Defining bit performance is simple—it’s lower rig time, fewer bit runs, improved BHA effectiveness, and how well the bit responds to key applications. To maximize performance in every drilling environment, Smith Bits has developed specialized bits—each tailored to meet customer-specific downhole challenges. We start with our unique-geometry elements that are Intelligent by Design, because better bit performance begins with better cutting performance.

Our materials-mechanics lab has an extensive library of cutter-formation interface details. The IDEAS* integrated dynamic design and analysis platform uses this data for finite element analysis modeling to identify which elements and configurations perform best for any given application. Field success drives ongoing design improvements for superior, solution-specific bits that fracture rock quicker and more effectively, withstand impact and wear longer, and crush ROP standards by 50% per field or more, driving vast industry acceptance worldwide.

Intelligent by Design is our continuing effort to develop bits that further downhole performance.

Despite evolving to be more rugged and more suitable in a wider range of drilling applications, cutters on conventional PDC bits are not ideal for every type of rock. Extreme wear slows ROP and increases NPT. Yet, it’s from these small cutting components that Smith Bits developed big results.

Better bit performance begins with simply asking, “Why are bits being pulled?” Understanding why led to creating elements with specialized shapes that optimize performance beyond a conventional, fixed, and flat cutter. Reducing wear and impact damage means reducing bit trips, thus reducing NPT, and decreasing costs.
Unique-Geometry Cutting Elements

ONYX 360
Rolling PDC cutter

The genesis product of our Intelligent by Design approach is the **ONYX 360 rolling PDC cutter**. This revolutionary cutting technology solves the challenges of multiple bit trips due to low footage and reduced ROP caused by excessive wear and damage. ONYX 360 cutters withstand abrasive formations, such as sandstone, as well as harder formations. Compared to PDC bits with conventional and fixed cutters, bits incorporating ONYX 360 cutters demonstrate run length increases of up to 57%, resulting in fewer bit trips and lower drilling costs.

Stinger
Conical diamond element

Impact-prone harder carbonates, pyrite-inclusion conglomerates, and multiple layers of formations with softer shale followed by hard limestone damage conventional cutters. Analysis of this scenario led to the **Stinger conical diamond element**, developed to improve performance by applying a significantly higher concentrated point load on the rock, amplifying cutting and plowing while resulting in smoother torque response and decreased vibration. Fitted with this element, StingBlade conical diamond element bits average an 80% increase in footage with 15% increase in ROP compared with offsets.

Axe
Ridged-diamond element

Our next development came from applications containing lower compressive strength and high impact formations. We took the point of a Stinger element and stretched it out, resulting in the **Axe ridged-diamond element**. PDC bits fitted with this element are AxeBlade ridged-diamond element bits, which increase overall ROP by up to 84%. AxeBlade bits combine roller cone TCI rock-crushing action with PDC-cutter shearing force for improved cutting efficiency, while a 70% thicker diamond table on the element ridge boosts frontal impact resistance for better durability. There is less torque, reduced reactive torque fluctuation, and better toolface control in curve applications. Production zone exposure is maximized and NPT is minimized by delivering higher ROP, better directional control, and well placement.

Award-winning technology

Smith Bits technology is continually recognized for advancement in bit technology, having earned the Hart’s E&P MEA for the ONYX 360 cutter in 2014, the StingBlade bit in 2015, and the AxeBlade bit in 2017. ONYX 360 cutters also won the World Oil Award for Drill Bits in 2014 and StingBlade bit was a finalist for the World Oil Award for Drill Bit in 2015.

Record-breaking performance

Smith Bits has an 18-year record for achieving more world records than any other drill bit company. Since 1999, Hart Energy’s E&P documents drillbit records data for different types and sizes of bits in three categories—single-run footage, cumulative footage, and ROP. Data is verified by bit run sheets from drilling contractors and operators. In last year’s review, Smith Bits set 53% of the global records in the drill bit industry — more than all other bit companies combined — with 595 of the 1,123 world records.