

What are the heat treatment processes for large steel castings?

Large steel castings are widely used in building materials, metallurgy, ceramics, forging, construction and other industries, such as slag pot, vertical mill grinding roller, ball mill girth gear, rotary kiln tyre, rolling mill housing, press machine body, and so on. Large steel castings are generally important components of major technical equipment, and therefore have high requirements for performance and quality.

Due to casting defects such as porosity, cracks, and shrinkage, coarse grain, uneven structure and residual internal stress in the as-cast steel casting, the mechanical properties of the steel casting are reduced. Therefore, heat treatment is an indispensable production process for eliminating casting defects in steel castings.



Several heat treatment methods for large steel castings are:

1. Diffusion annealing (high temperature homogenization annealing): used to eliminate or reduce the segregation of components in steel castings, improve the morphology of certain soluble inclusions (such as sulfides), and make the chemical composition, internal structure and mechanical properties of castings tend to be uniform and stable.
2. Normalizing and tempering: Refining the internal structure by recrystallization, improving the strength and toughness, so that the castings have good comprehensive mechanical properties and the cutting performance of the workpiece is improved.
3. Annealing: Stabilize the size, structure and properties of the castings, so that the plasticity and toughness of the castings are significantly improved.
4. Quenching and tempering: heat treatment method of high temperature tempering after

quenching. The quenching and tempering treatment can greatly adjust the properties and materials of the steel, to make the steel materials have good strength, plasticity and toughness, and have good comprehensive mechanical properties.

5. Stress relief annealing: eliminate the internal stress in the casting, mainly used for repair parts, welding repair and roughing stress elimination.

6. Water toughness treatment: Austenitic castings such as high manganese steel require water toughening treatment.

Steel castings include carbon steel, alloy steel, high manganese steel and other materials. In the production process of large steel castings, it is necessary to adopt reasonable post-processing technology according to the specific materials of steel castings to improve the mechanical properties of castings.

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