## A single cryogenic treatment will increase overall performance and extend component life.

CryoPlus part treatment improves performance, fuel economy, and service life for performance and commercial vehicles. The treatment enhances the mechanical properties of materials increasing strength, durability, and dimensional stability. Treated engines deliver improved compression, fuel economy, and increased horsepower with reduced vibration. Components are also less prone to high temperature operational problems. Heads and other components resist warping or distorting maintaining proper tolerances between components. Brake rotors last 40% longer with increased material durability and no warping or cracking. Cylinder and piston performance is increased with improved wear resistance, and tighter dimensional tolerances are maintained with greatly reduced thermal expansion/deformation.

## Why have CryoPlus treat your tooling and parts?

- Increased durability/strength of components and reduced internal stresses
- Increased material uniformity and dimensional stability
- Reduced friction increases horsepower and improves fuel economy
- Engines can run hotter without adverse effects
- Reduced component wear
- Eliminates engine component warping and distortion
- Longer service life between rebuilds
- Reduced operating costs over the life of the engine

## Here's proof: CryoPlus treatment improves vehicle part performance.

*"Brake rotors require careful break-in and go through a stage where they warp and knock the pads, giving a poor pedal for a few laps. CryoPlus treated rotors don't go through any of this. There is no surface cracking or crazing."*

Pat Smith, Dyson Racing Team Inc.
Poughkeepsie, NY

*"The proof is in the starting. With cryo-treated parts, motors start quicker, spark plugs don't foul out anymore, and I get better gas mileage, too. I haven't changed spark plugs in six races, which is unheard of! And instead of changing valve springs every 400 laps—now it's 1000 laps. With CryoPlus, my motorcycle performs better than ever!"*

Roy Hostetter, Hoss Cycle
Ashland, OH

*"I used to have to adjust my Yamaha motorcycle chain after the first run because it would stretch. After cryo-treatment, the chains don't stretch at all, and the treatment also keeps cam chains from breaking. I haven't broken a chain since I started cryo-treating all of my parts."*

Lloyd Meeks, Meeks Racing
1995 Top Gas Winner
Akron, OH

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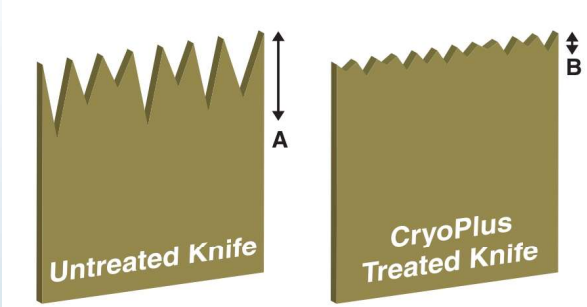
CryoPlus
CRYOGENIC SERVICES

# MOTORSPORTS & AUTOMOTIVE

## CRYOGENIC TREATMENT FOR RACING, RECREATIONAL, AND COMMERCIAL VEHICLE COMPONENTS

## What is Cryogenic Treatment?




**On a microscopic level, untreated tools experience aggressive wear and crack patterns. To re-sharpen these tools, a substantial area of the cutting surface (A) must be ground down to reach solid material. A CryoPlus-treated tool resists wear and cracking, and retains its cutting edge much longer than untreated tools. When sharpening a treated tool, significantly less of the edge surface must be ground away (B), resulting in substantially longer tool life.**

Cryogenic tempering of metal parts and tools is a thermal treatment process that greatly improves the metal's physical characteristics. It is not a surface treatment; the entire mass is made stronger, more uniform, and more durable. Cryogenic treatment chambers utilize computer controlled processors to chill metal parts to -300°F for a prescribed duration — a process known as "cold soaking". The chamber then returns the parts to ambient temperature, after which they are heated to +300°F for a period of time.

During the heat treating and quenching of tool steels, most of the austenite (a soft form of iron within the alloy) is converted to martensite which is strong and hard. However, there is often a considerable amount of retained austenite after heat treatment and the additional step of deep cryogenic processing works to further convert the majority of remaining austenite to martensite. The resulting treated steel has significantly enhanced properties, more uniform grain structure, and greater dimensional stability. This is an example of a very common application with tool steels, but cryogenic processing can be applied to a variety of metals an even nonmetals for the enhancement of various properties. Cryogenic treatment permanently enhances the performance of materials.

## CryoPlus: A Leader in Cryogenic Processing

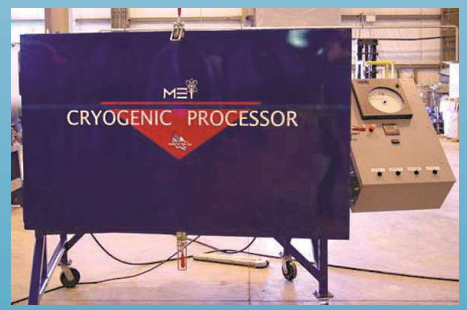
CryoPlus is recognized as one of the leading cryogenics service providers in the industry. CryoPlus was established in 1994 to provide cryogenic services for the woodworking, logging, metal forming, stamping, tool and die, shearing, slitting, welding, punching, musical, and racing industries. CryoPlus treats a wide variety of materials, including ferrous and non-ferrous metals, alloys, and carbides.

CryoPlus uses a specially designed processor engineered for maximum performance and efficiency. The cryogenic and tempering cycles are microprocessor controlled and occur within an 8,000 pound capacity chamber. Liquid nitrogen flows through a unique spray distribution system inside the chamber and is vaporized into an expanded gas, while a circulation fan ensures proper heat transfer through all parts being processed. Note that treated parts are not subject to direct contact with the liquid nitrogen, thereby eliminating any risk of thermal shock or distortion.

## CryoPlus Service

The CryoPlus treatment process takes approximately 36 hours. CryoPlus is centrally located in Ohio for easy and cost effective shipment of parts for treatment from throughout the country.

## CryoPlus Cryogenic Processing Applications

***New or used parts may be treated.***

Aluminum baseball bats
Bearings
Blocks
Blow molds
Brake rotors
Brass instruments
Broaches
Bucket teeth
Calendar knives
Cams
Chain saws
Chipper knives
Chopper blades
Circuit boards
Circular saws
Circular slitters
Connecting rods
Copper resistance welding caps
Crankshafts
Cultivator points
Drill bits
Electronic cables
End mills
Engines
Envelope dies
Extruder barrels & screws
Extruders
Feed screw tips
Forging dies
Gears
Golf club heads
Granulators
Hammermills
Harrow blades
Hobs
Inboard jet pumps
Jordan knives
Key cutters
Lathe knives
Lavel dies
Lawn mower blades
Milling inserts
Pelletizer knives
Perforators
Pistons
Plow shears
Press dies
Progressive dies
Punch dies
Razor blades
Reamers
Rocker levers
Rod Pumps
Router bits
Saw Teeth
Sewing needles
Shear blades
Shredding screens
Shuttle bobbins
Sickle bars
Skate blades
Spades
Splicers
Tines
Vacuum tubes