

Degreasing / sintering furnace

Degreasing and sintering process is to remove the binders and the spaces between the metal powders to create dense metal component. In this newsletter, we are introducing the degreasing and sintering furnace.

Furnace Type

Furnaces used in the sintering process are classified into 2 types; continuous and batch furnaces. Continuous furnaces are suitable for mass production of the same product because it takes time to start up and change the conditions. Some say that it is more difficult to control the atmosphere than a batch furnace however it has the advantage that the temperature variation is small. On the other hand, batch furnaces are less productive compared with continuous furnaces. However, the energy consumption during idling is almost zero. It is the mainstream to employ batch furnace in the MIM industry where the demand for various kinds in small quantities is increasing. In particular, it is indispensable for the MIM production with high-performance materials with complicated sintering conditions since it is easier to control the temperature and atmosphere than continuous furnaces.

Role of degreasing and sintering furnace



Cr. Photo <https://www.shimadzu.co.jp>

The degreasing furnace is used for removing the binder contained in the green part. The green part usually contains about 40% in volume of binder and generates a lot of volatiles at low temperature. Therefore, it is required relatively large gas flow and the exhaust line which traps the volatiles system. There is also a method to accelerate the degreasing reaction in an acidic atmosphere. In this case, a dedicated exhaust gas treatment device is installed.

It is called a brown part which most of the binder has been decomposed and removed through the degreasing process. In this brown part, the metal powders are bonded only by a small amount of residual resin, thus, very brittle and difficult to handle. The brown part is placed on a ceramic setter and delivered to the sintering furnace.

The sintering furnace is for obtaining a dense metal body. It is required to maintain a non-oxidizing atmosphere with high temperature uniformity. The sintering furnace is divided into two types, metal or carbon depending on the internal structure material. In metal-based furnace molybdenum is widely used in terms of melting point, vapour pressure, coefficient of thermal expansion, high-temperature strength, etc. On the other hand, carbon furnaces are less expensive and easier to operate than metal furnaces.

μ -MIM degreasing and sintering technology

In recent years, furnaces that combine the degreasing furnace and sintering furnace have become widespread in the MIM industry. The integrated furnace eliminates the handling of the brown body and increases productivity. However, since degreasing and sintering are performed in the same space, it is important to properly treat organic substances that evaporate during the degreasing process.

Micro MIM Japan Holdings Inc. and Taisei Kogyo Co., Ltd. have employed the originally developed integrated furnace since the beginning of its MIM business in the 1990s. During over 20 years of experience, we have developed sintering technology, such as materials having very narrow process window.

Column

We have attended the MD&M exhibition in Anaheim, USA. It was almost always sunny outside and we had some great opportunities to contact new and existing customers from different countries. The next exhibition we will have a booth is at Micronora in Besancon, France between 22-25 September 2020. Please come and visit us!

