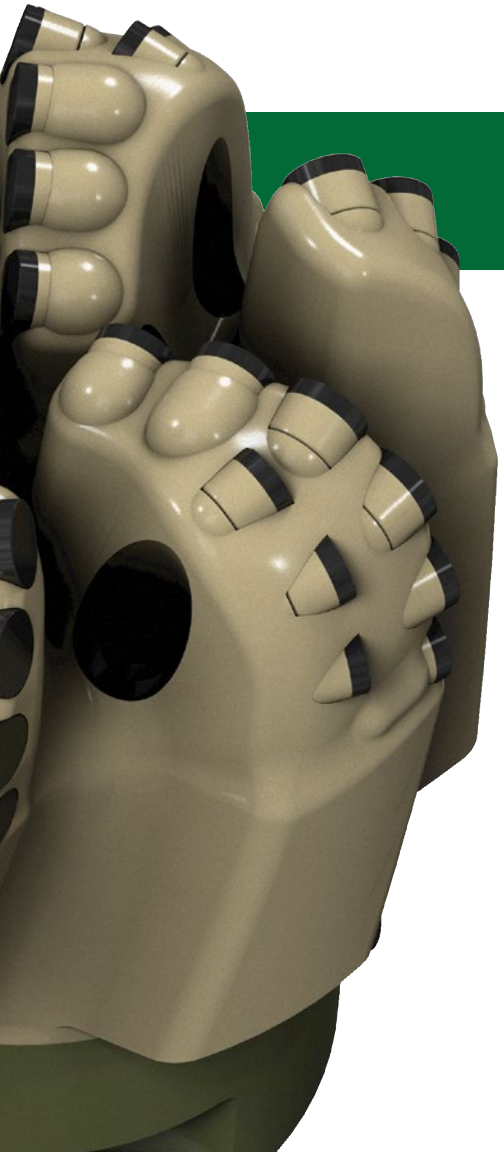
SMITH BITS
A Schlumberger Company

FireStorm

Wear-resistant high-impact
PDC cutter technology

Maintain a Sharp Edge

FireStorm* wear-resistant high-impact PDC cutter technology improves upon previous PDC cutter technology by maintaining superior wear resistance and thermal stability while increasing impact resistance by more than 20%.



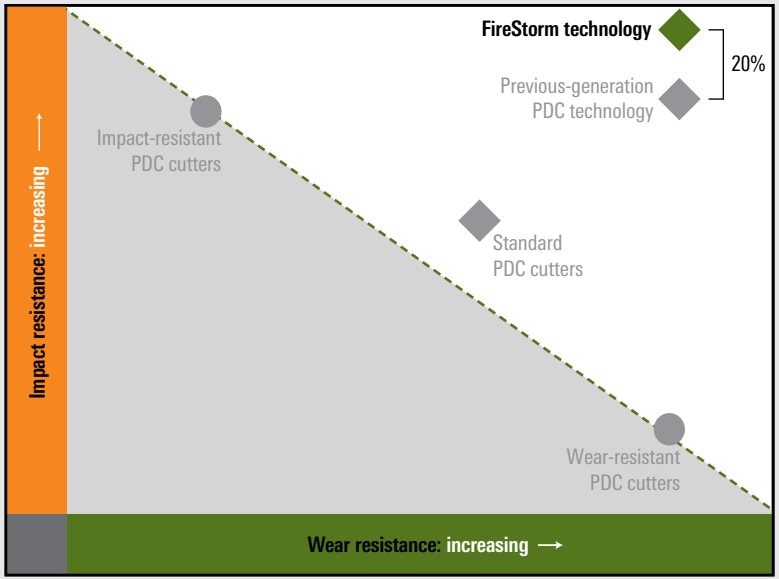
More Durability, Longer Life

FireStorm technology delivers improved ROP and footage through the following advances:

- greater impact resistance for more durability and extended cutter life
- improved resistance to delamination between the diamond table and substrate
- better resistance to spalling of the diamond table.

Impactful Performance

FireStorm technology builds on existing PDC technology to provide greater impact resistance while maintaining superior wear resistance. In application after application, FireStorm technology brings drilling efficiency to all formations, including hard, interbedded, and abrasive formations.



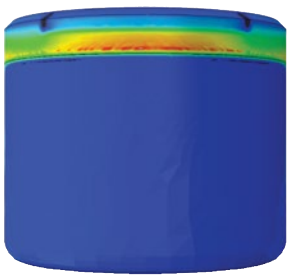
Comparison of the performance levels of the specified PDC cutters.

The Science of Stress

Minimizing the residual stress at the interface of the polycrystalline diamond table and tungsten carbide substrate is key to improving impact resistance.

Along with optimized selection of materials and an HPHT polycrystalline sintering process, the engineered tungsten carbide substrate with improved residual stress allows for FireStorm technology's enhanced capabilities.

Previous PDC Technology Design



FireStorm PDC Technology Design

With identical simulated drilling load applied to both cutters, the previous-generation PDC technology shows high tensile stress near the interface. In contrast, FireStorm technology displays a significant reduction in stress near the interface.

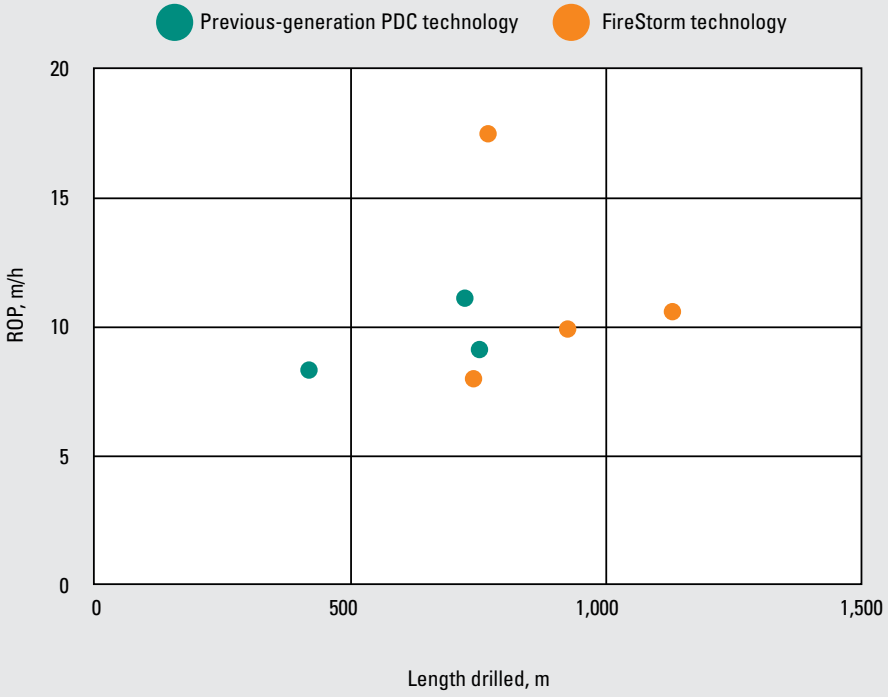
Case study: Montney Formation

Improve meters drilled 42% and ROP 20%

Challenge: An operator in Alberta, Canada, wanted to develop natural gas and condensate reserves in the Montney Shale play using horizontal drilling techniques. The lateral section is composed of abrasive and interbedded lithology, with unconfined compressive strength ranging from 15,000 to 27,000 psi [103.4 to 186.2 MPa]. Wear and impact were accelerating cutter damage and reducing ROP and interval length. As a result, multiple bits were needed to drill to TD. To improve drilling efficiency, a PDC bit with more durable cutters was needed.

Solution: Smith Bits engineers used the IDEAS* integrated drillbit design platform to reconfigure the 6 1/8-in MSi613 PDC bits that the customer was previously using and enhanced the design with FireStorm technology.

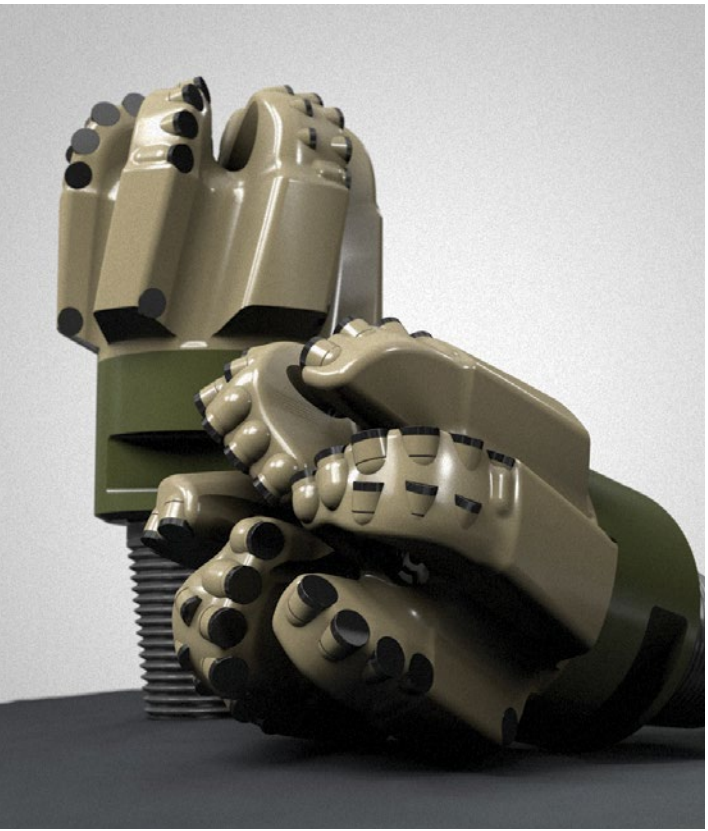
Results: Compared with cutters using previous-generation PDC technology, cutters with FireStorm technology increased meters drilled 42% and increased ROP 20%. Cutters with FireStorm technology also had better postrun dull condition, less delamination, and shallower spalls overall.



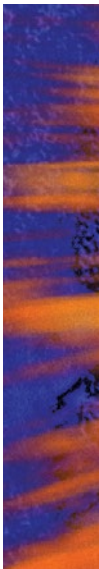
For the majority of all mid–Montney runs that were drilled with brine mud, the runs using FireStorm technology were completed at higher ROP, increased meters, or both.

The dull condition of previous-generation PDC technology showed considerable damage in this application.

The cutters using FireStorm technology demonstrated better resistance to wear and impact.



Learn more about the FireStorm wear-resistant high-impact PDC cutter technology at slb.com/FireStorm.



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