

Annealing furnace - GLO

General Information

The GLO annealing furnace features a vacuum tight retort with highly symmetric positioning of the heating elements. The heating elements are CrFeAl, also known as APM, and are embedded in the ceramic fibre insulation.

The GLO is often equipped with a vacuum pumping system to reduce the Oxygen levels prior to heat treatment. To ensure the lowest possible contamination levels, several cycles of vacuum and Nitrogen purging occur to create a pure atmosphere in the retort. Vacuum assisted cycling is far superior compared to simply flowing Nitrogen through the retort as the process creates a pure atmosphere faster and requires less Nitrogen. After Oxygen levels have been reduced, heat treatment begins under an inert atmosphere with a slight overpressure.

The highest possible temperature of the GLO annealing furnace is 1100°C for heat treatment with an atmosphere. The front door of the cylindrical retort can be heated if required. At the water cooled front door, the gas is purged inside the GLO. It is preheated by the radiation shields, which are inserted at the front. The GLO is provided with a rear port for the expulsion of any gaseous by-products generated during the process.

The GLO can be operated manually or with the use of an automated system. The furnace is available in sizes of 10 (mobile version), 40, 75, 120 and 260 litres. The retort is manufactured with temperature resistant steel alloy (1.4841). Other materials are available on request.

The annealing furnace may be operated with reactive gases such as Hydrogen, which requires appropriate safety technology. The Hydrogen safety system includes an automatic operating system with a Nitrogen flooding tank to detect and purge the system should any malfunctions be detected. All devices are SIL2 certified.

The furnaces have a compact, space saving design. The debinding package allows for debinding or pyrolysis processes to be carried out. Virtually no condensation occurs as the unit is equipped with an afterburner and heated gas outlet for strong outgassing applications.

The GLO can be equipped with a fast cooling system. The retort can be air cooled from the outside or purged with cold, inert gas.

The GLO furnace is also available in two alternative versions:

The vertical VGLO is loaded vertically and therefore provides a compact, space saving design. The mobile GLO is a transportable, space-saving version for flexible use in different applications.

Standard features

- Precisely controlled atmosphere with highest possible purity
- Sealed retort for highest vacuum possible
- Fast heat up and cool down options upon request



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- Hydrogen partial pressure operation upon request
- Afterburner
- Certified safety management for flammable and toxic gases
- Fully automatic operation or manual operation
- Data recording for quality management

Options (specify these at time of order)

- Vacuum System: pre-vacuum pump, roots pump, or turbomolecular pump
- Different software and controller options like Eurotherm 3508, Siemens, iTools, over-temperature protection or remote control available
- Reaction gas equipment for hydrogen concentrations larger than 4%
- Chiller in case no water cooling is available on-site

Technical Specifications

GLO 10/11-1G

Volume (l)	10
Tmax vacuum (°C)	600
Tmax atmospheric pressure (°C)	600 / 900 / 1100
Dimensions: External H x W x D (mm)	1800 x 850 x 1600
Transport weight	
Complete system (kg)	500
Usable space	
Ø x D (mm)	250 x 300
Thermal values	
-Delta-T between 300 and 1100°C (K) according to DIN 17052	± 5
Max. heat-up rate (K/min)	10
Cooling time (h)	4 - 5
Connecting values	
Power (kW)	14
Voltage (V)	400 (3P)
Current (A)	3 x 25
Series fuse (A)	3 x 32
Vacuum (option)	
Leakage rate - clean, cold and empty (mbar l/s)	< 5x10 ⁻³
Vacuum range depending on the pumping unit	rough, fine or high vacuum
Cooling water required	
Flow (l/min)	1-3
Max. inlet temperature (°C)	23

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Gas supply

Nitrogen or Argon flow, others on request (l/h)	200-2000
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Controller

Manual operation	Eurotherm
Automatic operation	Siemens

VGLO-TL 10/11-1G

Volume (l)	10
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Tmax vacuum (°C)	600
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Tmax atmospheric pressure (°C)	600 / 900 / 1100
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Dimensions: External H x W x D (mm)	1600 (open) x 1400 x 850
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Transport weight

Complete system (kg)	500
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Usable space

Ø x D (mm)	250 x 250
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Thermal values

-Delta-T between 300 and 1100°C (K) according to DIN 17052	± 5
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Max. heat-up rate (K/min)	10
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Cooling time (h)	4 - 5
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Connecting values

Power (kW)	14
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Voltage (V)	400 (3P)
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Current (A)	3 x 25
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Series fuse (A)	3 x 32
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Vacuum (option)

Leakage rate - clean, cold and empty (mbar l/s)	< 5x10 ⁻³
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Vacuum range depending on the pumping unit	rough, fine or high vacuum
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Cooling water required

Flow (l/min)	1-3
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Max. inlet temperature (°C)	23
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Gas supply

Nitrogen or Argon flow, others on request (l/h)	200-2000
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Controller

Manual operation	Eurotherm
Automatic operation	Siemens

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GLO 40/11-1G

Volume (l)	40
Tmax vacuum (°C)	600
Tmax atmospheric pressure (°C)	600 / 900 / 1100
Dimensions: External H x W x D (mm)	1900 x 1400 x 1800
Transport weight	
Complete system (kg)	1200
Usable space	
Ø x D (mm)	300 x 600
Thermal values	
-Delta-T between 300 and 1100°C (K) according to DIN 17052	± 3
Max. heat-up rate (K/min)	10
Cooling time (h)	7 - 9
Connecting values	
Power (kW)	25
Voltage (V)	400 (3P)
Current (A)	3 x 63
Series fuse (A)	3 x 80
Vacuum (option)	
Leakage rate - clean, cold and empty (mbar l/s)	< 5x10 ⁻³
Vacuum range depending on the pumping unit	rough, fine or high vacuum
Cooling water required	
Flow (l/min)	1-3
Max. inlet temperature (°C)	23
Gas supply	
Nitrogen or Argon flow, others on request (l/h)	200-2000
Controller	
Manual operation	Eurotherm with KP 300 panel
Automatic operation	Siemens

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GLO 75/11-1G

Volume (l)	75
Tmax vacuum (°C)	600
Tmax atmospheric pressure (°C)	600 / 900 / 1100
Dimensions: External H x W x D (mm)	2000 x 1600 x 1800
Transport weight	
Complete system (kg)	1500
Usable space	
Ø x D (mm)	400 x 600
Thermal values	
-Delta-T between 300 and 1100°C (K) according to DIN 17052	± 3
Max. heat-up rate (K/min)	10
Cooling time (h)	7 - 9
Connecting values	
Power (kW)	40
Voltage (V)	400 (3P)
Current (A)	3 x 110
Series fuse (A)	3 x 160
Vacuum (option)	
Leakage rate - clean, cold and empty (mbar l/s)	< 5x10 ⁻³
Vacuum range depending on the pumping unit	rough, fine or high vacuum
Cooling water required	
Flow (l/min)	1-3
Gas supply	
Nitrogen or Argon flow, others on request (l/h)	200-2000
Controller	
Manual operation	Eurotherm with KP 300 panel
Automatic operation	Siemens

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GLO 120/11-1G

Volume (l)	120
Tmax vacuum (°C)	600 / 750
Tmax atmospheric pressure (°C)	600 / 900 / 1100
Dimensions: External H x W x D (mm)	2100 x 1800 x 2000
Transport weight	
Complete system (kg)	2000
Usable space	
Ø x D (mm)	500 x 700
Thermal values	
-Delta-T between 300 and 1100°C (K) according to DIN 17052	± 5
Max. heat-up rate (K/min)	10
Cooling time (h)	8 - 10
Connecting values	
Power (kW)	45
Voltage (V)	400 (3P)
Current (A)	3 x 67
Series fuse (A)	3 x 80
Vacuum (option)	
Leakage rate - clean, cold and empty (mbar l/s)	< 5x10 ⁻³
Vacuum range depending on the pumping unit	rough, fine or high vacuum
Cooling water required	
Flow (l/min)	5-10
Max. inlet temperature (°C)	23
Gas supply	
Nitrogen or Argon flow, others on request (l/h)	200-3000
Controller	
Manual operation	Eurotherm with KP 300 panel
Automatic operation	Siemens

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GLO 260/11-1G

Volume (l)	260
Tmax vacuum (°C)	600 / 750
Tmax atmospheric pressure (°C)	600 / 900 / 1100
Dimensions: External H x W x D (mm)	2100 x 1800 x 2000
Transport weight	
Complete system (kg)	3000
Usable space	
Ø x D (mm)	650 x 800
Thermal values	
-Delta-T between 300 and 1100°C (K) according to DIN 17052	± 5
Max. heat-up rate (K/min)	10
Cooling time (h)	10 - 12
Connecting values	
Power (kW)	70
Voltage (V)	400 (3P)
Current (A)	3 x 110
Series fuse (A)	3 x 125
Vacuum (option)	
Leakage rate - clean, cold and empty (mbar l/s)	< 5x10 ⁻³
Vacuum range depending on the pumping unit	rough, fine or high vacuum
Cooling water required	
Flow (l/min)	10-15
Max. inlet temperature (°C)	23
Gas supply	
Nitrogen or Argon flow, others on request (l/h)	300-3000
Controller	
Manual operation	Eurotherm with KP 300 panel
Automatic operation	Siemens