ReedHycalog | NOV

50th PDC Drill Bit 1974 - 2024 ANNIVERSARY

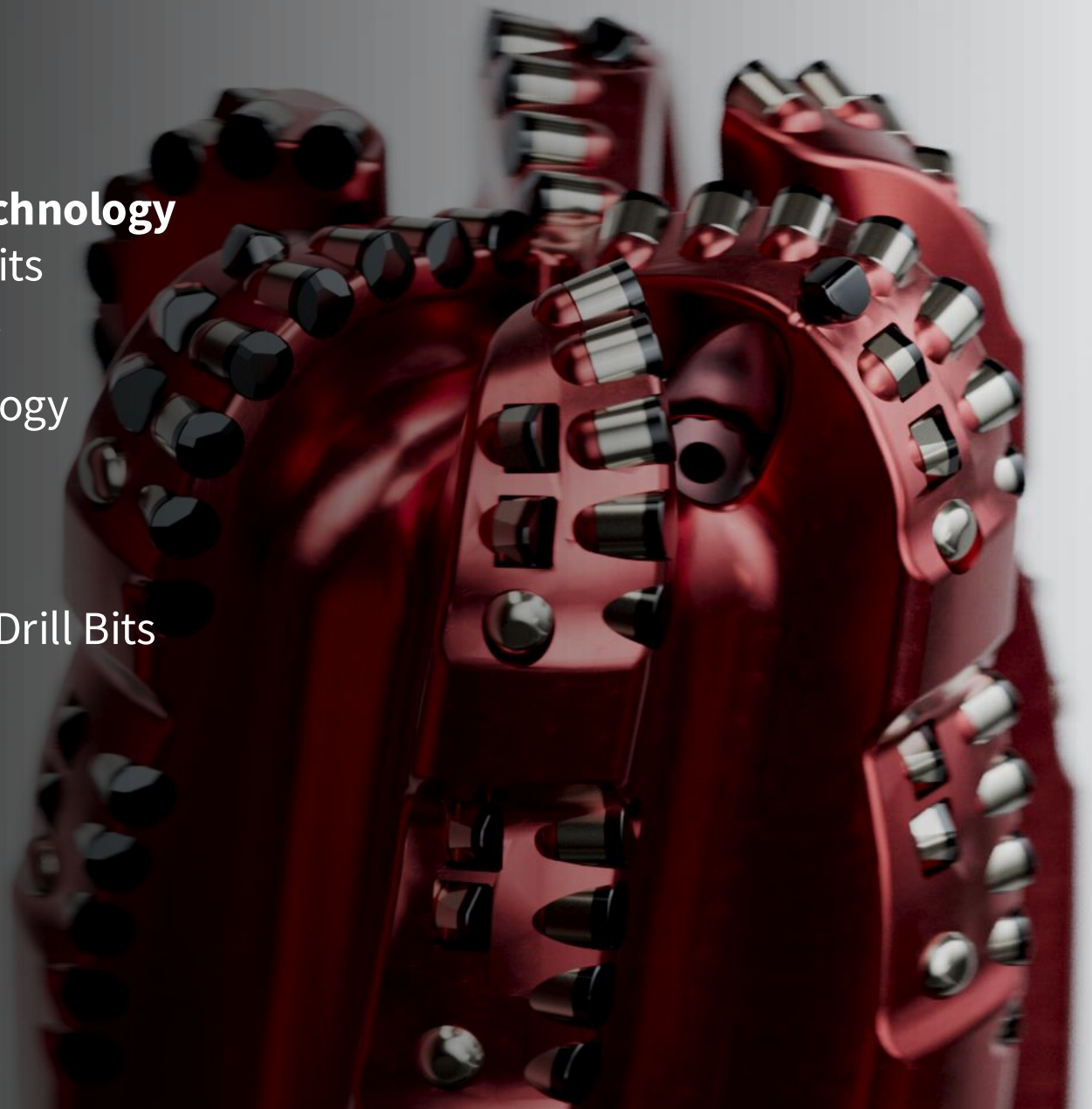
RH Drill Bits Technology



Date: 03 Aug 2026

Ahmed Haddouche

Agenda



RH Product Line Technology

- Tektonic Drill Bits
- Evolve Drill Bits

ION™ Cutter Technology

- Cutter Grades
- Cutter Shapes

Securis Roller Cone Drill Bits

BHE Tools

Questions

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ReedHycalog™

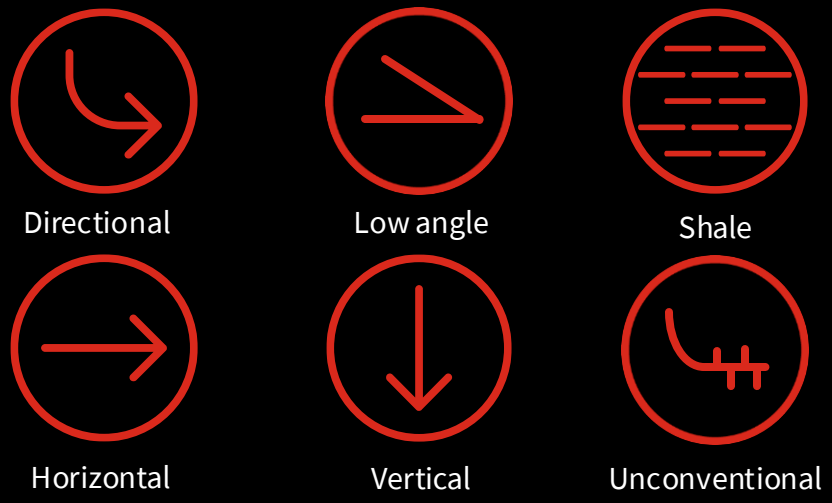
Fixed Cutter Drill Bits

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Spartan Drill Bits

Spartan PDC bit presents a holistic solution for drilling operations. Its stable cutting platform, cutting-edge PDC technology, robust gauge design, and hydraulic efficiency collectively address diverse drilling challenges.

Platform Applications





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Spartan Drill Bits

Spartan bits not only optimize drilling performance but also reduce nonproductive time and drilling costs, providing substantial value to operators across varied drilling environments.



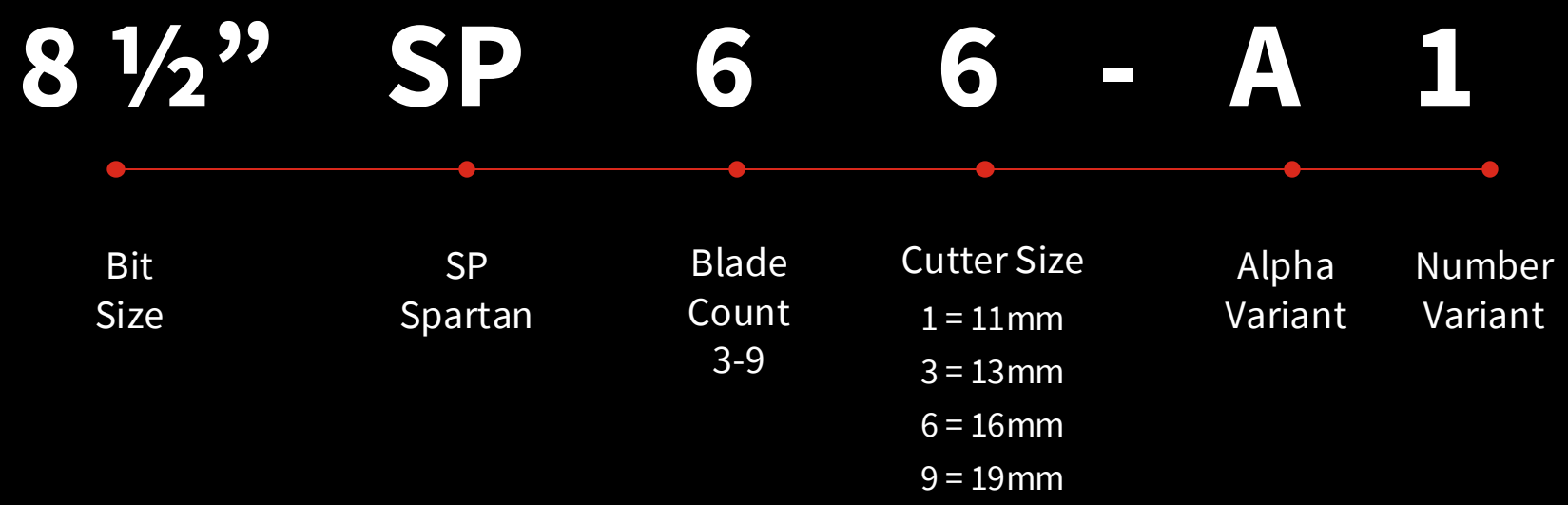
Core Features

- Advanced PDC Technology
- Advanced Fluid Flow Modelling
- TSP Gauge Protection

Available in sizes 2 ⅜ - 26”

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ReedHycalog Spartan Nomenclature



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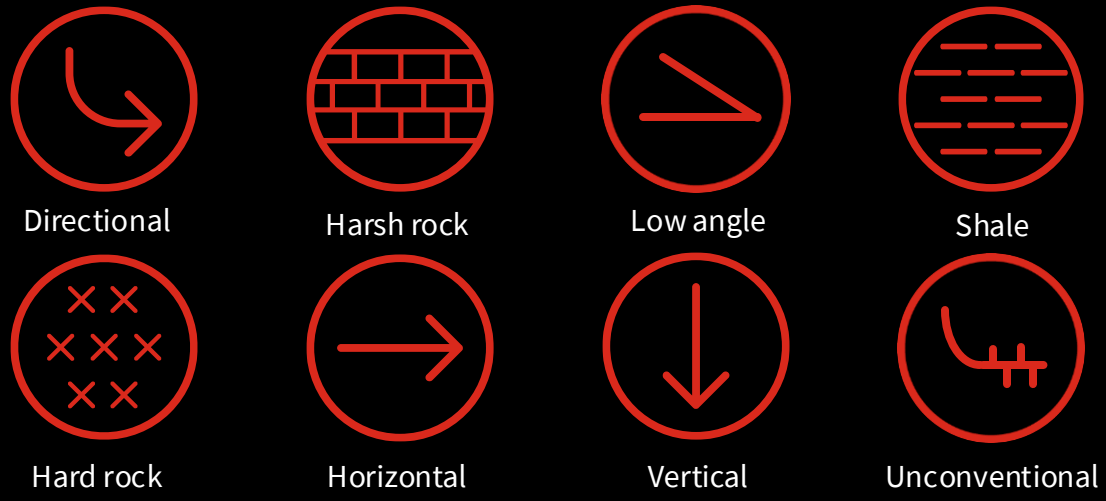
Tektonic™ Drill Bit Platform

Individually crafted, customized bit designs.

- Proven drilling efficiency
- Durability, Stability, Steerability & Stability



Platform Applications



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Tektonic™ Drill Bit Platform

All Tektonic bits are designed with an Improved philosophy, focusing on drilling efficiency, fracture initiation and propagation, and chip generation and evacuation

Core Features

- ION™ polished cutter technology
- Customized designs for maximum efficiency
- Forward leaning blades
- Advanced fluid flow modeling
- Dynamic rotation bit modeling

Available in sizes 2 ⅜ - 28”



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ReedHycalog Tektonic Nomenclature



Bit Size	TK Tektonic	Shaped Cutters	Blade Count 3-9	Cutter Size	Alpha Variant	Number Variant
				08 = 8mm 1 = 11mm 3 = 13mm 6 = 16mm 9 = 19mm 25 = 25mm		

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ReedHycalog Evolve – What is it?

Our Evolve bit is ReedHycalog's most customizable and application-specific fixed cutter product offering.

Reduce days on well and drilling costs for operators by maximizing drilling performance.

ReedHycalog's latest technologies will be surrounded by a moat of intellectual property.

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ReedHycalog Evolve - Objectives

ReedHycalog Evolve customized bits are aimed at early adopters to provide the latest drilling technology and deliver performance.

Building upon the success of Tektonic bits and outperform them for high-tier clients.

Deliver a range of new high-performance solutions to ever-increasing challenges.

Continually develop technology to solve customer pain points.

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ReedHycalog Evolve Nomenclature

8 ½”	RH	6	6	P	-	A	1
Bit Size	RH **Evolve**	Blade Count 3-9	Cutter Size 1 = 11mm 3 = 13mm 4 = 14.5mm 6 = 16mm 7 = 17.76mm 9 = 19mm 25 = 25mm	Hero Feature Pegasus Lynx HighExposure Janbiya Infinity Directional/Tracking Cyclone Hydraulics EagleEye		Alpha Variant	Number Variant

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Pegasus™

Dual-Diameter technology

- Mitigate damaging torsional and lateral vibrations
- Improve tracking by reducing unwanted bit tilt
- Reduce sliding time
- Improve average ROP
- Ongoing optimization extending technical limits



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ION+™ Intrepid

- Bridge cutter sizes for optimized DOC
- **Sizes: 14.5, 17.76 & 22mm**
- Maximize ROP
- Maximize interval
- Optimize cutter layout





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ION+™ Infinity

- Rotating Cutter
- Disruptive technology by reducing localized cutter wear
- Improves cutter and bit life
- Eliminates unnecessary trips
- Ultimate durability in homogenous, hard and abrasive formations

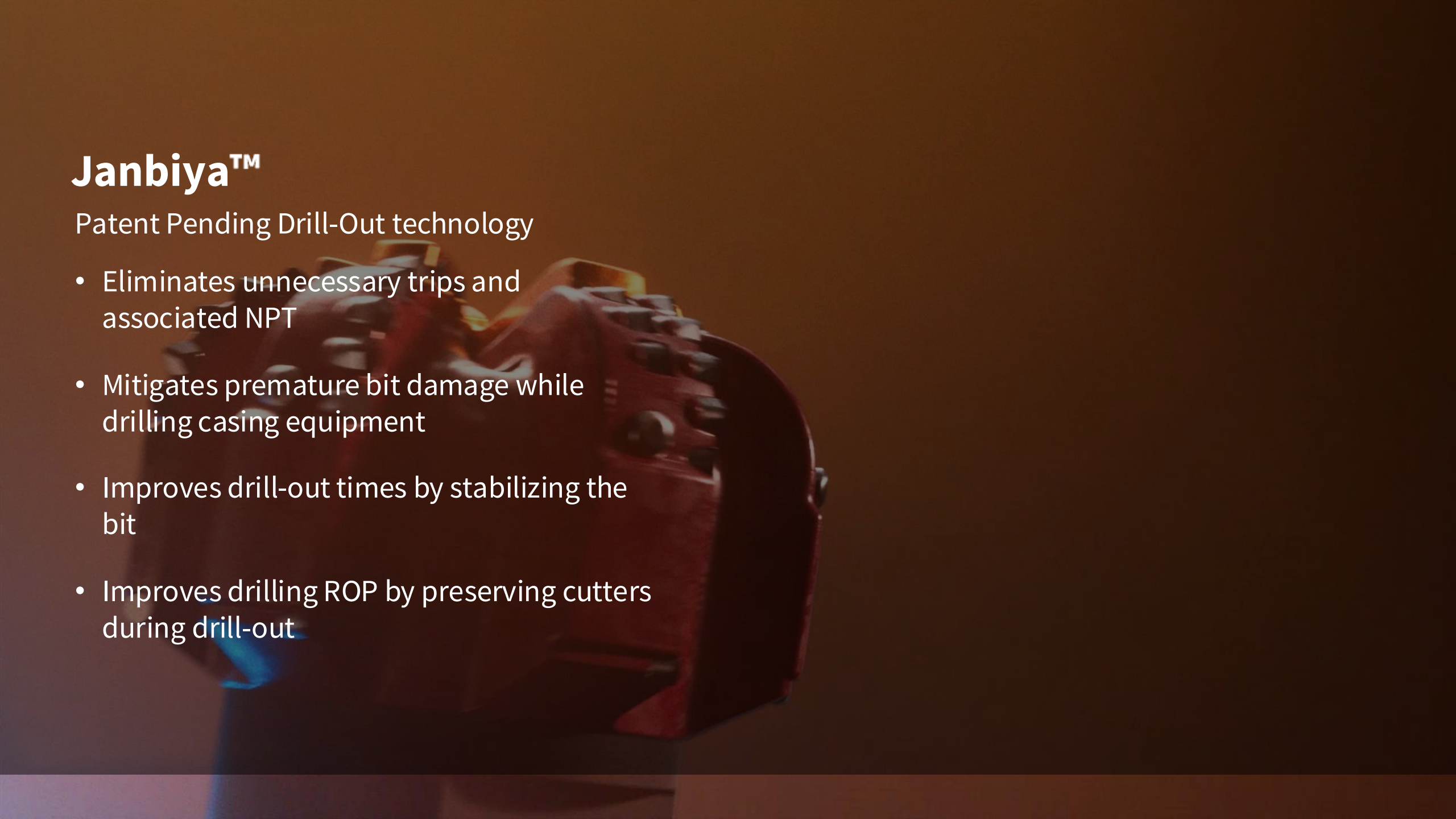


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Janbiya™

Patent Pending Drill-Out technology

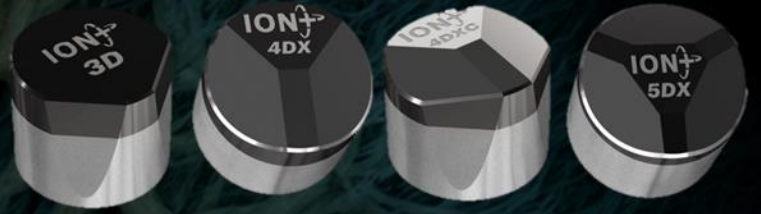
- Eliminates unnecessary trips and associated NPT
- Mitigates premature bit damage while drilling casing equipment
- Improves drill-out times by stabilizing the bit
- Improves drilling ROP by preserving cutters during drill-out



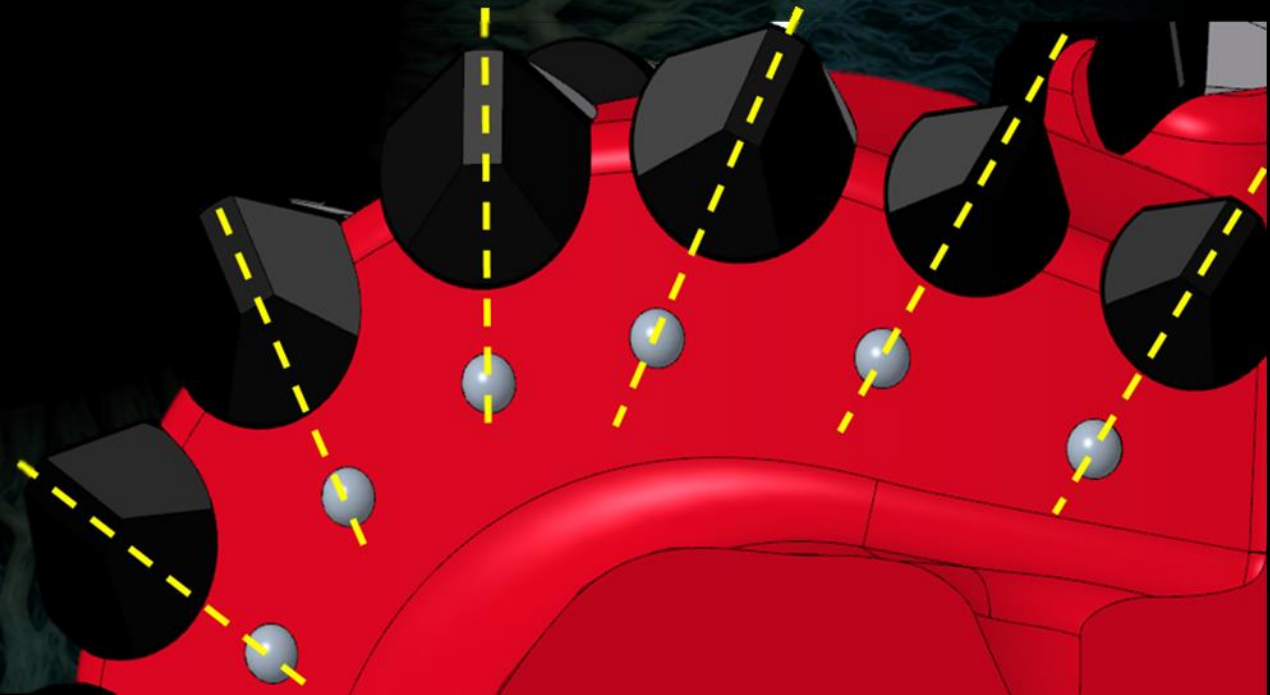
EagleEye™

Strategically oriented cutters

- Optimize cutter orientation
- Improve cutter efficiency
- Increase ROP
- Maximize longevity
- Patented shaped cutter orientation







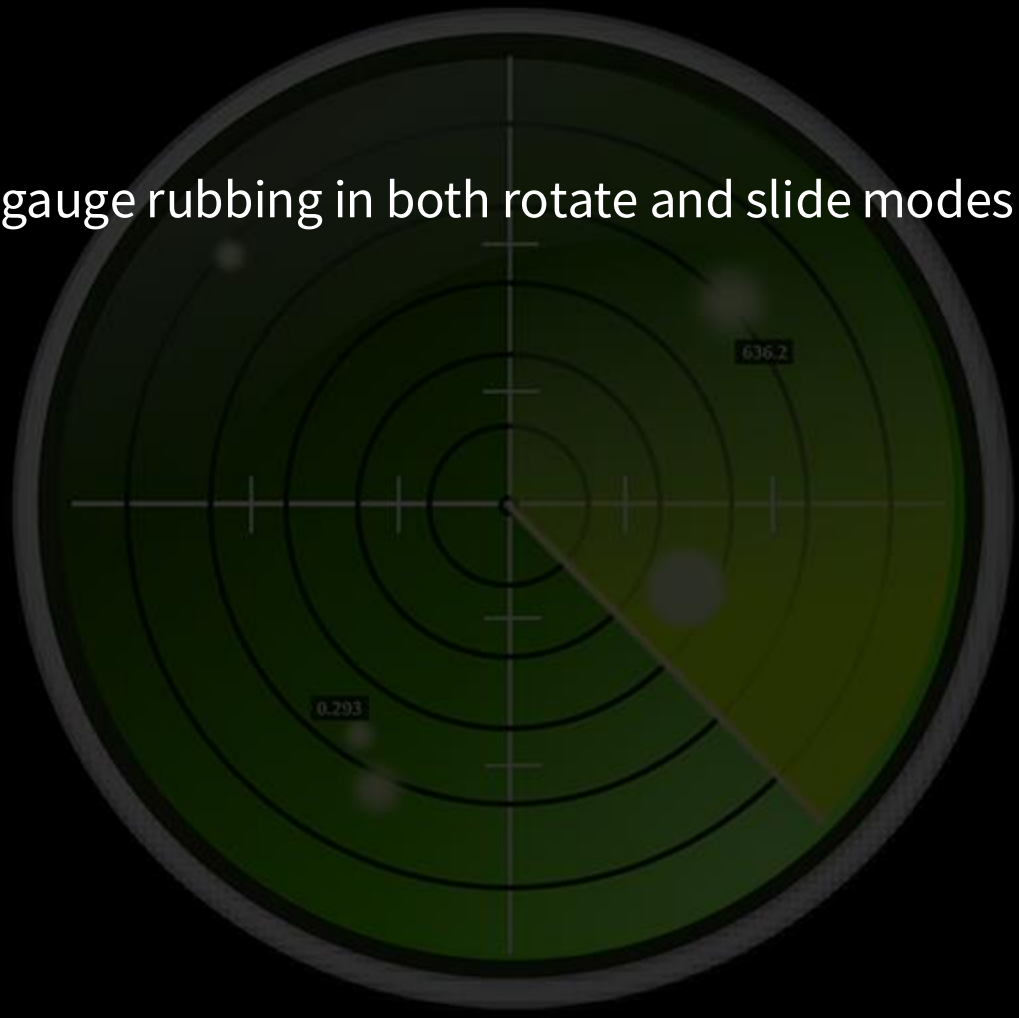
PATENTED

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Directional Gauge

Directionally tuned

- Dynamically manages gauge rubbing in both rotate and slide modes
- Improve tracking
- Minimize sliding
- Maximize interval ROP





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Patent Pending

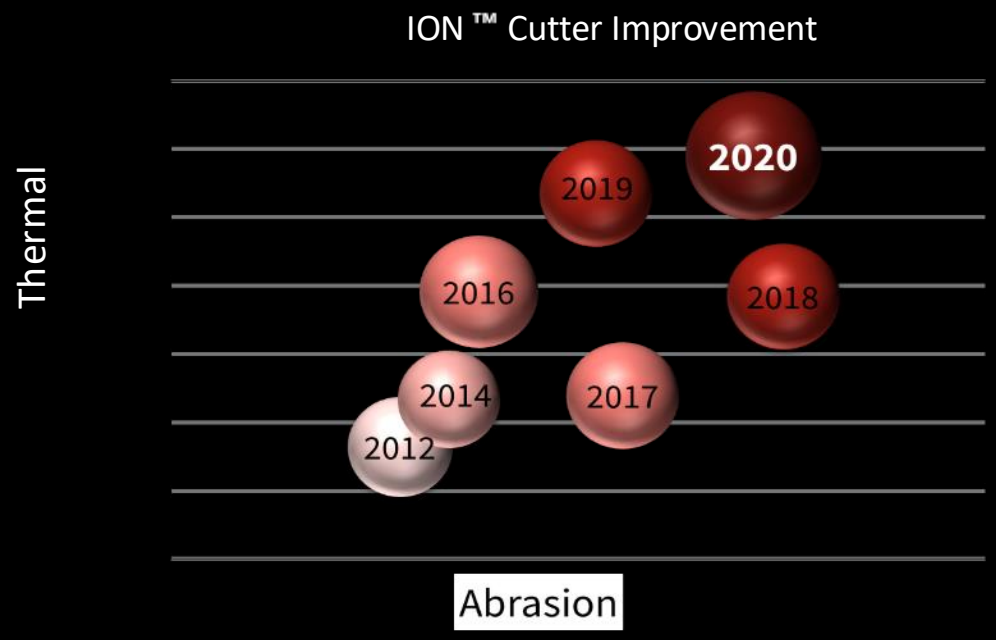
ION+™ Shaped Cutter Family

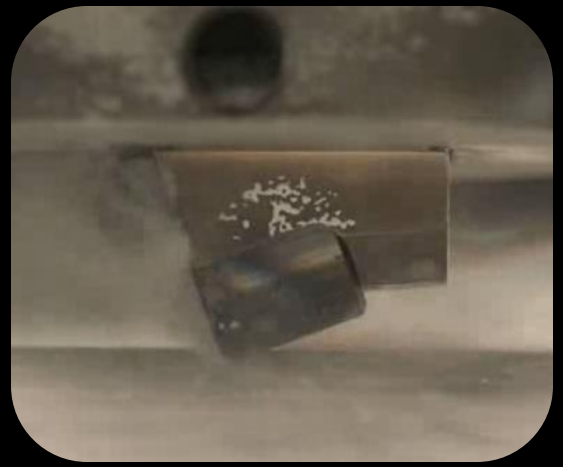
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ION+™ Application Specific Approach

Based on critical failure modes and replicated lab testing

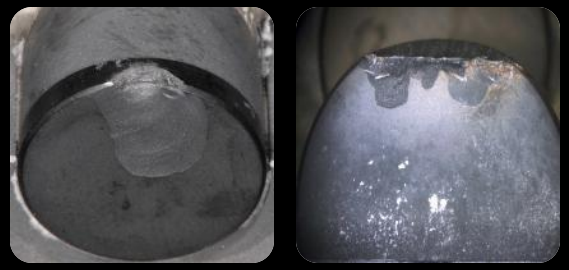
- Increased pressure platform achieved
  - Denser diamond with stronger diamond bonds
  - Improved abrasion resistance , mechanical strength and toughness
- Larger cutter grade selection
  - Each cutter characterized for optimal performance





Field Lab

Thermal



Abrasion



Impact



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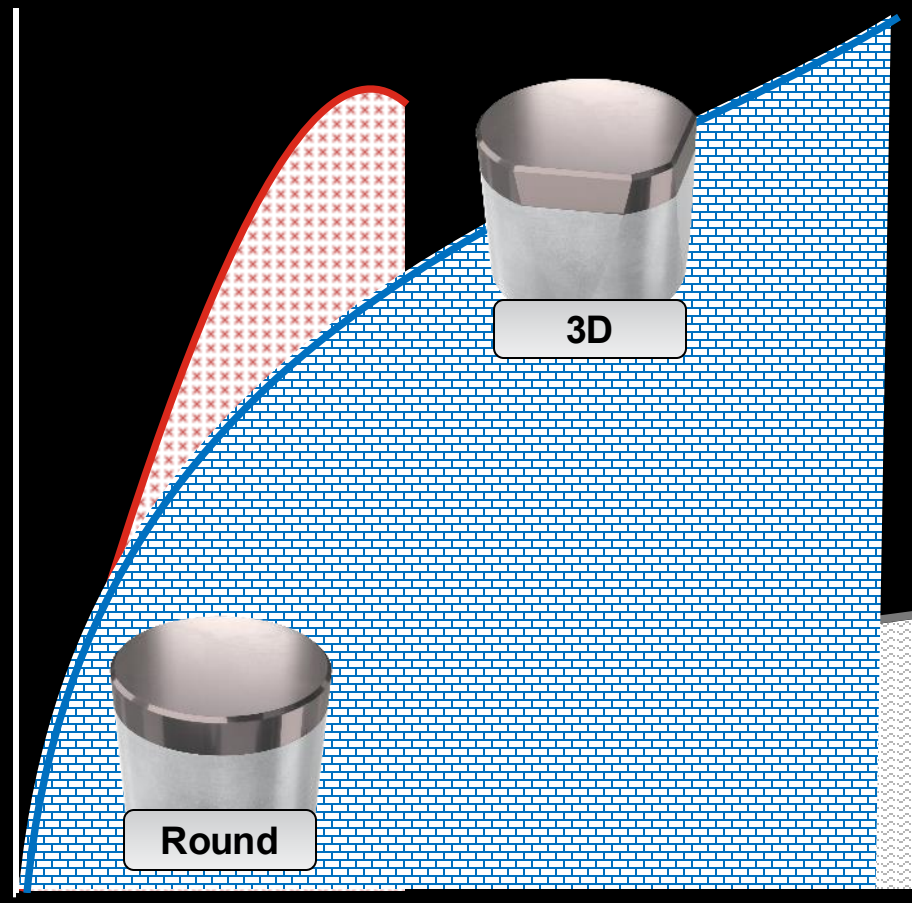
ION+™ Application Specific Approach

Based on critical failure modes and replicated lab testing

Hard and Brittle (Sandstone)

Hard and Brittle (Limestone)

Soft and Highly Ductile (Shale)



Field **Lab**

Thermal





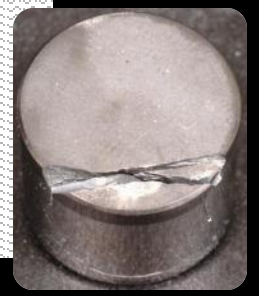
Abrasion





Impact





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ION+™ 4D Cutter

Cutter-Rock Interaction

- Pressurized single cutter tester
- Replicate downhole conditions
- Brittle lithologies exhibit ductile tendencies in pressurized environments.
- Cuttings extrude up the face of the cutter in the shape of ribbons causing frictional energy loss



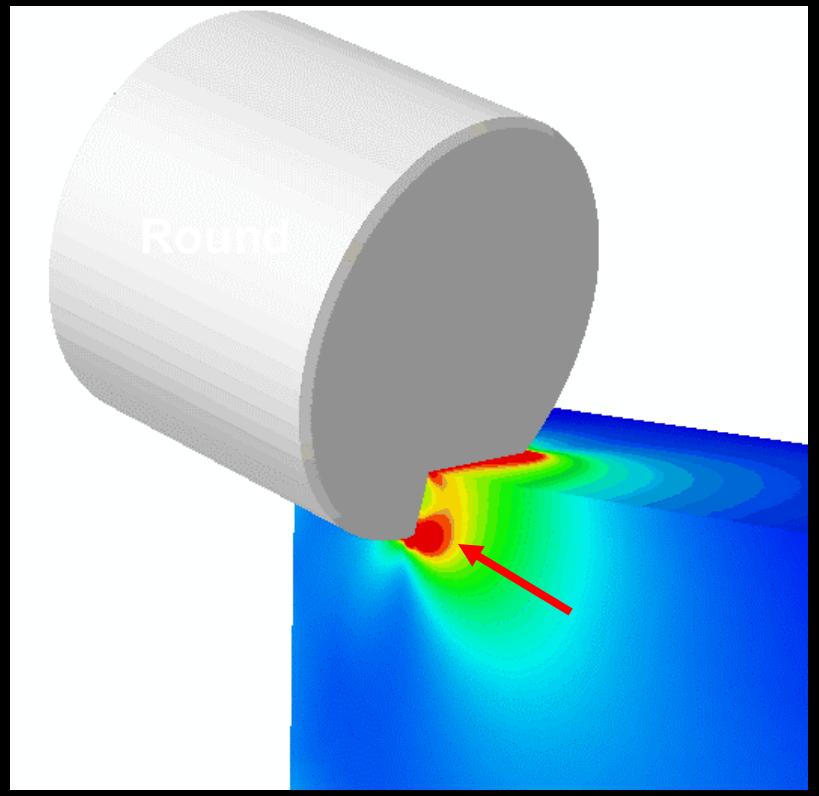


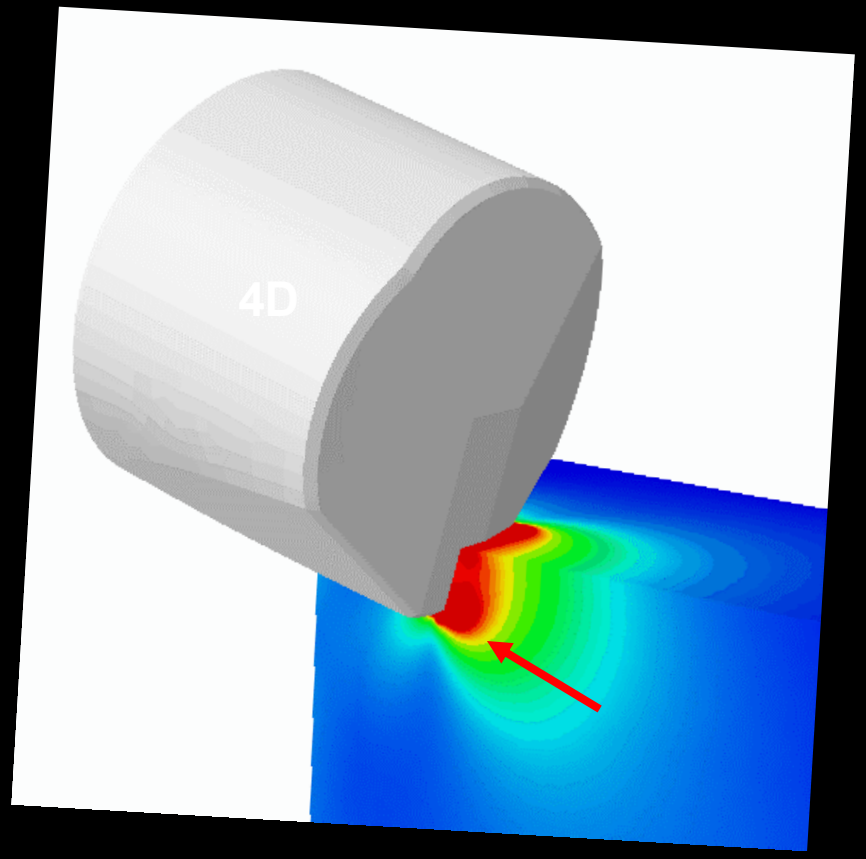


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ION+™ 4D Cutter

Rock Failure – Point Loading Crack Propagation





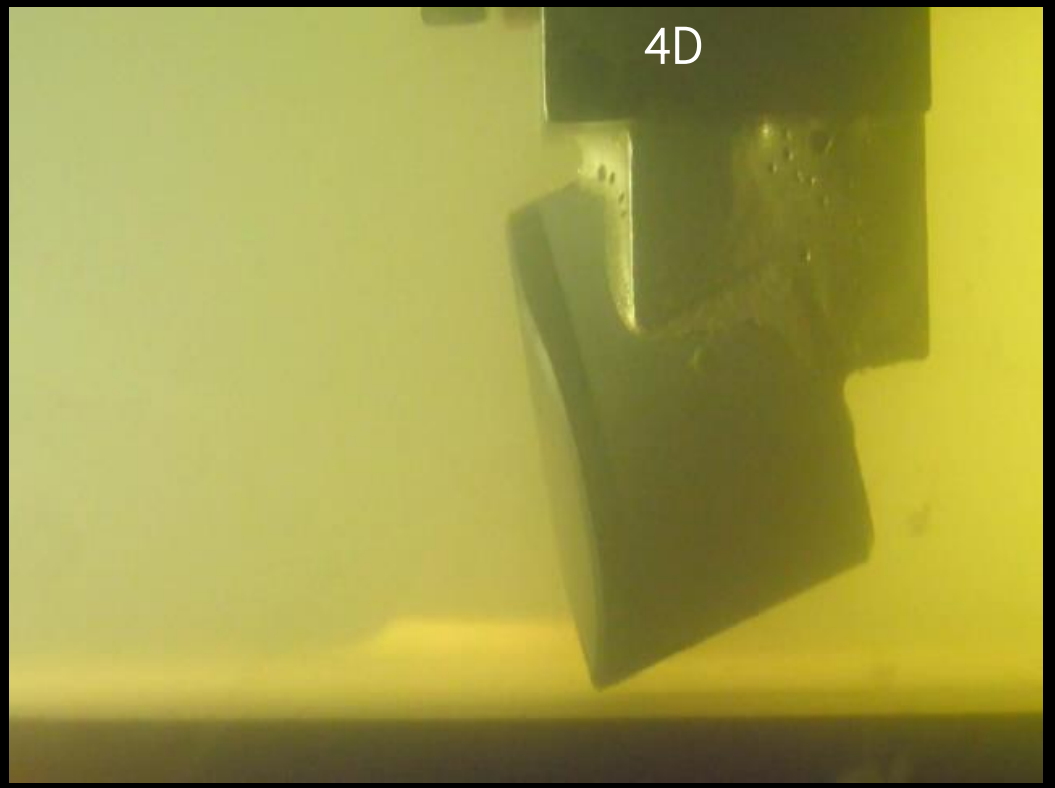
- ION+ 4D shape edge produces point loading in the tangential direction improving fracture propagation

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ION+™ 4D Cutter – Lab Testing

Pressurized Cutter Tester

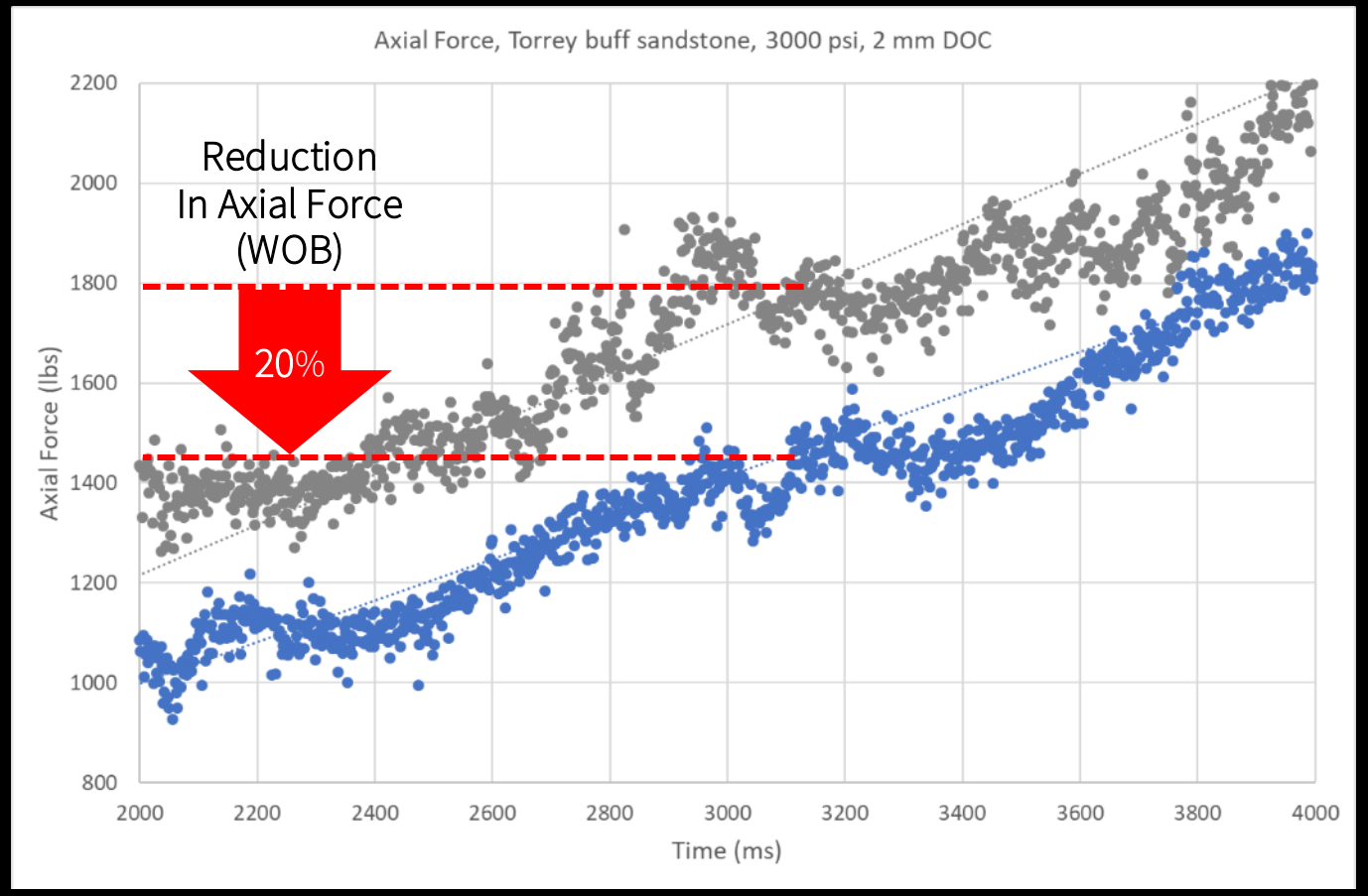




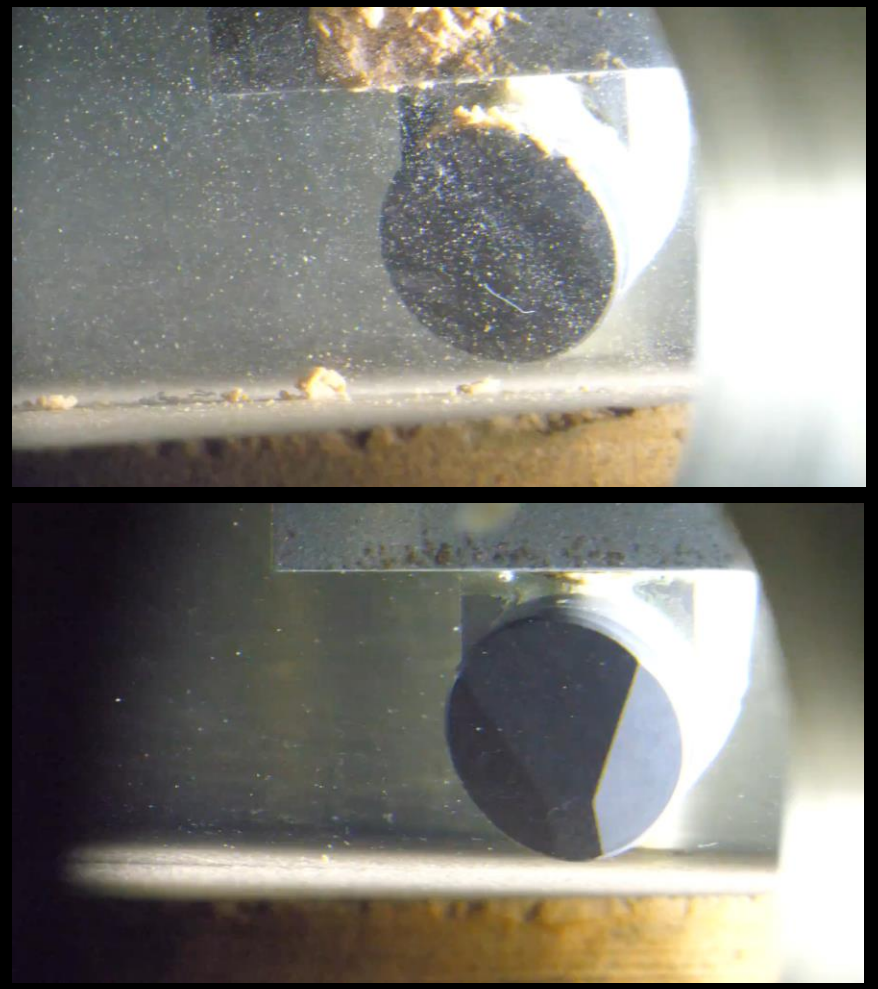
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ION+™ 4D Cutter – Lab Testing

Pressurized Cutter Tester



ION+ 4D Round Planar



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ION+ 5DX

Shaped Cutter for Hard Rock Drilling

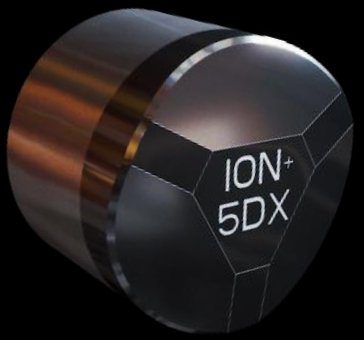
- A multi-faceted cutter that is designed for durability while drilling hard rock applications.
- Can withstand shock loads while drilling interbedded and nodular lithologies.
- Protects bit cutting structure integrity to allow longer drill intervals.
- Available in standard and ultra-thick diamond tables and all tougher grades.
- Provides thermal stability and high abrasion resistance.



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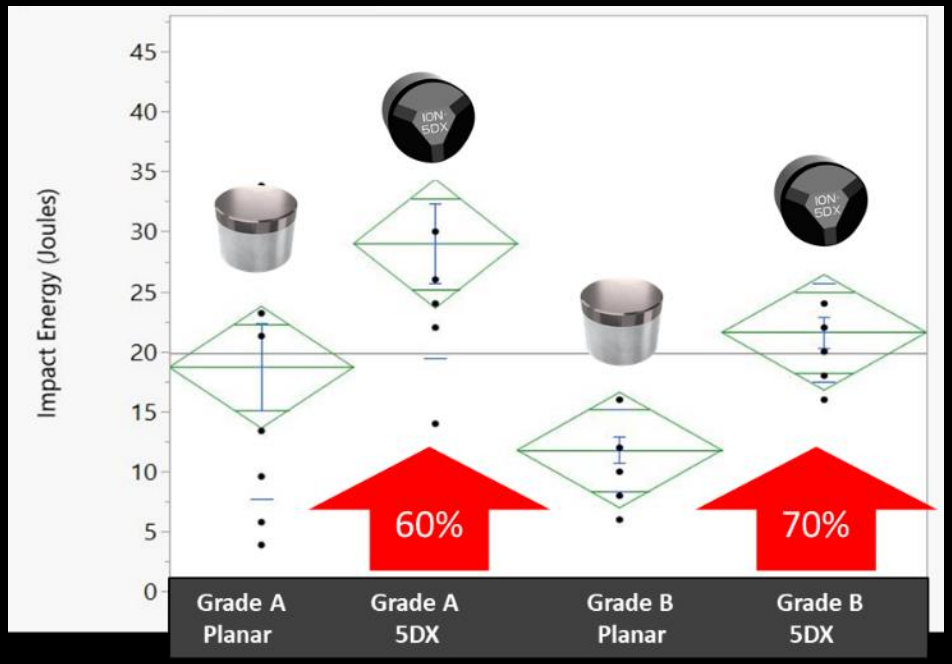
ION+ 5DX

Higher Impact Strength Cutter

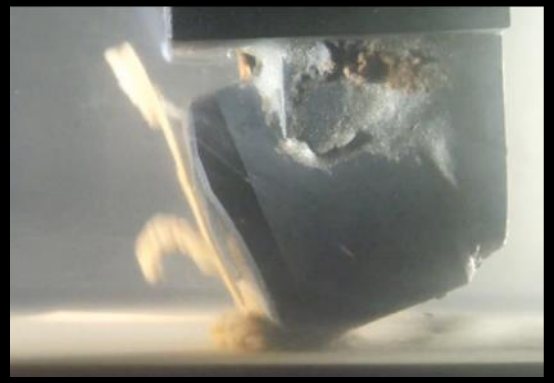


Laboratory tests demonstrate:

- Significantly higher impact strength compared to planar cutters
- Substantially reduced damage occurs while drilling through interbedded formations or conglomerates



Multi-faceted for multiple benefits in hard formations.





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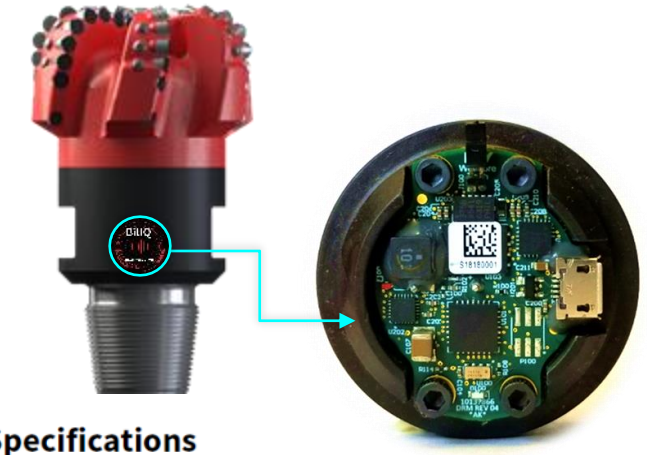
BitIQ™

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BitIQ™

- **Target:** Identify whirl, torsional, stick slip and general high shock and vibration conditions at bit depth
- **Value:** provide informed correlation between bit dull and at-bit vibrations for better bit design decisions & performance
- **Reporting:** Auto analysis/run-report ready minutes after upload to Spectra





Specifications

Sensor	Range
3 Axis accelerometer	±120 G
Single axis gyro	±666 RPM
Temperature sensor	32 to 257°F (0 to 125°C)

General Specs	
Master sampling rate	128 Hz
Memory	16 MB
Temperature rating	32 to 257°F (0 to 125°C)
Maximum pressure	15000 psi (1055 kg/cm)
Size (diameter)	1⅝ in (42 mm)
Retention system	Snap ring

Basic Technical info:

- **Calibrated to optimize data quality**
- **Measures** axial, radial & tangential acceleration [G], Gyro[RPM], and Temperature[°C] **syncing this to a real time clock (UTC)**
- **SPOTFIRE raw data analysis** is done for further in-depth drilling parameter analysis



ReedHycalog™

Roller Cone Drill Bits

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Securis ™

General Purpose Roller Cone Drill Bits

Securis™ drill bit is a general purpose roller cone bit platform developed to suit variety of drilling applications.

With a robust and reliable bearing technology and cutting structure design, Securis drill bits are capable of drilling longer over wide range of operating parameters.

Securis products are available in both steel tooth and tungsten carbide insert drill bits from 6” to 26” diameter.



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Securis™

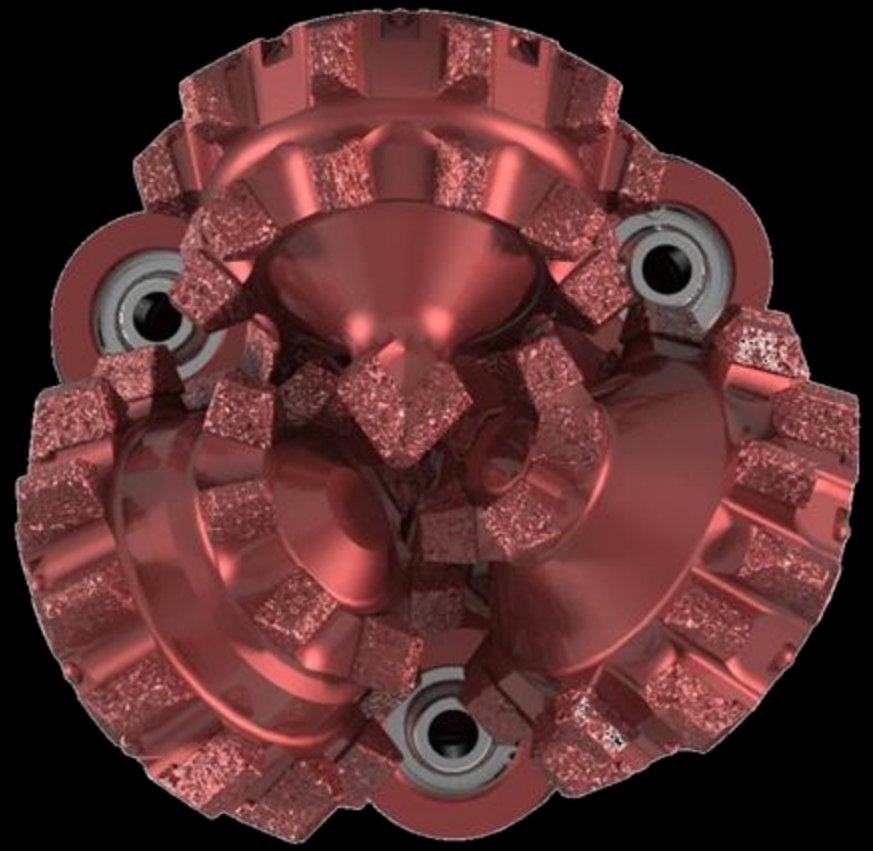
General Purpose Roller Cone Drill Bits

Application

- Vertical, directional, horizontal, and tangent wells.
- Soft to medium formations for steel teeth bits.
- Soft to hard formations for TCI bits.
- All rotary and motor applications.

Features / Benefits

- Optimized cutting structures – eliminates tracking and increases ROP.
- Robust bearing seal for longer drilling time.
- Shirttail Protection – optional feature to provide extra protection for increased life.



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ReedHycalog Securis™ Nomenclature

8 ½” SI 35 J A C F P D* - A 1

Bit Size	Product Line	Product Series	Optional Series	Insert Shape	Center Jet Flame Spray Carbide Shirttail Protection	Diamond Enhancement Location	Variant Designation
	SI – Securis™ TCI ST – Securis™ MT SIL – Large Dia TCI STL – Large Dia MT	Numerical value given to the product based on drillability of the intended application	J: Jet Air M: Metal Seal	A: Chisel Blank: Conical or round top		Code given to denote the percentage and location of enhancement	

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ReedHycalog™

BHE Tools

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Dog Leg Reamer

The **DL Reamer** delivers real-time wellbore conditioning to improve wellbore geometry and reduce trip times. Its eccentric design slightly enlarges the wellbore while rotating concentrically to improve weight transfer, reduce tight spots, and minimize backreaming. Proprietary placement software optimizes tool placement in the BHA for efficient borehole conditioning without negatively affecting drilling dynamics.



Features

- One-piece steel construction
- Eccentric design
- Low-torque cutting structure
- Bi-directional cutting capability
- Optimized blade layout
- Application-specific PDC cutter options

Benefits

- Improves wellbore geometry and stability
- Reduces trip times and backreaming
- Improves weight transfer in directional wells
- Minimizes tight spots and casing running issues
- Reduces surface torque and drilling vibration

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Dog Leg Reamer

Specification

Bit size	DL Reamer Diameters			Make Up Length	Junk Slot Area	Collar OD (inches)	Tool ID (inches)
	Pass Through*	Drill Size*	Max Tool Size				
5⅝ in.	-0.125	+0.0625 in.	5.175 in.	4.08 ft.	7.920 in^2	5.000 in.	2.000 in.
5¾ in.	-0.125	+0.0625 in.	5.175 in.	4.08 ft.	8.870 in^2	5.000 in.	2.000 in.
5⅞ in.	-0.125	+0.0625 in.	5.188 in.	4.07 ft.	9.060 in^2	5.000 in.	2.000 in.
6 in.	-0.125	+0.0625 in.	5.375 in.	4.56 ft.	9.660 in^2	5.000 in.	2.688 in.
6⅛ in.	-0.125	+0.0625 in.	5.563 in.	4.28 ft.	9.340 in^2	5.250 in.	2.813 in.
6¼ in.	-0.125	+0.0625 in.	5.563 in.	4.27 ft.	10.970 in^2	5.250 in.	2.688 in.
6 ½ in.	-0.125	+0.0625 in.	6.125 in.	4.31 ft.	12.300 in^2	5.000 in.	2.688 in.
6¾ in.	-0.125	+0.0625 in.	6.125 in.	4.27 ft.	14.670 in^2	5.250 in.	2.688 in.
7⅞ in.	-0.125	+0.1250 in.	7.200 in.	4.45 ft.	15.920 in^2	6.125 in.	3.000 in.
8⅜ in.	-0.125	+0.1250 in.	7.750 in.	6.17 ft.	11.800 in^2	6.750 in.	2.835 in.
8½ in.	-0.125	+0.1250 in.	7.750 in.	3.97 ft.	17.140 in^2	6.625 in.	3.000 in.
8¾ in.	-0.125	+0.1250 in.	8.000 in.	4.00 ft.	29.200 in^2	6.625 in.	3.000 in.
9½ in.	-0.125	+0.1250 in.	8.875 in.	5.00 ft.	29.500 in^2	6.750 in.	2.250 in.
9⅞ in.	-0.125	+0.1250 in.	9.000 in.	6.70 ft.	35.160 in^2	7.000 in.	2.250 in.
11⅝ in.	-0.125	+0.188 in.	10.83 in.	6.74 ft.	42.960 in^2	8.000 in.	3.000 in.
12¼ in.	-0.125	+0.1875 in.	11.25 in.	6.67 ft.	56.080 in^2	8.000 in.	3.000 in.
12⅝ in.	-0.125	+0.1875 in.	11.25 in.	6.67 ft.	58.940 in^2	8.000 in.	3.000 in.
15½ in.	-0.125	+0.1875 in.	14.431 in.	7.50 ft.	96.820 in^2	9.500 in.	3.000 in.
16 in.	-0.125	+0.2500 in.	14.75 in.	7.50 ft.	99.000 in^2	9.500 in.	3.000 in.
17½ in.	-0.125	+0.2500 in.	16.000 in.	7.50 ft.	120.00 in^2	9.500 in.	3.000 in.

*nominally relative to bit size



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xCaliper Eccentric String Reamer

The **xCaliper™ Eccentric String Reamer** delivers cost-effective borehole enlargement without the compatibility and pass-through limitations common to traditional enlargement tools. Designed to run with existing drill bits and BHAs, xCaliper combines proven eccentric string reamer technology with wellbore conditioning to improve drilling efficiency, reduce torque, and enhance stability. Our proprietary Our proprietary Multifunctional Advanced Placement Software (MAPS™) optimizes tool placement in the drillstring, while application-specific PDC cutter configurations increase cutting efficiency and reduce reactive torque.



Features

- Eccentric string reamer design
- MAPS
- One-piece steel construction
- Application-specific premium PDC cutters
- Optimized cutter placement configuration

Benefits

- Eliminates pass-through and compatibility limitations
- Improves borehole enlargement efficiency
- Reduces torque and vibration
- Improves wellbore conditioning and stability
- Supports smoother drilling operations
- Reduces operational costs compared with conventional underreamers

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ReedHycalog | NOV

WHERE xCALIPER™ FITS

THE RIGHT SOLUTION BETWEEN CONDITIONING TOOLS AND FULL UNDERREAMERS.

xCaliper™ fills the gap between wellbore conditioning tools and full underreamers delivering targeted enlargement and ECD reduction with less complexity and lower cost.

WELLBORE CONDITIONING
MINIMAL ENLARGEMENT

TARGETED ENLARGEMENT
OPTIMAL BALANCE

FULL UNDERREAMING
MAXIMUM ENLARGEMENT

DLR / CONDITIONING TOOLS



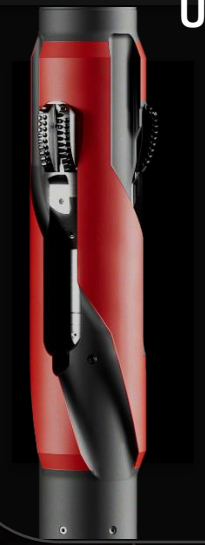
- Improves wellbore quality and conditions the hole
- Minimal to limited enlargement
- Best for hole conditioning and enhanced drilling performance
- Lower complexity and cost

xCALIPER™ REAMER



- Targeted enlargement for annular clearance
- Reduces ECD and improves hydraulics
- Same BHA / no moving parts – lower risk
- Less complexity than underreamers
- Lower cost than full underreaming

ANDERREAMER / FULL UNDERREAMING



- Maximum enlargement and full bore opening
- Concentric enlargement throughout the section
- Complex tool with moving parts and hydraulics
- Higher cost and operational complexity

xCALIPER™ REAMER
DELIVERS THE OPTIMAL BALANCE:

- More annular clearance than conditioning tools
- Less complexity and cost than underreamers
- Proven performance without compromising your BHA

THE SMART CHOICE
FOR TARGETED ENLARGEMENT AND ECD REDUCTION.

Fast-R Flow-Controleed Anderreamer Technology

FAST-R Underreamer builds on the field-proven Anderreamer™ platform with advanced ball-drop and flow-control capability for multi-cycle underreaming applications. Integrating our premium PDC cutter technology with a hybrid cycling mechanism, FAST-R completes underreamed intervals faster while improving operational flexibility and reliability. Multiple fail-safe retraction systems, clear pressure signals, and modular configuration options support dependable one-trip underreaming operations across conventional, Lock-Closed, 3D, flow activation, and rathole elimination (RHE) applications.



Features

- Hybrid ball-drop and flow-cycling mechanism
- Premium PDC cutter technology
- Lock-Closed configuration option
- Three fail-safe cutter block retraction systems
- Clear activation and deactivation pressure signals
- Modular configuration platform
- RHE-compatible design

Benefits

- Improves underreaming reliability
- Reduces NPT
- Prevents cutter blocks from getting stuck open
- Supports one-trip underreaming operations
- Enables high-flow circulation with blocks retracted
- Increases operational flexibility across multiple applications

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Questions?

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