

Operator Saves 20 Hours of Milling Time and Completes West Texas Job in One Run

DynaForce TT high-performance high-performance thru-tubing motor successfully mills 19 frac plugs one run in challenging HT environment

CHALLENGE

Mill 19 frac plugs in a high-temperature, high-flow environment where most elastomer-based thru-tubing motors would not survive.

SOLUTION

Use a DynaForce TT* high-performance thru-tubing motor and the NBR-HR elastomer to enable high-torque milling in high temperatures.

RESULTS

- Saved 20 hours of milling time.
- Completed the job in one run.
- Experienced zero stalls throughout the operation.



Mill frac plugs in a high-temperature, high-flow environment

An operator in West Texas needed to bring a recently completed well into production. To do this, the operator needed to mill 19 frac plugs that were in the 4,200-ft horizontal zone of the 5-in completion. This zone measured at 310 degF, a temperature that most elastomer-based thru-tubing motors cannot survive because of premature chunking.

Further, the horizontal section was long enough to create debris beds if the flow rate was not high enough. The optimal flow rate was calculated to be 4.45 bbl/min.

Use DynaForce TT high-performance thru-tubing motor to power milling operations

After communicating with the operator, Schlumberger proposed running a 3 $\frac{1}{8}$ -in, 7/8, 3.3-stage DynaForce TT motor. Schlumberger also determined that the motor should have a 3-loose fit, achieved by installing a double-undersized rotor (2US) and an oversized stator (10S). Such a fit would enable the elastomer to swell to an optimal level in bottomhole conditions and provide the necessary torque to mill the plugs. The fit would also enable the operator to keep a continuous 4.5 bbl/min, with peaks of 5 bbl/min if a higher flow speed were needed.

Additionally, Schlumberger determined that the motor needed to be injected with an NBR-HR elastomer, which holds good hardness at high temperatures and delivers up to 30% more power while minimizing the risk of premature chunking. The specially formulated elastomer enables the motor to withstand high temperatures in water-base fluid environments, virtually eliminating the possibility of debonding.

Saved 20 hours while milling in a single run

Using the DynaForce TT motor, the operator completed the job in one run and in just 40 hours, saving 20 hours when compared with the time estimated in competitors' proposals. The high torque created by the motor eliminated stalls during the job, so the motor was able to mill all the plugs in an average of 20 minutes per plug, or 6 minutes shorter than what was calculated during the prejob plan.

After postjob evaluation and surface testing of the motor determined that it was in good condition, the motor was sent to a subsequent well in the same pad to complete another job.



By combining the DynaForce TT motor with the NBR-HR elastomer, the operator was able to continue operations in temperatures that conventional thru-tubing motors could not withstand.