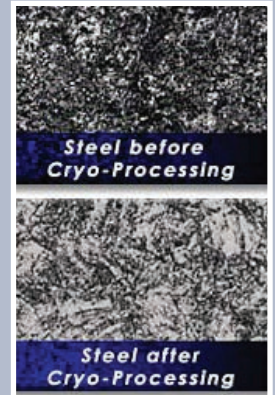


CRYOGENIC TREATING



Taylor Cryogenics, LP is a subsidiary of Black Viper Energy, LP and provides deep cryogenic treatment to virtually all types of parts. Deep cryogenics realigns the grain structure of metal & other materials sub zero temperatures to increase durability, wear resistance and dimensional stability.



Why cryogenics? – Cryogenics is truly a Space Age technology for treating materials. In the early 1960s, aerospace engineers applied the benefits of cryogenic treatment to stress relieve parts for use in space. Soon afterwards, the military used super cold treatment on aircraft. Many industrial uses have emerged from this technology.

Cryogenic processing brings the materials down to typical -120°F (-84°C). This process mimics the age old tradition of the swiss watch makers of taking steel and other materials and leaving them in the Alps during the seasonal changes. Our process of deep cryogenic tempering uses an advanced computer-controlled thermal processing system to treat materials at an extremely low temperature.

The process of deep cryogenic tempering involves ramping the temperature down to -300°F (-184°C) at a rate of 1 degree per minute, then holding for 24 hours, afterwards returning to ambient temperature at the same rate. This allows the realignment of the molecular structure, enhancing wear characteristics in the structure of steel.



A Subsidiary of Black Viper Energy Services, LP

P.O. Box 2552 • 11220 WCR 127 • Midland, TX 79702 • Office: 432.561.8801

Fax: 432.561.8870 • International: 00 + 1 + 432.561.8801 • www.blackviperenergy.com

Deep cryogenics treatments boosts the performance and service life of critical components. Observed changes include increased resistance to abrasion, resistance to fatigue, increased electrical conductivity, and stabilization of metals to reduce warping under heat, stress and vibration.

Some of the beneficial results on cryogenic treatment:

- Increases abrasive wear resistance
- Requires only one permanent treatment
- Creates a denser molecular structure, producing a larger contact surface area that reduces friction, heat and wear
- Changes the material's entire structure, not just the surface
- Subsequent refinishing operations or re-grinds do not affect permanent cryo tempering
- Transforms almost all soft retained austenite to hard martensite in steel
- Forms microfine carbide fillers to enhance large carbide structures
- Increases durability or wear life
- Decreases residual stresses in tool steels
- Decreases brittleness
- Increases tensile strength, toughness and stability coupled with the release of internal stresses
- Does not change hardness

There is a wide range of applications for cryogenic treatment.

Automotive

Cryogenic processing is currently in use in every form of racing imaginable. It is used in



virtually every class of NASCAR racing, IRL, CART, NHRA, IHRA, SCCA, IMSA, and ARCA.

Among the automotive parts that can be cryogenically treated are:

Brakes and clutches, springs, chassis, gears, shafts and assemblies, connecting rods, cylinder heads, camshafts and lifters, bearings, cylinders, pistons and rings, crankshafts

Oil field

Cryogenics is used in the treatment of any tool or part that is subjected to high wear shock loads or torsional stress.

Other applications

Stereo sound reproduction, industrial tools, sporting goods, firearms, and musical instruments

For information on how cryogenic treating could benefit your business, extend the service life of your equipment, and help maximize your return on investment, contact Taylor Cryogenics, LP.



Midland, Texas

Black Viper Energy Services, LP
P.O. Box 2552
11220 WCR 127
Midland, TX 79702
Office: 432.561.8801
Fax: 432.561.8870
International: 00 + 1 + 432.561.8801
www.blackviperenergy.com

Viper Bit Services, LP
Taylor Cryogenics, LP
915 South Goode Street
Midland, TX 79702
Office: 432.617.5000
Fax: 432.617.5004
International: 00 + 1 + 432.617.5000

Oklahoma City, Oklahoma

District Office
32125 South Ann Arbor
Oklahoma City, OK 73179
Office: 405.681.8900
Fax: 405.681.8916
www.blackviperenergy.com

Casper, Wyoming

District Office
7340 Gray Cloud Road
P.O. Box 1638
Casper, WY 82602
Office: 307.234.0063
Fax: 307.473.3066
www.blackviperenergy.com