

PCM Oil & Gas ▶ Opening new frontiers



## Your PCP specialist

Exploiting new sources of oil and gas—or optimizing existing fields—has never been more demanding or capital intensive. Our original Progressing Cavity Pumps (PCP) will put you ahead of the competition.

### Solutions for every challenge

PCM Oil & Gas enables you to reduce capital and operational expenditure with one of the widest ranges of highly efficient Progressing Cavity Pumps (PCP) in the industry.

For access to untapped reserves and optimization of mature fields, PCM Oil & Gas Innovation programs focus on solutions for higher temperature (350°C/660°F), higher gas content (90%) and higher fluid pressure processing (260 bar/3,770 psi).

### Experts in every environment

Our PCP systems are designed to withstand the harshest working conditions on the planet, both onshore and offshore, in compliance with the highest international oilfield standards.

All our systems are eco-designed and conceived to enhance energy savings and maintenance safety.



René Moineau

### Inventor of the PCP

René Moineau, the founder of PCM, invented the world's first Progressing Cavity Pump (PCP) in 1930. It was the start of the innovation and technical excellence that has made PCM famous. See page 4 for more information about our technological leadership.



During operation we are at your side

## Services that make the difference

At project startup, we provide feasibility studies and designs based on your well data. During operation we are at your side, providing operational support and project reporting as well as field optimization to boost productivity and save money. Our experts ensure responsive consulting, delivery and after-sales support throughout the world.

### **PCM OFFER**

**Services**

**Artificial Lift Pumps**

**Surface Transfer Pumps**



### **APPLICATIONS**

EXPLORATION

COLD PRODUCTION

THERMAL RECOVERY

SURFACE TRANSFER

PROCESSING

Wherever you operate,  
PCM Oil & Gas is there with you.

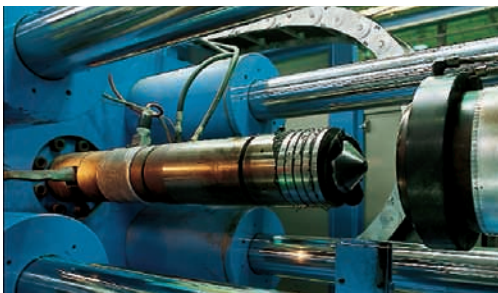


## Advanced technology at work for you

For over 75 years, PCM has expanded the market for PCP pumps with one innovation after another. Today all our solutions take advantage of this technological leadership.

### Elastomers

Picking the right elastomer plays a crucial role in determining the lifetime and performance of a PCP pump. We have been developing elastomers for more than 75 years using the highest quality rubbers available. We develop, mix and produce our own elastomers in our state-of-the-art laboratory. PCM has leading expertise in analyzing elastomer/hydrocarbon compatibility. Today, we offer the widest variety of elastomers. They are capable of handling very light to extra heavy oil.



Elastomer press

### PCM innovation challenge

Achieving new performances with new technologies has always been a goal of PCM Oil & Gas. Preparing for the future with advanced technologies for unconventional oil recovery is now at the center of our research programs.



Testing of a vertical Moineau pump 150 I 20



PCM Vulcain™ PCP in operation in Alberta

## Advances in thermal process recovery: PCM Vulcain™

Worldwide reserves of heavy and extra-heavy oils are estimated at 4,600 billion barrels. But these oils are difficult or impossible to produce at reservoir temperature due to their extreme viscosity.

One way to extract them is to assist the recovery with thermal processes. We have developed a revolutionary patented technology for manufacturing a metallic pump with the lowest capital and operating cost, capable of extracting heavy oil and aggressive fluids during thermal recovery.

This new PCM generation of PCM Vulcain™ pumps can handle temperature limits of 350°C/660°F.

## New multiphase progressing cavity pump

By combining a conventional PCP with hydraulic regulators, it is possible to control the cavity pressure distribution along the axis of the pump.

This unique patented PCM technology increases performance in multiphase or viscous fluids pumping. It provides lower energy consumption for surface and downhole applications, both onshore and offshore.



## Reliable, cost-effective extraction

PCM provides PCP artificial lift systems for oil and gas exploration and production that ensure long life, maximum volume and minimum downtime.

### Less capital intensive

Our PCP systems offer lower capital costs for the same pump capacity as traditional pumps. There are no expensive foundations to be laid. Construction is simple and can be adapted to any kind of well head. Since the drive system is surface-mounted, electrical wiring is straightforward.

The compact size of the pump drive units means you can fit more driveheads into a given space, thereby reducing capital outlay. Installation is quick and reliable, which keeps costs minimal. All these factors drastically reduce the time it takes to mobilize rigs.



Size comparison of PCP drivehead (in blue) and typical beam pump (in red)

### Cost-effective operations

Our pumps offer a longer lifespan than traditional pumps and require less manpower to operate and maintain.

The remarkable volumetric efficiency and overall mechanical efficiency of our PCP systems increase field production and lower power requirements. This energy saving tremendously reduces the cost per barrel of oil.

### Business-critical reliability

Our PCP systems are the best choice for use in conditions that other artificial lift system cannot handle. The design of our systems is capable of handling fluids with high levels of viscosity and solids. They are also ideal for use in corrosive conditions and for moving fluids with high levels of sand cuts, water and gas.



Cluster of PCP in Venezuela

## Driveheads

PCM takes advantage of its expertise, to provide durable, safe and reliable driveheads for its oilfield pumps. Driveheads can be driven by electric or hydraulic motors with belts and pulleys or through in-line gear reducers. For easy serviceability and field maintenance, PCM offers low-profile, small footprint driveheads with minimized noise levels and maximized operational safety.

All PCM driveheads are equipped with hydraulic and automatic anti-backspin devices for totally safe operation during maintenance.

## Precision engineering

The precision engineering and world-class build quality of PCM Oil & Gas pumps have enabled us to push the envelope in terms of performance.

### Recorded performances

Well depth:	2,400 m (7,800 ft)
Rated capacity:	800 m <sup>3</sup> /day (5,000 bpd)
Temperatures:	110°C max. (230°F) – Elastomer PCP
Sand cuts:	50% max.
H <sub>2</sub> S content:	5% max.
CO <sub>2</sub> content:	12% max.
Aromatic content:	15% max.
Power savings:	up to 50% compared to non-PCP pumps
Operating life time:	12 years

## Typical applications

- ↗ Oil wells
  - Light, heavy oils and oil sands
  - Horizontal and deviated wells
  - Cold or thermal recovery
- ↗ Water wells
  - Coal bed methane recovery
  - Geothermals

*“One of our customers installed PCM pumps on an old field that the previous owner had written off as going dry. The PCM pumps were able to extract oil that traditional pumps could not. They doubled the field’s total production within four years without any additional drilling. They have also drastically reduced the per-well operating cost.”*

**Laurent Zimmer, Middle East Area Manager, PCM Oil & Gas**



## Keeping fluids moving in any environment

Whether during exploration or exploitation, our transfer pump systems provide an economic answer to handling difficult materials at the wellhead.

### A wide range of technologies

With flow rates up to 12,000 m<sup>3</sup>/day (75,000 bpd) and head capabilities up to 260 bar / 3,770 psi and 2,500 m / 8,000 feet, our tailor-made PCP transfer systems and complete range of Delasco hose pumps provide the performance you require. They are available in cast iron, carbon steel, stainless steel and high alloys to handle most existing applications.



Offshore pumps supplied with relief valve.

### You've got the choice

The design of our pumps is the result of years of experience providing systems for onshore and offshore production. You can select from standard models or specially engineered pumps that comply with API 676.



High pressure transfer pump - THP range

## Built for the toughest jobs with maximum safety

Low suction NPSH, high power THP (Transfer High Pressure) or multiphase handling, all PCM pumps are designed with high integrity sealing systems and instruments and first class motor suppliers in order to meet the most demanding safety requirements of any hazardous area.

## Typical applications

### PROCESSING

- ↗ Sump pumps
- ↗ Vessel drainage  
(HP/LP flares)
- ↗ Condensate recovery
- ↗ Diesel transfer
- ↗ Hydrocyclone feeding
- ↗ Glycol

### HIGH TRANSFER REQUIREMENTS

- ↗ Multiphase transfer at well head
- ↗ Water injection
- ↗ Oil re-injection
- ↗ Mud

*“A customer called us to solve a problem with their booster pumps, which provided two thirds of their overall field output. The installed twin screw pumps had a mean time between failure (MTBF) of just three months, due to sand and viscosity variations. PCM designed and delivered one of the largest PCP ever made within 11 weeks. The five units have been working 24/7 for more than two years without any downtime or drop in performance.”*

Bastien Limoges, Sales Manager, PCM Oil & Gas






## Expertise at your service

PCM delivers more than just pumps. Our pre-sales and after-sales services can design, deploy and support customized PCP artificial lift solutions, leaving you to focus on your core business.

### Consulting and engineering

We select the most appropriate artificial lift system to secure production continuity, increase the well's operational uptime and reduce operational costs. PCM field service engineers and experienced professionals provide:

-  Well testing campaigns during exploration
-  On-site field optimization campaigns
-  Maintenance and permanent on-site supervision



PCP installation

### Well and production optimization

Capital expenditure can be significantly reduced through strong pre-sales assistance. Drillstem testing (DST) during exploration, on-site well data analysis, pump site design and PCP selection are all part of the PCM approach to reducing capital costs.

Similarly, running costs can be optimized. On-site monitoring, failure analysis campaigns and consulting on spare parts storage and staging are just some of the services provided by PCM to help you reduce operating costs.



Typical beam pump replaced by PCP for production optimization



Maintenance of PCP installation

## Field services

From well testing to installation, commissioning and troubleshooting, field interventions are performed by a worldwide network of PCM engineers, who work closely with operators. They can provide permanent or regular on-site PCM inspection, maintenance and stock management.

## Training

To accelerate knowledge transfer with our customers, our Field Services Teams can train your personnel. A wide range of subjects are taught, including PCP theory (Moineau principle, PCP design and selection, surface equipment and driving power) and application (engineering, manufacturing, installation, maintenance and troubleshooting). Courses can be provided on-site, at PCM offices or at PCM's main training center.

## Spare parts

Our highly advanced spare parts logistics system ensures that replacements arrive as quickly as possible in order to avoid costly downtime. We keep a permanent stock of spare parts and accessories on hand, ready for shipping to anywhere the world.

*"For one of our customers we successfully mobilized a group of full-time, on-site PCP experts to optimize their field production and reduce OPEX and CAPEX. This close cooperation has enabled the customer's teams to develop new skills and be more involved in PCP operations, which has benefited both parties."*

**Geoffroy Guise, Nile Valley Area Manager, PCM Oil & Gas**

*"Over the past two years we have halved the average time it takes us to deliver spare parts. Over the next two years we will cut the time in half again."*

**Jacques Fay, CEO, PCM**

## They have put their trust in PCM

ADMA OPCO	PETROCHINA
BP	PETROBRAS
BP TNK	PETRONAS
CHIYODA	PTTEP
CNPC INT	REPSOL
CNRL	SAIPEM
DORIS	SCHLUMBERGER
DUBLIN	SHELL
ENI	SINCOR
EXXON MOBIL	SINOPEC
GEOSERVICES	SOFRESID
HUSKY OIL	SONATRACH
LUKOIL	STATOIL
MAUREL & PROM	SUDAPET
NPCC	TECHNIP
ONGC	TOREADOR
PDVSA	TOTAL
PERENCO	TPAO
PERTAMINA	UNOCAL
PETROANDINA	



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