

Prism shaped-cutter technology

Drill in tough applications with efficient cutting action and durability

The **Prism™ shaped-cutter technology** from Baker Hughes provides strategically placed point loading in the cutting structure to deliver peak penetration rates in tough, ductile formations interbedded with hard formations without sacrificing durability. The Prism shaped cutter provides point loading by distributing more weight to a smaller portion of the rock, and the unique three-dimensional shape also provides a plowing effect to further increase cutter efficiency. This allows a drill bit modified with this shaped-cutter technology to penetrate ductile formations and generate maximum rate of penetration.

Baker Hughes has also incorporated elements of the **StayCool™ 2.0 shaped-cutter technology** into the Prism shaped-cutter design to improve durability in hard abrasive applications. Bit performance in hard, interbedded sandstones and carbonates is directly related to the cutters ability to withstand heat. The integration of the StayCool 2.0 technology reduces heat generation at the cutter/rock interface with an exceptionally wear-resistant working surface, maintaining a sharper cutting edge to maximize drilling efficiency.

The Prism geometry and StayCool 2.0 technology feature have been fine-tuned and applied successfully to Baker Hughes drill bits to maximize the rate of penetration (ROP) and durability through challenging ductile and interbedded formations.

Our shaped-cutter technology has been rigorously designed and tested using a structured development process to provide the most efficient cutter geometry for specific applications. These geometries have been vetted with industry leading lab testing facilities and digital drilling and integrity simulations. The full-bit testing showed a 25% increase in ROP drilling a carbonate with a corresponding 25% decrease in mechanical specific energy (MSE) for the Prism shaped cutter versus a conventional round cutter.

Advanced modeling optimizes cutter placement, performance

To deliver optimal performance, the placement of the shaped-cutters in the right locations within the cutting structure to suit a specific application is just as important as the cutter design and technology. Our Tetrahedron 3D bit drilling simulation software evaluates

Applications

- Carbonates, anhydrites, salts, and pressured shales
- Hard and/or abrasive formations
- High mud weight applications

Benefits

- Superior ROP
- Excellent durability and abrasion resistance
- Optimized drilling efficiency
- Lower drilling costs

cutter and bit body interactions with the rock. Complex formation types are modeled, and field-based parameters are used to create a digital twin of the target application. The proprietary cutter force models have been calibrated by lab tests from the high-pressure simulator drilling lab. The customized cutter placement optimization process includes the Tetrahedron performance analysis

that determines the ROP response and bit aggressiveness for the given cutter layout, rock properties, and drilling mode. The simulation is set up to accurately reflect the application description and is calibrated to reflect the bit damage identified by the dull study for the application. Using this powerful software, our service delivery teams determine the selection of the best drill bit frame for the application

and establish the ideal placement of Prism cutters to maximize ROP and footage.

Contact your Baker Hughes representative to learn how Prism cutters can help you get the most efficient cutting action while maintaining the durability needed in tough-to-drill, high energy environments.



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