Sintering Furnaces for Ceramic Matrix Composites (CMCs) and Metals

Oxide composites can provide an alternative to SiC/SiC composites due to lower manufacturing costs and improved thermal stability in the presence of oxygen at high temperatures. Pyrolysis and Sintering processes are used to fill the ceramic matrix in between the fibers. The sintering process of ceramic composites doesn’t require an oxygen free atmosphere, but tight temperature control and temperature uniformity inside the furnace for heating and cooling yield better results. Keith Company also builds pyrolysis furnaces (carbonization furnaces) for carbon carbon composites which requires less than 100ppm oxygen in the vessel. Sintering process are done at temperatures between 900degC [1650degF] and 1250degC [2300degF].

Powdered metal processing allows the production of products with properties that can surpass alloyed materials, and many products can be pressed and fired to yield products that are near net shape. This is achieved by mixing metal, ceramic powders, or both, with a binder. This mixture can then be pressed into the desired shapes. For larger parts, the mixture is filled into molds, as in the infiltration casting process used to manufacture Polycrystalline Diamond Composite (PDC) drill bits for deep well drilling.

The sintering process of powdered materials is conducted at elevated temperatures (usually above 1800°F) and, depending on application, in an inert, reducing, or oxidizing atmosphere. The sintering process of powdered metals is intimately related to ceramic sintering. Automated powdered metal sintering furnaces can overcome challenges such as process contamination, limited processing capabilities, reliability and operating costs. Automated systems such as a pusher furnace or kiln can sinter parts in boats while being moved through the heating system. The heating system consists of a preheat section, a heating section and cooling section. Typically, gas fired systems feature a muffle with a protective atmosphere while electric fired systems, such as a sintering furnace for semiconductor manufacturing, do not require muffles to protect the ware.

Furnaces and Kilns for sintering metals and ceramic composites

- Pusher Kilns
- Box Furnaces
- Bottom Loading Furnaces
- Shuttle Kilns / Envelope Kilns
- Atmosphere Furnaces
Contact Keith Company to order one of the kilns/furnaces mentioned or to learn more about any of our products.

Category Files:

- [AMS 2750E Article](#)
- [AMS / NADCAP Specifications](#)