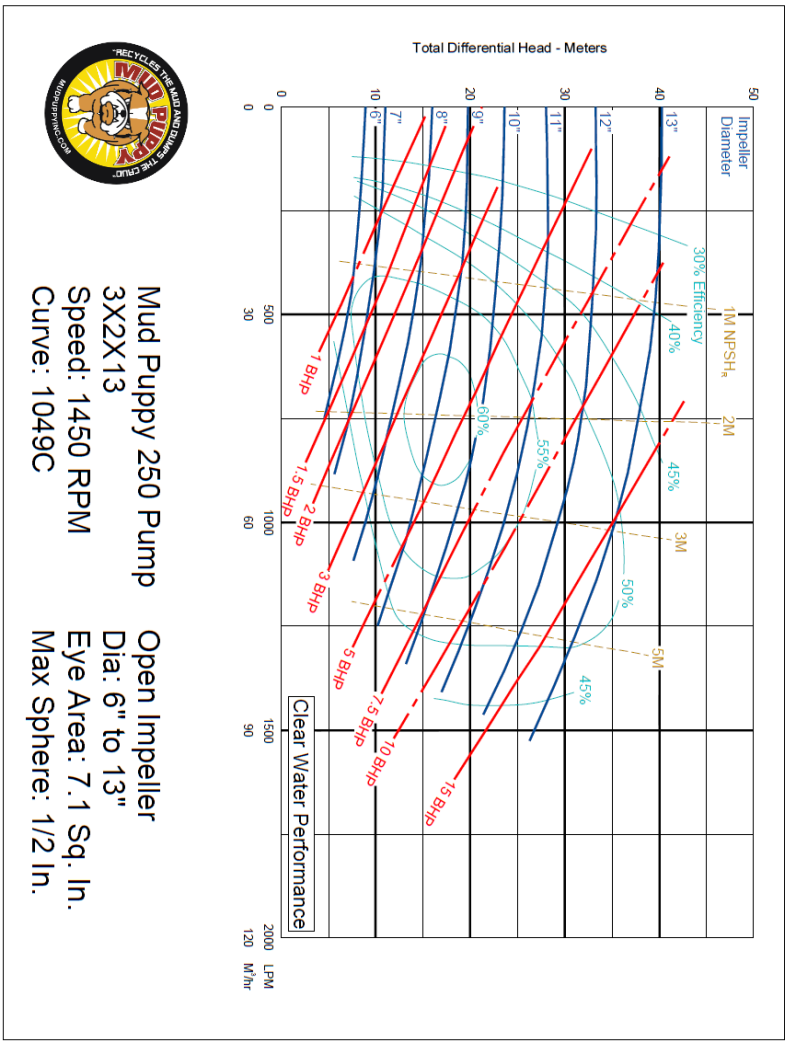
250 PUMP 3X2X13 PUMP CURVE 970 RPM



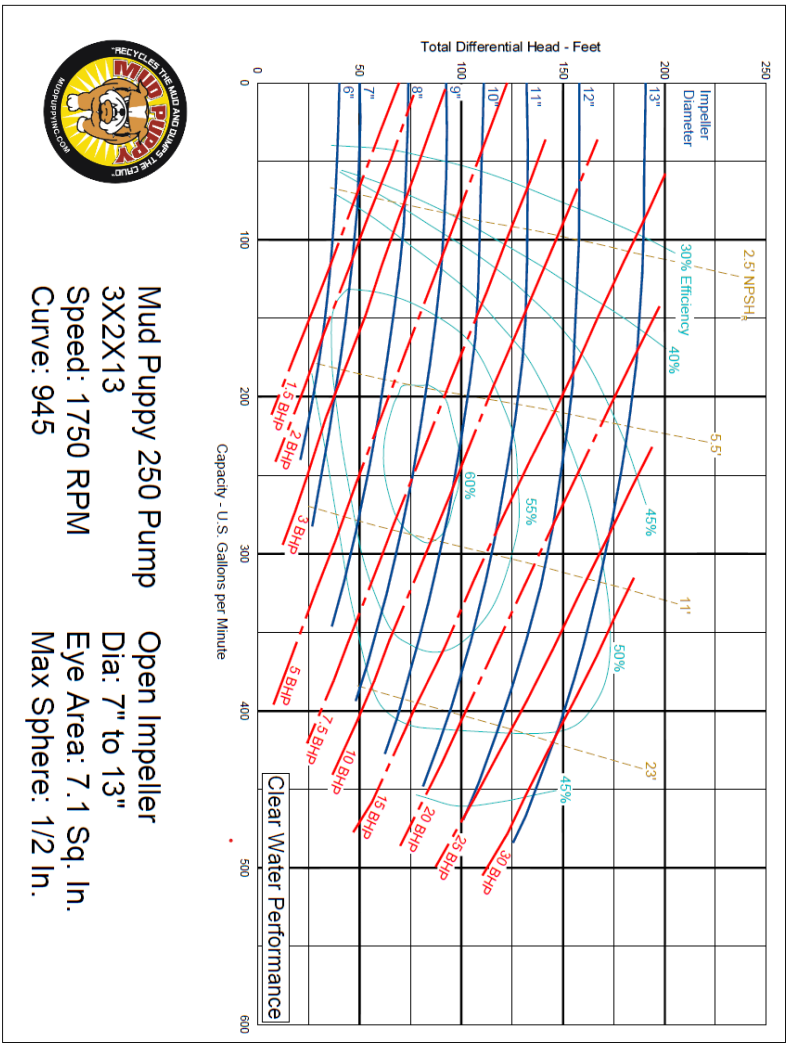
250 PUMP 3X2X13 PUMP CURVE 1150 RPM



250 PUMP 3X2X13 PUMP CURVE 1450 RPM



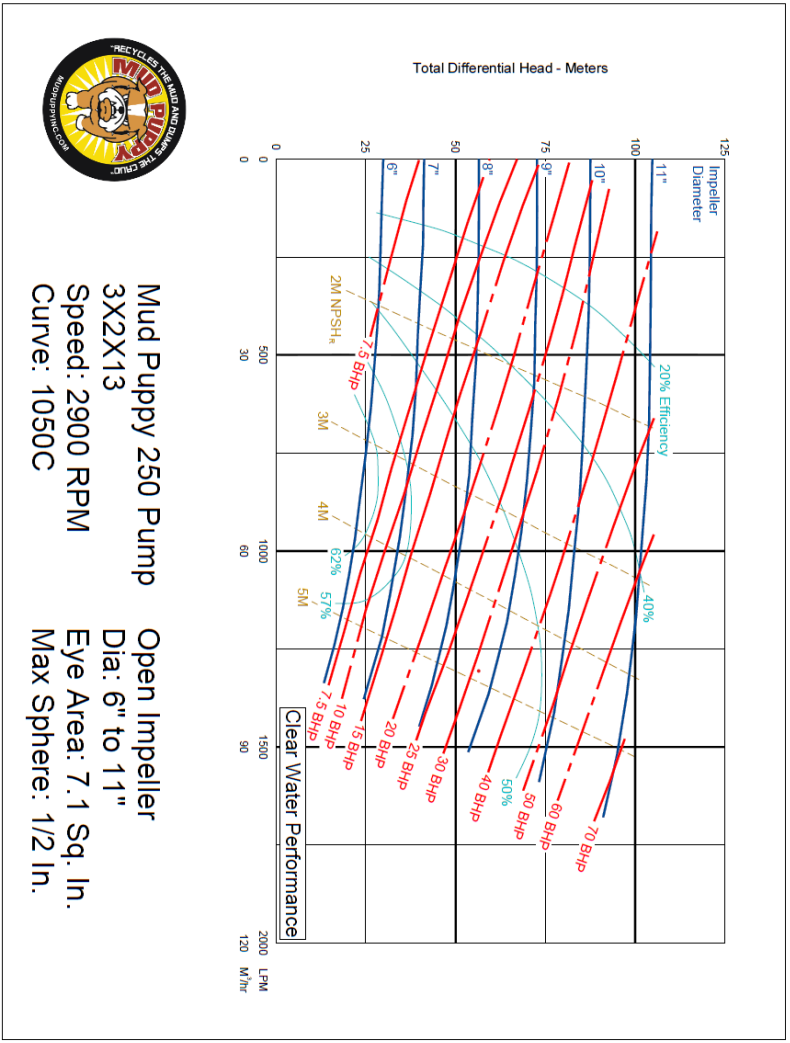
250 PUMP 3X2X13 PUMP CURVE 1750 RPM



Mud Puppy 250 Pump
3X2X13
Speed: 1750 RPM
Curve: 945

Open Impeller
Dia: 7" to 13"
Eye Area: 7.1 Sq. In.
Max Sphere: 1/2 In.

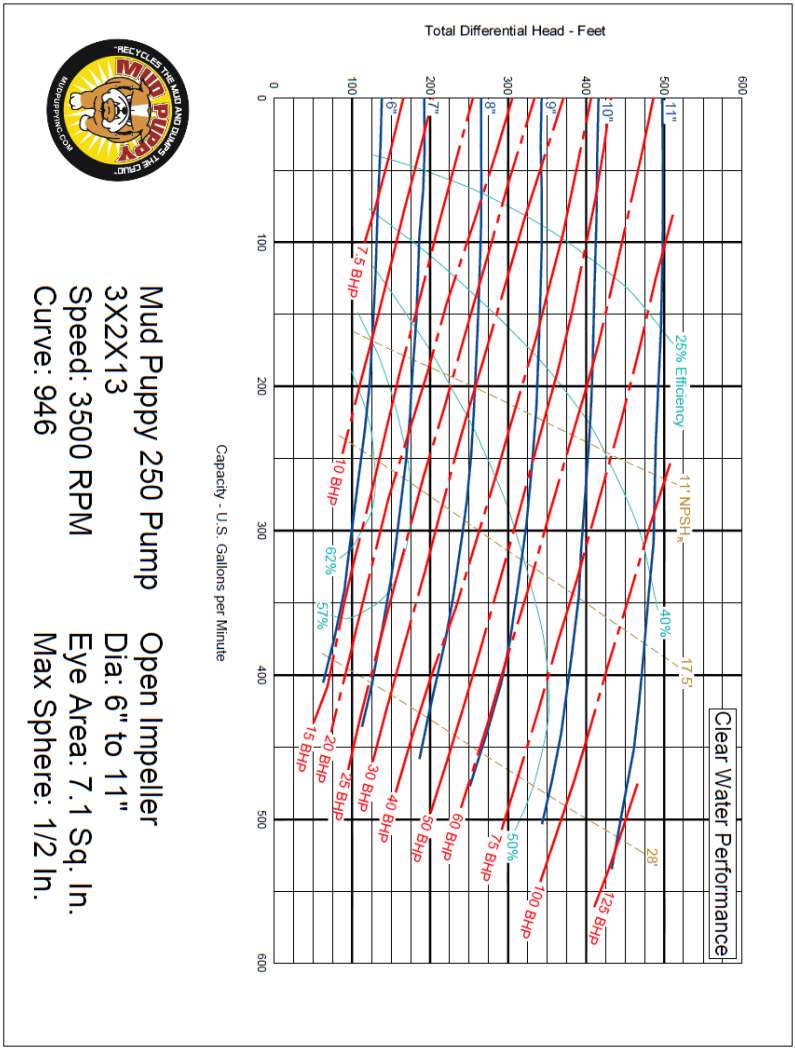
250 PUMP 3X2X13 PUMP CURVE 2900 RPM



Mud Puppy 250 Pump
3X2X13
Speed: 2900 RPM
Curve: 1050C

Open Impeller
Dia: 6" to 11"
Eye Area: 7.1 Sq. In.
Max Sphere: 1/2 In.

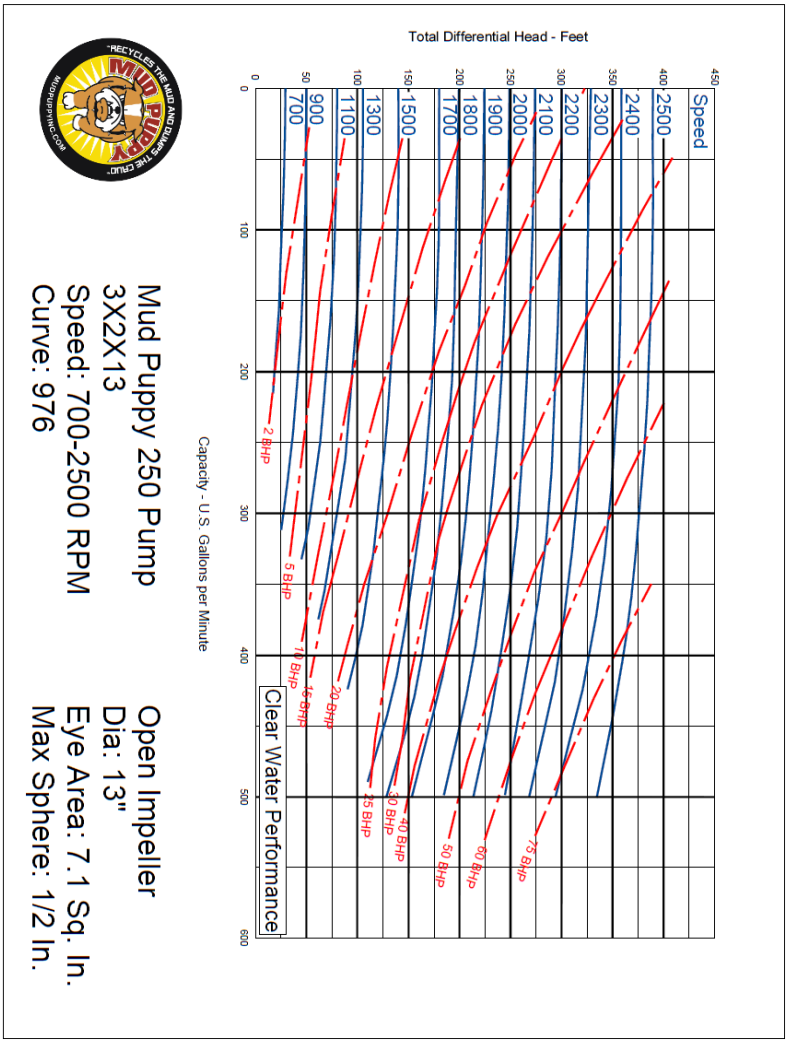
250 PUMP 3X2X13 PUMP CURVE 3500 RPM



Mud Puppy 250 Pump
3X2X13
Speed: 3500 RPM
Curve: 946

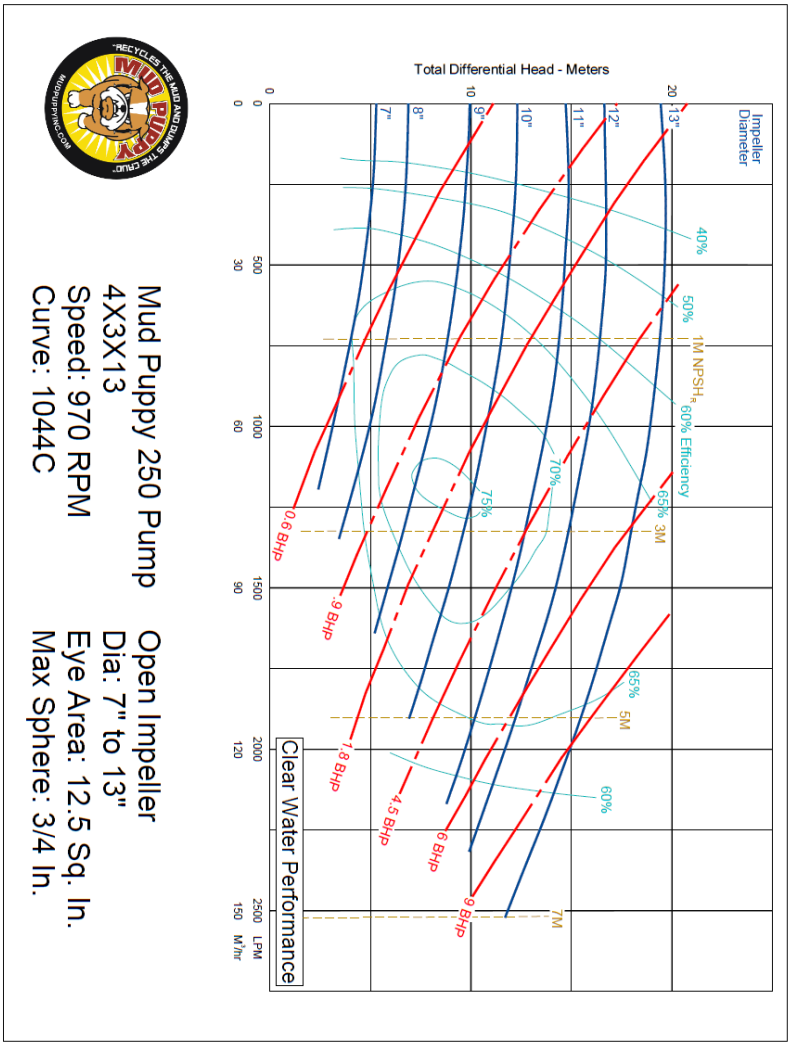
Open Impeller
Dia: 6" to 11"
Eye Area: 7.1 Sq. In.
Max Sphere: 1/2 In.

250 PUMP 3X2X13 PUMP CURVE 700-2500 RPM

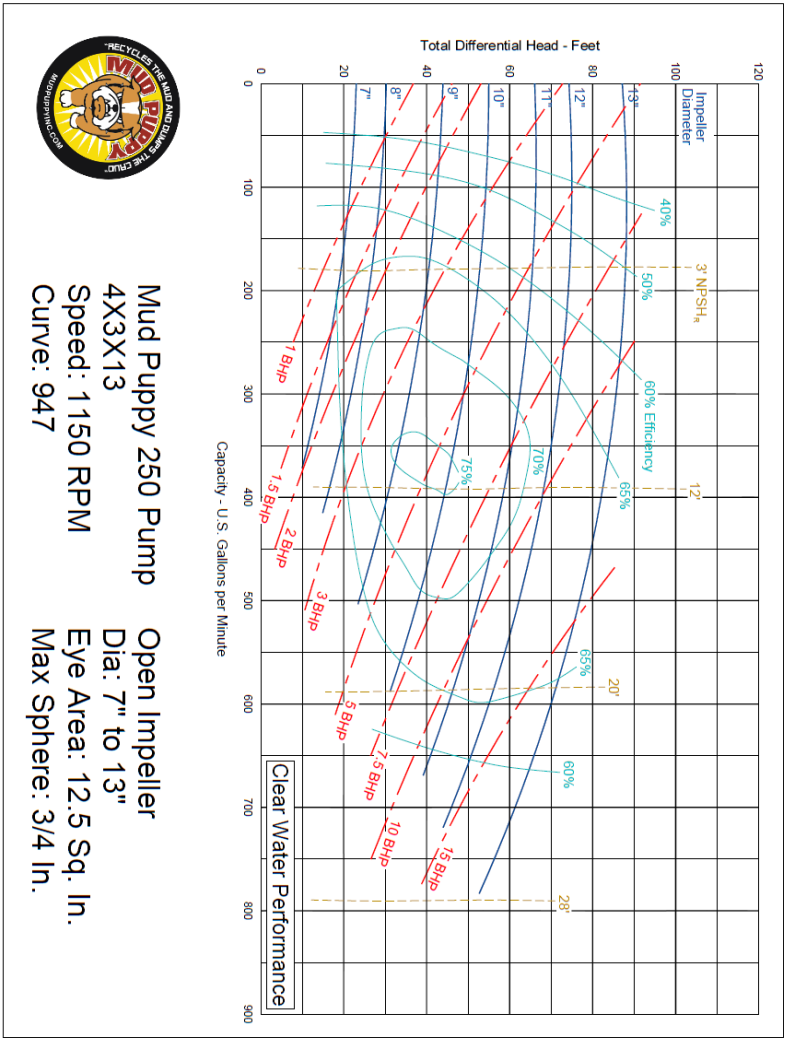


250 PUMP 4X3X13 PUMPCURVE 970 RPM

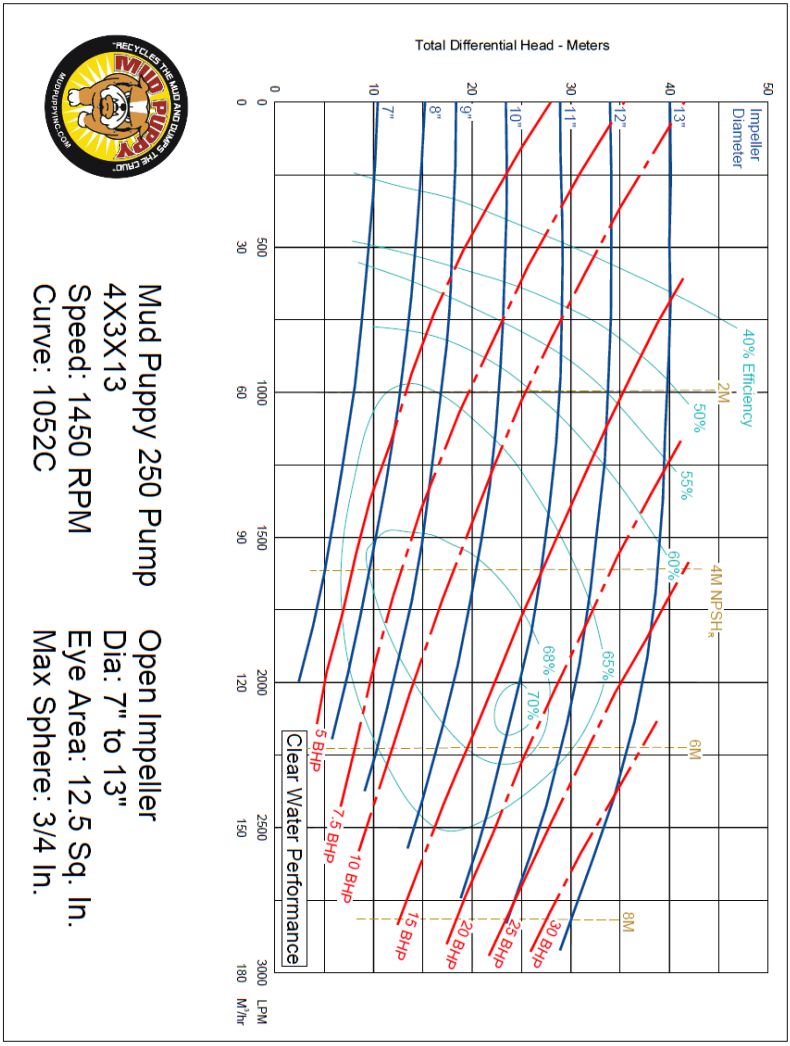
(Please see www.MudPuppyInc.com for The Mud Puppy 250 Pump Long Body 3x4 and Short and Long Body 2X3 and 4X5)



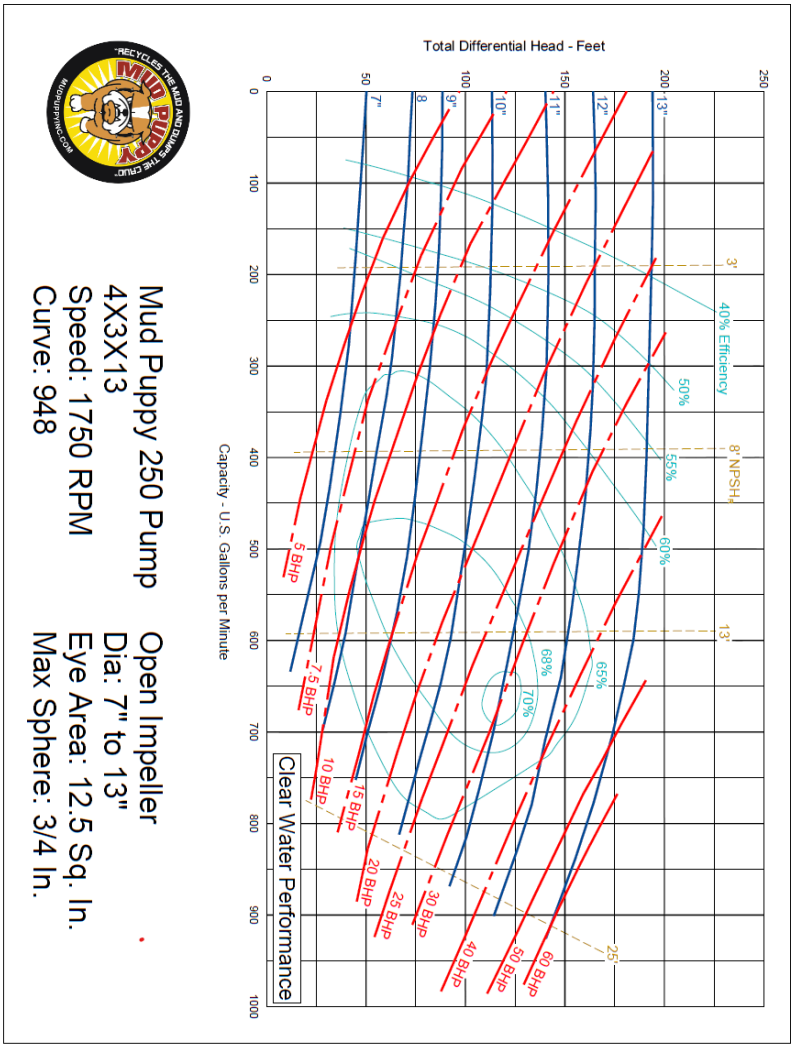
250 PUMP 4X3X13 PUMP CURVE 1150 RPM



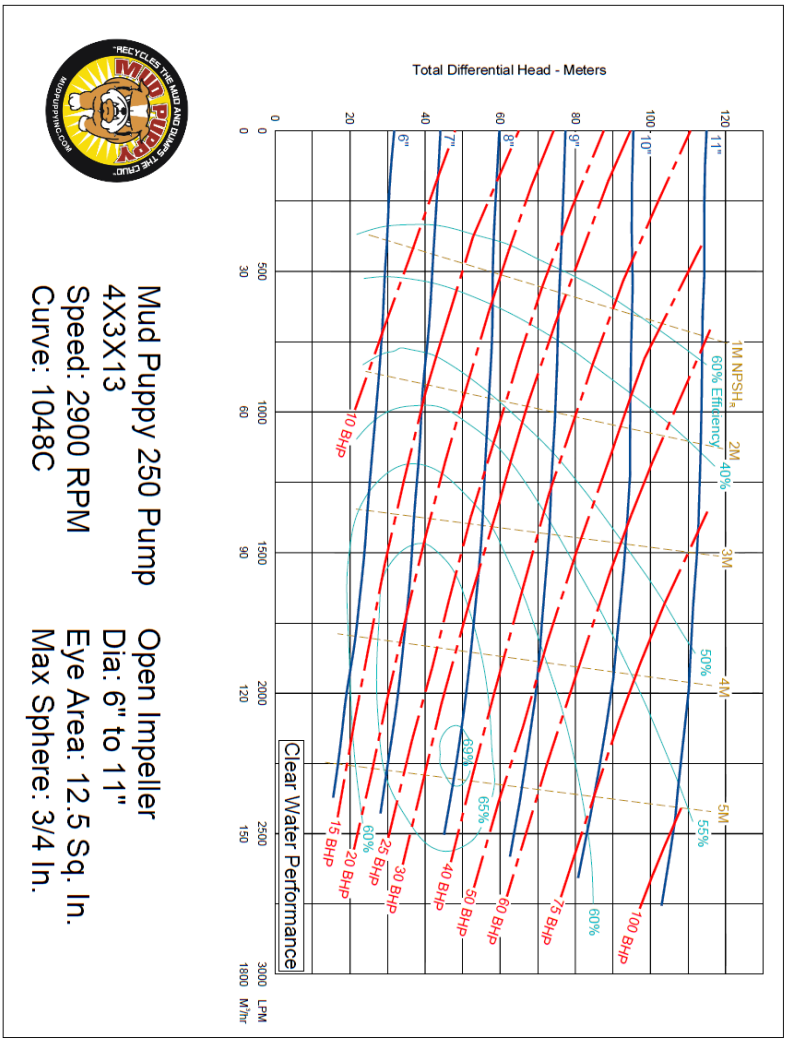
250 PUMP 4X3X13PUMP CURVE 1450 RPM



250 PUMP 4X3X13PUMP CURVE 1750 RPM



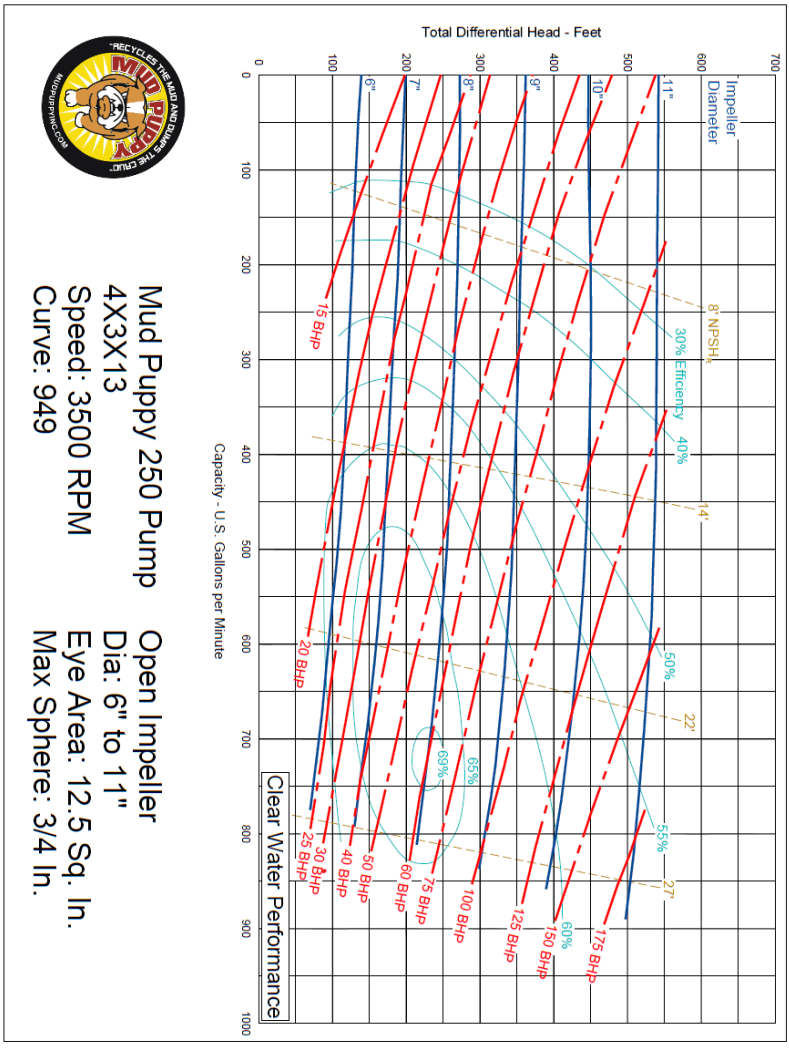
250 PUMP 4X3X13 PUMPCURVE 2900 RPM



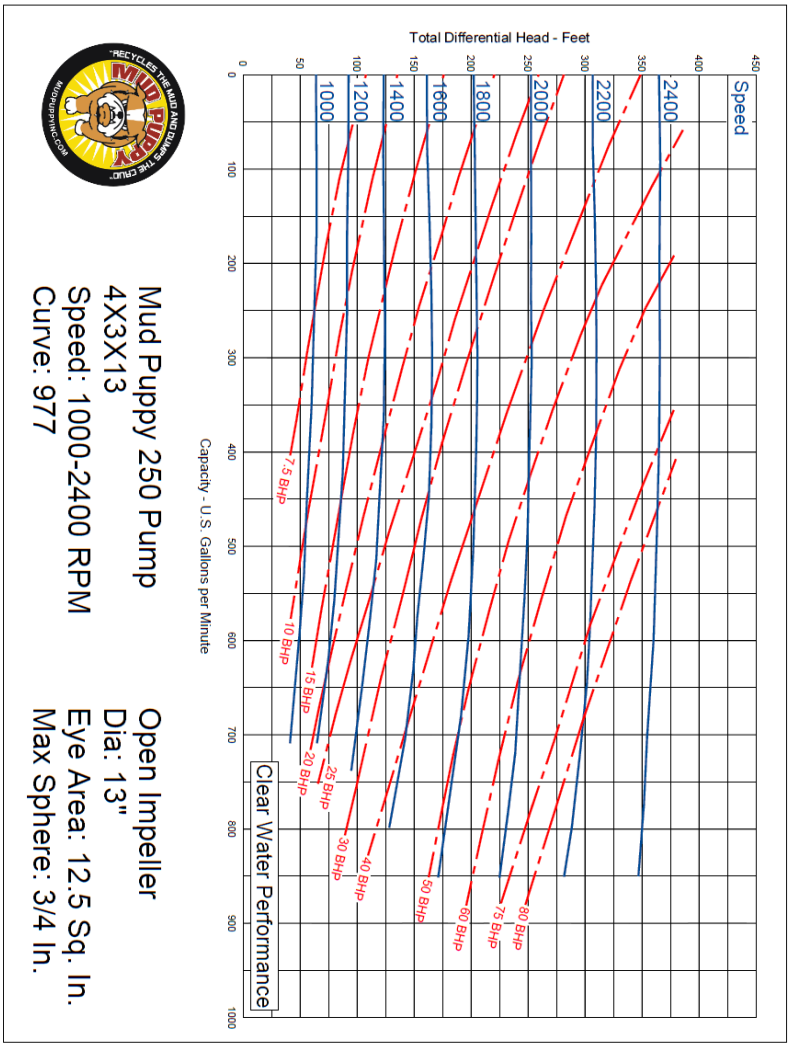
Mud Puppy 250 Pump
4X3X13
Speed: 2900 RPM
Curve: 1048C

Open Impeller
Dia: 6" to 11"
Eye Area: 12.5 Sq. In.
Max Sphere: 3/4 In.

250 PUMP 4X3X13 PUMPCURVE 3500 RPM



250 PUMP 4X3X13 PUMP CURVE 1000-2400 RPM

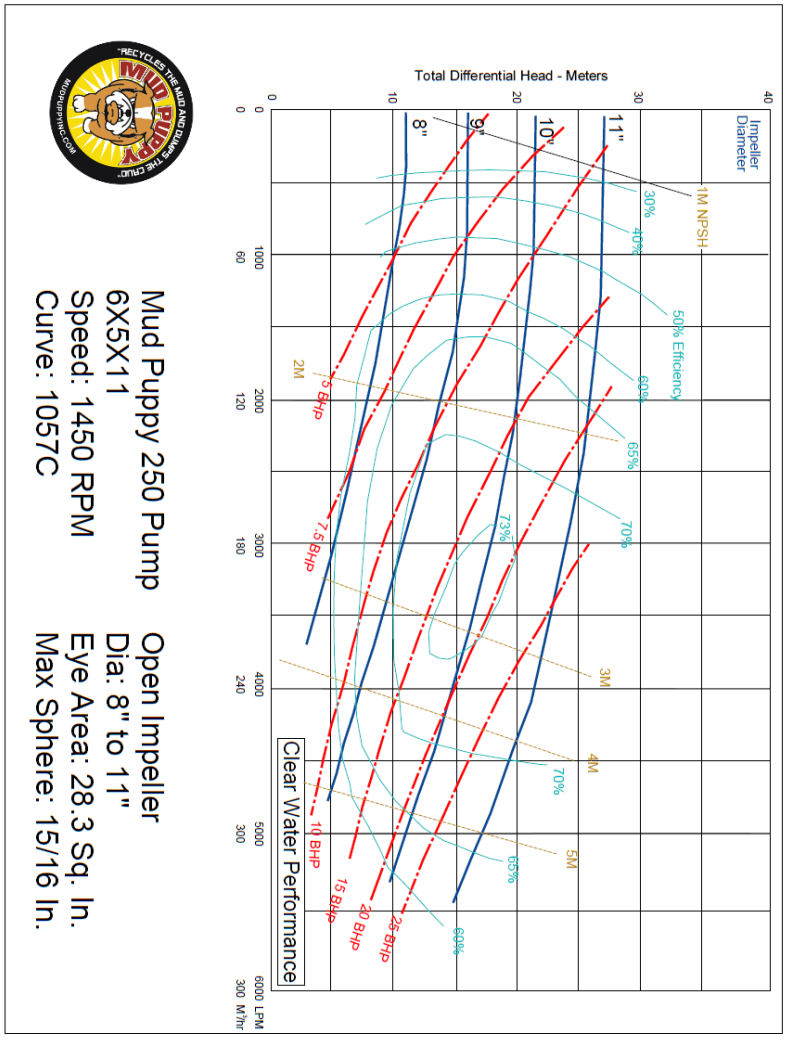


250 PUMP 6X5X11 PUMP CURVE 970 RPM

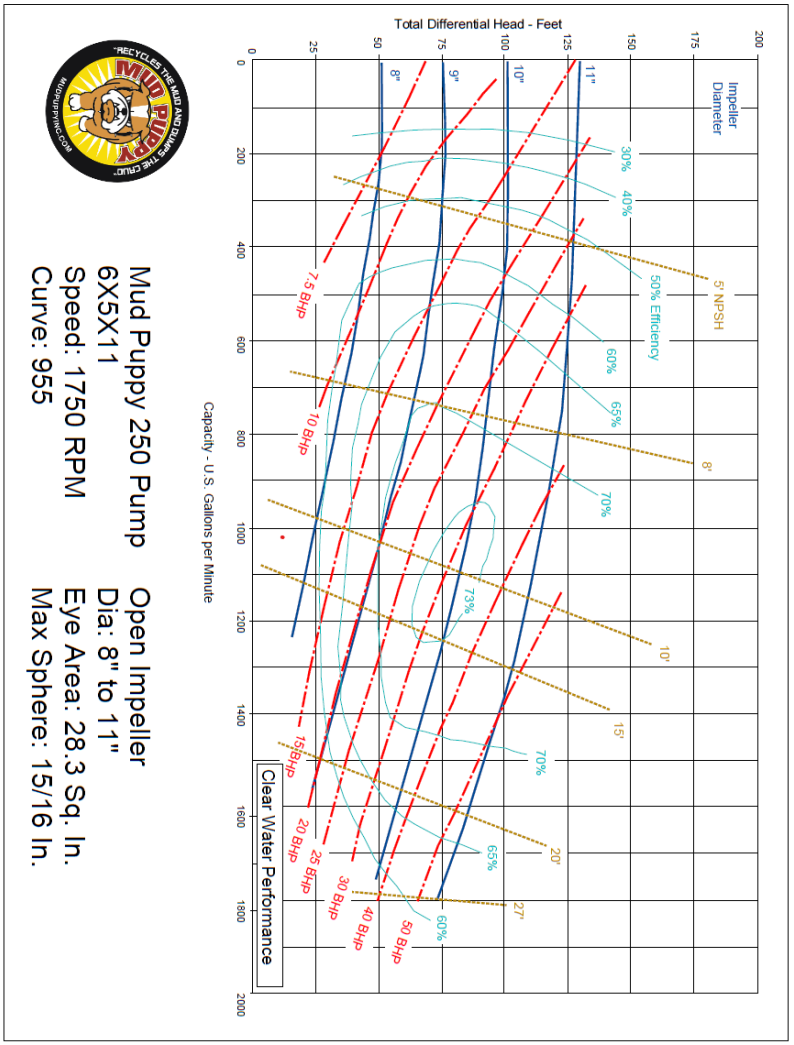
Mud Puppy 250 Pump
6X5X11
Speed: 970 RPM
Curve: 1054C

Open Impeller
Dia: 8" to 11 1/2"
Eye Area: 28.3 Sq. In.
Max Sphere: 15/16 In.

250 PUMP 6X5X11 PUMP CURVE 1450 RPM



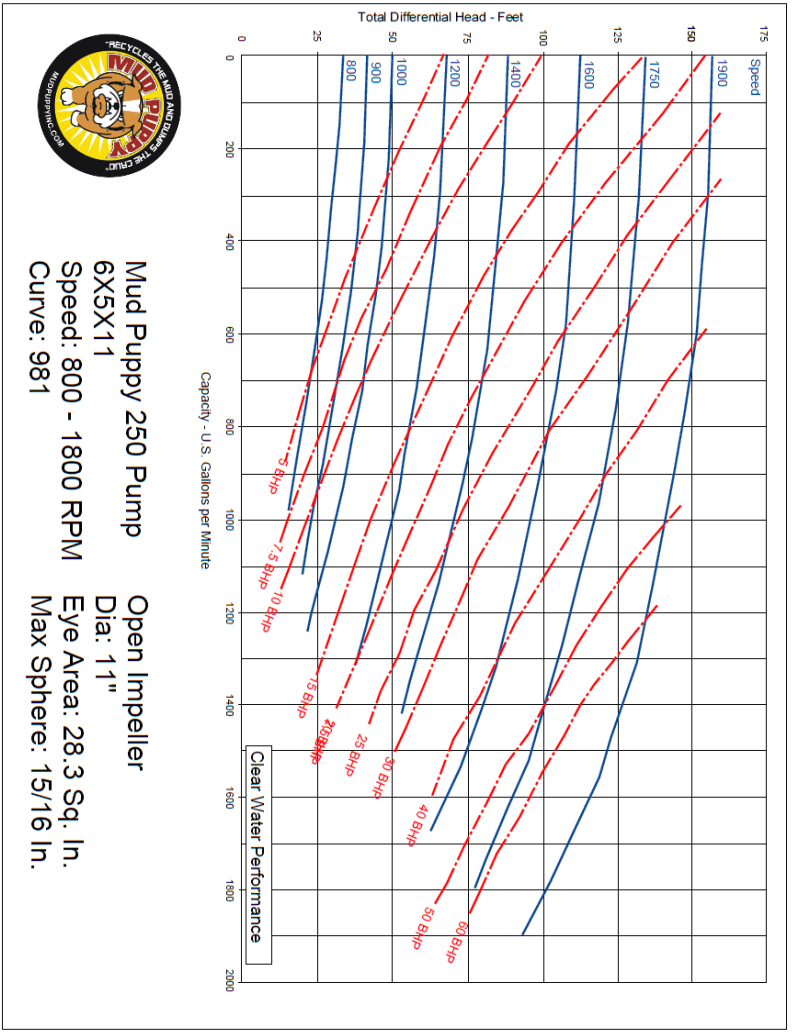
250 PUMP 6X5X11 PUMP CURVE 1750 RPM



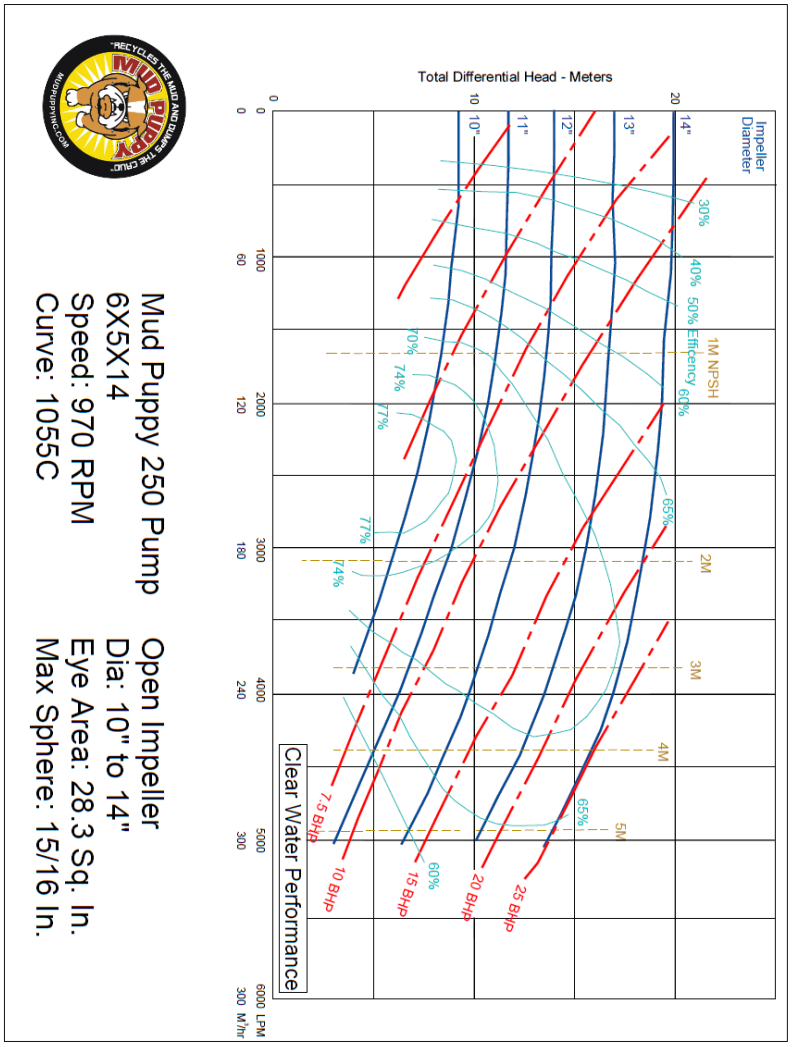
Mud Puppy 250 Pump
6X5X11
Speed: 1750 RPM
Curve: 955

Open Impeller
Dia: 8" to 11"
Eye Area: 28.3 Sq. In.
Max Sphere: 15/16 In.

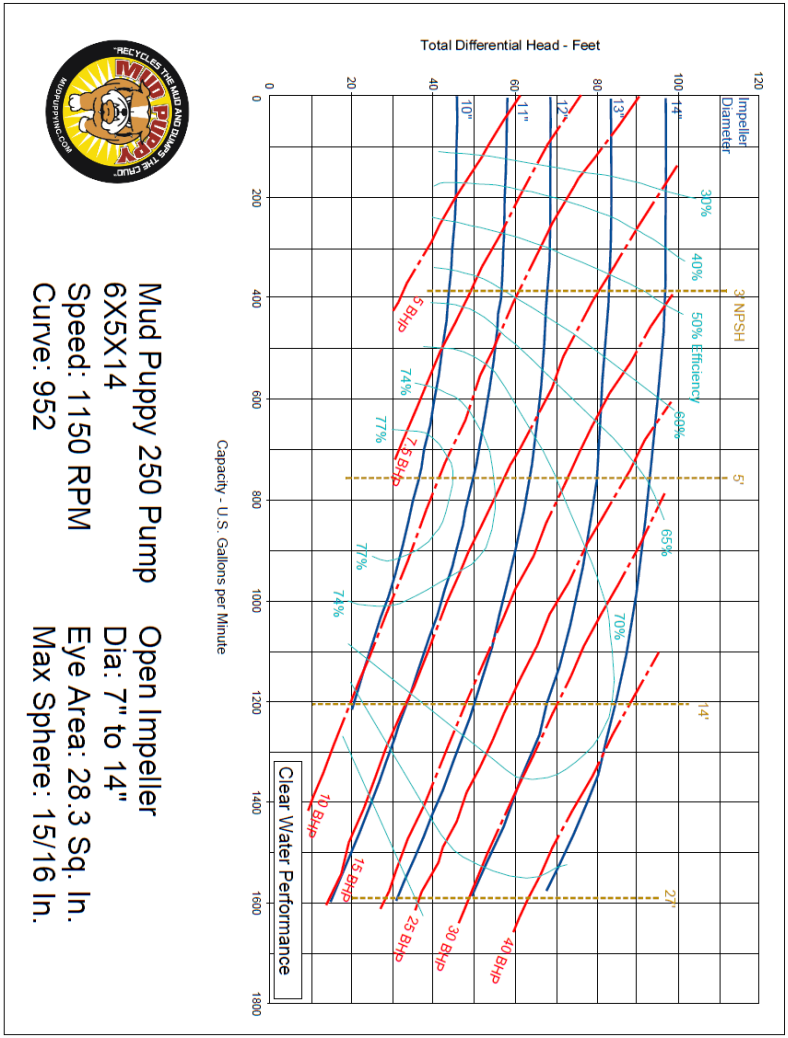
250 PUMP 6X5X11 PUMP CURVE 800-1800 RPM



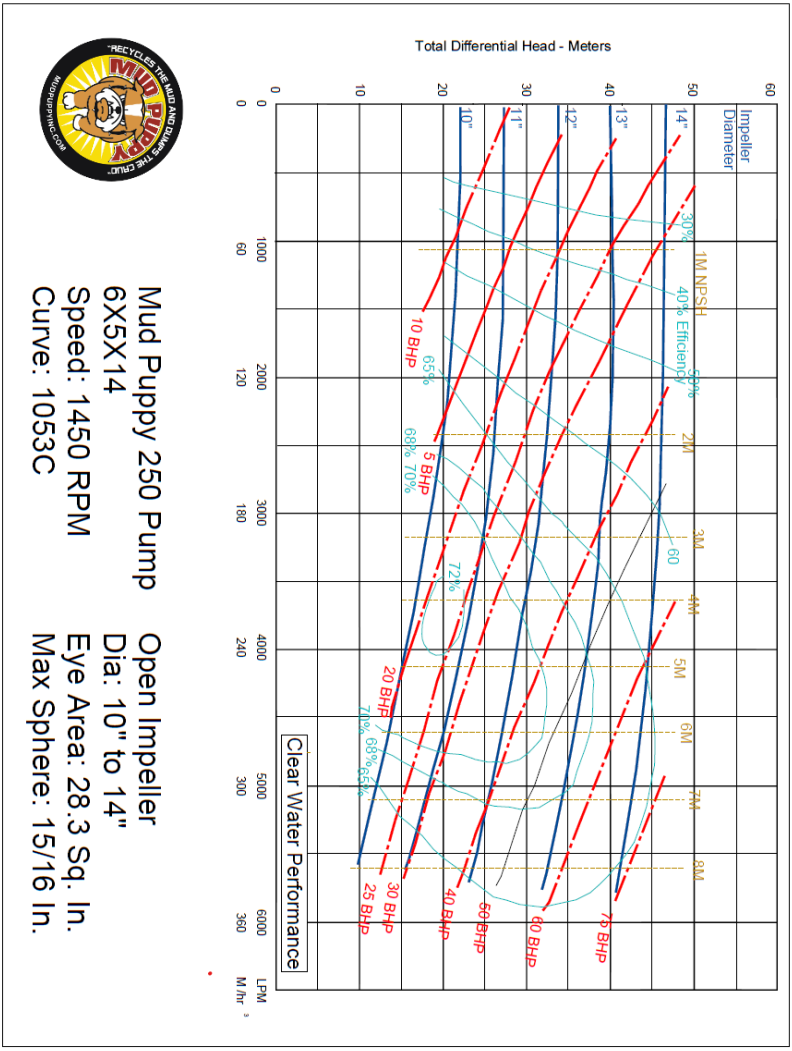
250 PUMP 6X5X14 PUMP CURVE 970 RPM



250 PUMP 6X5X14 PUMP CURVE 1150 RPM



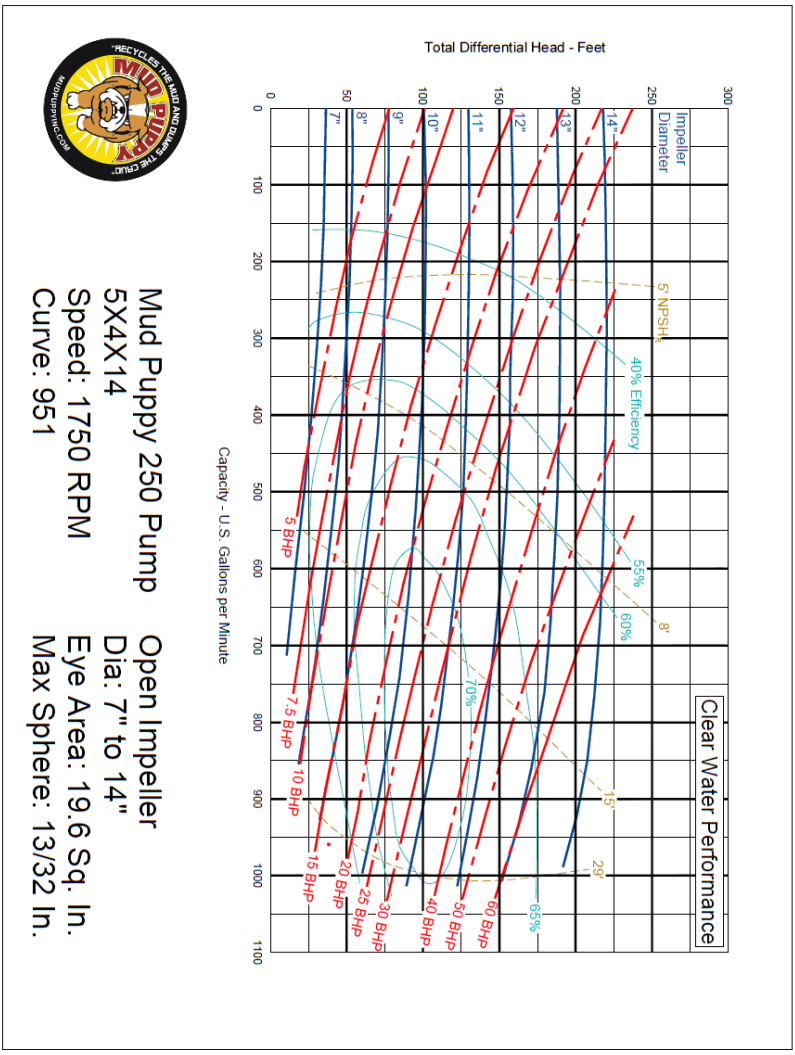
250 PUMP 6X5X14 PUMP CURVE 1450 RPM



Mud Puppy 250 Pump
6X5X14
Speed: 1450 RPM
Curve: 1053C

Open Impeller
Dia: 10" to 14"
Eye Area: 28.3 Sq. In.
Max Sphere: 15/16 In.

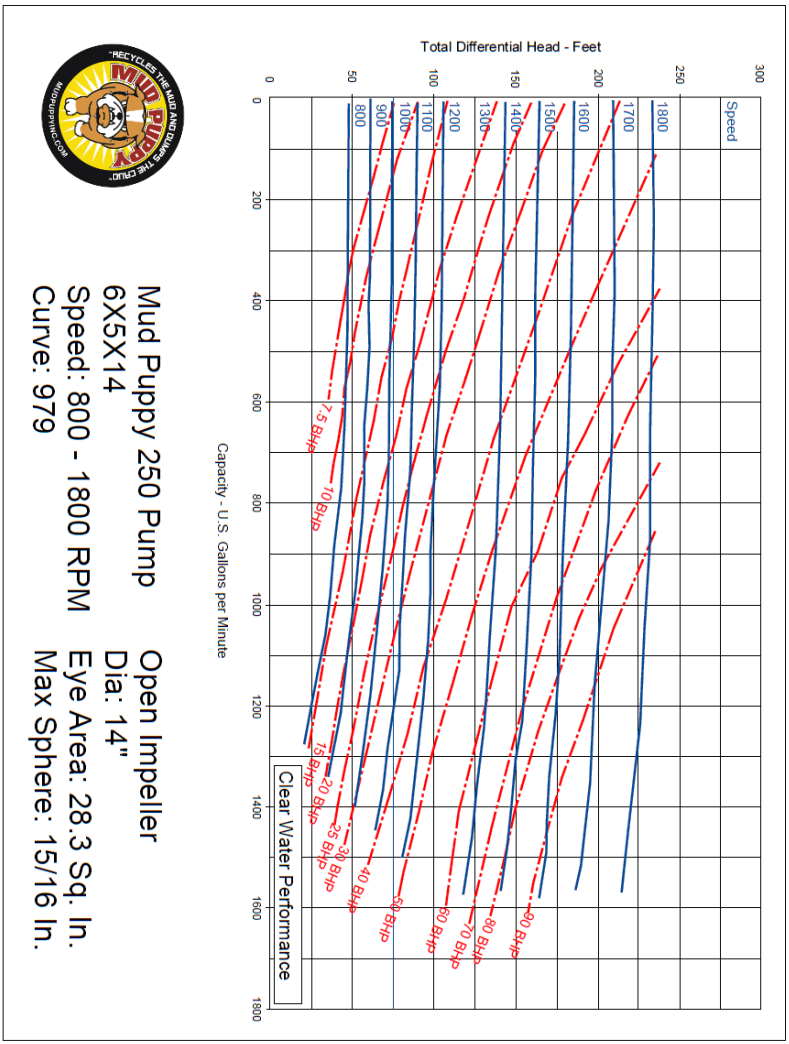
250 PUMP 6X5X14 PUMP CURVE 1750 RPM



Mud Puppy 250 Pump
5X4X14
Speed: 1750 RPM
Curve: 951

Open Impeller
Dia: 7" to 14"
Eye Area: 19.6 Sq. In.
Max Sphere: 13/32 In.

250 PUMP 6X5X14 PUMP CURVE 800-1800 RPM



Mud Puppy Corporation

530-662-5055

38642 W. Kentucky Ave.
Woodland, CA 95695

orders@mudpuppyinc.com
www.mudpuppyinc.com

Mail: PO Box 8522
Woodland, CA 95776