



# Optimize high-temperature drilling with a PDC solution built for geothermal

## Vulcanix geothermal PDC drill bit

The Vulcanix™ geothermal polycrystalline diamond compact (PDC) drill bit delivers value to your geothermal wells by drilling deeper and longer in hotter environments. Built on technologies and procedures honed in hard and abrasive applications around the world, Vulcanix bits offer proven capabilities to help you reliably reach total depth.

### OPTIMIZING DESIGN THROUGH COLLABORATION

Our field-based design engineers work with you to understand your drilling challenges and then design a Vulcanix bit to meet your needs. Our advanced design methodology includes reference bit dull studies and application analysis, cutting structure concept creation, digital twin simulations, and simulations created in the Baker Hughes proprietary 3D Tetrahedron™ advanced software optimization to evaluate various cutting structure concepts. The optimal design is then built and implemented in your field to deliver a customized, durable cutting structure for your reservoir conditions.

### STAYING SHARP WITH DURABLE CUTTING STRUCTURES

Drilling through hard, abrasive igneous lithologies in most geothermal reservoirs can increase cutter wear and shorten

bit life. Vulcanix bits are designed to stay sharper for longer with shaped cutters on the outer profile. The cutting structure consists of a longer profile, extended shoulder for durability, and parabolic cone for high weight parameters—all of which help ensure higher rates of penetration (ROPs) and greater drilling distances in hard-rock applications.

### KEEPING COOL WITH IMPROVED HYDRAULICS

High temperatures generated at the bit when drilling hard and abrasive lithology, coupled with the inherent downhole temperatures of the formation, can accelerate cutter wear. The Vulcanix PDC bit stays cooler for longer with an open layout design that maximizes junkslot area and face volume to improve flow. Multiple nozzles maintain cooling on the outer portions of the bit.

### IMPROVING EFFICIENCIES WITH STRATEGIC CUTTER PLACEMENT

Strategic placement of multidimensional shaped cutters across the profile has many advantages. A durable edge cutter in the cone of the bit absorbs loading and resists breakage when high weight-on-bit is applied to drill hard formations. A chisel-shaped edge placed on the nose profile improves drilling efficiency. Shaped cutters apply

### APPLICATIONS

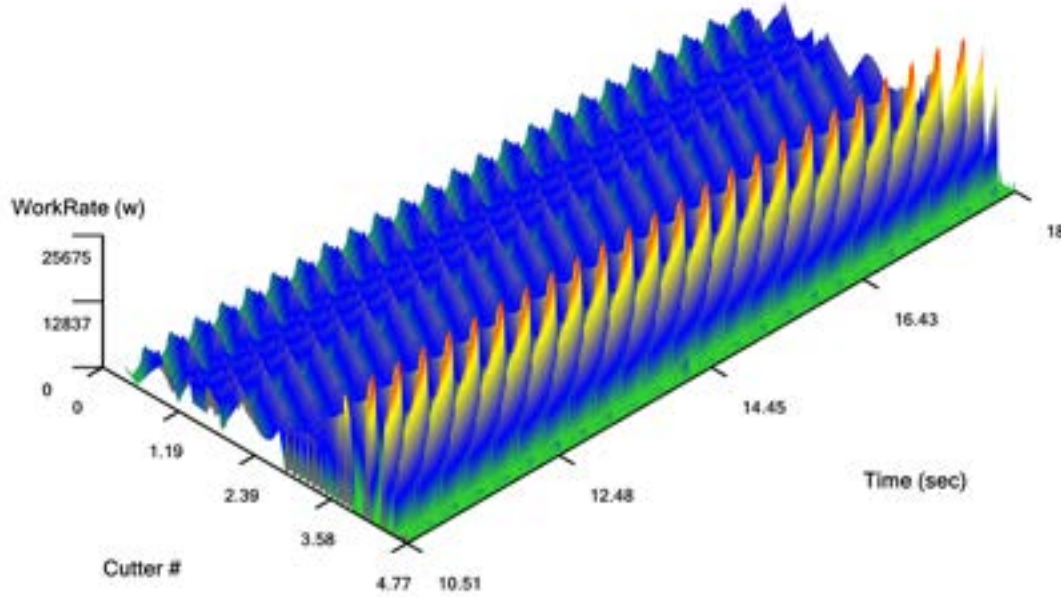
- Hard igneous and/or metamorphic lithology with rock strength above 25 KPSI unconfined compressive strength (UCS)
- Non-homogenous and/or interbedded volcanic formations
- Abrasive formations

### BENEFITS

- Delivers optimal bit designs through collaboration, advanced simulation, and testing
- Withstands high temperatures and challenging lithologies to drill farther without replacement
- Improves drilling efficiency and increases ROP, even through formation transitions

point loading to increase drilling rates of penetration. The shoulder of the bit, which sees the largest amount of wear, benefits from a cutter that is both durable and efficient.

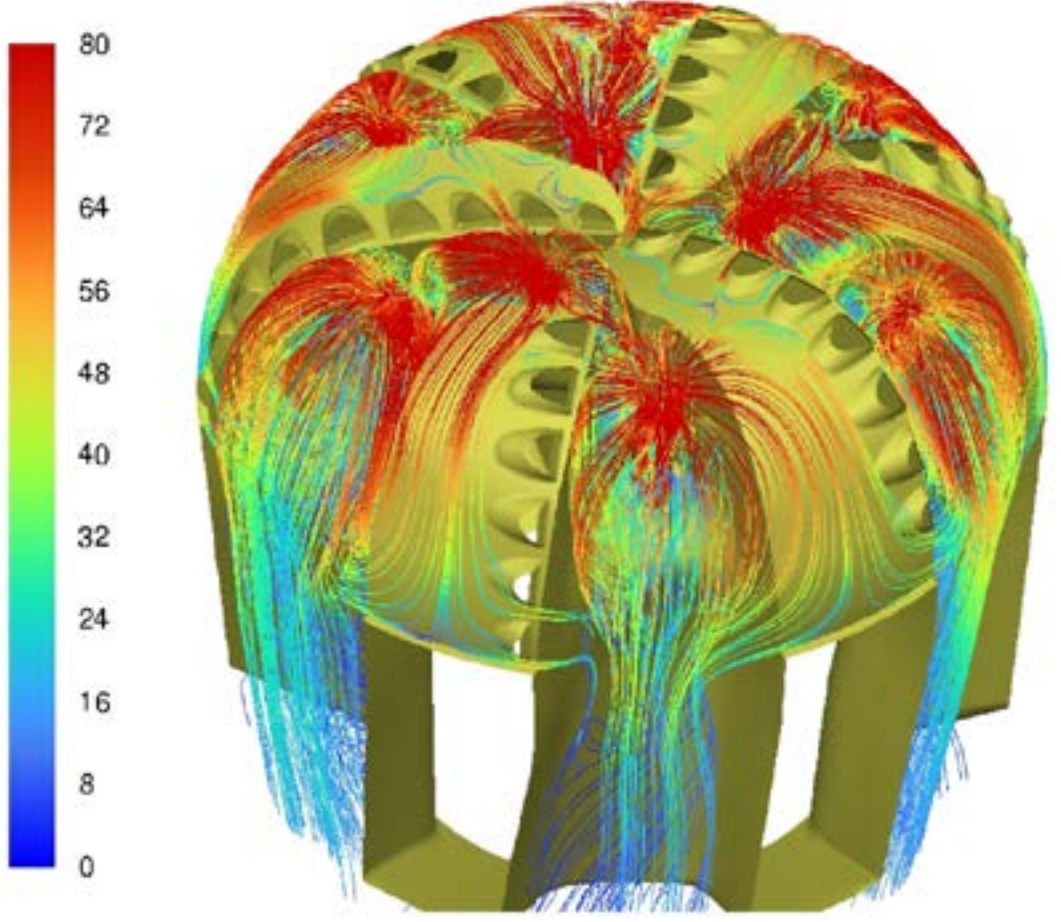
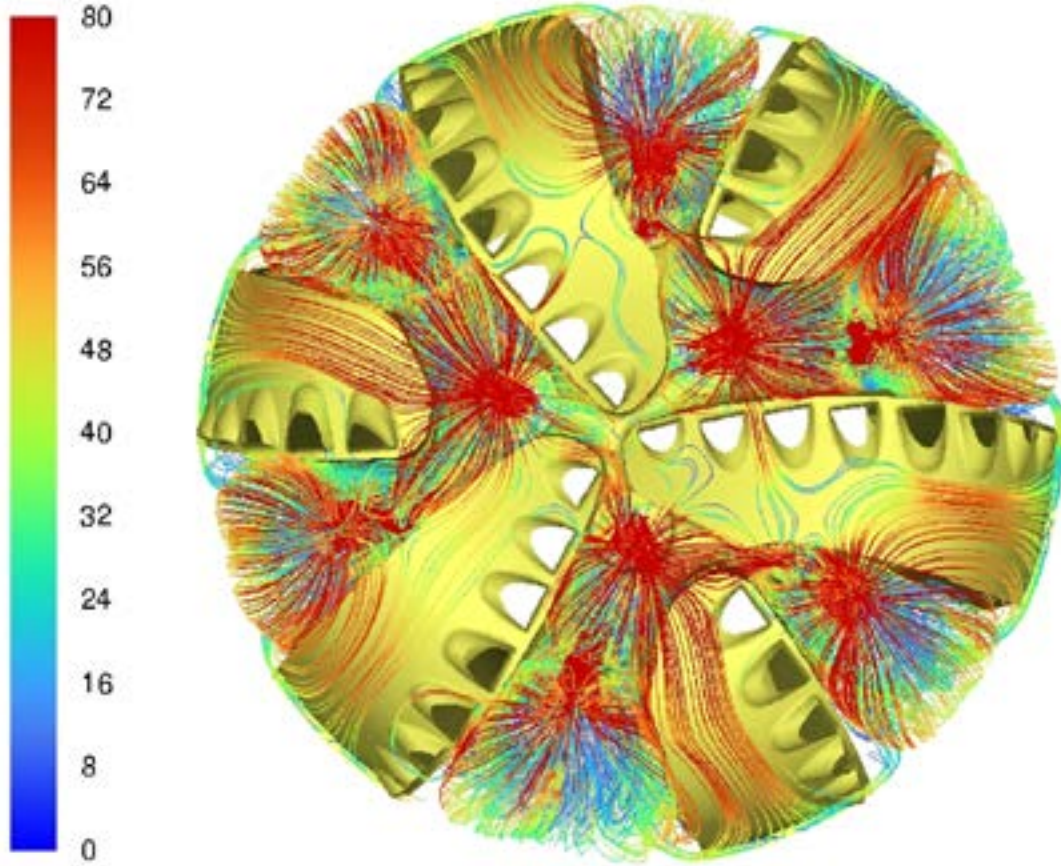
Contact your Baker Hughes representative to learn how Vulcanix PDC drill bits can optimize drilling performance in the harshest geothermal environments.



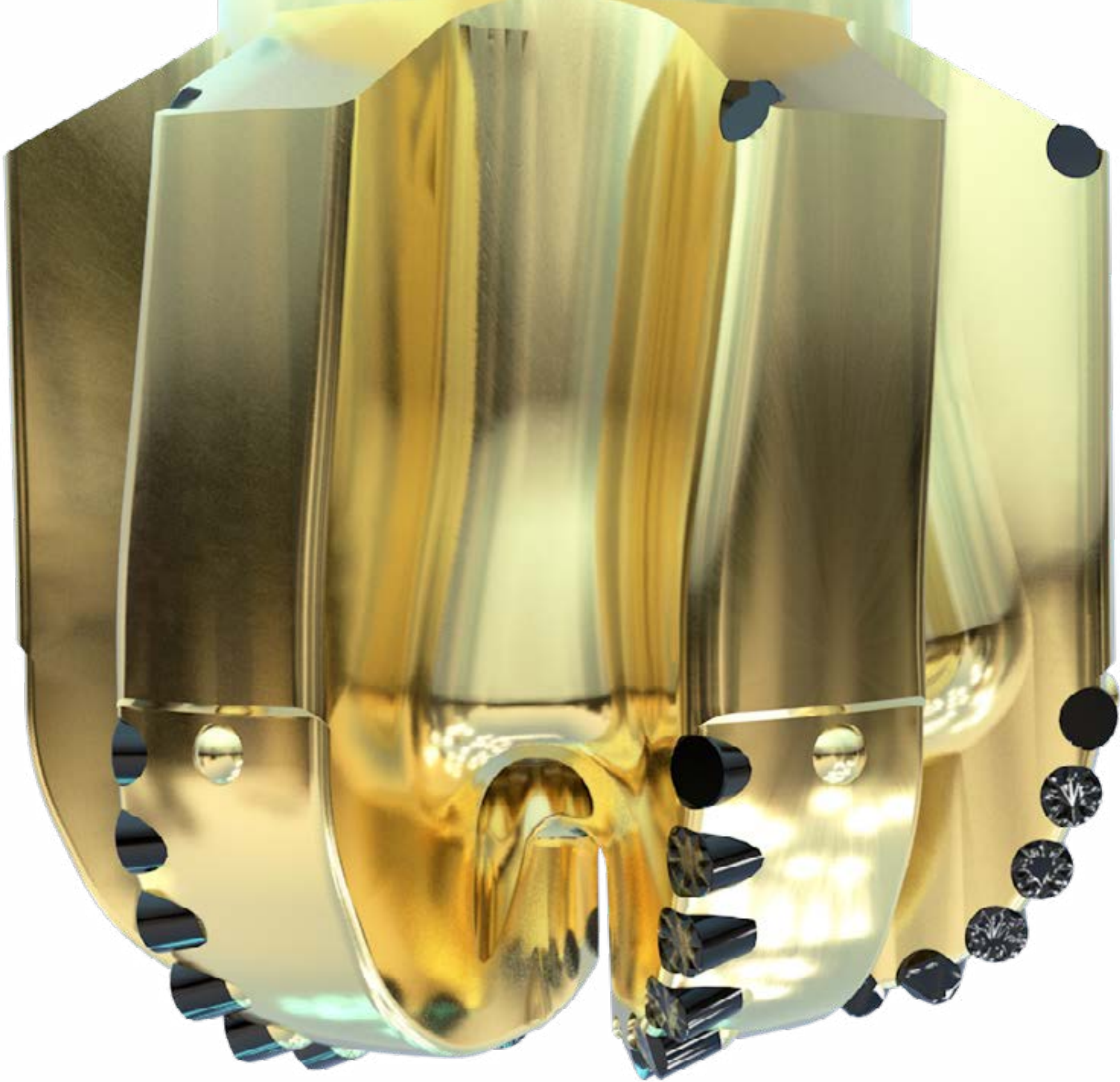
3D Tetrahedron bit drilling simulation for Vulcanix geothermal drill bit solution – cutter workrate distribution



Shaped cutter placement



Computational fluid dynamics for cooling



**Vulcanix**<sup>TM</sup>  
geothermal PDC drill bit