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WHAT IS CRYOGENICS ?

The word "Cryogenics" comes from two Greek words – 'CRYO' means 'cold' and 'GENICS' is 'born of'. The process works by treating material at below -190°C i.e. (-310°F).

CRYOGENIC PROCESSING

Cryogenic Processing was developed by NASA for aerospace applications and now has many benefits for industrial, commercial and consumer uses.

CRYOGENICS IS A ONE-TIME, IRREVERSIBLE PROCESS

Several different time / temperature profiles are used; depending on certain variables like material composition, wall thickness and total mass being processed. The material is treated at this temperature in certain phased steps and finally brought up to room temperature.

APPLICATIONS

Cryogenic processing can be applied to many different kinds of materials. These range from Steels (all kinds of Steels, Tool Steels, HSS, HCHCr, Stainless Steel etc.) , Non ferrous metals like Copper, Zinc Nickel alloys, tungsten and their alloys (brass, bronze), Carbides

At this temperature, in steels three things happen.

- The soft retained austenite of the steel is completely converted to tough martensite structure (up to 99.7%)
- Many small carbide particles (ETA carbides) are created that are evenly distributed in the martensitic matrix.

Thus the key to success of this process if uniformity and homogenous molecular level structural changes.

BENEFITS AND FEATURES OF CRYOGENIC PROCESSING

- Processed materials have increased wear resistance.
- Increased toughness, Reduced Brittleness.
- Increase in impact resistance, fatigue limit.
- Parts that are treated show very high dimensional stability. Items are able to maintain dimensions for extended period of time and repetitive stress cycles.
- Cryogenic processing saves you money with longer lasting equipment; it is a solid treatment; the entire mass is affected thus the effect of the treatment is retained even after regrinding and re-sharpening.

INDUSTRIAL APPLICATIONS

All types of industrial tools can be treated with improvement in life from about 100% to 600%.
Cutting tools of HSS and Carbides, Hot and cold rolls for rolling and forming operations, Press tooling like punches, dies, progressive dies, Carbide tools and Carbide Inserts last longer

INDUSTRIAL COMPONENTS

Cryogenic processing makes parts wear resistant, tougher and uniform, but less brittle. As a result cutting tools, gears, chains, bushings, welding tips, wear parts, cutters and more will last 2 to 5 times longer. The resultant pieces are more ductile, less brittle with an increase in bending strength, and tougher with an increase in resiliency. Benefits include longer life, less tendency to crack, and this one time, permanent and irreversible process means that parts that are reground or re-sharpened do not have to be treated the second time.

BENEFITS TO GAUGES

- Highest dimensional stability due to complete elemination of retained austenite
- Increase wear resistance and toughness which improves gauge life (reduces wear and tear and breakages)
- Longer lasting gauges which give higher productivity and reduced time loss due to frequent calbration and polishing/recondition
- Reduced gauging/measuring cost per piece