

# Apex shaped-cutter technology

Drill in tough applications with efficient cutting action and durability

The **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 shaped 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 the **Dynamus™ extended-life drill bit** and **Talon Strike™ PDC drill bit** 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 Apex shaped 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 proper locations within the cutting structure to suit a specific application is just as important as the cutter design and technology.

## Advanced modeling optimizes cutter placement, performance

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

## Applications

- Carbonates, anhydrites, and salts
- High mud weight applications

## Benefits

- High ROP
- Superior durability
- Increased drilling efficiency
- Lower drilling costs

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 Apex shaped cutters to maximize ROP and footage.

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



Apex shaped cutters