Main Characteristics and Components of High Performance MIM Vacuum Sintering Furnace

A **MIM vacuum sintering furnace** is a type of equipment used for the Metal Injection Molding (MIM) process. It involves injecting metal powder into a mold and then sintering it in a vacuum environment to achieve the desired shape and structure. These furnaces typically use high temperatures and pressures to accelerate the sintering process of the metal powder, enabling efficient production. MIM vacuum sintering furnaces are widely used in industries such as automotive, medical, electronics, and aerospace, as they can produce metal parts with high precision, strength, and corrosion resistance.

The market for MIM vacuum sintering furnaces is experiencing rapid growth and is expected to continue its strong momentum in the coming years. The global market size for MIM vacuum sintering furnaces is projected to increase from approximately $250 million in 2021 to around $350 million in 2026, with a compound annual growth rate of 6.8%. The demand for high-precision, high-strength, and corrosion-resistant metal parts is continuously increasing in industries such as automotive, medical, electronics, and aerospace, which is driving the growth of the MIM vacuum sintering furnace market.

I. Introduction

In the past two to three decades, metal injection moulding (MIM) technology has become increasingly complex, and its application has covered a wide range of different industries.

With the increasing demand for high-quality parts with small geometric deformation and strong material properties, MIM technology has spread into

the production lines of all aspects, such as automobile, medical equipment and mobile phone manufacturing. High power density areas (e.g. modern automotive engines, power assemblies and machine manufacturing) require compact mechanical systems that provide greater innovation potential and productivity. In addition, complex MIM components have many advantages. For example, they can effectively reduce the assemble time of notebook computers, mobile phones and other mass-produced products.

In order to meet the needs of the industry for continuous development of technical requirements, we must explore the growth space of MIM equipment in accuracy and efficiency. Current limitations such as parts mechanical and chemical properties and optical appearance are mainly caused by the following aspects:

1) Non-uniform shrinkage (geometric deformation)

A. The mixture of powder and raw material is not uniform.
B. Density fluctuations caused by injection and/or the first degreasing stage;
C. The temperature in sintering furnace is not uniform.

2) Chemical decomposition and color

A. Imprecise process gas management;
B. The binder is deposited again in the second degreasing step.
C. Residual sintering furnace pollutants.

In addition to these technical constraints, the competitive market environment shifts cost pressures to component manufacturers. For this reason, in order to promote the MIM industry to move forward, higher profits, sophisticated production equipment and materials are the key.

Harber Metal based on R & D and innovation has a number of completely independent intellectual property rights patents, our mim factory has always attached importance to the investment in technology and process, through independent innovation, synchronous development with the customer and other ways in the product structure and process and other aspects of the formation of a strong advantage, according to the guests want to effect, to design a variety of new intelligent products. Our products are widely used in intelligent robots, intelligent electronic locks, intelligent time and attendance machines, intelligent home systems, intelligent sweepers, power tools, meat grinders, remote control fuel trucks, underwater yachts, automobile central locks, eyeglasses, cell phones, paper shredders, instruments, beauty equipment, medical equipment, aviation models, watches, ATM machines, etc.; exported homemade products are exported to Hong

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