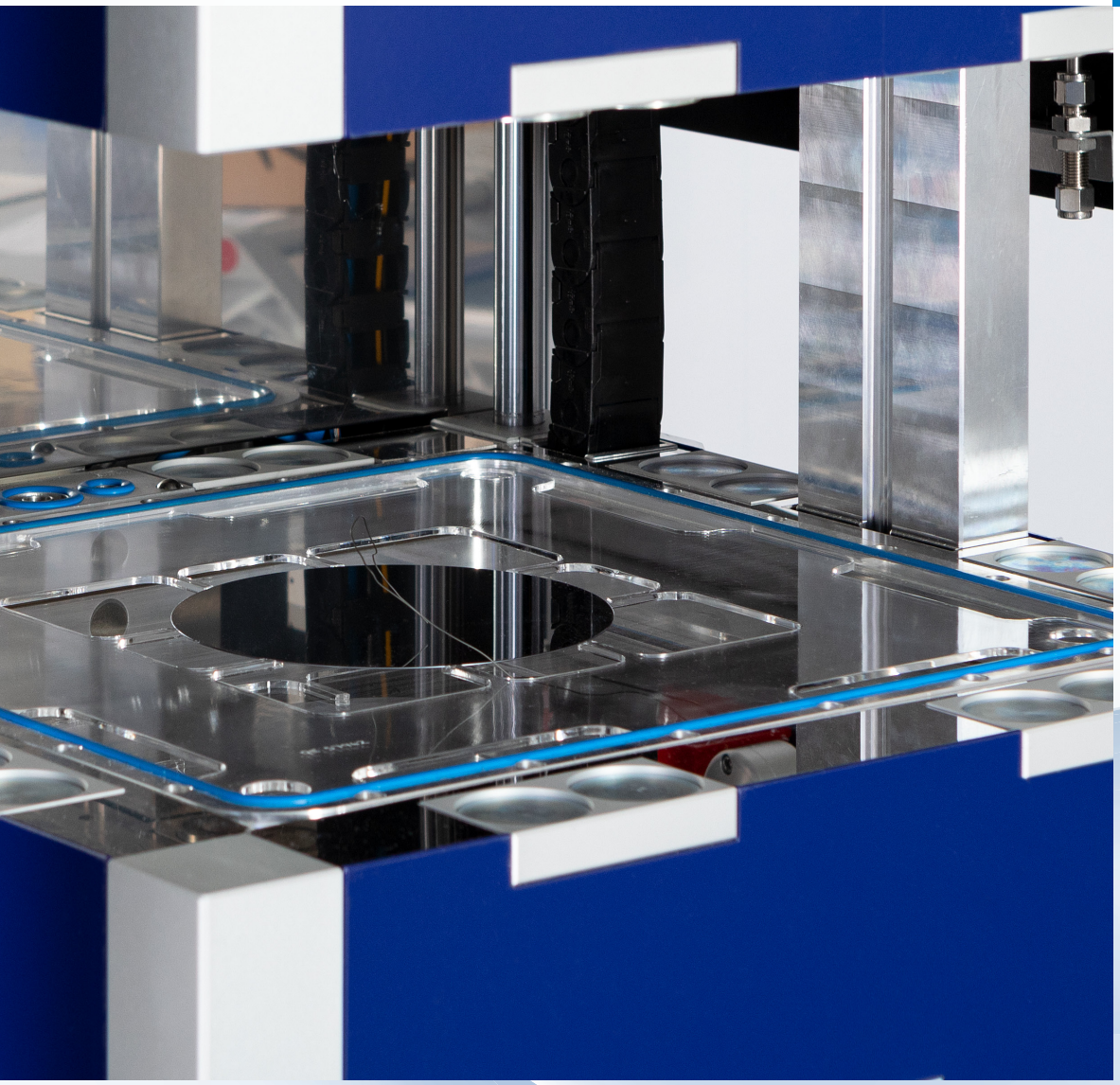
Vacuum Process Oven

New with overpressure

up to 2000 hPa (= 0,2 MPa)



VPO-300 with quartz frame holder for 200 mm wafer

VPO-300, VPO-300-HV

- For substrate size up to 300 mm x 300 mm
- Ramp up rate up to 40 K/sec.
  Ramp down rate up to 200 K/min.
- SIMATIC® controller with 7“ touch panel
- Vacuum up to 10^{-3} hPa (VPO-300-HV up to 10^{-6} hPa)
- Process gas line with Mass Flow Controller for Nitrogen
- overpressure up to 0,2 MPa
- Temperature up to 1000 °C (optional up to 1200 °C)

Application

- Implantation/Contact Annealing
  Annealing processes with or without vacuum up to 10^{-3} hPa/ 10^{-6} hPa. Easy profiling by using a SPS SIMATIC® controller with WIN based software. Perfect lab tool and also for production on a low cost base. High production output. A remote control can be adjusted and the system can easily integrated into a production line.
- RTP, RTA, RTO, RTN
- Operation with inert gases, Oxygen, Hydrogen, Forming gas
- SiAu, SiAl, SiMo Alloying
- Low k dielectrica
- Crystallization & densification
- Si-Solar Wafer Cells on glass by Si-Wafer bonding

Features

- Precise ramp up and fast ramp down rates
- Up to 4 gas lines (Mass Flow Controller)
- 3 heating zones programmable, heated by Infrared lamps
- 50 programs with 50 steps each
- Top and bottom heating (selection by Software)
- Small foot print

UNITEMP
Universal Temperature Processes

VPO-300, VPO-300-HV

- Vacuum Process Oven
- Programmable temperature profiles
- Record of process data
- Process in different gas atmospheres
- Perfect lab tool due to small dimensions and weight

The VPO-300 Vacuum Process Oven

The VPO-300 Vacuum Process Oven refers to a semiconductor manufacturing process which heats silicon wafers to high temperatures (up to 1000 °C or 1200 °C) on a timescale of several seconds or less. During cooling, however, wafer temperatures must be brought down slowly to prevent dislocations and wafer breakage due to thermal shock. Such rapid heating rates are often attained by high intensity lamps. These processes are used for a wide variety of applications in

- semiconductor manufacturing
- dopant activation
- thermal oxidation
- metal reflow and chemical
- vapor deposition

Application

The VPO-300 Vacuum Process Oven is an excellent tool for various semiconductor processes with up to 300 mm wafer or 300 mm x 300 mm substrate size. Some examples for applications: Laboratory furnace for all kind of developers implementing and researching new processes, prototype research, environmental research purposes and for small preseries or series.

Process Gases

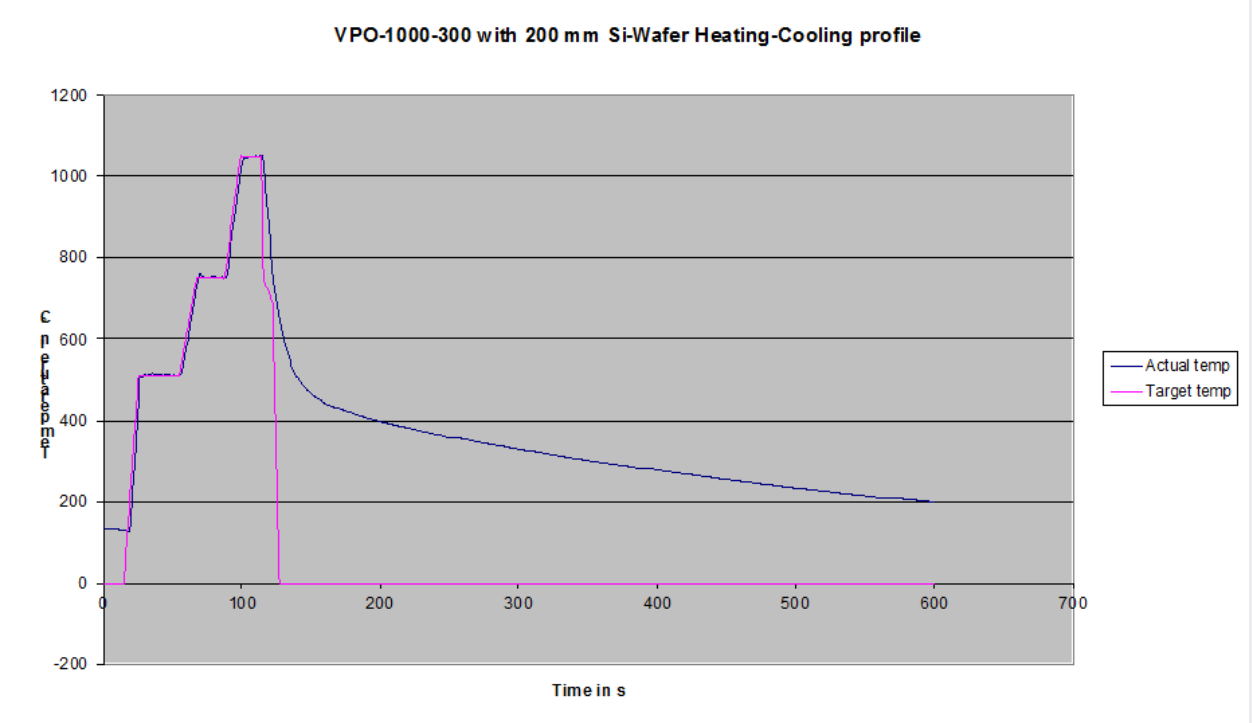
The VPO-300 can be used with standard process gases, like Nitrogen, Oxygen, Forming Gas. The chamber is sealed and can easily be cleaned.

Gas flow control

One gas line with Mass Flow Controller (MFC) for Nitrogen (5 nlm = norm liter per minute) is default, three more gas lines (Option: MFC) are possible.

Vacuum

The system is vacuum capable of up to 10^{-3} hPa (optionally up to 10^{-6} hPa).



Heating

The maximal achievable temperature is 1000 °C (optional up to 1200 °C). Key features are precisely controlled fast ramp-up (40 K/sec) and excellent ramp-down rates (depend on temperature and loading).

Temperature distribution

The VPO-300 allows an excellent temperature distribution and homogeneity. Optionally a graphite suzceptor can be inserted on the quartz bottom plate.

Programming

The VPO-300 is controlled by a SPS SIMATIC© controller. A 7" touch panel allows a very comfortable programming and control of the process. There can be saved up to 50 programs with 50 steps each (unlimited programs can be down- and uploaded from an external data storage).

Process control

The software allows the permanent monitoring, readout and analysis of

- temperature
- process gas flow
- cooling water level status
- pressure value and status

Cooling process

The hot plate is cooled with homogenous cooling from both sides by a large flow of cooling.

Others

An interlock function as well as an Emergency-OFF-Button (EMO) are default.

Special

This oven can also be integrated into a production line. The chamber open/close is realized by push button operation.

VPO-300, VPO-300-HV

VPO-300 oven integrated in a Safety Hood for pure Hydrogen application

VPO-300 Vacuum Process Oven up to 1000 °C (optionally up to 1200 °C) integrated in a hood with integrated pump and universal heat exchanger. Easy control by touch panel.

Specification

Max. part size	12" wafer or 300 mm x 300 mm
Chamber material	Aluminium chamber (chamber area: 350 mm x 350 mm) inclusive quartz glass bottom plate
Chamber height	50 mm (optional: 120 mm)
Vacuum capability	Up to 10^{-3} hPa (optional up to 10^{-6} hPa)
Temperature max.	1000 °C (for max. 10 sec) (higher temp. on request)
Temp. uniformity	≤ 1 % of set temperature (on a 200 mm wafer) (e.g. ± 3K @ 300 °C)
Heating	Bottom Heating: Infrared lamps cross aligned (18 kW) Top Heating: Infrared lamps cross aligned (18 kW)
Ramp up rate	**40 K/sec**
Ramp down rate	T = 1000 °C > 400 °C: 200 K/min, T = 400 °C > 100 °C: 30 /min
Flow Controller	One Mass Flow Controller for 5 nlm (= norm liter per minute) as default, up to 3 more Mass Flow Controllers are available as option
Controller	SIMATIC® controller, 50 programs with 50 steps each
Chamber cooling	By external water cooling system
Substrate Cooling	By Nitrogen Gas

Technical Data

Dimension oven	540 mm x 690 mm x 890 mm (W x D x H)
Weight	140 kg
Electrical connection	2 x 400/230 V, 18 kW

Options

VPO-CAB-UHE	Floor model with cabinet and integrated Universal Heat Exchanger (UHE)
VPO-MFC	Additional gas line with Mass Flow Controller (max. 3 add. gas lines)
VPO-EH	Chamber height 100 mm (instead of 50 mm) with viewing window (85 mm x 25 mm)
VPO-HT	Temperature extension up to 1200 °C
VPO-SS	Chamber made of stainless steel (VA 1.4305) polished, instead of aluminium 50 mm
VPO-GP	Graphite Plate or Susceptor 3 mm thick
VPO-LP	Lift pins for raising a single wafer
VPO-TC	Additional thermocouple to measure on device (plugged in chamber) (max. 3 pcs)
VPO-QP	Quartz glass plate for sealing the top lamp field
VPO-OP1	Overpressure up to 200 mbar, 10^{-3} hPa up to 0,02 MPa
VPO-OP2	Overpressure up to 2000 mbar, 10^{-3} hPa bis 0,2 MPa
VPO-SI	Serial interface between VPO system and external PC
VPO-RC	Remote control of top cover opening and closing (not for VPO-300-HV version)
VAC I	Basic Vacuum up to 3 hPa, Vacuum sensor, vacuum valve excl. pump (not for VPO-300-HV version)
VAC II	Comfort Vacuum up to 10^{-3} hPa, Pirani Sensor, vacuum valve, excl. pump
Hood L	Protective safety hood for use of 100 % hydrogen (excl. H2 sensor, gas box and flame -off unit) others on request

Accessories

We offer a lot of different kind of closed loop water coolers and different pumps from e.g. Pfeiffer, Edwards, Leybold, Agilent. We recommend the correct configuration for your system.

UNITEMP
Universal Temperature Processes

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