

Vulcanix Geothermal tricone drill bit

High-temperature performance

The Baker Hughes Vulcanix™ Geothermal tricone bit line introduces application specific bearing packages that deliver unsurpassed reliability for a variety of high-temperature ranges.

For circulating temperatures up to 350°F (177°C), the Baker Hughes Vulcanix Metal Face Seal is ideal. A patented, metal-to-metal sealing system provides unmatched reliability in temperatures beyond the capabilities of ordinary, elastomer-based designs.

For even higher temperatures, the Vulcanix Geothermal Metal Face Seal has a sealed-bearing package designed specifically for drilling in circulating temperatures of 275°F to 400°F (177°C to 204°C). This new sealed-bearing system further enhances the high-performance advantages of the Metal Face Seal system by replacing all of its elastomer components with specially formulated, high-temperature compounds that are more resistant to thermal degradation and compression set.

New elastomer improves bit life in extreme temperatures

Drilling equipment is subject to high thermal demands when used in geologically active areas. The lithology

of these areas often consists of hard rock requiring rollercone drill bits. However, the conventional rubber seals of these bits are only rated up to 320°F resulting in sealing failure when subjected to the higher temperatures encountered in HP/HT environments.

To solve this problem, Baker Hughes developed a new rubber compound for roller-cone drill bits. Engineers tested the bits by drilling an 8½-in. diameter vertical well to 11,500 ft in the Cooper Basin of South Australia.

Vulcanix diamond heels

For demanding applications that exceed the capabilities of standard carbide heels, Vulcanix bits are available with optional diamond heel configurations. These diamond heel configurations use higher quality diamonds to build and sustain better shapes, with greater projection. This allows faster, more aggressive drilling, better dull conditions, and improved bearing and seal reliability.

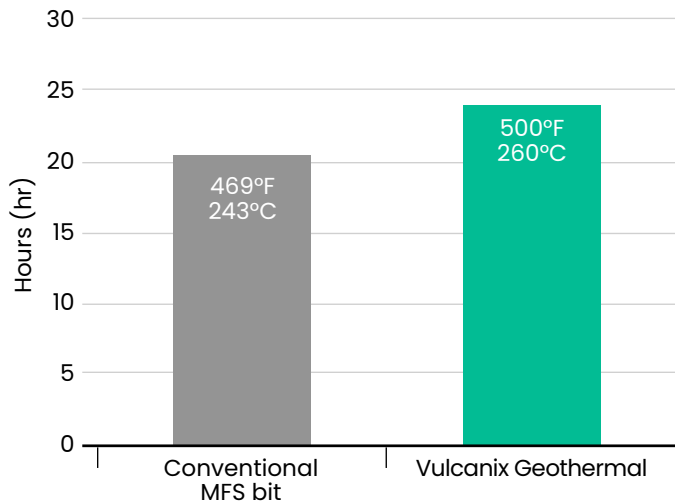
Seventeen drill bits were tested. 14 used the new rubber compound and three used conventional rubber. Indicators showed that the bits were subject to temperatures over 500°F. The ones using the new rubber ran for a 62%

Applications

- Geothermal drilling
- High-temperature environments
- Rotary and motor applications
- Air drilling applications

Benefits

- Bit types and bearing/seal packages to address a range of high-temperatures
 - Longer continuous operation in hot-hole environments
 - Reduced nonproductive time
- Patented Metal Face Seal technology
 - Greater drilling reliability in high RPM and high temperature conditions
- Anti-tracking cutting structures
 - Improved drilling efficiencies for faster ROP and reduced vibrations
- Advanced STL™ shirttail and leg hardfacing
 - Enhanced outer diameter protection for consistently drilling in-gauge holes and improved seal reliability
- BOSS stabilization design
 - Increased bit stability for superior borehole quality
- Optional diamond enhancement packages that may include, Vulcanix diamond heels, diamond gauge, and diamond bar trimmers
 - Extended cutting structure life in abrasive drilling environments
 - Higher overall ROP with improved bearing and seal reliability



Field proven increase in drilling hours with new high-temperature elastomers

greater duration and drilled 27% longer intervals than the bits containing conventional elastomer components.*

Although from a single geothermal well, these preliminary results are promising. Since this initial test, several other runs in hostile conditions have further validated these results.*

The Vulcanix tricone drill bit with its elite features is up to the most challenging drilling applications.

Baker Hughes engineering and application experience and industry-leading design methodologies establish this drill bit as a leader in performance and reliability.

*"New elastomer parts improve roller-cone bit performance at high temperatures," World Oil January 2011

