D-FORCE™

THE PREFERRED SOLUTION FOR ABRASIVE FORMATIONS

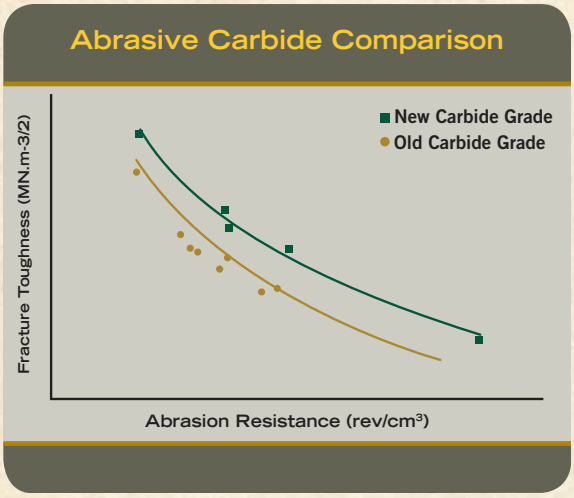
VAREL
MINING AND INDUSTRIAL

D-Force™ Roller Cone Bits

Varel D-Force bits are the preferred solution for drilling abrasive formations. Varel is the leader of high performance drill bits for abrasive applications and utilizes application targeted cutting structures, select premium materials, and 440+ years of mining technology experience within the Varel Mining & Industrial group to reduce our customers' costs of drilling.

Abrasive Ground Drilling Solutions From D-Force:

- Reduce total drilling cost
- Lower cost per drilled ton
- Increase ROP
- Fewer bit changes reduces risk of injury
- Maintain borehole diameter longer
- Increase available hours per shift for drilling
- Abrasion resistant carbide improves bit life



Computer Aided Design and Analysis

- Created in house as a proprietary design solution for roller cone cutting structrues, RC Pro allows Varel engineers to fully develop a bit's cutting structure for the required application.
- Advanced Modeling Package (AMP) is a stand alone virtual drilling simulator for roller cone bit designs utilizing formation information. This software predicts how effective the cutting structure is at drilling the rock based on input variables from mine personnel and Varel engineers.

New Abrasion Resistant Carbide

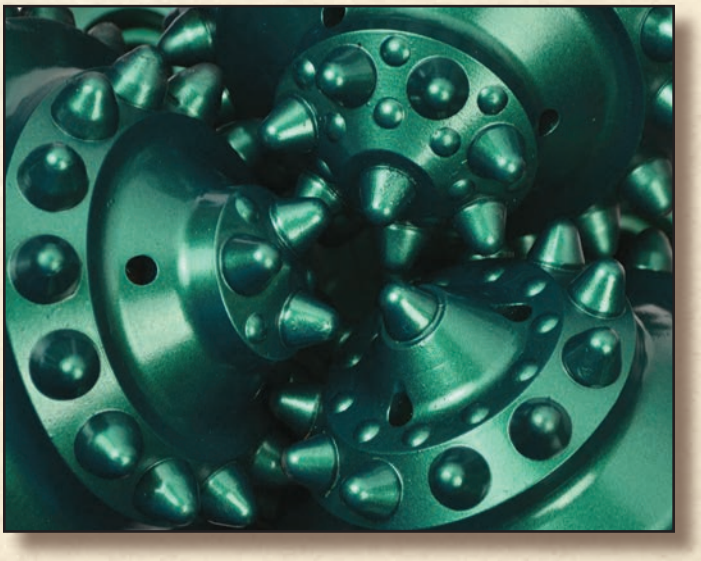
As part of ongoing research and testing in all mining products and materials, Varel has developed new, abrasion resistant carbide grades. These new grades have improved both the fracture toughness and abrasion resistance of tungsten carbide inserts (TCI) available for Varel Mining & Industrial roller cone bits.

Features

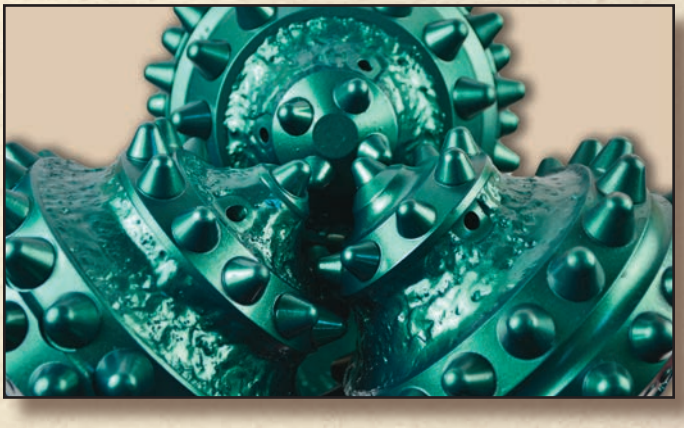
Decades of engineering and development have created this line of superior mining bits. D-Force bits combine the most pertinent and powerful features available to increase your "mine to mill" results in abrasive ground.

Sidewinder Shirttail provides a return path for cuttings to flow up the side of the head and into the annulus reducing recirculation of cuttings on bottom and improving ROP through enhanced chip removal.

Vented Cones provide improved airflow through the bearing to help reduce heat generation and also help keep the bearing clean for improved bit life. This is of particular use in high altitude applications where compressor output is reduced.



Interstitial Inserts provide additional cone protection. Abrasive formations wear the cone nose away quickly, but with these small tungsten carbide inserts, the TCI cutting structure is protected, eliminating cone wear.



Hard Shell Cones provide maximum durability for any application. The hardfacing within the grooves of each cone prevent wear of the cone steel.

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WORLD HEADQUARTERS
VAREL NORTH AMERICA

Toll Free: +1.800.827.3526
Phone: +1.972.242.1160
Fax: +1.972.242.8770
Email: varelminingnorthamerica@varelintl.com

VAREL SOUTH AMERICA

Phone: +51.1.365.2529
Fax: +51.1.365.8305
Email: servicioalcliente@varelintl.com

VAREL ASIA-PACIFIC

Phone: +61.8.9315.9999
Fax: +61.8.9315.9800
Email: varelminingaustralia@varelintl.com

VAREL EUROPE, AFRICA, ME (EAME) & CIS

Phone: + 33.5.59.14.48.41
Fax: + 33.5.59.98.78.62
Email: varelminingeamecis@varelintl.com

 | www.varelmining.com | miningcustomerservice@varelintl.com