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DJAM PUMP SPECIALISTS

PUMP KNOWLEDGE SERIES

APPLICATION & FAILURES

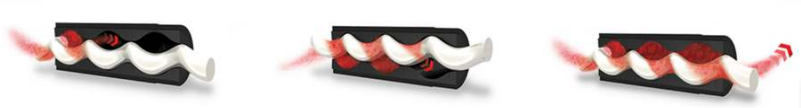
PROGRESSIVE CAVITY PUMPS

Progressive Cavity Pumps.

The Progressive Cavity Pump was invented & patented in 1930 by René Moineau, a pioneer of aviation. While inventing a compressor for jet engines, Rene discovered that this principle could also work as a pumping system. Rene then sold 4 manufacturing licences for geographic locations, Moyno (America's), Mono

(UK), Gardier (Belgium) and PCM (France). Each manufacturer was limited to sell in their area only and that is why Moyno has the largest installed base of PC pumps here in Western Canada. Eventually with globalization and pump replicators, there are many manufacturers and distributors selling these pumps.

Progressive Cavity Pumps are comprised of a metallic rotor with a helical profile, as well as an elastomeric stator with a double helix profile. When the rotor is assembled within the stator, a series of sealed cavities are formed inside the pump, each of identical size and profile. When the pump is running, the rotor turns, allowing the cavities to move in a spiral path from one end of the pump to the other. This conveys fluid from the inlet to the outlet of the pump. This leads to the volumetric flow rate being proportional to the rotation rate (bidirectionally) and to low levels of shearing being applied to the pumped fluid.



Applications for PC Pumps are so varied it is hard to list them all. Aside from being a positive displacement pump, some of the advantages of PC Pumps are repeatable flow rates (metering), ability to move solids, abrasives, sewage, sludge, grout, cement, etc.. PC Pumps also have the ability to pump heavy sour oil with high viscosities. The most common applications in the oil field are downhole artificial lift, surface oil transfer, slurry pumping, recycle and skim pumps.

3 KEY FACTORS TO REMEMBER WHEN APPLYING A PC PUMP

1. Always make sure that all of the application details are included when you send out for RFQ's. This includes flow rate, suction & discharge pressure, viscosity, temperature, abrasives and a fluid analysis. A common miss

here, is not including if there are any chemical additives being added to the fluid before the pump.

2. Always check for the number of stages quoted. Each stage in a surface PC pump is capable of producing a differential of between 75-87 psi per stage. When pumping abrasives, the manufacturer should be derating the pressure per stage by up to 75% if there is heavy abrasion. If you do not de-rate for abrasion, the life of your pumps in the field will be considerably less than if sized properly.

3. Make sure the horsepower calculations include the viscosity, abrasives and temperature. Missing any of these 3 items in the HP calculation can leave you short on your HP and hinder the use of the pump.

DJAM Pump Specialists

Over the past 40 years, I have quoted and applied hundreds and hundreds of PC pumps, and I have lost my share of them as well. The most common questions I get when talking with buyers, is why do you have 20 HP and they have 10 HP, or why do you have a 3 stage and they are quoting a single stage.

Many things can affect the life and success of using a PC Pump, the above are just three. If you have any questions or comments about sizing a PC pump, or if you are having issues with pumps in the field, please send me a quick email to mike.keeley@djampumps.ca and I will be glad to help you out.

2 COMMON MISTAKES THAT LEAD TO PC PUMP FAILURE

RUNNING DRY

With a PC pump, you have a steel rotor rotating inside a stationary elastomeric stator and it needs lubrication to cool down. Usually, the fluid going through the pump will provide enough lubrication to keep the stator cool, but when no fluid goes through the pump, the

temperature of the stator increases quickly, the stator swells and will tear up the stator and you will lose any pressure and flow capabilities. ***I would suggest either a no flow switch or using a downstream meter as a shutdown of the pump if the pump rates drops.***

OVER PRESSURE

When you dead head a PC Pump or even over pressure the pump, the pressure will slip back along the seals lines of the pump and will rip chunks of the elastomeric stator apart. **I would suggest either a pressure relief valve and either a high pressure or a high differential pressure switch/transmitter.**

If you have any field application or premature wear/failures of any of your PC pumps, I am available to do a virtual or on-site inspection and offer you solutions to your problems.
Check out my website at www.djampumps.ca

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