Using the Well’s Energy for Maximum Deliquification

Plunger Lift
Leading Brands. Leading Solutions.

Apergy’s artificial lift division is a team of industry-leading companies that utilize their collective resources to help oil and gas producers optimize revenues, profitability, safety, and environmental compliance through high-quality production, completion, gathering and control systems.

Our story is founded on a simple truth: Life Requires Energy.

We’re focused on unlocking energy with highly engineered products and technologies used to drill for and produce oil and gas efficiently and safely around the world. Our products include a full range of equipment essential to efficient functioning throughout the lifecycle of the wellsite—from drilling to completion to production.

Our products consist of artificial lift equipment and solutions, including rod pumping systems, electric submersible pump systems, progressive cavity pumps and drive systems, plunger lift, gas lift, and hydraulic lift, as well as polycrystalline diamond cutters and bearings for drilling. We provide a full automation offering consisting of equipment, software, and IIoT solutions for downhole monitoring, wellsite productivity enhancement, and asset integrity management. We have operations in eight countries and employ more than 3,100 associates globally.

Whatever your production challenge is, Apergy Artificial Lift has a solution. Our Artificial Lift experts work with you to understand your short-term challenges and long-term goals. We fine tune the right lift solution, drawing from our complete portfolio of Artificial Lift technologies, application expertise, and in-depth analytical tools. For every stage of the field’s operating life, we will help meet our customers production goals quickly, safely, and most cost effectively.

Vision Statement
Our vision is to improve the lives of our customers, employees, shareholders, and those in our communities. Working toward that vision—through our actions, our products, and our commitments—is why we get out of bed in the morning. Unlocking Energy is the economic engine that will support us as we improve lives and achieve relevance in the marketplace.

Core Values
We have no interest in being just an ordinary company. We’re committed to creating a positive culture that improves lives. Our goal is to make Apergy a customer’s collaborative partner and a rewarding place to work. We strive to maintain a unique culture that values and encourages honesty, unity, respect, hard work, friendship, and an entrepreneurial spirit.
Utilizing a well’s energy to cost-effectively remove liquids.

Plunger lift is one of the most economical ways to achieve maximum deliquification, particularly in marginal and aging wells.

During their natural lives, most gas wells experience some type of liquid loading, when water and oil accumulate in the tubing and well bore. As the volume of those fluids increases and the well loses energy, artificial lift is needed to remove the liquids and maintain production of the well.

Supported by the best plunger lift experts in the world, PCS Ferguson® Plunger Lift systems are quick and easy to set up. Requiring low capital investment and minimal operating expense, plunger lift provides an excellent return on investment, producing production gains that can offset the cost of the system in as little as a few weeks and almost always within a few months.

Our plunger lift products are thoroughly tested, manufactured to the highest standards, and backed by our decades of experience in the field.

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**INCREASED PRODUCTION**

Plunger lift increases production and extends the economic life of the well.

**MINIMAL COST**

PCS Ferguson Plunger Lift systems are quick and easy to implement. With low capital investment and operating costs, it is an ideal solution for removing accumulated liquids.

**QUALITY AND EXPERTISE**

PCS Ferguson provides unrivaled expertise, service, training, and line out assistance. We offer the largest selection of custom-engineered equipment addressing the full range of well conditions and employ only the highest quality manufacturing processes and materials.
The Plunger Lift System

PCS Ferguson designs and manufactures the most comprehensive line of plunger lift equipment in the industry, including a full array of plungers and lubricators to meet even the most challenging conditions.

LUBRICATOR
Provides safe access to the wellbore for installation, inspection, and replacement of the plunger and bottom hole equipment. Also cushions the impact of an arriving plunger at the surface.

CATCHER
Catches and holds the plunger in the lubricator for safe removal.

CONTROLLER
Opens and closes the motor valve using time, pressure, and flow rate, plus provides production history for the operator.

MOTOR VALVE
Starts and stops the well’s production based on input from the controller.

SOLAR PANEL
Provides a power source to the controller batteries.

DRIP POT
Prevents downtime by trapping and preventing condensate, water, and other contaminants from clogging the latch valves.

ARRIVAL SENSOR
Signals the plunger’s arrival to the controller.

PLUNGER
Functions like a swab, creating a seal to the tubing and lifting liquids and solids (sand, salt, coal fines, paraffin, and scale) to the surface.

BOTTOM HOLE BUMPER SPRING
Sits above the seating nipple, protecting the plunger upon impact. Can also hold a ball and seat to trap liquids in the tubing.
How Plunger Lift Works

The plunger lift system is dependent on the natural buildup of pressure in a gas well. Employing the plunger as a swab, a plunger lift system uses this pressure as energy to lift the plunger itself and any fluids. This is how a typical plunger lift cycle occurs:

1. The well is shut-in. The plunger, which is installed at the surface lubricator, falls down the well through the gas and accumulated liquid to the bottom of the tubing and lands at the bumper spring.

2. As the well builds pressure, the plunger rests at the bottom of the tubing, and liquids gather above it.

3. The controller monitors time, as well as casing, tubing, and line pressures. When the pressures reach the prescribed values as programmed for efficient plunger lift operation, the controller opens the motor valve.

4. The well’s shut-in pressure creates a differential pressure, lifting the plunger and the fluids above it to the surface.

5. An arrival sensor on the lubricator detects the plunger’s arrival and notifies the controller. A catcher holds the plunger in place in the lubricator, and gas flows to the sales line.

Proven Control Algorithms

Maintaining efficient cycles for ongoing optimization of a plunger lift well can be a challenge. To reduce the need for intervention, cycles are often set conservatively to keep a plunger running, but this can result in inefficiency and lost production opportunity.

PCS Ferguson offers proven control algorithms, including our proprietary AutoCycle™ technology, to optimize plunger lift operations. Our algorithms continually assess and automatically adjust sales and shut-in cycles based on the changing well conditions. Fluctuations in sales line pressure and well decline are monitored, and cycles are automatically corrected to maintain the highest level of efficiency.
When Plunger Lift is the Right Choice

Plunger lift is most effective and economical in wells with specific characteristics, namely low bottom hole pressures, higher gas-to-liquid ratios, and liquid production of roughly 130 barrels per day or less. It typically performs best when gas velocity is at, or near, critical rate.

Exceptional Return on Investment

The investment in a PCS Ferguson Plunger Lift system typically runs between $2,500 and $10,000. A plunger lift system could increase production by 100 Mcf/day or more. Even with a conservative increase of 50 MCF/day, an average plunger lift system typically pays for itself in as little as a few weeks.

<table>
<thead>
<tr>
<th>Days to Pay off Plunger Lift System*</th>
<th>Example Production Increase of 50 MCF/Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gas Price (Dollars/Mcf)</td>
<td></td>
</tr>
<tr>
<td>$2.00</td>
<td>45 Days</td>
</tr>
<tr>
<td>$3.00</td>
<td>30 Days</td>
</tr>
<tr>
<td>$4.00</td>
<td>23 Days</td>
</tr>
<tr>
<td>$5.00</td>
<td>18 Days</td>
</tr>
</tbody>
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*Assumes average system cost of $4,500
Partner with the best team in the business.

Apergy offers a comprehensive line of artificial lift equipment, accessories, and services strategically designed to drive the operational excellence of each of our customers.

- Decades of experience recommending and servicing lift systems to accommodate changing well conditions
- Unrivaled expertise in plunger lift, gas lift, hydraulic lift, well control, and well unloading
- The best performing, highest quality, and safest products designed, engineered, and manufactured in-house
- Experienced and responsive field support staff with extensive local knowledge
- The highest commitment to the protection and safety of our employees, our customers, and the environment
- Comprehensive customer training and product support

PCS Ferguson products and services are available in the following North American locations:

**Administrative & Manufacturing**
- Frederick, CO ........................................ 720.407.3550

**Canada**
- Calgary, AB ........................................ 403.464.5782
- Edson, AB ........................................ 780.723.2759
- Grande Prairie, AB ................................ 780.532.0804
- Red Deer, AB ...................................... 403.464.5782

**Arkansas**
- Conway ........................................... 501.932.0449

**Colorado**
- Evans ............................................. 970.539.9003
- Parachute ......................................... 970.285.9652

**New Mexico**
- Farmington ....................................... 505.326.4239
- Hobbs ............................................. 575.397.0040

**North Dakota**
- Mohall ............................................. 701.756.6934
- Watford City ..................................... 701.842.2231

**Oklahoma**
- Oklahoma City .................................. 405.603.7492
- Stigler ............................................ 918.967.3236
- Woodward ........................................ 580.256.1317

**Pennsylvania**
- Brookville ........................................ 724.227.3263

**Texas**
- Buffalo ............................................ 903.390.7615
- Fort Worth ........................................ 817.769.8584
- Karnes City ...................................... 830.299.8508
- Perryton .......................................... 405.213.8114
- Pleasanton ...................................... 830.299.9745
- Odessa ............................................ 432.231.9987
- Sonora ............................................ 325.387.6260
- Tyler .............................................. 903.533.8266

**Utah**
- Roosevelt ........................................ 435.722.4520
- Vernal ............................................ 435.789.2031

**Wyoming**
- Rock Springs .................................... 307.362.6010