

# Heavy Duty Cast Iron Hand Pump

Model: 19-HP

Operation, Maintenance, and Installation Manual

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## Introduction

The design of hand pumps has not changed significantly in more than a century. They are great for drawing water from shallow wells with a water level of less than 20 feet (25 feet max. at sea level) from the bottom of the intake pipe where the water is being drawn from.

These shallow well hand pumps are also commonly used to pump water from cisterns, rain barrels, and ponds. They can be used to pump drinking water and are also used for non-working decorative water features with pond pumps (internal valve mechanisms removed). They are quite easy to install, are compatible with commonly used plumbing connectors, and can provide decades of trouble-free use with minimal maintenance.

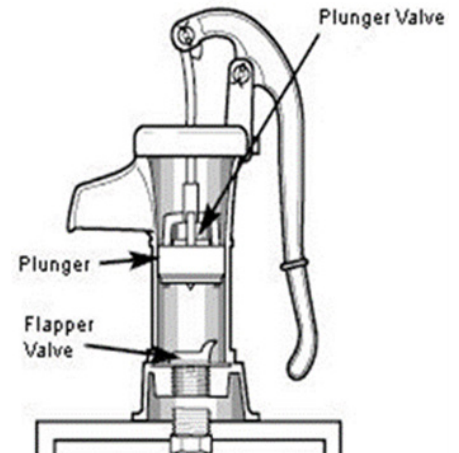
If you need to pump from deeper than 25 feet refer to the article at the link below:

<https://support.boshart.com/can-a-19-hp-hand-pump-be-used-to-pump-water-from-deeper-than-25-feet>

## Pump Operation

The cylinder holds two valves, a plunger valve and a weighted flapper valve. The handle moves the plunger assembly up and down inside the cylinder. As the handle is pushed downwards, the plunger moves up, creating a vacuum. This causes the flapper valve at the bottom base to open and water to be pulled into the cylinder. When the plunger reaches the top of the stroke, the weighted flapper valve closes due to the force of gravity, trapping the water in the cylinder. As the handle is lifted the plunger moves downward, the plunger valve opens, and trapped water is allowed to flow up through the plunger. The water remains in the cylinder. Then, as the handle is pushed downward raising the plunger in the second stroke, the cylinder is refilled with water from the well, and the water above the plunger valve in the cylinder is forced out of the spout. Therefore, steady pumping of the handle creates a continuous flow of water at a rate of about 1 gallon for every 10 strokes.

- Shallow Pitcher Pumps will pump water from a water level of up to 20 feet.
- They can be installed on a well, a cistern or a barrel.
- Deduct from the allowable suction lift of 20 feet, one foot for every 50 feet of horizontal pipe distance and one foot every 1000 feet of elevation above sea level.



## Drop Pipe Installation

The drop pipe can be made of galvanized steel pipe, schedule 40 PVC pipe, or poly (PE) pipe. A 1-1/4" MPT pipe thread is required on at least one end. With PVC pipe you will need a 1-1/4" MPT male x Slip adapter to transition for the hand pump connection to your PVC pipe. With steel pipe you need 1-1/4" MPT pipe with threads. For poly pipe you will need a 1-1/4" male MPT x INSERT adapter and two 1-1/4" all 300 grade stainless-steel gear clamps. You can use almost any kind of potable (drinking water) grade pipe.

- Apply a quality thread sealant such as P.T.F.E. Thread Seal Tape or Thread Sealing Compound such as Gray Magic on all pipe threads.
- Thread the drop-pipe or adapter into the 1-1/4" FPT connection at bottom of the pump (drop pipe should be the same size as the connections on the pump). Tighten the drop pipe enough to prevent leaks. All pipe joints in the suction pipe MUST be airtight as well as watertight, if the suction pipe can suck air, the pump will lose prime and will not be able to drawl water from the well.
- If using PE plastic pipe, secure the pipe with two all 300 grade stainless steel clamps.
- The drop pipe should extend at least 5 feet below the actual pumping level ensuring the intake of the drop pipe is submerged at least 5 feet.
- When running pipe horizontally, you will need to deduct one foot of lift for every 50 feet of horizontal distance.

For additional resources on making NPT connections and applying PTFE thread seal tape refer to the links below:

<https://support.boshart.com/making-npt-connections>

<https://support.boshart.com/how-to-apply-ptfe-thread-seal-tape>

## Priming the Pump

Never operate the pump dry. Operating the pump without water may cause damage to the cup leather. ALWAYS fill pump cylinder with water before starting to pump. **CAUTION:** The pump handle may fly up when released during the downstroke.

- To prime the pump, pour clean water in the top of the pump until it runs out of the spout.
- Wait 7-10 minutes until the cup leather absorbs water and swells enough to contact the pump cylinder wall.
- Raise and lower the handle in short strokes to draw water from the well until you feel resistance, indicating that the drop (suction) pipe is pulling water. When the pump is full, water will spill from the spout, and the pump is primed.
- If necessary, add more water. Any leak on the suction side will prevent the pump from priming.

“Losing it's prime” can occur for two reasons:

- 1) A leak in the suction pipe will cause air to enter and the vacuum will be lost. The water will drain back down to the water level.
- 2) The pump leathers can eventually wear or dry out, also causing them to lose their seal and the vacuum effect. The leathers can dry out from long-term lack of use or when you are operating close to the maximum depth. There are two leathers which need to be replaced as they begin to lose their seal. We recommend replacing both at the same time for maximum efficiency.

## Installation of a Foot Valve

The installation of a foot valve will maintain permanent prime. A foot valve is a one-way valve, which allows liquid to flow into the pipe and prevents it from flowing back out, which keeps the pipe full of water. This is a common practice if the water level is down 10 feet or more. However, if a foot valve is installed you must take preventative actions to ensure the pump does not freeze (see below for freezing protection).

## Freezing Weather

In freezing weather, the internal flapper valve and plunger (both are made of leather or composite material) may freeze to the pump cylinder wall. If you start pumping, they may get damaged, making the pump inoperable. If you suspect that your pump is frozen, thaw it out by pouring hot water into the top and letting it sit for a few minutes, if this does not work you may have to open the pump and free the individual components by hand. In some cases, you may have to remove the pump by unthreading it from the connector, get it inside to a warm spot, and soak it in a tub of hot water.

## Freezing Protection

You do not need a foot valve with hand pitcher pump. However, if you use it frequently and want water without priming, you can install a foot valve at the bottom end of the pipe. The use of a foot valve will maintain permanent prime. We suggest a foot valve if your water is 10' down or deeper. A foot valve is a one-way valve that lets water in but not back out again, so it keeps the pipe full of water. Problems may arise with freezing weather when water in the pipe freezes, rendering the whole apparatus inoperable and possibly splitting the pipe.

- If you do not use a foot valve you can protect the pump against freezing by lifting the pump handle as high as possible, the check valve (lower end of the cylinder) will tilt when the plunger is forced down on top of the valve. Tilting the check valve allows the pump and suction line to drain. The handle must remain in the up position.
- If you use a foot valve then you **MUST** remove the pump from the well and keep the water in the well below the frost line. This can be done by drilling a hole between the foot valve and frost line which allows the water to drain to a level below which it will freeze. This is the only way you can prevent the pump and pipe from freezing!

## Troubleshooting

If your pump will not work:

- Open the pump and make sure that the flapper valve is not damaged and that it is centered over the hole.
- Check to see that the valve in the top of the plunger (a cone-shaped weight) is not stuck. If it is, manually free it.
- Reassemble the body and ensure the bolts are tightened enough to prevent air leakage around the base.
- Check for leaks at all connections/joints. Tighten clamps and replace thread tape as needed. Make sure there is no damage to the leathers. Replace any worn or defective components.
- Make sure the pipe intake end is immersed 5 feet below the water. Water levels change throughout the year, so make sure your pipe is long enough to accommodate this variation.
- Use clean water when priming, the plunger seal is made of leather and will expand as it absorbs water, let the cup leather absorb water for a few hours and try again.
- Make sure you are not trying to lift the water more than 20 feet (measured from the water surface to the spout). NOTE: In higher elevations, the distance water can be lifted is reduced. At sea level and under ideal conditions, these pumps will lift to a maximum of about 20', but higher elevations will reduce the lift.

## General Notes:

- Leather seals are always preserved with oil, which may cause an oily film or smell during the first few weeks of use.
- The length of the pipe does not make the pumping any different, only the level of the water.
- Never use a foot valve unless you protect pump from freezing.
- Pumps will self-drain if the handle is left in the up position and the foot valve is removed.
- Your local codes or Health Department may require a sealed system. These keep water sanitary. Check local code requirements.

## Maintenance and Repair

Periodically inspect the pump for worn components and do not allow the pump to freeze. Damage due to freezing will void the warranty.

To view what replacement parts are available for this pump refer to the link below:

<https://support.boshart.com/what-replacement-parts-are-available-for-the-19-hp-cast-iron-hand-pump>

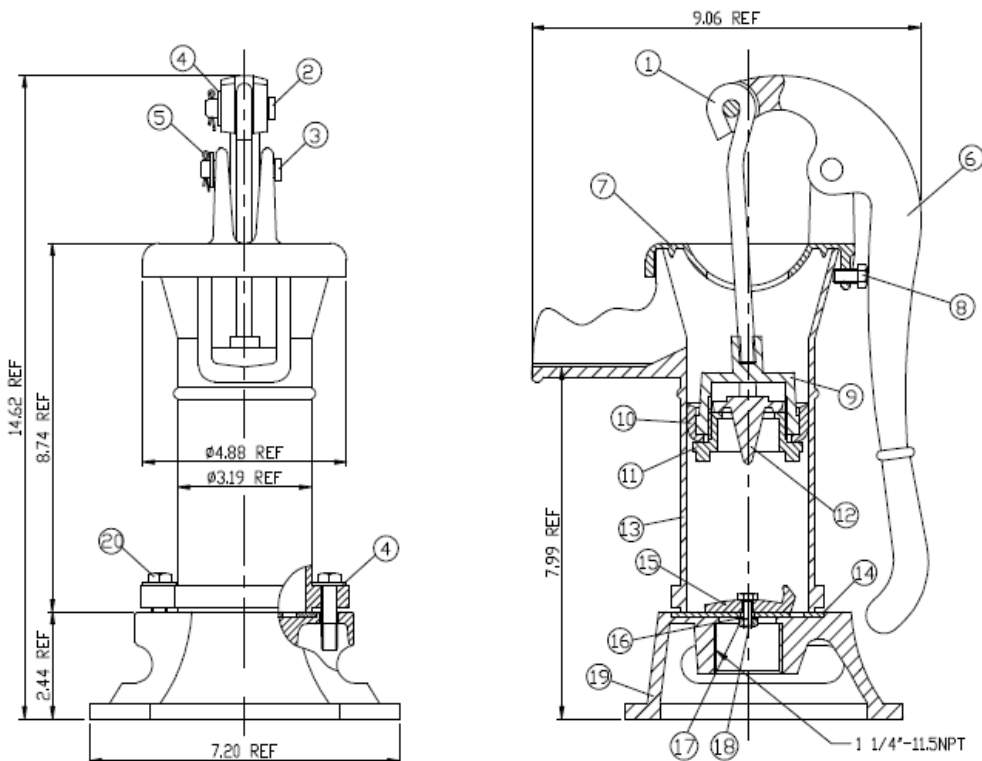
## Replacing the Cup Leather

1. Loosen the cap screw on the pump cap and lift the plunger assembly out of the pump.
2. Unscrew the cup leather holder.
3. Remove the old cup leather and put on new cup leather.
4. Screw leather cup holder back into original position.
5. Reinstall plunger assembly and cap.
6. Insert cap screw and tighten.



## Replacing the Valve Leather

1. Remove one of the cap screws located at the base of the plunger body and loosen the other cap screw.
2. Remove the pump body (Key No. 8) from the pump base.
3. Remove the check valve from the valve leather.
4. Remove old valve leather. Clean any old leather off column and base.
5. Position the raised end of check valve at the attached/hinged end of valve leather.
6. Reattach check valve to the valve leather with the screw, nut, and washer.
7. Position new valve leather with check valve on base.
8. Reattach pump body to the base by reinstalling and tightening the cap screws.



PARTS LIST			
Part Name		Part Name	
1	Plunger Rod	11	Threaded Nut
2	Short Clevis Pin	12	Plunger Weight
3	Long Clevis Pin	13	Pump Cylinder
4	Flat Washer	14	Flat Valve Leather
5	Cotter Pin	15	Flat Valve Weight
6	Pump Handle	16	Flat Washer
7	Pump Top	17	Hex. Nut
8	Set Screw	18	Valve Bolt
9	Plunger Cage	19	Pump Base
10	Cup Leather	20	Hex. Bolt

For more information on installation, adjustment, repair & operation, visit Boshart Knowledge Base at  
SUPPORT.BOSHART.COM

