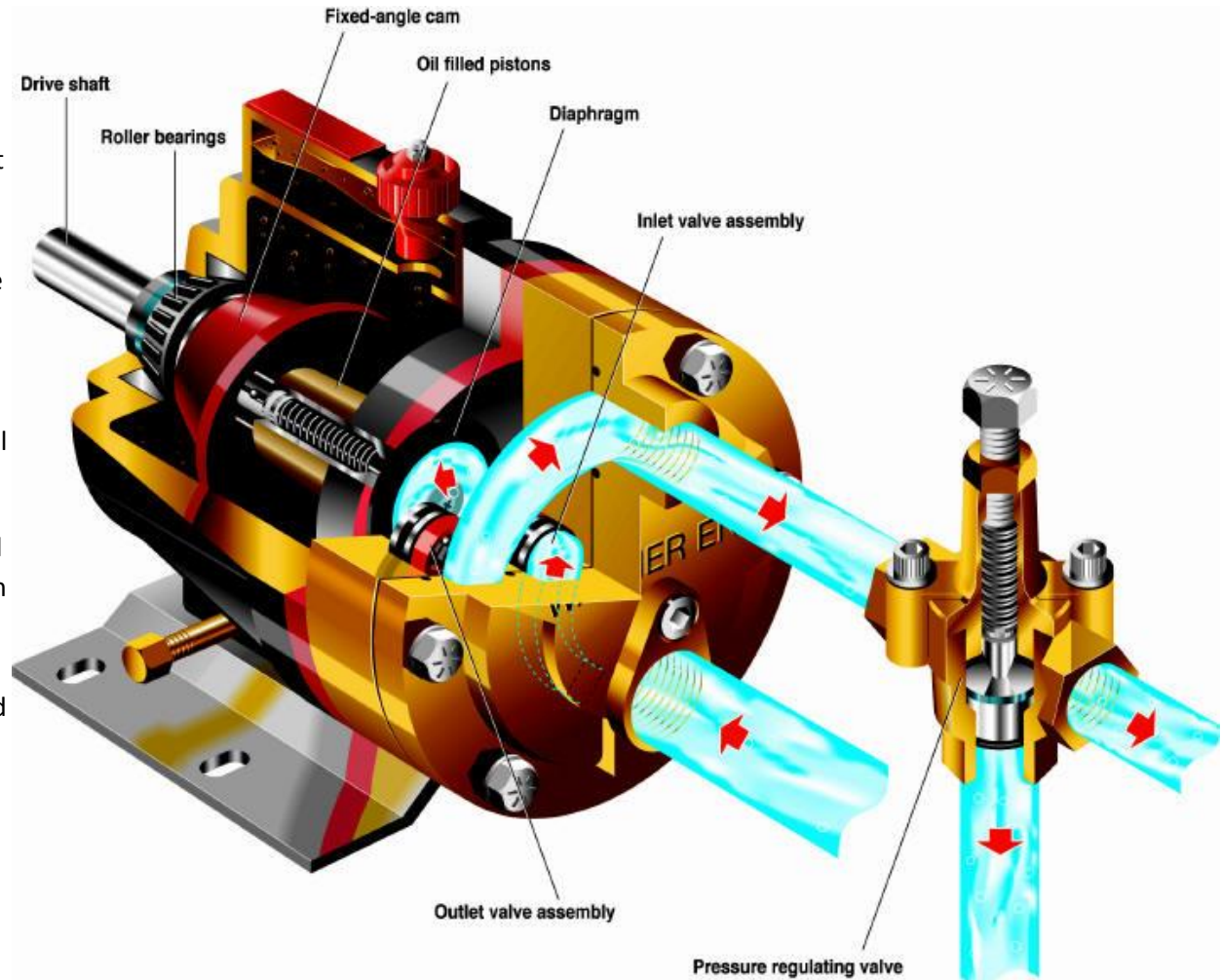


How Sealless Positive Displacement Hydra-Cell™ Pumps Work

The unique positive-displacement Hydra-Cell™ pumps operate using the following principle:

The drive shaft **(1)** is rigidly supported by a large Timken tapered roller bearing at the rear of the shaft and a smaller Timken bearing at the front of the shaft. Sandwiched between another pair of large Timken bearings is a fixed angle cam or wobble plate **(2)**. As the drive shaft turns, the wobble plate moves, oscillating forward and back (converting rotary motion into linear motion). This complete pumping mechanism is submerged in a lubricating oil bath **(3)**.

The Hydra-Cell™ pistons **(4)** are alternately displaced by the wobble plate. The pistons are filled with oil on their rearward stroke. A ball check valve in the bottom of the piston ensures that the Hydra-Cells™ remain full of oil on their forward stroke. The oil held in the Hydra-Cell™ pressurizes the back side of the diaphragms **(5)** and causes them to flex forward and back as the wobble plate moves, thus providing the pumping action.



To provide long trouble free diaphragm life, the Hydra-Cell™ hydraulically balances the diaphragm over the pump's complete pressure range. The diaphragm actually faces only a 2 PSI pressure differential no matter at what pressure the fluid is being delivered.

Each diaphragm has its own pumping chamber which contains an inlet and outlet self-aligning check valve assembly **(7)**. As the diaphragms retract, fluid enters the pump through a common inlet **(6)** and passes through one of the inlet check valves. On the forward stroke, the diaphragm, equally spaced 120° from one another, operate sequentially to provide a constant, virtually pulse-free flow of fluid.

Hydra-Cell's™ are very efficient (typical operation is at or above 85% efficiency) and can be driven (belt, gear, or direct) by electric, air, or hydraulic motors. This allows system designers ultimate flexibility in selecting drives for their machines. The Hydra-Cell's™ efficiency offers substantial energy savings to users when compared to other types of positive displacements pumps. The pumps are available in flow rates from 0.5 to 40 GPM (2 to 170 LPM) at discharge pressures from 30 to 2500 PSI (2 to 83 BAR).