

## **Effect of Diffusion Chromized Coating on Produced Steel from Powder Materials**

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### **Abstract**

Thermo-chemical treatment of chromium on the surface of produced steel from powder materials process is considered as one of the methods in surface treatment. It is used to improve the mechanical and tribological properties of the machine elements recently, that are exposed to corrosion and wear. The treatment processes have performed in chromium chlorides atmosphere at high temperature.

The thickness of diffusion layers was studied, the phase and microstructure composition, porosity across the depth profiles in diffusion zone were ministered. The effect of the chromizing level during the process and various parameters such as time, porosity and temperature on the growth of diffusion layer on the surface of medium and high carbon steel have been investigated.

The results show that the method of diffusion treatment chromized has a significant and important effect to the work capacity of machine elements that are exposed to dry friction. Stability of powder material after chromizing was 2.5 – 3.5 times higher for wear resistance and 10 – 20 times higher for corrosion resistance in magnitude as compared to materials treated by sintering only.

The results show the technological possibility to combine sintering with chromizing in order to reduce the cost, and improve tribological characteristics, corrosion resistance of powder steel, wick the possibility of replacing steel parts that are manufactured with conventional methods in other parts that are made from powder materials.

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**Keywords:** Powder steel, sintering, porosity, diffusion chromizing, coating layer, microhardness, structure, wear/corrosion resistance, mechanical and tribological properties.

For the abstract in Arabic see pages (165-175).

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