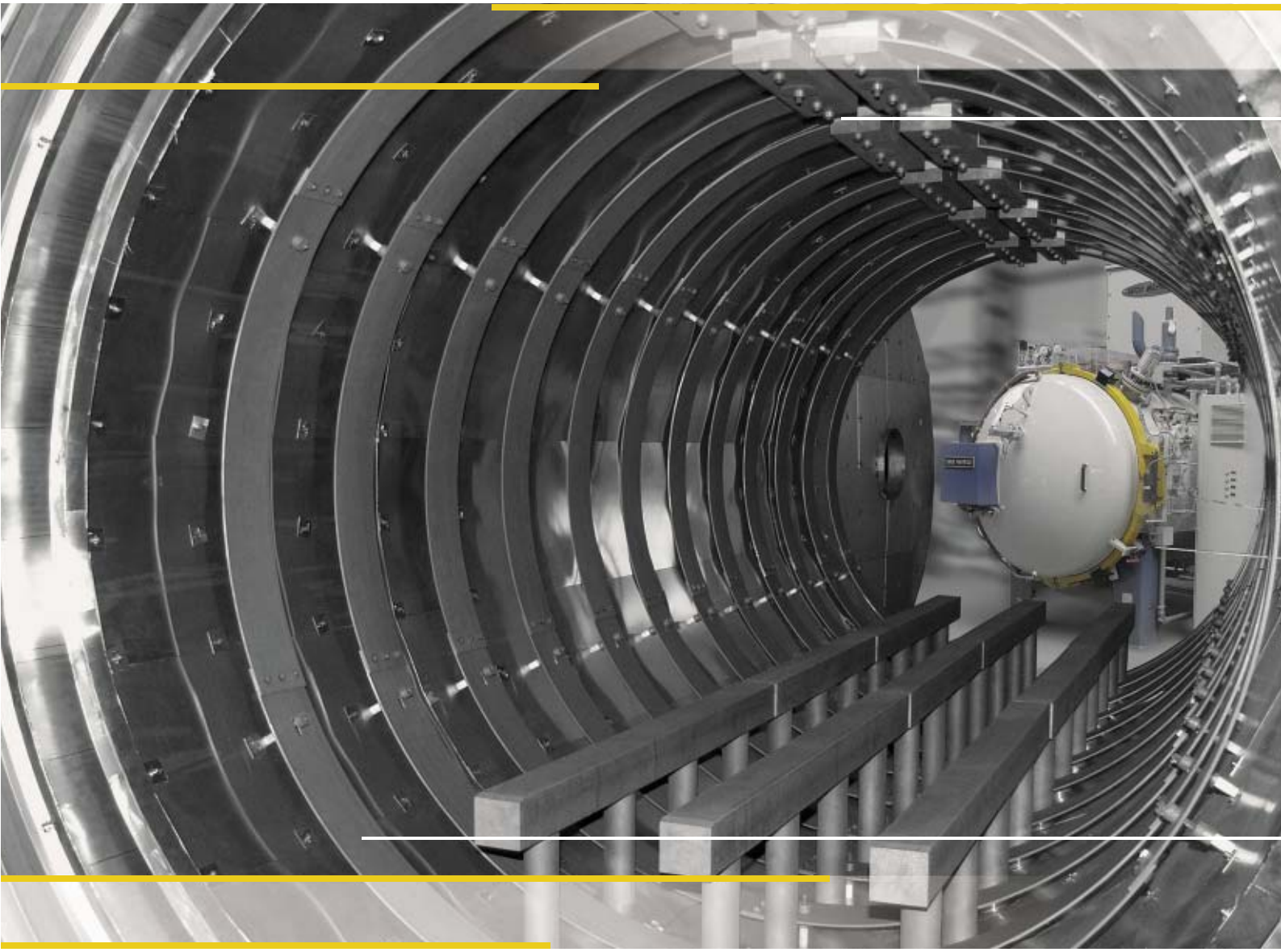
# VACUUM SINTERING

## VACUUM FURNACES



### Applications

- Dewaxing and vacuum sintering of hard metals, cermets, rare earth (RE) magnets
- Oxide and non-oxide ceramics
- Overpressure vacuum sintering of hard metals
- Metal Injection Molding (MIM)
- Outgassing

### Furnace Features

- Compact design
- Temperature uniformity
- Wide temperature range
- Industrial computer / PLC control
- Accommodates oversized loads
- Curved heating elements

### Process Advantages

- Versatile with a wide variety of application
- Short cycle time
- Low operating cost
- Environmentally friendly

# VACUUM SINTERING

## Technology

- Sintering of hard metals with densification pressure up to 100 bar;
- Powder metallurgy of tool steel, such as HSS cutting tools and trimming dies;
- Sintering of corrosion resistant steel for chemical and medical industry;
- Sintering of AlNiCo materials for manufacturing of soft magnetic products;
- Sintering of rear 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 of 1350°C, 1600°C, 2200°C;
- Adjustment of carbon content in sintered components made from WC;

## Furnace Advantages

- Heating system, well proven in most advanced vacuum heat treatment and sintering furnaces:
  - *Flat heating elements,* surrounding the load from all sides assure excellent temperature uniformity with deviation less than ± 3°, 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 user;
- 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;
- Internal cooling system, with forced gas circulation to minimize the cycle time;
- Cooling blower powered with frequency inverter for precise control of gas velocity, especially important during cooling of small components in MIM technology;
- High reliability of pumping system with short evacuation times;
- Designed for easy maintenance and service.

Standard sizes (mm)

300 x 300 x 600
400 x 400 x 600
600 x 400 x 600
600 x 600 x 900
900 x 800 x 1200
900 x 800 x 1500
900 x 800 x 1800


SiC 2300°C

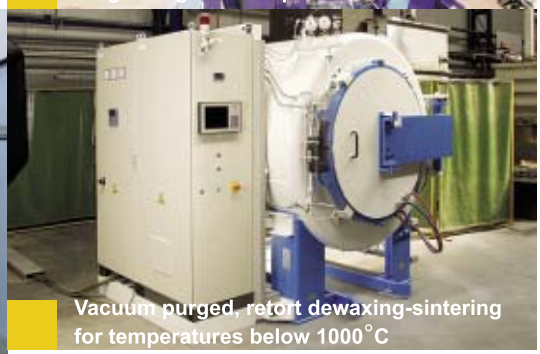

Dewaxing/Vacuum Sintering/ Overpressure sintering 60 bar


Dewaxing/MIM proces


MIM proces 900x800x1800 mm


Dewaxing/Vacuum Sintering


Outgassing of metal powders


Vacuum purged, retort dewaxing-sintering for temperatures below 1000°C

SECO/WARWICK


SECO/WARWICK (Poland) Ltd.
ul. Sobieskiego 8
66-200 Świebodzin
tel.: +48 (0) 68 3820 500
fax: +48 (0) 68 3820 555
info@secowarwick.com.pl
www.secowarwick.com.pl

SECO/WARWICK Corp.
P.O. Box 908
Meadville
Pennsylvania 16335-6908
USA
tel.: +1 814 332 8400
fax: + 1 814 724 1407
info@secowarwick.com
www.secowarwick.com

SECO/WARWICK
Moscow 117105
Varshavskoje Shosse,17
build.9
tel/fax +7 095 786 39 44
moscow@secowarwick.com.pl
www.secowarwick.com.pl

SECO/WARWICK Corp.
Beijing Representative Office
2 Fu Cheng Men Wai Avenue
Xicheng District
Vantone New World Plaza A 1107
Beijing 100037, China
tel.: +86 10 685 78891
fax: +86 10 685 78892
warwick@public.bta.net.cn