MODERN TECHNOLOGIES OF HARDENING OF MACHINE PARTS

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In the laboratory "High-energy methods of hardening" at the engineering faculty of the educational institution "Baranovichi State University" there is a unique installation that allows to realize the process of ion-plasma nitriding of machine parts.

The essence of the method of ion-plasma nitriding lies in the fact that an anomalous glow discharge is generated between the cathode on which the machined parts are located and the anode, the role of which is performed by the walls of the vacuum chamber, in the discharged vacuum nitrogen-containing gaseous medium, which forms the active medium (ions, atoms excited molecule).

This ensures the formation of a nitrided layer on the surface of the product, consisting of an external - nitride zone with a diffusion layer located below it.

The nitrided layer obtained by this method has a high hardness and wear resistance. The wear resistance of nitrided steel is 1.5 ... 4 times higher than the wear resistance of hardened high-carbon steels which had the process of cyanidation, carburization and nitrocarburization.

Nitriding reduces the viscosity of steel, increases its strength, reduces the influence of stress concentrators on the reduction of the endurance limit of steel and significantly increases the endurance limit, in particular that of thin parts and parts that work in some corrosive environments.

The main advantage of the method is stable quality of processing with minimal dispersion of physical and mechanical properties of the part. In comparison with the widely used methods of hardening the chemical-thermal treatment of steel parts, such as carburizing, nitrocarburizing, cyanidation, gas nitriding, the ion-plasma nitriding method has the following main advantages: higher surface hardness of nitrided parts; no deformation of parts after processing; increase of the endurance limit with increasing wear resistance of machined parts; lower process temperature, due to which the processed parts have no structural changes;

the ability to process blind and through holes; preservation of hardness of the nitrided layer after heating up to 600 - 650 ° C; the possibility of obtaining layers of a given composition; the possibility of processing products of unlimited sizes of any shape; absence of environmental pollution; improving the culture of production; reduction of the cost of processing.

The method of ion-plasma nitriding is promising for hardening machine parts that work under friction wear conditions. The hardness of the surfaces of machine parts is increased by 2 ... 2.5 times. Besides the method is environmentally friendly (clean).

References

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