SYSTHERMS

Vacuum furnaces with gas cooling/ gas quenching

Vacuum furnaces for hardening, brazing, tempering, annealing

Your application defines the furnace design

Your application defines how the furnace should look like.
For example, a cubic heating chamber is ideal for plane-parallel installed sheets, whereas a cylindrical heating chamber is more suitable for most dies and bulk material applications.
In all furnaces with gas quenching it comes to the question: How will the cooling gas flow through the batch? The answer to this usually defines your furnace design.

Achieve results faster with convection

In the vacuum furnace, the energy is applied to the component via heat radiation. However, this is only effective from approx. 500° C or more. So-called convective heating cheats the laws of physics: After initial evacuation, an inert gas is fed into the furnace as a heat transfer medium. With a furnace pressure of more than 1 bar, the heating elements now work like an immersion heater in water: The gas is heated and effectively gives off heat to the load. A fan ensures for good mixing and therefore for high temperature uniformity. From approx. 500 - 600° C, the gas is pumped off again and the process is continued in the vacuum. In this way, the heating time can be reduced by up to 30 %.

Type VWC:

Furnace with cylindrical heating chamber

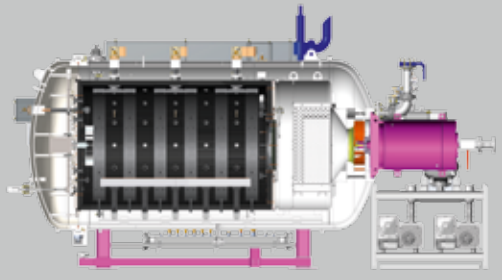
vacuum furnace type VWC

In case of the vacuum furnace with a cylindrical heating chamber, the working space consists of a graphite cylinder, in which the curved graphite band heating elements are positioned. Compared to conventional polygon segments significantly less fasteners required, which represent thermal bridges. As a result approx. 20% less energy for the heating up process is needed.

The cylindrical chamber design is of advantage when loading components whose dimensions are partially outside of the specified usable space. The cooling gas is radially applied to the load by nozzles on the cylinder wall and then fed axially towards the back to a copper heat exchanger.

Advantages of the VWC:

- Innovative design of the heating chamber
- Fast, homogenous quenching
- Variable gas flow during quenching
- Highest temperature uniformity
- Long service life of the heating elements
- Highly flexible loading
- Up to 20% less energy consumption compared to conventional design



high vacuum-brazing furnace type VWCmo

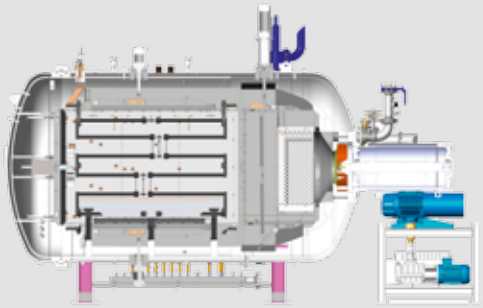
Type VWQ:

Furnace with cubic heating chamber

In the case of a vacuum furnace with a traditional cubic heating chamber, the usable space is limited by vertical and horizontal chamber walls. The heater consists of graphite heating elements. The cooling gas is supplied from the chamber floor to the chamber ceiling via slotted flaps and will be re-cooled via the copper heat exchanger. It is possible to reverse the direction of the gas flow, controlled both by temperature and by time.

Advantages of the VWQ:

- Low-distortion quenching for parts with large surfaces
- Modular design



Type VWS:

Bottom Loader Furnace

bottom loader furnace VWS

The bottom loader furnace is frequently used for round and heavy components. In principle, this furnace type is a vertically installed VWC where the load is mounted on the lowerable furnace floor. The lowered furnace floor can be moved with a motor. Therefore the batch can also be loaded and unloaded with an indoor crane. The heat exchanger is installed either above the heating chamber or in order to reduce height in a separate housing next to the furnace chamber.

Advantages of the VWS:

- Optimum treatment of large rotation-symmetric components
- Homogenous quenching with optional loading table rotation
- Space-saving design possible with external heat exchanger
- High batch weights possible

Trust is good, control is even better!

For maximum reliability, SYSTHERMS attaches great importance to measuring and actively controlling as much as possible in the furnace. With our furnaces it is possible to record further data, in addition to the usual measurement values such as vacuum, pressure and temperature, and regulate them to a certain set point. The fine adjustment of partial pressure, gas and water flow rates as well as the heating power enables you to realise your heat treatment process precisely. Specific program features allow for example the determination of maintenance intervals for the vacuum pumps and motors, leakage rates or the consumption of energy and process gases. All program parameters are logged completely.

With our ***hestia*** control system, we offer you a software tool which allows you to control, manage and document your heat treatment process without any problems. The software accepted by the aviation industry provides interfaces to various ERP systems. An integration of third-party products is also easily possible. In this way, you always remain in charge of the process.

SYSTHERMS standard furnace sizes:

	VWC 446	VWC 669	VWQ 669	VWC 9812	VWC 101015
Usable space W x H x D in mm	400 x 400 x 600	600 x 600 x 900		900 x 800 x 1200	1000 x 1000 x 1500
Alternative usable space W x H in mm	500 x 260	800 x 280	--	1200 x 100	1400 x 200
Standard load weight in kg	200	600		1200	2000
Rated temperature in °C	1300				
Heating power in kW	60	130	130	240	320
Vacuum in mbar	< 0,05 (5 · 10^{-2})				
Leak rate in mbar l/s	< 5 · 10^{-3}				
Quenching pressure in bar (abs.)	1,5 / 6 / 10 / 15				
Quenching media (gas types)	Nitrogen, argon, helium, hydrogen, …				
Space requirement incl. open switch cabinet approx. W x H x D in mm	3450 x 5150 x 2500	4200 x 6400 x 3500	4200 x 6400 x 3500	5000 x 8000 x 3900	6300 x 7900 x 4400
Net weight of the machine in kg	5000	8000	8000	12000	20000

SYSTHERMS

SYSTHERMS GmbH
Friedrich-Koenig-Str. 6
97297 Waldbüttelbrunn

Tel: +49 (0) 931 35 943-0
Fax: +49 (0) 931 35 943-20

info@systherms.de
www.systherms.de