

# StayCool 2.0 shaped-cutter technology

Beat the drilling day curve with cooler, sharper, more efficient cutter technology

**StayCool™ 2.0 shaped-cutter technology** from Baker Hughes, helps beat the drilling day curve and reduce drilling costs by minimizing friction on the cutter face, improving rates of penetration (ROP), and drilling more efficiently. Run on the Baker Hughes **Dynamus™ platform of extended-life PDC drill bits**, StayCool 2.0 shaped cutters use unique nonplanar diamond table geometry and polished cutter base technology to enhance performance in key applications.

In more challenging environments, like interbedded sandstones and carbonates, bit performance is directly related to cutters and their ability to withstand heat. StayCool 2.0 technology reduces heat generation at the cutter/rock interface. This lengthens the life of the cutter, which leads to extended runs, fewer bit trips, and reduced overall time to reach total depth (TD).

## Stays cooler, runs more efficiently

Overheated cutters experience abrasive wear faster, which can lead to lower ROP and higher mechanical specific energy (MSE) or wasted energy that isn't directly transferred into removing rock. Lab testing has shown that

StayCool 2.0 technology generates 25% less heat on the cutter face than conventional planar cutters. This reduction allows the cutter to maintain a sharper edge for longer durations during a bit run (Figure 1). Reducing the heat generation on the cutter face also minimizes cracking and spalling tendencies that can lead to failures and shorten run life.

## Improved toughness and durability

The innovative non-planar geometry on the face of the StayCool 2.0 shaped cutter not only reduces the temperature at the working edge of the bit, but also improves mechanical longevity and strength and reducing stress levels compared to the legacy StayCool design. Laboratory test comparisons of the StayCool 2.0 shaped cutter against the legacy design demonstrate a greater than 10% increase in loading capabilities. This translates to improved durability, which is especially critical when drilling challenging interbedded applications. The StayCool 2.0 design also reduces the internal stress levels, leading to delayed crack initiation in service. The StayCool 2.0 geometry also functions as a crack inhibitor, resisting

## Applications

- Abrasive formations
- High-speed motor applications

## Benefits

- Proven to lower torque in lab test and field applications
- Nonplanar diamond table
  - Reduces friction on diamond table
  - Lowers heat generation at cutter/rock interface
  - Maintains sharper edge for more efficient drilling over the life of the run
- Improved diamond materials
  - Increase durability and consistency
  - Reduce cracking
  - Enable faster and longer drilling
- Superior manufacturing process
  - Maximizes thermal stability

crack propagation through the non-planar geometry. The net result is a longer lasting, more efficient cutting edge.

### Maintains aggressiveness as it wears

The StayCool 2.0 technology's unique multidimensional geometry causes the cutter to display a degree of self-sharpening behavior since the effective backrake increases as the cutter wears into the profiled portion of the cutter face. This compensates for the increasing diamond footprint while drilling (Figure 2).

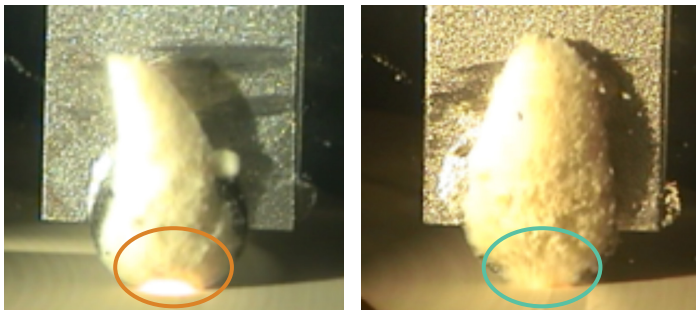
Conventional planar cutters do not provide this benefit and simply become duller as a cutter wears; thus, losing aggressiveness throughout the bit run. StayCool 2.0 shaped cutters dull more evenly and smoothly to maintain cutter aggressiveness, and allow the bit to drill at higher ROPs for longer durations during the bit run.

Diamond mixes used in the manufacturing process enable the diamond structure in each StayCool 2.0 shaped cutter to be accurately tailored for each unique application. The result is a cutter with an exceptionally wear-resistant working surface, a

sharper cutting edge, and a durable, impact-resistant supporting structure.

Combining our advanced design modeling and bit-testing capabilities with our unmatched shaped-cutter portfolio, Baker Hughes drill bit experts can optimize the placement of StayCool 2.0 shaped cutters on your bit to deliver optimal performance across multiple formation types and applications.

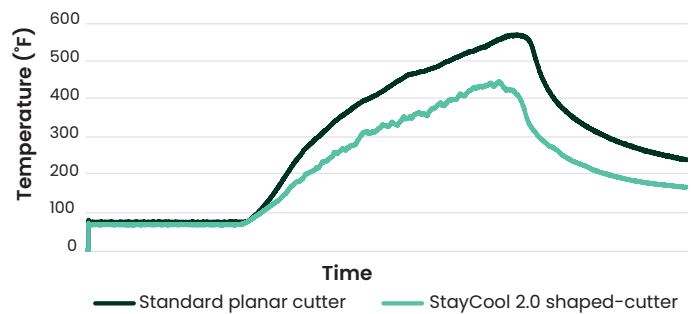
Contact your Baker Hughes drill bit representative today and discover how StayCool 2.0 shaped cutters can help lower MSE, improve ROP, and minimize your drilling costs.



Conventional planar cutter StayCool 2.0 multidimensional cutter

**Figure 1:** the images above compare the heat generated from a conventional planar cutter (left) and the StayCool 2.0 shaped-cutter (right)

### Comparison of Cutting tip temperatures with Conventional cutters vs. StayCool 2.0 shaped-cutters



**Figure 2:** the angle where the diamond table interacts with the rock gets more aggressive as the cutter wears down, allowing the StayCool 2.0 shaped-cutter to maintain a more aggressive cutting edge