



Progressing
cavity pumps



PCM Moineau™ HR

Multiphase PCP for artificial lift



PCM Keep it
moving



PCM Moineau™ HR: Easy-to-recover oil is increasingly hard to find.

Operators need new technologies that enable them to extend the lifespan of existing fields and extract hard-to-recover oil. PCM Moineau HR is the first progressing cavity pump (PCP) for multiphase pumping. It features a revolutionary rotor design with patented PCM HR (Hydraulic Regulator technology).

This technology brings the inherent benefits of PCP – simple operations, non-pulsating flow and non-emulsifying design – to multiphase applications.

▶ IMPROVE PCP RUN LIFE IN MULTIPHASE CONDITIONS

When using a conventional PCP for multiphase flow, compression occurs on the discharge side of the pump that will shorten run life. With a PCM Moineau HR pump, pressure is balanced. Liquid and gas pressure increase is more uniformly distributed along the stator. This reduces strain and stress, and contributes to better reliability and longer run life. PCM Moineau HR pumps also operate efficiently if stator swelling occurs.

▶ EXTEND OILFIELD CAPACITIES

PCM Moineau HR pumps can increase your oil and gas production by operating at lower submergence. They also enable additional recovery of reserves thanks to a lower ultimate abandonment pressure.

▶ REDUCE LIFE CYCLE COST

As for any progressing cavity pumps, PCM Moineau HR pumps have a lower CAPEX than rod or electrical submersible pumps. They also offer a higher life span, which means fewer workovers, less production losses and fewer spare parts.

➤ PCM Moineau HR, artificial lift system

PCM Moineau HR technology is available in a full artificial lift package, including surface equipment for well production control and monitoring.

State of the art

The PCM Moineau HR pump is built using patented PCM technology. It has been developed from theory to field test, using lab tests and multiphase simulation tools developed by PCM that take full advantage of the latest advances in computational fluid dynamics.

Compatible with existing PCP completions

PCM Moineau HR pumps are flexible and simple to adapt to existing PCP completions. PCM Moineau HR rotors are fully compatible with conventional PCP stators. As a result, you can upgrade an existing PCM pump as reservoir conditions evolve by simply replacing the conventional rotor with a PCM Moineau HR rotor.

Model designation

XXEYYYY HR

XXX	Capacity in m ³ /d at 100 rpm & 0 bar
E	Elastomer
YYYY	Maximum pump head in meter water column
HR	Hydraulically Regulated

Range

16 models are available.
Choice of 5 dedicated elastomers

Range of Flow rate	5 to 700 m ³ /d (30 to 4500 bfpd)
Range of Pressure	Up to 260 bar (3800 psi)



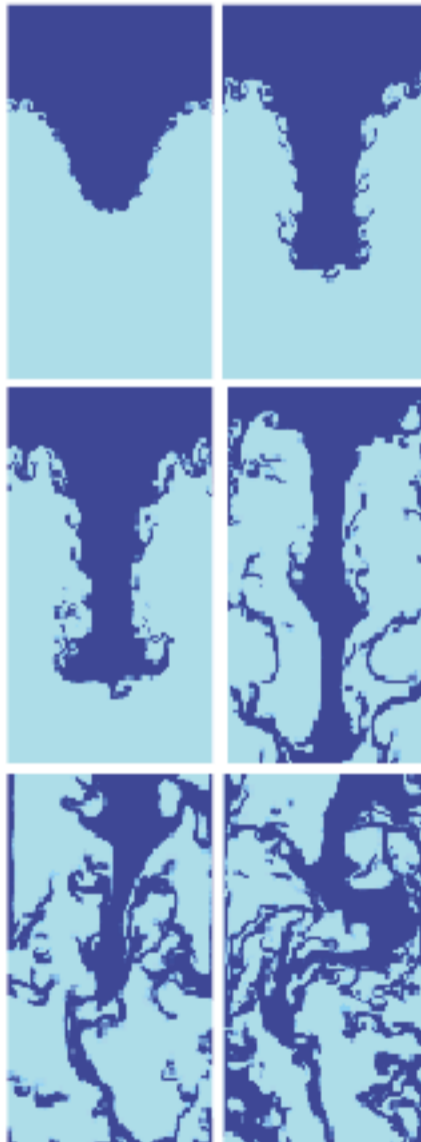
At your service

PCM Field Services offer dedicated support from installation to optimization, as special attention may be needed for multiphase production.

➤ From liquid to gas

Multiphase flow is not in a steady state. Multiphase flow patterns depend on viscosity, fluid velocity, temperature and well architecture. Fluid composition at the pump intake may be predominantly liquid, gas/liquid mixture, or mainly gas. Furthermore, fluid characteristics are likely to change over the life of the field.

PCM Moineau HR pumps handle up to 99% GVF (Gas Void Fraction) and offer the same reliability at low or zero gas levels. This makes PCM Moineau HR technology a highly versatile choice for variable and changing pumping conditions.



Multiphase computational fluid dynamics

Mature field revitalization

PCM Moineau HR pumps enable you to develop the full potential of your mature assets. In older fields, when the reservoir pressure declines, Gas Void Fraction (GVF) increases. This high GVF causes ESP and SRP to gas lock and shortens the run life of conventional PCPs, causing frequent production shut downs. PCM Moineau HR pumps are a reliable artificial lift solution that meets the requirements of multiphase operation and continuous production, extending well life and putting abandoned wells back on stream. In Venezuela's Orinoco belt area, PCM Moineau HR pumps have reached 23 months run life with regular and constant parameters, exceeding customer expectations.

Gassy wells

PCM Moineau HR pumps can reduce the need for gas separators. Extracting heavy to light oil with a low intake pressure generates free gas downhole. Handling a high free-gas/liquid ratio with existing artificial lift systems requires the addition of a gas separator, which can be costly and problematic in heavy oil applications. PCM Moineau HR pumps handle gas without requiring a gas separator. As a result, fluid density in the tubing column is lighter and power consumption is reduced. Several PCM Moineau HR pumps are being used in a field in Argentina to handle a level of free gas that other artificial lift systems could not cope with.

Gas well deliquification

PCM Moineau HR pumps provide longer PCP lifespan. In gas wells, water can accumulate in the bottom of the well if gas velocity is not high enough. This can either slow or stop gas production. Although PCP technology is recognised as a highly efficient artificial lift system for gas well dewatering (especially in Coal Bed Methane applications) the presence of gas can reduce PCP life span. Because it is specifically designed to handle high gas levels, PCM Moineau HR overcomes this problem.

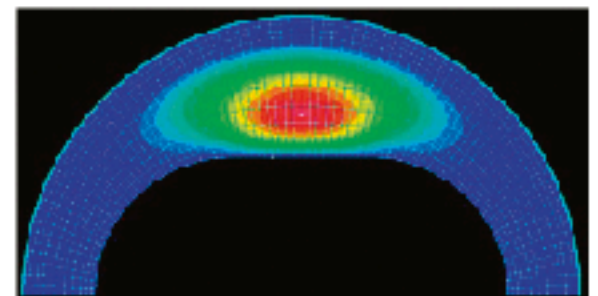
➤ PCM Moineau™ HR Technology

PCM Moineau™ HR technology consists of modifying the traditional PCP design by adding hydraulic regulators. PCM patented hydraulic regulators are embedded in the rotor design. They are self-regulating and require zero maintenance. They provide better pressure distribution inside the pump and enable internal recirculation between cavities. Pressure and temperature are balanced along the rotor, allowing optimum performance and a significantly longer run life.

The problem

Operations in multiphase conditions with high gas content, is challenging and conventional PCPs reach their limits quickly.

Gas compression located at the pump outlet generates heat, elastomer deformation and possible premature failure.

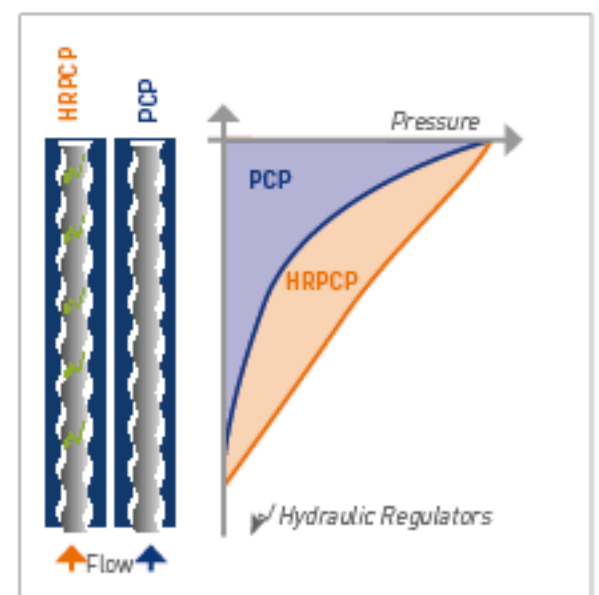


Internal strain within stator elastomer resulting in internal heating

The solution

PCM Moineau HR technology improves conventional PCP performance by providing:

- > **Uniform pressure distribution**
- > **Lower temperature**
- > **Less stator strain**
- > **Lower friction torque**



Hydraulic regulator progressing cavity pump principle



Patented Design

The heart of the patented PCM Moineau HR technology is contained in the PCM expertise in dimensioning and positioning the regulators along the pump.

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