Rotary & Centrifugal Pumps

Rotary pumps operate in a circular motion and displace a constant amount of liquid with each revolution of the pump shaft. In general, this is accomplished by pumping elements (e.g., gears, lobes, vanes, screws) moving in such a way as to expand volumes to allow liquid to enter the pump. These volumes are then contained by the pump geometry until the pumping elements move in such a way as to reduce the volumes and force liquid out of the pump. Flow from rotary PD pumps is relatively unaffected by differential pressure and is smooth and continuous. Rotary PD pumps have very tight internal clearances that minimize the amount of liquid that slips back from discharge to suction side of the pump. Because of this, they are very efficient. These pumps work well with a wide range of viscosities, particularly high viscosities.

Centrifugal pumps differ from rotary pumps in that they rely on kinetic energy rather than mechanical means to move liquid. Liquid enters the pump at the center of a rotating impeller and gains energy as it moves to the outer diameter of the impeller. Liquid is forced out of the pump by the energy it obtains from the rotating impeller. Centrifugal pumps can transfer large volumes of liquid but efficiency and flow decrease rapidly as pressure and/or viscosity increases.

Comparisons Between Rotary and Centrifugal Pumps

	Rotary	Centrifugal
Max. Viscosity (cSt / SSU)	1,320,000 / 6,000,000	550 / 2,500
Max. Capacity (M^3/Hr / GPM)	750 / 3,300	27,250 / 120,000
Pumping Efficiency	E	A
Energy Costs	E	A
Self-Priming	Yes	No
Flow Control	E	P
Life-Cycle Cost	G	G
Initial Cost	A	E

E = Excellent, G = Good, A = Average, P = Poor