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What is heat treatment

■ **Hardening treatment** (the heating and cooling of metal to alter their physical and mechanical properties.)

The structure of steel at normal temperature is called ferrite, after ferrite is heated it turns into *Austenite then turns into *Martensite after cooling, and this is called hardening treatment.

The hardening temperature of SK, SKS series is around 800°C, SKD series is around 1000~1050°C, and SKH series is 1200°C and above.

■ **Sub-zero treatment** (process to prevent aged deterioration)

After hardening treatment it will cool below 0°C to enhance the decomposition treatment of austenite. Generally dry ice (-78°C) are used, however, the use of liquid nitrogen (-196°C) as super sub-zero treatment (cryogenics) will result a better decomposing outcome.

■ **Remained austenite**

Structure of martensite has not altered completely from cooling to normal temperature due to the fact that some of the remained austenite is mixed in during hardening treatment.

If there are much remained austenite, inadequate hardness will be happened, arising problem of changing size after heat treatment.

■ **Stabilization treatment**

To prevent aged deterioration, use temper treatment with average temperature. Average temperature range (around 500°C) is the perfect temperature for remained austenite to decompose. After the temper treatment of steel at this temperature the remained austenite is at its active state, which is more likely to decompose and aged deterioration. The solution to stabilizing the remained austenite is after temper treatment continue on with another average temperature temper treatment at 250~450°C.

*Austenite: Name of steel at high-temperature phase.

*Martensite: Solid solution steel after super saturation of carbon atom.

Its nature is brittle not hard.