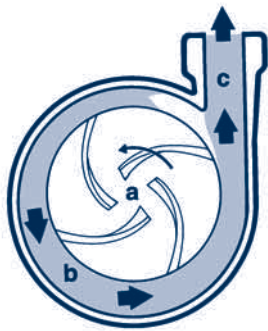


# PUMPING PRINCIPLES

## CENTRIFUGAL



### HOW IT WORKS:

- Liquid enters the inlet port of the pump through gravity or priming and is directed towards the center of the impeller.
- The rotating impeller uses centrifugal force to add velocity to the liquid as it is slung off the edges of the blades into the volute casing.
- The volute configuration converts the velocity energy into static pressure or available pump head as the liquid leaves the discharge port.

### FEATURES:

**High Volume Flow:** centrifugal pumps deliver a high volume of flow with smooth, non-pulsating delivery

**Low Maintenance:** wear due to operation is minimal, are easily disassembled and have few moving parts

**Low Power Consumption:** most efficient pump for moving large volumes of liquid

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ENGINE COOLING

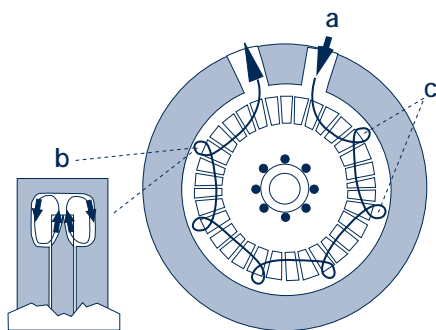
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## REGENERATIVE TURBINE



### HOW IT WORKS:

- Liquid enters the suction port (a) and is pushed forward by the blades of the impeller (b) in an orderly circular flow around the periphery of the housing.
- The circular liquid flow in the side channels (c) occurs many times during one revolution resulting in 10 times or more discharge pressure than from a similar diameter impeller turning the same speed in a centrifugal pump.

### FEATURES:

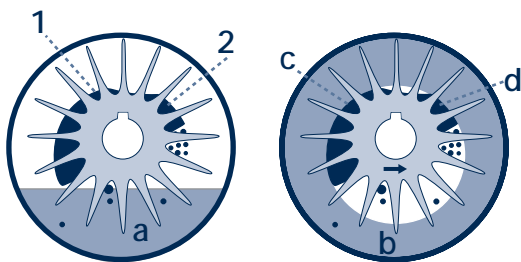
**High Head/Low Flow:** Produces high head at low flow without damaging pump components

**Continuous Duty:** Designed to run 24 hours a day, 7 days a week

**Compact:** More compact than multistage centrifugals that deliver the same flow and head

**Entrained Air Handling:** up to 20%

## LIQUID RING



### HOW IT WORKS:

- Liquid remains trapped in the pump housing between uses.
- When impeller rotates the trapped liquid forms a ring around the interior diameter of the pump housing.
- The expanding cavities formed between the rotating impeller vanes and the liquid ring draws in liquid through the inlet port area (1).
- The compressing cavities formed between the rotating impeller vanes and the liquid ring forces the liquid out through the discharge port area (2).

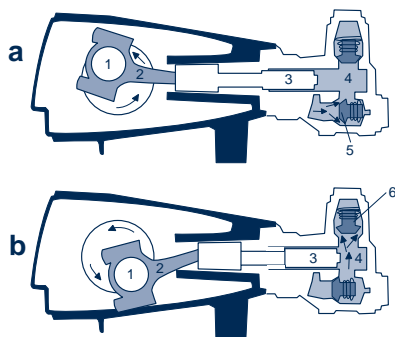
### FEATURES:

**Won't Airlock:** fastest, surest priming there is!

**Low Wear:** non-contacting internal parts using the "liquid ring" to maintain efficiency

**Reversible (some models):** great as a transfer pump

## PLUNGER



### HOW IT WORKS:

- As the crankshaft (1) rotates, the connecting rod (2) pulls back the plunger (3) from the liquid chamber (4) within the manifold which increases the chamber's size. This creates a vacuum that draws in liquid through the inlet valve (5).
- As the crankshaft's rotation continues, the connecting rod (2) pushes the plunger (3) toward the liquid chamber (4) reducing the chamber's size. This forces the liquid out the discharge valve (6).

### FEATURES:

**High Pressure:** pressures of up to 15,000 psi can be achieved

**Clean Liquids:** closed fitting components require clean non-abrasive liquids

**Durable:** ceramic plungers and an oil filled crankcase ensure a long operating life