

Vacuum - Heat Treatment and Sintering Furnaces COV

COV

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COV furnaces are graphite-heated systems, designed for heat treatment in vacuum. The variety with respect to design, usable space, vacuum level and working temperature is extremely wide. As a consequence, COV furnaces can be used for numerous applications. Typical fields of application are sintering (including dewaxing), soldering, degassing, heat treatment, purification, CVD-coating, etc.

Application examples

Maximum working temperature	Applications
1,100 °C	Heat treatment, soldering, degassing, dewaxing, chemical reduction
1,350 °C	Heat treatment, soldering, degassing, dewaxing, sintering, CVD-coating
1,600 °C	Dewaxing and sintering of hardmetals, crystal growth, purification, CVD-coating
1,800 °C	Sintering of non-oxide ceramics
2,000 °C	Pyrolyze processes, degassing and purification, sintering
2,200 °C	Degassing, purification, sintering of SiC, graphitizing of composites

Characteristics

COV furnace units contain a double-walled vessel which is watercooled. The vessel can be made of mild steel or stainless steel, respectively, depending upon the process requirements. The general design can be horizontally or vertically. The number of controlled heating zones can be up to 8 (or even more). By adjusting the number and the arrangement of these control zones, an excellent temperature homogeneity can be achieved, which is in some cases better than $\pm 2^{\circ}\text{C}$.

A closed graphite box is installed in the hot zone, whenever a superior temperature homogeneity is required or if the process includes a dewaxing / debinding step.

With the possibility to flow in a large number of reactive gases, a chemical treatment of the products can be done.

For the evacuation, a large number of pumping units of different types and from all market-leading brands can be used. Depending upon the process demands, pressures from 0.1 mbar (10 Pa) down to $1 \cdot 10^{-5}$ mbar ($1 \cdot 10^{-3}$ Pa) can be achieved.

A micro processor controlled program sequence ensures a fully automatic and reproducible process and a uniform product quality. PC-operating and related data handling comply with today's demands on a responsible quality assurance.

Vacuum furnaces type COV consist of the following subassemblies: Furnace vessel, current feedthrough, heating insert, temperature measurement, cooling water distribution, vacuum pumping unit, electrical power and control system (if applicable: dewaxing unit and gas-treatment device).

The basic equipment can be extended with a variety of additions, like closed loop water recooling system, a charge loading system, bottom- or top-loading units, etc.

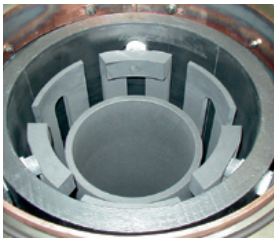
Specialities

- Maximum operating temperature 2,200°C
- Usable space from 4.5 L up to 13 m³ (even more, upon customer's request)
- Heating of the hot zone, using several independent heaters
- Excellent temperature homogeneity within the usable space down to ± 2 K
- Vacuum range down to $1 \cdot 10^{-5}$ mbar ($1 \cdot 10^{-3}$ Pa)
- Efficient dewaxing systems for molded and extruded parts
- Safe and reliable operation with inflammable gases
- Fully automatic control of the entire process
- Operation of the plant by PC including data logging and -storage

Benefits for users

- High reliability by mature technology and a world-wide market presence
- Highest product quality by excellent temperature homogeneity in vacuum and during process gas operation
- Well elaborated technical safety philosophy for the reliable and full automatic furnace operation
- Quick availability of the furnace due to a fully pre-tested and pre-adjusted furnace in the works of PVA TePla AG, incl. a heating cycle
- Lowest „Total Costs of Ownership“ due to high reliability, process reproducibility and a long lifetime
- **Rapid „Return of Invest“**

Design versions (examples):

**Furnace type:**

Usable space (Ø x H):
Usable volume:
max. Temperature:
installed heating power:

COV 131 R

Ø 150 x 250 mm
4.5 l
1,600 °C
20 kVA

**Furnace type:**

Usable space (Ø x H):
Usable volume:
max. Temperature:
installed heating power:

COV 231 R

Ø 200 x 300 mm
9.5 l
1,600 °C
25 kVA

**Furnace type:**

Usable space (WxHxL):
Usable volume:
max. Temperature:
installed heating power:

COV 633 R

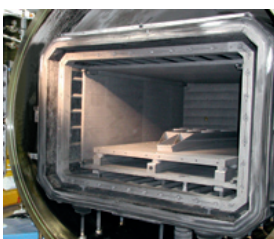
450 x 450 x 900 mm
180 l
1,600 °C
120 kVA

**Furnace type:**

Usable space (Ø x H):
Usable volume:
max. Temperature:
installed heating power:

COV 942 R

1500 x 2500 mm
4,400 l
1,800 °C
500 kVA

**Furnace type:**

Usable space (WxHxL):
Usable volume:
max. Temperature:
installed heating power:

COV 1263 R

1400 x 800 x 2000 mm
2,250 l
2,200 °C
800 kVA

PVA TePla – The Company

As a vacuum specialist for high-temperature and plasma treatment processes, PVA TePla AG is one of the world's leading plant engineering companies. Its core competencies are in the fields of hard metal sintering and crystal growing as well as the use of plasma systems for surface activation and ultra-fine cleaning.

With its systems and services, PVA TePla enables and supports the innovative manufacturing processes and developments of its customers, primarily in the semiconductor, hard metal, electrical/electronic and optical industries – as well as the energy, photovoltaic and environmental technologies of tomorrow. Corresponding to its main customer markets, PVA TePla is divided into three business divisions, Industrial Systems, Semiconductor Systems and Solar Systems.

Industrial Systems – The Division

The Industrial Systems Division of PVA TePla specializes in the development, construction and marketing of thermal plants and systems for processing top-quality materials at high temperatures.

With almost 50 years experience from more than 1,000 systems supplied worldwide, testimonials from big names in the industry and a diversified range of process plants, the Industrial Systems Division of PVA TePla AG sets technological standards that have seen it grow to become a global market leader in the provision of vacuum sintering plant for hard metals in particular.

Vacuum Systems – The Products

The core competence of PVA TePla is to build resistance and inductively heated systems for vacuum and high temperature applications and heat treatment.

Especially graphite resistance heated vacuum (COV) and pressure (COD) systems for the universal application of dewaxing, vacuum sintering and the subsequent isostatic pressing of metals, carbides, alloys and ceramics are main products of the Industrial Systems Division.

Metallic heated high-vacuum heat-treatment furnaces (MOV), designed for typical applications like vacuum brazing, degassing, sintering and cleaning are further successful products.

Inductively heated melting and casting systems (VSG) for melting of metals, alloys and special materials under high-vacuum, fine-vacuum or inert gas atmosphere and heat treatment furnaces (IOV) for sintering and carburising applications round up PVA TePla's product range of vacuum systems.