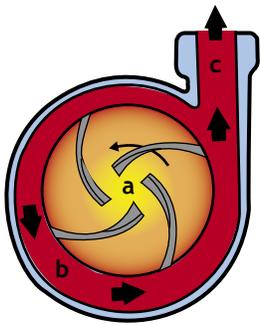


PUMPING PRINCIPLES

CENTRIFUGAL



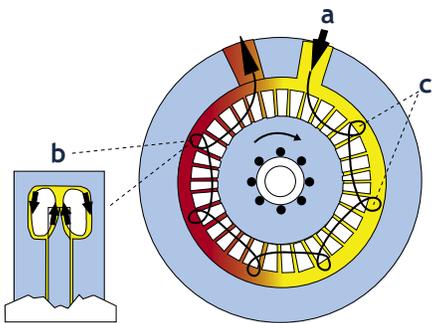
HOW IT WORKS:

- 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

REGENERATIVE TURBINE



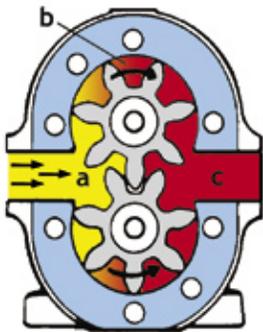
HOW IT WORKS:

- 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) occur 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%

EXTERNAL GEAR



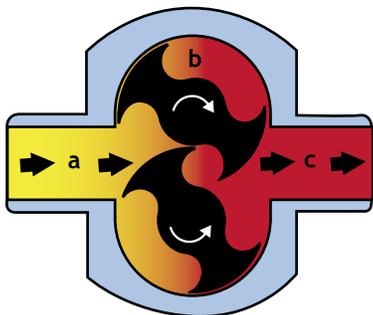
HOW IT WORKS:

- As the gears separate on the inlet side of the pump, cavities are created between the gear teeth which create a vacuum that draws in the liquid.
- Once the teeth clear the inlet port, the liquid is captured between the gear teeth and the housing.
- As the teeth mesh, the liquid is squeezed out of the cavity and forced out the discharge port.

FEATURES:

- Metering:** thin to viscous liquids can be dispensed in a smooth repeatable flow
- High Pressure:** up to 500 psi can be achieved with low to high viscosity liquids
- Clean Liquids:** close fitting gears require clean non-abrasive liquids

LOBE



HOW IT WORKS:

- The motion of the counter rotating rotors create a partial vacuum which draws the liquid smoothly into the pump chamber.
- As the rotors revolve, liquid is captured between the rotor cavities and the outer housing.
- The liquid is forced out the discharge as the rotors mesh and eliminate the cavities the liquid occupies.

FEATURES:

- Efficient:** Improved efficiency and sterilizability over the traditional lobe pump design. Longer sealing surfaces ensure high volumetric efficiencies with thin liquids.
- Solids Handling:** gentle low shear solids and abrasive handling
- Wide Viscosity Range:** from 1 to 1,000,000 centipoise