

High Roller™

A VAREL INNOVATION



HIGH PERFORMANCE SEALED
ROLLER BEARING BITS



VAREL
INTERNATIONAL

High Roller™ Series: Building from High Energy™ foundation

Using the solid foundation of the proven High Energy™ series, Varel International has expanded its roller cone product line with the introduction of the High Roller™ drill bit series. The series features our 14 ¾" to 18 ½" sealed roller bearing bits and is available as both TCI and Steel Tooth designs.

Innovations from the High Energy series such as the patented seal geometry, coupled with a new, larger lubricant reservoir, allow High Roller bits to support longer bit life and increasingly demanding applications. Bit designers also worked to tailor specific cutting structure designs to match operating requirements and parameters, including those for complex well placements such as in directional and rotary steerable drilling.

High Roller Technology



Highly engineered roller bearing

Optimized for large diameter bits, Varel systematically improved and enhanced its roller bearing package. This larger, anti-friction bearing package assists in reducing heat generation and bearing torque for higher RPM runs. To support this new bearing package a high viscosity grease is employed for further friction reduction.



Patented conical seal gland design

The conical seal gland's geometry positions the seal to better handle pressure fluctuations and still maintain a preferred dynamic sealing interface. In addition, the overall dimension of the seal has been increased compared to previous large diameter roller bearing bits, resulting in longer bit life.



Increased capacity reservoir design

To increase lubricant volume, a larger grease reservoir was designed for the series. The new design increases the grease volume compared to the previous design.



Redesigned head forgings

Larger, stronger forgings were developed and deployed for this large diameter series. These rugged and dependable forgings provide long-lasting drill bit performance.

✓ Proven Roller Cone Features

High Roller bits also carry forward proven Varel International roller cone features. Field tested and approved, these features work in unison to extend bit life in demanding energy environments.

Precision Silver-plated Floating Thrust Washer

A silver-plated floating thrust washer between the head and cone reduces frictional heat build-up and lowers bearing operating temperature.

Tool Steel Thrust Buttons

Opposing tool steel thrust buttons provide secondary thrust capacity. These work with the floating thrust washer to provide superior bearing load carrying capability.

Hardmetal Inlay

Hardmetal inlays on critical bearing surfaces are precision machined to provide superior bearing performance by reducing friction and wear.

Crowned Rollers

Crowned rollers reduce peak bearing end stresses, significantly raising the bearing load capacity and prolonging bearing life.

Shale Diverting Insert/Groove

High Roller bits feature an innovative, stepped shale burn insert. This stepped design is more effective in diverting cuttings away from the seal, prolonging seal life.

High Energy Tumbled (HET™) Processed Inserts

High Roller TCI bits are equipped with HET processed carbide inserts – Cutting elements undergo the HET process to alter the surface attributes, resulting in inserts that are more abrasion and impact resistant.

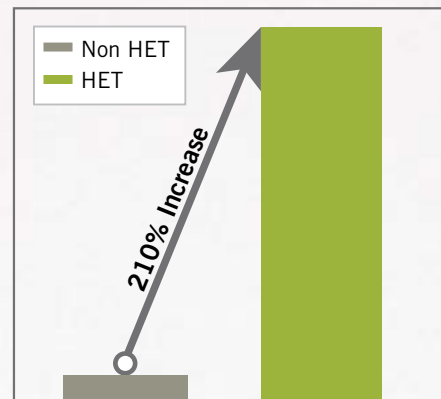
To support directional drilling and steerable application, High Roller bits are equipped with shirttail hardfacing and inserts as well as stabilization inserts for protection as a standard feature.

- Built upon a proven platform, Varel continues to advance roller cone innovation through the introduction of its High Roller large diameter roller bearing drill bit series.



The power of V-Jet hydraulics

We have put the power of V-Jet hydraulics to work on the High Roller Series. Available in TCI bits, IADC 545 and softer High Roller Series bits, the V-Jet aimed flow stream produces better cone cleaning, which improves bit penetration rates. In addition to new head forgings, the new designs maximize leg strength while minimizing overall bit length, helping to deliver more hydraulic horsepower to the hole bottom. The shorter overall bit length improves steerability on directional BHAs.



Features and Benefits

a Patented HET™ Carbide Inserts

The cutting elements in TCI bits undergo Varel's patented HET process to alter the surface attributes, resulting in inserts that are more abrasion and impact resistant.

b Patented Conical Seal Gland

A best practice from the High Energy series, the geometry of the seal gland assists in maintaining a preferred dynamic sealing interface.

c Highly Engineered Roller Bearing

This anti-friction bearing package assists in reducing heat generation and bearing torque for higher RPM runs.

d New Forging Design

Redesigned forgings accommodate larger reservoirs, hydraulics features and steel is reallocated to maximize strength. In addition, the forgings' overall length is minimized for enhanced steerability and hydraulic efficiency.

e New Bearing Lubricant

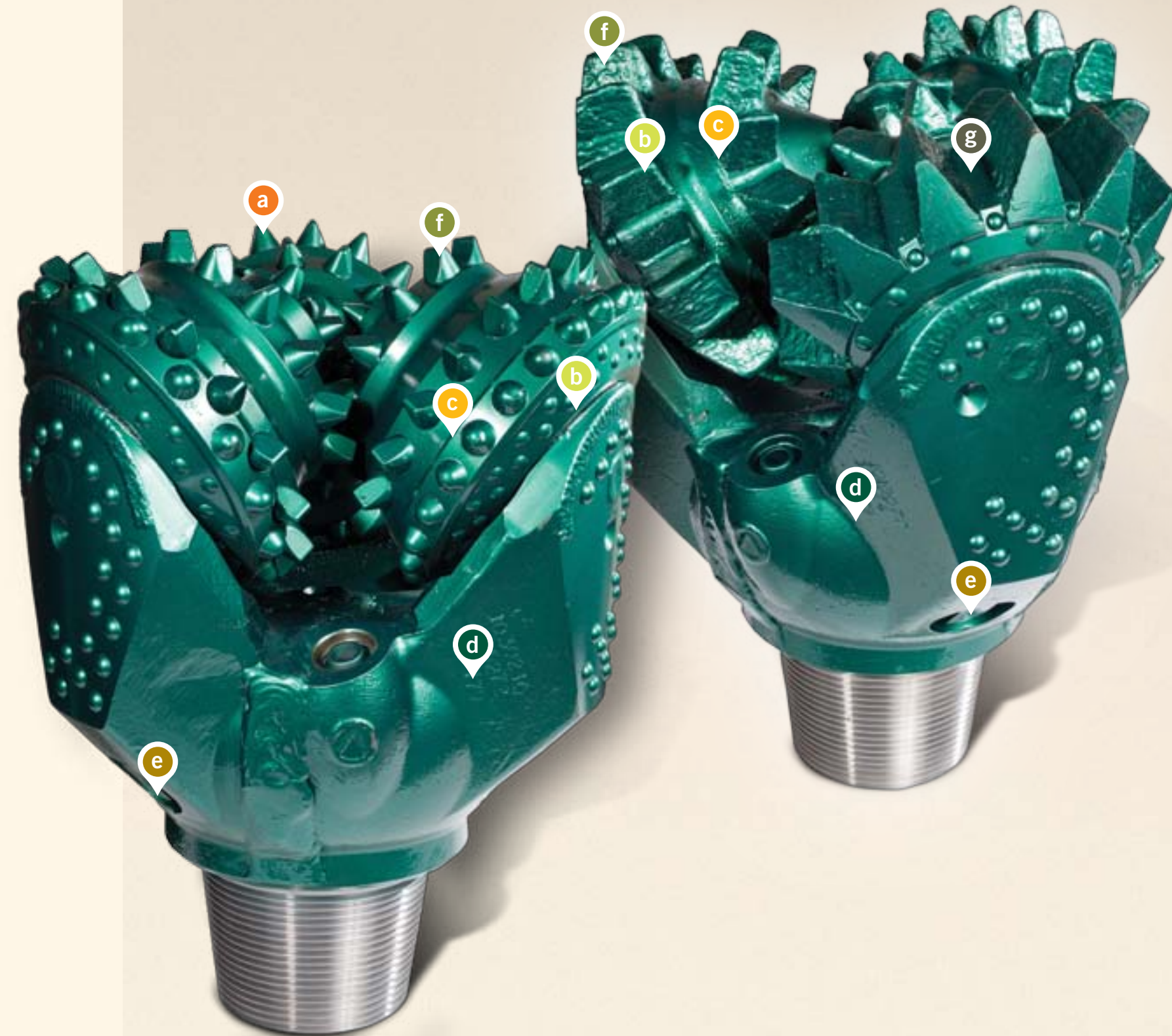
A new high viscosity grease is used to reduce friction and increase reliability in higher temperature applications. Grease flow paths were increased to aid in free communication of lubricant.

f Optimized Cutting Structure

High Roller cutting structures are designed to maximize ROP and directional control. Steel tooth cutting structures have high offset, wide tooth spacing, and anti-tracking tooth deletions to maximize action on bottom and resist balling. TCI cutting structures are calculated to maximize ROP with available weight on bit. Inserts are designed with aggressive tooth extensions, durable shapes, and feature HET processing to provide reliable performance in vertical sections or on steerable systems.

g Enhanced Hardmetal

Newly enhanced **DuraClad™ Hardmetal Technology**, a new hardfacing compound, is applied to provide additional durability to critical areas of the bit and to steel tooth cutting structures for long lasting performance.



DuraClad™ Hardmetal Technology

Through intense investigation of welding specifications for hardmetal application, processes were reviewed and adjusted to produce accurate, repeatable outcomes. The DuraClad™ Hardmetal Technology specifications now allow for a 20% increase in hardmetal application to the critical areas of the bit. This produces a bit with a more durable, long-lasting cutting structure. Skilled welders are provided with extensive application training and are regularly audited as part of Varel's commitment to quality.

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