

What is hardening?

Metallic materials are preferred for their low hardness so that they can be processed more easily.

The process made to give the parts mechanical properties and make them suitable for use is called the hardening process.

In the hardening process, the material is heated to 820-900°C temperatures. Then, sudden cooling and then tempering processes are done. The tempering process takes place at a lower temperature (200°C to 650°C) It is a heat treatment applied to improve the properties of the parts by eliminating the tension and fragile structure formed during the hardening process.



How does the hardening process take place?

It is a type of process called neutral hardening, which consists of the combination of hardening + tempering. As a result of the process, there will be no significant change in the surface chemical composition and hardness of the product compared to the core. Neutral hardening is the most preferred heat treatment method in the industry.

The process consists of three main stages

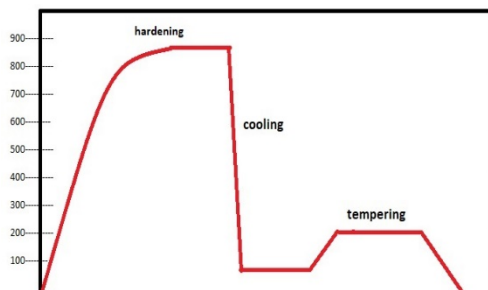
1. First, the steel component microstructure is transformed into a austenitic structure. Austenitic structure can also be described as making the steel suitable for hardening. To make the material austenitic, its temperature should be brought in the range of 820-900 ° C. It is aimed to heat the material completely homogeneously. The determined heat and time varies according to the material properties. The austenite structure is successfully created homogeneously.

It is important to prevent oxidation and decarburization on the surface by keeping the atmosphere under control during the austenitic process.

2. At this stage, the austenite structure is directly immersed in a stable cold environment. Martensitic structure is created. Quenching bath can vary (Water, Oil, Polymer Melted salt, Nitrogen and Argon).

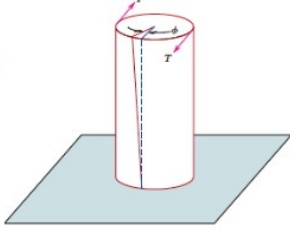
Special heat treatment oil is used as quenching bath in our company. The structure must pass the Ms - Mf temperature ranges fast enough from the austenite state, so the cooling must be fast enough.

3. Tempering process is applied to give the structure ductility and strength.

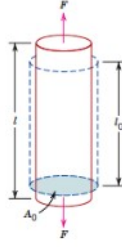


What are the features of Neutral Hardening?

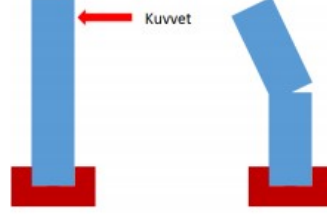
- Higher strength is obtained than non-heat treated material.
- Higher abrasion resistance is obtained than to non-heat treated material.
- Higher hardness is obtained than non-heat treated material.
- Improved ductility is achieved.



Burulma



çekme



Sünek Kırılma (Tokluk yüksek, kırılmadan önce şekil değişimi var)