

Solution for Sucker Rod Pumps power saving up to 35% in harsh well conditions

Challenges

- Power loss in the V-belt system
- Risks of failure due to limited controllability
- Downtime due to maintenance of the control unit
- Low efficiency of the system

Results

- Power saving up to 35%
- Increase in overall efficiency
- Stabilization of the submersible pump operation
- Adaptation of the swing speed to the current well conditions
- Reduced downtime due to V-belt workover

The sucker rod pump with the asynchronous motor and v-belt transmission is still the standard lift method at most wells worldwide. However, the low efficiency of the asynchronous motor and power loss that accompanies torque transmission in the V-belt system result in high overall power consumption.

Our optimized power-saving solution, which replaces the asynchronous motor with the SynchroGear™ permanent magnet motor (PMM) technology, allows to cut down energy costs by more than 1/3.

About 75% of artificial lifters worldwide use the sucker rod pump with the V-belt transmission and Asynchronous Motor. This system is simple and easy to service, yet it is low inefficient, quite unreliable in design, and has limited controllability.

In the sucker rod pump, the rods connected to the horsehead, which moves up and down through the crank-and-rod system being induced by the gearbox torque, drive the submersible cavity pump. In its turn, the asynchronous motor drives the gearbox via the V-belt gear, and that is precisely where the maximum power loss occurs. The torque transmission from the asynchronous motor to the gearbox shaft comes with excess demand energy and a mutual risk of failure because of the impossibility of promptly responding to emergent complications.

Since the creation and introduction of the sucker rod pump, no fundamental improvements have been made last 70 years.

We have reconsidered the torque gear transmission and sucker rod

pump operation to create an innovatively new solution, the **SynchroGear™** technology with its highly efficient PMM and a smart control station instead of the asynchronous motor with V-belt gear.

The PM Motor saves power by reducing the electric and magnetic losses to gain overall efficiency.

We mount the stator on the gearbox body and put the rotor on its intake shaft so the motor directly transmits the torque to the gearbox. This solution allows eliminating the low-efficiency V-belt gear with an asynchronous motor.

The control station reacts to any change of current capacity during motor operation and adapts the pumping rate and lag to the existing conditions of the well. In case of emergency, it can completely shut down the pump automatically under a preset program.

The **SynchroGear™** technology implementation leads to the power saving up to 35%, evens out the submersible plunger pump operation, and decreases downtime due to V-belt drive.