

MITIGATING VIBRATIONS & SLIP-STICK WITH DOWNHOLE MOTORS



NeoTork is a downhole tool that manages torque generated by the drill bit as well as mitigating axial and torsional vibrations, protecting critical downhole equipment.

The simple, unique design automatically controls downhole torque. When torque exceeds a preset limit, the tool contracts to reduce the drill bit depth of cut. The excess torque 'stored' in the system is slowly released as the drilling structure drills off.

Application

There has been a rise in the use of PDMs over recent years, mostly thanks to increased horizontal drilling in shale developments. Although PDMs are effective, they are at risk of stalling if torque levels exceed their operational limits.

Once a PDM stalls, the coil needs to be lifted from bottom to allow the PDM to restart rotating. The coil is then slowly returned to the bottom to resume milling. This costs time and money.

To avoid stalling, operators limit parameters, or use mill bits generating lower torque (roller cones). Whilst this does reduce stalling, it impacts on ROP and the completion time for the well.

NeoTork manages downhole torque and prevents PDM stalling. Any excess torque, from a peak on WOB or a change in milling material is 'stored' by the tool. **NeoTork** contracts, automatically pulling up the mill bit and allows milling to continue without stalling the PDM. Running **NeoTork** when using a PDM allows optimization of milling parameters as well as the use of more aggressive milling structures instead of roller cones, removing the risk of lost cones downhole.

Results

- Less downtime
- Faster ROP
- Longer bit life
- Smoother borehole
- Reduced number of stalls
- Reduced equipment damage

Milling made easy !

Tool Description

NeoTork is made up of two sections, assembled as a sole body.

There is a boxed connection in the top section of the tool. A shaft in the lower section of the tool supports the pin connection. The tool is supplied to site ready to use.

Top Assembly

Includes a barrel, with a stack of disc springs inside.

These springs are compressed during assembly. The springs push on an axis, forcing NeoTork to extend up to its full length. The number of springs depends on the preset threshold for WOB and torque.

The disc springs are packed in a calibrated quantity and also absorb the tool's axial movement.

Bottom Assembly

The bottom assembly manages the extension or contraction of the tool. The rotating body, which includes the bottom shaft, is attached by steel cables to the upper section. In the extended position, the cables are set at a pre-defined angle.

When torque levels on the bottom shaft exceed the resistance exerted by the disc springs, the shaft will rotate clockwise. This forces the cables to 'swivel' around the sleeve at an increasing angle, lifting the bottom shaft until torque returns to the set level.

As the bit drills off and torque decreases, the opposite action occurs, letting the tool naturally return to its full length.

Shoulders limit the maximum upward and downward amplitude of the shaft stroke. It is these shoulders, not the cables, that stop the extension or contraction of the tool.

Top Assembly :

The disc springs are packed in a calibrated quantity and force the tool open. At both ends of the stack a low friction bearing ensures smooth rotation.

Bottom Assembly :

In the extended position, the cables are set at a pre-defined angle and are all bolted on with the exact same tension at both ends of the bottom section.

OUTER DIAMETER	2-1/8	2-7/8	3-1/2	4-3/4	6-3/4	8-1/2	9-1/2
Overall Length (ft)	4.8	5.5	7.1	14.2	16	17.6	17.6
Minimum ID (in)	0.70	0.79	0.98	1.38	2.05	2.75	2.84
Stroke	1.46	2	2.50	3.25	4.33	4.33	4.33
Ultimate Tensile Load (lbs)	59,000	111,500	215,000	396,000	920,000	1,270,000	2,000,000
Pulling Capacity (lbs)	45,000	90,000	172,000	316,000	730,000	850,000	1,700,000
Ultimate Torque (ft-lbs)	882	2,100	3,100	16,000	45,000	65,000	80,000
Maximum Torque (ft-lbs)	700	1,475	2,200	12,500	33,700	50,000	64,000
Operating Temperature (°F)	425	425	425	425	425	425	425
Connection	1-1/2 AMMT	2-3/8 PAC	2-7/8 REG	NC 38	NC 50	6-5/8 REG	7-5/8 REG