

PUMP SAFETY PRECAUTIONS

Pump operators and maintenance personnel must always comply with the safety precautions given in this manual and on the stickers and tags attached to the pump and hose. These safety precautions are given for your safety. Review them carefully before operating the pump and before performing general maintenance or repairs. Supervising personnel should develop additional precautions relating to the specific work area and local safety regulations. If so, place the added precautions in the space provided in this manual.

All Hydra-Tech submersible pumps will provide safe and dependable service if operated in accordance with the instructions given in this manual. Read and understand this manual and any stickers and tags attached to the pump and hoses before operation. Failure to do so could result in personal injury or equipment damage.

- Operator must start in a work area without bystanders. The operator must be familiar with all prohibited work areas such as excessive slopes, dangerous terrain conditions, and confined spaces.
- Establish a training program for all operators to ensure safe operations.
- Do not operate the pump unless thoroughly trained or under the supervision of an instructor.
- Always wear safety equipment such as goggles, head protection, hearing protection, and safety shoes at all times when operating the pump.
- Do not inspect or clean the pump while the hydraulic power source is engaged. Disconnect both hydraulic hoses before attempting to clean or inspect the pump. Accidental engagement of the pump can cause serious injury.
- Do not operate this pump without first reading the Operating Instructions.
- Do not install or remove this pump while the hydraulic power source is connected. Accidental engagement of the pump can cause serious injury.
- Never operate the pump near energized transmission lines. Know the location of buried or covered services before starting work.
- Do not wear loose fitting clothing when operating the pump. Loose fitting clothing may get entangled with the pump and cause serious injury.
- Supply hoses must have a minimum working pressure rating of 2500 psi/175 bar.
- The hydraulic circuit control valve must be in the "OFF" position when coupling or uncoupling the pump. Wipe all couplers clean before connecting. Failure to do so may result in damage to the quick couplers and cause overheating. Use only lint-free cloths.
- Be sure all hose connections are tight.
- Do not operate the pump at oil temperatures above 140° F/60° C. Operation at higher oil temperatures can cause operator discomfort and may cause damage to the pump.
- Do not operate a damaged, improperly adjusted, or incompletely assembled pump.
- To avoid personal injury or equipment damage, all pump repair, maintenance and service must only be performed by authorized and properly trained personnel.
- Do not exceed the rated limits of the pump or use the pump for applications beyond its design capacity.
- Always keep critical pump markings, such as labels and warning stickers legible.
- Always replace parts with replacement parts recommended by Hydra-Tech Pumps.
- Check fastener tightness often and before each daily use.
- NEVER put your hands or any other body part into the volute or discharge outlet while the pump is running. Do not operate pump without the strainer and discharge lines in place.
- Do not lift the pump by pulling on the hydraulic hoses. Use a suitable line or chain fastened to the pump handle or lifting point. Always use appropriate lifting equipment to locate or move the pump.
- Do not point water discharge toward bystanders or property.
- DO NOT PUMP FLAMMABLE LIQUIDS.

OPERATION

PREOPERATION PROCEDURES

CHECK HYDRAULIC POWER SOURCE

1. Using a calibrated flow meter and pressure gauge, make sure the hydraulic power source develops flow and pressure that is appropriate for the pump.
2. Make certain that the hydraulic power source is equipped with a relief valve set to open at 2100-2250 psi/145-155 bar maximum.
3. Make certain that the power source return pressure does not exceed 250 psi/17 bar.
4. Make sure the pump inlet is clear of debris. Remove any obstruction before connecting the hydraulic hoses.

CONNECTING HYDRAULIC HOSES

1. Wipe all hose couplers with a clean lint free cloth before making connections. Do not connect pressure to the return port. Motor shaft seal limit is 250 psi/17 bar.
2. Connect the hoses from the hydraulic power source to the couplers on the pump or pump hoses. It is a good practice to connect return hose first and disconnect it last to minimize or avoid trapped pressure within the pump motor.

Note: If uncoupled hoses are left in the sun, pressure increase inside the hoses might make them difficult to connect. Whenever possible, connect the free ends of the hoses together.

3. Make sure the hydraulic hoses are connected to ensure that the flow is in the proper direction. The female coupler on the submersible pump is the inlet (pressure) coupler.

PUMP OPERATION

1. Observe all safety precautions.
2. Attach discharge hose to the pump outlet. For best performance, keep the discharge hose as short as possible and lay it out to avoid sharp bends or kinks.
3. Attach a chain or cable to the pump's handle or lifting point. Use suitable lifting equipment to lower the pump into the liquid to be pumped. Do not raise or lower the pump by its hoses or couplers to avoid damage to the hoses or couplers. Never point the discharge hose at bystanders or property.
4. Turn on the hydraulic power source. Watch for solids in the liquid being pumped. If solids or semi-solids are excessive, the discharge flow might decrease. If this happens, stop the pump and check for the cause of the problem. Under some conditions, the liquid being pumped might be slowed enough so that it can no longer push particles in the liquid. If this happens, particles can accumulate in the pumping chamber, causing further restriction and damage. The impeller then acts as a "grinding wheel" which causes accelerated pump wear.

Reduced liquid flow can be caused by the following:

- The pump sinks into solids at the bottom of the hole blocking the inlet.
- The end of the discharge hose is too high, causing an excessive lift height for the column of liquid being pushed by the pump. This slows the flow of liquid to a level where it can no longer carry solids. Kinks in the discharge line will reduce flow and increase demand on the power unit.
- The flow and pressure of hydraulic fluid to the pump is too low, which reduces impeller speed. A 20 percent decrease in hydraulic fluid flow can reduce pump performance by 50 percent. When operating at reduced hydraulic flow and pressure, keep the end of the discharge line as low as possible.

Note: It will not damage the pump to operate it "dry."

5. The pump must maintain a minimum impeller speed in order to move semi-solid particles through the pump. While pumping liquids containing large semi-solids, monitor the flow from the outlet of the discharge hose. If it begins to slow, turn off the hydraulic power source and lift the pump from the work area. Disconnect the hydraulic hoses and clean at the water hose and the pumping chamber. Pumping liquids with a solids to liquid ratio greater than 30 per cent solids to 70 percent liquid will cause accelerated impeller wear.
6. When pumping is complete, set the hydraulic control valve to the "OFF" position. Lift the pump from the work area using the chain or cable to avoid damage to the hoses or couplers.
7. To maintain optimum performance, it is good practice to periodically inspect the impeller and wear components for wear or damage. This is especially important following the pumping of liquids containing sharp, abrasive solids. **ALWAYS DISCONNECT THE HYDRAULIC HOSES BEFORE ATTEMPTING INSPECTION OF THE IMPELLER.**

COLD WEATHER OPERATION

If the pump is to be used during cold weather, preheat the hydraulic fluid at low power source speed. When using the normally recommended fluids, fluid should be at or above 50°F/10° C (400 ssu/82 centistokes) before use. Damage to the hydraulic system or pump motor seals can result from use with fluid that is too viscous or thick.

EQUIPMENT PROTECTION & CARE

- Make sure all couplers are wiped clean before connection.
- The hydraulic circuit control valve must be in the "OFF" position when coupling or uncoupling the pump. Failure to do so may result in damage to the quick couplers and cause overheating of the hydraulic system.
- Make sure the circuit PRESSURE hose (with male quick disconnect) is connected to the "IN" (female quick disconnect) port on the submersible pump. The circuit RETURN hose (with female quick disconnect) is connected to the opposite port. Do not reverse circuit flow. This can cause damage to internal seals.
- Always replace hoses, couplings and other parts with replacement parts recommended by Hydra-Tech Pumps. Supply hoses must have a minimum working pressure rating of 2500 psi/172 bar.
- Do not exceed the maximum rated flow or pressure for the submersible pump (refer to Specifications in this manual for correct flow rate and pressure). If specifications are exceeded, rapid failure of the internal seals will result.
- Always keep critical labels and markings, such as warning stickers and tags legible.
- Pump repair should be performed by experienced personnel only.
- Make certain that the recommended relief valves are installed in the pressure side of the system.