

# Isothermal hardening

Making steel hard and wear resistant



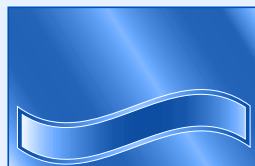
High wear resistance



Increased mechanical properties



High stability



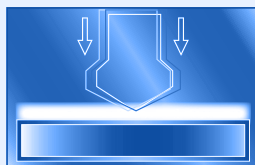
Improved fatigue strength



High hardness



Improved ductility



Increased impact resistance



Increased bending fatigue strength

# Isothermal hardening

## Making steel hard and wear resistant

### What is Isothermal Hardening?

Isothermal hardening is a special hardening technique, also called hot-bath hardening. It is a hardening process, where unlike conventional hardening or tempering cooling is not immediately carried out below the MS temperature (martensite start temperature). Alike conventional hardening steel alloys are first heated and then cooling at such a speed that a significant increase in hardness occurs. In most cases, isothermal hardening also occurs in relation to a subsequent new heating.

### How does hardening take place?

The isothermal hardening process of workpieces can also be divided into three technical steps. First, the workpiece is heated so that the output structure transforms into an austenitic structure. This austenitizing temperature depends on the material used (750 °C – 1210 °C).

Then the workpiece is maintained at this temperature so that alloying elements can be incorporated homogeneously in this austenitic structure. The final step is quenching the workpiece with a cooling rate such that the desired structure is originated. Unlike conventional hardening, products are now quenched in a salt or oil bath at a temperature above the MS temperature. The products remain, depending on their geometry, in this salt or oil bath.

### Bainitic Hardening:

Bainitic hardening is a special hardening technique in isothermal hardening. Steel alloys are maintained so long above the MS temperature so that no martensite structure, but a bainite structure is originated.

The bainite structure is a stable structure where hardness as well as the toughness are improved. This is due to internal stresses and a better distribution of the carbides. Bainite hardening has the advantage that much less size and shape changes occur during quenching.

### Installations

Mamesta has a belt conveyor oven with salt bath quenching. Belt conveyor furnaces are automated systems with a very high efficiency. They offer exceptional ability and ensure, through computer-assisted processes the strictest manufacturing tolerances are adhered to.

### Properties

- Higher wear-resistance
- Higher hardness
- Improved resistance to deflection
- Improved resistance against fraction/tearing
- Improved resistance to chipping
- Improved ductility
- Excellent combination of hardness and toughness
- Low distortion compared to conventional hardening processes

### Areas of application

- Punch parts
- Coal dust bearing steel types
- Sprockets
- Tools
- Engines and drive parts
- Machine parts

