



## Empowering sustainable energy

ReedHycalog's unrivaled Phoenix™ geothermal portfolio is engineered to endure and excel in hot, hard rock formations. From fixed-cutter to roller cone, our customizable designs deliver superior performance worldwide, drilling farther, faster, and safer in abrasive and benign environments.

Phoenix fixed-cutter drill bits incorporate ION+™ GT polycrystalline diamond compact (PDC) cutter technology, featuring formation-specific diamond grades fine-tuned for enhanced thermal stability and impact resistance. This robust collection also includes application-specific, multidimensional-shaped cutters and grades for unmatched performance, reliability, and efficiency. We use specialized design tools, including thermal analysis and torque response analysis, to ensure the proper Phoenix drill bit solutions meet your performance demands.

As the proven leader in drill bit solutions, we're positioned to equip you with the most advanced drilling technologies for your geothermal applications.



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ReedHycalog

# Phoenix Portfolio for Geothermal Drilling





# Drill bits engineered to conquer geothermal drilling

We offer an extensive range of drill bit solutions that rise to the challenges of geothermal applications.

Like the mystical beast, our Pegasus™ series drill bits are ready to battle and dominate any drilling challenge in any geothermal application. By combining industry-leading technologies, these premium bits are designed to maximize stability, durability, steerability, and aggressivity. With a dual-diameter and shankless design, high-performance cutters and inserts, and no moving parts, Pegasus bits enable you to drill faster, reduce torque generation, and run multiple times without repair.



Phoenix series drill bits are engineered to drill farther and faster in hard rock environments. Based on the field-proven, technically advanced Tektonic™ drill bit platform, this high-performance PDC bit has delivered record-breaking performances in geothermal applications worldwide.

Our roller cone offering features reliable and robust milled-tooth and tungsten carbide insert bits available in a variety of sizes. With high-temperature seals rated to 210°C (410°F), coupled with premium bearings and effective shirrtail protection, these proven bits are designed to thrive in your geothermal application.

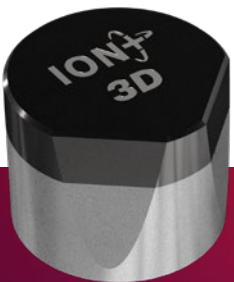
# ION+ GT Geothermal Technology

## Pioneering shaped PDC cutters

ION+ GT, the premier PDC cutter collection for the geothermal market, enables you to drill through hard, abrasive granite formations faster and endure extreme temperatures with less bit damage and fewer trips.

Using thermal-stabilizing deep-leach technology with refined diamond feeds, increased sintering pressure, and denser diamond tables, these cutters deliver enhanced durability and abrasion resistance.

Our ION+ GT collection also offers application- and formation-specific geometries designed to maximize rock failure by balancing fracturing and shearing mechanisms. These mechanisms are highly effective in volcanic rock formations, providing increased efficiency without sacrificing durability.



### ION+ 3D cutter

- Planar face with a V-shaped (chisel/scribe) profile
- Produces point loading in the axial direction
- Improves fracture propagation
- Designed for hard rock work but proven effective in various formations



### ION+ 4DXC cutter

- 4DX shape coupled with 3D chisel
- Designed for applications requiring point loading in the axial direction
- Decreases mechanical specific energy through torque reduction
- Increases ROP



### ION+ 5DX cutter

- Working ridge with optimized multi-faceted geometry
- Designed to withstand sudden impacts and impart higher compressive loads
- Provides significant durability in hard and interbedded rock drilling

# Our high-performance shaped PDC cutter series is fine-tuned to overcome critical failure modes in hard rock drilling.

## Thermal index modelling

Unique computational fluid dynamics analysis evaluates the thermal effects of drilling on PDC cutters. Cutter temperatures while drilling and hydraulic cooling rates are evaluated to maximize cooling effects at the hottest cutters, which increases the ROP and durability by preventing thermal degradation.

## TORC Components

Phoenix series bits reduce the risk of torsional oscillations through patent-pending TORC™ components. Their unique geometry matches the cutter size and cut shape to increase the available contact area, improving the torque response compared to conventional round depth-of-cut (DOC) controllers.

Proprietary cutter analysis software simulates the WOB and torque relationship, using enhanced DOC control to reduce torque fluctuations through hard formations. This results in improved bit durability and overall ROP.

## Heat transfer coefficient <W/(m^2 K)>

