THE TURBOFORCE™ DIAMOND IMPREGNATED DRILL BIT

DRILL FURTHER, FASTER, AND MORE EFFICIENTLY THROUGH HARDER FORMATIONS.
TurboForce™ impregnated drill bits feature advanced technology that results in longer intervals drilled, enhanced versatility and reliability, and a lower cost per foot. Halliburton’s exclusive mass distribution calculation and balancing methods improve bit stability and negate underbalanced centrifugal forces. The increased diamond content on the continuous shoulder further promotes bit stability and enables greater run length. Hydro-dynamic bridges redirect fluid and boost the cleaning and cooling of the cutting structure. A proprietary wear indicator precisely determines the bit condition, optimizing decisions for product usage. Advanced active gauge geometry reduces differential sticking, improving overall drilling efficiency.

Designed for an operator’s specific application by one of Halliburton’s Application Design Evaluation service specialists, you can take advantage of our industry-unique design at the Customer Interface (DatCIS™) service for a drill bit that is custom designed to meet the specific needs of your particular well.

Not just different, but demonstrably better. The differentiating features of TurboForce Drill Bit equal big benefits for operators. Take a look at what these features can mean to you.

<table>
<thead>
<tr>
<th>Features</th>
<th>Benefits</th>
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<tbody>
<tr>
<td>Mass Balancing</td>
<td>Mass distribution calculations and methods balance centrifugal forces that increase stability.</td>
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<tr>
<td>Continuous Shoulder</td>
<td>Increased diamond content increases run length and stability.</td>
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<td>Hydro-dynamic Bridges</td>
<td>These structures improve the cleaning and cooling of cutting structure while strengthening high diamond volume blades and directing fluid to increase effectiveness.</td>
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<td>Wear Indicator</td>
<td>This indicator determines dull conditions more consistently, thereby optimizing decisions for product usage and increasing accuracy for product optimization.</td>
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<tr>
<td>Optimized Active Gauge</td>
<td>The gauge geometry increases stability and reduces differential sticking.</td>
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TurboForce drill bits have a reduced mass imbalance force, which results in longer runs.

<table>
<thead>
<tr>
<th>Unbalanced</th>
<th>Internally Balanced</th>
</tr>
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<tbody>
<tr>
<td>If RPM = 1200</td>
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<tr>
<td>Then force angle = 158°</td>
<td>Then force angle = ---</td>
</tr>
<tr>
<td>Centrifugal force = 275 N</td>
<td>Centrifugal force = 0 N</td>
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The Optimized Active Gauge geometry enables better stabilization.

TurboForce drill bits’ active gauge geometry enables better stabilization. It lowers torque, reduces differential sticking, and reduces the chances of bit sticking.
Achieve a continuous shoulder.
TurboForce drill bits’ new shoulder profile enables better stability with a larger contact area and longer life via a larger diamond volume.

Hydro-Dynamic Bridges improve cleaning and cooling.
Fluid deflection improves cleaning and cooling of the cutting structure-rock interface by improving flow across the bottomhole.

Wear indication by the numbers.
The guesswork is taken out of wear indication via a TurboForce drill bit proprietary feature that enables easily recognizable and precisely measured bit wear. Using an additive manufacturing process and titanium low-friction material, the amount of wear is highlighted by number. The higher the number, the more the wear.

TurboForce™ drill bits get the job done with numbers that speak for themselves.

8 ½ TF510D – Grady County, Oklahoma
- Bromide Formation
- Footage: 390 ft
- ROP: 6.9 ft/hr
- WOB: 5 to 8 Klbs
- RPM: 1,140
- Dull Grade: 6-7–WT–A–X–In–No-TD

8 ¼ TF510 – Saudi Arabia
- Red Sea
- Footage: 798 ft
- ROP: 4.23 ft/hr
- WOB: 10 to 15 Klbs
- RPM: 866
- Dull Grade: 5-8–WT–S–X–I–No-CP

8 ½ TF616D – Congo
- M’boundi Field
- Djeno conglomerate 65%
- Footage: 481 m (out 1598m)
- ROP: 4.1 m/hr
- WOB: 4-7 T
- Neyrfor 1300 RPM
- Dull Grade: 5-2–CR–C–X–In–CT-PR

6 ½ TF608 – Washita County, Oklahoma
- Bromide Formation
- Footage: 706 ft
- ROP: 5.7 ft/hr
- WOB: 3 to 6 Klbs
- RPM: 1,345
- Dull Grade: 2-4-WT-A-X-I–NO-TD
TURBOFORCE™ IMPREGNATED DRILL BITS

Advantages that make drilling more efficient, more effective, more successful:

- Longer intervals drilled
- Increased stability
- Improved cleaning and cooling
- Lower cost per foot
- Application-specific design