

Optimus Apex shaped cutter technology

Drill in tough applications with efficient cutting action and durability

The **Optimus™ Apex shaped cutter technology** from Baker Hughes provides strategically placed point loading in the cutting structure to deliver peak penetration rates in tough, ductile formations without sacrificing durability. The Apex cutter provides a traditional point-loading approach by distributing more weight to a smaller portion of the rock. This allows the cutter to penetrate ductile formations and generate maximum rate of penetration (ROP). Baker Hughes has fine-tuned the Apex geometry and applied it to Dynamus and Talon Strike cutters to maximize penetration rates and durability through difficult 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, high-pressure simulator test pressurizes the rock up to 6,000 psi (41.4 MPa) duplicating how rock chips form when drilling at depth in the field. The Optimus Apex cutter showed a 30% increase in penetration rate drilling a carbonate

with a corresponding 30% decrease in mechanical specific energy (MSE) versus a conventional round cutter.

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 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

Applications

- Conventional or unconventional oil and gas wells
- Onshore or offshore
- Carbonates, anhydrites, and salts
- High mud weight applications

Benefits

- High ROP
- Good durability
- Better drilling efficiency
- Lower drilling cost

Optimus Apex cutters to maximize ROP and footage.

Contact your Baker Hughes representative to learn how the Optimus Apex cutters have been engineered to provide the most efficient cutting action while maintaining the durability needed in tough-to-drill, high energy environments.



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