Positve Displacement Pumps Vs. Centrifugal Pumps: Which is Right for Your Sanitary Process

The centrifugal pump is the most commonly used pump type in the world, but it may not be the most suitable for your sanitary processes. Certainly, the sanitary process components you choose— including flow pumps — should be selected with careful consideration.

SO, WHAT'S THE DIFFERENCE?

The two pump types operate very differently. For instance, the positive displacement (PD) pump provides a continuous flow (more or less) regardless of pressure, whereas the centrifugal pump pressure depends on the changing flow. This can have an impact on the speed of your sanitary processes.

Another important distinction between these two sanitary process components is the effect viscosity has on the capability of each pump. The centrifugal pump loses flow as viscosity increases, so it is ideal for transfer applications of low viscosity liquids. On the other hand, the PD pump flow essentially increases with higher viscosity liquids. For the positive displacement pumps, this introduces a higher efficiency rate not seen in centrifugal pumps.

PD pumps normally produce more pressure than centrifugal pumps, and they operate at a lower speed than the centrifugal, so PD seals tend to last longer than seals on a centrifugal pump. Centrifugal pumps tend to do well in high flow conditions. Conversely, positive displacement pumps are typically preferred for high pressure/low flow rate applications.

Positive displacement pumps operate by forcing a fixed volume of fluid from the inlet pressure section of the pump into the discharge zone of the pump. PD pumps frequently are used in hydraulic systems.
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What to Look for When Selecting a Sanitary Process Pump Component

Before selecting the best pump for the job, consider the following characteristics:

1. Total head or pressure capability
2. Desired flow rate
3. Fluid characteristics (temperature, corrosiveness, etc.)
4. Suction lift

The liquid being transferred should be a key consideration when selecting a pump. If the product is thick, it may be best to select a PD pump. Liquids with a high viscosity (usually >1,000 centipoise) can be easily handled with one of the many types of PD pumps, such as rotary lobe or diaphragm pumps. In contrast, water, thin oils, and similar liquids may be better served with a centrifugal pump, especially in situations demanding higher volumes.

If you encounter periods where the pump remains "dry", a positive displacement pump will prime on its own without liquid. On the other hand, a centrifugal pump is unable to create a pressure differential by priming without liquid already in the unit.

Some PD pumps (rotary lobe) can be used in applications where you need to be able to control the flow rate. These pumps can be adjusted as needed to match other parts of your process or for rough metering of fluids. Alternatively, if you need to move high volumes, a centrifugal pump can be sized to move more gallons per minute than many other pumps.

Finally, PD pumps can manage product with larger suspended solids, such as chunky soup, fruit filling or ice cream. Positive displacement is also a preferred choice over centrifugals when transporting shear sensitive fluids and fluids with abrasive particles.

To find out more about whether a positive displacement or centrifugal pump is right for you facility, get in touch a Rodem rep.