# PMM-PCP System

## Highly efficient production system in challenging and deviated wells

### Applications

- Deviated and horizontal wells
- Low flow rate and unstable inflow wells
- Heavy oil and viscous oil wells
- Wells producing with higher solids volume or scale
- High lift system adaptability to variable conditions

### Benefits

Improved system reliability through the

- Elimination of rods and rod-wear associated failure
- Elimination of downhole gearbox and associated failure

Reduced OPEX through lower power consumption

Improved viscous or abrasive production in deviated wellbores

Reduced wellhead equipment footprint and environmental risk

### Features

**Low-speed, high-torque PMM**

- Speed range of 100 – 1,500 rpm
- Torque up to 1,670 lb-ft

**Intake - flex shaft to transfer the rotation from the seal to the PCP rotor.**

**Flush valve to reduce and smoothen starting torque impact on motor and system**

**Downhole monitoring sensor**

**Surface variable speed drive**

**Handles up to 50% free gas**

**Handles up to 0.6 g/l solids**

**No fluid emulsification**

Wells producing large volumes of sand and abrasives, high-viscosity fluids, or high gas-to-liquid ratios are considered technically challenging for electric submersible pump (ESP) systems and even more so at lower flow rates. While more suited to these conditions, progressing cavity pump (PCP) systems encounter limitations to their application from well depth and deviation, resulting in inferior system run life and performance efficiency.

For these conditions, the Levare PMM-PCP system is a cost-effective lift system that overcomes such challenges to help increase well productivity and operational performance.

Levare PMM-PCP system is an electric submersible progressing cavity pump that incorporates a downhole permanent magnet motor (PMM).

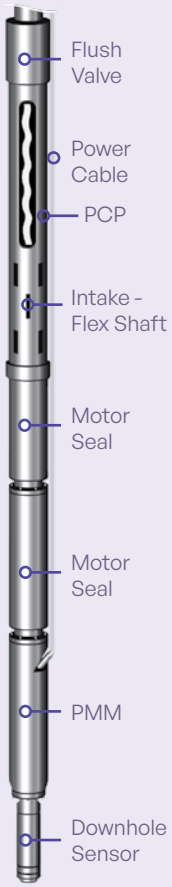
The downhole driven PMM-PCP system provides all the advantages of PCPs in viscous or abrasive fluids while eliminating the wear-risks associated with a steel rod string to surface.

Utilizing a low-speed 10-pole PMM to deliver sufficiently higher torque, the Levare PMM-PCP system also reduces downhole mechanical complexity by eliminating the need for a speed-reducing gearbox required by electric submersible PCP systems using downhole induction motors. Levare PMM technology is well proven to operate at lower current, increased efficiency, and reduced power consumption than an equivalent induction motor.

The PMM-PCP system effectively extends the application range of PCPs to highly deviated wellbores where this technology was not previously considered because of the well bore geometry limitations. In this manner, the Levare PMM-PCP system enables lower rate or more viscous fluids to produce from deviated wells with lower power consumption than historically deemed feasible with ESPs or conventional PCPs.

In one study, power consumption was directly measured on several hundred low flowrate wells, producing with different forms of artificial lift.

Analysis showed that the Levare PMM-PCP system consumed the least power per unit volume of fluid lifted than the other forms of lift considered in this study.



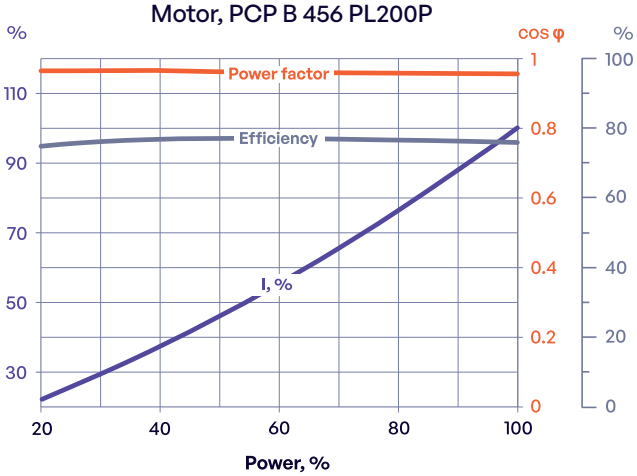
## PCP Specifications @ 500 rpm

| Pump series | 362 | 406 |
|---|---|---|
| Flow range, 120 – 750 rpm | 8.8 – 283 bpd<br>1.4 – 45 m³/d | 45 – 1,182 bpd<br>7.2 – 188 m³/d |
| Max. head | 8,203 ft<br>2,500 m | 8,203 ft<br>2,500 m |
| Max. pump power consumption | 20.1 hp<br>15.0 kW | 35.8 hp<br>26.7 kW |
| Max. recommended motor power | 24 hp<br>18 kW | 48 hp<br>35 kW |

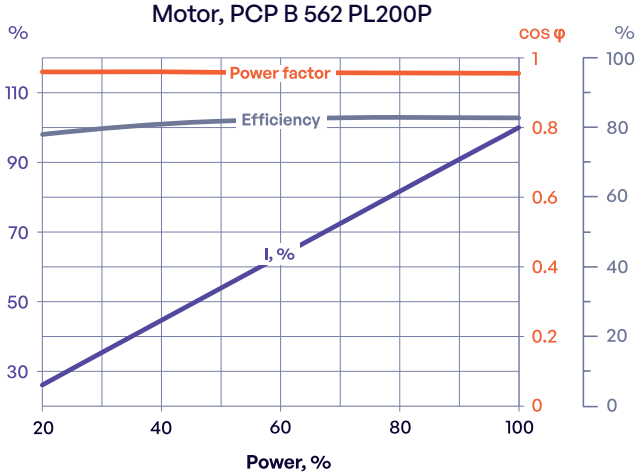
## Low-speed PMM Specifications @ 500 rpm

| Motor series | 456 | 562 |
|---|---|---|
| Max. power | 60 hp (45 kW) | 109 hp (81 kW) |
| V | 157 – 1,063 | 247 – 2,343 |
| A | 34 | 36.5 |
| Max. efficiency | 79% | 83% |
| Power factor | 0.96 | 0.96 |
| Max. torque | 620 lb-ft | 1,140 lb-ft |

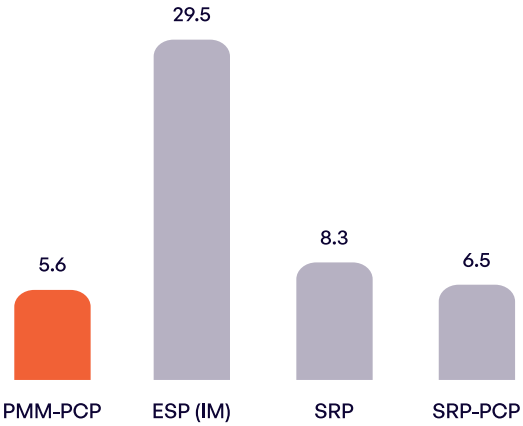
Motor, PCP B 456 PL200P




Motor, PCP B 562 PL200P




**Power Consumption**
per 1 m³ of fluid produced

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