PRODUCT APPLICATION NO: HTGMWH2022

PRODUCT APPLICATION

Vacuum Heat Treatment

At our LaserBond Smeaton Grange facility we have three large Heat Treatment Vacuum Furnaces.

A Vacuum Furnace is a type of furnace whereby the product in the furnace is surrounded by a vacuum during processing. The absence of air or other gases prevents oxidation and heat loss from the product through convection, and it also removes any source of contamination.

We have the ability to conduct many heat treatments, including Vacuum Hardening and Tempering, Annealing and Age Hardening on a huge variety of steels.

We can carry out heat treatment to a large number of parts and materials and the process can vary immensely, as it is dependent on the material to be treated.

Vacuum Hardening & Tempering

Vacuum Hardening is the hardening of components under a controlled partial pressure, during which temperatures of up to 1300 Degrees Celsius can be reached. The process involves using a vacuum pump to remove the air from the sealed chamber where the heat treatment will take place. By removing air from the environment during the hardening process can lead to better and more predictable results.

The vacuum hardening process can also improve the properties of metal. After treatment the metal comes out harder and resists corrosion better. Some other benefits include:

- **Improved properties** - greater tensile strength, better shear strength ductility, and improved elasticity.
- **No discoloration** - there are no impurities in the vacuum, which could result in discoloration or scalding.
- **Avoid oxidation** - no oxygen comes into contact with the metal, therefore there is no chance for oxidation to occur and weaken the metal.
- **Faster results** - this method allows for faster heating and cooling treatments to occur.

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Annealing

Annealing is a heat treatment that alters the physical and sometimes also the chemical properties of the material.

During the annealing process the metal is heated to a specific temperature and allowed to cool at a specified rate. This will remove the impurities in the grain structure, increase the ductility of the metal and reduce its hardness, making it more workable.

Age Hardening

Age hardening is a heat treatment technique used to increase hardness of any metal by relatively low temperature heat treatment. It causes precipitation of components or phases of the metal from a supersaturated solid.

Why Heat Treatment

Some reasons why we recommend heat treatment is to harden steel for wear and corrosion protection. Heat treatment, such as annealing is done to soften steel, change the structure to remove stresses and prevent cracking.

The many processes and practical applications of heat treatment are used in various ways to prevent steel from moving later due to stresses placed upon the steel. It can also be used to prevent premature failure with some items.

We will be able to work with you to recommend appropriate heat treatment processes if required.

About LaserBond

We are a specialist surface engineering company, founded in 1992, that focuses on the development and application of materials, technologies and methodologies to increase operating performance and wear life of capital intensive machinery components. Our surface engineering technology has applications across many industries, such as resources and energy, agriculture, advanced manufacturing, defence and infrastructure construction.

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