



## Vacuum Furnace Systems

Industrial Systems

# PVA TePla – The Company

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Together with its subsidiaries, PVA TePla AG is an internationally established supplier of systems and facilities for producing, treating and refining sophisticated industrial materials using:

<b>Vacuum</b>	<b>High temperature</b>	<b>Plasma</b>
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PVA TePla AG is one of the key players in the world market for crystal growing and hard metal sintering systems, as well as plasma systems used for surface activation and ultra-fine cleaning. With its systems and services, PVA TePla enables and supports the most important manufacturing processes and technological developments of industrial companies, primarily in the semiconductor, hard metal, electrical/electronic and optical industries, as well as in the forward-looking areas of energy, photovoltaic and environmental technology.



**The company is divided into three divisions**

<b>Industrial Systems</b> 	<b>Semiconductor Systems</b> 	<b>Solar Systems</b> 
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# PVA TePla - Vacuum Systems

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The Vacuum Systems business unit of PVA TePla specializes in the development, construction and marketing of thermal systems for developing, manufacturing and treating high-quality materials at high temperatures – typically in the range between 1,000°C and 2,500°C. We have over 50 years of experience from more than 1,000 systems supplied worldwide, testimonials from big names in the industry and a diversified range of process systems. The Vacuum Systems division of PVA TePla AG sets technological standards that made it a global market leader in the provision of vacuum sintering systems.

The company provides its customers with customized solutions from a single source. These range from technology development through tailor-made design and construction of production facilities right up to an after-sales service that covers all four corners of the globe. The company will use its systems to enter the latest fields of application jointly with its customers – from powder metal technology to the development of high-tech materials and surfaces.

## Melting and Casting



## Sintering – Vacuum and Pressure



## Brazing and Diffusion Bonding



## Heat Treatment and Special Equipment



# Melting and Casting

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VGS vacuum-melting and casting systems allow universal application in the inductive melting of metals, alloys and special materials under high vacuum, fine vacuum and gas atmosphere conditions. In the laboratory and in industrial production, entire blocks and molded parts are cast with maximum precision and purity.

The main areas of application include processing precious metals such as platinum, gold and silver, high purity and fine-alloy metals as well as high-precision special alloys and silicon for solar cells. In addition to melting processes such as remelting, degassing, cleaning and homogenization, VGS systems are also the right solution for precision casting, with directional solidification of high-temperature Fe-Ni-Co-based materials.



Melting process



Turbine components



Turbocharger

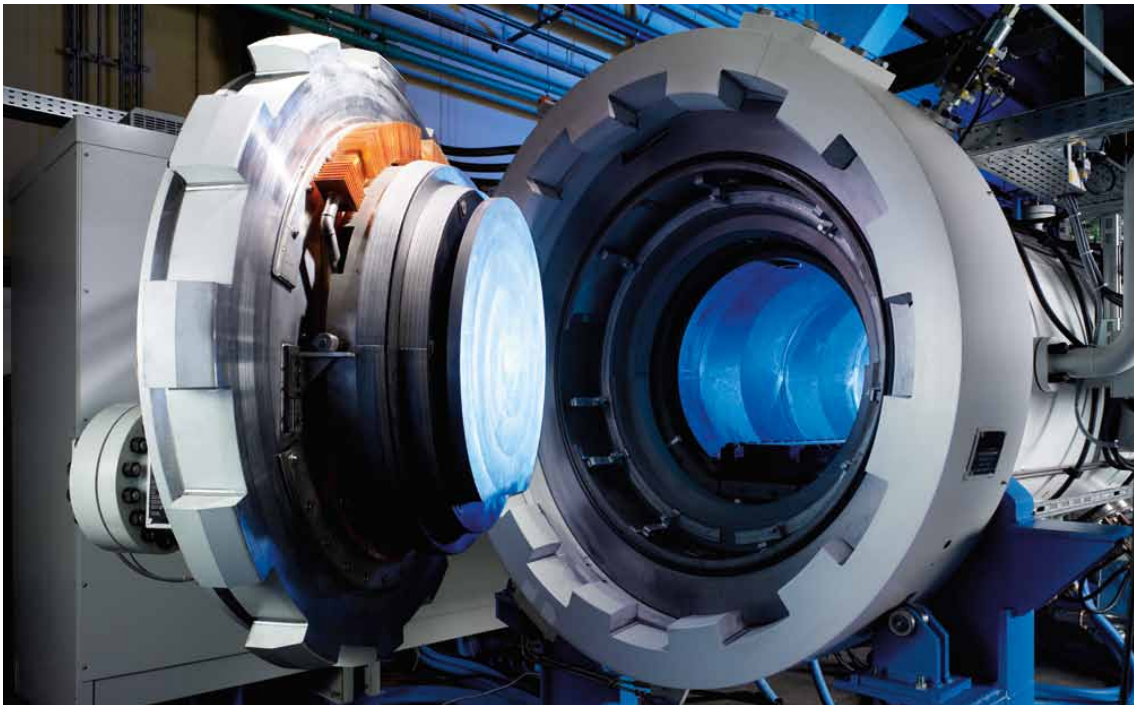


# Sintering – Vacuum and Pressure

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The vacuum (COV) and pressure (COD) systems are designed for universal application in dewaxing, vacuum sintering and the subsequent isostatic pressing of metals, carbides, alloys and ceramics, carried out under fine vacuum conditions, active gas atmosphere and gas overpressure of up to 100 bar.

The graphite resistance heated systems offer a high degree of efficiency as well as excellent temperature uniformity in vacuum and overpressure conditions. The precisely recurring processes in our vacuum and pressure sintering systems ensure the consistently high product quality for which we are renowned.



Space telescope



Hard metal cutting inserts



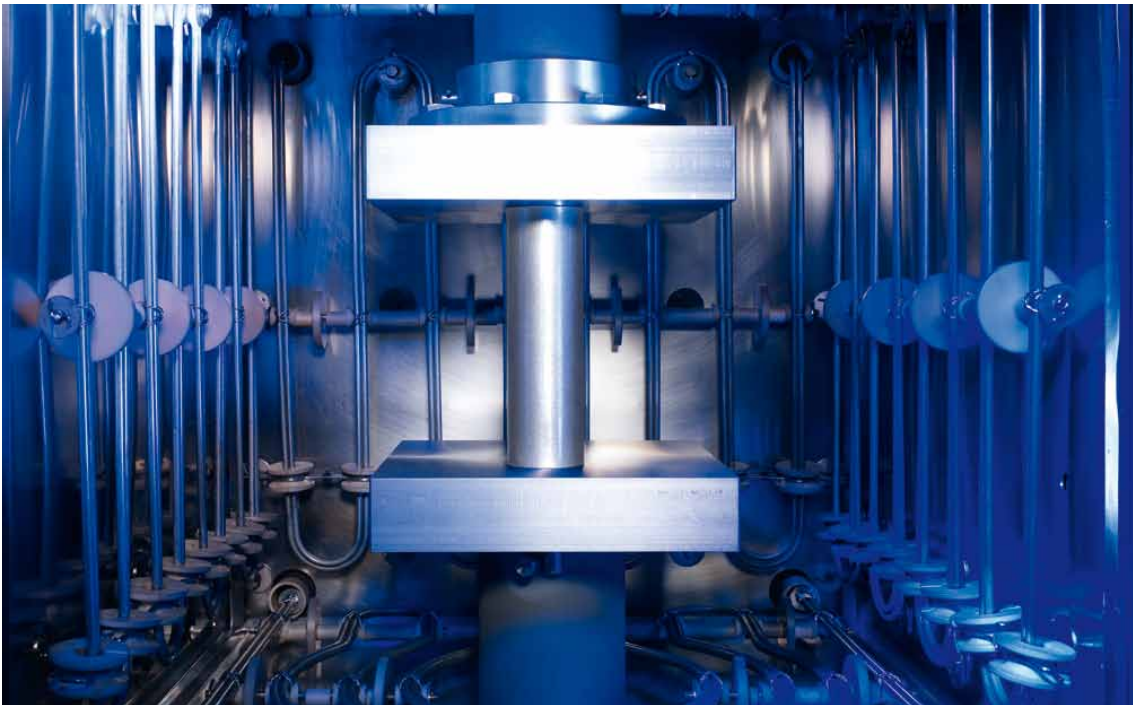
Milling head with cutting inserts

# Brazing and Diffusion Bonding

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The application of these joining technologies is often an essential part in the production of complex components. These processes enable optimum joint precision, purity and quality. While in diffusion bonding, parts are connected nearly at their melting temperature under high vacuum with a press capacity up to 1 MN, the connection by vacuum brazing is achieved by high-temperature batches. In this way, all kinds of parts made of metal, graphite and ceramics, etc. can be connected firmly. For both processes, resistance heated vacuum systems are used – graphite-heated (type COV) or metal-heated (MOV), depending on the application.

Beside excellent temperature homogeneity and a clean process atmosphere, these applications require economic efficiency, which is achieved in our furnaces by well-engineered, fast-cooling systems. In our two brazing centers, which currently have 9 brazing furnaces, the possibilities of these technologies can be demonstrated to our customers.



Vacuum switches



Heat exchangers



Micro heat exchanger

# Heat Treatment and Special Equipment

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Our vacuum systems are individually designed for a wide range of applications. Beside the processes mentioned, these include chemical reduction, carburizing, purification, annealing, degassing, coating, granulation, distillation, impregnation, drying, plasma nitriding and plasma surface treatments. Multi-crystallizing systems, type VGF, are used for the production of silicon blocks for the solar industry. Our vacuum systems are resistance-heated (type COV or MOV) or inductively heated (type IOV), operating with atmospheres in fine vacuum, high vacuum and ultra-high vacuum, inert or active gases.

The application temperatures can be up to 2,500°C. State of the art control systems meet our customers' high requirements regarding safety of systems as well as versatile and flexible application.

For research institutions such as CERN, Max Planck Institutes and JET, PVATePla supplies special components for use in fusion and basic research and related areas.



Ion source



Multicrystalline silicon ingot



CFC heater



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