NEW ERA NEWS
R&M ENERGY SYSTEMS
A Unit of Robbins & Myers, Inc.

TECHNICAL BULLETIN NO. 11

SUMMARY

- Guides should not be bonded to the rod in rotating rod strings.
- Spin-through guides will improve PC pump efficiency.
- Spin-through guides will significantly reduce torque generated by mechanical friction.
- Rod guides should be used to reduce rod and tubing wear.
- Hydraulic resistance is significantly less for the spin-through guides.
- One-inch rods and poly guides begin to generate significant pressure drops at production rates over 350 BPD.
- Pressure drop is negligible for the NETB, and spin-through guides below 2000 BPD.

Spin-Through Rod Guides For PC Pumps

In response to an increasing number of progressing cavity (PC) pumps being utilized in the oil field, R&M Energy Systems has developed a new spin-through rod guide that significantly reduces both pressure drop and torque generated by mechanical and hydraulic friction. These characteristics substantially improve the PC pump's efficiency.

Unlike guides for conventional reciprocating rod strings, which are one piece and bonded to the rod, R&M Energy Systems spin-through design has an outer half - or stator portion - which is not bonded to the rod. The unique 3-fin stator remains stationary while the rotor - or inner sleeve which is bonded to the rod - spins freely inside the stator. The loose fit between the rotor and stator, coupled with unique scallops at each end of the stator, provides large flow passages to keep debris, such as sand, purged from the guide.

These features reduce pressure drop and eliminate the possibility of the rotor and stator freezing or locking together. Manufactured from ultra-high molecular weight polyethylene, the stator is tough and durable enough to handle most downhole situations.

Spin-Thru Guide Increases Efficiency

The power required to operate a PC system has to overcome three primary sources of resistance to rotate the rod string. If power can be reduced at constant production volume, then production efficiency increases.

1. Mechanical (Coulomb) Friction

When two surfaces are rubbed together, the resistance to movement increases as the force pressing the surfaces together increases. Because the frictional resistance is closer to the center of the sucker rod, the spin-through design has less resisting torque than a guide fixed to the sucker rod. Less torque translates to less power required to operate the pump. Calculations indicate torque will decrease by a factor of 2.5 for a 1 rod spinning through a 2-1/2 guide, rather than the guide turning against the tubing. This improvement alone justifies the spin-through design.

2. Hydraulic Friction

Hydraulic friction occurs as a guide rotates in a fluid, resulting in lost energy. The energy losses are less if the guide remains stationary and the rod rotates inside the guide.

3. Pressure Drop

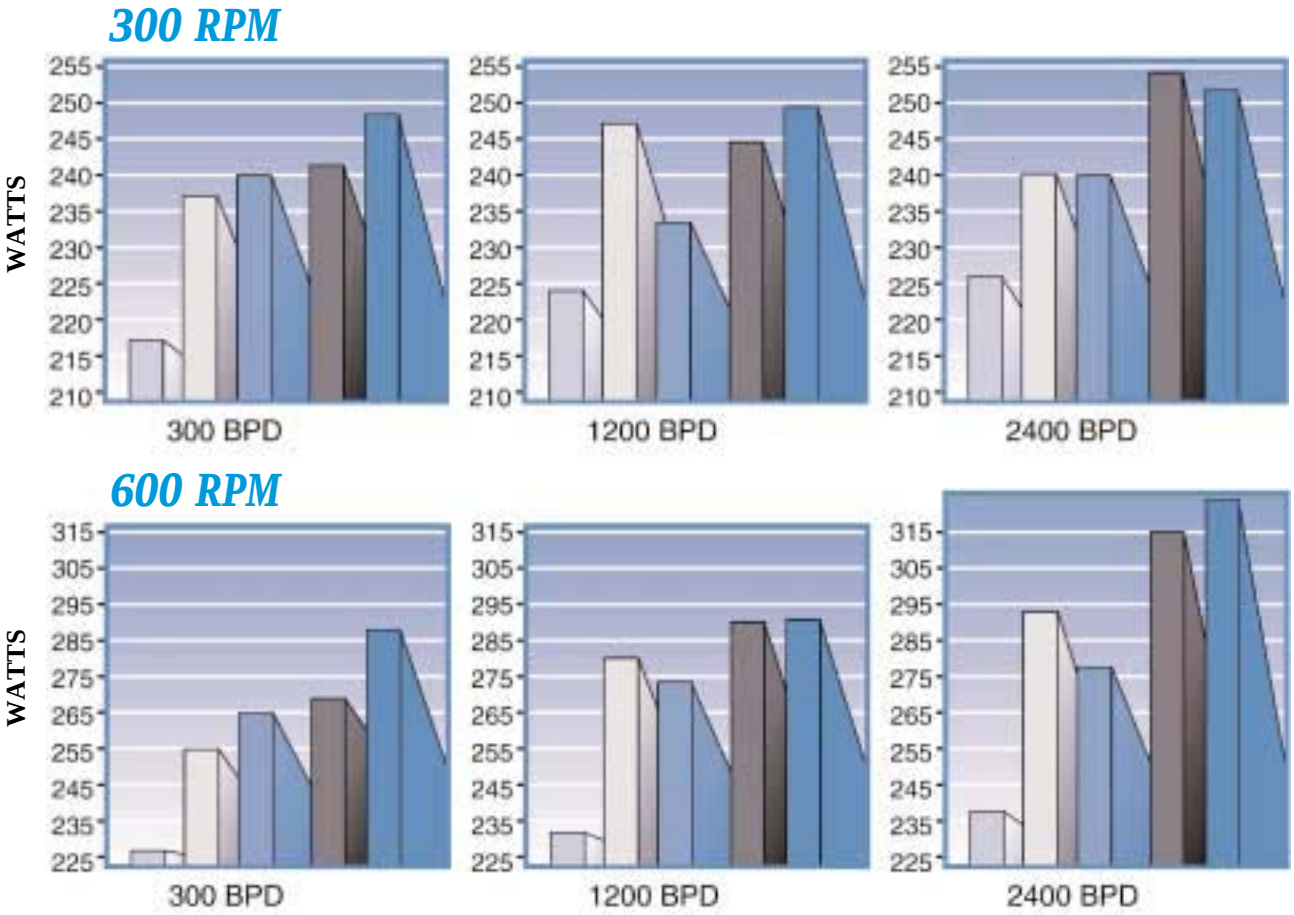
A PC pump must receive enough power through the rod string to overcome the hydrostatic pressure of the fluid column plus the pressure drop resulting from fluid flowing through the tubing and around the rod string. Power decreases if the pressure drop generated by the fluid flowing through this annulus decreases. Therefore, guides which generate the least amount of pressure drop will reduce power and improve production efficiency.

Testing Confirms Advantages of Spin-Through Design

To test the new spin-through rod guide, R&M Energy Systems constructed a test apparatus to compare the performance of various rod guides. Tap water was used as the flowing medium and pressure drops were measured in inches of water and a calibrated flow gauge measured flow rate through the apparatus. The power required to rotate the rod was calculated from measurements of electrical current and voltage to a variable speed motor. These charts represent the power required to turn a one-inch rod at speeds of 300 and 600 RPM.

- R&MES Spin-Through Guide
- R&MES NETB Turbulence Breaker Guide
- R&MES NEPG Poly Guide
- Double Paddle
- 2-1/2" Twist-On Between Molded Stops

Note: Guides tested were not subjected to side loads.



Contact Customer Service for your copy of the complete test results

R&M Energy Systems' Commitment

R&M Energy Systems knows that rod guide design, rod alignment, well deviation, side loading, proper material selection, and continuous material performance evaluations are all important considerations for operators today. R&M Energy Systems utilizes a solution-oriented systems approach that optimizes the well operation.

Excellence Through Innovation

R&M ENERGY SYSTEMS™
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