



**SECO/WARWICK**

# Vacuum Sintering

## Applications

- Vacuum sintering of hard metals, cermets, rare earth (RE) magnets
- Sintering of oxide and non-oxide ceramics
- Overpressure vacuum sintering of hard metals
- Sintering in Metal Injection Molding Technology (MIM)
- Dewaxing (PEG, Paraffin oil, etc.)

## Furnace Features

- Temperature uniformity
- Wide temperature range
- Industrial computer/PLC control
- Compact design

## Process Advantages

- Wide range of applications
- Short cycle time
- Low operating cost
- Environmentally friendly

## Technology

- Sintering of hard alloys with densification pressures up to 60 bar
- Powder metallurgy of tool steels, such as HSS cutting tools and trimming dies
- Sintering of corrosion resistant steels for chemical and medical industry
- Sintering of AlNiCo materials for manufacturing of soft magnetic products
- Sintering of rare earth metals, such as Samarium/Cobalt alloys, Neodymium/Iron/Boron for production of permanent magnets
- Sintering of high alloyed materials for the aerospace industry
- Sintering of ceramics components
- Sintering at the temperatures up to 2200°C
- Control of carbon content in sintered components made from Tungsten carbide
- Outgassing of metal powder



*Dewaxing/MIM Process*



*MIM Process 900x800x1800mm*

## Furnace Advantages:

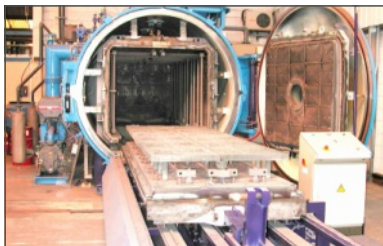
- Heating system, well proven in most advanced vacuum heat treatment an
  - curved heating elements, surrounding the load from all sides for excellent temperature uniformity with deviation less than  $\pm 3^{\circ}\text{C}$  a critical parameter for positive sintering results,
  - low surface load for longer life of the heating elements and lower maintenance costs.
- Four different types of binder removal systems, depending on the technological requirements of the end users.
- Segmented graphite muffle for easy service and lower maintenance costs.
- PLC/Industrial Computer with color touch screen for fully automatic furnace operation, process set up, data storage, exchange and transmission.
- Cooling blower powered through variable frequency drive for precise control of gas velocity, especially important during cooling of small components sintered in MIM technology.
- High reliability of pumping system with short evacuation times.
- **Standard sizes (mm):**
  - from 300x300x600 to 900x800x1800 and others.



*Dewaxing/Vacuum Sintering*



*Dewaxing/Vacuum Sintering*



*Outgassing of Powder Metal*



*Sintering of SiC  
2300°C*



*Dewaxing/Vacuum  
Sintering/Overpressure Sintering 60bar*



*Vacuum purged, retort dewaxing  
Sintering for temperatures below  
1000°C*



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