OnGauge
Torque-reduction sealed-bearing roller reamer
The OnGauge* torque-reduction sealed-bearing roller reamer offers fully customizable hole-gauge maintenance and torque reduction, providing greater stability and reliability in harsh downhole environments. Its wedge-style cutter retention system prevents lost cutter incidents, and a durable sealed-bearing assembly endures high loads, temperatures, and rotary speeds to extend bearing life.
OnGauge

Features

- Blank-ended manufacturing to configure for near-bit and string placement in the BHA
- High-flow body for increased annular total flow area (TFA) to improve hole cleaning
- Longer full-gauge cutting section for enhanced gauge maintenance
- Proprietary sealed-bearing assembly that endures high loads, temperatures, and rotary speeds to extend bearing life
- Bidirectional cutter assemblies for backreaming
- Optional real-time data connection for use with Schlumberger LWD tools
- Wedge-fit cutter retention system that ensures cutters are not lost in hole

Applications

- Extended-reach drilling (ERD) and complex well geometries
- Torque reduction for severely packed hole assemblies
- Extremely abrasive drilling conditions

Benefits

- Reduces downhole torque caused by well profiles and by wellbore spiraling and doglegs
- Maintains borehole quality and addresses ledging formations
- Maintains hole gauge for abrasive conditions
Friction areas

Designed with a bullet seal-and-bearing assembly, the OnGauge roller reamer reduces downhole torque that is typical with fixed-blade stabilizers. Torque reduction allows a more stable drilling environment, minimizing stick/slip and other downhole vibrations that impede the ability to reach the technical limits of ROP and reduce the operational life of MLWD tools.

Three rotating cutter blocks that act as a bearing for the drillstring provide a reduced torque stabilization point. Reduction of the drillstring’s friction coefficient minimizes the limiting effects of downhole torque, allowing extended runs in complex ERD wellbore geometries and improving weight transfer to the bit. With reduced downhole torque and stick/slip and improved weight transfer, more energy is available at the bit to improve ROP in a stable drilling environment and extend drillbit and MLWD tool life.

The OnGauge roller reamer has three cutter assemblies that rotate continuously, minimizing surface area that creates friction and, as a result, increases torque caused by the BHA. By comparison, standard stabilizers have a much larger surface area in contact with the borehole wall, increasing overall torque.
Improved borehole quality and tripping times

The OnGauge sealed-bearing roller reamer provides mechanical hole conditioning through microdoglegs, wellbore spiraling, and formation ledging. When compared with a standard fixed-blade stabilizer, the OnGauge roller reamer reduces borehole damage in formations that tend to break out. There is less wear on the reamer’s rolling cutters in abrasive formations that cause excessive stabilizer blade wear on traditional stabilizers. During backreaming operations, the bidirectional cutter blocks allow hole conditioning through tight hole conditions. The reamed hole section results in the removal of tight sections and ledges, significantly reducing trip times and improving subsequent trips with drillstrings or casing strings.

There is less wear on the reamer’s rolling cutters in abrasive formations, which can cause excessive stabilizer blade wear on traditional stabilizers.
Conventional roller reamers feature unsealed cutter bearing assemblies that expose the bearings to drilling fluid and cause early wear on the bearing and eventual failure. Unlike other sealed-bearing roller reamers that use O-ring seals, the OnGauge roller reamer features a pressure-compensated, sealed-bearing system within the cutter blocks that prevents mud and cutting exposure and increases durability of the bearing assembly. The sealed system retains bearing lubricant, extending the total attainable revolutions of the cutter blocks. The bearing system is pressure balanced, ensuring that the system works effectively in high-pressure downhole environments.
OnGauge sealed-bearing roller reamers feature the bullet seal-and-bearing assembly designed by experts from Smith Bits, a Schlumberger company. Over the past 5 years, the bearing assemblies from Smith Bits have more than doubled roller cone drillbit reliability. In an analysis of 8 ¾-in TCI bits, reliability increased 100%, 4 times the reliability factor when compared with the closest competitor. Using the same methodology, the roller reamer bearing system is designed to address bearing life—one of the major concerns with conventional roller reamers—and eventual failure.
Secure anchoring point for cutter block retention

Conventional roller reamers are prone to failure because of loss of cutter blocks, which often requires a fishing operation. The OnGauge roller reamer cutter features a wedge-fit mechanical retention block to ensure that cutters are not lost in hole during extended run lengths. The tapered geometry of the retention wedge forces the cutter block into the roller reamer body, providing a secure anchoring point for cutter block retention. Cutter blocks feature carbide inserts to provide an undergauge reaming surface area and wear resistance for the cutter block and reamer body.
The OnGauge reamer block retention system is designed to be easily serviced in the field.
The OnGauge roller reamer uses sophisticated dynamic modeling to increase operational efficiency. Modeling helps determine optimal reamer placement and surface operating parameters.

The i-DRILL* engineered drilling system design uses predictive modeling to identify solutions that minimize vibrations and stick/slip. Using offset well data, surface and downhole measurements, and a thorough knowledge of products and applications, the i-DRILL design process creates a virtual drilling environment. A bit-underreamer balance analysis helps determine the combination that will result in the highest ROP under stable conditions. The final design improves drilling performance over a wide range of applications.

Using i-DRILL system design, BHAs are engineered to incorporate the OnGauge roller reamer with advanced technologies such as Rhino* borehole enlargement system and TDDirect* casing-drilling and liner-drilling technology.
Increasing ROP shortens trip times in abrasive sandstone formations

While drilling the vertical sections of two wells in Oklahoma, USA, the OnGauge torque-reduction sealed-bearing roller reamer improved ROP and reduced trip times. Downhole tool failures and multiple bit trips were common while reaming through the highly abrasive sandstone formations to kickoff points.

In the South Central Oklahoma Oil Province, the OnGauge roller reamer drilled 8,893 ft in 123 hours with one bit and saved the operator USD 57,000. In Ellis County, the roller reamer drilled 7,260 ft in less than 43 hours with one bit.

After the runs in both operations, the cutter bearings were still in good condition for continued drilling.

After drilling in the highly abrasive sandstone formation, the cutter showed very little wear and was still in good condition for continued drilling.
Learn more about OnGauge torque-reduction sealed-bearing roller reamer at slb.com/OnGauge.

**Tech Reports**
Read more about how the OnGauge roller reamer

- drilled 7,260 ft in less than 43 hours with one bit while increasing ROP to 173 ft/h
- drilled 8,893 ft in 123 hours with one bit, saving the operator USD 57,000.

**Rhino**
Integrated borehole enlargement system
slb.com/Rhino

**TDDirect**
Casing-drilling and liner-drilling technology
slb.com/TDDirect