



# Maximize drilling efficiencies to total depth with the hybrid solution for geothermal

## Vulcanix geothermal Kymera hybrid drill bit

The Vulcanix™ geothermal Kymera™ hybrid drill bit delivers value to your geothermal operations by drilling deeper and longer in hotter environments. With their unique combination of polycrystalline diamond compact (PDC) and roller cone cutting structures, our hybrid bits help increase your rates of penetration (ROPs), improve borehole quality, and accurately place your well to total depth—with greater efficiency than PDCs or roller cones could achieve alone.

Working with Baker Hughes, you'll find the optimal hybrid bit design for your geothermal application, based on proven processes and technologies honed in hard and abrasive formations worldwide.

### COLLABORATING ON THE OPTIMAL DESIGN

Baker Hughes field-based design engineers help you understand your drilling challenges and design a Vulcanix bit to meet your needs. Our advanced design methodology includes reference bit dull studies and application analysis, cutting structure concept creation, and digital twins.

Streamline your cutter creation process with Baker Hughes proprietary 3D Tetrahedron™ bit drilling simulation software.

A primary feature of the Vulcanix design methodology, 3D Tetrahedron bit drilling simulation software is the first step to creating a robust and durable cutting structure for geothermal wells.

3D Tetrahedron bit drilling simulation software guides bit selection by predicting the downhole response of a given bit frame and cutting structure for your application. The advanced software optimizes bit design and cutter placement by calculating cutter work and loads under given conditions. You can analyze the performance and failure of multiple bit iterations—without manufacturing and field testing each one—to arrive at the right design with less time, cost, and risk.

### LEVERAGING DUAL-ACTION CUTTING

The Vulcanix hybrid Kymera bit's unique cutting structure is designed for efficiency and accuracy in the most demanding geothermal formations. Densely packed PDC blades, combined with a high volume of tungsten carbide inserts (TCIs) and diamond gauge protection on the outer diameter, produce an optimized hard-rock drilling solution.

The roller cone pre-fractures the igneous lithologies, allowing the PDC cutters to plow away the formation

### APPLICATIONS

- Hard igneous and/or metamorphic lithology with rock strength above 25 KPSI unconfined compressive strength (UCS)
- Non-homogeneous and/or interbedded volcanic formations
- Abrasive formations

### BENEFITS

- Delivers optimal bit designs through collaboration, advanced simulation, and testing
- Withstands high temperatures and challenging lithologies to drill farther without replacement
- Drills effectively through hard formations at lower costs and time compared to conventional PDC bits
- Increases ROP while minimizing vibrations and maintaining excellent toolface control to target

more efficiently. The combined effect is a hybrid bit with double the aggressiveness of standard TCI bits and superior wear resistance compared to PDC bits.

Drilling operations benefit from higher overall ROPs at lower weight on bit, minimal vibrations, and improved stability when drilling through interbedded formations. And with its durability and smoother performance in hard rock, the hybrid bit improves drilling efficiency to save rig time, costs, and power requirements.

#### **STAYING COOL WITH IMPROVED HYDRAULICS**

High temperatures generated at the bit when drilling, coupled with the inherent downhole temperatures of the formation, can accelerate cutter wear in geothermal applications. The Vulcanix hybrid Kymera bit's open layout design maximizes junkslot area and face volume to improve flow while multiple nozzles maintain cooling on the outer portions of the bit. A metal face sealing (MFS) system isolates the rotational sliding motion between two highly polished metal sealing surfaces, which reduces frictional heat for improved bearing and seal life. The hybrid bit also includes the option for high-temperature elastomer components rated for up to 204°C (400°F) circulating temperature.

# Vulcanix™

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