Weatherford®

Progressing Cavity Pumps

Weatherford is the industry leader in progressing cavity pumping (PCP) sales, manufacturing and technical expertise. We continually refine and expand our product line, building on the strong foundation of products that pioneered the modern era of PCPs for oilfield applications. We offer you today's most comprehensive portfolio of value-added PCPs for a wide variety of lifting applications and well conditions.

Weatherford: The Lift Experts℠

Pumping real value into artificial lift.

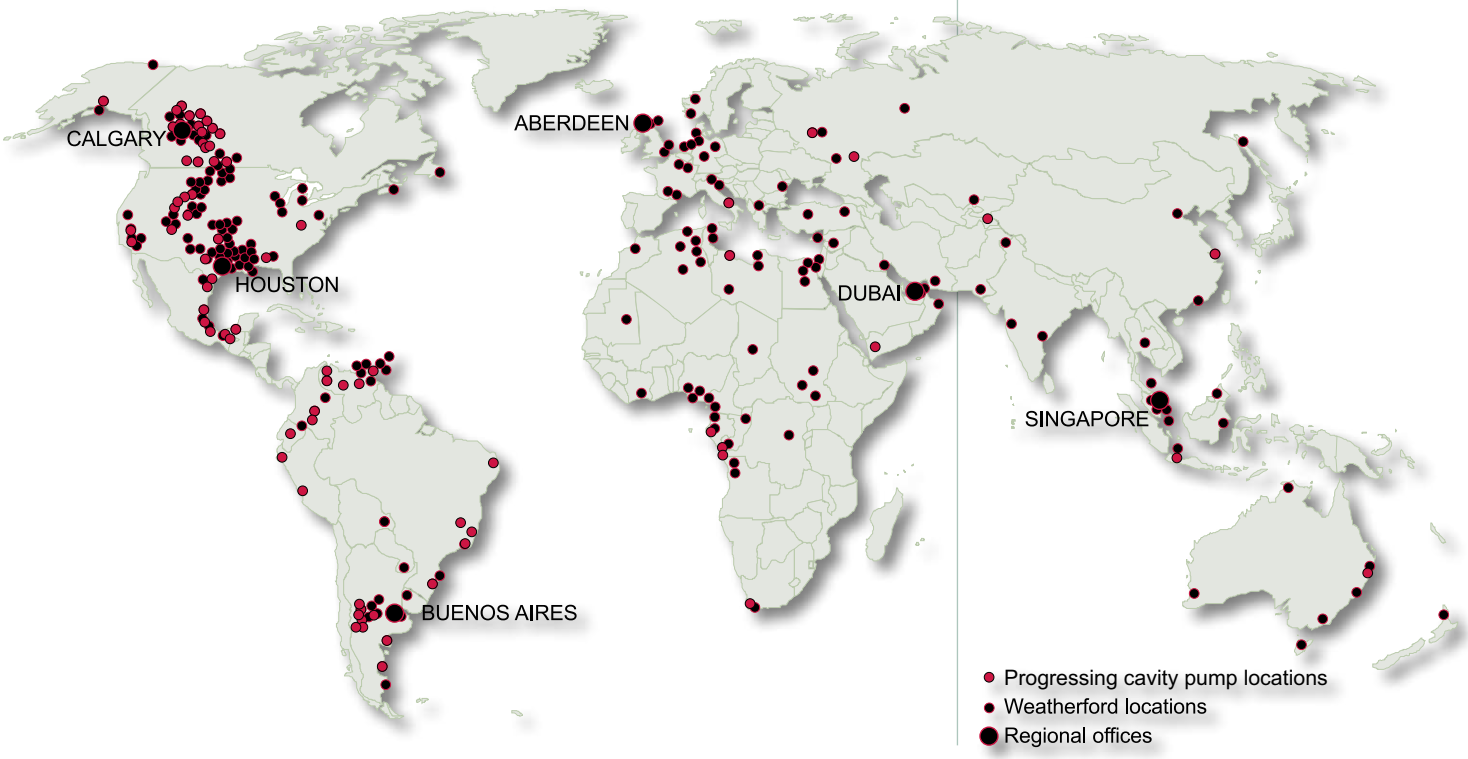
Only Weatherford offers products and services across all artificial-lift platforms worldwide. This total offering is complemented by our across-the-board expertise and service capabilities unmatched in the industry.

Solving the most complex reservoir production problems.

We're good listeners. We work closely with you to thoroughly understand the situation and your requirements to provide solid answers. Your input is combined with our in-depth knowledge of reservoir dynamics and production economics.

Our specialists carefully analyze well data, system characteristics, equipment capabilities, related costs and other critical factors to design a lift system providing maximum performance and return on investment.

Worldwide Services



The Weatherford Advantage

Progressing cavity pumps (PCPs) are a widely accepted means of artificial lift; with high production, lift capacity and system efficiency being a few of the major benefits over other artificial-lift systems.

Advantages

- Low-capital investment
- High-system efficiency
- Low-power consumption
- Pumps oil and water with solids
- No internal valves to clog or gas lock
- Continuous smooth operation helps in preventing and controlling production of undesired reservoir fluids and particles
- Minimal maintenance costs
- Simple installation
- Low-surface equipment profile for visual- and height-sensitive areas
- Portable, lightweight surface equipment
- Compatible with diverse types of prime movers (electric, gas, fuel oil)

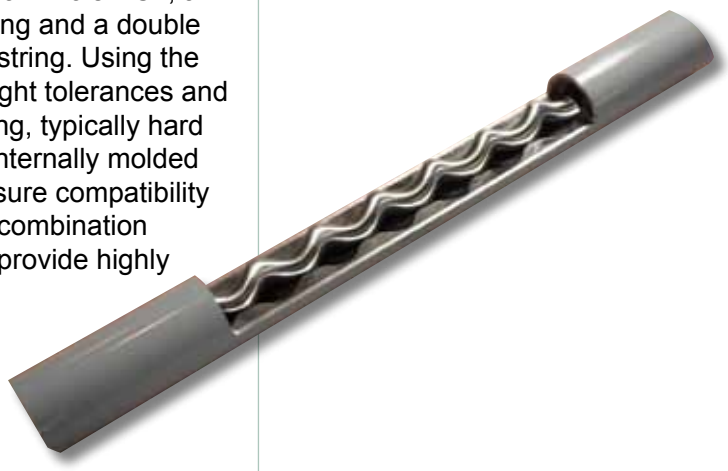
Applications

- Sand-laden heavy crude oil and bitumen
- High-water cuts
- Various oil gravities with limits on H_2S, CO_2 and aromatics
- Dewatering gas wells, such as coal bed methane projects
- Mature water floods
- All well types including horizontal, slant, directional and vertical
- Offshore platforms (compatible with footprint restrictions)

Subsurface PC Pumps (PCPs)

Conventional PCPs

There are two basic components that make up the downhole PCP, a single helical alloy-steel rotor connected to a rod string and a double helical elastomer-lined stator attached to the tubing string. Using the latest manufacturing technology, rotors are kept to tight tolerances and treated with a chemical and abrasion-resistant coating, typically hard chrome. Stators are composed of a steel tube with internally molded elastomer. The elastomer is carefully selected to ensure compatibility with fluid properties and operating conditions. Each combination of rotor/stator is matched to downhole conditions to provide highly efficient operation and optimal production.

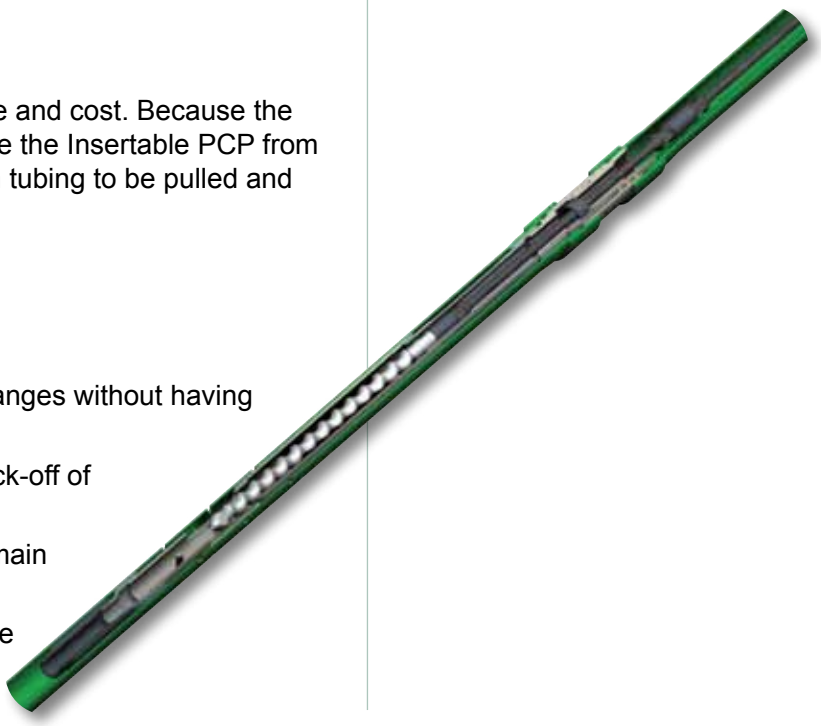


Key Features and Benefits

- Elastomer types optimized for compatibility with various well conditions
- Available from 1 cubic meter per day (CUMD)/100 rpm to 205 CUMD/100 rpm

Insertable PCPs

Insertable PCPs reduce well-servicing time and cost. Because the sucker rod string is used to install or remove the Insertable PCP from the well, there is no need for the production tubing to be pulled and re-run during servicing operations.



Key Features and Benefits

- Reduction of well-servicing time
- Design permits pump volume and lift changes without having to pull tubing
- Integral no-turn tool feature prevents back-off of pump components
- Downhole monitoring equipment can remain in place during pump servicing
- Patented Arrowhead™ design reduces the length of the assembly during running and pulling

Surface Transfer Pumps

The Surface Transfer Pump system utilizes Weatherford's PCP and drive technology to provide a proven and cost-effective alternative for fluid transfer applications. These systems are capable of a wide range of displacements and discharge pressures, and are powered hydraulically or electrically.

Key Features and Benefits

- Effective transfer and disposal of fluids, entrained solids or mixtures
- Highly versatile design
- Minimal site preparation
- Low operating and maintenance cost

Surface Drives

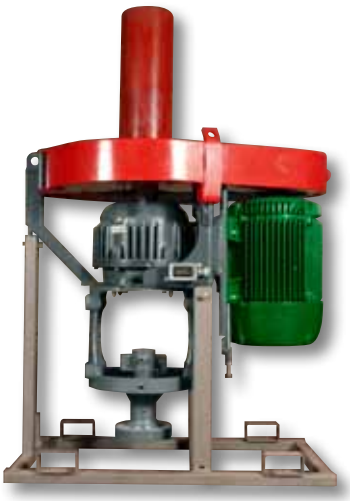
The surface drive provides a link between input energy and the PCP. It completes this energy transition by supporting and rotating a sucker rod string which is connected to the PCP located in the well.

Key Features and Benefits

- Efficient and economical
- Reduced capital, setup time and expense
- Bearing box drive style with a vertical, hollow shaft design
- Simple installation and maintenance
- Hinged-belt guards
- Standard wellhead connections
- Removable stuffing box
- Accepts gas or electric prime movers
- Variable speeds
- Precise torque and backspin control
- Safety guards for rotating components
- Small footprint

Direct Drives

The direct drive is coupled directly to the prime mover via belts and sheaves.



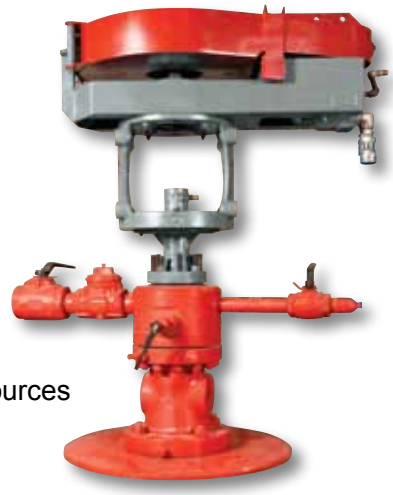
Key Features and Benefits

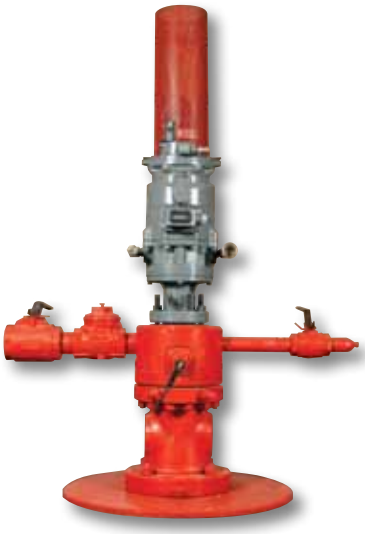
- Compact with minimal moving parts
- Internal backspin control

Hydraulic Drives

Hydraulic drives are not connected directly to the energy source. Energy is provided to the drive via fluid power. This action is accomplished by having the prime mover located on a skid, which is coupled to a hydraulic pump. This fluid energy from the pump is supplied to a hydraulic motor located at the drive. Hydraulically driven drives are available in two models: HTD and Inline.

The Hydraulic Top Drive (HTD) has belts and sheaves to connect to the hydraulic motor; whereas the Inline HTD has the hydraulic motor built into its housing; thus, eliminating the belts and sheaves.





HTD and Inline HTD Key Features and Benefits

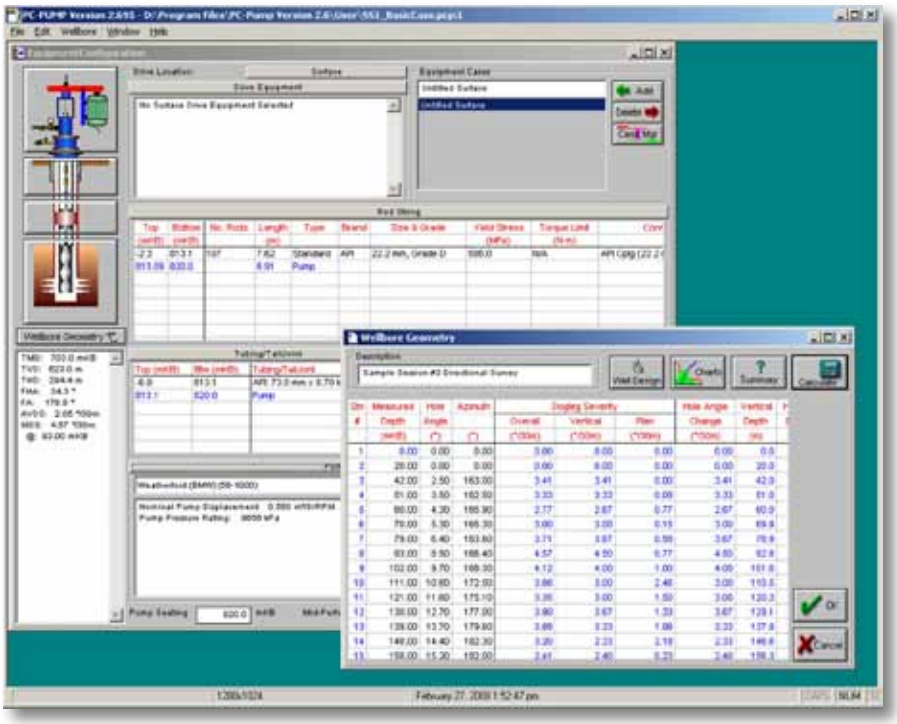
- Environmental containment skid
- Adaptable to alternate fuel/energy sources
- Integrated variable speed and simple backspin control
- Large selection of speed and torque combinations

Additional Inline HTD Key Features and Benefits

- More compact than the conventional hydraulic drive
- Minimal external moving parts
- Quieter operation is ideal for noise-sensitive areas

PC Pump (PCP) System Selection

Weatherford has the ability to analyze and recommend the most efficient and effective PCP system for each application. Through extensive world wide experience and predictive software, Weatherford PCP specialists are able to provide equipment and technical recommendations for global applications.



Current PCP System Applications

	Imperial	Metric
Operating depths	≤8,000 ft TVD	≤2,400 m TVD
Operating volumes	≤5,000 BPD	≤800 m^3PD
Operating temperatures	≤250°F	≤120°C
Operating horsepower	≤250 HP	≤186 Kw
Maximum input torque	≤3,500 ft lb	≤4,745 Nm

Gas handling	Good
Solids handling	Excellent
Fluid gravity	≤45° API
Offshore applications	Yes
System efficiency	≤75%

Real Results

Insertable PCP Reduces Time and Costs in Canada

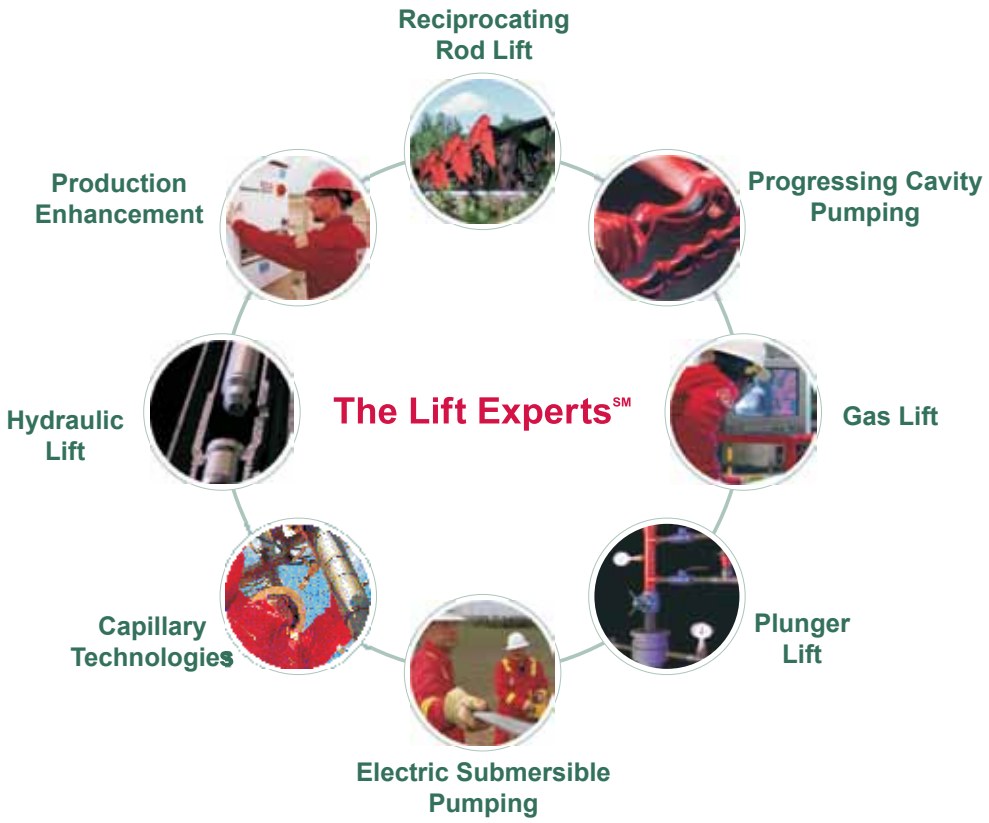
Weatherford's insertable PCP helped reduce downtime during a change-out and thus saved on workover costs for an independent Canadian operator. A flush-by rig was used to change an insertable PCP that had run for more than 16 months. Installing the Weatherford PCP required removal of only the rods from the well rather than the string, which would have necessitated a complete service rig. Only three hours (compared to the average eight hours) were required to remove and install the Weatherford insertable PCP.

Coalbed Methane PCP Installed in Record Time

Weatherford designed, supplied and installed a PCP system for methane extraction in a horizontal openhole section well before the client's five-week installation time frame, completing the operation in just 30 days. The Weatherford PCP system was delivered to the UK rig site, where the client-owned drive head was reworked as the tubing was being pulled. The PCP system was then picked up and successfully run into the openhole section to the planned setting depth of 3,450 ft (1,052 m) and brought on line. This operation was completed on budget and within days of the pump's delivery to the UK.

Artificial-Lift Systems

Pump up reservoir recovery with the experts in all forms of lift.



To learn more about our dynamic PCP offering, contact **als.pcp@weatherford.com** or visit us online at **weatherford.com/pcp** and click on the Experts link under the Locations icon in the right hand column.

Weatherford®

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