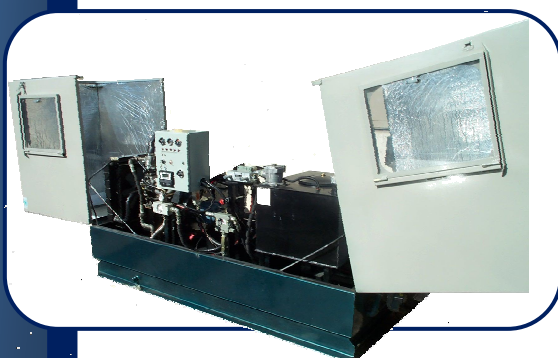


Activator

Hydraulic Submersible Pump



Artificial lift solutions for CBM, Shallow Gas, Tight Gas and Conventional Oil



Overview

Designed to specifically address artificial lift problems, such as deviated or horizontal wells, low pressure dewatering and low fluid production, Raise Production Inc's. patented *Activator* Hydraulic Submersible Pump (HSP) meets the challenges of dewatering Coalbed Methane (CBM), tight gas, shale gas and oil well applications.

Activator Hydraulic Submersible Pump (HSP)

The *Activator* Hydraulic Submersible Pump is a positive displacement, low to mid volume pump that is highly resistant to gas locking. Hydraulically powering the submersible pump allows the motor to be located on the surface, rather than downhole - this minimizes the amount of equipment and moving components downhole.

- Installed and suspended on coil tubing eliminates the need for a service rig
- Resistant to gas locking with a compression ratio of over 500
- Self cleaning sand screen aids in prevention of solids entering the pump and prevents solids build up that could restrict the flow into the pump
- Pumps commingled fluid and gas
- Self lubricating and cooling feature allows pump to be pumped off with no damage done to the pump

Surface Unit

The patented surface unit is an environmentally friendly self contained system that utilizes various types of power sources to power the hydraulic system: Electricity, Propane, Wellbore Natural Gas or Solar/Wind Power.

- Environmentally friendly enclosure with sound dampening
- 15-40 HP Industrial Engine
- Operates in remote locations
- Operator friendly control system
- Fluid heat tracing of the wellhead, fuel gas lines and flow lines

Proven Results

The pump has been successfully deployed in varying and difficult well applications: deviated gas wells, horizontal gas wells, CBM wells, shallow gas wells and low volume oil wells.

Some of the results include:

- Deployment of *Activator* HSP added 0.75 Bcf of recoverable reserves in two (2) mature low pressure gas wells
- *Activator* HSP has over 2 year run life landed in the horizontal of a Coalbed Methane (CBM) well - it's the client's longest running pump
- Average run life on pump beyond one (1) year
- *Activator* HSP successfully operating in the horizontal section of several CBM and horizontal gas wells

Innovative Solutions

Solar/Wind Power System

- *Activator* HSP is powered by wind and solar energy
- Reduces operating costs
- Reduces greenhouse (GHG) gas emissions



Surface Unit Mounted on a Trailer

- Mobile surface drive mounted on a trailer can be shared among multiple installations
- Excellent for applications requiring occasional dewatering



Activator Lift

- Dewater gas wells with nuisance water issues and/or wells where swabbing damages the producing formation
- Produced fluid is pumped through coil tubing string keeping perforations “dry”



Benefits

- No rod or tubing wear
- Operates efficiently in horizontal position
- Highly resistant to gas locking
- Optimized operating economics
 - Reduced installation times
 - Works well in low pressure wells
 - Highly efficient surface equipment
- Reduces heat buildup
 - Self cooling design avoids system degradation from heat buildup
- Reduces deterioration and wear from sand and formation fines
 - Self cleaning sand screen reduces sand and formation fines getting into pump
 - Not prone to screen plugging prevalent in continuous suction products
- Environmentally Friendly
 - Very quiet running motor and surface unit; only 55 decibels at 10m (33ft.) distance
 - Small Surface footprint and no base required
 - Built in containment in engine enclosure
- Reduces operational costs for power consumption
 - Solar/Wind powered option available
- Reduces work over costs
 - Pump is deployed on coil tubing, which does not require service rig
- Built in excess capacity
 - Hydraulic heat trace lines to help prevent flow lines, fuel gas lines and well head from freezing
 - Raise Production's Patent Pending Wellhead Compressor can be powered by surface unit excess capacity

Specifications

Pump

OD, mm [in]	95.25 [3.75]
Flow range, m3/d [bbl/d]	0.1 to 30 [1 to 188]
Length m [ft]	5.59 m [18.33]
Weight kg [lbs]	114 kg [250.8]
Shaft	Nickle alloy shaft
Housing Material	Corrosion resistant Monel Coated Carbon Steel
Internal components	Nitride coated internal components

Surface Power Unit

Power Sources	Solar/Wind Propane Field gas Electricity
Power for Electric motor HP	0.5 - 25
Power for Gas motor HP	15 - 40
Noise level	55 decibels @ 10 m
Heat trace	On flow lines and well head & fuel gas lines
Dimensions m [ft]	2.5 x 1.0 x 1.0 m [8.2 x 3.3 x 3.3]

Coil Tubing

Standard Coil Tubing	OD of production string mm [in] 31.75 [1.25] OD of hydraulic strings mm [in] 25.4 [1.0]
Encapsulated Coil Tubing	OD mm [in] 81.28 [3.2]

Diagrams

