磁盒使用后发生退磁现象的原因分析

ANALYSIS OF THE CAUSES OF DEMAGNETIZATION AFTER USE OF THE SHUTTERING MAGNET

With the rapid advancement of building industrialization, an increasing number of precast concrete component factories have begun utilizing shuttering magnets to secure side molds. However, many of these factories have reported that after a period of use, the magnetic boxes exhibit significant demagnetization, leading to insufficient suction and inadequate mold fixation. This results in substandard component quality, causing many customers to question the effectiveness of shuttering magnets. Additionally, the substantial loss associated with shuttering magnets, coupled with their higher costs compared to traditional screw fixation and labor, adversely impacts their application prospects.

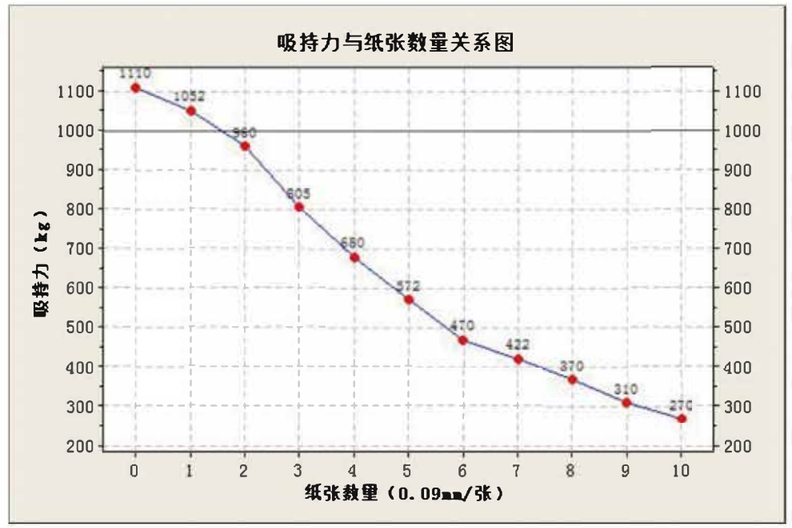
Based on our visits to numerous component factories and our expertise in magnetic materials and components, we have conducted an analysis of the potential causes of the demagnetization phenomenon that occurs after the use of shuttering magnets.

1. Operating temperature

Shuttering Magnet is primarily composed of sintered NdFeB permanent magnet material. Sintered NdFeB is widely utilized in various applications, ranging from standard suction components to permanent magnet motors, voice coil motors, high-end audio speakers, and mobile phone vibration motors, among others. Depending on the specific application, different performance grades of NdFeB materials are selected. When considering operating temperatures, high-performance sintered NdFeB materials can withstand maximum temperatures of up to 230 degrees Celsius, while the lowest performance materials can tolerate temperatures up to 80 degrees Celsius. If the temperature during the production and maintenance of our PC components remains below 80 degrees Celsius, it will not affect the magnetism of the magnetic box. However, if the magnetic box is required to operate at temperatures of 80 degrees Celsius or higher, a higher grade of NdFeB material should be employed.

2. The magnetic surface is uneven and does not fit securely against the mold table.

When using the Shuttering Magnet, it is essential to ensure that there is no debris at the bottom, as this can adversely affect its adsorption force with the mold platform. In its operational state, the adsorption surface at the bottom of the magnetic block fits tightly against the steel mold platform, ensuring a strong hold. However, the presence of foreign objects—such as concrete, grease, or film—between the magnetic block and the platform can prevent a secure fit, significantly reducing the adsorption force. To illustrate this, we used our company's QCM-1000B model magnetic box to investigate the relationship between adsorption force and the gap between the bottom of the magnetic block and the platform. We placed between 0 to 10 A4 sheets of paper (each with a thickness of 0.09 mm) between the bottom of the magnetic block and the platform to measure the adsorption force of the Shuttering Magnet at various gap sizes. The test data is as follows:



As illustrated in the figure above, the gap between the bottom of the magnet block and the platform significantly influences the pull force of the shuttering magnet. Therefore, we recommend that customers conduct daily maintenance on the shuttering magnet.

On the other hand, the structure of the magnetic block itself can lead to uneven magnetic surfaces if the production process is not meticulously controlled. The magnetic block is assembled using NdFeB magnets and iron bars connected by bolts. If the size and positioning of the screw holes are not accurately managed, the overall surface of the iron bars may become uneven after assembly, necessitating smoothing with a grinder. During operation, the screw rod that passes longitudinally through the middle iron bar exerts a pulling force on the entire magnetic block. If the size tolerance of the hole is excessively large, a gap may form between the screw rod and the horizontally positioned iron bar, resulting in misalignment of the iron bars. This misalignment can lead to an uneven overall magnetic surface, significantly affecting the pull force of the magnetic block. To ensure optimal assembly of the magnet and iron bar into a magnetic block, it is crucial that the magnet surface is positioned as low as possible relative to the plane of the iron bar. This positioning helps to prevent collisions. Additionally, the magnet requires a protective layer to guard against damage and corrosion. To protect the magnet, our company employs advanced technology to affix a stainless steel ring to each magnet, ensuring a tight fit through welding and mechanical fastening.