

稀有金属粉末烧结炉水冷变压器

Water-cooled Transformer for Rare Metal Powder Sintering Furnace

■ 产品概述(Product Introduction)

粉末冶金烧结炉是一种利用金属粉末(或金属粉末与非金属粉末的混合物)作为原料, 经过成形和烧结制成金属或合金零部件的热处理设备。主要用于压制成形的铁基、铜基及其它相关粉末冶金制品。广泛应用于军工、汽车、机械、家电、电动工具、磁性材料等。

烧结时需要使用压力而有加压烧结炉。这种炉子主要用于薄层制品如粉末冶金摩擦片的烧结。钟罩炉便是一种典型的加压烧结炉。

为提高生产效率和保证产品质量, 在粉末冶金铁基制品的烧结中, 发展了金属网带传送式烧结炉和步进梁式烧结炉。它的电热元件, 低温段用镍铬丝, 高温段用碳化硅棒, 工作温度可达1300℃。在高温段也有用高温铁铬铝钴合金丝作电热元件的。步进梁式烧结炉的电热元件, 低温段用0Cr25Al5铁铬铝丝, 高温段用钼丝或高温铁铬铝钴合金丝, 也有用碳化硅棒的。

我公司定制研发的烧结炉专用水冷变压器整机容量450kVA, 分为6个安装单元, 分别布置到炉体侧面, 整机安装高度达到2米, 对抗震结构提出了很高的要求。为了保证高温炉的调温要求, 水冷变压器要具备原边大范围调压功能, 这给水冷变压器的研发制造提高了很大难度。经过精确的电气参数设计计算和科学的结构设计, 在保证产品的电气性能优良的前提下, 高压线圈采用自冷箔式结构, 低压线圈采用水冷铜管式结构, 整体线圈为同心式分布轴向压装, 既降低了器身高度, 且保证高效的散热。产品得到用户认可及好评。



Powder metallurgy sintering furnace is a heat treatment equipment that uses metal powder (or a mixture of metal powder and non-metal powder) as raw materials to form and sinter metal or alloy parts. It is mainly used for press-forming iron-based, copper-based and other related powder metallurgy products. It widely used in military industry, automobiles, machinery, home appliances, power tools, magnetic materials, etc.

Pressure is required during sintering and a pressure sintering furnace is needed. This furnace is mainly used for sintering thin-layer products such as powder metallurgy friction discs. The bell furnace is a typical pressure sintering furnace.

In order to improve production efficiency and ensure product quality, in the sintering of powder metallurgy iron-based products, metal mesh belt conveyor sintering furnaces and walking beam sintering furnaces have been developed. The electric heating elements use nickel-chromium wire in the low-temperature section and silicon carbide rods in high-temperature section. The working temperature can reach 1300°C. High-temperature iron-chromium-aluminum-cobalt alloy wires are also used as electric heating elements in the high-temperature section. For electric heating elements in walking beam sintering furnaces, 0Cr25Al5 iron-chromium-aluminum wire is used in the low-temperature section, and molybdenum wire or high-temperature iron-chromium-aluminum-cobalt alloy wire or silicon carbide rods is used in the high-temperature section.

The water-cooled transformer specially developed by our company for sintering furnaces has a total capacity of 450kVA and is divided into 6 installation units, which are respectively arranged on the side of the furnace body. The height of the whole machine reaches 2 meters, which puts forward high requirements for earthquake-resistant structures. In order to ensure the temperature regulation requirements of high-temperature furnaces, the water-cooled transformer must have a large-range voltage regulation function on the primary side, which makes the development and manufacturing of water-cooled transformers very difficult. After accurate electrical parameter design calculations and scientific structural design, the product can be guaranteed on the premise of excellent electrical performance, the high-voltage coil adopts a self-cooling foil structure, the low-voltage coil adopts a water-cooled copper tube structure, and the overall coil is concentrically distributed and axially pressed, which not only reduces the height of the device but also ensures efficient heat dissipation. The products have been recognized and praised by users. In order to ensure the temperature regulation requirements of high-temperature furnaces, the water-cooled transformer must have a large-range voltage regulation function on the primary side, which makes the development and manufacturing of water-cooled transformers very difficult. Be guaranteed the excellent electrical performance, after accurate electrical parameter design calculations and scientific structural design, the high-voltage coil adopts a self-cooling foil structure, the low-voltage coil adopts a water-cooling copper tube structure, and the overall coil is concentrically distributed axially press-fitting, which not only reduces the height of the device but also ensures efficient heat dissipation. The products have been confirmed and praised by users.

■ 产品特点(Product Feature)

1. 选用进口杜邦公司N0mex-T410绝缘材料, 保证绝缘和耐温特性。铜管单螺旋裸管抛光, 保证散热和美观。高、低压线圈分别采用箔式层式和水冷铜管式结构, 低压线圈为多单元并联式分布轴向压装, 降低线圈高度、保证高效的散热。高压侧调压抽头用铜排轴向引出
2. 铁芯内置水冷换热器, 强化铁芯散热能力。采用30Q120高导磁硅钢片, 同时采用先进的多级步进多级叠片方式, 有效降低了空载损耗、空载电流和噪声。在设计、制造过程中较好地消除了变压器大电流漏磁涡流引起局部发热问题, 产品具有极高的可靠性
3. 变压器“三防漆”处理(防盐雾、防湿热、防霉菌), 装饰性、耐腐蚀性、保光性、保色性、流平性和遮盖力较好, 结构简化, 外形美观。整流变压器配温度保护装置, 用于测量、控制、保护、通讯
4. 根据水冷散热特性, 合理分配水冷管路水流量, 达到最佳冷却效果。水系统管路设计安全可靠, 主管路采用铜管路, 满足防腐要求, 出水嘴采用国际标准的密封螺纹, 有效防止渗漏。分支连接管路采用耐高温尼龙纤维与橡胶符合管路或聚四氟乙烯管路, 保证可靠的耐高温耐压耐久性
5. 整机满足IP56等级的防护要求

1. Imported DuPont N0mex-T410 insulation material is selected to ensure insulation and temperature resistance. The single spiral bare copper tube is polished to ensure heat dissipation and beauty. The high and low voltage coils adopt foil layered and water-cooled copper tube structures respectively. The low voltage coil is multi-unit parallel distributed axial press-fitting, which reduces the height of the coil and ensures efficient heat dissipation. The pressure regulating tap on the high voltage side is led out axially with a copper bar
2. The iron core has a built-in water-cooled heat exchanger to enhance the heat dissipation capacity of the iron core. It adopts 30Q120 high magnetic permeability silicon steel sheet and advanced multi-stage stepping multi-stage lamination method to effectively reduce no-load loss, no-load current and noise. During design and manufacturing, local heating problems caused by large current leakage magnetic eddy currents in the transformer have been eliminated, and the product has extremely high reliability
3. The transformer is treated with "three-proof paint" according to customer requirements (anti-salt spray, anti-humidity and heat, and anti-mold). It has good decorative properties, strong corrosion resistance, good gloss retention, good color retention, good leveling and hiding power, simplified structure and beautiful appearance. The rectifier transformer is equipped with a temperature protection device for measurement, control, protection and communication
4. According to the water-cooling heat dissipation characteristics, reasonably distribute the water flow in the water-cooling pipeline to achieve the best cooling effect. The water system pipeline design is safe and reliable. The main pipeline uses copper pipelines to meet anti-corrosion requirements. The water outlet uses international standard sealing threads to effectively prevent leakage. The branch connecting pipes are made of high-temperature resistant nylon fiber and rubber-compatible pipes or polytetrafluoroethylene pipes to ensure reliable temperature and pressure resistance and durability
5. The whole machine meets the protection requirements of IP56 level