

## The knowledge of gear steel

Gear steel is a general term for steel that can be used for producing gears. The existence of oxides and sulfides in the steel, harmful elements such as nitrogen, hydrogen, oxygen etc will reduce the mechanical properties and performance of steel, thus produce bad affecting the service life of automobile carburized gears.



Gears are generally manufactured by following steels

1. Low-carbon steel e.g., 1020
2. Low-carbon-alloy steel 20Cr, 20CrMnTi etc
3. Medium carbon steel : C35, C45 etc
4. Medium carbon-alloy steel : 40Cr, 42CrMo4, 35CrMo etc

These kind of steel is usually have a good strength, hardness and toughness, or with high wear resistance and impact resistance in the heart of steel.

Hardenability is One of most important performance indexes of gear steel, which is mainly to ensure the core hardness of gear in different sizes, and also is good for reducing the deformation during heat treatment. The Hardenability and hardenability bandwidth is depend on the uniformity of chemical composition. That is, the control of Carbon, Manganese etc elements which have greatly influence on hardenability.

The grain size is another important index for gear steel. After heat treatment, a fine and uniform austenite grain will get fine martensite structure, it will significantly improve the fatigue property of gear, meanwhile reduce the deformation after heat treatment. Generally It required the grain size not less than 6 class ref. ASTM E112. Mostly it's go by controlling the residual aluminum content to refine grain size.

Banded structure is a kind of defect, for gear steel, the serious banded structure will down the uniformity of carburizing, increase the deformation degree of quenching, SO that lead to a poor dimensional accuracy of carburizing gear. Normally, the banded structure are not allowed to exceed 3 class.

In order to reduce or eliminate the banded structure, an appropriate technical measures should be taken in smelting and rolling process.

During the Smelting process, it should try to reduce the harmful elements, gas and inclusion as much as possible

During the pouring process, it need to take a low pouring temperature, increase the cooling speed and use electromagnetic Stirring.

During the rolling process, it need to take high stiffness and large deformation process and increase the rolling(forging) ratio, meanwhile you should improve the finish rolling temperature.

Any requires on the steel materials, please contact ALTA, we are professional and timely deal your issues.

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