

SELF PRIMING PUMPS

The self priming centrifugal pump is designed to lift water from some level below the pump suction without having to fill the suction piping with liquid. It accomplishes this by creating a partial vacuum at the pump suction which removes the air from the suction line. The pump then releases the entrained air through its discharge while retaining the initial fill of water in the pump case. This air / water separation is what makes the self primer different. Try this with a standard end suction centrifugal and all you will get is a slug of water.

Although the self priming centrifugal pump will remove all air from its suction piping, it will not "dry prime". Unlike positive displacement pumps (ie diaphragm, piston etc.) the pump case must be filled with water prior to starting. Also, there must be a way for the air to exit the discharge of the pump. If the discharge piping is not open to atmosphere, an air release valve must be installed.

SUCTION LIFT

Since water has no tensile strength, a pump cannot "pull" water up the suction pipe. All the pump can do is create a partial vacuum and allow atmospheric pressure to "push" the water up the suction pipe. At sea level atmospheric pressure is 14.7 psi or about 34 feet of water (1 psi = 2.31'). Although this maximum of 34 feet is unobtainable with any pump, lifts of 20 to 25 feet are common for a good self primer. As elevation increases atmospheric pressure decreases and so will suction lift. It should be noted that any good centrifugal pump, self priming or not, will lift water 15 to 25 feet. The difference is that the suction piping must be filled completely before operating the non-self priming pump. This is usually accomplished by placing a foot valve at the end of the suction line. If, however, the valve were to leak the pump would fail to prime when restarted.

CLEAR WATER SELF PRIMERS

These versatile pumps offer a broad range of pumping capability and are used in applications where water must be lifted and priming failures cannot be tolerated. They are available with flows of 10 to 1000 gpm and heads of 30 to 250 feet . Even though they are not designed for pumping solids most will pass particulates up to 3/8 inch.

Typical applications include swimming pools, bilge pumping, water wells, fire fighting, irrigation, and water trucks. Materials of construction include plastic, cast iron, bronze, and stainless steel. Drivers include gas and diesel engines and electric motors.

SOLIDS HANDLING SELF PRIMERS

These pumps are designed to pump water containing a high percentage of solid or stringy material. Depending upon the model, solids from 1/2 to 3 inches can be accommodated. Often the impeller and volute will be hardened to reduce wear from abrasive materials. Most have a quick clean out port so that they can be cleaned quickly if they plug. They are available with flows of 50 to 1500 gpm and heads of 50 to 150 feet.

Typical applications include sewage, construction dewatering, and flood control. Materials of construction include cast iron, ductile iron, and aluminum. Drivers include gas and diesel engines, electric motors, and hydraulic drives.

For a detailed discussion of centrifugal pump priming, see "The Priming Puzzler". It is part of THE PUZZLER series and can be found on our education page.



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